

**DRAFT**

## NOTES

## REVISIONS

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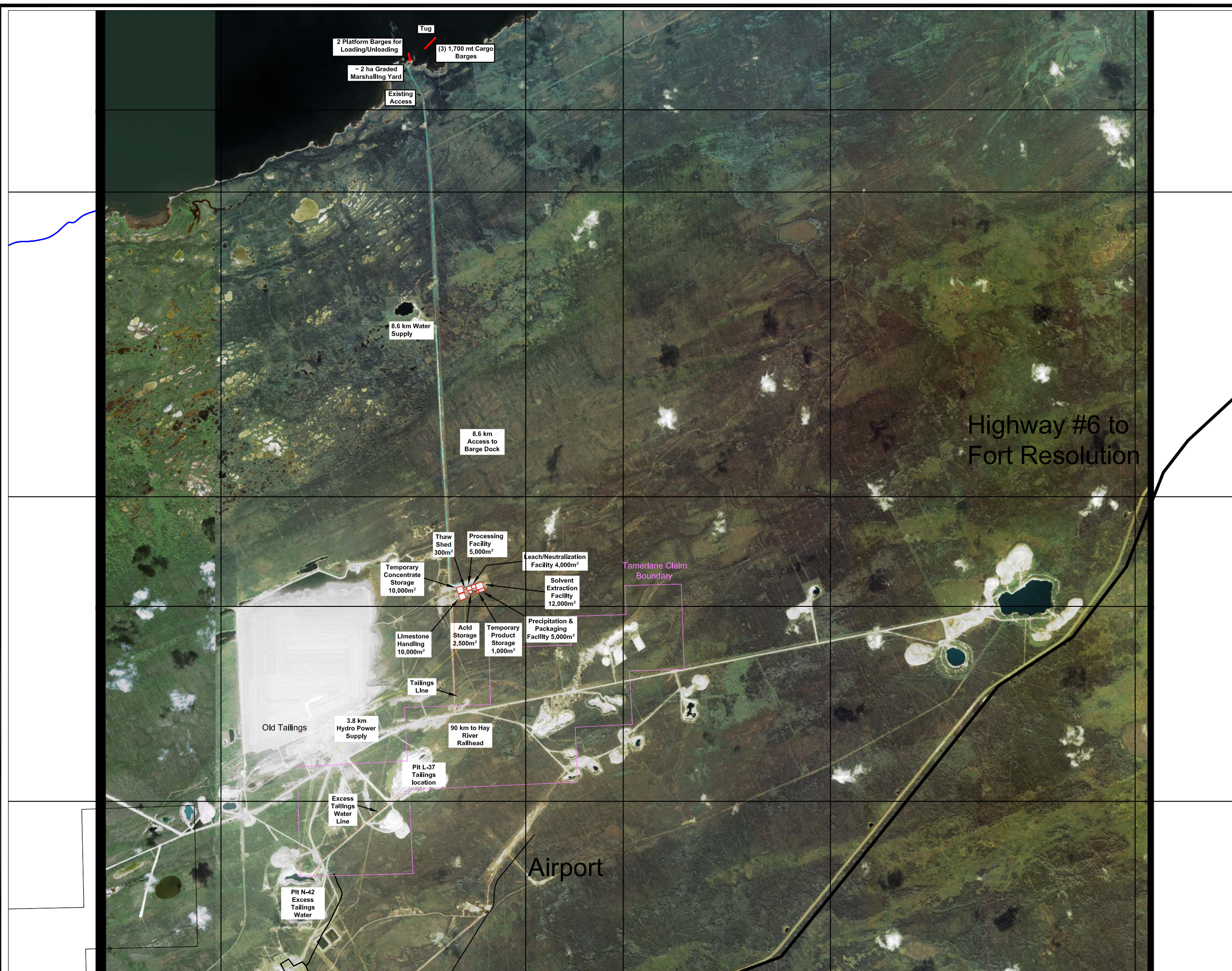
# Nechalacho

TITLE	Pine Point Hydromet General Arrangement
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DWG NO.

GA - 000 - 002

DATE: <b>Jan 31, 2011</b>	DRAWN BY:
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## 2.2 Petroleum

All fuel and lubricants will be stored on site in approved storage tanks and containers in an engineered and lined surface fuel and lube cache capable of holding 110% of the capacity of the largest tank in accordance with CCME criteria (See Figures above). The areas designated for fuel and lube cache will be located adjacent to the flotation plant and near the Thor Lake barge dock facility for ease of access.

The fuel and lube caches will contain:

- (4) 4.5 million liter diesel fuel tanks (Flotation Plant)
- (2) 1.5 million liter diesel fuel tanks (Barge area)
- (~2) 40,000 liter hydraulic (or multipurpose) oil
- (~12) 2,000 liter totes for transmission oils
- (8) pallets of five gallon buckets of specialty oils (yet to be determined)
- (10) pallets of five gallon buckets of multipurpose grease

Outside the fuel and lube cache, the Thor Lake generator system will be directly connected to the diesel fuel tanks. Additionally, there will be a small generator for a shack located near the barge loading facility which will be fuelled from a 200 litre drum.

Fuel and lubricants will be supplied via tanker truck from the barge loading area to the main fuel depot located near the flotation plant. Fuel and hydraulic oil will be transported underground via 5 cm (2") HDPE line for daily underground use and will be drained after each transfer. Lubricants will be sent underground via bulk totes. Appropriate spill response equipment will be stored at the fuel and lube cache. The *Federal Storage Tank Systems for Petroleum Products and Allied petroleum Products Regulations*, under the *Canadian Environmental Protection Act* (CEPA 1999) has been considered and will be adhered to in this plan.

## 2.3 Graywater Sewage

Avalon will install and utilize a self-contained, packaged, Rotating Biological Contactor (RBC) sewage treatment plant for both the Nechalacho Mine and Hydrometallurgical sites. The plant is readily transportable and will be contained in a 3 x 6 meter (10 ft x 20 ft) structure. The treated effluent will be suitable for discharge to the receiving environment and will be co-mingled with the discharge line reporting to the tailings management facilities.

## 2.4 Reagents

The reagents employed in the flotation circuits will be stored and used in the process facility. The below Tables lists the reagent quantities required at both the Nechalacho Mine and Hydrometallurgical Plant.

The reagents used in the flotation circuits will be adsorbed onto the mineral surfaces either to enhance specific mineral floatability or to prevent their floatability. Consequently, most of the reagents will leave the flotation plant on the surface of the concentrates produced or on the surface of the discharge solids reject which will be returned to the tailings management facility and after year five, underground as cemented pastefill.

No special handling is required for any of the reagents used in the process. The flotation operators will receive personnel training that will detail how to prevent excess quantities of all reagents from entering the process.

Reagents will be delivered to the TLP site in bulk, tote bags (1 tonne) and steel or plastic drums. Deliveries will be scheduled on an annual basis depending on the availability of product.

NECHALACHO MINE FLOTATION PLANT REAGENTS	
Reagent	Life of Mine
	Tonnes/Year
Ferric Chloride ( $\text{FeCl}_3$ )	139.6
Fluorosilicic Acid ( $\text{H}_2\text{SiF}_6$ )	760
Flocculant (Magnaflow 156)	11.34
Sodium Hexametaphosphate ( $\text{NaPO}_3$ ) <sub>6</sub>	121
Sodium Hydroxide ( $\text{NaOH}$ )	129
Sodium Silicate ( $\text{Na}_2\text{SiO}_3$ )	118.6
Sodium Sulphide ( $\text{Na}_2\text{S}$ )	912
Flotisor SM15 (1682)	256
Aero 845	152.8
Disponil SLS 101/103	346
Witcomul 3251	97.8
Acumer 9400	216
Rheosperse 3010	92.8
Alginic Acid ( $\text{C}_6\text{H}_8\text{O}_6$ )	192.8
Oxalic Acid ( $\text{C}_2\text{O}_2(\text{OH})_2$ )	188
Citric Acid ( $\text{C}_6\text{H}_8\text{O}_7$ )	186.2
Lactic Acid ( $\text{C}_3\text{H}_6\text{O}_3$ )	105.8

HYDROMETALLURGICAL PLANT: AVERAGE REAGENT CONSUMPTION	
Reagent	Life of Mine
	Tonnes/Year
Limestone	27,000
Lime	3,500
Elemental Sulphur (Used on site to produce acid and SO <sub>2</sub> )	30,000
H <sub>2</sub> SO <sub>4</sub> (produced on site from sulphur)	79,000
Flocculant	2.5
Sodium Sulphate	13,000

## 2.5 Explosives

Temporary powder and cap magazines will be located on the surface during the TLP's construction. The magazines will be located approximately 300 metres south of the TLP facilities. Approximately 7,000 kg of explosives will be stored in the explosives magazine and 12,000 caps will be stored in the detonator magazine at any given time. Both magazines will meet the NWT Mine Health and Safety Act and Regulations. The magazines will be bermed on three sides, locked and secured.

## 3.0 SPILL RESPONSE ORGANIZATION

In the event of a hazardous materials spill on the site, all personnel will follow a defined response and notification procedure led by the On-Site Coordinator and supported by the Environmental Advisor (EBA) and site employees. This group will form the TLP Spill Response Team and will be responsible for specific tasks during a hazardous materials spill. The Spill Response Team will also be responsible for ensuring that all hazardous materials on the surface and underground are stored properly. This team will follow the NWT Mine Health and Safety Act and Regulations, section 9.08, Storage of Hazardous Materials.

### 3.1 On-Site Coordinator

The On-Site Coordinator will have the following responsibilities:

- Assume complete authority over the spill area and coordinate the actions of site personnel.
- Evaluate the spill and develop an overall response plan.
- Mobilize personnel and equipment to the site of the spill.
- Report the spill immediately to the Northwest Territory (NWT) Spill Line and Environmental Advisor.
- Obtain additional manpower, equipment and materials if they are not available on-site.

- Provide regulatory agencies and Avalon Rare Metals Inc. with information regarding the status of clean-up activities.
- Prepare and submit a report on the spill incident to regulatory agencies within 30 days of the event.

### **3.2 Environmental Advisor**

The Environmental Advisor will have the following responsibilities:

- Provide technical advice regarding probable environmental effects from the spill.
- Provide advice to the On-Site Coordinator for spill response procedures.
- Assist in developing any sampling, testing or monitoring of soil or water directly affected by the spill.

### **3.3 Site Employees**

The TLP will employ an estimated 280 total personnel during operations. Approximately 80 of the personnel will work on the surface. These employees will be available to assist and mitigate spill response situations. Spill Response training for surface employees is discussed in Section 9.0.

## **4.0 INITIAL SPILL RESPONSE**

Specific actions and communications are in place to ensure an expedient response to a hazardous materials spill (Figure 4.0-1). Initial Spill Response measures include the following steps:

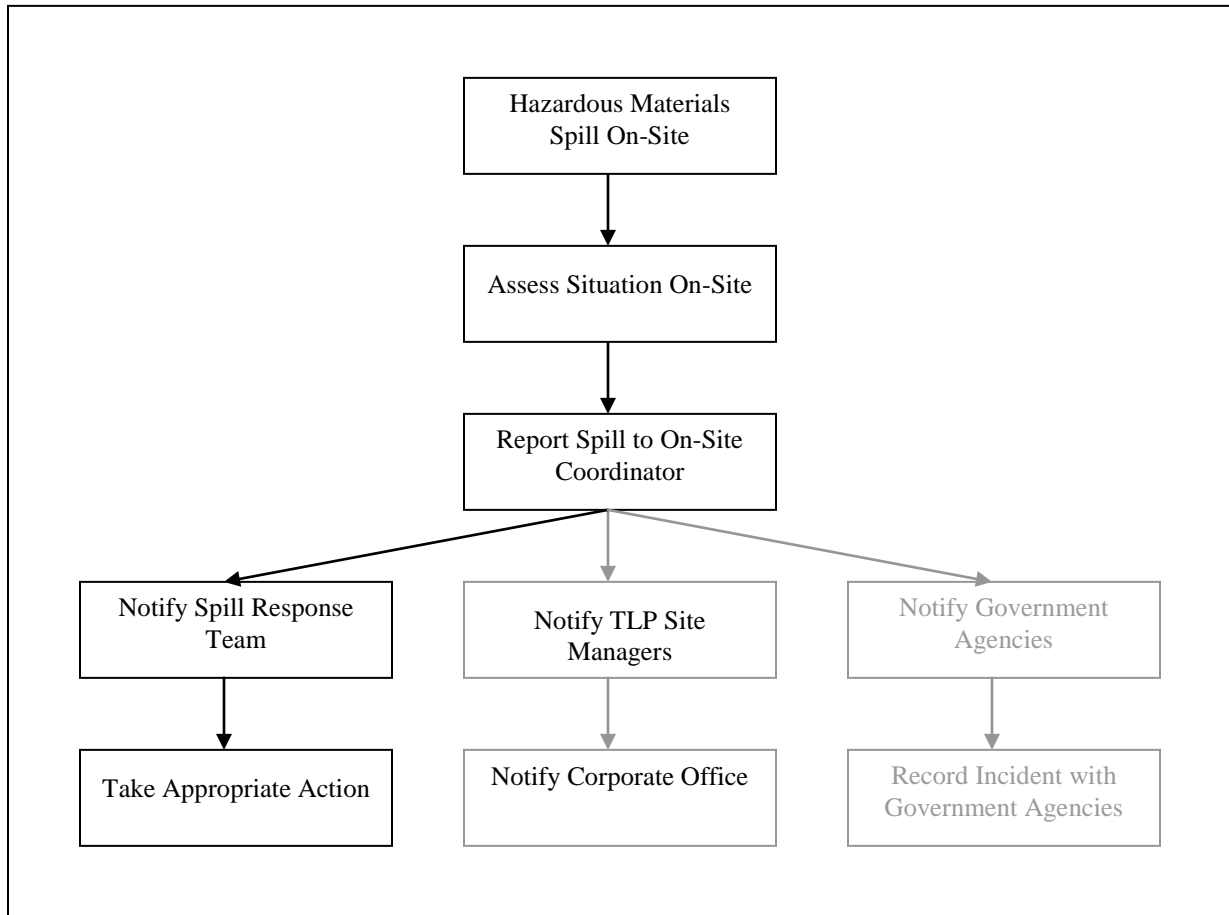
### **4.1 First Person at the Site**

- Consider personal safety first and put on appropriate personal protective equipment
- Identify the material that has been spilled.
- Assess any potential hazard to people in the vicinity of the spill.
- Control the danger to human life if it is possible to do so without additional assistance.
- Assess if the spill can be stopped or brought under control.
- Stop the flow of material if it can be done safely.
- Immediately report the spill to the On-Site Coordinator.
- Call the 24 hr NWT Spill Line ((867) 920-8130) **IF** the On-Site Coordinator cannot be contacted.
- Resume effective action to contain, mitigate, or terminate the flow of spilled material.

### **4.2 On-Site Coordinator**

- Call the NWT 24 hr Spill Line at (867) 920-8130 as soon as possible to report the spill and provide initial incident details.
- Complete and fax a NWT Spill Report Form to (867) 873-6924.
- Gather relevant information and submit a detailed spill report to the applicable regulatory agencies no later than 30 days after the spill event.

**Figure 4.0-1 TLP Response and Notification Process**



## **5.0 SPILL RESPONSE CONTACTS**

### **5.1 Internal Contacts**

On-Site Coordinator	TBD	office: TBD cell: TBD
Environmental Advisor (EBA)	Rick Hoos	office: (604) 685-0275 cell: (604) 813-4952
Office Manager	TBD	office: TBD cell: TBD
V.P. Exploration	Bill Mercer	office: (416) 364-4938 cell: (647) 282-4069
V.P. Operations	David Swisher	office: (604) 940-3800 cell: (604) 347-9620
President and CEO	Donald S. Bubar	office: (416) 364-4938 cell: (416) 723-9132

### **5.2 External Contacts**

Additional assistance may be obtained as necessary from the following organizations:

#### **Emergency Services**

Ambulance	(867) 874-9333
Fire	(867) 874-2222
Police	(867) 874-1111
Medical Emergency	(867) 874-7100
Poison Control	(867) 874-7100
Oil and Chemical Spills	(867) 920-8130

#### **Charter Companies**

Great Slave Helicopters	(867) 873-2081
Deton Cho Logistics	(867) 873-6970
Discovery Mining Services	(867) 920-4600

#### **Government**

WCB Mine Accident Reporting Line	1-800-661-0792
EC Reporting Line	(867) 766-3737
INAC Contaminants	(867) 669-2756
INAC Contaminants Hot Line	1-800-661-0827
INAC Hay River Sub-District Office	(867) 874-6994

## **6.0 SPILL RESPONSE ACTION PLAN**

Only trained personnel will participate in containment and clean-up activities. All non-trained personnel will be required to immediately report any spills to his/her supervisor.

### **6.1 Diesel Fuel, Hydraulic Oil and Lubricating Oil**

- Used for all mobile equipment and generators on the surface and underground.
- Stop the spill flow if it is possible and safety permits.
- No smoking is permitted when responding to a diesel fuel, hydraulic oil or lubricating oil spill.

#### **On Land**

- Do not flush into ditches or drainage systems.
- Build barrier with soil to block entry into waterways.
- Remove the spill by using sorbent pads or digging out the soil.

#### **On Water**

- Use a containment boom to concentrate the spill for recovery.
- Use sorbent pads to remove small spills.
- Use a skimmer to remove larger spills.

#### **On Ice and Snow**

- Block entry into waterways by building a barrier with snow to contain the spill.
- Remove the spill using sorbent pads and shovel contaminated ice and snow into plastic buckets with lids and/or polypropylene bags.

#### **Storage and Transfer**

- Store all contaminated water, snow/ice, soils, clean-up supplies, and absorbent materials in closed, labeled containers.
- Store containers in ventilated areas away from incompatible materials.

#### **Disposal**

- Consult with Federal and Territorial Environmental Authorities before disposing contaminated material.
- See Section 9.0

### **6.2 Gasoline**

- Used minimally for light-duty company vehicles.
- Stop the spill flow if it is possible and safety permits.
- Eliminate ignition sources. Gasoline forms vapors that can ignite and explode.
- No smoking is permitted when responding to a gasoline spill.



**On Land**

- Build barrier with soil to block entry into waterways.
- Do not attempt to contain the spill if ignition potential exists.
- Use particulate sorbent material to soak up the spill.

**On Water**

- Contain and remove spills only after vapors have dissipated.
- Use containment booms to concentrate spills.
- Use a skimmer on a contained slick.

**On Ice and Snow**

- Block entry into waterways by building a barrier with snow to contain the spill.
- Remove the spill by using particulate sorbent and shovel contaminated ice and snow into plastic buckets with lids and/or polypropylene bags.

**Storage and Transfer**

- Store all contaminated water, snow/ice, soils, clean-up supplies, and absorbent materials in closed, labeled containers.
- Store containers in ventilated areas away from incompatible materials.
- Electrically ground all containers and transporting equipment.

**Disposal**

- Consult with Federal and Territorial Environmental Authorities before disposing contaminated material.
- See Section 8.0

**6.3 Antifreeze**

- Used in all mobile equipment and generators.
- Stop the spill flow if it is possible and safety permits.

**On Land**

- Do not flush into ditches or drainage systems.
- Build barrier with soil to block entry into waterways.
- Remove spill using sorbent pads or digging out soil.

**On Water**

- Be aware that antifreeze sinks and mixes with water.
- Confine and isolate the spill by damming or diverting the spill.
- Pump contaminated water into containers.

**On Ice and Snow**

- Block entry into waterways by building a barrier with snow to contain the spill.
- Remove the spill by using particulate sorbent and shovel contaminated ice and snow into plastic buckets with lids and/or polypropylene bags.

**Storage and Transfer**

- Store all contaminated water, snow/ice, soils, clean-up supplies, and absorbent materials in closed, labeled containers.
- Store containers in ventilated areas away from incompatible materials.

**Disposal**

- Consult with Federal and Territorial Environmental Authorities before disposing contaminated material.
- See Section 8.0

**6.4 Propane**

- Used for the underground heater located on the surface near main shaft.
- Stop the spill flow if it is possible and safety permits. Eliminate ignition sources. No smoking is permitted when responding to a propane spill.

**On Land**

- Do not attempt to contain or remove the spill.

**On Ice and Snow**

- Do not attempt to contain or remove the spill.

**Storage and Transfer**

- It is not possible to collect and/or contain propane once it is released.

**Disposal**

- No disposal is required.

**6.5 Flotation Reagents**

- Used in the flotation process and stored, handled and mixed inside the process facility building.
- Stop the spill flow if it is possible and safety permits.
- Keep away from all heat or ignition sources.....smoking is prohibited around all reagents.

**On Land**

- Do not flush into ditches or drainage systems.
- Build barrier with soil to block entry into waterways.

- Remove spill using sorbent pads or digging out soil.
- For small spills, dilute with water, mop up and absorb with inert dry material.

**On Water**

- Be aware that reagents sink and mix with water.
- Confine and isolate the spill by damming or diverting the spill.
- Pump contaminated water into containers.

**On Ice and Snow**

- Block entry into waterways by building a barrier with snow to contain the spill.
- Remove the spill by using particulate sorbent and shovel contaminated ice and snow into plastic buckets with lids and/or polypropylene bags.

**Storage and Transfer**

- Store all contaminated water, snow/ice, soils, clean-up supplies, and absorbent materials in closed, labeled containers.
- Store containers in ventilated areas away from incompatible materials.

**Disposal**

- Consult with Federal and Territorial Environmental Authorities before disposing contaminated material.
- See Section 8.0

**6.6 Hydrometallurgical Plant Reagents**

- Used in the flotation process and stored, handled and mixed inside the process facility building.
- Stop the spill flow if it is possible and safety permits.
- Keep away from all heat or ignition sources.....smoking is prohibited around all reagents.

**On Land**

- Do not flush into ditches or drainage systems.
- Build barrier with soil to block entry into waterways.
- Remove spill using sorbent pads or digging out soil.
- For small spills, dilute with water, mop up and absorb with inert dry material.

**On Water**

- Be aware that reagents sink and mix with water.
- Confine and isolate the spill by damming or diverting the spill.
- Pump contaminated water into containers.

**On Ice and Snow**

- Block entry into waterways by building a barrier with snow to contain the spill.



- Remove the spill by using particulate sorbent and shovel contaminated ice and snow into plastic buckets with lids and/or polypropylene bags.

**Storage and Transfer**

- Store all contaminated water, snow/ice, soils, clean-up supplies, and absorbent materials in closed, labeled containers.
- Store containers in ventilated areas away from incompatible materials.

**Disposal**

- Consult with Federal and Territorial Environmental Authorities before disposing contaminated material.
- See Section 8.0

**6.7 ANFO**

- Used for blasting activities during construction and development.
- Use non-sparking tools during clean-up procedures. Stop the spill flow if it is possible and safety permits. Protect from all ignition sources. Protect from all impacts. In case of fire, evacuate area not less than 2,500 feet in all directions.

**On Land**

- Do not flush into ditches or drainage systems.
- Build barrier with soil to block entry into waterways.
- Handle spills using non-sparking tools.
- If uncontaminated, repackage product in original packaging or clean approved container.

**On Water**

- Nitrate salts are completely soluble, but emulsion dissolution is very slow.
- Confine and isolate the spill by damming or diverting the spill.
- Collect contaminated water into containers.

**On Ice and Snow**

- Block entry into waterways by building a barrier with snow to contain the spill.
- Remove the spill and snow into plastic buckets with lids and/or polypropylene bags.

**Storage and Transfer**

- Store all contaminated water, snow/ice, soils, clean-up supplies, and absorbent materials in closed, labeled containers.
- Store containers in cool and ventilated areas away from incompatible materials.

**Disposal**

- Consult with Federal and Territorial Environmental Authorities before disposing contaminated material.
- Consult with Manufacturer.
- See Section 8.0

## **7.0 SPILL RESPONSE EQUIPMENT**

### **7.1 General Equipment**

Hand tools will be kept on site to aid in the mitigation of hazardous materials spills. A rubber tire loader will also be available for emergency use and to respond to spill incidents.

### **7.2 Spill Kits**

Avalon Rare Metals Inc. will maintain spill kits on-site. Spill kits will be located in the Maintenance Shop, Warehouse, Freeze Plant, Process Building and the Fuel and Lube Storage Area. The spill kit locations are illustrated in Figure 2.1-1. Spill kit inventories will contain the following items:

- (1) 16 Gauge Open-Top Drum with Bolting Ring and Gasket (205 litre)
- (1) Pkg. of 10 Disposable Polyethylene Bags (5 mil)
- (1) Shovel (spark proof)
- (4) 5" x 10' Absorbent Booms
- (1) 10 lb. Bag of Absorbent Particulate
- (1) Bail of 17' x 19' x d = Sorbent Sheets (100 sheets)
- (2) PVC Oil Resistant Gloves
- (2) Respirators
- (2) Pairs Splash Protective Goggles

## **8.0 DISPOSAL METHODS**

In the event of a spill, the On-Site Coordinator will seek government approval and advice for proper disposal. The selected disposal method will require approval from the Environmental, Health and Safety Coordinator or Site Manager. The following disposal options are considered appropriate and are expected to meet government approval.

- Off-Site Disposal (to a landfill that permits disposal of hazardous materials)
- Controlled Burning (contaminants)
- Incineration (liquid product)
- Manufacturer retrieval

## **9.0 SPILL RESPONSE TRAINING**

The On-Site Coordinator will conduct training for all surface personnel working on the TLP. Surface personnel will be trained in the techniques and materials required to manage hazardous spill responses. Training will include the following instruction:

- The initial spill response procedure to use in the event of a spill.
- Location and use of emergency equipment to respond to spills.
- Safe operation of equipment and tools to minimize the potential for spills.
- Operational procedures to limit the potential and impact of spills.
- Monthly safety discussions to address work hazards.