



Canada - Lupin Mine Spill Contingency Plan

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Nunavut Water Board

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TABLE OF CONTENTS

1	GENERAL	7
1.1	PREAMBLE	7
1.2	CONTACTS	7
1.3	DISTRIBUTION LIST	7
1.4	PURPOSE	8
1.5	MMG CORPORATE ENVIRONMENTAL POLICY	8
2	REPORTING PROCEDURES	9
2.1	INITIAL REPORTING/ACTION	9
2.2	INTERNAL REPORTING	9
2.3	EXTERNAL REPORTING	9
2.4	RESPONSE TEAM ORGANISATION	10
	2.4.1 Development Manager	10
	2.4.2 Project Manager – Izok Lake	10
2.5	RESPONSE TEAM ROLE	11
3	SITE INFORMATION	11
3.1	GENERAL	11
3.2	SITE COMPONENTS (OPERATIONS)	12
	3.2.1 Mill Tailings Handling	12
	3.2.2 Sewage	13
	3.2.3 Paste Backfill	13
	3.2.4 Mine water	13
	3.2.5 Water Source/Supply	14
	3.2.6 Storage Facilities (Consumables)	14
	3.2.7 Petroleum Products	14
	3.2.8 Chemical Products	15
	3.2.9 Receiving Environment	15
4	OPERATIONS SYSTEM – COMPONENT MALFUNCTION PREVENTION	16
4.1	TAILINGS LINE	16
4.2	SEWAGE LINE	16
4.3	FLOAT PLANE DOCK	16
4.4	ENGINEERED FACILITIES	16
5	SYSTEM MALFUNCTION – RESPONSE INFORMATION	17
5.1	TAILINGS LINE	17
5.2	TAILINGS IMPOUNDMENT	17
5.3	SEWAGE SYSTEM	18
5.4	MINE WATER	18



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

6	PETROLEUM AND CHEMICAL PRODUCTS – RESPONSE INFORMATION	18
6.1	GENERAL	18
6.2	SPILL CONTAINMENT, RECOVERY AND DISPOSAL	19
6.2.1	Containment on Land	20
6.2.2	Containment on Snow	20
6.2.3	Containment on Ice	20
6.2.4	Containment on Open Water	21
6.3	RECOVERY	21
6.4	DISPOSAL	21
6.5	OTHER CONCERNS	22
6.5.1	Oil-soaked Snow	22
6.5.2	Fire	22
6.5.3	Main Fuel Tank Farm	23
7	SPILL RESPONSE RESOURCES	23
7.1	RESPONSE EQUIPMENT	23
7.2	RESPONSE TEAM	24
7.3	TRAINING AND EXERCISES	24
8	COMPONENT AND PETROLEUM-CHEMICAL PRODUCT – DETAILED RESPONSE PLANS	24
8.1	SYSTEM COMPONENTS	25
8.2	PETROLEUM/CHEMICAL PRODUCTS	25



LIST OF TABLES

Table 1	Petroleum and Chemical Products Inventory – Major Components	43
Table 2	Heavy Equipment Inventory – Lupin Mine	43
Table 3	Spill Containment/Recovery Materials	44

LIST OF FIGURES

Figure 1	Response Team Flow Sheet	42
Figure 2	Spill Report Form	42
Figure 3	Site Location Map	42
Figure 4	Typical Tailings Dam Cross-section	42
Figure 5	Lupin Site Plan	42
Figure 6	Sewage General Arrangement	42
Figure 7	Raw Water Supply	42
Figure 8	Storage Facilities	42
Figure 9	Tailings Line Dump Ponds	42
Figure 10	Tailings Line Route	42
Figure 11	Dam Locations – Tailings Containment Area	42

APPENDICES

Appendix 1	Telephone Listings and Communications	40
Appendix 2	Figures	42
Appendix 3	Tables	43
Appendix 4	References	45
Appendix 5	Material Safety Datasheets	46



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

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1 GENERAL

1.1 PREAMBLE

This Contingency Plan has been compiled with respect to the requirements within Water License Number 2AM-LUP0914, Part H, Item 1; renewed on 25 February 2010 and is effective from 1 January 2010 to 31 December 2010.

An annual review of the Plan takes place and revisions are usually submitted as necessary with the annual report. The current Water License for the Lupin Mine is valid until March 31, 2014.

Mining and milling operations at Lupin were suspended in January 2005 and the property was put on Care and Maintenance.

The 'Guidelines For Contingency Planning, Northwest Territories Water Board, 1987', have been utilised as the guide to the requirements of the manual as per Item 1, Part H. The Plan has been expanded beyond these guidelines where appropriate.

1.2 CONTACTS

The Corporate person responsible for the operation of the Lupin site is:

Andrew Mitchell
MMG Canada
Manager, Development
Suite 200, 1159 Alloy Drive
Thunder Bay, Ontario
Canada P7B 6M8

Phone: (807) 346-1668

Site Managers are: Unknown at this time

1.3 DISTRIBUTION LIST

Affiliation	Position	Name	Copy #
MMG Canada	President	Martin McFarlane	
MMG Canada	Manager, Development	Andrew Mitchell	
MMG Canada	Exploration Manager	Ian Neill	
MMG Canada	Project Manager- High Lake	Jason Rickard	
MMG Canada	Project Manager – Izok Lake	Ron Fenlon	

Additional copies of the Plan may be obtained by contacting the Development Manager, at the address above.



1.4 PURPOSE

This Contingency Plan 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 minimise 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 the safe and effective containment and clean up/disposal of a system failure or material spill.
- Define specific individuals and their responsibilities.

The transportation joint venture which is responsible for the winter road, drafts a contingency plan for the road before hauling starts entitled 'Tibbitt to Contwoyto Winter Road Joint Venture Spill Contingency 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 Lupin Operations Contingency Plan is limited to the Lupin Mine Operations and is not intended to cover the response action plans for winter road transportation.

1.5 MMG CORPORATE ENVIRONMENTAL POLICY

Our aim is to achieve a high standard of care for the natural environment in all of the activities in which we engage. We undertake to minimise our impact on the environment.

We will:

- Conduct our operations in compliance with all relevant environmental regulations, licenses and legislation as a minimum condition;
- identify, monitor and manage environmental risks arising from our operations;
- seek continuous improvement in environmental performance, production processes, waste management and the use of resources;
- provide appropriate training and awareness for all employees on environmental issues;
- communicate regularly with employees about our aim and about individual responsibilities;
- inform our customers and suppliers of our aim and of their responsibilities in relation to our business;
- communicate with shareholders, the community and governments about our environmental performance, and contribute to the development of laws and regulations which may affect our business.



2 REPORTING PROCEDURES

2.1 INITIAL REPORTING/ACTION

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

An assessment of the spill/potential spill should be made, regarding identification of the material, risk to personnel safety and the environment, cessation, control and containment. If you are **SURE** it is **SAFE** to do so, an attempt should be made to control the spill. 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 accident/incident investigations. Upon proper notification of the personnel in the 'Response Team Flow sheet' (Figure 1), remedial action can commence in accordance with the corresponding response plan. The immediate reporting of the spill to the 24 HOUR SPILL HOTLINE (867) 920-8130 (fax 867-873-6924) will be carried out by the Development Manager or the Project Manager or, if neither is available, the appropriate designate.

2.3 EXTERNAL REPORTING

The Development Manager (or designate), upon receiving a report, will follow through with the 'Response Team Flow sheet' (Figure 1) and its first line of authority.

The Response Team shall then:

1. Proceed to the failure/spill location and assess the situation;
2. DO NOT TAKE ANY UNNECESSARY RISKS;
3. Make arrangements for first-aid and removal of injured personnel;
4. Co-ordinate equipment support and mobilise to location;
5. When an unauthorised 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 (Figure 2, Appendix 2). Retain the original and deliver one copy of the report to each of:

Development Manager	Andrew Mitchell,
Project Manager, Izok Camp	Ron Fenlon

6. Upon reporting a spill to the Spill Report Line, the INAC Water Resources Inspector (Iqaluit) must be notified at (867) 975-4289, if the spill is above the reportable quantities.

The Development Manager or designate, shall complete a Detailed Spill Report and submit to a Water Resources Inspector no later than 30 days after the initial report of the spill.



Submit to:

Melissa Bell
Water Resources Officer
DIAND, Nunavut District, NT
Baffin Region
PO Box 100
Iqaluit NT X0A 0H0

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 included in Appendix 1.

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 Appendix 1 for current contacts and phone numbers.

2.4 RESPONSE TEAM ORGANISATION

The response team organisation has been summarised in the Response Team Flow Sheet (Figure 1). Within this team there are key personnel who 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. Since the property is in care and maintenance and currently has no personnel on site the initial response team will be at the Izok Lake exploration camp located approximately 75km west of the Lupin Mine Site.

2.4.1 Development Manager

The Development Manager will:

- Ensure that the Plan is properly distributed to those personnel most likely to encounter a spill or unauthorised release;
- 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 minimise the risks during response;
- Carry out all media relations. Note that incoming media or other outside inquiries should be directed to the Development Manager or designate.

2.4.2 Project Manager – Izok Lake

The Project Manager - Izok Lake will:

- Provide technical support to personnel involved with the incident response. Under their direction, personnel are available for collection and preservation of samples;
- Provide all necessary personnel and equipment to contain, mitigate and clean up the spill as required;



- Initiate the relocation of any additional supplies that may be required to the incident location;
- Provide availability of maintenance personnel of so required for the termination of a spill or release and repair of faulty equipment;
- Ensure all safety practices are in place and that the activity is performed according to safety standards;
- Provide technical advise on containment, clean up and disposal procedures activated through the Plan.

2.5 RESPONSE TEAM ROLE

Following consultation between the Manager, Environmental Affairs and the Exploration Manager, or their designates, the role of the team(s) upon arrival at a competent failure, petroleum, or chemical spill are as follows:

- a) Assemble the necessary personnel and equipment required to contain a spill;
- b) Proceed to the scene and coordinate the overall clean up and or repairs;
- c) Assess the possibilities of any danger to life, property or equipment;
- d) Determine if any product is seeping;
- e) Take necessary action required to stop/reduce/contain any further product from escaping;
- f) Attempt to determine the extent of the damage 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). Any burning requires prior approval from the regulatory authorities.
- h) If outside of 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 it 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 the containment necessary (ID chemical and reference MSDS, etc).

All contaminated materials are to be removed and deposited according to the individual response plans, or as directed by appropriate regulatory personnel.

3 SITE INFORMATION

3.1 GENERAL

The Lupin Mine is located in Nunavut on the western shore of Contwoyto Lake, approximately 285 km S.E. of the community of Kugluktuk and approximately 400 km northeast of Yellowknife. The coordinates are 65° 46' Latitude and 111° 14' Longitude (see Figure 3).



Mining operations were terminated on January 26, 2005 and mill tailings discharge was terminated in June, 2005. The tailings line between the mill and the tailings containment area was thoroughly flushed out with fresh water and decommissioned at the end of October 2005. The property is now on care and maintenance.

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

During the winter months, the Lupin operation was, and can be serviced by an ice road from Yellowknife, NWT. With an operating window of approximately six weeks, the winter road is used to facilitate the re-supply of Lupin with fuel and bulk supplies for the ensuing year. With the termination of mining and milling operations, there is no further requirement for reagents. All reagents which remained on site following termination of milling have been returned to manufacturers or sold and shipped off site on the 2005 and 2006 winter roads. A modest amount of fuel was trucked to site in the winters of 2005 and 2006.

Figure 5 shows the general site plan and Figures 6 through 11 show more detailed views of the camp, water supply, sewage and tailings disposal areas.

3.2 SITE COMPONENTS (OPERATIONS)

The site components used to support operations consist of facilities for handling tailings transport, storage, paste backfill, sewage handling, mine water disposal and freshwater supply. These are described below.

3.2.1 Mill Tailings Handling

Mill production commenced in 1982 with temporary suspensions of operations from January 1998 to April 2000 and from August 2003 to March 2004. Mining activities were terminated as of January 26, 2005, and the mine decommissioned. Mill discharge to tailings ceased in June, 2005. The property is now under care and maintenance.

While the mine was in operation, the mill tailings slurry was transported approximately six (6) kilometres to the tailing containment area (TCA), via an eight (8) inch diameter insulated pipeline. The total impoundment area of approximately 750 hectares consists of four solids retention cells (Cells 1, 2, 3 and 5), and three liquid holding ponds. Cell 4 was originally planned as a solids retention cell but has instead been used as a primary polishing pond. It is separated from Cell 3 by an internal dam.

The main liquid holding ponds (Pond 1, Pond 2) are operated in series and are separated by a constructed dam (J-Dam). Lined perimeter dams contain the liquid in Pond 2, which is discharged via siphons, usually bi-annually, in July/August. (Figure 4 shows a typical dam construction).



3.2.2 Sewage

All camp sewage is discharged to the two cell Sewage Lakes system for storage, via a six (6) inch insulated pipeline of approximately 500m in length. Annual decant of the system provides adequate storage capacity and treatment for all current camp needs.

A constructed dam divides the system into two cells, which are operated in series. Discharge to the environment via a siphon system from the second lake takes place annually between June and October. See Figure 6 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. Between 1995 and 2005, approximately 1,800,000 tons of mill tailings, constituting 30% of total tailings produced during that period, were deposited in the underground stopes.

In general, the paste was a high-density mixture of water and fine solid particles (tailings) with moisture content typically between 18% and 22%. Cement was added in various quantities (1-5%) for strengthening properties. The material was then pumped through a high pressure pipeline to the active stopes or to inactive mine voids.

Piping to the underground system is located through the main plant complex where practical. A short distance of pipeline was also located outside the plant to permit the backfilling of the surface crown pillar stopes.

With the termination of operations, mill tailings and paste backfill are no longer being produced, and the distribution system is no longer in operation.

3.2.4 Mine water

The Lupin mine is located geographically in an area of continuous permafrost resulting in frozen ground to a depth of approximately 490 metres. Due to this feature, there was very little ground water that required handling from the underground workings.

The day-to-day underground operations required a water supply from surface. Recycling of water occurred throughout the mine, however some water was pumped to surface for disposal in the TCA (Figure 6) via the tailings pipeline.

Pumping of mine water to surface ceased during the summer of 2005 and the system has been decommissioned.



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 7). A maximum quantity of 1,700,000 m³/year (4,657 m³/day) can be withdrawn for all uses, as stipulated by water license NWB1LUP0008. Since October 2005, pipeline water usage has been less than 300 m³/day. The 2009 field season will see minimum water consumption for the 1300 wing and the weather haven tent kitchen, the water will be supplied via the water truck.

3.2.6 Storage Facilities (Consumables)

All consumables, where practical, are transported to the site via winter road and stored for use during the ensuing year. The items of concern in this contingency plan are the petroleum products and explosive products 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. Most remaining bulk reagents and chemicals, used for the milling operation, have been transported off site and returned to the manufacturers, disposed of, or sold.

3.2.7 Petroleum Products

All bulk storage facilities for petroleum products at the mine have been provided with secondary containment in the form of an impermeable liner and berm. There are two fuel tank storage areas on site – the main tank farm and the satellite tank farm. The impoundment volume of each facility is sufficient to accommodate 110% of the largest single tank volume that is contained.

The main tank farm containment measures 230 metres long by 58 metres wide and contains 15 fuel storage tanks with a total storage capacity of 21.6 million litres. Tank capacities and products are listed in Table 1. Oil cubes (1600 litre capacity each) and drums of various other lubricants are also stored within the main tank farm containment; which includes two areas for barrel storage, at the north and south ends. Both barrel storage areas are lined and bermed.

The satellite tank farm is located adjacent to the powerhouse. The 35-metre x 25-metre lined and bermed facility contains ten 18,000 gallon capacity tanks for the storage of diesel fuel and 2 (two) 5,000gallon tanks for gasoline.

The products that are located at the site include; Diesel, Jet A and Jet B fuels, Gasoline, Ralube 40 CF, and various lubricating oils.

Please refer to Figure 8 for general location of all storage facilities and Table 1 for a summary of the products on site, their amounts, storage units and location of the storage facility. Table 1 lists quantities of product on-site as of 31 March 2006, at the end of the winter road re-supply and product backhauls, which reflects the maximum amount in storage for the remainder of the year.

Note that in order to fulfil Schedule H, Item 1g (of the water license), which identifies a requirement to provide more clarity on the quantities and locations of Jet A and Jet B fuel on site as well as information regarding proper storage of hazardous materials including types, volumes and locations, a detailed inventory is planned for 2010.



3.2.8 Chemical Products

The major chemical products that were used at the mine and mill (in order of amount) consisted of ANFO, cyanide, lime, lead nitrate, flocculent, ferric sulphate, and zinc dust. Where possible, these reagents were ordered in bulk containers to decrease handling, reduce costs and minimise risk associated with spillage. With the cessation of operations, the mill reagents - cyanide, lead nitrate, flocculent, ferric sulphate, and zinc dust - have been shipped off site and returned to the manufacturers.

Numerous other chemicals/reagents were used on a regular basis at Lupin but, due to the small quantities involved, they are not considered within this document under the detailed response plans. The majority of these chemicals have also been shipped off site, to the Swan Hills hazardous waste facility. MSD sheets are available for all products still present on site (Appendix 2).

3.2.9 Receiving Environment

The Lupin mine is located in the barren land tundra of Nunavut. 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 could enter Contwoyto Lake, and the tailings containment area which, in the event of an unplanned release, would discharge to either the west or south drainage basins of Contwoyto Lake. The six-kilometre tailings line route is no longer in use and not subject to contamination from line spillage.

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 (petroleum storage areas, winter road access). The sewage disposal pipeline is located on the south end of the complex, therefore, any spill would report 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 approximately 1.5 km from the site, is situated in a gentle sloping terrain which receives runoff from an approximately 4-5 km² area which includes the location of the No.2 Dump station and the tailings line to the north and south (approx. 2km). As the tailings line is no longer in use, there is no further potential for contamination.



There are several small lakes in the immediate vicinity of the TCA that could have been 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 fisheries habitat. These areas are adjacent to the following dam locations; dam 6, 5, 4 and 3 respectively. Dam 3 and 6 are now inactive, as contained tailings have been covered with esker material. Dam 5 has never contained tailings, being at a higher elevation than the level of the tailings. Dam 4 is in excess of 40 metres wide, toe to toe, at the closest point between the Cell 4 polishing pond and Long Lake.

4 OPERATIONS SYSTEM – COMPONENT MALFUNCTION PREVENTION

Since the mine site is not operating nor is it occupied by any personnel, the following quarterly inspections will take place:

4.1 TAILINGS LINE

- Visual inspection of the tailings line;
- Inspection of the emergency dump station buildings including piping, valves, doors, heaters and lights;
- Inspection of vacuum breaker stations;
- Inspection of discharge point for ice build up.

4.2 SEWAGE LINE

- Visual inspection of the decommissioned pipeline.

4.3 FLOAT PLANE DOCK

- Visual inspection of dock area;
- Infilling of sink holes or depressions that may develop due to wave action of Contwoyto Lake.

4.4 ENGINEERED FACILITIES

Engineered facilities at the TCA are checked quarterly for general condition and 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 Development Manager or designate for timely action. Records of the quarterly inspections are retained on file and are available for review upon request of the inspector.

An annual inspection of the TCA is carried out during ice free, open water conditions by a registered geotechnical engineer. As required by the Water License, the annual report is forwarded to the Nunavut Water Board within 60 days of the inspection.



5 SYSTEM MALFUNCTION – RESPONSE INFORMATION

The tailings line and main deposition areas were of utmost concern when operating. Due to the present care and maintenance status, this concern has been mitigated.

5.1 TAILINGS LINE

The tailings line is no longer in use for conveying tailings, mine water or fresh water to the tailings area. Mine water is no longer being pumped from the mine.

The tailings line has not been permanently taken out of service. It may be reactivated at some point in the future, if necessary. If this eventuality occurs, a revision to the contingency plan will be submitted for approval.

5.2 TAILINGS IMPOUNDMENT

Originally, all waste was to be contained within the TCA. As mine capacity increased, it became necessary to expand the TCA and discharge effluent. Effluent discharge commenced on 5 September 1985. Effluent was discharged in mid-summer, generally beginning on 15 July and continued for periods that extended into early September. The maximum rate of effluent discharge, as per the Nunavut Water Board Water License, has been 60 000 to 70 000 m³/d (AQUAMIN 1996b; EVS 1996). Since the initial discharge in 1985, effluent was discharged into Seep Creek which empties into an unnamed lake (colloquially known as Unnamed Lake). Unnamed Lake drains into Contwoyto Lake at the south end of Inner Sun Bay.

The tailings management process at Lupin is as follows:

The tailings slurry is pumped from the mill to one of two solids retention cells (Cell 3 or Cell 5), where the solids settle. For the last four years, Cell 5 has been used for winter deposition and Cell 3 for summer deposition (Figure 11). Each spring, usually beginning in late June, the build-up of meltwater and tailings water is decanted from Cells 5 and 3 into Cell 4. Cell 4 has not been used for solids deposition, and functions as a primary polishing pond. Water is held in this cell for a one-year period, where cyanide undergoes natural degradation due to exposure to sunlight, air, and agitation by wind action.

The following year, water is released from Cell 4, through a gated culvert, into Pond #1, where it is held for a further one-year period, before being siphoned into Pond #2. If necessary, the water can be treated with ferric-sulphate during the siphoning process to precipitate arsenic in Pond #2.

Historically, water was retained only for a 2-year period and arsenic levels were still high in Pond #1. An arsenic treatment plant was built between Ponds #1 and #2, so that the water could be injected with ferric sulphate solution as it was being siphoned between the two ponds. Since 2000, water has been retained for a 3 year period (1 year in Cell 4, 1 year in Pond #1, and 1 year in Pond #2). The extra year of water retention before going into Pond #2 has resulted in naturally lowering the arsenic levels, thus negating the use of the plant. Periodically, treatments of ferric sulphate (two tonne batches) are placed into Pond #1 to control arsenic concentrations. More recently, lime has been added to pond 1 to control pH levels prior to discharge.



Depending on the water level and water quality in Pond #2, water can be released to the environment after 15 July of any year (as per Nunavut Water Board water licence). Water quality is monitored on a daily basis during discharge to ensure that discharge criteria are not exceeded.

5.3 SEWAGE SYSTEM

The sewage system is contained by two (2) low dams and natural relief. The system operates as a 'closed system' from October to June (i.e. no discharge of effluent from the lakes). Camp discharge enters the upper lake.

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 license limits, the solution would be pumped back into the lower 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.

A short-term option, available with minor modifications to the system, is to re-route the sewage line within the mill complex to connect up with the old 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 MINE WATER

Due to termination of mine operations, mine dewatering activities have ceased. The mine pumps have been shut down and the mine is being allowed to flood. There is no further possibility of a spill. Mining operations and dewatering may be resumed at some point in the future.

6 PETROLEUM AND CHEMICAL PRODUCTS – RESPONSE INFORMATION

6.1 GENERAL

The petroleum and chemical products used at the Lupin Mine that exist in significant quantities and which are of concern within this Plan are summarised in Table 1, located in Appendix 3. Table 1 indicates the petroleum/chemical product name, storage location and normal storage container packaging or storage volume utilised. In addition to the product quantities referred to as stock-on-hand, the quantities of product expected to be on-hand after winter road re-supply and product backhauls are also listed. This list would then indicate the maximum quantity of a product to be on site at any one time. Because of the suspension of mining and milling operations, most reagents were returned to the manufacturers on the 2005 and 2006 winter roads.



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

1. receiving/offloading procedures during re-supply whereby fuel is pumped from tanker trucks (winter road) or cargo aircraft to site storage facilities, and shipping/loading of surplus inventories of fuel and/or chemical supplies onto transport trucks or aircraft for export off site; and
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 for shipment.

During the winter road re-supply period there may be times when Lupin Mine personnel will be called upon to assist in a winter road spill recovery. Internal policies will ensure that the Site Supervisor and lead hands are familiar with procedures followed by the Winter Road Transportation and Operations contractor and are available to provide assistance where necessary, generally for the upper portion of the winter road on or near Contwoyto Lake. Material and supplies for these types of spill recovery plans (i.e.: overturned tanker) are available, in the 'Emergency Spill Response' sea container for easy transport on the road.

The measures outlined in the response plans intend to minimise 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 petroleum products and various chemicals used at the Lupin Mine. A spill may be in the form of a liquid as in petroleum products, or in the form of a solid or a chemical reagent 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 could also result if a 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 summarised 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 via the winter road and/or aircraft, as well as movement year-round from storage locations to areas of use. During potential winter road re-supply, the greatest amount of material is moved in a short period of time and therefore 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 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.

6.2.2 Containment 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.

6.2.3 Containment 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.

6.2.4 Containment 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.

6.3 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, such as 3M brand Conweb and Phase III brand Oil Sponge.

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 front-end 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.

Impacted materials should be containerized during recovery efforts. Use of open top steel drums or other appropriate containers should be utilized to contain snow, ice, soil, etc, recovered during spill clean ups. Once filled, drums should be sealed with their supplied lids, and then placed in secondary containment where available (i.e., drum overpack) or within bermed and lined containment areas. Recovered materials should be disposed of as soon as possible via outlined disposal procedures. Where disposal on site is not possible, recovered materials should be transported off site as soon as possible and arrangements made for transfer of materials via documented chain of custody with a licensed handling facility.

Contact Federal and Territorial regulatory agencies to identify appropriate disposal methods before disposing of contaminated material(s)

In the event that remedial actions are required to mitigate a spill and the potential impacts that may be incurred as such, the NWT Environmental Guideline for Contaminated Site Remediation (2003) will be utilized.

6.4 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 minimised 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 (but not through to the water). 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. Currently, hydrocarbon contaminated materials are removed to either the incinerator or the burn area of the site landfill for ignition. Disposal at local municipal dumps may be an alternative if required. In this case Government officials would be consulted.

Spilled chemical products will be recovered and reused wherever possible. Materials unable to be used will be collected and stored in containers and shipped off site for disposal.

6.5 OTHER CONCERNS

6.5.1 Oil-soaked Snow

As requested in schedule H, Section 1b, of the current Lupin water license (2AM-LUP0914), the following section describes the management of large quantities of oil-soaked snow.

In the event that an oil/petroleum spill occurs during the winter, impacted snow will be collected and contained as outlined above in section 6.2 - Spill Containment, Recovery and Disposal. In the event that large quantities of snow become oil soaked, the appropriate heavy equipment will be used to collect, transport and re-locate the material to the main fuel tank farm or another lined and bermed containment area. Where deemed necessary, the oil impacted snow will be covered to mitigate the potential for wind blown dispersion. In most cases, oil soaked snow would be allowed to melt, and the oil content would be pumped into separate containers and/or collected using hydrophobic oil absorbent materials. Once contained, impacted snow can be disposed of as per methodologies outlined on the appropriate spill contingency action sheet(s).

6.5.2 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 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.

In the case where Info 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; and
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.

6.5.3 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 minimise further damage. The procedure can be initiated through the powerhouse and electrical departments.

7 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. Surface crews would immediately respond to a reported spill site by moving equipment and material necessary to provide control and clean-up measures at the reported spill. Additional operations personnel are available if the need arose.

The equipment to be used would consist of a Volvo 20t haul truck, two Komatsu WA250 loaders, CAT 14H grader, CAT 966G loader, Komatsu D85 dozer, 5 light vehicles and a rubber tired backhoe. A current list of MMG Canada equipment at the Lupin Mine is available in Table 2. This list will be updated and forwarded to the NWB as required. Contractor-owned heavy mobile equipment (loaders, dozers) may also be available during operational summer months, but not available during winter months.

Emergency spill containment and recovery materials and supplies are available for immediate mobilisation 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, floor dry absorbent, oil sponge, hoses, couplings and miscellaneous parts for recovery equipment. The van container, centrally located near the fuel receiving area of the tank farm, is indicated on Figure 8, Storage Facilities.



7.2 RESPONSE TEAM

Authorization for deployment of personnel, containment, clean-up and recovery equipment are as per the Figure1 'Response Team Flow sheet' organisational chart.

The designate/next in line authority shall be contacted if management is unavailable.

A current telephone listing of MMG Canada is included in Appendix 1.

7.3 TRAINING AND EXERCISES

All response team staff will maintain familiarity with the continually updated Contingency Plan by scheduling periodic reviews. For the designated personnel this is completed in conjunction with the review of the sites Emergency Procedures Manual.

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

Training with regard to hazardous materials handling is carried out in conjunction with Workplace Hazardous Materials Information System (WHMIS) and Transportation of Dangerous Goods Regulation (TDGR) training for all employees handling hazardous materials defined by the TDGR.

Workplace Hazardous Material Information System WHMIS 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 specific 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 MSDSs for the entire site.

Selected key staff have also participated in Awareness and Operations Spill Response Training, focussing on the following:

- Activating the Emergency Response Plan
- Approach and Respond Safely
- Chemical Identification and Verification
- Container Handling
- Control Creeks and Deploy Booms
- Control Spills on Open Water
- Concentrate Products for Recovery

8 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.



8.1 SYSTEM COMPONENTS

The Mill Tailings Line, Paste Backfill System, and Mine Water discharge lines are no longer in service. As such, response plans to deal with these systems have been omitted from the Plan. If they are put back in service at some future point, a revision to the Plan will be submitted. The following system components remain in place:

1. Mill Tailings Containment (Retaining Dams);
2. Sewage Disposal Facility

8.2 PETROLEUM/CHEMICAL PRODUCTS

As stated previously, the reagents formerly used in the milling process have been shipped off site. The following lists the products that still remain on site:

1. Diesel Fuel;
2. Gasoline and Aviation Fuel;
3. Lubricating and Hydraulic Oils;
4. Ethylene Glycol Antifreeze;
5. Hydrated Lime;

Detailed contingency response plans for each of the fore mentioned components and/or products remaining on site are as follows.



CONTINGENCY PLAN LUPIN MINE	Section	Action Plans
	Subject	Tailings Containment

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

24 HOUR SPILL REPORT LINE (867) 920-8130

INITIAL SPILL RESPONSE

- Notify Manager, Environmental Manager (or designate) immediately via radio, phone or in person;
- The response team action shall be initiated. Spill reported via 24 hour emergency spill line, above;
- 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 the tailings solution approaches a flowing natural stream, mobilise team to contain tailings solution 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 contained chemicals used in the process and must be handled with these taken into account. The material would have been diluted with raw water during the care & maintenance period and should not be a hazard. Samples will be taken to check this assumption.

ACTION FOR FIRE

- Non-flammable
- Use dry chemical, foam or water spray (fog), although water may spread the contaminant;

RECOVERY

- **Ground contamination;** any tailings solids that have escaped from the 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.
- **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 the un-reclaimed tailings cell or solutions pumped directly to Pond No.1.

PROPERTIES

- The mill tailings contained a mixture of mill reagents and finely ground rock which has had the precious metal content removed. Reagents used included sodium cyanide, lime, lead nitrate, zinc metal and flocculent;
- Appearance is of dark grey solids suspended in a clear water base solution;

ENVIRONMENTAL CONCERNS

- Solution might be mildly harmful to fish, other aquatic organisms and wildlife;
- Might be mildly 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

NOTE Tailings cells are currently being reclaimed. Deposition of tailings in the cells is no longer taking place.



CONTINGENCY PLAN LUPIN MINE	Section	Action Plans
	Subject	Sewage System

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

24 HOUR SPILL REPORT LINE (867) 920-8130

INITIAL SPILL RESPONSE

- Notify Development Manager (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 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 connect up with the old mine water line to discharge to the second sewage lake. This option will be temporary until repairs are complete.
- 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 License requirements. Seepage from the first sewage lake to the second lake will be monitored for water quality during repair activities.
- 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 dries, all accommodation and 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 bacterial infections and disease that may be transmitted through exposure.

ACTION FOR FIRE

- Non-flammable
- Use CO₂, 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;



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

- 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. INAC Water Resources or Env. Can. Dept. of Fisheries and Oceans.

DISPOSAL

- Contaminated materials are to be stored until disposal within the repaired sewage lakes containment system is possible.

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 dries, accommodation 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



CONTINGENCY PLAN LUPIN MINE	Section	Action Plans
	Subject	Diesel Fuel

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

24 HOUR SPILL REPORT LINE (867) 920-8130

INITIAL SPILL RESPONSE

- The Development 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, mobilise team to deploy river boom, skimmer and absorbent booms.
- A detailed spill report shall be submitted as per Section 2.3

HAZARDS

- Slightly toxic by ingestion, highly toxic if aspirated, drying of skin on contact;
- Flammable, treat as combustible.

ACTION FOR FIRE

- Use CO₂, 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, by natural products such as Phase III Oil Sponge, or by synthetic absorbents such as 3M Brand, Graboil or Conwed;



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

- 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 absorbent booms (See section on Recovery of Oil Spills).

DISPOSAL

- Incineration under controlled conditions; obtain prior approval.
- Landfarm and bio-remediate at an approved site.

PROPERTIES

- Chemical composition: mixture of hydrocarbons in the range C₉ to C₁₈;
- 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 1.

SUPPLIER

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



CONTINGENCY PLAN LUPIN MINE	Section	Action Plans
	Subject	Gasoline/Aviation Fuel

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

24 HOUR SPILL REPORT LINE (867) 920-8130

INITIAL SPILL RESPONSE

- The Development 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, e.g. 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 (i.e. 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 (e.g. 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 CO₂, 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;



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

- 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 tyres 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 absorbents 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;
- Landfarm and bio-remediate at an approved site.

PROPERTIES

- Chemical composition: mixture of hydrocarbons; Gasoline C₄-C₁₂, Jet B C₆-C₁₄ and Jet A C₉-C₁₆;
- 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. (e.g. Petro-Canada)
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

CONTINGENCY PLAN LUPIN MINE	Section	Action Plans
	Subject	Lubricating/Hydraulic Oils

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

24 HOUR SPILL REPORT LINE (867) 920-8130

INITIAL SPILL RESPONSE

- The Development 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 (e.g. lead nitrate, acids).

ACTION FOR FIRE

- Use CO₂, 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 tyres 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 absorbents such as 3M Brand, Graboil or Conwed;



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

- If necessary, contaminated soil should be excavated;
- Oil on a water surface should be recovered by skimmers and absorbent 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; C₂₀-C₆₆;
- 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



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

CONTINGENCY PLAN LUPIN MINE	Section	Action Plans
	Subject	Ethylene Glycol - Antifreeze

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

24 HOUR SPILL REPORT LINE (867) 920-8130

INITIAL SPILL RESPONSE

- The Development 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; CO₂, 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 absorbents 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 ($\text{CH}_2\text{OHCH}_2\text{OH}$)
- 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 (Appendix IV)



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

CONTINGENCY PLAN LUPIN MINE	Section	Action Plans
	Subject	Lime – Ca (OH) ₂ , CaO

In the event of a Lime spill (of solid or solution) or where there is reasonable likelihood of a spill occurring, the following action plan is to be initiated.

24 HOUR SPILL REPORT LINE (867) 920-8130

INITIAL SPILL RESPONSE

- The Development 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;
- use proper PPE for respiratory protection and body (coveralls, face shield, rubber gloves) when dust is anticipated as a hazard;
- 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 eyes, 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 minimise the quantity of lime being dissolved;
- Pump liquids into containers and use sorbets to contain and recover spilled solutions.

DISPOSAL

- Hydrated lime and all lime solutions should be disposed of in Cell 4 or Pond 1.



PROPERTIES

- Chemical formula Ca(OH)_2 ;
- Unslaked lime (pebble lime, CaO) also used which is not hydrated, therefore reacts with water to form slaked lime;
- White or white/grey solid, crystalline powder, odourless;
- 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 palletised and double stretch wrapped (54 bags/pallet);

SUPPLIER

- Continental Lime
- SEE ATTACHED MSDS FOR ADDITIONAL INFORMATION



Appendix 1 Telephone Listings and Communications

LUPIN MINE, NUNAVUT

Lupin Mine, Nunavut	Telephone
Development Manager, MMG Canada Andrew Mitchell	(807) 346-1668
Project Manager, Izok Camp Ron Fenlon	(403) 451-3226
Exploration Manager, MMG Canada Ian Neill	(778) 989-6700
It shall be the responsibility of the Development Manager or his designate to notify:	
President, MMG Canada Martin McFarlane	(807) 346-1668

GOVERNMENT AGENCIES

Government Agencies	Telephone / Facsimile
24 HOUR SPILL REPORT LINE (Yellowknife)	(867) 920-8130 (867) 873-6924
INAC Water Resources Inspector	(Iqaluit) (867) 975-4289
Nunavut Water Board	(867) 360-6338 (867) 360-6369
Government NWT – Department of Renewable Resources	
Environmental Protection, Yellowknife	
Ken Hall; Manager Env. Prot	(867) 920-6476 (867) 873-0221
Harvey Gaukel; Hazmat Specialist	(867) 873-7645 (867) 873-0221
Wildlife Management Division	
Wildlife Biologist	(867) 920-6190 (867) 873-0293
Government of Nunavut	
Environmental Protection, Iqaluit	(867) 975-5910 (867) 975-5980
Government of Canada	
Indian and Northern Affairs Canada-Land Use and Water Use	
Baba Pederson, Resource Management Officer	(867) 982-4306
Mellissa Joy, Water Resources Inspector, Iqaluit	(867) 982-4302



Canada –Lupin Mine
SPILL CONTINGENCY PLAN

Government Agencies	Telephone / Facsimile
Environment Canada	
Environment Canada, Iqaluit	(867) 975-4644
Department of Fisheries and Oceans	
Fisheries Habitat Biologist (Iqaluit)	(867) 979-8007 (867) 979-8039
Others	
Kitikmeot Inuit Association, Kugluktuk	(867) 982-3310 (867) 982-3311
Kugluktuk Hunters and Trappers Assoc.	(867) 982-4908 (867) 982-4047

ADDITIONAL COMMUNICATIONS

Emergency Contacts	Telephone
Invista (formerly Dupont)	(613) 348-3616
Chemtrec	1-800 262-8200
Absorbents	
Conweb & Oil Snare Canadian Industries Ltd	(780) 465-0221
Alberta Oil Spill Consultants (Booms, absorbents, skimmers)	(780) 451-0585



Appendix 2 Figures

Figure 1	Response Team Flow Sheet
Figure 2	Spill Report Form
Figure 3	Site Location Map
Figure 4	Typical Tailings Dam Cross-section
Figure 5	Lupin Site Plan
Figure 6	Sewage General Arrangement
Figure 7	Raw Water Supply
Figure 8	Storage Facilities
Figure 9	Tailings Line Dump Ponds
Figure 10	Tailings Line Route
Figure 11	Dam Locations – Tailings Containment Area



Appendix 3 Tables

Table 1 Petroleum and Chemical Products Inventory – Major Components

Product	Quantity (31 March 2006)	Storage Units	# of units SOH (WRRS)	Storage Location
P40 FUEL	463,563 Imp Gal	350,000 Imp Gal	9	Main Tank Farm
		360,000 Imp Gal	2	Main Tank Farm
		18,000 Imp Gal	6	Satellite Tank Farm
P50 FUEL	47,618 Imp Gal	187,000 Imp Gal	3	Main Tank Farm
		18,000 Imp Gal	4	Satellite Tank Farm
GASOLINE	546 Imp Gal	5,000 Imp Gal	2	Satellite Tank Farm
JET A/JET B	126,936 Imp Gal	360,000 Imp Gal	1	Main Tank Farm
RALUBE 40	40,000 L	Super-B tanker	1	Main Tank Farm
W30 LUBE OIL	38,400 L	1,600 L, Cubes	24 cubes	Main Tank Farm
HYDRATED LIME	157.8 mt	25 kg Bag	6313 bags	Cold Storage 2
ANFO (AMEX II)	0 mt	25 kg Bag	0 bags	Main Magazine
PORTLAND TYPE 10	10 mt	25-kg Bag	400 bags	Cold Storage 2
PORTLAND TYPE 30	53.9 mt		2156 bags	
Magnafrac 25 x 300	0 kg	25 kg Case	0 cases	Main Magazine
Magnafrac 32 x 300	0 kg		0 cases	
Xactex 19 x 600	0 kg		0 cases	
BATTERY ACID	360 L	20 L Container	18 ea	Cold Storage 2

Table 2 Heavy Equipment Inventory – Lupin Mine

No	Description
2	Komatsu WA250 Loaders
1	Cat 966C Wheel Loader
1	Cat 966G Wheel Loader
1	Cat 14H Grader
1	Grove Crane (20 T)
2	Volvo Haul Truck (20t)
1	Ford 9000 Truck
1	Flat Deck Truck
1	D85 Komatsu Dozer
5	Pickup Trucks



Table 3 Spill Containment/Recovery Materials

Spill containment/recovery materials located at Lupin within the 'Emergency Spill Response Van' container, centrally located adjacent to the fuel tank farm receiving station 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;
2	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
1	Chainsaw
1	Gas ice auger
2	Chemical Resistant Safety Gloves

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



Appendix 4 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
Kinross Gold Corp., 1984, updated annually
- Contingency Plan; Kinross Gold Corp.
June 2005, 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 22 July 1993
- BHP Ekati Diamond Mine Spill and General Contingency Plan, 1999.



Appendix 5 Material Safety Datasheets

- Diesel fuel
- Jet-A fuel
- Jet-B fuel
- Gasoline
- Ralube 40 CF
- Motor Oil
- Ucartherm Glycol
- Magnafrac
- Hydrated Lime
- Portland Cement