Appendix 13

- **Contingency Plan Prepared for the Northwest Territories Water Board, Water Licence N7L2-0925; Lupin Operation, November 1995, revised April 1996.**

CONTINGENCY PLAN

PREPARED FOR
THE
NORTHWEST TERRITORIES WATER BOARD

WATER LICENCE N7L2-0925

ECHO BAY MINES LTD.

LUPIN OPERATIONS

CONTWOYTO LAKE, NWT

Prepared; November 1995
Revised for Approval; April 1996

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RECORD OF REVISIONS

SECTION	DESCRIPTION	DATE OF ENTRY	PAGE NO.

NOTE: After completing the revision entries and replacing the appropriate sections, the Record of Revisions should be signed by the user.

1 GENERAL

1.1 PREAMBLE

This Contingency Plan has been compiled with respect to the requirements within Water Licence N7L2-0925, Part F, Item 1 renewed on June 1, 1995. This Plan replaces the previous two plans entitled "General Contingency Plan" and Oil and Toxic Materials Spill Contingency Plan". An annual review of the Plan will take place and revisions submitted as necessary.

The Lupin Operation Contingency Plan is distributed to all applicable departments at the Lupin Mine and is incorporated within the Operation's "Emergency Procedures Manual".

This Contingency Plan will supersede previous plans upon approval by the N.W.T. Water Board.

The Guidelines For Contingency Planning, Northwest Territories Water Board, 1987, has been utilized as the guide to the requirements of the manual. The Plan has been expanded beyond these guidelines where possible.

Additional copies of this plan may be obtained by writing to:

Echo Bay Mines Ltd.
Lupin Operation
Lupin, NT
X0E 1M0
Attn: Mr. J. McCrank, General Manager or
Mr. D. Hohnstein, Manager Environmental Affairs, Lupin

or by contacting the above directly at (403) 890-7000

1.2 PURPOSE

This Contingency Manual is designed to provide the necessary background information and plans of action in the event of a failure at the facility or an incident within the Lupin Mine Operations resulting in a spill of fuel, oil, reagents or tailings. It is intended to outline the means for responding to failures and material spills within these systems in a way that will minimize potential health hazards, environmental damage and clean up costs.

The objectives of the Plan are to:

- Define the reporting procedures and communication network to be used in the event of a system failure or material spill.
- Define procedures for containment and clean up/disposal of a system failure or material spill.
- Define specific individuals and their responsibilities.

The Transportation Department of Echo Bay Mines Ltd, responsible for Winter Road Operations, has an Emergency Response Plan for winter road personnel and the transportation of supplies via the winter road. A copy is available on site for reference in the event that the assistance of Lupin personnel is requested for a winter road emergency. The site manual will not cover the response action plans for winter road transportation.

1.3 POLICY

Environmental Policy

Echo Bay Mines Ltd. is committed to good stewardship in the protection of the environment during its conduct of business.

As a member of the Mining Association of Canada, Echo Bay Mines Ltd. supports the MAC Environmental Policy which addresses all aspects of Environmental Management, Risk Management, Communications, Research, Technology Transfer, Closure priorities and Continual Improvement of Environmental Performance. As well, Echo Bay Mines subscribes to the principles of the Gold Institute (USA) and has incorporated aspects of both into its recently approved Environmental Policy. For reference, a copy of the Environmental Policy is attached in Appendix II.

2.0 Reporting Procedures

2.1 Initial Reporting/Action

Upon encountering a failure within any of the disposal systems or a petroleum/ chemical spill, every Echo Bay Mines employee/contractor is responsible for **immediately reporting** the situation to their supervisor, or if unavailable, report directly to the General Manager. A telephone listing of department management is included in the Appendix.

An assessment of the spill/potential spill should be made regarding risk to personnel safety and the environment, cessation, control and containment. If you are **SURE** it is safe to do so, attempt control. Otherwise, after reporting the incident to a supervisor, you should **REMAIN CLEAR** and prevent others from accidentally entering the area.

2.2 Internal Reporting

Once the incident has been reported to the supervisor and an assessment has been made, the spill reporting will be handled as an incident through the Loss Control Department and its accident/incident investigations. Upon proper notification of the personel in the "Response Team Flowsheet" (Fig.1), remedial action can commence in accordance with the corresponding response plan. The immediate reporting of the spill to the **N.W.T. Spill Line** will be carried out by the Environmental Manager, Environmental Technologist or if unavailable, the appropriate Department Head or designate.

2.3 External Reporting

The General Manager (or designate), upon receiving a report, will follow through with the "Response Team Flowsheet" (Fig. 1) and its first line of authority.

The Response Team shall then:

- Proceed to the failure/spill location and assess the situation;
- DO NOT TAKE ANY UNNECESSARY RISKS
- make arrangements for first-aid and removal of injured personnel;
- co-ordinate equipment support and mobilize to location;
- liaison with Emergency Response personnel regarding containment, clean up and disposal procedures.
- when an unauthorized discharge of waste occurs or ***where there is a reasonable likelihood of a spill***, REGARDLESS OF QUANTITY, fill out as complete as possible, a formal Spill Report Form (Fig. 2 and Appendix) and contact the **24 HOUR SPILL REPORT LINE immediately at (403) 920-8130**, giving notification of the spill.
- retain the original and deliver one copy to:
    - General Manager (Lupin) - Attention J. McCrank
    - Technical Services Superintendent (Lupin)
    - Loss Control Superintendent (Lupin)
    - Mill Superintendent (Lupin)
    - Plant Superintendent (Lupin)
    - Mgr Env Affairs - Attention D. Hohnstein
- The Manager Environmental Affairs or designate shall complete a **Detailed Spill Report** and submit no later than 30 days after the initial report of the spill. Submit to:

    Regional Manager
    Water Resources Division
    Northern Affairs Program
    Indian and Northern Affairs Canada
    P.O. Box 1500
    Yellowknife, NWT
    X1A 2R3

Several Government departments are available with expert advice to assist in decision making where there are environmental concerns. A telephone listing of these departments is also included in the Appendix.

Where there is a concern for the general health and safety of the public, every effort should be made to contact local communities and hunters and trappers associations. See the Appendix for current contacts and phone numbers.

RESPONSE TEAM FLOWSHEET
FIGURE 1

Northwest Territories

N.W.T. SPILL REPORT (Oil, Gas, Hazardous Chemicals or other Materials)

[illegible]

24-Hour Report Line

[illegible]

Phone/[illegible] (403) 920-8130

Fax/[illegible] (403) 873-6924

A Report date and time [illegible]	**B** Date and time of spill (if known) [illegible]	**C.** Original report [illegible] Update no. ____ [illegible] Spill number [illegible]

D Location and map coordinates (if known) and direction (if moving) [illegible]

E Party responsible for spill [illegible]

F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible) [illegible]

G Cause of spill [illegible]

H Is spill terminated? [illegible] __ yes/[illegible] __ no/[illegible]	**I** If spill is continuing, give estimated rate [illegible]	**J** Is further spillage possible? [illegible] __ yes/[illegible] __ no/[illegible]	**K** Extent of contaminated area (in square metres if possible) [illegible]

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.) [illegible]	**M** Containment (natural depression, dykes, etc.) [illegible]

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials [illegible]

O Do you require assistance? [illegible] __ no __ yes, describe:	**P** Possible hazards to persons, property, or environment: eg: fire, drinking water, fish or wildlife [illegible]

Q Comments and/or recommendations [illegible]

FOR SPILL LINE USE ONLY [illegible]

Lead Agency [illegible]

Spill significance [illegible]

Lead Agency contact and time [illegible]

Is this file now closed? [illegible]

Reported by [illegible]	Position, Employer, Location [illegible]	Telephone [illegible]
Reported to [illegible]	Position, Employer, Location [illegible]	Telephone [illegible]

NWT 1752/0593

FIGURE 2; SPILL REPORT FORM

2.4 Response Team Organization

The response team organization has been summarized in the Response Team Flow Sheet (Figure 1). Within this team there are key personnel which will respond to all spills and assist in the implementation and coordination of the respective response plans. The titles and roles of these individuals include, but are not limited to those outlined below. Due to the rotational schedule of many individuals, there is the possibility of one or more being off site at any one time. The alternate person(s) resposible for the specific role will be the designate identified below.

General Manager

Through the Company's Policies and the Emergency Procedures Manual, ensure that the Plan is properly distributed to those personnel most likely to encounter a spill or unauthorized release during normal operations.

Ensure that all personnel are adequately trained in the safe working procedures and have access to the proper personal protection for handling hazardous material spills **PRIOR TO** an incident occurring.

Ensure that all equipment is properly designed and maintained, and is available for an emergency situation to minimize the risk during response.

Media Relations

ALTERNATE; Chief Mine Engineer, Chief Geologist or other as designated from time to time.

Environmental Manager

Evaluating the initial report and assessing the magnitude/potential impacts of the incident.

Provide direction and technical advice on the containment, clean-up and disposal procedures activated through the Plan.

Liaison with Company Management and Government Agencies.

Submit the spill report via the 24 hour Emergency Spill Line and follow-up with the formal written "Detailed Spill Report".

Media Relations

ALTERNATE; Environmental Technologist, in the absence of environmental staff, spill reporting shall be the responsibility of the respective Department Head (or alternate).

Loss Control Superintendent

Provide technical support and advice on personnel safety during control and clean-up operations. Ensure all safety practices are in place and that the activity is performed according to standard safety procedures.

Ensure through regular training programs that all personnel involved in the response are capable of dealing with the identified spills as provided in the contingency manual.

In the event of a petroleum spill, mobilize the Fire Crew to stand-by as there may also be a need for controlled burning.

ALTERNATE; In the absence of the Loss Control Superintendent, the Loss Control Coordinator (or designate) shall assume the responsibilities.

Mill Superintendent

Responsible for ensuring that adequate precautions are taken during normal operations in association will the mill, tailings line and Tailings Containment Area.

In the event of an emergency with the tailings line or the impoundment, will be responsible for immediate shutdown of process plant operations in a manner that will minimize further risk to health and the environment.

Provide the availability of maintenance personnel, if so required, for the termination of a spill/release and repair of faulty equipment.

Provide technical support to personnel involved with the incident response.

ALTERNATE; In the absence of the Mill Superintendent, the Process Control Engineer (or designate) shall assume the responsibilities.

Surface Foreman/Leadhand

Provide all necessary personnel and equipment to contain, mitigate and clean-up the spill as required.

If additional supplies are required, initiate the relocation of the "Emergency Spill Response Trailer" to the spill location for immediate access.

ALTERNATE; a leadhand may be designated during periods where the Surface Foreman and Leadhand are off-site at the same time.

Environmental Technologist

Provide technical advice on matters relating to the spill and the collection of samples for subsequent analysis.

Monitoring and follow-up where required regarding the effectiveness of the clean-up and any additional recommendations.

Follow-up internally with the Loss Control Department and its accident/incident investigation with regard to cause and prevention.

ALTERNATE; Assay lab personnel are available for collection and preservation of samples in the event environmental staff are off-site.

2.5 Response Team Role

Following consultation between the Mine Manager, Surface Foreman and the Mill Superintendent or their designates; The role of the Team(s) upon arrival at a component failure, petroleum or chemical spill are as follows:

a) assemble the necessary personnel and equipment required to contain the spill;

b) proceed to the scene with the Response Team and co-ordinate the overall containment/clean up and/or repairs;

c) assess the possibilities of any danger to life, property or equipment;

d) determine if any product is escaping;

e) take necessary action required to stop/reduce/contain any further product from escaping;

f) attempt to determine the extent of the damage and if it extends beyond an original containment area;

g) if contained within a berm (fuel/oil), pump out that which is recoverable, then remove and replace the soil within the berm (contaminated soil to be removed to the disposal site and burned);

h) if outside the berm (fuel/oil) attempt to determine whether the cause is from overflow or a damaged berm/liner. Should the cause be a damaged liner, repair or replace it;

i) determine whether it would be safe to burn off the spilled fuel or would the surrounding soil have to be removed to a disposal area and burned. Any burning requires prior approval from regulatory authorities.

j) if chemical, determine extent of spill, whether any material is still escaping and containment necessary.

k) all contaminated materials are to be removed and disposed of according to individual response plans, or as directed by appropriate regulatory personnel.

3.0 Site Information

3.1 General

The Lupin Minesite is located on the western shore of Contwoyto Lake, in the Northwest Territories, approximately 400 kilometres northeast of Yellowknife and 80 kilometres south of the Arctic Circle. The coordinates are 65° 46' Latitude and 111° 14' Longitude (see Figure 3).

The Lupin site is completely self-contained with the exception of the transportation requirements for materials/supplies and workforce mobilization. There are two main areas; the residential complex consisting of accommodations, kitchen, and recreation centre, and the industrial complex comprised of milling and maintenance areas, headframe, hoistroom, powerhouse, warehouse and office facilities.

During the winter months the Lupin Operation is serviced by an ice road from Yellowknife. With an operating window of approximately 12 weeks, the winter road facilitates the re-supply of Lupin with reagents, grinding media and fuel for the following year of operation.

The attached map (Appendix) shows the general site plan and Figures 5 and 10 show a more detailed location of sewage and tailings disposal areas.

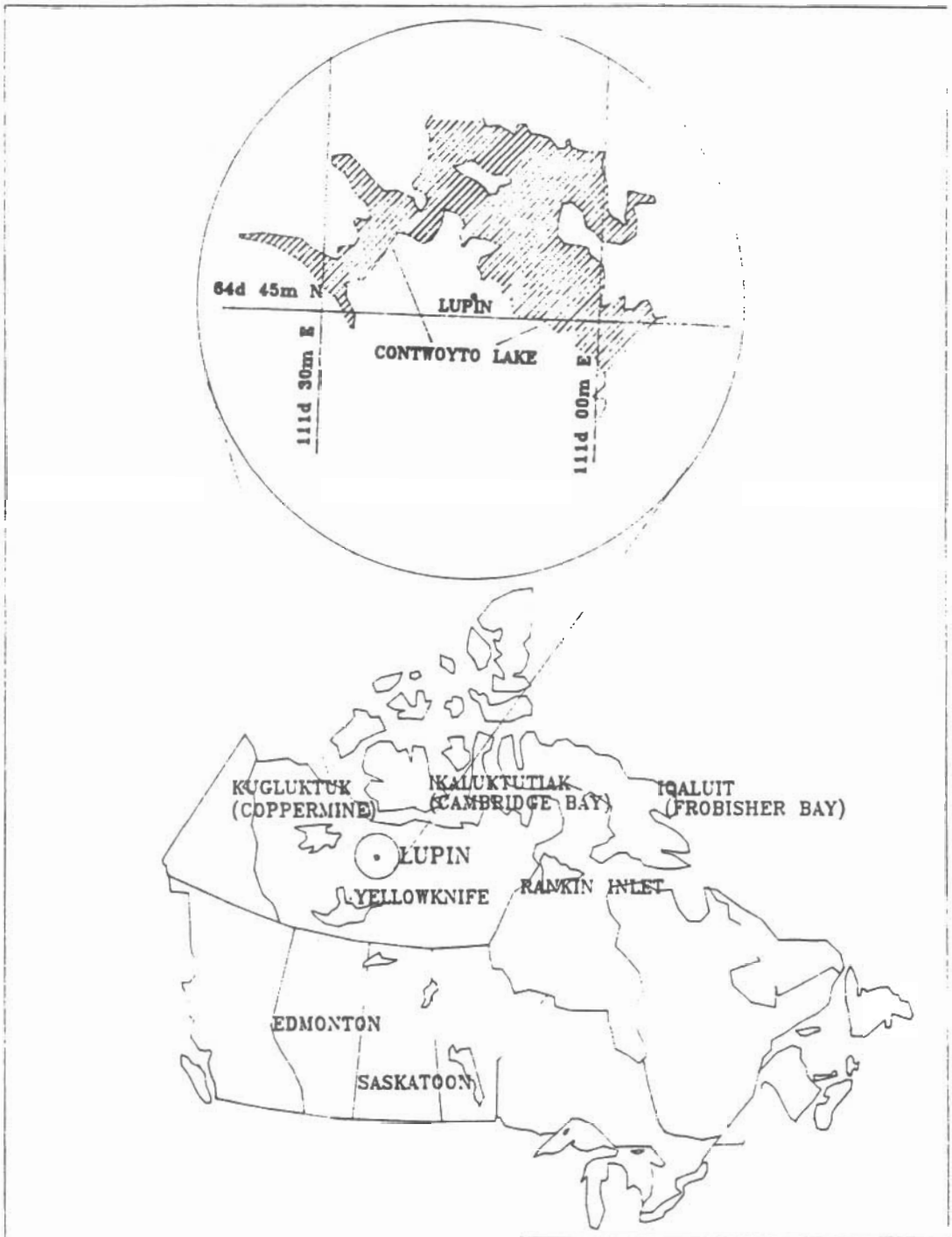
3.2 Site Components (Operations)

The site components consisting of facilities for handling tailings transport, storage, paste backfill, sewage handling, mine water disposal and freshwater supply are described below.

3.2.1 Mill Tailings Handling

Mill production commenced in 1982 and is presently maintained at 1900 mt/day with a tailings volume discharge of approximately 3500 m^3/day of slurry. In the fourth quarter of 1994, the Paste Backfill system was put into operation, supplying underground operations with a backfill material consisting of dewatered tailings, cement, aggregate and water. This was initiated to improve ground conditions, and provide a basis for new mining methods to reduce dilution and improve production. When this system is operating, approximately 75% of the tailings solids generated from the mill would report underground. Solutions and approximately 25% solids are transported to the Tailings Containment Area for storage.

The tailings slurry is transported approximately six (6) kilometres via an eight (8) inch insulated pipeline to the tailings impoundment area. The total area of approximately 750 hectares consists of five solids retention cells and two liquid holding ponds. The location of the actual tailings deposition point is changed on a regular basis to minimize solids/liquid build up due to freezing.



ECHO BAY MINES LTD.
LUPIN N.W.T.

LOCATION MAP

Fig. 3

The liquid holding ponds (No. 1 and 2) are operated in series and are separated by a constructed dam (J-Dam). Lined perimeter dams contain the liquid in the second pond, which is discharged via syphons annually in July. (FIGURE 4 shows a typical dam construction).

3.2.2 Sewage

All camp wastes are discharged to the two (2) cell "sewage lakes" system for storage, via a six (6) inch insulated pipeline of approximately 500m in length.

A constructed dam divides the system in two, and a second dam with a control structure contains the second lake. The two (2) lakes are operated in series. Discharge to the environment, from the second lake, takes place annually between June and October. See Figure 5 for details.

3.2.3 Paste Backfill

The Paste Backfill system was introduced to the Lupin Operation in the fourth quarter of 1994. After completion of a number of test stopes underground and assessment, the system was fully operational in 1995.

In general, the paste is a high density mixture of water and fine solid particles (tailings) with a low moisture content, typically between 10% and 25%. Cement is usually added in various quantities (3-6%) for strengthening properties. The material is then pumped through high pressure pipeline to the active stopes or to inactive upper mine voids.

Piping to the underground system is located through the main building complex where practical. A short distance of pipeline is also located outside the building to access the surface opening for backfill. Under normal operations approximately 75% of the tailings solids are pumped underground at a 50% operational availability.

3.2.4 Minewater

The Lupin mine is located geographically in an area of continuous permafrost resulting in frozen ground to a depth of approximately 350 metres. Due to this feature, there is very little ground water that requires handling from the underground workings.

The day to day underground operations do however require a water supply from surface. Recycling of water occurs throughout the mine, however some water is pumped to surface for handling either through the mill to report to the Tailings Containment Area, or directly to the Sewage Lakes system (See also Figure 5) via a six inch insulated pipeline.

3.2.5 Water Source/Supply

All process and camp water is obtained from Contwoyto Lake, supplied to the site via an eight (8) inch insulated pipeline (Figure 6). A maximum quantity of 1,700,000 m^3/year can be withdrawn for all uses.

3.3 Storage Facilities (Consumable)

All consumables, where practical, are transported to the site via winter road and stored for use during the next operational year. The items of concern here are the petroleum products and chemicals/reagents that are stored in large quantity in above ground facilities. These may contribute some risk with regard to the protection of water quality within the mine site area.

3.3.1 Petroleum Products

All bulk storage for petroleum products at the mine has been provided with secondary containment in the form of properly constructed facilities incorporating an impermeable liner and berm. The impoundment volume of each facility is sufficient to accommodate 110% volume of the largest single tank volume that is contained.

The products that are located at the site include, in order of quantity; P40 fuel, P50 fuel, Jet A, W30 lube oil, Ralube and Gasoline.

Please refer to Figure 7 for general location of all storage facilities and Table No.2 in the Appendix for a summary of the products on site, their amounts, storage units and location of the storage facility.

3.3.2 Chemical Products

The major chemical products used at the mine and mill (in order of amount) consist of anfo, cyanide, lime, lead nitrate, flocculant, ferric sulphate, zinc dust and Lomex II. Where possible, the reagents are ordered in bulk containers to decrease handling, reduce costs and minimize risk associated with spillage.

There are numerous other chemicals/reagents that are used on a regular basis at Lupin. Due to the small quantities involved, they are not considered within this document under the detailed response plans. They are however, tracked through the Loss Control Department with regard to incidents, and information is available through the WHMIS system and MSDS stations on all aspects of health, safety and environmental risk associated with the products.

A product listing is provided in Appendix II for general information. These products may not currently be on site as order quantity was minimal and use short term. The MSD sheets are available for all products, however due to the quantity, those discussed within this plan are included within the Appendix II.

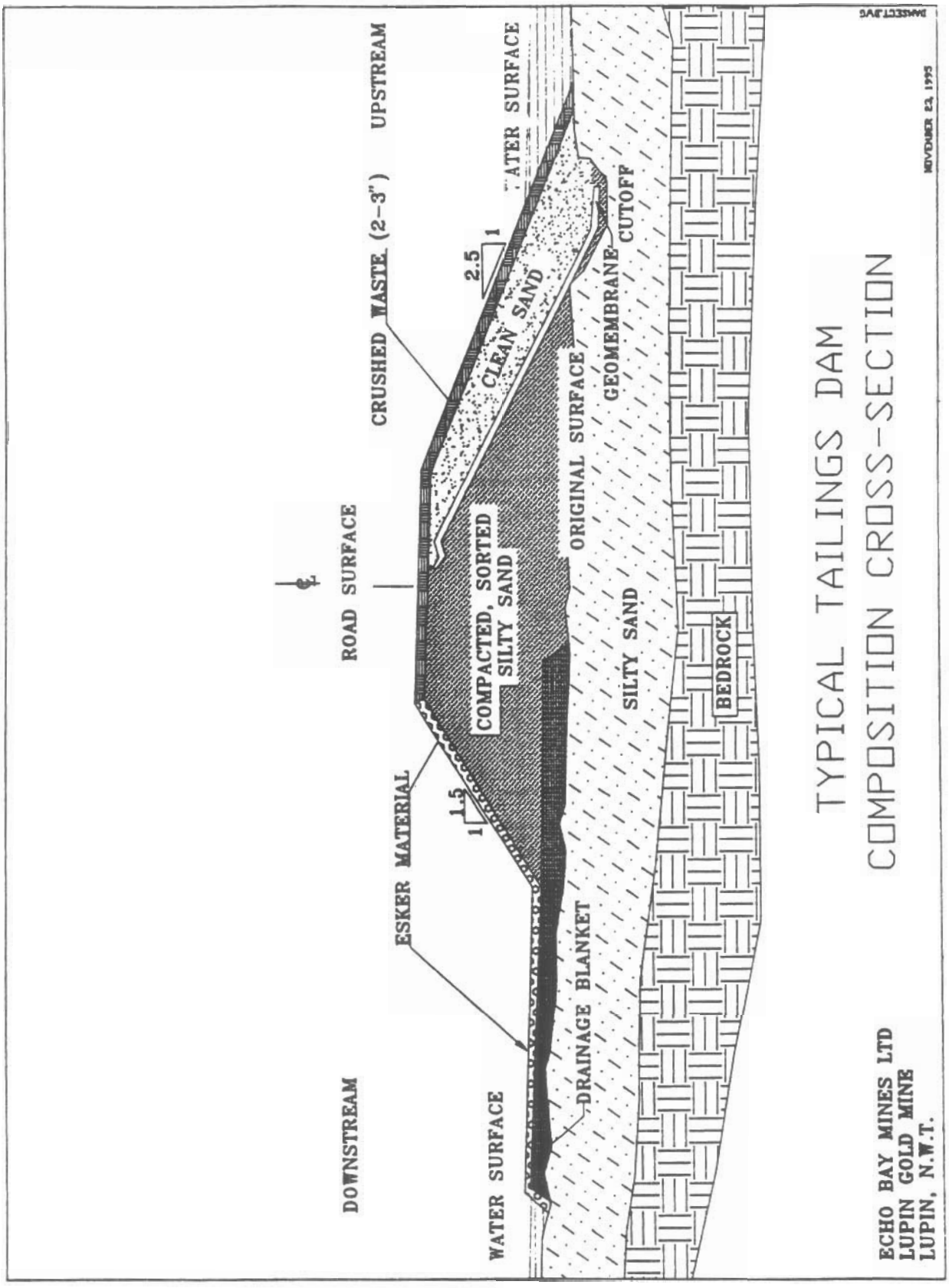

TYPICAL TAILINGS DAM
COMPOSITION CROSS-SECTION
ECHO BAY MINES LTD
LUPIN GOLD MINE
LUPIN, N.W.T.
NOVEMBER 23, 1993
DOWNSTREAM
UPSTREAM
ROAD SURFACE
CRUSHED WASTE (2-3")
CLEAN SAND
COMPACTED, SORTED SILTY SAND
ESKER MATERIAL
DRAINAGE BLANKET
WATER SURFACE
ORIGINAL SURFACE
GEOMEMBRANE CUTOFF
SILTY SAND
BEDROCK
2.5
1
1.5
1

FIGURE 4

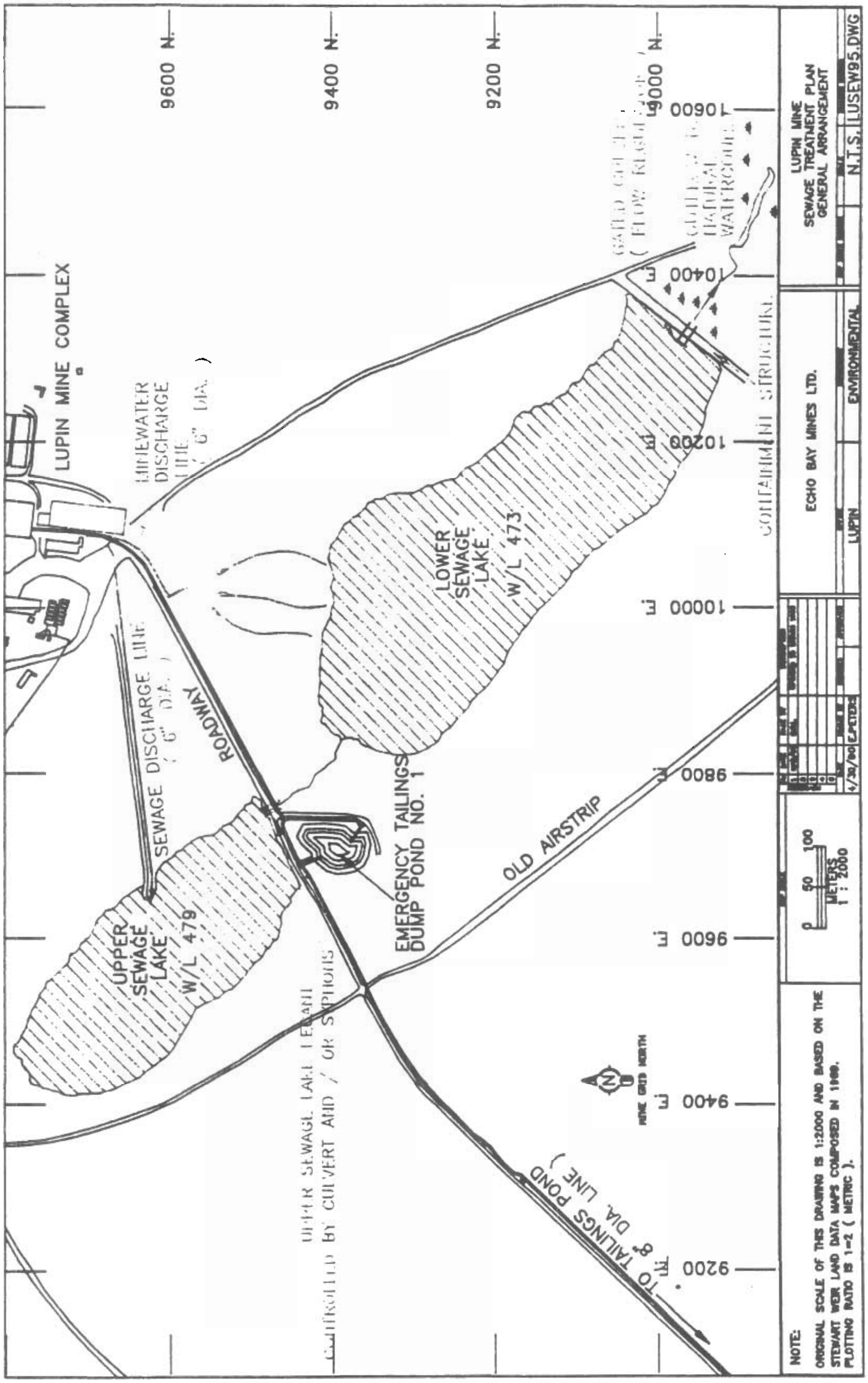

LUPIN MINE COMPLEX
MINEWATER DISCHARGE LINE (6" DIA.)
SEWAGE DISCHARGE LINE (6" DIA.)
ROADWAY
UPPER SEWAGE LAKE W/L 479
LOWER SEWAGE LAKE W/L 473
EMERGENCY TAILINGS DUMP POND NO. 1
OLD AIRSTRIP
CONTAINMENT STRUCTURE
TO TAILINGS POND (8" DIA. LINE)
9600 N.
9400 N.
9200 N.
9000 N.
10600 E.
10400 E.
10200 E.
10000 E.
9800 E.
9600 E.
9400 E.
9200 E.
MINE GRID NORTH
NOTE:
ORIGINAL SCALE OF THIS DRAWING IS 1:2000 AND BASED ON THE STEWART WEIR LAND DATA MAPS COMPOSED IN 1989. PLOTTING RATIO IS 1=2 (METRIC).
0 50 100
METERS 1 : 2000
ECHO BAY MINES LTD.
LUPIN
ENVIRONMENTAL
LUPIN MINE
SEWAGE TREATMENT PLAN
GENERAL ARRANGEMENT
N.T.S.
LUSEW95.DWG

FIGURE 5

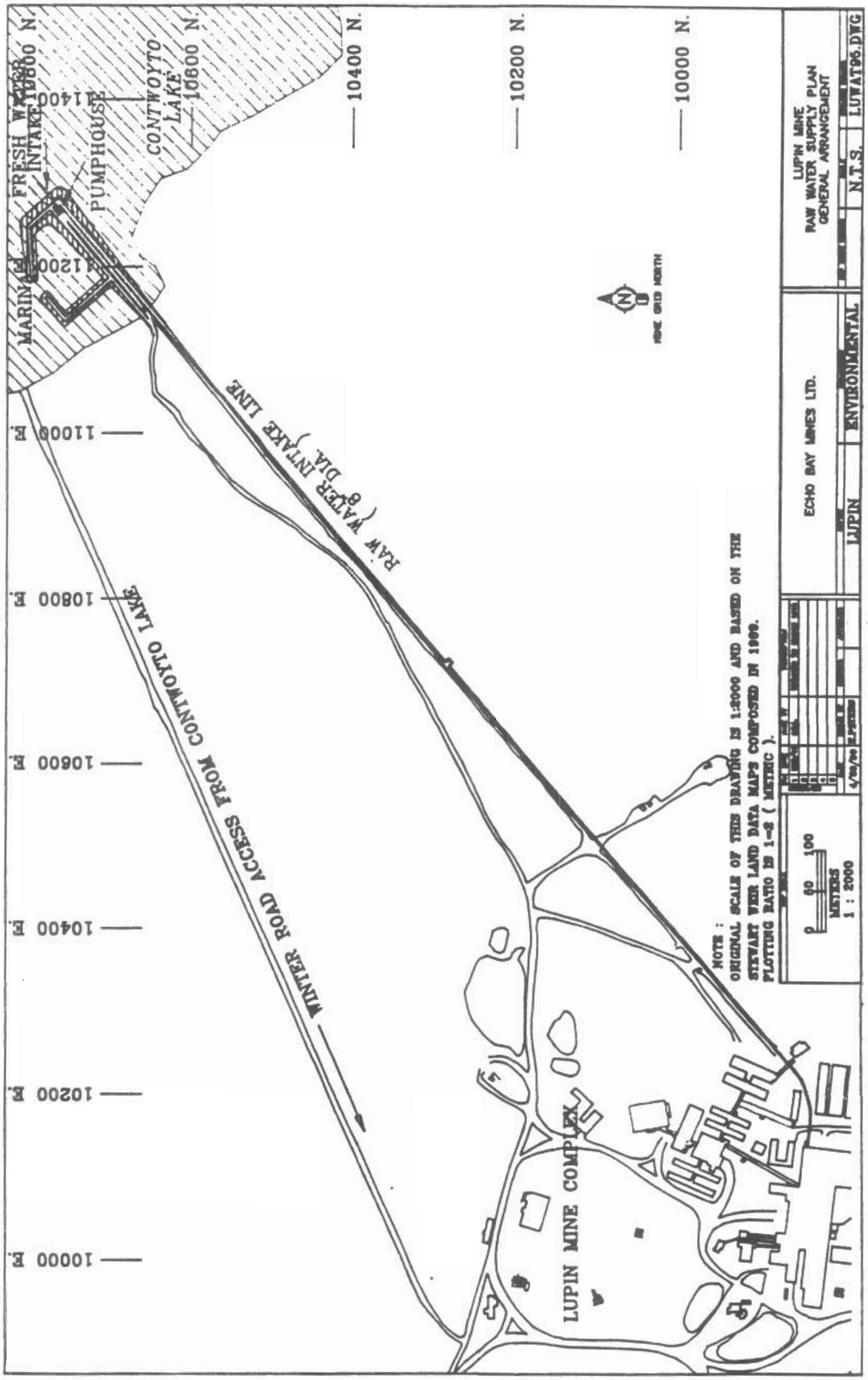

CONTWOYTO LAKE
PUMPHOUSE
FRESH WATER INTAKE
MARINA
RAW WATER INTAKE LINE (8" DIA.)
WINTER ROAD ACCESS FROM CONTWOYTO LAKE
LUPIN MINE COMPLEX
10400 N.
10200 N.
10000 N.
10600 N.
11000 E.
10800 E.
10600 E.
10400 E.
10200 E.
10000 E.
MINE GRID NORTH
NOTE :
ORIGINAL SCALE OF THIS DRAWING IS 1:2000 AND BASED ON THE STEWART WEIR LAND DATA MAPS COMPOSED IN 1989.
PLOTTING RATIO IS 1=2 (METRIC).
METERS
1 : 2000
ECHO BAY MINES LTD.
LUPIN
ENVIRONMENTAL
LUPIN MINE
RAW WATER SUPPLY PLAN
GENERAL ARRANGEMENT
N.T.S.
LUWAT96.DWG

FIGURE 6

3.4 Receiving Environment

The Lupin mine is located in the barren land tundra of the Northwest Territories. Typical surrounding terrain is that of glacial till overburden and a thin organic layer with a generous amount of low-lying vegetation. Bedrock outcrops and areas of frost shattering exist along with boulder fields. Due to the isolated location of the mine and air access only (with the exception of the winter road haul season), the potential impacts to public access areas are minimal.

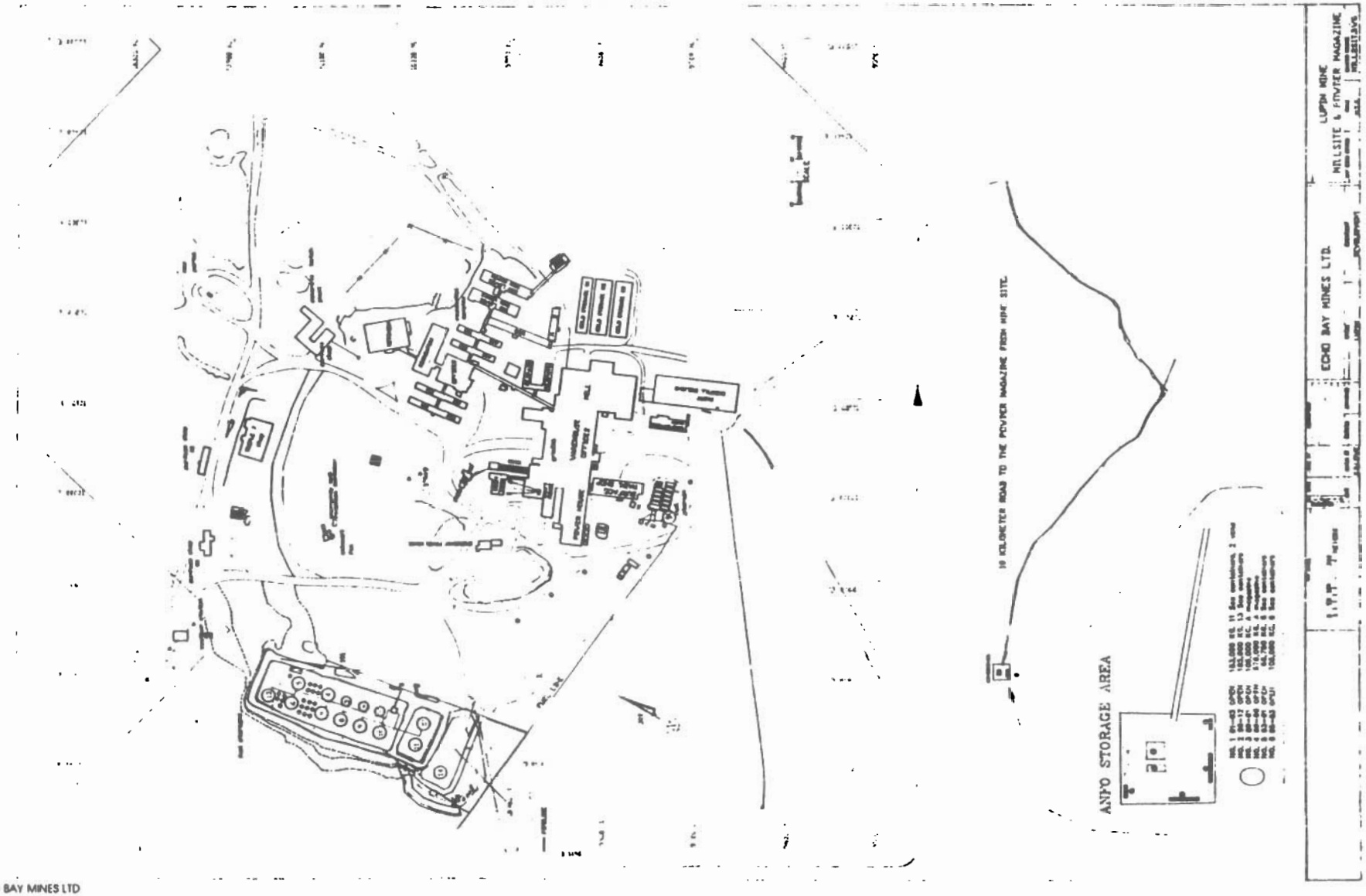
Environmentally sensitive areas, in addition to the surrounding tundra include; the limited extent of the west shore of Contwoyto Lake where the mine is located, the potential for runoff from the site to the lake, drainage from the sewage lakes system which will enter Contwoyto Lake, the six kilometre tailings line route and accompanying tundra and the tailings containment area which, in the event of an unplanned release, will discharge to either the west or south drainage basins of Contwoyto Lake.

Most of the larger lakes in the Lupin area are regarded as having fish habitat to some extent. Contwoyto Lake is the largest body of water in the area, containing the greatest water and fisheries resource. Possible sources of contamination of this area include general runoff from the site facilities (chemical and petroleum storage areas, winter road access). The tailings line, minewater, backfill and sewage disposal pipelines are all located on the south end of the complex which would result in any spills reporting to the sewage lakes drainage basin. Boot Lake, located N.E. of the site was the original water supply during construction and is known to be a seasonal fisheries habitat. This area has a potential to be affected in the event of a major petroleum spill from the fuel tank farm.

Along the tailings line route several smaller lakes exist with only one larger lake having a known fish habitat. Punkin Lake, located approx. 1.5 km from the site is situated in a gentle sloping terrain receiving runoff from an approx. 4-5 km^2 area which includes the location of the No.2 Dump station and the tailings line to the north and south (approx. 2km).

There are several small lakes in the immediate vicinity of the Tailings Containment Area that could be affected by potential spills from the impoundment. These include Norma Lake, Lori Lake, Long Lake and Boomerang Lake, all of which are considered to be valuable fisheries habitat. These areas are directly related to the potential for spills to occur at the following dam locations; dam 6, 5, 4 and 3 respectfully. Dam3 is currently considered as being inactive as contained tailings have been covered with esker material and the actual tailings line deposition points are no longer in service.

FIGURE 7
GENERAL SITE PLAN - STORAGE FACILITIES



4.0 Operations System - Component Malfunction Prevention

As a regular daily inspection, the following checks are carried out by the Mill Department under the supervision of the Mill Superintendent:

Tailings Line

- Visual inspection of the tailings line;
- Inspection of the emergency dump station buildings including piping, valves, doors, heaters (when in use) and lights.
- Inspection of the vacuum breaker stations including piping, valves, doors, heaters (when in use) and lights.
- Inspection of all tailings line transfer points (junctions) for access, snow accumulation, valves and piping for leaks.
- Inspection of the discharge point for ice build up and solids build up.

Sewage Line

- Visual inspection of the pipeline and heat trace checks at locations along the pipeline.

Minewater Line

- During periods of discharge to the sewage lakes system the minewater transport line is inspected for flow and ice accumulation.

Freshwater Pumphouse

- Building heater check; ambient room temperature.
- Inline heater check; discharge water temperature.
- Pump temperature.
- Doors and general condition.

Engineered Facilities

On a weekly basis, the engineered facilities at the tailings containment area are checked for general condition, erosion and existence of any seepage. The divider dam at the sewage facility is checked for water elevation.

Any immediate concerns from the inspections are brought to the attention of the Mill Superintendent, Environmental Manager or other designated personnel for timely action. Records of the daily and weekly inspections are retained on file and are available for review upon the request of the Inspector.

An annual inspection of the tailings containment area is carried out during ice

free, open water conditions by a qualified geotechnical engineer, registered in the Northwest Territories. The annual report is be forwarded under a separate cover to the N.W.T. Water Board within 60 days of the inspection.

5.0 System Malfunction - Response Information

The tailings line and main deposition areas are of utmost concern when discussing failures and system malfunctions.

5.1 Tailings Line

Two types of release from the tailings line may occur. (1) A controlled release occurs as a result of an intentional dump of the tailings line into permanent dump stations along the line (ie: during mill shutdown). The concern here is the unexpected overfilling of these holding stations after repeated use. (2) An uncontrolled release may occur as a result of freezing, material failure or erosion and line blockage or any combination which may result in an unauthorized discharge to the environment. See Figures No. 8 and No. 9 for tailings line route and component location with regard to surrounding topography.

5.1.1 Controlled Release

There are two (2) emergency dump stations located at strategic points along the length of the tailings line. These are designed to contain tailings that have drained from the line in the event of a shut-down or loss in line pressure. Dump pond No. 1 and No. 2 have a holding capacity of approximately 12,000 and 22,000 cubic meters respectively. The tailings line volume that would flow to each dump pond (on each occurrence) is approximately 440 and 534 cubic meters respectively. The liquid of both ponds is pumped out once a year, usually in July and August and directed back into the tails line for deposition into the tailings impoundment area.

Solids accumulation within the ponds is removed if required during the summer and transported to the active tailings cell.

5.1.2 Uncontrolled Release

In the event of a line break or malfunction along the tailings line system, a loss in line pressure would result in the Mill Superintendent (or designate) initiating the process shut-down and appropriate Reporting/Response team action employed.

Remaining contents within the tailings line would report to the emergency dump stations, however, in the case of a line break, some amount of tailings may be deposited in the area of the break. Immediate action to reduce and minimize impacts on water quality in the area are required. Containment and prevention of material migrating from the original area of spill area are priority.

FIGURE 9
TAILINGS LINE/IMPOUNDMENT - TOPOGRAPHY

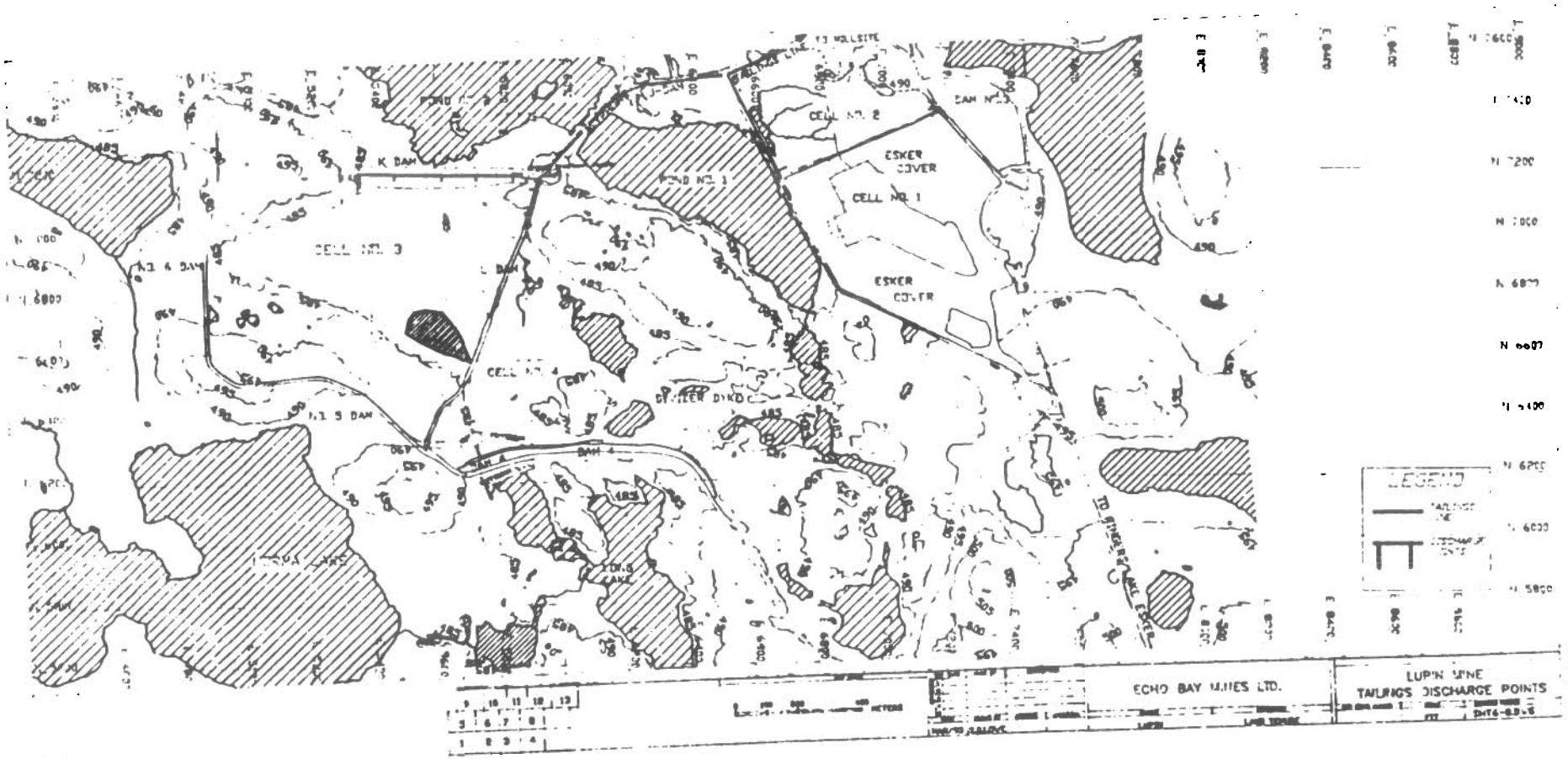
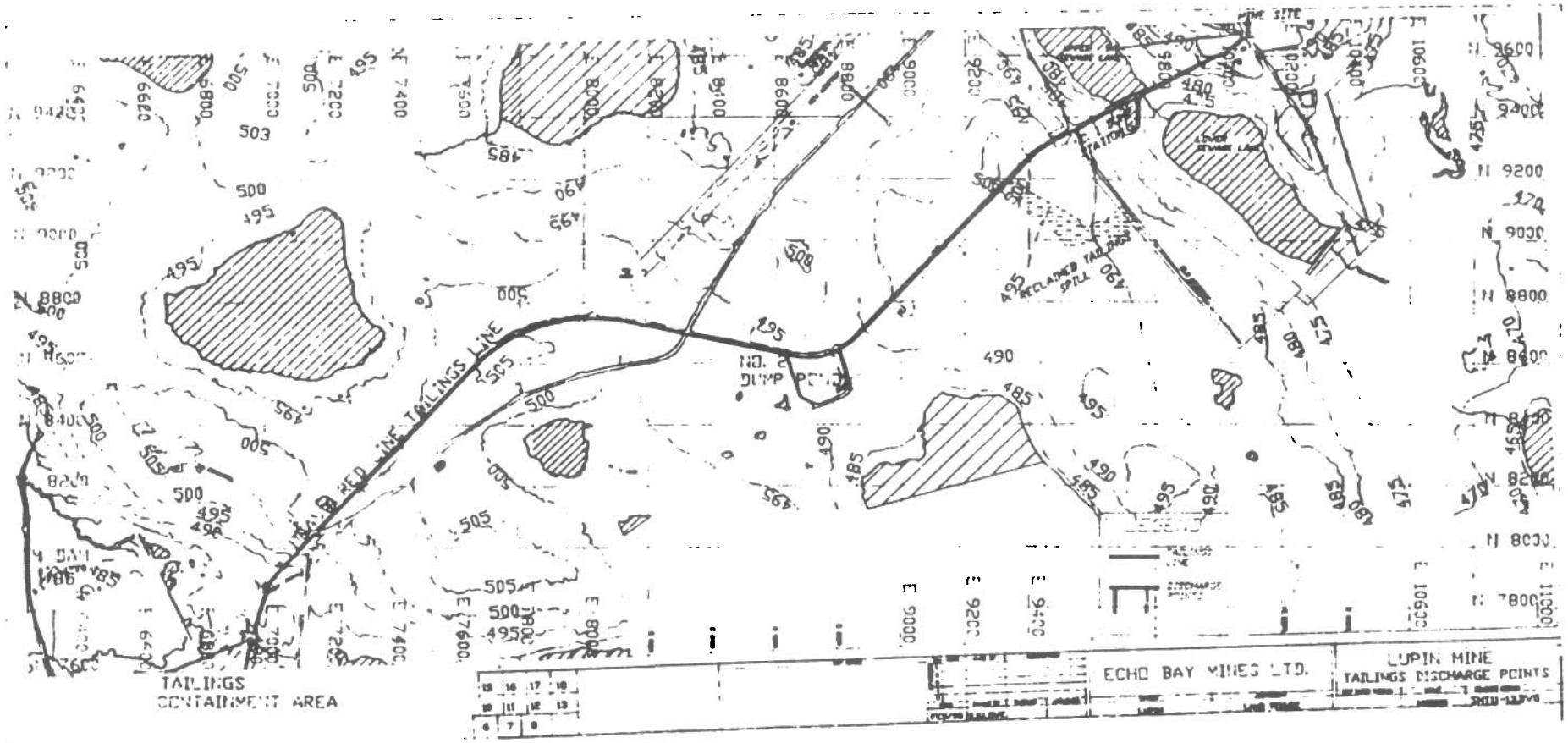


FIGURE 8
TAILINGS LINE ROUTE - TOPOGRAPHY



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LUPIN OPERATION, NORTHWEST TERRITORIES

Ground Contamination - Any tailings material that has escaped from the pipeline and deposited on the surrounding ground would be removed and disposed of at the Tailings Containment. Esker material and/or crushed waste rock would be used to re-contour the area to original ground elevation.

Water Contamination - Any tailings material that has escaped from the system to a water body would be left in place and the local authority contacted for further advice on the cleanup. Further environmental damage may result as a consequence of recovery operations.

5.2 Tailings Impoundment

5.2.1 Pond No.2

In the tailings impoundment area the perimeter dams are of main concern. Because of the low water level presently maintained in the two main ponds, only two (2) of the dams (Dam1a and Dam2) of Pond No. 2 have water against their upstream surfaces.

Operation of the system should remain the same in the near future, so this situation would not change.

Water contained in pond No. 2 is of discharge quality. However, if seepage or a dam breach should occur, the water shall be contained where possible by construction of catchment basins and the liquid returned to the tailings pond. Timely action will minimize potentail impacts to surrounding water quality. Repairs to the structure will conform to a standard acceptable to management and engineering practice (See FIGURE 10 for Dam location layout).

5.2.2 Pond No.1

Water contained in Pond No.1 is of a quality requiring treatment prior to discharge. With the current configuration of the Pond, the dividing J-DAM is the structure of concern. In the event of a failure of this structure, water would report Pond No.2 and be contained. Treatment would be considered prior to eventual discharge.

If seepage or a dam breach were to occur, repairs to the structure will take place to an engineering standard acceptable to management.

5.2.3 Solids Containment Cells

Water contained in the Solids Cells No. 1, 2, 3, 4 and 5 is unsuitable for discharge and of tailings line quality. In the event of a failure or seepage, the release shall be contained where possible to minimize potential impacts on receiving water bodies. This is accomplished by the construction of catchment basins and the liquid returned to the tailings pond. Re-routing of the tailings end of pipe discharge point would take place if the affected solids cell is in use. Dams No.4,5 and 6 are of main concern with regard to seepage outside of the

containment area. Seepage from the other cells (No.'s 1,2,5) would report to Pond No.1 or 2. Solids that have escaped and are contained within the catchment area would be removed and disposed of within another tailings cell.

Repairs to the structure will take place to an engineering standard acceptable by management.

5.3 Sewage System

The sewage system is contained by two (2) low dams and natural relief. The system is closed from October to June; camp discharge enters the upper lake and minewater discharge enters the second (lower) lake (or the mill circuit).

Any seepage from the upper lake would report to the lower lake and be addressed to prevent any structural damage to the dam itself. Seepage from the lower lake would be contained by construction of a catchment basin and if water quality did not meet licence limits, the solution would be pumped back into the lake.

If a failure should result along the heat traced six (6) inch pipeline between the camp and the upper lake, an alternate disposal location would be initiated. Two options are readily available with minor modifications to the systems. They are:

- re-route the sewage line within the mill complex to discharge into the tailings box and be pumped to the tailings impoundment.
- for the short term, re-route the sewage line within the mill complex to connect up with the mine water discharge line and pump to the second (lower) sewage lake.

Appropriate response team action would have repairs completed to the satisfaction of management and the system returned to the upper lake within a reasonable time frame.

5.4 Paste Backfill

The Paste Backfill high pressure pipeline that services the underground operations is routed through the mill complex where possible. There is however a portion of the line that exists outside the buildings. The operators are responsible for a daily check of the line during operating conditions.

In the event of a failure with this line, a drop in line pressure would signal an emergency, the operator would initiate the shutdown of the system and the appropriate reporting and response team action would be employed.

The faulty component(s) would be identified and repaired/replaced where necessary. Any spilled material would be cleaned up and disposed of at the Tailings Containment Area. If the incident occurred outside of the buildings the ground would be replaced with esker or crushed waste rock and re-graded.

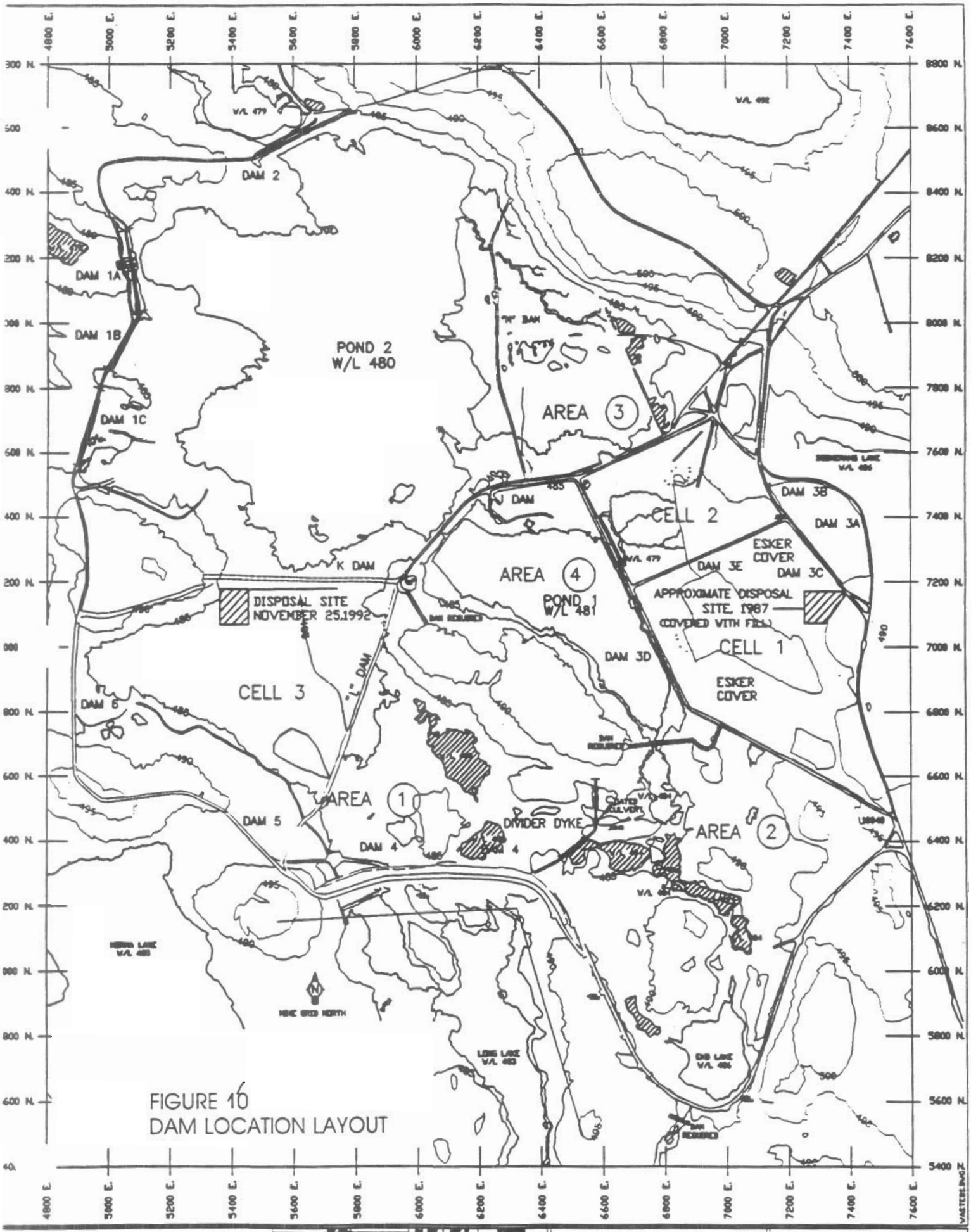

FIGURE 10
DAM LOCATION LAYOUT

CONTAMINATED WASTE DISPOSAL
1987 & 1992

5.5 Minewater

The mine is dewatered on an intermittent basis from the 250 metre level sump via a six inch line to either the second sewage lake or combined with the mill tailings.

In the event of a failure with this line an immediate switchover of the discharge point would be made from within the mill.

The faulty component(s) would be identified and repaired/replaced where necessary. Any spilled material would be cleaned up and disposed of at the Tailings Containment Area. Any ground area disturbed during clean-up would be replaced with esker or crushed waste rock and re-graded.

6.0 Petroleum and Chemical Products - Response Information

6.1 General

The petroleum and chemical products used at the Lupin Operations that exist in significant amounts to be concerned with in this Plan are summarized in Table 2 located within the appendix. This table indicates the petroleum/chemical product name, storage location and normal storage container packaging or storage volume utilized. Additional chemicals are included in the listing to alert the site personnel to possible combination hazards that may be present during winter road/receiving, storage operations.

There are two standard operational procedures where possible spill scenarios may be encountered. These are during:

1) receiving/offloading procedures during winter road resupply whereby fuel is pumped from tanker trucks to site storage facilities and chemical supplies are removed from transport trucks to their respective storage locations.

2) normal daily operations whereby fuel is pumped from the main tank farm to the vehicle refuelling/powerhouse satellite tanks and mill reagents are transported from the cold storage facilities to the reagent mix area within the mill.

During the winter road re-supply period there may be times when Lupin Operation personnel will be called upon to assist in a winter road spill recovery. The surface foreman and leadhands are familiar with procedures followed by the Winter Road Transportation Department and are available to provide assistance, generally for the upper portion of the winter road on Contwoyto Lake. Material and supplies for these types of spill recovery plans (ie: overturned tanker) are available, in the "Emergency Spill Response" seacontainer for easy transport on the road.

The measures outlined in the response plans intend to minimize the potential impact to water and land following a petroleum/chemical spill. Keeping in mind that the immediate action is to preserve health and limit environmental damage, the plans deal with the procedures/methods of spill containment, termination, remedial measures and clean-up of spills related to those products used at the mine.

6.2 Spill Containment, Recovery and Disposal

The potential exists for spills of both petroleum products and various chemicals used at the Lupin Operation. A spill may be in the form of a liquid as in petroleum products, or in the form of a solid as in the ANFO or Cyanide that is used on a regular basis. A liquid chemical spill is likely to occur only in the mill reagent mix area where control measures are in place to reduce the risk of a spill migrating outside of the building. A liquid chemical spill may result if the dry chemical contacts water once the spill has taken place.

The spill of either form may occur in one or a combination of the following areas; on land, snow, ice or in the water. Various proven practical methods of containment and recovery are well documented for use in northern climates and are summarized below. For additional technical information, one should consult the Environment Canada Report EPS 9/SP/2, December, 1986.

The first initial response is to prevent any direct health risk to response personnel. Persons not directly associated with the clean-up operations are to be directed to leave the immediate area. The area will be isolated and limited to traffic as directed by the response team personnel.

6.2.1 Containment

On Land

The potential for spills to occur on land is the highest of the four areas due to the transferring of materials off the winter road transport as well as movement year-round from storage locations to areas of use. During the winter road re-supply, the greatest amount of material is moved in the least amount of time and therefor the snow and ice factor also plays an important role.

Petroleum products spilling onto frozen snow covered ground may be contained by the construction of **snow dykes**. For fast initial containment of smaller spills the dykes can be built manually with shovels. Larger spills may require the use of heavy equipment such as graders and bulldozers.

The impermeability of dykes may be ensured by lining with a polyethylene plastic liner, plastic tarpaulin or similar synthetic material. Alternatively, in freezing temperatures, water may be sprayed or poured over the dykes to further enhance the barrier to the spilled material. This method assumes that water is available or may be accessed from the spill site. Synthetically lined dykes are more effective than just snow or snow and ice-lined dykes.

During warmer months, containment dykes may be constructed from **sand or gravel** if these materials are available in an unfrozen form. Again, for smaller spills, the dykes can be fashioned manually with shovels where for larger spills, trucks or other heavy equipment (front-end loaders) will normally be required to

transport and handle sand and gravel.

Trenching or ditching can be used as a method for containing and/or intercepting the flow of liquid spills on land. Ice, snow, loose sand, gravel and surface layers of organic material can usually be scraped or dug away until the underlying frozen substrate is reached. This can be effective in re-directing flow or simple containment prior to pumping or absorbing the spilled material. Trenching in solid frozen ground or rocky substrate is normally neither practical nor possible.

The spillage of solid materials on land is much simpler to contain and recover. During the winter months, spilled material is generally self-contained due to its nature. Some precaution with regard to wind-blown dispersion may be required with lighter materials (lime). In these cases, a layer of snow placed on top of the spilled material will suffice until removal to appropriate disposal is arranged. In summer months, minor containment berms will be required when there is moisture present or precipitation is occurring or is likely to occur.

On Snow

Containment on snow is readily achieved and is very effective due to its absorbent quality. Liquid spills (petroleum) will become immobile within the snow pack and easily removed for transport for recovery or disposal. Use the snow to its advantage in construction of snow dykes/dams. Whenever possible, the snow pack should be left in place to avoid contaminating the underlying substrate.

On Ice

Spills that occur on ice, from either direct spillage or migration to the ice, are greatly affected by the strength of the ice. If the spill does not penetrate the ice, and the ice is safe to work on, then the methods of containment are similar to that on land. Where the spill has penetrated the ice, the situation should be handled similar to that on open water. If, as in petroleum spills, the material floats, then every effort should focus on the recovery of the material using pumping/suction methods, and absorbents.

On Open Water

A spill occurring on or into open water is very difficult to contain and every effort should be made to prevent the material from entering the water. If in the case of petroleum products, the material floats, then immediate deployment of surface booms should take place to control the spread of material. Pumping is the method of choice for removal of contained material.

6.2.2 Recovery

Spilled petroleum products contained within a dyked or trenched area should be recovered by pumping into a standby tanker, portable storage tank or drums dependent on volume involved, or use of an independent vacuum truck. Pump and suction hoses should be screened to prevent snow, ice or debris from clogging the line or pump.

Any remaining material may be absorbed by use of a variety of natural and commercially available products. Synthetic products such as 3M Brand, Conweb and others are easier to use and more efficient than natural products.

The availability of shovels, rakes and pitchforks are invaluable in any spill clean-up and recovery operation. The use of heavy equipment for larger spill situations such as frontend loaders and haul trucks, make the removal of material easier. It also ensures that all materials, including absorbent sand, snow etc. have been removed from the site.

6.2.3 Disposal

Petroleum products such as oil that has been recovered by pumping into portable tanks, drums or a standby tanker can often be reclaimed and reused. Water and debris can be separated from the pure fuel by gravimetric means in a tank. In this manner disposal can be minimized and financial losses reduced.

In-situ combustion may be used as a final means of disposal after every effort has been made to remove the spilled fuel/oil etc. Approval for burning of petroleum products must be obtained prior to combustion. Burning should never be carried out on land where combustible organics are present and the oil has migrated into the soil. Removal is the method of choice in this case.

The most efficient means of igniting diesel oil for in-situ combustion is with a large size portable propane torch. Other highly flammable products such as gasoline or alcohol, or combustible products, such as wood may also be used to promote ignition of the spilled product. Spilled oil should be ignited where it has pooled naturally or been contained by dykes, trenches or depressions. Oil which has collected in slots in river ice may also be disposed of by in-situ combustion if sufficient holes are drilled in the ice. Once holes are drilled, the oil which collects in the holes may be ignited.

Liquid oil wastes (which cannot be reclaimed), oil contaminated snow and debris and oil residues left after in-situ combustion will be picked up and disposed of at a land disposal site approved by government authorities. A disposal site exists at Lupin and has been approved by INAC, Land Resources (see drawing "Contaminated waste disposal; 1987 and 1992"). Disposal at local municipal dumps may be an alternative if required, in this case GNWT would be consulted.

Spilled chemical products should be recovered and reused wherever possible. Materials unable to be used will be disposed of at the Contaminated Waste disposal site located within the Tailings Containment Area (FIGURE 10).

6.2.4 Other Concerns

Fire

In the event that the accident/incident is in combination with a fire, extinguishing the fire may be required prior to initiating efforts to stop the spillage.

In order to control the resulting runoff (in cases where water is used), and the subsequent spreading of the spilled material, any indication of slope away from the area of the spill should be dyked off for containment.

Petroleum and chemical fires have the potential to generate toxic fumes under poor combustion conditions. Approaching and dealing with any fire from upwind is recommended as well as caution with regard to breathing the vapours generated from the fire. Fire Department crews are well trained and have access to the proper Personal Protective Equipment.

In the case where ANFO is the material involved the following action should be taken;

1) rope off the area and control entry
2) evacuate the area and do not attempt to fight the fire
3) the ANFO, or any resulting solution (fire in winter on snow or ice) must not be allowed access to bodies of water, especially flowing streams/rivers
4) fires involving small quantities of ANFO may be fought using water, however if the fire is not a hazard to persons or the surrounding environment, it is generally accepted to allow the material to burn off, then initiate clean-up measures

Main Fuel Tank Farm

In the event of any emergency at the tank farms relating to fire, flooding, spills, etc; all electrical power shall be shut off as quickly as possible within the tank farm area to minimize further damage. The procedure can be initiated through the powerhouse and electrical departments.

7.0 Spill Response Resources

A wide variety of spill control/recovery equipment and materials exists at the site for dealing with emergency spills of petroleum products and chemical reagents. Heavy construction equipment is also available for use on demand.

7.1 Response Equipment

All equipment is stored in such a manner as to be readily available on short notice. The Surface Foreman would immediately respond to a reported spill site by notifying his on duty equipment operators to move equipment and material necessary to provide control and clean-up measures at the reported spill. Additional operations personnel are available through the mine department if the need arises.

The equipment to be used would consist of a Cat 966 Loader, Euclid or Volvo Heavy Hauler Trucks, or D-7 Dozer and a rubber tired backhoe. A current list of equipment at the Lupin Mine is available in the appendix, Table 2.

Emergency spill containment and recovery materials and supplies are available for immediate mobilization at any time. Table 3 lists the materials inventory for the "Emergency Spill Response" van, available to be located at a spill site. The on-site warehouse maintains a supply of absorbent pads, floordry absorbent, hoses, couplings and miscellaneous parts for recovery equipment. The van container, centrally located at the site next to the underground exhaust fan, is indicated on Figure No.7, "General Site Plan - Storage Facilities".

7.2 Response Team

Authorization for deployment of personnel, containment, clean-up and recovery equipment are as per the Fig. 1 "Response Team Flowsheet" organizational chart.

The designate/next-in-line authority shall be contacted if management is off site and unavailable.

A telephone listing of Lupin contact personnel is included in Appendix I.

7.3 Training and Exercises

All response team staff will maintain familiarity with the continually updated Contingency Plan by scheduling periodic reviews. For the Department heads, this is completed in conjunction with the review of the site's Emergency Procedures Manual.

All personnel dealing with equipment that would be involved in cleaning up any spills related to the Contingency Plan have extensive experience as heavy equipment operators and, therefore, further training in this area is not seen to be

applicable. The daily work routine followed by the surface heavy equipment operators, involves much of the same type of work as would be required when dealing with a dam break or a tailings line spill. Roadway construction (materials hauling, grading)and snow removal/clearing are all part of day to day activities.

Training with regard to hazardous materials handling is carried out in conjunction with annual TDGR (Transportation of Dangerous Goods Regulations) training for all surface department employees (those running equipment and their supervisors) as well as the warehouse employees for handling materials. In addition, the mine site fire crew is trained to handle hazardous materials used at the site in relation to potential fires. This crew is currently not directly involved with the response, but is available if the need arises.

WHMIS (Workplace Hazardous Material Information System) training is provided to all new employees as well as in the form of annual refresher courses for current employees. Core WHMIS along with job specic training is covered in these programs. Information, through WHMIS, is available at each department for "specifics" of that department. As well, master stations are in place which carry the MSDS's for the entire site.

Environmental Awareness Program sessions are held which deal with employee environmental responsibility and spill reporting. Initial orientation prior to beginning employment also touches on the importance of environmental awareness.

The question of a simulation exercise should be scrutinized because it is our belief that during a simulated exercise, there could be damage caused to the fragile tundra which may result in extensive long term effects. It is suggested that the annual procedure of cleaning out the tails line dump ponds be considered as a simulation exercise, as all the equipment listed is used. This will have minimal potential to damage the local environment.

8.0 Component And Petroleum/Chemical Product - Detailed Response Plans

The following section contains the Response Plans for the major System Components of the mine site and Petroleum/chemical products stored and used at the Lupin Operation.

System Components

a) Mill Tailings Line

b) Mill Tailings Containment (Retaining Dams)

c) Sewage Disposal Facility

d) Paste Backfill

e) Mine water

Petroleum/Chemical Products

f) Diesel Fuel

g) Gasoline and Aviation Fuel

h) Lubricating and Hydraulic Oils

i) Ethylene Glycol Antifreeze

j) Sodium Cyanide

k) Hydrated Lime

l) Anfo Explosives

m) Lead Nitrate

n) Ferric Sulphate

In the event of a **TAILINGS LINE** break or malfunction the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- Notify Mill Superintendent (or designate) immediately via radio, phone or in person;
- The senior mill person will direct the initiation of shut down procedures for the mill in order to **STOP** the flow of tailings through the tailings line;
- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- The flow of tailings shall be **CONTAINED** by dyking, barricading or blocking flow by any means available. This can include snow, sand or other available materials (geotex liner) in order to construct retaining structures. Use earth-moving equipment if nearby;
- If tailings has reached a flowing natural stream, mobilize team to contain tailings from entering stream. Contact should be made with DIAND Water Resources and Environment Canada, Department of Fisheries and Oceans for further direction.
- A detailed spill report shall be submitted as per Section 2:3

HAZARDS

- the mill tailings contains chemicals used in the process and must be handled with these taken into account. The major chemical additive involved is sodium cyanide that is present in concentrations generally in the range of 200-300 mg/L. Because of this, solutions are slightly toxic by ingestion or aspiration; drying of skin can result on prolonged contact due to the presence of alkaline materials (lime and sodium cyanide);
- avoid contact with acids, which would lower pH and liberate gaseous HCN;

ACTION FOR FIRE

- Non-flammable
- use dry chemical, foam or water spray (fog), although water may spread the contaminant;
- use water to cool outside surface of tanks as heat could promote generation of HCN gas; DO NOT USE CO_2 as weak acids may be formed which will liberate HCN gas.

RECOVERY

- **Ground contamination**; any tailings material that has escaped form the pipeline or dump station containment areas onto surrounding tundra shall be removed and disposed of at the tailings containment area;
- If required, esker material and/or crushed wasted rock shall be used to fill any depressions left after excavation of the spill material.

- **Water contamination**; these areas are difficult to mitigate as movement of contaminated material (and water) may continue long after initial incident;
- local authorities should be contacted regarding advice for cleanup or additional work to be carried out.

DISPOSAL

- contaminated materials are to be disposed of at the Tailings Containment in an active tailings cell.

PROPERTIES

- the mill tailings contain a mixture of mill reagents and finely ground rock which has had the precious metal content removed. Reagents in use include sodium cyanide, lime, lead nitrate, zinc metal and flocculant;
- appearance is dark grey solids suspended in a clear water base solution;
- solution portion miscible with water, relatively odorless however may seem musty with faint odor of cyanide (bitter almond) to some individuals.

ENVIRONMENTAL CONCERNS

- solution extremely toxic to fish, other aquatic organisms and wildlife;
- harmful to waterfowl;
- solids portion known to generate acid through oxidation processes if left exposed to weathering and open environment.

CONTAINERS

- N/A

SUPPLIER

- N/A

In the event of an **TAILINGS CONTAINMENT ENGINEERING FAILURE (DAMS)** the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- Notify Mill Superintendent (or designate) immediately via radio, phone or in person;
- If necessary, the senior mill person will direct the initiation of shut down procedures for the mill in order to **STOP** the flow of tailings through to the tailings containment area;
- If required, the tailings discharge point will be relocated to an area unaffected by the failure.
- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- The flow of tailings shall be **CONTAINED** by dyking, barricading or blocking flow by any means available. This can include snow, sand or other available materials (geotex liner) in order to construct retaining structures. Use earth-moving equipment if nearby. Tailings pond solutions can be pumped back to the containment area during repair work;
- Any of the tailings containment area "Cells" can be dewatered to Pond No.1 in the event flow cannot be controlled at the failure site.
- If tailings has reached a flowing natural stream, mobilize team to contain tailings from entering stream. Contact should be made with DIAND Water Resources and Environment Canada, Department of Fisheries and Oceans for further direction.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- the mill tailings contains chemicals used in the process and must be handled with these taken into account. The major chemical additive involved is sodium cyanide that is present in concentrations up to 300 mg/L, depending on the area of containment. Because of this component, solutions are slightly toxic by ingestion or aspiration; drying of skin on prolonged contact due to the presence of alkaline materials (lime and sodium cyanide);
- avoid contact with acids, which would lower pH and liberate gaseous HCN;

ACTION FOR FIRE

- Non-flammable
- use, dry chemical, foam or water spray (fog), although water may spread the contaminant;
- use water to cool other flammable materials as heat could promote generation of HCN gas; DO NOT USE CO_2 as weak acids may be formed which will liberate HCN gas.

RECOVERY

- **Ground contamination**; any tailings material that has escaped from the pipeline or containment areas onto surrounding tundra shall be removed and disposed of at the tailings containment area;
- Solutions, where contained shall be pumped back into the tailings containment area;
- If required, esker material and/or crushed wasted rock shall be used to fill any depressions left after excavation of the spill material.

RECOVERY cont.

- **Water contamination**: these areas are difficult to mitigate as movement of contaminated material (and water) may continue long after initial incident;
- local authorities should be contacted regarding advice for cleanup or additional work to be carried out.

DISPOSAL

- contaminated materials are to be disposed of at the Tailings Containment in an active tailings cell or solutions pumped directly to Pond No.1.

PROPERTIES

- the mill tailings contain a mixture of mill reagents and finely ground rock which has had the precious metal content removed. Reagents in use include sodium cyanide, lime, lead nitrate, zinc metal and flocculant;
- appearance is of dark grey solids suspended in a clear water base solution;
- solution portion miscible with water, relatively odorless however may seem musty with faint odor of cyanide (bitter almond) to some individuals.

ENVIRONMENTAL CONCERNS

- solution extremely toxic to fish, other aquatic organisms and wildlife;
- harmful to waterfowl;
- solids portion known to generate acid through oxidation processes if left exposed to weathering and open environment.

CONTAINERS

- N/A

SUPPLIER

- N/A

In the event of a **SEWAGE SYSTEM FAILURE (PIPELINE/DAMS)** the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- Notify Mill Superintendent or Plant Maintenance Superintendent (or designate) immediately via radio, phone or in person;
- If necessary, direct the initiation of shut down procedures for the pumping system in order to STOP the flow of sewage through to the sewage lakes containment area;
- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- If the failure is piping related, the sewage discharge will be redirected within the mill to either the tailings pumpbox (pump to TCA) or connected up with the mine water line to discharge to the second sewage lake. Both these options will be temporary until repairs are complete.
- If the failure is dam structure related, the sewage flow will be redirected to the TCA. Seepage from the second sewage lake will be contained within a constructed catchment basin, checked for water quality and pumped back to the containment if water quality is not consistent with Licence requirements. Seepage from the first sewage lake to the second lake will be monitored for water quality during repair acitivities.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- the sewage stream from the site contains grey water from all sources (mill and mine drys, all accomodation shower facilities, kitchen and all washroom facilities on site.
- there are no chemicals used in the process;
- due to the nature of the source, health risks are associated with baciterial infections and disease that may be transmitted through exposure.

ACTION FOR FIRE

- Non-flammable
- use CO_2, dry chemical, foam or water spray (fog), although water may spread the contaminant;
- use water to cool other flammable materials;

RECOVERY

- **Ground contamination**; any sewage material that has escaped from the pipeline or containment areas onto surrounding tundra shall be removed, where possible and disposed of within the sewage lake or buried with esker if necessary;
- If required, esker material and/or crushed wasted rock shall be used to fill any depressions left after excavation of the spill material.
- Solutions, where contained shall be pumped back into the sewage lakes containment;

- **Water contamination**; these areas are difficult to mitigate as movement of contaminated material (and water) may continue long after the initial incident;
- local authorities should be contacted regarding advice for cleanup or additional work to be carried out. DIAND Water Resources or Env. Can. Dept. of Fisheries and Oceans.

DISPOSAL

- contaminated materials are to be disposed of within the sewage lakes containment system or at the Tailings Containment in an active tailings cell.

PROPERTIES

- the mine site sewage system contains a mixture of camp waters (excluding those of the mill process and the mine dewatering). These include camp drys, accomodation washroom facilities and kitchen.
- water accounts for greater than 90% of the component which is used during day to day activities; the remainder is organic solids which readily settle in the disposal system.

ENVIRONMENTAL CONCERNS

- solution only mildly toxic to fish and other aquatic organisms due to the low dissolved oxygen that may occur at certain times of the year;
- effluents could contain minor amounts of nutrients (nitrogen components) that may promote plant growth in downstream water bodies.

CONTAINERS

- N/A

SUPPLIER

- N/A

In the event of a **PASTE BACKFILL LINE FAILURE** the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- Notify Mill Superintendent (or designate) immediately via radio, phone or in person;
- When safe to do so, initiate shut down procedures for the pumping system in order to **STOP** the flow of paste material through the line;
- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- The Mine Superintendent is notified regarding the potential need for disruption to the pumping system;
- Necessary manpower and equipment deployed to contain/clean-up spill area;
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- The residual cyanide may be hazardous if pH levels drop allowing HCN gas to be liberated.
- A more likely scenario may be the (un)intentional use of mine water near the backfilled stopes combining the high pH moisture of the backfill with the water containing ammonia, liberating ammonia gas.

ACTION FOR FIRE

- Non-flammable
- Dry chemical, foam or water spray (fog), although water may spread the contaminant;
- Use water to cool other flammable materials;
- DO NOT use CO_2 as weak acids can be formed favoring the release of HCN gas.

RECOVERY In general the paste material when released from the pipeline does not travel or flow due to its minimal moisture and cement addition. Some minor amount of moisture seeps from the paste during the set-up which may need control during a large spill situation.

- **Ground contamination:** any paste that has escaped from the pipeline onto prepared ground (no natural tundra is crossed with the pipeline) shall be removed to the greatest extent possible, and disposed of within the TCA;
- If required, esker material and/or crushed wasted rock shall be used to fill any depressions left after excavation of the spill material and return the natural grade.
- Solutions (if any), where contained, shall be pumped to the paste building sump or to the tailings sump;

- **Water contamination:** these areas are difficult to mitigate as movement of contaminated material (and water) may continue long after the initial incident;
- Every effort should be made to prevent contamination of any natural water;
- local authorities should be contacted regarding advice for cleanup or additional work to be carried out. DIAND Water Resources or Env. Can. Dept. of Fisheries and Oceans.

DISPOSAL

- All contaminated materials (including the paste) are to be disposed of within the Tailings Containment in an active tailings cell.

PROPERTIES

- The mill paste plant provides backfill material for underground utilizing mill tailings. The process is composed of the tailings solids, and between 10-20% water. Residual process reagents are present including cyanide, lime, zinc, lead nitrate and flocculant.
- Appearance is dark grey solids suspended in enough water to allow pumping with high pressure pumps. Described as having the consistency of toothpaste prior to set;
- The pH is generally greater than 10.

ENVIRONMENTAL CONCERNS

- small amount of solution within the paste would be comparable to tailings solution an regarded with the same toxicity to fish and other aquatic organisms due to the residual cyanide and complexed metals present;
- solids portion known to generate acid through oxidation if left exposed to weathering and open environment.

CONTAINERS

- N/A

SUPPLIER

- N/A

In the event of a **MINE WATER PIPELINE FAILURE** the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- Notify Mill Superintendent or Plant Maintenance Superintendent (or designate) immediately via radio, phone or in person;
- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- The Mine Superintendent is notified regarding the potential need for disruption to the pumping system;
- If necessary, direct the initiation of shut down procedures for the pumping system in order to **STOP** the flow of mine water through to the sewage lakes containment area;
- If the failure is piping related, the mine water discharge will be redirected within the mill to either the tailings pumpbox (pump to TCA) or milling ciruit. Both these options will be temporary until repairs are complete.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- the mine water stream from underground contains water from all mining activities and a small amount of infiltration water.
- the only additive used is calcuim chloride, added for drilling in the upper permafrost areas of the mine;
- due to the nature of activities underground (explosives use), there is ammonia contained in the water from dissolution at active mining areas. This ammonia will be released as a gas if in contact with cement which raises the pH above 9. Recirculation of water underground for reduced volume usage increases the concentration of ammonia (and other minor contaminants) over time.

ACTION FOR FIRE

- Non-flammable
- use CO_2, dry chemical, foam or water spray (fog), although water may spread the contaminant;
- use water to cool other flammable materials;

RECOVERY

- **Ground contamination**; any mine water that has escaped from the pipeline onto surrounding tundra shall be removed (pumped), where possible, and disposed of within the sewage lake or buried with esker if necessary;
- If required, esker material and/or crushed wasted rock shall be used to fill any depressions left after excavation of the spill material.
- Solutions, where contained shall be pumped to the sewage lakes containment or to the tailings sump;

- **Water contamination**; these areas are difficult to mitigate as movement of contaminated material (and water) may continue long after the initial incident;
- local authorities should be contacted regarding aavice for cleanup or additional work to be carried out. DIAND Water Resources or Env. Can. Dept. of Fisheries and Oceans.

DISPOSAL

- contaminated materials are to be disposed of within the sewage lakes containment system or at the Tailings Containment in an active tailings cell.

PROPERTIES

- the mine site mine water contains a mixture of many naturally occuring elements from the ground being developed. As a result, various metals are present (nickel, iron, copper, zinc, arsenic) in very low concentrations giving the water a high conductivity from the dissolved solids. The pH is neutral at 7-7.5.

ENVIRONMENTAL CONCERNS

- solution toxic to fish and other aquatic organisms due to the low dissolved oxygen that may occur and considerable dissolve solids present;
- effluents could contain minor amounts of nutrients (nitrogen components) that may promote plant growth in downstream water bodies. Ammonia is present from residual blasting agents.

CONTAINERS

- N/A

SUPPLIER

- N/A

In the event of a **DIESEL FUEL** spill or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- **STOP** the flow of diesel fuel if possible;
- ELIMINATE open flame ignition sources;
- CONTAIN flow of oil by dyking, barricading or blocking flow by any means available. Use earth-moving equipment if nearby;
- if flow has reached flowing natural stream, mobilize team to deploy river boom, skimmer and sorbent booms.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- allowing the contact between mine water and the cement used underground slightly toxic by ingestion, highly toxic if aspirated, drying of skin on contact;
- flammable, treat as combustible;

ACTION FOR FIRE

- use CO_2, dry chemical, foam or water spray (fog), although water may spread the fire;
- use fog streams to protect rescue team and trapped people;
- use water to cool surface of tanks;
- divert the diesel fuel to an open area and let it burn off under control;
- if the fire is put out before all diesel fuel is consumed, beware of re-ignition;
- where diesel fuel is running downhill, try to contain it as quickly as possible;
- rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with burning tires removed from the danger area.

RECOVERY

- Recovered soils from contaminated fuel can be soaked up by sand and peat moss or snow if available, or by synthetic sorbents such as 3M Brand, Graboil or Conwed;
- if necessary, contaminated soil should be excavated;
- diesel fuel entering the ground can be recovered by digging sumps or trenches;
- diesel fuel on a water surface should be recovered by skimmers and sorbent booms (See Section on Recovery of Oil Spills).

DISPOSAL

- incineration under controlled conditions; obtain prior approval.
- burial at an approved site.

PROPERTIES

- chemical composition: mixture of hydrocarbons in the range C_9 to C_{18};
- clear to yellow, bright oily liquid with hydrocarbon odour;
- not soluble, floats on water.

ENVIRONMENTAL CONCERNS

- moderately toxic to fish and other aquatic organisms;
- harmful to waterfowl;
- may create unsightly film on water.

CONTAINERS

- transported by tanker truck and transferred to various storage tanks in the tank farm. See inventory in appendix.

SUPPLIER

- As per annual tendering. (eg: Petro-Canada)
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

In the event of a **GASOLINE OR AVIATION FUEL** spill or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- **STOP** the flow of gasoline or aviation fuel if possible;
- ELIMINATE all possible sources of IGNITION, eg. extinguish cigarettes, shut off motors (from a remote location if surrounded by vapours);
- EVACUATE personnel from danger area;
- CAREFULLY CONSIDER the hazards and merits of trying to contain the spill. Contain only if safe to do so, and obvious benefit of containment is apparent (ie. contain if flowing towards a creek or water body). Otherwise leave gasoline to spread and evaporate. Do not attempt to contain a gasoline spill on water. Allow it to spread and evaporate;
- if spilled in an enclosed area, VENTILATE vapours.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- **EXTREME FIRE HAZARD** (Jet A, MODERATE), highly flammable;
- forms explosive mixture with air; is heavier than air and can migrate considerable distances to sources of ignition and flashback;
- easily ignited by flame or spark;
- avoid contact with oxidizing materials (eg. Lead Nitrate, acids);
- moderately toxic by ingestion, highly toxic if aspirated.
- Note: Jet B contains a small amount of Benzene which is a suspect human carcinogen.

ACTION FOR FIRE

- use CO_2, dry chemical, foam or water spray (fog), although water may spread the fire;
- use jet streams to wash away burning gasoline;
- use fog streams to protect rescue team and trapped people;
- use water to cool surface of tanks;
- divert the gasoline to an open area and let it burn off under control;
- if the fire is put out before all gasoline is consumed, beware of re-ignition;
- where gasoline is running downhill, try to contain it at the bottom prior to reaching lakes or streams;
- rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with burning tires removed from the danger area.

RECOVERY

- unburned gasoline can be soaked up by sand and peat moss and snow when available, or by synthetic sorbents such as 3M Brand, Graboil or Conwed;
- if necessary, contaminated soil should be excavated;
- gasoline entering the ground can be recovered by digging sumps or trenches.

DISPOSAL

- evaporation;
- incineration under controlled conditions; obtain prior approval.
- burial at an approved site.

PROPERTIES

- chemical composition: mixture of hydrocarbons; Gasoline C_4-C_{12}, Jet B C_6-C_{14} and Jet A C_9-C_{16}
- light green, clear, amber coloured liquids;
- volatile;
- not soluble, floats on water

ENVIRONMENTAL CONCERNS

- moderately toxic to fish and other aquatic organisms;
- may create unsightly film on water.

CONTAINERS

- Gasoline is transported by tanker trucks and pumped into a storage tank in the satellite tank farm. Bulk shipping via tanker truck of Aviation fuel (Jet A) occurs with tank storage at the main tank farm. Drum shipping and storage is in limited quantities.

SUPPLIERS

- As per annual tendering. (eg. Petro-Canada)
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

In the event of a **LUBRICATING OIL OR HYDRAULIC OIL** spill or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line, above;**
- **STOP** the flow of oil if possible;
- ELIMINATE open flame ignition sources;
- CONTAIN flow of oil by dyking, barricading or blocking flow by any means available. Use earth-moving equipment if nearby;
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- low toxicity by ingestion, mildly irritating to eyes
- combustible, low fire hazard;
- avoid contact with oxidizing materials (eg. Lead Nitrate, acids).

ACTION FOR FIRE

- use CO_2, dry chemical, foam or water spray (fog), although water may spread the fire;
- use fog streams to protect rescue team and trapped people;
- use water to cool surface fire exposed containers;
- divert the oil to an open area and let it burn off under control;
- if the fire is put out before all oil is consumed, beware of re-ignition;
- rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with burning tires removed from the danger area.

RECOVERY

- after containment, recover as much oil as possible by pumping into drums;
- residual oil may be burned in-situ, upon approval;
- remaining unburned oil can be soaked up by sand, peat moss and snow when available, or by synthetic sorbents such as 3M Brand, Graboil or Conwed;
- if necessary, contaminated soil should be excavated;
- oil on a water surface should be recovered by skimmers and sorbent booms.

DISPOSAL

- incineration under controlled conditions, prior approval required;
- burial at an approved site.
- ship to licensed waste reclaiming facility

PROPERTIES

- chemical composition: mixture of hydrocarbons and conventional industrial oil additives; C_{20}-C_{66}
- generally viscous liquids, light to dark amber colours;
- not soluble, floats on water.

ENVIRONMENTAL CONCERNS

- moderately toxic to fish and other aquatic organisms;
- harmful to waterfowl;
- may create unsightly film on water and shorelines.

CONTAINERS

- transported and stored in steel drums or cubes (these are self-contained units with an 8 drum capacity).

SUPPLIER

- As per annual tendering.
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

In the event of an **ANTIFREEZE (GLYCOL)** spill or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- **STOP** the flow of Antifreeze at source if possible;
- ELIMINATE open flame ignition sources;
- CONTAIN flow of liquid by dyking, barricading or blocking flow by any means available;
- **PREVENT** antifreeze from entering any flowing streams.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- inhalation of mist may cause irritation of nose, throat and headache;
- moderately toxic by ingestion, can be fatal;
- avoid contact with strong oxidizing agents
- flammable, decomposition products include carbon dioxide and/or carbon monoxide.

ACTION FOR FIRE

- use alcohol type or all purpose foam for large fires; CO_2, dry chemical or water spray (fog) for small fires. Do not force solid streams into the burning liquid.

RECOVERY

- ethylene glycol antifreeze can be soaked up by peat moss or snow when available, or by synthetic sorbents such as Hazorb;
- small spills may be washed with copious amounts of water for dilution;
- access to spilled or recovered ethylene glycol by mammals should be prevented.

DISPOSAL

- only incinerate in a furnace under controlled conditions where approved by appropriate federal, provincial and local regulations;
- burial at an approved site.

PROPERTIES

- chemical composition: 96% ethylene glycol (CH_2OHCH_2OH)
- 4% water and rust inhibitors
- clear, syrupy liquid normally contains a dye for identification in water sources;
- 100% soluble in water;
- flammable.

ENVIRONMENTAL THREAT

- low to moderate toxicity for fish and other aquatic organisms;
- attractive smell and taste to some mammals, and toxic by ingestion.

CONTAINERS

- transported and stored in steel drums or cubes (which are a self-contained unit with an 8 drum capacity).

SUPPLIER

- DOW Chemical of Canada Ltd., Van Waters & Rogers Ltd.
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

In the event of a **CYANIDE** spill (of solid or solution) or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- **Dupont Emergency Response Centre; 24 hour access - (613) 348-3616, Maitland, ON.**
- Evacuate any non-essential personnel;
- **ALERT** the Heath Services Registered Nurse as to the nature of the emergency;
- **TEST** for the presence of hydrocyanic acid (HCN) gas;
- **DO NOT ENTER** an area containing sodium cyanide (NaCN) dust or HCN gas without self-contained breathing apparatus. In the winter solid NaCN may be difficult to visually detect because of its white appearance;
- **STOP** spill at source if possible;
- **PREVENT** solid NaCN from contacting acid, acid salts or water as it will liberate HCN gas;
- if sodium cyanide does contact water, **CONTAIN** solution to as small an area as possible. Consider dyking with sand or snow;
- if HCH gas is being produced, **WEAR PROTECTIVE CLOTHING AND BREATHING APPARATUS, VENTILATE and ADD HYDRATED LIME** to slow the reaction;
- **ISOLATE** area of spill, preferably by roping off affected area and posting appropriate hazard signs.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- extremely toxic (rapidly fatal) by ingestion or inhalation (of gas or dust); **Prompt Treatment** is essential in cases of cyanide poisoning;
- corrosive to skin, due to strong alkalinity;
- liberates highly toxic, flammable HCN gas if sodium cyanide comes in contact with water, any acid or acid salts;
- contact with carbon dioxide (CO_2) produces HCN gas in lesser, but possibly dangerous quantities. **DO NOT USE CO_2 EXTINGUISHERS;**
- HCN gas can be absorbed through the skin;
- being very alkaline, NaCN may cause burns to the eyes or open skin abrasions;
- avoid contact with strong oxidizing agents (ie: Lead Nitrate).
- **ALWAYS HAVE CYANIDE ANTIDOTE KITS ON HAND**

ACTION FOR FIRE

- sodium cyanide is not flammable and will not support combustion, and will not be destroyed in an ordinary fire involving combustible materials such as paper and wood.
- DO NOT USE CARBON DIOXIDE (CO_2) extinguishers to fight a fire involving Sodium Cyanide; this may produce toxic HCN gas if moisture is present for the reaction;
- if water must be used to fight a fire involving sodium cyanide, limit the amounts to that which is necessary and treat runoff as though it was a spill of sodium cyanide solution.
- Do not allow runoff to reach a flowing stream or river, contain and dispose of properly.

RECOVERY

- spills of sodium cyanide on dry surfaces can be shovelled into containers. Crews should wear dust masks while shovelling or sweeping up spills. Beware of contacting the skin with solid NaCN because it can be readily absorbed (enhanced with moisture; sweating);
- spills of solid sodium cyanide on wet surfaces or exposed to rain should be shovelled into waterproof containers as soon as possible to minimize the quantity of sodium cyanide being dissolved. Affected area should be sprayed with solution of calcium hypochlorite to neutralize the cyanide, avoiding the formation of HCN gas as this gas is highly toxic. Personnel so employed shall be required to utilize a self-contained breathing apparatus;
- sodium cyanide, as a solid or in solution, must not be allowed access to any flowing stream, as its recovery from such a stream outside the plantsite area is virtually impossible. Inside the mill, solution spills of concentrated cyanide solution are pumped back into the mixing system. Spills outside this area will be directed to the main floor sumps which are pumped back into the mill circuit.
- soil contaminated with sodium cyanide should be excavated if the affected groundwater threatens to travel to an adjacent flowing stream;
- solutions of sodium cyanide which are not recovered can be neutralized by addition of lime and a dilute solution of calcium hypochlorite;
- sorbents may be used to contain and recover spilled solutions.

DISPOSAL

- solid sodium cyanide recovered from a spill may be used in the mill if it is of acceptable quality;
- solid sodium cyanide, all sodium cyanide solutions recovered from the spills, and soil containing sodium cyanide can be added to the mill circuits under the direction of the Mill Superintendent, or direct disposal at the Contaminated Materials Disposal location in the tailings pond.

PROPERTIES

- chemical formula NaCN;
- white solid, briquets or granular;
- very soluble in water, 37 WT % at 20 °C;
- aqueous solution is strongly alkaline and decomposes rapidly;
- solid sodium cyanide absorbs moisture from the air, and tends toward a liquid state.

ENVIRONMENTAL CONCERN

- much more toxic to fish and other forms of aquatic life than terrestrial life; concentrations considerably less than 1 mg/1 are of concern;
- contain and prevent from entering natural water course

CONTAINERS

- transported and stored in 1360 kg steel FloBins.

SUPPLIER

- Dupont
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

In the event of a **LIME** spill (of solid or solution) or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- **STOP** spill of lime/lime slurry at source if possible;
- **PREVENT** hydrated lime from contacting water;
- if lime does contact water, **CONTAIN** solution to as small an area as possible.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- dry chemical prone to dusting
- skin irritant and mild burns - alkaline; dusts and mists may cause irritation of mouth, nose throat and possibly lungs;
- unslaked lime (CaO) reacts with water to form hydrated lime, releasing heat.

ACTION FOR FIRE

- no special precautions;
- use extinguishing media appropriate for surrounding fires.

RECOVERY

- spills of hydrated lime on dry surfaces can simply be shovelled into containers and re-used if appropriate;
- spills of lime on wet surfaces or exposed to rain should be shovelled into waterproof containers as soon as possible to minimize the quantity of lime being dissolved;
- pump liquids into containers and use sorbents to contain and recover spilled solutions.

DISPOSAL

- hydrated lime recovered from a spill may be used in the mill if it is of acceptable quality;
- solid lime and all lime solutions (where use is inappropriate) should be disposed of in the mill tailings sump, or directly to the tailings pond.

PROPERTIES

- chemical formula $Ca(OH)_2$;
- unslaked lime (pebble lime, CaO) also used which is not hydrated, therefor reacts with water to form slaked lime
- white or white/grey solid, crystalline powder, odorless;
- strong alkaline;
- slightly soluble in water, less than 1%.

ENVIRONMENTAL CONCERNS

- toxic to fish and other aquatic life at higher concentrations in the order of 50 mg/l and greater.

CONTAINERS

- transported and stored in lined paper bags (25kg) which are palletized and double stretch wrapped (54 bags/pallet);
- also available in 1.4 tonne tote bag.

SUPPLIER

- Continental Lime
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION on Both $Ca(OH)_2$ and CaO

In the event of a **AMMONIUM NITRATE/FUEL OIL** spill or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line, above;**
- **STOP** the spill of ANFO at the source if possible;
- evacuate all non-essential personnel from the area and ensure the health and safety of those remaining;
- **ELIMINATE** all possible sources of ignition;
- **PREVENT** ANFO from contacting water;
- if ANFO does contact water, **CONTAIN** solution to as small an area as possible. Consider dyking with sand or snow to minimize travel;
- **ISOLATE** area of spill preferably by roping off affected area.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- may explode under confinement or high temperatures and friction;
- avoid contact with strong oxidizers (ie: Lead Nitrate)
- flammable;
- combustion products are toxic and may include hydrocarbons, oxides of carbon and nitrogen;
- low toxicity.

ACTION FOR FIRE

- for fires involving large quantities of ANFO, evacuate and **Do Not Attempt** to fight fires;
- for fires involving small quantities of ANFO, use large amounts of water to extinguish, control runoff;
- ANFO may detonate in fire, under severe impact or confinement.

RECOVERY

- spills of ANFO on dry surfaces can simply be shovelled into containers;
- spills of ANFO on wet surfaces or exposed to rain should be shovelled into waterproof containers as soon as possible to minimize the quantity of ammonium nitrate being dissolved;
- ANFO, or a resulting ammonium nitrate solution, **must not be allowed** access to any flowing stream;
- sorbents such as peat moss, Conwed or Graboil should be used to recover any oil emanating from the ANFO spill; snow may be used during the winter months under freezing conditions.
- soil heavily contaminated with ammonium nitrate should be excavated for incineration if the affected groundwater threatens to travel to an adjacent flowing stream.

DISPOSAL

- ANFO recovered from a spill may be used in the mine;
- ammonium nitrate solutions and soil containing ammonium nitrate should be disposed of within the mill tailings system or directly in the tailings pond;
- sorbents used to recover the oil may be incinerated under controlled conditions or buried at an approved site;
- ANFO can be disposed of by detonation or incineration under knowledgeable supervision.

PROPERTIES

- comprised of 94% prilled ammonium nitrate (NH_4NO_3) and 6% No.2 fuel oil, trade name: Amex II
- small porous pellets coated with oil, may be dyed with bright colours (yellow), odour of fuel oil;
- ammonium nitrate is Very Soluble in water; the oil is not soluble and will float;
- strong oxidizing agent;
- flammable.

ENVIRONMENTAL CONCERNS

- ammonium nitrate is moderately toxic to fish and other aquatic organisms at low concentrations. Toxicity increases with increased pH and temperature of the water.
- being very water soluble, the ammonium nitrate in the anfo can readily dissolve and enter the natural surface or ground water streams.

CONTAINERS

- ANFO is transported and stored in 25 kg polyethylene bags at the main explosives magazine.

SUPPLIER

- Explosives Limited (Calgary, Alberta)
- CIL
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

In the event of a **LEAD NITRATE** spill or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line, above;**
- **STOP** spill of Lead Nitrate solid/solution at source if possible;
- **PREVENT** solid lead nitrate from contacting water, to facilitate clean-up;
- use proper PPE for respiratory protection and body (coveralls, face shield, rubber gloves) when dust is anticipated as a hazard;
- if lead nitrate does contact water, **CONTAIN** solution to as small an area as possible;
- **Do Not Allow** material to reach water sources.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- stable, promotes combustion of inflammables and easily oxidizable materials;
- will liberate toxic oxides of nitrogen during decomposition;
- material contains lead which is a cumulative poison, avoid dust inhalation/ingestion;
- avoid skin contact, resulting in irritation and lead absorbtion;
- avoid high temperatures;
- lead and lead compounds are listed as a possible carcinogen;

ACTION FOR FIRE

- promotes combustion of inflammables;
- under decomposition releases toxic oxides of nitrogen;
- use flooding amounts of water to extinguish the fire.

RECOVERY

- spills of lead nitrate on dry surfaces can be shovelled into containers;
- spills on wet surfaces or exposed to rain should be shovelled into waterproof containers as soon as possible to minimize the quantity of material being dissolved;
- collected liquids should be pumped into containers for disposal, and use sorbents to contain and recover residual spilled solutions.

DISPOSAL

- lead nitrate recovered from a spill may be used in the mill if it is of acceptable quality;
- lead nitrate solid and solutions (where use is inappropriate) should be disposed of in the mill tailings sump, or directly to the tailings pond (contaminated material disposal).

PROPERTIES

- chemical formula $Pb(NO_3)_2$; soluble in water;
- solid white semi-transparent, crystalline powder, odourless.

ENVIRONMENTAL CONCERNS

- possibly toxic to fish and other aquatic systems through accumulation in the ecosystem and may become hazardous to man through this route.
- containers, even those that have been emptied, may contain residues and should be disposed of accordingly in approved disposal sites. (NOT LANDFILLED).

CONTAINERS

- shipped/transported and stored 25 kg plastic lined metal pails which are palletized and double stretch wrapped. Also available in plastic lined 1.4 tonne tote bag.

SUPPLIER

- Van Waters & Rogers
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

In the event of a **FERRIC SULPHATE** spill (either solid or liquid) or where there is reasonable likelyhood of a spill occuring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE 920-8130

INITIAL SPILL RESPONSE

- The General Manager or designate shall be informed of the incident and the response team action initiated. **Spill reported via 24 hour emergency spill line**, above;
- **STOP** spill of ferric sulphate solid/solution at source if possible;
- **PREVENT** solid ferric sulphate from contacting water, to facilitate clean-up;
- if working in a confined area, ventilate and use proper PPE for respiratory protection and body (full facepiece/respirator or self-contained breathing apparatus, coveralls, rubber gloves) as dusts and mist will be a hazard;
- if ferric sulphate does contact water, **CONTAIN** solution to as small an area as possible by dyking with sand or other non-reactive material and slowly neutralize with lime;
- **Do Not Allow** material to reach water sources.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- stable, reacts with lime and other basic materials to form iron salts;
- corrosive to mild steel, copper alloys, galvanized steel, paints, enamels and concrete
- high temp. (+600 °C) decomposition releases toxic iron oxide and sulphur trioxide;
- **Do Not Get in Eyes**, on skin and clothing, wash thoroughly after handling; contact with the mists can severely damage the eyes to the extent of permanent injury;
- dusts will lead to the same hazards when allowed to contact moist areas such as eyes, nose, throat and lungs; contact with skin/sweating can have the same affect;

ACTION FOR FIRE

- this material is non-combustible;
- requires self-contained breathing apparatus and full protective clothing;
- use extinguishing media compatible with the surrounding combustible materials;

RECOVERY

- spills of ferric sulphate on dry surfaces can be shovelled into containers;
- spills on wet surfaces or exposed to rain should be shovelled into waterproof containers as soon as possible to minimize the quantity of material being dissolved;
- collected liquids should be pumped into containers for disposal; use sorbents to contain and recover residual spilled solutions.

DISPOSAL

- ferric sulphate recovered from a spill may be used as per tailings treatment requirements if of acceptable quality (has not been wetted);
- ferric sulphate solid and solutions (where use is inappropriate) should be disposed of directly to the tailings pond (contaminated material disposal).

PROPERTIES

- chemical formula $Fe_2(SO_4)_3$; soluble in water approximately 55% weight;
- may contain up to 3% sulphuric acid;
- dry powder is reddish brown, liquid is clear red, odourless.

ENVIRONMENTAL CONCERNS

- possibly toxic to fish and other aquatic systems through accumulation in the ecosystem and may become hazardous to man through this route.
- containers, even those that have been emptied, may contain residues and should be disposed of accordingly in approved disposal sites. (NOT LANDFILLED).

CONTAINERS

- shipped/transported in 1 ton, plastic lined tote bags; store in cool, dry well ventilated area.

SUPPLIER

- Van Waters & Rogers
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION

APPENDIX I

TELEPHONE LISTING

LUPIN OPERATIONS, N.W.T.

24 Hour Emergency Powerhouse (Paging for fire crew and mine rescue)	Bus.	Ext-8129
Switchboard	Bus.	890-7000
General Manager Mr. J. McCrank	Bus.	Ext-8787
Technical Services Superintendent Mr. Rod Cooper	Bus.	Ext-8763
Mine Superintendent Mr. Aidan O'Toole	Bus.	Ext-8777
Mill Superintendent Mr. James Rappel	Bus.	Ext-8767
Surface Foreman Mr. Ralph Gillard	Bus.	Ext-8143
Loss Control Superintendent Mr. Hugh Ducasse	Bus.	Ext-8779
Manager, Environmental Affairs, Lupin Mr. David Hohnstein	Bus.	Ext-8794
Environmental Technologist	Bus.	Ext-8756

It shall be the responsibility of the General Manager or his designate to notify the Vice President Environment and/or the Company President.

Mr. Don Ewigleben, VP Environment	1 (303) 714-8821
Mr. Richard Kraus, President	1 (303) 714-8835

REVISED 4/90

TELEPHONE LISTING

GOVERNMENT AGENCIES	TELEPHONE	FACSIMILE
GOVERNMENT NWT - Department of Renewable Resources		
Environmental Protection Division		
Mr. Neill Thompson	(403) 873-7654	(403) 873-0221
Mr. Ken Hall (Alt.)	(403) 920-6476	
Wildlife Management Division		
Wildlife Biologist	(403) 920-6190	(403) 873-0293
GOVERNMENT OF CANADA		
Indian and Northern Affairs Canada Land Use and Water Use		
Regulatory Approvals, Water Resources	(403) 669-2653	(403) 873-9318
Land Use; Reg. Manager, Land	(403) 920-8561	(403) 920-4669
NUNAVUT District Office	(819) 979-4405	(819) 979-6445
Environment Canada Environmental Protection Branch	(403) 920-6060	(403) 873-8185
Habitat Biologist	(403) 920-6059	(403) 873-8185
OTHERS		
24 HOUR SPILL REPORT LINE GNWT - Dept. of Renewable Resources	(403) 920-8130	(403) 873-6924
Kitikmeot Inuit Association, Kugluktuk	(403) 982-3310	(403) 982-3311
Kugluktuk Hunters and Trappers Assoc.	(403) 982-4908	(403) 982-4047

ADDITIONAL COMMUNICATIONS

Lupin

Lupin can be contacted by:

Telephone	403-890-7000
H.F.	4765.0 or 4441.0 MHz
Radio Telephone	SR1555
Fax	403-890-8766

Winter Road

Winter Road Camps & Vehicles:

HF	4765.0 or 4441.0 Mhz
CB	Channel 19

TELEPHONE PATCH THRU YELLOWKNIFE - PHONE 920-2161 ask for telephone patch to Lockhart/Lac DeGras

Yellowknife (Hangar)

Telephone	920-2161
HF	4765.0 or 4441.0
CB	Channel 19

EMERGENCY CONTACTS

Dupont 901-357-1546
EMERGENCY RESPONSE CENTER (24 HOUR) 1-800-387-3616

Chemtrec 1-800-424-9300

Sorbents

Conweb & Oil Snare Canadian Industries Ltd 465-0221
Alberta Oil Spill Consultants (Booms, sorbents, skimmers) 451-0585

PETROLEUM AND CHEMICAL PRODUCTS INVENTORY
MAJOR COMPONENTS

PRODUCT	QUANTITY	STORAGE UNITS	# OF UNITS	STORAGE LOCATION
P40 FUEL	3804000 IG	350000 IG 360000 IG	9 2	Main Tank Farm Main Tank Farm
P50 FUEL	592000 IG	187000 IG 18000 IG	3 3	Main Tank Farm Main Tank Farm
GASOLINE	6540 IG	3500 IG	2	Satellite Tank Farm
JET A	248000 IG	360000 IG	1	Main Tank Farm
RALUBE 40	80000 L	BULK: Tanker	3	Main Tank Farm
W30 LUBE OIL	340000 L	BULK: Tanker	11	Main Tank Farm
CYANIDE	560 mt	1.36 Tonne, Bin	412	Cold Storage 3
LIME (PEBBLE)	470 mt	1.4 Tonne, Bag	336	Cold Storage 2,3
HYDRATED LIME	82.5 mt	25 kg Bag	3300	Cold Storage 2,3
LEAD NITRATE	299 mt	25 kg Pail 1.2 Tonne bag	584 237	Cold Storage 3
HYDROCHLORIC ACID	2080 L	20 L Jug	104	Cold Storage 2
ZINC DUST	38.5 mt	45.4 kg Pail	849	Cold Storage 2
FERRIC SULPHATE	45 mt	1 TON Bag(various)	51	Cold Storage 2
ANFO (AMEX)	621 mt	25 kg Bag	24860	Main Magazine
LOMEX II	14775 kg	15 kg Bag	985	Main Magazine
SODIUM NITRATE *	2596 kg	22.7 kg Bag	132	Cold Storage 3
SODA ASH *	2100 kg	25 kg Bag	84	Cold Storage 3
SILICA *	1816 kg	22.7 kg Bag	80	Cold Storage 3
BORAX *	4425 kg	22.7 kg Bag	172	Cold Storage 3
FLUORSPAR *	1000 kg	22.7 kg Bag	44	Cold Storage 3
FLOCCULANT	92.375 mt	25 kg Bag	3695	Cold Storage 3

* 1996 on Hand (April) Refinery reagents. Annual use low, will not be reordering for 1997.
Actual inventory after winter road re-supply, 1996

TABLE 1

HEAVY EQUIPMENT INVENTORY
ECHO BAY MINES LTD.
LUPIN OPERATIONS, N.W.T.

No.	Description
1	930 Loader
1	966 Loader
2	Volvo Loader
1	Badger Crane
1	Grover Crane
2	Volvo Haul Truck (20t)
1	Ford 9000 Truck
1	Flat Deck Truck
2	Euclid Haul Truck (28t)
1	769 Cat Haul Truck (35t)
1	D85E Dozer
1	D8K Cat Dozer
1	Grader
1	Rubber Wheel Backhoe
2	Pickup Truck

TABLE 2

SPILL CONTAINMENT/RECOVERY MATERIALS

Spill containment/recovery materials located at Lupin within the "Emergency Spill Response Van" container, centrally located beside the backfill shop, adjacent to the underground ventilation fan (see Fig. 7) contains the following inventory:

3	Shovels;
2	Roll Poly; 4mL, 500 ft.;
1	Crate of floordry; (50) 20kg bags;
4	booms, 11 ft.;
1	Pump; 2" Honda;
1	Safety approved 2 gallon gas container;
2	20 ft. 2" hoses;
10	45 gallon drums (no lids) for collection of contaminated materials;
1	100 ft. rope;
2	fire extinguishers;
1	4 lb sledge;
1	Box, dust masks

In addition to the above, the on-site Lupin warehouse maintains a supply on hand of the smaller items such as floordry, pads, shovels, dust masks. If additional equipment is required during a clean-up procedure warehouse issues are readily available.

TABLE 3

ADDITIONAL NWT SPILL FORM

REFERENCES

- Guidelines For Contingency Planning
  Northwest Territories Water Board, 1987

- Contingency Planning And Spill Reporting In The NWT
  A Guide To The New Regulations; unauthored, GNWT

- Guidelines For The Preparation of Hazardous Material Spill Contingency Plans;
  Environmental Protection, W&N Region, Report No. CP(EP) ENR90-91-4
  March 1990

- Oil And Toxic Material Spill Contingency Plan
  Echo Bay Mines Ltd., 1984, updated annually

- General Contingency Plan; Echo Bay Mines Ltd.
  November, 1990; Updated annually

- Polaris Operations Contingency Plan;
  Cominco Ltd, Polaris , N.W.T.; June 1994

- Guidelines For Preparing Spill Contingency Plans For Winter Road Operations In The Northwest Territories; E. Paquin, GNWT; D. Stendahl, NAP/INAC; D. Tilden, EPS/DOE; October 1983

- The Environmental Protection Act of The Northwest Territories; Spill Contingency Planning and Reporting Regulations, Registered July 22, 1993

APPENDIX II

MATERIAL SAFETY DATA SHEETS

SITE PRODUCT LISTING

Northwest Territories

N.W.T. SPILL REPORT

'Oil, Gas, Hazardous Chemicals or other Materials'

ᓄᓇᕗᑦ ᑯᐃᓕᐅᑦ ᐅᓂᒃᑳᖅ ᐅᖃᓕᒫᒃᑯᓐᓂᖅ ᓴᖅᑭᑐᖅ ᐊᒻᒪᓗ ᐊᑐᐊᓕᖅᑐᑦ ᐅᖃᓕᒫᒃᑯᓐᓂᖅ

24-Hour Report Line
24-ᓂᑦ ᐃᑲᖏᓂᑦ ᐅᓂᒃᑳᖏᑕᐅᓂᖅᓴᖅ ᐅᑦᑎᐊᕐᓂᖅ
Phone/ᐅᖏᓪᓗᐅᑦ (403) 920-8130
Fax/ᓱᒃᑐᐃᓐᑯᑦ (403) 873-6924

A Report date and time
ᐅᑦᓚᓐ ᓯᓚᐃᓐᓇᖅᑐᓗ ᑲᓇᑕᒥᓐᓄᑦ ᐅᓂᒃᑳᑎᓪᓗᒍ

B Date and time of spill (if known)
ᐅᑦᓚᓐ ᐊᑎᓐᓄᑦ ᑲᓇᑕᒥᓐᓄᑦ (ᑲᑎᕐᓗᒍ)

C ___ Original report ᓄᓇᕗᑦᑎᐊᓕ ᐅᓂᒃᑳᖅᐅᔪᓐ
Spill number ᐊᖏᑦ ᓴᓇᐅᑦ
___ Update no. _____
ᐅᓂᒃᑳᖅᐅᔪᓐᓇᖅᑐᖅ ᓴᓇᐅᑦ ___.

D Location and map coordinates (if known) and direction (if moving)
ᓴᓪ ᐊᖏᑦ ᑭᓚᓐ ᐊᓂᓵᔪᑦ ᐊᓯᑎᕐᓂᑦ ᖃᐅᔨᓴᖅᑐᑦ (ᑲᑎᓐ ᓄᓇᕗᒻᒥᔪᖅᑕᐅᓂᖅ)

E Party responsible for spill
ᐱᓕᑦ ᐊᐃᑎᑎᒋᑦ

F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)
ᐱᓇᑦ ᐱᓕᓴᓂᑦ ᐊᐃᑦ ᖃᓄᐃᓗ ᑕᕐᓂᖃᖅᑐᑦ (ᑕᕐᓂᓕᓐᓂ ᐅᖃᓕᒫᒃᑯᓐᓂᖅᓴᓂᑦ ᑎᑎᕋᖅᑐᑦ)

G Cause of spill
ᐱᓇ ᓴᓇᔨᓴᒋᑦ

H Is spill terminated?
ᓴᓇᐅᖅ ᓂᕆᖃᑎᒋᑦ?
___ yes/ Δ ___ no/ ᑭᖑ

I If spill is continuing, give estimated rate
ᓄᓇ ᐊᐃᑦᑐᑦ ᖃᓄᐃᓗ ᐱᖓᓕᒫᖅᓯᒪᑦ

J Is further spillage possible?
ᓴᓇᖃᓐᓂᐊᓕᖅᑐᖅ?
___ yes/ Δ ___ no/ ᑭᖑ

K Extent of contaminated area (in square metres if possible)
ᖃᓄᖅ ᑕᕐᓂᑎᒋᑦ ᐊᐃᑦᑎᐊᓕᖅ (ᐅᓪᓗᒥᒃᓵᓗᒍ ᑎᑎᕋᖅᑐᑦ)

L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.)
ᑭᓱᓕᖅ ᐱᓕᕐᑕᒋᑦ ᐊᐃᓕᒍᑦ ᐅᑭᓐ ᑕᕐᓂᑕᐅᓂᖃᖅᑐᓗ ᓄᓇ ᖃᓄᐃᓕᖅᓯᒪᓂᖅᓴᑦ, ᓴᓇ ᖃᓄᐃᓕᖅᓯᒪᓂᖅᓴᑦ ᐊᑐᕐᕕᒃᓯᒪᓂᖅᓴᑦ, ᐊᕐᕕᒃᓴᖅᑐᓗ)

M Containment (natural depression, dykes, etc.)
ᐅᓪᓗᓕᖃᖅᑎᑦ ᑭᓄᖅᑐᑦ ᐃᓕᓴᕐᓂᕐᓚᐅᖅ (ᓄᓇᒥ ᐃᓕᓴᕐᓂᑦ, ᐊᕐᕕᒃᓴᖅᑐᓗ)

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
ᖃᓄᐃᓕᖅᑎᑦ, ᖃᓄᐃᓕᖅᑎᑦᑎᓂᖅᓯᒪᓂᑦ ᑎᑎᕋᖅᑐᓗ ᖃᓄᐃᓕᖅᑎᑦᑎᓂᖅᓯᒪᓂᑦ ᐊᑕᐅᓯᒋᐊᕐᓂᑦ, ᓄᓇᖃᖅᑎᑦᑕᐅᓂᑦ, ᓴᓇᓕᖅᓯᒪᓂᑦ ᑎᑎᕋᖅᑐᓗ ᓯᓚᑕᐅᓂᖅᓯᒪᓂᑦ ᓴᓇᐅᖅ (ᐊᖏᔪᓄᑦ) ᑭᓚᓐ ᐊᐃᑦᑎᐊᓕᖅ.

O Do you require assistance?
ᐃᑲᓂᒃᑕᐅᔪᓂᖃᖅᑎᑦ?
___ no ___ yes, describe:
___ ᑭᖑ ___ Δ - ᓄᓇᕗᑦᑐᓗ

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife
ᑭᑦᑕᓄᐃᓐᓇᖃᖅᑎᑦᑐᑦ ᐃᓄᓐᓄᑦ, ᐱᔭᕐᓂᐅᔪᓄᑦ ᐅᑭᓐ ᑭᖅᑎᒥ ᓱᓐ - ᐃᒪᓐᓄᓂ, ᐃᒥᒍᒥ ᓂᐅᖃᖅᑕᐅᔪᒍᓂ, ᐃᖃᓗᓄᑦ ᐅᑭᓐ ᓂᑦᑎᓄᑦ

Q Comments and/or recommendations ᐅᖃᐅᓯᐃᑦ ᑭᓚᓐ ᐅᑭᓄᓐᓂᑦ ᖃᓄᐃᓕᒋᐅᓄᐅᔪᑦ

FOR SPILL LINE USE ONLY
ᑭᐅᑕᐅᔪᓐᓇᖅ ᑯᐃᓕᓄᑦ ᐅᖃᓕᒫᒃᑯᓐᓂᑕᐅᓂᖅ

Lead Agency
ᐃᓐᖃᐃᓕᐅᓕᖅᓯᒪᑦ ᑯᐃᐊᒃ ᑲᒪᔨᖃᐅᓂᑦ-

Spill significance
ᑯᐃᓄᑦ ᖃᓄᐃᓕᖅᓯᒪᓂᖅ-

Lead Agency contact and time
ᐃᓐᖃᐃᓕᐅᓕᖅᓯᒪᑦ ᑯᐃᐊᒃ ᑲᒪᔨᖃᐅᓂᑦ
ᖃᐅᔨᖃᖅᑕᐅᓂᖅ ᑭᓚᓐ ᖃᔪᔪᒥᒃᑐᓗ

Is this file now closed?
ᑕᑯ ᐅᓂᖅᓴᔪᐅᓂᖅ ᒪᑐᐅᑦ?

Reported by ᐅᓂᖃᖅᑐᖅ	Position, Employer, Location ᖃᓄᐃᑎᒥ ᐃᖃᓄᐃᓕᓂᑦ, ᐃᖃᓄᐃᓕᒫᒥᒃ, ᓄᑕ	Telephone ᑎᖃᐅᑦ
Reported to ᐱᓕᕐᓂᑦ ᐅᓂᖃᖅᑕᐅᓂᖅ	Position, Employer, Location ᖃᓄᐃᑎᒥ ᐃᖃᓄᐃᓕᓂᑦ, ᐃᖃᓄᐃᓕᒫᒥᒃ, ᓄᑕ	Telephone ᑎᖃᐅᑦ

ECHO BAY MINES

ENVIRONMENTAL POLICY

February 15, 1996

Echo Bay Mines participated in the development of and subscribes to the environmental principles adopted by the Mining Association of Canada and The Gold Institute (USA), but it believes that it should also state clearly its own principles and practices, which are:

- Seek to be environmental leaders in the mining community by integrating responsible environmental management as an essential component of all business decisions.
- Assign accountability and responsibility for implementation of the environmental policy and make environmental performance an important factor in the management review process.
- Provide adequate resources, personnel and training so that all employees are aware of and able to carry out their environmental responsibilities in accordance with the environmental policy.
- Communicate openly with employees, the regulatory community, and the public on environmental issues, and address concerns pertaining to potential hazards and impacts.
- Design, construct, operate and reclaim all projects in compliance with applicable national and local regulations. In situations where environmental regulations are absent, or less than Echo Bay's standards, apply best management practices to achieve environmental protection.
- Conduct operations in an environmentally sound manner, incorporating the efficient use of energy and materials, and minimizing the use and production of hazardous substances.
- Assess environmental risks and impacts from all activities. Evaluate the regulatory requirements for each project and schedule their implementation as components of the initial project planning process. Establish and maintain appropriate emergency response plans for all activities and facilities.
- Maintain a strict monitoring program at each facility to ensure compliance.
- Conduct periodic environmental assessments of all Echo Bay facilities and develop and implement action plans to correct potential deficiencies in a timely manner.
- Promote company involvement in environmental enhancement projects and encourage employee participation in such projects.
- Support research to develop more effective measures for compliance with environmental regulations and to increase the protection of the environment from mining related impacts.
- Work in cooperation with industry, the public and government toward the development of environmental policies, laws and regulations which are cost effective and scientifically sound.