



## **Giant Mine Project**

### **GENERAL CONTINGENCY & EMERGENCY SPILL RESPONSE PLAN**

**Submitted to:** AANDC and PWGSC Canada

**Initial Submission:** July 2005  
**Updated:** July 2012

**Updated by :** Ron Connell, Environmental Superintendent, DCNJV

## **PREAMBLE**

This General Contingency Plan and Emergency Spill Response Manual came into effect July 1, 2005, and applies to projects and operations of the Giant Mine Remediation Project (GMRP) co-managed by Aboriginal Affairs and Northern Development Canada (AANDC), formerly known as Indian and Northern Affairs Canada (INAC), and the Government of the Northwest Territories (GNWT). The operations are conducted under the terms and conditions of surface land lease L-3668T, issued by the GNWT, and of the former Water Licence N1L2-0043. The name and contact information for the General Manager of the operation can be found in Section 10, on Page 19 of this document.

This General Contingency Plan and Emergency Spill Response Manual is under the control of the Giant Mine Manager. He is responsible for activating the spill contingency plan, or delegating the authority to do so in the event of his absence. His contact information is shown below:

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## **IMPORTANT NOTICE**

**It must be recognized by the reader that the process operations (mill/roaster complex) at Giant Mine were closed in 1999. These facilities have been secured to prevent access by the public and declared out of bounds to Giant Mine employees. Access may be granted for inspection purposes only by contacting Aboriginal Affairs and Northern Development Canada's Giant Mine Remediation Project.**

**The hazardous materials currently in use on site are confined to hydrocarbons such as fuels, oils and lubricants; propane; and the reagents employed at the Effluent Treatment Plant (ETP). The only other hazardous material that one would expect to encounter on the minesite is the minewater that is pumped from underground and stored in the tailing containment areas, or materials currently stored in the hazardous materials containment area located at the Northwest Pond. In addition, several buildings onsite potentially contain asbestos and/or arsenic contamination.**

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## **DISTRIBUTION**

Formal distribution of this plan is as follows:

### **Deton'Cho / Nuna Giant Mine**

Mine Manager  
General Mine Superintendent  
Environmental Coordinator  
Underground Mine Superintendent  
Mine Shift Supervisors  
Maintenance General Foreman  
Safety & Security Supervisor  
Security Officers

### **Deton'Cho / Nuna Joint Venture**

Miles Safranovich, COO  
Pat McHale, Operations Manager  
Kevin Anderson, Corp Safety Manager  
Len McHale, VP Operations

### **Government Agencies**

Mackenzie Valley Land & Water Board  
Public Works and Government Services Canada  
Aboriginal Affairs and Northern Development Canada – Giant Mine Remediation Project (GMRP)  
GNWT - Environment & Natural Resources (Environment Division)  
GNWT - Municipal and Community Affairs (Lands Division)  
GNWT - Municipal and Community Affairs (Office of the Fire Marshall)  
Aboriginal Affairs and Northern Development Canada (Water Resources Division)  
Environment Canada (Environmental Protection Branch)  
Department of Fisheries and Oceans Canada  
Workers' Safety and Compensation Commission (Prevention Services Division)  
City of Yellowknife

### **Additional copies of this plan can be obtained by contacting:**

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### Appendix A: Deton'Cho / Nuna Joint Venture Environmental Code of Practice

### Appendix B: Response Action Plans

1. Arsenic Sludge (includes Arsenic in dust or powder form)
2. Diesel Fuel
3. Ferric Sulphate
4. Gasoline
5. Hydrogen Peroxide
6. Lime
7. Lubricating Or Hydraulic Oil
8. Minewater/Tailings Supernatant
9. Propane
10. Sewage
11. Tailings (solids)
12. Waste Oil
13. Dynalene HC
14. R-507
15. Ammonia
16. CO<sub>2</sub>

### Appendix C: Spill / Incident Report Forms

### Appendix D: Superior Propane Spill Contingency & Emergency Response Plan

### Appendix E: Guideline for the General Management of Hazardous Waste in the NWT

### Appendix F: Equipment Lists and Rates for Local Contractors/Companies

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## 1.0 INTRODUCTION

Giant Mine was a gold mining facility located on Highway # 4 (the Ingraham Trail), approximately 5 kilometres north of the city of Yellowknife, Northwest Territories. The mine produced gold from 1948 to 2004, ceasing to process onsite in 1999.

The purpose of this contingency plan is to outline a formal, practical response system that can be implemented rapidly in the event of a spill of materials resulting from industrial activities at the Giant minesite that may be hazardous to human health or the natural environment. The plan is intended to promote safe handling of hazardous materials and help to minimize the occurrence of spill incidents. If spills do occur, this plan is intended to guide minesite personnel in the correct response to these incidents and minimize health and safety hazards, environmental damage and cleanup costs.

This plan is to be used by employees of Deton'Cho/Nuna Joint Venture. It is intended to be easily understood and to be reasonably comprehensive in providing access to the information required to deal with a spill.

Legislative authority for contingency plans is controlled by both the territorial and federal governments under various acts and regulations. Principal legislation includes the ***Environmental Protection Act, Spill Contingency Planning and Reporting Regulations*** (GNWT, July 1993), as well as contingency planning guidelines developed by INAC (2007), the Northwest Territories Water Board (1987) and Environment Canada (1999). Additionally, the NWT Water Board, under the ***Guidelines for Tailings Impoundment in the Northwest Territories*** (1987), requires mining companies to prepare contingency plans for tailing spill incidents.

The ***Transportation of Dangerous Goods Act*** (TDGA) applies to those companies involved in shipping goods to and from the mine. The GMRP is registered with the GNWT's Department of Environment and Natural Resources (ENR) as both a generator and receiver of hazardous wastes. In 2010, ENR issued a letter designating Giant Mine as a receiver of Hazardous Wastes as previous documentation could not be located at that time. Under the TDGA, DCNJV, on behalf of AANDC, is responsible for the safe loading and the proper placarding and documentation of shipments of dangerous goods leaving the minesite. When hazardous materials are transferred to a contracted carrier, they become the carrier's responsibility therefore **this contingency plan does not deal with the spill or release of any material that is not on mine property.**

As the Giant Mine is owned by AANDC and the GNWT, DCNJV has no control over hazardous goods being shipped to or from the Giant minesite. However, the company is committed to using its available resources to contain and cleanup any spilled materials that are associated with the site's activities.

All Giant Mine employees should be familiar with the company's Environmental Code of Practice (a copy of this Code is provided in Appendix A.). The principles expressed in the Code of Practice form the basis of this contingency plan.

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## **2.0 SITE DESCRIPTION**

### **2.1 SETTING AND INFRASTRUCTURE**

Giant Mine is located near Yellowknife, adjacent to the shores of Great Slave Lake, on the western shore of Yellowknife Bay. The mine is located in a zone of discontinuous permafrost. The local topography is characterized by exposed bedrock highs and minor overburden deposits in low areas.

The mine infrastructure is comprised of several buildings that were required for gold production. These include, but are not limited to, the mill, headframes, several office buildings and various support services buildings (i.e. engineering, carpentry, and mechanical shops). A townsite, formerly used to house a number of Giant Mine staff, is located in the southern section of the property. From 2009 to 2011, the Freeze Optimization Study (FOS) was constructed and brought online near the location of the former crusher building. For more information on the FOS see Section 11.0.

Figures included with this plan depict the layout of the existing infrastructure at the Giant Mine; however some variations may occur due to the nature of the site remediation. Figures will be updated on a regular basis to reflect any significant changes to the mine infrastructure.

### **2.2 GENERAL OPERATIONS**

#### **Mining**

Mining ceased at Giant Mine in 2004. Underground work is now confined to maintenance and development of access routes to the underground arsenic chambers using conventional mining methods as per the long term care and maintenance plan. Generally, the rock is drilled and then blasted with an ammonium nitrate and fuel oil based explosive (ANFO). Blasted rock is excavated and transported underground by diesel powered machinery.

#### **Ore Processing - None**

The milling operation was shut down in the late fall of 1999.

#### **Tailings Disposal – None**

The milling operation was shut down in the fall of 1999. Currently, no tailings are produced at Giant Mine; however tailings continue to be stored onsite in 4 locations that comprise the Tailings Containment Areas (TCA) (see Figure 1).

#### **Minewater Treatment**

The main waste produced from the care and maintenance operation is minewater pumped from the underground minewater management system. Minewater is collected underground, pumped to surface, and discharged directly to the Northwest Pond TCA. The original tailings area comprises the South, Central, and North Ponds whereas the Northwest Pond was constructed in 1988. The tailings containment areas were constructed to contain tailings in local topographic lows. Containment is provided by the natural surrounding terrain and engineered dams constructed of clay and waste rock. During the summer months, minewater is pumped to the Effluent Treatment Plant (ETP) from the Northwest Pond TCA

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(and on occasion from the North Pond TCA), where dissolved contaminants (mainly arsenic) are removed from the water in carefully controlled chemical reactions. Chemicals, such as lime and ferric sulphate, are added to the water to convert the contaminants into solid compounds that are precipitated from the water in the Settling and Polishing Ponds. The treated effluent is then discharged into Baker Creek (however, on occasion, water from the Polishing Pond is sent back to the ETP for re-treatment). In 2011, due to icing within Baker Creek, the discharge line from the Polishing Pond was extended further into Baker Pond in order to avoid a tailings impacted area that had the potential for erosion.

### **Surface Water**

Currently surface water is collected by and/or diverted into sumps that are pumped as needed to the Mill Pond, near the C Shaft (see Figure 1). Any water that collects at the Mill Pond is then pumped to the North, Central or South Ponds.

### **Use of Water**

There are three main sources of water for Giant Mine:

- Fresh water can be pumped from Great Slave Lake (this practice has not been utilized in the last few years);
- Groundwater, which seeps into the mine from the surrounding area, is pumped to surface and discharged to the Northwest Pond TCA; and
- A small amount of potable water is trucked to site for use in the washrooms and boilers. All water from these sources ultimately reports to the water treatment system.

### **Sewage Disposal**

Domestic grey water from the mine washroom facilities is pumped through surface pipelines to C Shaft, where it is combined with minewater and pumped underground. On occasion, the solids portion is removed from site by a sub-contractor. All domestic grey water is ultimately captured by the minewater treatment system prior to release into the environment as treated effluent. At the time of printing, this system has been altered due to a frozen pipe in the C Shaft. The site is currently exploring options to permanently resolve this issue, until then all sewage is being removed from site by a subcontractor.

### **Chemical Storage and Handling**

In the past numerous chemicals were used in the milling and water treatment operations. With the exception of the reagents used at the ETP, these chemicals are no longer in use, and while many have been removed, some are still stored at the minesite (see Figure 3). As noted in the Preamble, some chemicals and reagents are still located within the mill/roaster complex, which has been sealed off to prevent access. There are also some dry chemicals stored in the Mill Reagent Shed. Lime is delivered in bulk and stored in a silo at the ETP. Ferric Sulphate is delivered in bulk, in liquid form, and stored in tanks adjacent to the ETP. 7,500 kg of Hydrogen Peroxide, left over from earlier treatment seasons, is still being stored in two tanks at the ETP.

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## **Explosives**

As the mine is no longer in production, it is anticipated that no use of explosives will occur in the foreseeable future. However, if needed, the primary explosive used would be a mixture of ammonium nitrate and fuel oil (diesel), known as ANFO. Dyno Nobel can deliver ready-to-use ANFO to the portal in small bags. DCNJV assumes responsibility for these products to the point of delivery at the portal and maintains a contingency plan for these operations. In the past, two explosives storage areas were located onsite that were the property of two companies: Dyno Nobel and Explosives Ltd. By the end of 2010, both companies had decommissioned all of their onsite storage facilities.

## **Heating Fuels**

Heat for the majority of the mine is provided by one boiler house, C Boiler (22,000 L tank). The C Dry has its own boiler and tank (25,000 L), located on the south side of the building. Additional heat is provided in isolated buildings by electric heaters. Mine ventilation air is heated in winter by propane-fired furnaces, located at the B Vent Plant. Propane storage is provided at this location and regular bulk deliveries of propane are received. Heating oil is also supplied to site via tanker truck. See Figure 3 for storage tank locations.

## **Automotive Fuels**

Mobile heavy equipment at the mine is generally powered with diesel fuel. Some equipment such as generators, still require gasoline. In 2009 a diesel and gasoline fuelling station (100,000 L diesel tank and 2,500 L gasoline tank) was installed near the C Dry (see Figure 3) and has been in fulltime use since the summer/fall of 2011 after a series of code deficiencies were addressed. Bulk deliveries of fuels are made to this location on a regular basis.

## **Propane**

Propane is stored in one location at Giant Mine (see Figure 3):

- A 30,000 gal (US) propane tank is located next to the B Shaft Ventilation Plant. Propane from this tank is used to heat air supplied to the underground during the winter months. While the tank is owned and maintained by Superior Propane, the site was advised in the fall of 2011 that it was their responsibility to register the tank under the E2 Regulations, rather than Superior Propane's responsibility as had been done in the past. DCNJV completed the registration of the tank as per Environment Canada instructions in the fall/early winter of 2011.

Until the winter of 2010-2011, Superior Propane maintained an unmanned storage yard in a fenced compound adjacent to the Vee Lake Road, approximately 500 meters west of the Ingraham Trail. A number of 30,000 gal (US) tanks, as well as numerous smaller tanks, were stored at this site. As of the time of updating this plan, Superior Propane had removed all their tanks from this location.

DCNJV is instructed to contact Superior Propane in the event of emergencies involving propane. **DCNJV personnel will not attempt to deal with any spill/leak involving propane other than to provide site security and/or remove possible sources of**

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ignition.

### **Hydraulic and Lubricating Oils**

Heavy equipment used at the mine consumes a quantity of hydraulic and lubricating oils. These oils are shipped to the mine in drums and pails, and stored in the Yard and the Warehouse. Used oil is drained from machinery, and pumped into a cube outside of the Mine Equipment Garage (MEG). The site is currently exploring options for disposal of this waste oil offsite.

## **3.0 SPILL RESPONSE TRAINING**

The effectiveness of this Emergency Spill Response Plan will be dependent upon the following:

- Access to the plan for site personnel:
  - The plan will be posted in the C Dry where all site personnel can reference it as needed. Individual plans (Appendix B) will be posted in locations where they may be relevant. For example, the response plans for Ferric Sulphate, Lime, Hydrogen Peroxide, Minewater and Tailings spills will be posted at the ETP.
- Education of DCNJV personnel in the objectives and contents of the plan, focusing mainly on First Response training:
  - All employees know how to report a spill and how to initiate the spill response system. General site workers have been provided with excerpts from the plan specific to their role (ie the First Response (section 4.1) and the individual Spill Response Plans from Appendix B). An emphasis has been placed on first responders ensuring that the spilled material does not enter Baker Creek or other site waterways.
  - Specific individuals named in the plan (eg Mine Manager, Safety and Security Supervisor, Environmental Coordinator, etc.) have received further instruction specific to their roles in the plan.
- Training of site personnel in the techniques and materials that can be employed during spill containment and cleanup activities:
  - Currently, no specific, external spill response training has occurred for DCNJV personnel. The Environmental Coordinator and the Safety and Security Supervisor are in the process of arranging for this training to occur. However, it may not happen until after spring freshet, at which time this plan will be updated to reflect the change.
- As Giant Minesite has a small number of workers onsite at any given time, **all DCNJV personnel will be utilized in the event of a spill and, therefore, all will be trained in spill response procedures.**
- Workers new to the site will be trained in First Response and provided with the excerpts mentioned above, as part of their site orientation. Should their job entail further responsibility under the Spill Response Plan, they will receive training in that area as well.

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- Training will be on going with respect to the Spill Response Plan. Bi-monthly refresher training will be held with all site personnel during the weekly site safety meeting. Yearly external spill response training will be held to instruct any new employees and to update those already trained.
- Sub-contractors working onsite will also be provided with excerpts regarding First Response procedures during their site orientation. All sub-contractors working onsite are assigned to do their work under a supervisor who will be their point of contact for spill response. Alternatively they can contact Security if they need to report a spill.

## 4.0 SPILL RESPONSE PROCEDURES

The **Giant Mine Spill Response Plan** is shown graphically in Figure 2, including relevant phone numbers. Upon encountering a spill, site personnel will initiate the sequence of phone calls outlined in the plan. Please note: **Appendix B provides individual spill response plans for dealing with specific types of spills/leaks.**

Individuals named in the spill response plan are responsible for designating a suitably trained replacement to assume their role in the plan before a planned extended absence from the workplace. The action required by the spill response plan is outlined in the following sections. **All site personnel should refrain from using the radio for non-spill related activities as much as possible during the initial stages of spill response.** Radio traffic should be limited to allow those arranging spill response equipment and coordinating the cleanup effort use of the airwaves.

### 4.1 FIRST PERSON RESPONSE

- Assess the hazard to persons in the vicinity of the spill. If necessary, take action to control danger to human life. Stay upwind of the spilled material. Secure the site and prevent non-authorized entry.
- Contact your **Supervisor** (by minesite radio or by telephone (see Figure 2 – Spill Response Flow Plan for Giant Mine)) and report the spill. Alternatively if you cannot reach your Supervisor contact **Security** (by minesite radio or at 669-3700) and report the spill. **Identify the location and request assistance.**
- Make every effort to **IDENTIFY** the spilled product. If product is known, relay information to your Supervisor and/or the Safety and Security Supervisor (or their designate) at 669-3717 or by mine site radio.
- Until help arrives, apply the following general procedures in dealing with the spill:
  - **Appendix B** contains spill response plans for specific materials. If the material spilled is any of the following, consult its **specific spill response plan** in conjunction with the remainder of this document:
    - Arsenic Sludge (includes Arsenic in dust or powder form)
    - Diesel Fuel
    - Ferric Sulphate
    - Gasoline

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- Hydrogen Peroxide
  - Lime
  - Lubricating or Hydraulic Oil
  - Minewater/Tailings Supernatant
  - Propane
  - Sewage
  - Tailings (solids)
  - Waste Oil
  - Dynalene HC®
  - R507
  - Ammonia
  - CO<sub>2</sub>
- Consult the appropriate **Material Safety Data Sheet (MSDS)** at the WHMIS (Workplace Hazardous Materials Information System) station located in the Safety and Security office at the C Dry to determine the principal types of health and safety hazards associated with this product or material (see Figure 4 for MSDS locations). This can be done by contacting the Safety and Security Supervisor (or their designate) via telephone (669-3717) or site radio.
  - **Do not leave the spill location** until instructed to do so by the Mine Manager, the Environmental Coordinator, or your Supervisor (or their designates). **If additional equipment is required to do the following activities, inform your supervisor and they will arrange for equipment to be brought to the spill location.**
  - At certain job sites, specific MSDS will be posted relevant to the work being performed. Examples of these sites are the Effluent Treatment Plant (eg. ferric sulphate, hydrated lime, hydrogen peroxide, flocculent, etc.) and the Freeze Optimization Study (FOS) site (eg. Dynalene, ammonia, etc.). If readily accessible, consult these MSDS for further information.
  - **Block any entry to waterways.** Construct an interceptor trench or direct flow using spill containment equipment towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water. As necessary, use materials found in the spill containment kits located onsite (see Figure 4). **After personal safety, protection of the site's waterways is the utmost priority during spill response.**
  - If spill has reached natural waters, deploy a containment boom and apply absorbent materials, as appropriate, found in the spill containment kits located onsite (see Figure 4). Prevent migration of the spilled material further downstream.
  - Attempt to **contain** the spill by dyking with earth, sand bags, snow or other type of barrier. Construct a berm if required. Use earth-moving equipment as necessary to complete containment measures. As necessary, use materials found in the spill containment kits located onsite (see Figure 4).
  - Use barriers as needed to keep all unnecessary people away. Barriers are located at the Carpenters' Shop (see Figure 4). If needed, contact your Supervisor (or Security)

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and request they be brought to the spill location.

- Wear the appropriate protective clothing when working on or near the spill.
- Recover as much free product as possible by pumping into appropriate drums or portable tanks.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated materials should be disposed of as directed by the Mine Manager or their designate.

#### **4.2 SUPERVISOR'S RESPONSE (alternatively Security's Response)**

- Contact the Mine Manager (at 669-3702, 445-5610, or by radio), or their designate, and advise them of the nature and status of the spill.
- Proceed to the spill location
- Assess the situation. Make arrangements for first aid, removal of injured personnel or fire-fighting assistance, as required; take action to secure site for the protection of human safety.
- If safe to do so, take appropriate action to stop the release of material and contain or prevent the spread of the spilled material (See guidelines for First Person Response). In conjunction with the Mine Manager (or their designate), arrange for necessary equipment, barriers, etc. to be brought to the spill location (see Figure 4 for spill containment equipment locations).
- Gather information on the status of the situation, including details of the material released, the amount released, flow direction, proximity to water courses, and an estimate of the containment measures required. Provide this information to the Environmental Coordinator for their spill report.

#### **4.3 RESPONSE TEAM ORGANIZATION** **Mine Manager (or their designate)**

- Will coordinate the on-scene response.
- Has complete authority over the spill scene and all mitigation efforts.
- Evaluates the initial situation and assesses the scale of the incident. The Mine Manager will authorize the call out of emergency services from Yellowknife. All efforts should be made to provide emergency services workers with information about materials involved in any incident.
- Assesses the requirements for manpower, equipment, materials and tools to contain the spilled material. In conjunction with the Supervisor (or Security in the event that the Supervisor is not reached by the First Respondent), arrange for necessary equipment to be brought to the spill location.

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- Develops the overall plan of action for containment and cleanup of the spill and designates the **Response Team Leader** who will be responsible for implementing the plan.
- Ensures that assigned responsibilities are carried out and that proper coordination exists between supervisors and other individuals responding to the spill.
- Contacts the Environmental Coordinator (at 669-3725, 445-7566, or by radio), or their designate, and advises them of the nature and status of the spill.
- Contacts the Safety and Security Supervisor (at 669-3717, 445-5620, or by radio), or their designate, and advises them of the nature and status of the spill.
- Notifies the General Mine Superintendent (who will in turn notify site personnel), AANDC, Public Works, the Mines Inspector, and the Corporate Nuna Team as outlined in Figure 2 – Spill Response Flow Plan for Giant Mine.
- Acts as DCNJV's local spokesperson with the public, media, and government services. Depending on the nature of the spill, this duty may become the responsibility of the Corporate Nuna Team. **No other DCNJV personnel should speak with the media regarding any spills at the minesite** unless otherwise instructed by the Mine Manager or their designate.
- Maintains constant communication with the Environmental Coordinator or their designate with respect to all aspects of the cleanup.

### **Response Team Leader**

- Depending on the nature of the spill, the response team leader may be the Mine Manager, General Mine Superintendent, Safety & Security Supervisor, Environmental Coordinator, or another individual designated to handle this responsibility. The Mine Manager, or their designate, will choose the appropriate team leader based on their knowledge of the materials and equipment involved in the incident.
- Responsible for all field operations in response to the spill.
- Utilizes available manpower, assembles supervisors and other individuals to respond to the spill, and ensures these individuals have appropriate skills to implement the response plan.
- Under direction from the Mine Manager or their designate, directs the response team in the implementation of the mitigation measures such as containment, recovery, remediation, and disposal operations and directs operational support, including decontamination procedures.
- In conjunction with the Safety and Security Supervisor, ensures that those responding to the spill have proper personal protective equipment.

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- Provides clean up progress reports to the Mine Manager or their designate.
- Works in conjunction and in cooperation with the Mine Manager or their designate.
- Works in conjunction and in cooperation with the Environmental Coordinator or their designate. Provides them with regular updates on spill status.

#### **Environmental Coordinator (or their designate)**

- Provides technical advice on anticipated environmental impacts of the spill.
- Estimates the effectiveness of various containment, recovery, and disposal options, suggesting the most appropriate approach. Works with the Mine Manager or their designate to determine the plan of action for remediation and cleanup of the spill.
- Is responsible for the collection and analysis of water samples to identify and monitor possible contaminant levels.
- Implements a program of sampling natural water courses he/she deems as directly or potentially impacted by the spill, as well as upstream and downstream of the spill site. The program should be designed to assess the potential for damage to the natural environment as a result of the incident. Initial samples should be taken as soon as possible after the spill has occurred, followed by repeated sampling at regular intervals during the subsequent clean up and restoration activities. Sampling time intervals will be determined on a case by case basis and should be developed in consultation with the appropriate regulatory officials whenever possible.
- Is responsible for the collection and analysis of soil/sediment samples to identify and monitor possible contaminant levels. The sampling program will be determined on a case by case basis as necessary, and will likely include grid sampling of the affected area. Samples will be submitted to a certified lab for analysis.
- Follows up at the spill site after the initial response to monitor the effectiveness of the cleanup operation and recommends further remediation work, if necessary.
- Reports the spill by calling the **24 Hour Spill Line at (867) 920-8130**. Provides initial incident details and follows up by completing and submitting a spill report form by email ([spills@gov.nt.ca](mailto:spills@gov.nt.ca)) or fax ((867) 873-6924).
  - **For Halocarbon Releases (R507 at the FOS):**
    - For releases of 100 kg or greater of R507, the Federal Halocarbon Regulations state that a report must be made to Environment Canada within 24 hours. This can be done through the GNWT Spill Line at the number listed in the bullet above. **At Giant Mine, it is DCNJV's policy to report all halocarbon releases regardless of size.**
- Follows up with the AANDC inspectors once the report is received by the spill line.

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Acts as the DCNJV liaison with environmental regulatory agencies

- Gathers relevant information and submits a detailed spill report to the applicable regulatory agencies, within the timeframe determined by the regulatory agencies. Issues a final report to Public Works and Government Services Canada (PWGSC) outlining the incident, cleanup details, etc.
- In conjunction with the Safety and Security Supervisor, ensures that annual updates to the Contingency Plan and Emergency Spill Response Manual are completed, distributed to mine site supervisors and submitted to regulatory agencies. Annual updates should reflect changes in mine site personnel, operations or technologies.
- In conjunction with the Safety and Security Supervisor, ensures that personnel that may be expected to respond to a spill receive adequate training in handling of the various types of spills that may be anticipated on the minesite.

#### **Safety and Security Supervisor (or their designate)**

- In conjunction with the Response Team Leader, ensures that those responding to the spill have proper personal protective equipment.
- Initiates preliminary Incident Reporting, and provides the Environmental Coordinator with information to be included in the spill response, final report, etc.
- In conjunction with the Environmental Coordinator, ensures that annual updates to the Contingency Plan and Emergency Spill Response Manual are completed, distributed to mine site supervisors and submitted to regulatory agencies. Annual updates should reflect changes in mine site personnel, operations or technologies.
- In conjunction with the Environmental Coordinator, ensures that personnel that may be expected to respond to a spill receive adequate training in handling of the various types of spills that may be anticipated on the minesite.

## **5.0 SYSTEM COMPONENT FAILURES - PREVENTION**

This section outlines potential failure modes of the mine site systems that handle or store hazardous materials, Descriptions of the control measures used to prevent failures, or detect and mitigate such incidents are also outlined.

### **5.1 MINEWATER PIPELINE**

The location of the tailing containment areas, dams, and seepage collection and pump back stations are shown in Figure 3.

The following is a list of possible causes for a failure of a minewater pipeline:

- Line is worn or broken;

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- Line blockages; or
- Accidental or intentional damage to the pipeline and its component parts (such as vehicle collision).

Visual inspections of active minewater lines are carried out at least once per shift (twice a day) by the Security Officers. Records of these checks are maintained by the Security Officers. These records are available for inspection by regulatory officials.

## 5.2 TAILING DAM STRUCTURES

The following is a list of possible causes for a tailing dam structural failure:

- Overfilling of the tailing containment area;
- Slumping or settling of the dam due to pressure;
- Erosion of the dam by natural elements or seepage; or
- Heavy precipitation (rain or snowfall) event, resulting in elevated levels in the tailing containment ponds or surface erosion.

DCNJV personnel carry out visual inspections of the tailing dams weekly as required under the former water license. Any problems noted during these inspections are reported to the Environmental Coordinator, the Mine Superintendent and the Mine Manager. Records of these reports are available for inspection by regulatory officials.

An annual inspection of the tailing structures is carried out each summer by a qualified geotechnical engineer. The last tailing dam inspection was completed by Golder Associates Ltd. in July of 2011. Submission of an inspection report is required by DCNJV within 60 days of the annual inspection.

## 5.3 HEATING FUEL STORAGE

With the exception of propane, heating oil tanks all have secondary containment measures in that they are all double-walled. Daily visual inspections of these tanks are made by site personnel and observations are recorded. These records are available for inspection by regulatory officials.

In addition, propane used for mine air heating is stored in a large tank at the B Vent Plant as shown in Figure 3. All Giant Mine personnel have been instructed that **Superior Propane is responsible for dealing with any leaks/spills pertaining to propane** at the B Vent Plant. **DCNJV personnel response is limited to securing the site and removing any immediate sources of ignition** as outlined in the Response Action Plan for a Leak Involving Propane (Appendix B).

## 5.4 AUTOMOTIVE FUEL STORAGE

A fuelling station for diesel and gasoline (both in double-walled tanks) is used to dispense fuel to mobile equipment and light vehicles. The location of these tanks is indicated on

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Figure 3. Site personnel make daily visual inspections of these tanks and observations are recorded. These records are available for inspection by regulatory officials.

## 5.5 PETROLEUM STORAGE AREAS

Some petroleum products are used at the site with drummed and pail storage provided. These materials are stored in a number of locations, as shown in Figure 3 and as listed in Section 9. Site personnel inspect the chemical and petroleum storage areas weekly.

## 5.6 PROPANE STORAGE SITE

As described in section 2.2 of this plan, propane is stored at one site next to the B Shaft Ventilation Plant for use at Giant Mine (see Figure 3). Propane from this 30,000 gal (US) tank is used to heat air supplied to underground during the winter months. Security personnel inspect the propane storage area twice daily.

# 6.0 POTENTIAL ENVIRONMENTAL EMERGENCIES

## 6.1 MINEWATER PIPELINE FAILURE

A pipeline carries underground minewater from the 750 level of the mine to surface at the Northwest Tailing Containment Area.

**Any person finding a discharge from the minewater pipeline, NO MATTER HOW SMALL, will immediately report the incident to their Supervisor or Security (by radio or at 669-3700).**

If a pipeline failure is located, the General Mine Superintendent will arrange to shut down the line. Flow will remain shut down until the line is repaired. See Section 4 above and Appendix B for Spill Response Procedures pertaining to a minewater spill. Minewater spills should be considered as potentially harmful as a hydrocarbon or arsenic spill, and site personnel should treat them as such.

## 6.2 TAILING DAM STRUCTURAL FAILURE

Potential tailing containment dam failures must be addressed as quickly as possible, in order to avoid or minimize environmental impacts.

Any person who observes liquid flowing or seeping from a tailing dam will report the following information to their Supervisor or Security (by minesite radio or at 669-3700).

- Your name and the location of the discharge source point;
- A description of your observations; and
- Be prepared to accompany response personnel to the appropriate location, to point out and confirm your observations.

The Supervisor or Security will, upon notification, determine the full extent of the failure and report it to the Mine Manager. It is the responsibility of the Mine Manager to evaluate the failure and initiate the spill response system if necessary (see Section 4 and Figure 2).

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### **Controlled Seepage from Tailings Dams**

It should be noted that **controlled** seepage from tailing dams is normal and acceptable. Currently, Dam 11 and Dam 22B are known to produce some seepage (see Figure 3). The water is contained by a secondary dam or trench (respectively) and pumped back into the ponds. In 2011, approximately 383 m<sup>3</sup> was pumped back at Dam 11 and approximately 492 m<sup>3</sup> at Dam 22B. Should seepage find its way out of these containment structures other than during the routine pump back to the TCA, the spill response will follow the procedures outlined for a Minewater/Tailings spill.

### **6.3 PROPANE TANK LEAK**

While the site is responsible for the registration of the B Vent Plant propane tank under the E2 Regulations, the tank itself is owned and maintained by Superior Propane, Yellowknife, NT. It is DNCJV's position that due to the volatile nature of propane, no emergency response by site personnel will be undertaken in the event of a leak. The site is committed to securing the location in the event of a leak and will do everything reasonable to eliminate sources of ignition and protect the safety of all workers onsite and the public. For more information regarding Propane Emergencies see Appendix B for its specific spill response plan or Appendix D for Superior Propane's Spill Contingency and Emergency Spill Response Plan (effective June 25, 2006).

## **7.0 GENERAL SPILL CONTAINMENT AND REMEDIATION**

The measures outlined in this section are intended to minimize the extent of contamination following the release of a hazardous material. For all spills, the initial response will be to immediately minimize any direct threat to human life or the natural environment. Personnel not directly associated with the containment and remedial operations will not be permitted near the incident scene. The locations of spill response resources are indicated in Figure 4.

### **7.1 CONTAINMENT ON OPEN WATER**

For spills on open water, containment procedures will vary depending on whether the material floats or sinks, and whether the water is flowing or standing.

For floating materials (such as hydrocarbon products), a surface boom may be deployed. In flowing water, the boom should be stretched across the flow, downstream from the spill and in an area of low velocity. In standing water, deploy the boom to contain the spill close to shore. Absorbent pads or socks should be placed between the spill location and the boom. If a boom is not available, an earthen dyke may be constructed, subject to regulatory approval.

For materials heavier than water, such as tailing solids, a containment dyke or silt fencing should be constructed if possible. This will contain the dispersion of the material in standing water. In small amounts of flowing water, divert the flow around the material by dyking and ditching if possible.

If containers of hazardous materials have been released into water, the containers must be recovered while containment measures are taken. Removal of damaged containers must be

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the priority action.

## 7.2 CONTAINMENT ON ICE

Spills on ice will be affected by the strength of the ice and the floating or sinking characteristics of the material. The safe bearing capacity of ice has to be carefully assessed. Using Gold's Formula, the capacity of the ice (in kg) can be determined based on the thickness (h) of the ice:

$$\text{Capacity} = 4 \times h^2$$

Table 1 below can be used to estimate the load bearing capacity of good ice:

**Table 1: Estimates of Load Bearing Capacity of Good Ice Based on Thickness**

Thickness (cm)	Capacity (kg)
10	400
12	576
14	784
16	1,024
18	1,296
20	1,600

From: DCNJV's Standard Operating Procedure for Determining Safe Work Area for Personnel Working on Ice Covered Tailings Ponds

General rules about ice strength include:

- "White" ice is only half as strong as "Blue" ice.
- Reduce load by a half, if ice cracks are parallel (in the same direction) to travel.
- Reduce load by three-quarters if ice cracks are both parallel and at right angles to travel.
- Use great care if weather is extremely cold after a warm period or warm after a cold period.
- Control speed in shallow water to avoid wave build up.

If the spill does not penetrate the ice and the ice is safe to work on, containment will be similar to procedures used on land.

If the spill penetrates the ice, the situation will be similar to spills in open water. If the material floats then the ice may be broken to install a containment boom. The ice between the spill and the boom should be collected and disposed of with the spilled material. In standing water under ice, the primary effort must be to recover the material.

## 7.3 CONTAINMENT ON SNOW

Snow is one of the best natural absorbents and should be used it as much as possible when available. Snow provides protection against the spread of fire if the spilled material is

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flammable. Contaminated, saturated snow facilitates removal of the contaminant to a recovery or disposal site.

Methods to prevent a spill on snow from spreading include:

- Compact the snow around the outside perimeter of the spill area
- Construct and compact snow dams (dams may be wetted with water in freezing conditions to reduce permeability)
- Locate the low point of the spill area, then clear channels in the snow to allow material not absorbed to flow into the low area.
- Once collected, the spilled material contained in the low area can be recovered with absorbent materials, pumped or shovelled into containers, or picked up using mobile heavy equipment and transported to an approved disposal site.
- Locations used to dispose of contaminated materials must be approved by the Mine Manager or their designate.

#### 7.4 CONTAINMENT ON LAND

In all cases of liquid spills, the initial step is to prevent further dispersion. This may be done by dyking around the spill, using locally available natural materials placed by mobile heavy equipment. Absorbent materials such as absorbent pads, socks and booms, found in the spill containment kits located around site, should be utilized to prevent the further spread or seepage of potentially contaminating materials.

#### 7.5 FIRE OR EXPLOSION HAZARDS

When fire is associated with a spill of hazardous material, extinguishing the fire is a necessary step. The fire may prevent efforts to stop or minimize the spillage. In all cases, the first step is to clear people from the surrounding area.

Containment dykes should be constructed down gradient from liquid spills to minimize the spread of fire and contain any unburned fluid. Foam, CO<sub>2</sub>, or water should be used to fight the fire, as is appropriate for the types of materials present (see Appendix B for appropriate fire suppression materials for specific materials, or consult the manufacturer's MSDS). Particular care must be taken to prevent inhalation of combustion vapours. When the fire is extinguished, proceed to stop further spillage, contain the spill, and initiate appropriate clean up measures.

The Mine Manager or their designate will advise the **Yellowknife Fire Department (at 873-2222)**, as soon as possible in the event of any spill involving fire. They should be advised of all details relating to the incident and the types of materials involved.

### 8.0 HAZARDOUS MATERIAL DISPOSAL & SITE RESTORATION

Small volumes of spilled materials, contaminated soils and absorbent materials should be manually

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shovelled into empty appropriate containers. The **contents of all containers used for spill residues must be clearly identified** on the outside of the container with permanent markings. The Environmental Coordinator will coordinate this inventory. Larger volumes of spill residues, contaminated soils or snow must be removed from the spill site with heavy equipment. Spill residues must be removed from the spill site to an approved location as part of the initial spill response plan. **All spill residues must be disposed of, stored and/or treated as approved of by the Mine Manager or their designate.**

As a general rule, there are four locations on the mine site for the disposal or storage of spill residues:

### **Tailing Containment Areas**

For spills of tailings, tailings seepage or minewater only, **hydrocarbon wastes must not be disposed of in these areas.**

### **Hazardous Waste Storage Area**

Contained chemical wastes including arsenic and asbestos (pending approval of disposal). **Hydrocarbon wastes must NOT be stored at this location.**

### **Waste Segregation Drums/Waste Oil Cube – MEG**

A series of drums located inside a container at the MEG is employed to store waste produced during the regular care and maintenance work and small spills at site. These include, but are not limited to, drums for hydrocarbon contaminated solids, hydrocarbon contaminated water and snow, aerosol cans, used oil filters, etc. As mentioned earlier, there is a used oil cube located outside of the MEG into which waste oil is pumped. Once a significant number of drums are filled, or the cube is filled to its allowable capacity, a suitable subcontractor removes the wastes from site.

### **Hydrocarbon Contaminated Waste Laydown Area**

Currently the site's method of dealing with hydrocarbon contaminated wastes is to dispose of them offsite via a subcontractor. This also applies to materials contaminated during an unexpected spill. If a spill is small, the contaminated materials are placed into the appropriate drum at the MEG in the waste segregation drums mentioned above. For larger spills, materials may be placed directly into their own appropriate, waterproof container (ie overpack). These drums are generally stored in the flat, laydown area NW of the MEG until such a time that they can be removed offsite by a suitable subcontractor.

Final disposal of the recovered materials will be determined by the Mine Manager in consultation with the appropriate regulatory officials and the product manufacturer.

Cleanup operations organized under the spill response system will be designed by the Mine Manager, in conjunction with the Response Team Leader and the Environmental Coordinator (see Section 4), primarily to mitigate the most significant and immediate threats to the natural environment. The effectiveness of the initial response, and the potential longer term impacts on the local environment, must be evaluated by the Environmental Coordinator based on visual inspections

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of the spill site and, if necessary, soil and water sampling and analyses. Final clean-up of affected areas will be conducted under the direction of the Environmental Coordinator in conjunction with the Mine Manager.

**Clean-up of a spill is not considered complete until the responsible regulatory officials have approved of the work conducted and do not consider the spill site to be a long term threat to the natural environment.**

## **9.0 SPILL RESPONSE RESOURCES**

Personal protective equipment for workers is available from security as required. Spill containment equipment is stored at the warehouse and/or carpenter shop, as well as at several other sites on the property, as noted in Figure 4.

### **9.1 SPILL KITS**

Spill kits are found at strategic locations on site, included but are not limited to the following:

- Fuelling Station near the C Boiler House (2 kits)
- ETP
- Nuna Equipment Laydown Rail (near the UBC Pit)
- The Akaitcho Headframe
- FOS Location
- Machine Shop
- Hazardous Waste Disposal Site
- MEG
- Two Pickups (the Environmental Truck (#1079) and the Security Truck)

The spill kits are equipped with nitrile gloves, goggles, disposable coveralls, liquid and/or hydrocarbon absorbent socks, pillows, and pads, disposable bags, and caution tape. Contents may vary from place to place depending on the type of spill that is anticipated. Both Universal and Oil kits are present on site. The kits are contained in polypropylene overpack drums with threaded lids. These drums meet the DOT regulations for salvage drums suitable for use as shipping containers.

Whenever work is undertaken that requires the use of heavy equipment and/or is in a sensitive location (ie near Baker Creek), a spill kit is brought to that location prior to the commencement of work. Additional spill kits are stored in the Carpenter Shop.

### **9.2 SPILL EQUIPMENT INVENTORY**

The following is a list of equipment available for spill containment and site remediation purposes:

- 1 - D8 Bulldozer
- 1 - 988 Loader
- 1 - 966 Loader

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- 1 - 562 Grader
- Portable Gas Driven Pumps
- Portable Generators
- Portable Lighting Equipment

### 9.3 OUTSIDE RESOURCE CONTACTS

Other sources of equipment and resources will be utilized as required. These include: Weatherby Trucking Ltd, Ace Enterprises Ltd, Camco Construction Ltd, Robinson Trucking Ltd and other rental/contracting companies in Yellowknife. A list of available equipment and rates for various local contractors/companies can be found in Appendix F. Please note that only Weatherby Trucking and Camco rates are current. The site is in the process of contacting the other companies for updated equipment rates.

- Ace Enterprises Ltd. 920-2082 (office)
  - Alain Rossignol (Owner) 873-9165 (h) 445-9300 (24 hour cell)
  - Kim Rossignol (Manager) 873-4380 (h) 445-9301 (24 hour cell)
- Weatherby Trucking Ltd.
  - Blair Weatherby (Owner) 873-9801(off/home) 445-1667 (24 hour cell)
- Camco Construction Ltd.
  - Sean Mailloux 873-8522 (office) 444-8522 (24 hour cell)
- RTL - Robinson Enterprises Ltd. 873-6271 (office)

## 10.0 HAZARDOUS MATERIALS INVENTORY

### 10.1 MATERIAL SAFETY DATA SHEETS (MSDS)

DCNJV has a centralized MSDS information center on the property located in the Health & Safety Office (see Figure 4). MSDS information for all products used on site is available from the Health & Safety Officer. Access to information on chemicals is available 24 hours per day through the Security Officer on duty. As they are maintained on site by Health and Safety and updated regularly, MSDS are no longer appended to the Contingency Plan and Emergency Spill Response Manual. Chemical spill emergency information is also available 24 hours a day from the Canadian Transport Emergency Center (CANUTEC) at (613) 996-6666. MSDS are also posted in a few locations around the property (eg ETP) and at specific projects (eg the FOS) on an as-needed basis

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## 10.2 MILL AND EFFLUENT TREATMENT PLANT REAGENTS

The locations of storage facilities for reagents, fuel and other hydrocarbon products at Giant minesite are shown on Figure 3. As noted earlier, many of these reagents are no longer in use, but some remain stored on the property. Table 2 provides a list of the various reagents.

**Table 2: Chemical Product Types, Volumes and Storage Locations**

Chemical Name	Unit Volume or Container Type	Storage Location
Armac HT Flake	27 kg boxes	Mill Reagent Shed
Borax, Anhydrous Granular	25 kg bags	Mill Reagent Shed
Caustic (Soda Ash)	25 kg bags	Mill Reagent Shed
Ferric Sulphate	Bulk Liquid – 50%	Effluent Treatment Plant
Ferric Sulphate	22.7 kg bags	Mill Reagent Shed
Flocculant	25 kg bags	Effluent Treatment Plant
Hydrogen Peroxide	Bulk Liquid – 50%	Effluent Treatment Plant
Lime (Quick and Hydrated)	Bulk – Powder	Silo - Effluent Treatment Plant
Silica Sand	25 kg bags	Mill Reagent Shed
Silica Flour	25 kg bags	Mill Reagent Shed
Sodium Metabisulphate	22.7 kg bags	Mill Reagent Shed
Sulphur – Prills	25 kg bags	Mill Reagent Shed
Smithing Coal	100 lb bags	Mill Reagent Shed
Water Stabilizer	50 lb bags	Mill Reagent Shed

## 10.3 FUELS, OILS, AND PETROLEUM PRODUCTS

### Diesel Fuel (P40 & P50 types)

Purchased in bulk, diesel fuel is currently stored in three aboveground, double-walled tanks, ranging from 22,000 to 100,000 L in size (see Figure 3).

### Gasoline

Purchased in bulk, gasoline is currently delivered to site via tanker truck to an aboveground, double-walled storage tank at the Fuelling Station, located near the C Dry (storage capacity of 2,500 liters). See Figure 3 for the location of the gasoline storage tank.

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**Propane**

Propane is used to heat ventilation air to the mine in winter. Purchased in bulk from Superior Propane Ltd., it is delivered via tanker truck to a storage tank at the mine ventilation plant at the B-shaft. Storage is in an above ground tank, 30,000 gal (US) in size (see Figure 3).

**Oils and Greases**

Purchased in drums, pails, and cases and delivered via truck. Storage locations for these materials are shown in Figure 3.

Table 3 provides a list of the oils and greases usually stocked on site and their normal unit volumes (may vary):

**Table 3: Inventory of Oil and Grease, and Storage Locations**

<b>Name</b>	<b>Container Type</b>	<b>Storage Location</b>
Arox EP22 of EP Arctic	205 L drum	Storage Yard
Arox EP100	4 L jug or 20 L pail	Storage Yard
Esso Cable Coating	205 L drum	Headframe
Esso Extra 10W30	1 L jug	Maintenance Shop
Hydraulic Essolube HD 10W	205 L drum	Storage Yard
Essolube HD 20/HD 30/XD 30	205 L drum	Storage Yard
Essolube Plus HDX 20-20 W	1 L jug	Maintenance Shops
Essolube Hydraulic XD3-10 W	20 L pail	Maintenance Shop
Esstic 32/68/100	205 L drum	Storage Yard
Esso GX 75W80/80W90/85W140	20 L pail	Storage Yard
Hydraulic Univis	205 L drum	Storage Yard
Tresso 32	205 L drum	Storage Yard
Thread Cutting Dark	4.5 L jug	Maintenance Shop
Voltesso 35	205 L drum	Storage Yard
ATF Type A & F	1 L jug	Maintenance Shop
Hydraulic ATF Type A	205 L drum	Storage Yard
Diamond Drill DDR-3	17 kg pail	Oil Shed
Lo-Temp EP Cartridge	400 g tube	Maintenance Shop

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MPH Cartridge	400 g tube	Maintenance Shop
Petrocan EP 2	400 g tube	Maintenance Shop
Petrocan EP 2	55 kg keg	Storage Yard
EP102 Epic Synthetic	17 kg pail	Maintenance Shop

#### 10.4 MISCELLANEOUS HYDROCARBONS

Table 4 provides a listing of miscellaneous hydrocarbon products that may be stocked in small quantities on the minesite; their storage location and respective unit volumes (may vary):

**Table 4: Miscellaneous Hydrocarbons, Volumes and Locations**

Product	Container Type	Location
Acetylene WS Small	4.5 kg cylinder	Warehouse Compressed Gas Storage
Acetylene WTL Large	80 kg cylinder	Warehouse Compressed Gas Storage
Additive Fuel Oil EG275F	205 L drum	Storage Yard
Alcohol Methyl Hydrate	20 L pail	Maintenance Shop
Antifreeze Gasoline K425	500 ml bottle	Maintenance Shop
Antifreeze Automotive	4 L jug	Maintenance Shop
Antifreeze Automotive	205 L drum	Storage Yard
Antifreeze Frost X	205 L drum	Storage Yard
Cleaner Electrosol	20 L pail	Maintenance Shop
Cleaner Lectra Clean 2018	spray can	Maintenance Shop
Degreaser 5107TI Ripper II	205 L drum	Storage Yard
Belt Spraygrip	spray can	Maintenance Shop
Glyptal Blue Grey G1237	spray can	Maintenance Shop
Glyptal Thinner	spray can	Maintenance Shop
Glyptal Thinner 3190	spray can	Maintenance Shop
Rockwell 147B	Box	Maintenance Shop
Rockwell 147C	Box	Maintenance Shop

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Rockwell # 775256	Box	Maintenance Shop
Solvent C-666	20 L pail	Maintenance Shop
Solvent Varsol	205 L drum	Storage Yard
Turpentine	4.5 L can	Maintenance Shop

## 11.0 FREEZE OPTIMIZATION STUDY

From 2009 to 2011, construction and commissioning of the Freeze Optimization Study (FOS) took place onsite at Giant. The purpose of this work is to explore options regarding the freezing of the arsenic trioxide in place underground. Currently the project is underway in the AR2 East area of the mine and is freezing arsenic Chamber #10 using thermosyphons and an active cooling plant. A variety of setups are being explored during this optimization phase which will lead to the determination of the final long term encasement of the remaining arsenic chambers onsite. Chemicals/products being used as part of the FOS are as follows:

- Dynalene HC: a heat transfer fluid that will be used in the active freeze holes.
- R-507: a refrigerant that will be used to as a coolant.
- Ammonia: used for cooling the dynalene.
- CO<sub>2</sub>: used as a heat transfer agent in the thermosyphons.

Copies of the specific spill response plans for each of these items can be found in Appendix B: Response Action Plans. In addition to these products, other fuels, oils and petroleum products generally used in heavy equipment will likely be used at the FOS. These products have already been discussed in earlier sections of this plan.

## 12.0 EMERGENCY TELEPHONE NUMBERS

### Fire Emergencies

Yellowknife Fire Dept. 873-2222  
24 Hour Forest Fire Line 1-800-661-0800

### Medical Emergencies

Ambulance 873-2222  
Hospital 669-4111  
Poison Control Center 669-4100

### Police

Police (RCMP) 669-1111

### Environmental Emergencies

24-Hour NWT Spill Line: 920-8130

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Marine and Air Search and Rescue (N.W.T.): 1-800-669-1111

**Propane Emergencies**

Superior Propane's **24 Hour Emergency Number (867) 873-5551**

Office	766-6122 (office)	444-1383 (24 hour cell)
Mark Gautschi	766-6122 (office)	445-7919 (cell)

**12.1 DETON'CHO / NUNA JV GIANT MINE REMEDIATION PROJECT****NT/NU 24 HOUR SPILL LINE****920-8130****873-6924**

**24-HOUR MINE TELEPHONE NUMBER:** 669-3700, 669-9843 or 445-5622 (SECURITY)

**DCNJV**

	<b>Work</b>	<b>Cellular</b>	<b>Home</b>
Mike Borden (Mine Manager)	669-3702	445-5610	920-2600
TBA (Environmental Coordinator)	669-3725	445-7566	444-0054 (alt Cell)
Mark Schmalz (General Mine Superintendent)	669-3704	445-1655	920-2054
Sandy Hamilton (Boiler Supervisor)	669-3704	445-5621	920-4355
Steve Millar (Safety Supervisor)	669-3717	445-5620	873-8736

**Nuna Logistics**

	<b>Work</b>	<b>Cellular</b>
Miles Safranovich (COO)	(780) 408-5353	(780) 886-4431
Pat McHale (Operations Manager)	(780) 434-9434	(780) 504-7044
Kevin Anderson (Safety Manager)	(780) 408-5340	(780) 264-2041
Len McHale (Vice President of Operations)	(780) 434-9354	(780) 238-5351

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**12.2 GOVERNMENT DEPARTMENTS****Government of Canada**

	<b>Phone</b>	<b>Fax</b>
Aboriginal Affairs and Northern Development Canada	669-2425 (-2430)	669-2720 (-2439)
Water Resources	669-2657	669-2716
Land Administration	669-2671	
Taiga Environmental Laboratory	669-2781	
Environmental & Conservation	669-2589	
Mackenzie Valley Land & Water Board	669-0506	873-6610

**AANDC Inspector**

Michael Martin (Water Resources Officer)	669-2768 (w)	444-0711 (c)	669-2720 (fax)
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**Environment Canada**

Environmental Protection Branch (Tim Morton – Enforcement Officer)	669-4794 (w)	446-0924 (c)
General Inquiries	669-4700	873-8185 (fax)

**Fisheries & Oceans Canada**

Morag McPherson (Fish Habitat Biologist)	669-4944 (w)	669-4940 (fax)
General Inquiries	669-4900	669-4940 (fax)

**Government of the Northwest Territories****Department of Transportation – North Slave Region**

(For approval of highway closure)

Michael Conway (Regional Superintendent)	873-7808 (w)	445-2834 (c)	766-3171 (h)
Del Miller (Region Manager)	920-3432 (w)	445-2053 (c)	669-7202 (h)

**Department of Environment and Natural Resources**

Environmental Protection	873-7654	873-0221 (fax)
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**Workers Safety and Compensation Commission (WSCC)**

Prevention Services Director	873-7078 or 873-0262
Mines Inspection Services	920-3888 or 669-4408 or 669-4414
Mine Accident Report Line (24 Hours)	873-7468 or 1-800-661-0792

**Municipal and Community Affairs**

Office of the Fire Marshall	873-7469
Emergency Measures	873-7083

**City of Yellowknife**

Office of the Mayor	920-5693	920-5649
General Inquiries	920-5600	

**12.3 OUTSIDE AGENCIES****TEAP (Transportation Emergency Assistance Plan of the Canadian Chemical Producers Association)**

24-Hour Emergency Number (403) 477-8339  
(Primarily designed for Highway Transport Emergencies)

**CANUTEC (Canadian Transport Emergency Center)**

24-Hour Emergency Number (613) 996-6666  
(Primarily designed for Highway Transport Emergencies)

**13.0 SPILL RESPONSE ACTION PLANS**

A variety of petroleum, chemical, and other hazardous materials could be encountered at Giant Mine. Individual Response Action Plans have been developed for those materials most commonly used or likely to be involved in an emergency on site. These are listed below and presented in Appendix B.

- ARSENIC SLUDGE (includes arsenic in dust or powder form)
- DIESEL FUEL
- FERRIC SULPHATE
- GASOLINE
- HYDROGEN PEROXIDE
- LIME
- LUBRICATING OR HYDRAULIC OIL

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- MINewater/TAILINGS SUPERNATANT
- PROPANE
- SEWAGE
- TAILINGS (solids)
- WASTE OIL
- DYNALENE HC
- R-507
- AMMONIA
- CO<sub>2</sub>

## **14.0 REFERENCES**

### **Government of the Northwest Territories**

Spill Contingency Planning and Reporting Regulations, July 1993

### **Government of Canada**

Guidelines for Preparation of Hazardous Material Spill Contingency Plans, April 2007 (INAC)  
Environment Canada, Canadian Environmental Protection Act, 1999  
Environmental Emergency (E2) Program, 2003

### **Mackenzie Valley Land & Water Board**

Guidelines for Contingency Planning, January 1987

### **Northwest Territories Water Board**

Guidelines for Tailing Containment, February 1987

### **Material Safety Data Sheets (MSDS)**

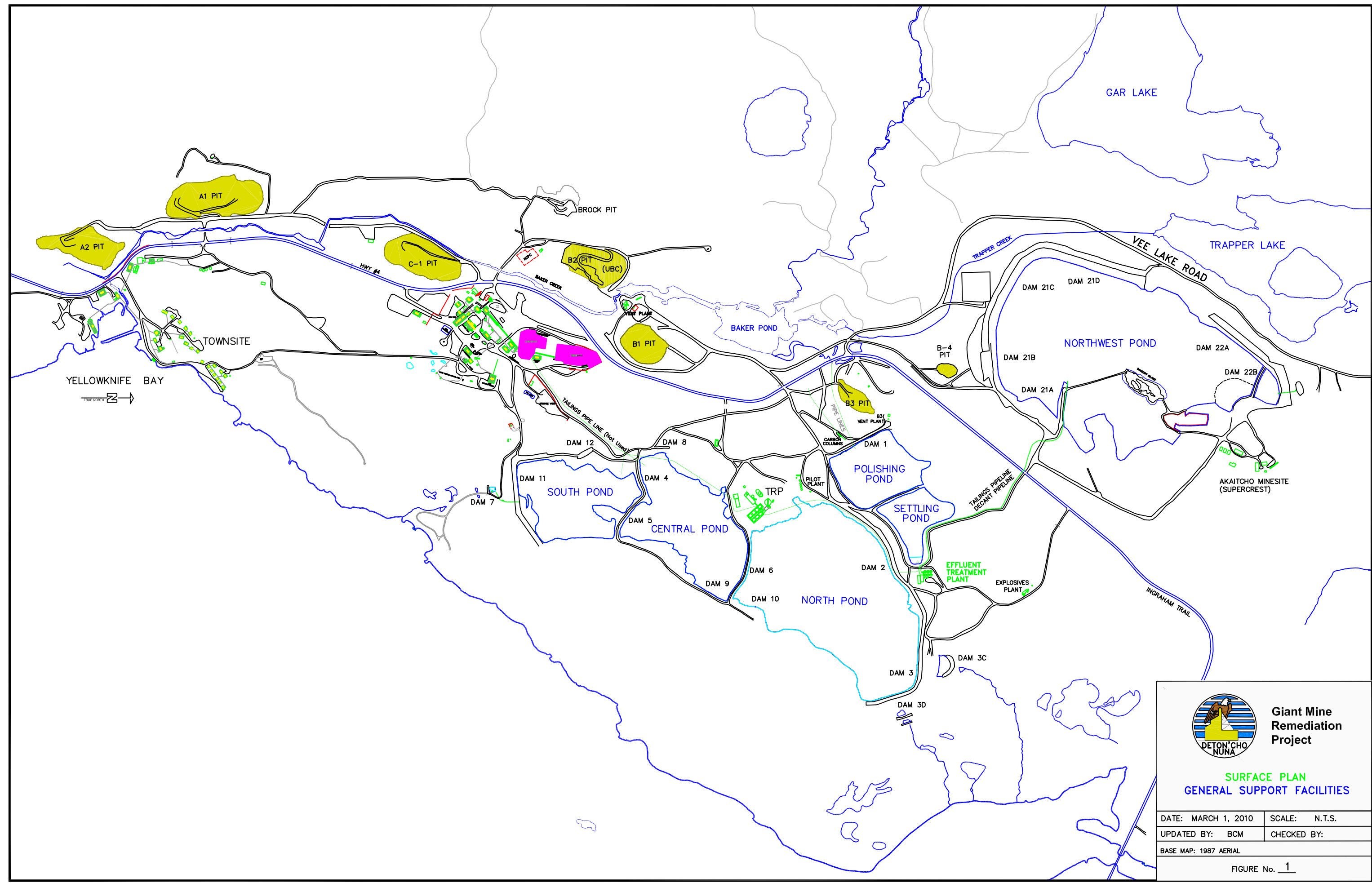
Various MSDS from the manufacturers that produce the chemicals/products used onsite.

**Controlled Document**

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Dated Printed: 7/13/2012

# Figures



**Giant Mine  
Remediation  
Project**

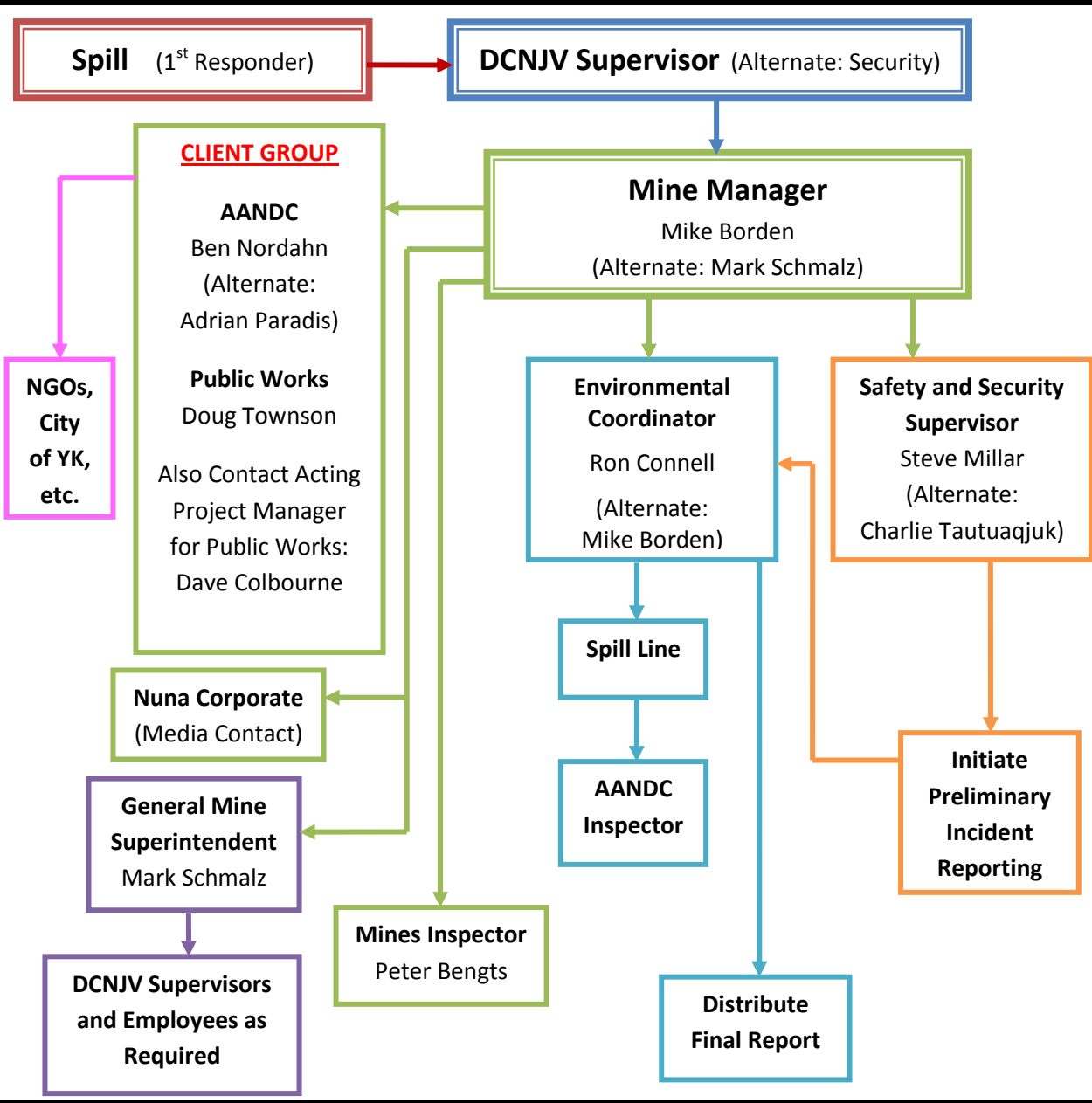
**SURFACE PLAN  
GENERAL SUPPORT FACILITIES**

DATE: MARCH 1, 2010	SCALE: N.T.S.
UPDATED BY: BCM	CHECKED BY:
BASE MAP: 1987 AERIAL	
FIGURE No. <u>1</u>	

Spill Response Flow Plan for Giant Mine

April 3, 2012

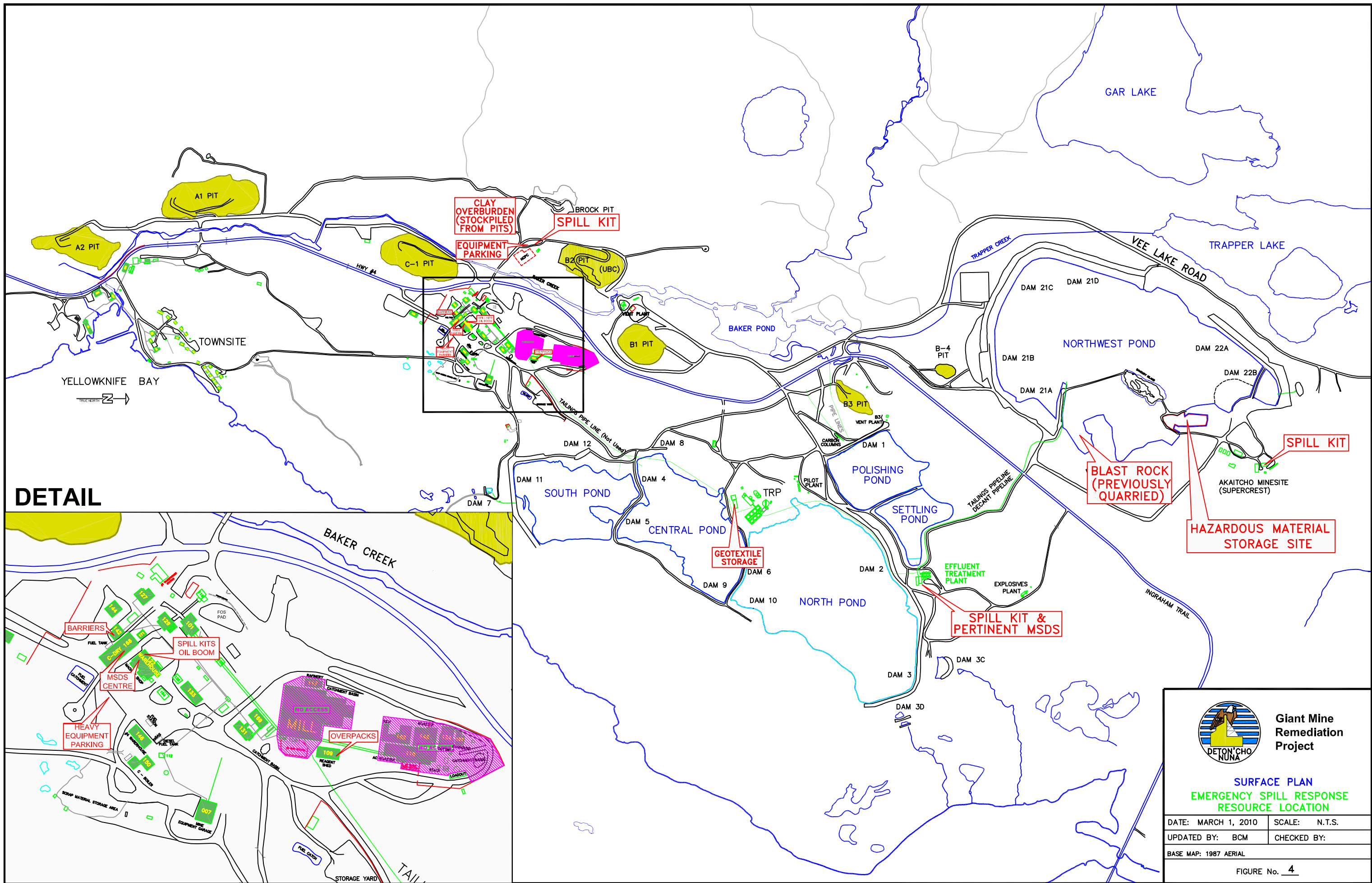
All notifications to the Client Group must be made verbally (via the phone or in person - voicemail messages are not acceptable) with a follow up email for confirmation



	Work (w)	Cell (c)	Home
DCNJV Supervisors			
Mark Schmalz	669-3704	445-1655	920-2054
Sandy Hamilton	669-3723	445-5621	920-4355
SECURITY			
	669-3700	445-5622	669-9843
Mike Borden	669-3702	445-5610	920-2600
Ron Connell	766-5317	444-8093	444-8093
Steve Millar	669-3717	445-5620	873-8736
Charlie Tautuaqjuk	669-3712	445-2333	920-2154
Aboriginal Affairs and Northern Development Canada (AANDC)			
Ben Nordahn	669-2430	445-5405	920-4924
Adrian Paradis	669-2425	446-0579	669-3187
Michael Martin (Inspector)	669-2768	444-0711	
Public Works and Government Services Canada (PWGSC)			
Rob Girvan	766-8361	445-5066	
Doug Townson	766-8366	445-6135	
GNWT Spill Line	920-8130 (24 hrs)		873-6924 (fax)
Chief Mines Inspector	Peter Bengts		669-4412 (w)
Nuna Corporate			
Miles Safranovich (COO)	(780) 408-5353 (w)	(780) 886-4431 (c)	
Kevin Anderson (Safety Manager)	(780) 408-5350 (w)	(780) 264-2041 (c)	
Len McHale (VP Ops)	(780) 434-9354 (w)	(780) 238-5351 (c)	
WSCC Emergency	1-800-661-0729		(867) 873-7468 (c)







**Giant Mine  
Remediation  
Project**

**SURFACE PLAN  
EMERGENCY SPILL RESPONSE  
RESOURCE LOCATION**

DATE: MARCH 1, 2010	SCALE: N.T.S.
UPDATED BY: BCM	CHECKED BY:
BASE MAP: 1987 AERIAL	

## **Appendix A**

### **Nuna Logistics Limited Environmental Policy**

## **Nuna Logistics Limited Environmental Policy**

Nuna Logistics Limited is committed to achieving and maintaining a high standard of environmental stewardship in our operations while conducting business as a resource development and industrial company.

Nuna Logistics Limited will seek continuous improvement, in all matters that affect the environment, by engaging employee, community, government and industry.

Nuna Logistics Limited will specifically:

- Communicate openly with all clients, government, community leaders and employees regarding environmental issues.
- Comply with all applicable regulations, laws and industry standards. Where regulations do not provide adequate environmental protection Nuna Logistics Limited will apply standards that will minimize environmental impact.
- Implement a risk management system that identifies, controls, and monitors potential environmental risks arising from Nuna Logistics Limited operations.
- Ensure that employees are aware of this policy, and their environmental responsibilities.
- Provide site-specific training for all employees and contractors to prevent damage to the environment before it happens by reporting problems, concerns to their supervisors.
- Ensure that suppliers of goods and services comply with this policy and are aware of their responsibilities in relation to Nuna Logistics Limited.
- Implement sustainable business practices such as efficient use of materials and energy and minimal use and production of hazardous substances.



## **Appendix B**

### **Individual Spill Response Plans**

# RESPONSE ACTION PLAN FOR AN ARSENIC SLUDGE SPILL

(Includes Arsenic in dust or powder form)  
Class 6.1 Material (TDG)

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow using spill containment equipment towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water.
- Secure the site and prevent non-authorized entry.
- Attempt to **contain** the arsenic sludge by dyking with earth, sand bags, snow or other type of barrier. Construct a berm if required. Use earth-moving equipment as necessary to complete containment measures. As necessary, use materials found in the spill containment kits located onsite.

## RECOVERY

- Recover / excavate all arsenic sludge, dust or powder, and contaminated soil or snow.
- Place contaminated materials into appropriate drums, containers or specially designed spill containment waste bags (when in dust or powder form – do not place sludge in bags unless bags are immediately placed into another container suitable for containing the sludge). All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- Ensure that all equipment utilized is decontaminated at the conclusion of the recovery operation. Decontamination may include washing equipment down with hot water and/or steam. Any waste water produced during such an effort will be collected and disposed of in an appropriate manner as directed by the Mine Manager or their designate.
- Thoroughly clean any surfaces affected (such as steel, concrete or wood).
- Resurface the affected area with waste rock, gravel or other appropriate material.

## FIRE RESPONSE

- Material is not flammable and will not support combustion.
- In a fire involving Arsenic sludge, Arsine gas may be produced as a result of the heat from the fire. **Do not attempt to extinguish the fire unless you are equipped with Self Contained Breathing Apparatus (SCBA) and protective clothing.**
- Use extinguishers compatible with storage site construction materials. If water must be used, limit quantities and treat any runoff in the same manner as you would a spill of minewater (see action plan below).

## **PROPERTIES**

- Arsenic sludge is a mixture of arsenic trioxide and water, and is dark grey in colour.
- The chemical formula for arsenic is As. Arsenic in the sludge form is Arsenic Trioxide ( $\text{As}_2\text{O}_3$ ). This form of arsenic is water-soluble.
- Arsenic trioxide ( $\text{As}_2\text{O}_3$ ) is a known carcinogen, poisonous by ingestion and dust inhalation, and possibly by skin absorption. It is corrosive to eyes, skin, and mucous membranes.
- Refer to the MSDS for Arsenic Trioxide (CAS # 1327-53-3) for more information.

## **ENVIRONMENTAL CONCERNS**

- Arsenic is toxic to human health and to aquatic life even in very low concentrations. Every effort must be made to prevent Arsenic Trioxide from migrating into waterways.

## **CONTAINERS**

- Use metal or plastic drums (overpacks) for the transportation of Arsenic Sludge.

## **PERSONAL PROTECTION**

- When working with arsenic, personnel are required to wear rubber boots, full slicker suit, rubber gloves and a full-face shield.
- Airstream respirators are required if dusty conditions are present.
- Avoid skin contact with arsenic sludge, dust or powder.
- Avoid inhalation of arsenic sludge, dust or powder.
- Avoid arsenic sludge, dust or powder from contacting clothing.
- Prevent arsenic sludge, dust or powder from contacting the eyes.
- Wash thoroughly after handling arsenic sludge or dust.
- Shower after the completion of your work.
- Do not eat or smoke until after completing wash up. Properly decontaminate work clothing or dispose of it in containers suitable for containing arsenic (see Recovery section above).
- Spill response personnel aiding in the cleanup of an arsenic spill are to provide urine samples to Environmental Services on a regular basis as deemed necessary by the Environmental Coordinator.

# RESPONSE ACTION PLAN FOR A DIESEL FUEL SPILL

## Class B-3, D-2B (WHMIS Canada)

### INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Eliminate** ignition sources and any open flame.
- **Stop** the flow of product.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water.
- Secure the site and prevent non-authorized entry.
- **Contain** the flow of oil. This can be achieved by dyking with earth, snow, ice or other barriers, construction of an oil interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.
- If spill has reached natural waters, deploy a containment boom and apply oil absorbent materials found in the spill containment kits located onsite.

### RECOVERY

- Recover as much free product as possible by pumping into appropriate drums or portable tanks.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- Diesel fuel spilled on water can be recovered by using skimmers, absorbent booms or other materials found in the spill containment kits located onsite.
- If deemed necessary, diesel fuel can be eliminated by burning it in a controlled manner. Under no circumstances should personnel burn diesel fuel without the permission of the Mine Manager or their designate.

### FIRE RESPONSE

- Use CO<sub>2</sub>, dry chemical, foam or water spray (fog).
- Use water to cool tanks.
- If necessary, divert the fuel to a secure area for controlled burning.
- If diesel fuel is escaping, contain it as soon as possible.

### PROPERTIES

- Chemical composition hydrocarbon C<sub>9</sub> to C<sub>16</sub>
- Clear to yellow with hydrocarbon odour.
- Diesel fuel will float on water.
- Flash Point of diesel fuel is 62° C.
- Ignition temperature of diesel fuel is 210° C.
- Refer to the manufacturer's MSDS for more information.

## **ENVIRONMENTAL CONCERNS**

- Diesel fuel is toxic to fish and other aquatic organisms, and harmful to waterfowl.

## **CONTAINERS**

- Diesel fuel is transported to the site by tanker truck and transferred to various storage tanks at the mine.

## **PERSONAL PROTECTION**

- Wear impervious chemical resistant clothing, gloves, footwear and goggles. For confined spaces SCBA may be required.
- Avoid contact with strong oxidizers such as nitric acid, sulphuric acid, chlorine and peroxides.
- Do not use handheld electronic equipment, such as cellular phones, in the vicinity of a diesel fuel spill. Sparks from such equipment could ignite the vapours.

# RESPONSE ACTION PLAN FOR A FERRIC SULPHATE SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Stop** the flow of ferric sulphate at source and **prevent** solid ferric sulphate from contacting any water.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow (if any) using spill containment equipment towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water and deploy a containment boom and absorbent materials found in the spill containment kits located onsite.
- **Contain** the flow of ferric sulphate solution by dyking with earth, sand bags or other barrier, blocking any entry to waterways, construction of an oil interceptor trench or depression, etc.
- Neutralize with lime.

## RECOVERY

- Recover as much product as possible by pumping into appropriate drums or containers.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums, containers or specially designed spill containment waste bags. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- Use absorbents for minor spills. Collected liquids should be pumped to appropriate leak proof containers pending disposal.

## FIRE RESPONSE

- Material is non-combustible.
- Use extinguishers compatible with storage site construction materials.
- Wear SCBA and protective clothing.

## PROPERTIES

- Chemical formula is  $\text{Fe}_2(\text{SO}_4)_3$ .
- Product is soluble in water and is 60% Ferric Sulphate by weight on average.
- Liquid is red.
- Odourless.
- Refer to the manufacturer's MSDS for more information.

## ENVIRONMENTAL CONCERNS

- Ferric Sulphate is toxic to fish and other aquatic organisms, through accumulation in the ecosystem.
- Dispose of all containers at an approved disposal site as directed by the Mine Manager or their designate. Deposition in a Landfill is not permitted.

## CONTAINERS

- Ferric Sulphate is transported to the mine site in bulk and stored in a large fibreglass tank at the Effluent Treatment Plant (ETP).

## PERSONAL PROTECTION

- Wear impervious chemical resistant clothing, gloves, footwear and goggles. The use of SCBA is required for confined space.
- Avoid contact with skin and clothing and **do not get into eyes**. Wash thoroughly after handling.
- Avoid inhalation of dust and prevent it from contacting eyes.

# RESPONSE ACTION PLAN FOR A GASOLINE SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Eliminate** ignition sources and any open flame.
- **Stop** the flow of product.
- **Remove** all personnel not involved with the incident from the area.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water.
- **Contain** the flow of gasoline. This can be achieved by dyking with earth, snow, ice or other barriers, construction of a gasoline interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.
- If spill has reached natural waters, deploy a containment boom, use skimmers or apply gasoline absorbent materials found in the spill containment kits located onsite.
- Gasoline contains benzene, a suspected carcinogen. Avoid breathing vapours, and if necessary, obtain an organic vapour cartridge full-face respirator or wear SCBA.

## RECOVERY

- Conduct regular explosive atmosphere monitoring with an intrinsically safe instrument.
- Recover as much free product as possible by pumping into appropriate drums or portable tanks. Free product recovery operations should utilize an **explosion proof pump** and all equipment involved in the transfer must be properly grounded. Sparks can cause gasoline vapours to ignite.
- Recover / excavate any contaminated soils or snow, or contaminated water. When excavating gasoline-contaminated soils, consider using a layer of fire suppression foam to reduce the potential of explosion arising from sparks caused during excavation.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- Gasoline spilled on water can be recovered by using skimmers, absorbent booms or other materials found in the spill containment kits located onsite. Gasoline spilled on water will evaporate, however this option should only be used as directed by the Mine Manager or their designate. Site personnel should make all efforts to recover gasoline on water until directed otherwise.



## **FIRE RESPONSE**

- Shut off any ignition source if possible.
- Use CO<sub>2</sub>, dry chemical, or foam.
- Use water to cool tanks until well after fire is out. Withdraw immediately if tank begins to discolour from heat of fire. Stay away from the ends of tanks.
- Divert gasoline to a secure area for controlled burning.
- If gasoline is escaping, get it contained as soon as possible.

## **PROPERTIES**

- Chemical composition hydrocarbon C<sub>4</sub> to C<sub>12</sub> range.
- Light green, clear, or amber colour liquid with hydrocarbon odour.
- Gasoline floats on water.
- Gasoline is a flammable material that may be ignited by heat, spark or flames.
- Gasoline has a Flash Point of -65° C.
- Gasoline has an ignition temperature of 232° C, which is relatively low.
- Vapours and product are highly flammable and explosive.
- Vapours are heavier than air. Runoff to a sewer or low area may create fire or explosion hazard.
- Containers full of gasoline may explode in heat of fire.
- Vapours may travel to a source of ignition and flash back.
- Consult the manufacturer's MSDS for further information.

## **ENVIRONMENTAL CONCERNS**

- Gasoline is toxic to fish and other aquatic organisms, and harmful to waterfowl.

## **CONTAINERS**

- Transported to the site by tanker truck and transferred to an aboveground double-walled storage tank located at the fuelling station.

## **PERSONAL PROTECTION**

- Gasoline is poisonous if inhaled or absorbed through the skin. Vapours may cause dizziness or suffocation.
- Wear impervious chemical resistant clothing, gloves, footwear and goggles. For confined spaces SCBA may be required.
- Restrict access and work upwind from the spilled product.
- Avoid contact with strong oxidizers such as nitric acid, sulphuric acid, chlorine and peroxides.
- Do not use handheld electronic equipment, such as cellular phones, in the vicinity of a gasoline spill. Sparks from such equipment could ignite the vapours.

# RESPONSE ACTION PLAN FOR A HYDROGEN PEROXIDE SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- Secure the site and prevent non-authorized entry. For a large spill, evacuate downwind area for at least 100 m.
- Monitor air quality for the presence of vapours. **Do not enter** spill area without proper protective clothing.
- If tank is involved in a fire, evacuate an 800 m radius in all directions as it will accelerate burning and containers may explode from heat.
- **Ventilate** the spill area.
- Prevent contact with eyes, skin, etc.
- **Stop** the flow of material as near to the leak source as possible.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water and erect
- **Contain** the flow of hydrogen peroxide. This can be achieved by dyking with earth or other barriers, construction of an interceptor trench or underflow dam, etc.
- Irrigate area of spill with plenty of water.
- Wear protective clothing and SCBA; **do not use leather boots or gloves** as these can ignite following contact with peroxide. **Cotton clothing can also ignite.**

## RECOVERY

- Do not attempt recovery of full strength product. Peroxide will quickly break down into Hydrogen and Oxygen. Flush area liberally with water. If possible, recover diluted product by pumping into drums. Dispose of recovered diluted product in effluent treatment plant or as directed by the Mine Manager or their designate.
- Provide workers with impervious chemical resistant clothing to protect hands, feet, face, and skin, and provide breathing protection.

## FIRE RESPONSE

- **Any fires involving Hydrogen Peroxide will be fought by firefighters from Yellowknife.** If necessary, provide them with the information below.
- Hydrogen Peroxide will not burn.
- Decomposition, which may be caused by heat, will release oxygen, which increases the explosive limit range and burning rate of flammable vapours.
- Use only water; cool tanks or containers with water spray.
- The use of SCBA is required.
- Wear suitable protective clothing **not leather.**
- May ignite combustibles.

## PROPERTIES

- The chemical formula for Hydrogen Peroxide is  $\text{H}_2\text{O}_2$ .
- Product is very soluble in water.
- The product stored on site is 50% Hydrogen Peroxide by volume.
- Material is a clear liquid with a pungent odour.
- Consult the manufacturer's MSDS for further information.

## ENVIRONMENTAL CONCERNS

- Hydrogen Peroxide is toxic to fish and other aquatic organisms. Even concentrations of less than 1 mg/L are of concern.
- Dispose of recovered diluted product at the effluent treatment plant.

## CONTAINERS

- Hydrogen Peroxide is no longer used in the water treatment process at site and therefore is no longer transported to or transferred onsite. Inventory remaining is stored in two large stainless steel tanks at the Effluent Treatment Plant.

## PERSONAL PROTECTION

- Wear impervious chemical resistant clothing, gloves, footwear and goggles.  
**Leather work boots and gloves are not recommended.**
- The use of SCBA is required.
- Avoid contact with skin and clothing, and do not get into eyes.
- Wash thoroughly after handling.
- Shower after completing your work.
- Refrain from eating and smoking until after completing wash up.
- Properly decontaminate work clothing or dispose of them in a manner approved by the Mine Manager or their designate.

# RESPONSE ACTION PLAN FOR SPILLS INVOLVING LIME

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Monitor air quality** for the presence of vapours. **Do not enter** spill area without proper protective clothing.
- **Ventilate** the spill area.
- **Prevent contact** with eyes, skin, etc.
- Secure the site and prevent non-authorized entry.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water and erect
- **Contain** the flow of lime. This can be achieved by dyking with earth or other barriers, construction of an interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.
- If spill has reached a natural waterway, build a dyke or berm to contain. As necessary, use materials found in the spill containment kits located onsite.
- Wear protective clothing and SCBA; do not use leather boots or gloves as these can ignite following contact with Lime. Cotton clothing can also ignite.

## RECOVERY

- If the spill is dry powder, pick it up with shovels or heavy equipment, taking care to minimize the creation of dust during the clean-up operation.
- An industrial vacuum may also be used for cleaning-up dry powder spills.
- Place the lime in waterproof containers, such as metal drums with sealable lids.
- Do not allow the cleaned-up powdered lime to become moist.
- If the spill involves a lime solution, or spill of powder that has entered a pond, ditch, stream or other body of water, contain the spill if possible by dyking by hand or with heavy equipment.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.

## FIRE RESPONSE

- Use CO<sub>2</sub>, dry chemical, foam, or water spray (fog).
- Does not burn.
- Wear SCBA and eye protection.

## PHYSICAL PROPERTIES

- Occurs as a white powder with a slight earthy odour.
- Can absorb CO<sub>2</sub> from the air and form calcium carbonate.
- Is corrosive.

- Causes irritation to the skin, eyes and respiratory tract. Prolonged exposure could lead to blindness.
- Harmful if ingested.
- Non-flammable, non-combustible, and non-explosive.
- Reacts violently with strong acids. Reacts chemically with acids and many other compounds and chemical elements to form calcium based compounds.
- Explosive when mixed with nitro organic compounds.
- Consult the manufacturer's MSDS for more information.

## **ENVIRONMENTAL CONCERNS**

- If lime or lime solutions enter waterways, the pH of the waterway will increase and aquatic life will be harmed or destroyed.

## **CONTAINERS**

- Lime is transported to site by tanker truck and transferred to a silo at the ETP.

## **PERSONAL PROTECTION**

- Wear oilers or vinyl coveralls with pants extending over tops of rubber boots, long sleeved shirt buttoned at the neck, gauntlet-type rubber or vinyl work gloves, head protection and eye goggles.
- Wear a disposable dust mask or cartridge-type respirator with filter cartridges
- Wash thoroughly after handling.
- Shower after completing your work, ensuring no lime remains on your person.

# RESPONSE ACTION PLAN FOR A LUBRICATING OR HYDRAULIC OIL SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Eliminate** ignition sources and any open flame.
- **Stop** the flow of product.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water.
- Secure the site and prevent non-authorized entry.
- **Contain** the flow of lubricant or oil. This can be achieved by dyking with earth, snow, ice or other barriers, construction of an interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.
- If spill has reached natural waters, deploy a containment boom and apply absorbent materials found in the spill containment kits located onsite.

## RECOVERY

- Recover as much free product as possible by pumping into appropriate drums or portable tanks.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- Lubricating and hydraulic oils spilled on water can be recovered by using skimmers, absorbent booms or other materials found in the spill containment kits located onsite.

## FIRE RESPONSE

- Use CO<sub>2</sub> dry chemical, foam or water spray (fog).
- **Water may spread fire.**
- Use water to cool containers or tanks.
- If necessary, divert the oil to a secure area and allow to burn under control.
- If oils are escaping, contained them as soon as possible.
- Wear SCBA and eye protection.

## PROPERTIES

- Chemical composition: mixture of hydrocarbons and conventional industrial oil additives, C<sub>22</sub> to C<sub>61</sub> range.
- Light and dark amber colours with hydrocarbon odour.
- Floats on water.
- Flash Point 190 to 215° C.

- Consult the manufacturer's MSDS for further information.

## **ENVIRONMENTAL CONCERNS**

- Lubricants and hydraulic oil are toxic to fish and other aquatic organisms, and are harmful to waterfowl.

## **CONTAINERS**

- Transported to the site by company truck and transferred to various storage locations at the mine. Various oils are delivered to site in 5 gallon buckets, various lubes are delivered in 45 gallon drums and grease comes in 10 gallon kegs.
- Additional, smaller quantities of various lubrications and hydraulic oils are used throughout the minesite. These are purchased on an as-needed basis by various suppliers in town.

## **PERSONAL PROTECTION**

- Wear impervious chemical resistant clothing, gloves, footwear and goggles.
- The use of an organic cartridge respirator will not likely be required.
- Avoid contact with strong oxidizers such as nitric acid, sulphuric acid, chlorine and peroxides.

# RESPONSE ACTION PLAN FOR A MINEWATER SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- Immediately shut down underground pumps to **stop** minewater flow.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water. Construct a berm if required using heavy equipment.
- Secure the site and prevent non-authorized entry.
- **Contain** the flow. This can be achieved by dyking with earth or other barriers, construction of an oil interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.

## RECOVERY

- Recover any ponded minewater by pumping into appropriate drums or portable tanks, and dispose of it as directed by the Mine Manager or their designate.

## FIRE RESPONSE

- N/A

## PROPERTIES

- Minewater contains a mixture of substances including low levels of arsenic, ammonia and suspended solids, in water with a pH of 6.5 to 8.0.

## ENVIRONMENTAL CONCERNS

- Minewater could potentially be toxic to fish and other aquatic organisms.
- Potentially harmful to wildlife and waterfowl.

## CONTAINERS

- N/A

## PERSONAL PROTECTION

- Wear impervious chemical resistant clothing, gloves, footwear and goggles.
- Avoid contact with skin and eyes.
- Do not ingest.



# RESPONSE ACTION PLAN FOR A LEAK INVOLVING PROPANE

Incidents involving propane should only be dealt with by trained staff from Superior Propane. DCNJV personnel should NOT attempt to deal with propane leaks.

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Eliminate** ignition sources and any open flame – **Do Not Smoke.**
- Secure the site and prevent non-authorized entry. Maintain a safe distance from the leaking tank while ensuring that the site is secure. Wait for Superior Propane representatives to provide further instructions.
- The Mine Manager or their designate will immediately call Superior Propane's **24-hour emergency number: (867) 873-5551.**
- The Mine Manager or their designate will **immediately notify Ken Yoder** at Superior Propane: **(867) 444-1327** (additional contact info available in the Spill Response Plan and Superior Propane's Emergency Response Plan – Appendix D).

## SUPERIOR PROPANE

- Superior Propane operates a 24hr / 365 day on call schedule in the event that their services are required.
- All Superior Propane operating staff is aware of the proper procedures for dealing with an emergency situation. The first respondent to the emergency call will make a decision as to the severity of the situation and the necessary actions that will take place. With safety being the highest priority, this usually involves a call to the local fire department as well as to the authorities in the event that an area has to be secured for public safety. At all storage locations the emergency contact numbers are posted along with the Fire Department.

## RECOVERY

- Due to the chemical properties of propane, ground contamination is usually not an issue. Being a liquefied petroleum gas under pressure, once it is released to atmosphere it returns to its natural state as a gas and is dispersed into the atmosphere.
- Ground that has been in contact with LPG will be disturbed to allow the gas to vaporize hence eliminating the hazard.
- If there is any oil associated with the spill, recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.

## FIRE RESPONSE

- Maintain a safe distance from any fire.
- Superior Propane will coordinate fire response.

## PROPERTIES

- Chemical composition is  $C_3H_8$ .
- Colourless and odourless in natural state. Characteristic smell is a result of an odorizing agent added prior to distribution.
- Will float on water before vaporizing.
- In gaseous state, twice as heavy as air. Will sink and collect in low spots, therefore avoid these types of locations while waiting for Superior Propane.
- Liquid propane can cause severe cold burns to the skin owing to its rapid vaporization. Avoid contact.
- At very high concentrations vapour can have an anaesthetic effect and subsequently become an asphyxiant by diluting the available oxygen.
- Refer to the manufacturer's MSDS for more information.

## ENVIRONMENTAL CONCERNS

- May freeze any plant or aquatic life in the immediate vicinity of the leak (as the liquid volatilizes).
- Poses risk to environment if ignited.

## CONTAINMENT

- Leaking Propane will be in the gas form and will be dealt with accordingly by trained staff from Superior Propane. **Do not attempt to contain or stop the leak yourself.**
- Secure the location and prevent access by unauthorized personnel. If it is a spill an evacuation of a minimum downwind distance of 800 to 1600 meters in all directions. If the leak involves a fire a minimum safe distance of 1600 meters evacuation in all directions is required.

## LOCATION OF EMERGENCY EQUIPMENT

- All emergency related equipment is located at the Yellowknife office of Superior Propane. This includes portable pumps, flaring equipment, containers, etc.

# RESPONSE ACTION PLAN FOR A SEWAGE SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water. Construct a berm if required using heavy equipment.
- Secure the site and prevent non-authorized entry.
- **Contain** the flow. This can be achieved by dyking with earth or other barriers, construction of an interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.
- If spill has reached natural waters, deploy a containment boom and apply absorbent materials found in the spill containment kits located onsite.

## RECOVERY

- Recover as much sewage as possible by pumping into appropriate drums or portable tanks.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- Cover the contaminated area with lime to neutralize.

## FIRE RESPONSE

- Use dry chemical, foam or water spray (fog).
- Use water to cool tanks.

## PROPERTIES

- Sewage is a mixture of human waste and wash water.
- Faecal Coliforms are present

## ENVIRONMENTAL CONCERNS

- Human health concerns are related to the potential presence of disease-causing organisms contained in the sewage.

## CONTAINERS

- Sewage is conveyed from the Mobile Equipment Garage, the C Dry and the C Boiler via aboveground pipeline to the C Shaft where it enters the underground water management system. The solids portion is captured prior to pumping underground and is transported offsite by a sub-contractor to DCNJV.

## **PERSONAL PROTECTION**

- Personnel are required to wear rubber boots, a full slicker suit, rubber gloves and a full-face shield.
- Avoid contact with skin, clothing and do not get into eyes. Wash thoroughly after handling.
- Shower after the completion of your work. Refrain from eating and smoking until after completing wash up.

# RESPONSE ACTION PLAN FOR A TAILING POND SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow using spill containment equipment towards a low area away from water. If the spill has reached natural waters, try to prevent additional tailings from entering the water.
- Secure the site and prevent non-authorized entry.
- **Contain** tailings by dyking with earth, sand bags, snow or other type of barrier. Construct a berm if required. Use earth-moving equipment as necessary to complete containment measures. As necessary, use materials found in the spill containment kits located onsite.

## RECOVERY

- Pump solutions to the Tailing Containment Area (TCA) or into appropriate drums or portable tanks for transport to the TCA.
- Excavate any tailing contaminated soils/snow and dispose of at the TCA.

## FIRE RESPONSE

- Use dry chemical, foam or water spray (fog).
- Use water to cool tanks.
- **Do not use CO<sub>2</sub>** to fight fires as HCN gas could be released.

## PROPERTIES

- Tailing solids are composed of finely ground rock that may contain arsenic and mill reagents such as lime.
- In water it is usually grey to brown in colour.
- The solution found in the tailing ponds at Giant Mine is minewater (see Response Action Plan for a Minewater Spill above).

## ENVIRONMENTAL CONCERNS

- Tailing solids and solutions are toxic to fish and other aquatic organisms,
- Harmful to wildlife and waterfowl.
- Tailing solids at Giant Mine are not acid generating.

## CONTAINERS

- N/A

## PERSONAL PROTECTION

- Wear impervious chemical resistant clothing, gloves, footwear and goggles.

# RESPONSE ACTION PLAN FOR A WASTE OIL SPILL

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Eliminate** ignition sources and any open flame.
- **Stop** the flow of product.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water.
- Secure the site and prevent non-authorized entry.
- **Contain** the flow of waste oil. This can be achieved by dyking with earth, snow, ice or other barriers, construction of an interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.
- If spill has reached natural waters, deploy a containment boom and apply absorbent materials found in the spill containment kits located onsite.

## RECOVERY

- Recover as much free product as possible by pumping into appropriate drums or portable tanks.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- Waste oil spilled on water can be recovered by using skimmers, absorbent booms or other materials found in the spill containment kits located onsite.

## FIRE RESPONSE

- Use CO<sub>2</sub> dry chemical, foam or water spray (fog).
- **Water may spread fire.**
- Use water to cool containers or tanks.
- If necessary, divert the oil to a secure area and allow to burn under control.
- If oils are escaping, contain them as soon as possible.
- Wear SCBA and eye protection.

## PROPERTIES

- Chemical composition: mixture of hydrocarbons and conventional industrial oil additives, C<sub>22</sub> to C<sub>66</sub> range.
- Black and brown colours with hydrocarbon odour.
- Floats on water.
- Flash Point 10 to 200° C.
- Consult the manufacturer's MSDS for further information.

## **ENVIRONMENTAL CONCERNS**

- Waste oils are toxic to fish and other aquatic organisms, and are harmful to waterfowl.

## **CONTAINERS**

- Stored on the minesite at various locations, usually in 205 L drums or 5000 L storage tanks. Periodically, waste oils are taken offsite for disposal by sub-contractors to DCNJV.

## **PERSONAL PROTECTION**

- Wear impervious chemical resistant clothing, gloves, footwear and goggles.
- The use of an organic cartridge respirator will not likely be required.
- Avoid contact with strong oxidizers such as nitric acid, sulphuric acid, chlorine and peroxides.

# RESPONSE ACTION PLAN FOR SPILLS INVOLVING DYNALENE HC<sup>®</sup>

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Stop** the flow of product.
- Secure the site and prevent non-authorized entry.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water.
- **Contain** the flow of Dynalene<sup>®</sup>. This can be achieved by dyking with earth, snow, ice or other barriers, construction of an interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.

## RECOVERY

- Recover as much free product as possible by pumping into appropriate drums or portable tanks.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.

## FIRE RESPONSE

- Use CO<sub>2</sub> dry chemical, foam or water spray (fog).
- When involved in fire, may decompose and produce irritating vapours, toxic compounds, soot and smoke.
- First responders should wear eye protection.
- Structural firefighters should wear SCBA.
- Contain run-off water and prevent it from entering environmentally sensitive areas.

## PROPERTIES

- Clear, odourless, and colourless to light yellow (or light blue).
- Soluble in water. Booms will not work for product spilled on water.
- If exposed to extremely high temperatures, decomposition will produce carbon dioxide, carbon monoxide, and potassium compounds.
- Avoid contact with strong oxidizers.
- Consult the manufacturer's MSDS for further information.

## ENVIRONMENTAL CONCERNS

- May be harmful to plant, animal and aquatic life, especially if released in large quantities.



## **CONTAINERS**

- Stored on the minesite in a tank at the FOS.
- Store in a cool, dry location away from direct sunlight, or sources of intense heat.
- Keep drums or containers tightly closed when not in use.

## **PERSONAL PROTECTION**

- Handle in a well-ventilated location.
- Avoid contact with skin, clothing and do not get into eyes. Wash thoroughly after handling or unintentional contact.
- Wear rubber or neoprene gloves for day-to-day handling.
- Decontaminate equipment using soapy water before performing maintenance. Collect any runoff and dispose of it properly.

# RESPONSE ACTION PLAN FOR SPILLS INVOLVING R-507

Incidents involving R-507 should only be dealt with by personnel subcontracted to look after the FOS. DCNJV personnel should NOT attempt to deal with R-507 leaks.

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Eliminate** ignition sources and any open flame.
- Ventilate the area.
- Secure the site and prevent non-authorized entry.
- Spills will likely evaporate as R-507 is a gas at ambient temperatures.

## RECOVERY

- Due to the chemical properties of R-507, ground contamination is usually not an issue. It is liquefied under pressure therefore once it is released to the atmosphere it returns to its natural state as a gas and disperses.

## FIRE RESPONSE

- Not flammable at ambient temperatures and atmospheric pressure.
- Becomes combustible when mixed with air under pressure and exposed to strong ignition sources.
- Use CO<sub>2</sub> dry chemical, foam or water spray (fog) as appropriate for material surrounding the product.
- Wear SCBA or supplied air respirator.
- Contain run-off water and prevent it from entering environmentally sensitive areas.
- Use water spray to keep fire-exposed containers cool.

## PROPERTIES

- Colourless, volatile liquid with ethereal and faint sweetish odour (when under pressure).
- Clear, colourless gas at ambient temperatures.
- Under specific conditions, freshly abraded aluminum surfaces may cause strong exothermic reaction.
- Incompatible with chemically active metals (potassium, calcium, powdered aluminum, magnesium and zinc).
- Do not mix with oxygen or air above atmospheric pressure.

## ENVIRONMENTAL CONCERNS

- Due to physical state when subject to ambient temperatures and pressure, unlikely to cause any environmental impact other than to air quality.

- Prevent any runoff from firefighting measures to enter nearby waterways. Contain and dispose of runoff in an environmentally sound manner as approved by the Mine Manager or his designate.

## CONTAINERS

- Stored on the minesite in cylinders at the FOS.
- Follow standard safety precautions for the handling and use of compressed gas cylinders.
- Store in a cool, well-ventilated area of low fire risk and out of direct sunlight.
- Keep valves tightly closed when not in use or when empty.
- Storage in subsurface locations should be avoided.
- Avoid physical damage to cylinders or fittings.
- **Do not vent to atmosphere** – contains components that may contribute to global warming.

## PERSONAL PROTECTION

- **Do Not Smoke** near product or cylinders.
- Vapours displace air and can cause asphyxiation in confined spaces.
- Avoid inhalation and use in a well-ventilated location.
- **May Cause Frostbite** if contact with liquid is made.
- Always use gloves (leather) when handling. When prolonged periods of handling are anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used.
- Avoid contact with skin, clothing and do not get into eyes. Wash thoroughly after handling or unintentional contact.
- Wear safety glasses under normal conditions.
- Where contact with liquid is likely, impervious boots and clothing, and safety goggles should be worn.
- Contaminated clothing should be promptly removed and washed before reuse.

# RESPONSE ACTION PLAN FOR SPILLS INVOLVING AMMONIA

Incidents involving ammonia should only be dealt with by trained personnel subcontracted to look after the FOS. DCNJV personnel should NOT attempt to deal with ammonia leaks.

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Eliminate** ignition sources and any open flame.
- Secure the site and prevent non-authorized entry.
- Ventilate the area and avoid low areas where vapours may collect. Stay upwind.
- Test for sufficient oxygen before re-entry.
- **Block any entry to waterways.** Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water.
- Secure the site and prevent non-authorized entry.
- **Contain** the flow of product. This can be achieved by dyking with earth, snow, ice or other barriers, construction of an interceptor trench or underflow dam, etc. As necessary, use materials found in the spill containment kits located onsite.

## RECOVERY

- Recover as much free product as possible using inert, absorbent materials (do not use combustible materials such as sawdust).
- Carefully neutralize spill using dilute HCl (upon direction from the Mine Manager or his designate).
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- **Do not put water on liquid ammonia.**

## FIRE RESPONSE

- Stopping the flow of gas rather than extinguishing the fire is usually best procedure to follow when escaping gas is burning. If possible, move container away from fire.
- Wear positive-pressure SCBA and full chemical protective clothing (liquid may cause protective equipment to become brittle).
- Use CO<sub>2</sub> or dry chemical for small fires, and water spray (fog) or foam for large fires. Or as appropriate for material surrounding the product.
- Use water to cool containers exposed to flames until well after the fire is out (closed containers exposed to heat may explode).

- Contain run-off water and prevent it from entering environmentally sensitive areas.
- Gives off flammable vapours that may form an explosive mixture with air. Use water spray or foam to control vapours.

## PROPERTIES

- Colourless gas and liquid (liquid under pressure).
- Intense, pungent, suffocating odour.
- Soluble in water.
- Vapour is toxic and irritating to eyes, nose, throat and skin.

## ENVIRONMENTAL CONCERNS

- Is harmful to aquatic life in very low concentrations.
- Waterfowl toxicity may occur in elevated concentrations.
- May reduce concentration of dissolved oxygen in waterways.

## CONTAINERS

- Stored on the minesite in cylinders at the FOS.
- Follow standard safety precautions for the handling and use of compressed gas cylinders.
- Keep container tightly closed when not in use.
- Store in a cool, dry, well-ventilated area below 25°C.
- Avoid physical damage to cylinders or fittings.
- Empty containers may be hazardous since they retain product residues.

## PERSONAL PROTECTION

- Ammonia is very alkaline and reacts corrosively with all body tissues. Avoid direct contact with product.
- **Do Not Smoke** near product or cylinders.
- Avoid inhalation and use in a well-ventilated location.
- Use chemical safety goggles and/or a full face shield where splashing is possible.
- Wear impervious protective clothing including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
- Use positive pressure SCBA.
- **May cause frostbite** if exposed to liquid.

# RESPONSE ACTION PLAN FOR SPILLS INVOLVING CO<sub>2</sub>

## INITIAL RESPONSE

- **Immediately** initiate the spill response flow plan outlined in the main body of the Emergency Spill Response Plan.
- **Stop** the flow of product if safe to do so.
- Secure the site and prevent non-authorized entry.
- Ventilate the area or move leaking container to well-ventilated area.
- Avoid low areas where vapours may collect. Stay upwind of leak.
- Test for sufficient oxygen before re-entry.

## RECOVERY

- Due to the chemical properties of CO<sub>2</sub>, ground contamination is usually not an issue. It is liquefied under pressure therefore once it is released to the atmosphere it returns to its natural state as a gas and disperses.
- Recover / excavate any contaminated soils or snow, or contaminated water.
- Place contaminated materials into appropriate drums or containers. All contaminated material should be disposed of as directed by the Mine Manager or their designate.
- “Dry Ice” produced by leaks may be left to sublime/evaporate and dissipate but if necessary tongs and Kevlar gloves could be used to put into thermally insulated and vented containers. Appropriate foot and leg protection, and SCBA must be worn during this procedure.

## FIRE RESPONSE

- Is not flammable and will not burn.
- Treat fire as appropriate for the material on fire surrounding the product.
- Wear SCBA and full protective clothing as usual.
- Use water to cool containers exposed to flames until well after the fire is out (closed containers exposed to heat may rupture or explode).
- Remove containers from fire area if safe to do so.
- Contain run-off water and prevent it from entering environmentally sensitive areas.

## PROPERTIES

- Colourless, odourless gas (non-flammable) and liquid (liquid under pressure).
- At high concentrations, gas will have a sharp, acidic odour.
- Slightly soluble in water.
- Incompatible with alkali metals, chromium, metal acetylides, alkaline earth metals, titanium (above 550°C) and uranium (above 750°C).
- Electrical discharge can cause it to decompose into carbon monoxide and oxygen.
- Will combine with water vapour or liquid to form carbonic acid.

## ENVIRONMENTAL CONCERNS

- Due to physical state when subject to ambient temperatures and pressure, unlikely to cause any environmental impact other than to air quality.
- Prevent any runoff from firefighting measures to enter nearby waterways. Contain and dispose of runoff in an environmentally sound manner as approved by the Mine Manager or his designate.

## CONTAINERS

- Stored on the minesite in cylinders at the FOS.
- It is **extremely cold and under pressure**. A leak will form “Dry Ice” particles which could be forcibly ejected from the system. Care must be taken when depressurizing or disconnecting hoses. **Never work on a pressurized system.**
- Store in a dry, well-ventilated area below 52°C.
- Keep container tightly closed when not in use, or empty.
- Store full and empty cylinders separately. Use a first-in, first-out system to avoid storing cylinders for long periods of time.
- Avoid physical damage to cylinders or fittings.

## PERSONAL PROTECTION

- Never allow any unprotected part of the body to touch uninsulated pipes or vessels containing CO<sub>2</sub>.
- **May cause frostbite.**
- CO<sub>2</sub> is an asphyxiant, effects are due to lack of oxygen. Avoid inhalation and use in a well-ventilated location. CO<sub>2</sub> is an irritant.
- Wear goggles/safety glasses, insulated neoprene gloves and suitable protective clothing. Cuffless trousers should be worn outside the shoes.
- Use SCBA.

## **Appendix C**

### **Spill / Incident Report Forms**





Canada

# NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE

TEL: (867) 920-8130

FAX: (867) 873-6924

EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR		REPORT TIME		<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input type="checkbox"/> UPDATE # _____ TO THE ORIGINAL SPILL REPORT	<b>REPORT NUMBER</b> _____
	OCCURRENCE DATE: MONTH – DAY – YEAR		OCCURRENCE TIME			
C	LAND USE PERMIT NUMBER (IF APPLICABLE)			WATER LICENCE NUMBER (IF APPLICABLE)		
	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION				REGION <input type="checkbox"/> NWT <input type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR OCEAN	
E	LATITUDE			LONGITUDE		
	DEGREES	MINUTES	SECONDS	DEGREES	MINUTES	SECONDS
F	RESPONSIBLE PARTY OR VESSEL NAME		RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION			
	ANY CONTRACTOR INVOLVED		CONTRACTOR ADDRESS OR OFFICE LOCATION			
H	PRODUCT SPILLED		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES		U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES		U.N. NUMBER	
I	SPILL SOURCE		SPILL CAUSE		AREA OF CONTAMINATION IN SQUARE METRES	
	FACTORS AFFECTING SPILL OR RECOVERY		DESCRIBE ANY ASSISTANCE REQUIRED		HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS					
L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE	
	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE	

## REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLED	REPORT LINE NUMBER
		STATION OPERATOR		YELLOWKNIFE, NT	(867) 920-8130
LEAD AGENCY <input type="checkbox"/> EC <input type="checkbox"/> CCG <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> INAC <input type="checkbox"/> NEB <input type="checkbox"/> TC			SIGNIFICANCE <input type="checkbox"/> MINOR <input type="checkbox"/> MAJOR <input type="checkbox"/> UNKNOWN		FILE STATUS <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED
AGENCY		CONTACT NAME	CONTACT TIME	REMARKS	
LEAD AGENCY					
FIRST SUPPORT AGENCY					
SECOND SUPPORT AGENCY					
THIRD SUPPORT AGENCY					



## INCIDENT INVESTIGATION REPORT

Tracking Number: \_\_\_\_\_

### INCIDENT COMMON DETAILS - SUBMIT TO SAFETY DEPARTMENT BY END OF SHIFT

1. DEPARTMENT / CONTRACTOR				2. Front Line Supervisor			
3. INJURY				4. DAMAGE			
Unit #:							
5. MISCELLANEOUS				6. EMPLOYEE(s) INVOLVED:			
Witness #1:				Witness #2:			
Date of Incident:				Time of Incident 24 hr. clock:			

### Nuna Investigation Team:

Level 1	Level 2	Level 3
Supervisor Worker Rep / OH&SC Safety Officer	Foreman (or Higher) Worker Rep/OH&S Safety Officer	Nuna Management Investigation Team with Corporate Support

- Level 1 Marginal: did or could have caused first aid injury or cause minor damage. < 5K
- Level 2 High: did or could have caused serious injury (MA, LTI) , serious damage or environment damage. >5K - 50K
- Level 3 Extreme: fatality, permanent disability , cause extreme damage, major down time or major environment damage. >50K

### 7. Brief Description of Incident:

--

### 8. Time Supervisor had last contact with employee(s) involved in this incident:

--



## INCIDENT INVESTIGATION REPORT

Tracking Number: \_\_\_\_\_

### INJURY / ILLNESS

11. Injured Person(s) Name(s):

12. Body Part Affected:

13. Did Employee report to First Aid for Treatment?

Date: \_\_\_\_\_

14. This Injury Occurred:

15. Mechanism of Injury:

16. Personal Protective Equipment Required:

17. Personal Protective Equipment Worn:

### Equipment / Property Damage

18. Describe the Damage Incurred:

19. Was the Operator Trained On This Equipment:

Date Trained: \_\_\_\_\_

If Yes, insert training documents

If No, Complete section 19

20. Who directed this employee to operate this equipment untrained, and why:

### Root Cause Analysis - Immediate Cause:

Sub Standard Acts

Sub Standard Conditions

### Basic / Root Cause - Personal Factors 1 to 6:

1. Inadequate Physical Capability

2. Inadequate Mental Capability

3. Physical Stress

4. Mental Stress

5. Lack of Knowledge

6. Lack of Skill



# INCIDENT INVESTIGATION REPORT

Tracking Number: \_\_\_\_\_

## Basic / Root Cause - Job Factors 7 to 16:

<b>7. Improper Motivation</b>	<b>8. Leadership / Supervision</b>
<b>9. Inadequate Engineering</b>	<b>10. Inadequate Purchasing / Controlling</b>
<b>11. Inadequate Maintenance</b>	<b>12. Inadequate Tools / Equipment</b>
<b>13. Inadequate Work Standards</b>	<b>14. Excessive Wear and Tear</b>
<b>15. Abuse or Misuse</b>	<b>16. Liason and Community Engagement</b>

Attach Toobox form

Attach Copy JHA

Attach copy SOP #



## INCIDENT INVESTIGATION REPORT

Tracking Number: \_\_\_\_\_

### Map, Drawings and Pictures

24. copy pictures, maps and/or drawings here:

[illegible]



## INCIDENT INVESTIGATION REPORT

Tracking Number: \_\_\_\_\_

### COMMENTS AND SIGNATURES

28. Comments From Investigation team.

--

29. Signature(s) of Investigation team.(Print and sign)

Date:

--

--

Signature(s) of Investigation team.(Print and sign)

Date:

--

--

Signature(s) of Investigation team.(Print and sign)

Date:

--

--

32. Comments From Project Manager

--

33. Project Manager PRINT and Signature

Date:

--

--

34. Comments From Corporate Safety Manager

--

35. Corporate Safety Manager PRINT and Signature

Date:

--

--

36. Comments From Operations Manager

--

37. Operations Manager PRINT and Signature

Date:

--

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## **Appendix D**

# **Superior Propane Emergency Response Plan**



**ATTACHMENT "A": TERRITORY TEMPLATE – EMERGENCY PLAN FOR LPG (PROPANE and/or BUTANE)**  
**To be maintained with current information and posted on the Bulletin Board**

Superior's Emergency Response Plan for transportation and environmental (stationary tank) emergencies involving LPG is multi-layered, with each level providing more comprehensive resources as the scale of the event increases.

The Territory level component of the Emergency Response Plan will consist of establishing and maintaining 24-hour Emergency Response Capability utilizing Territory Staff and/or Contractors. These resources will generally respond to small scale transportation and stationary container events.

This document forms part of Superior's Corporate Emergency Response Plan for LPG related events. It **MUST** be reviewed by Territory Safety Committees monthly and revised more frequently if required to keep it current.

**Facility Contact Information:**

Name: <b>Ken Yoder</b>	Phone: <b><u>(877) 873-7467</u></b>
Email Address: <b>yoderk@superiorpropane.com</b>	Fax: <b>(867) 873-5584</b>

**Alternate Contact Information:**

Name: <b>Mark Gautschi</b>	Phone: <b><u>(877) 873-7467</u></b>
Email Address: <b>gautschm@superiorpropane.com</b>	Fax: <b>(867) 873-5584</b>

**Facility/Plant Information: (One plan MUST be completed for each Superior Territory or Satellite Facility within the Territory)**

Territory/Satellite Name: **YELLOWKNIFE – GIANT MINES**

Address: **Giant Mines Lot 210 Group 964**

City: <b>Yellowknife</b>	Province: <b>NT</b>	Postal Code: <b>X1A 3T4</b>	Phone: <b>(867) 766-8120</b>
--------------------------	---------------------	-----------------------------	------------------------------

**Propane Quantity Information:**

Total Plant Storage:	<b>385,000</b>	USWG:	<b>612.0 tonnes</b>
Capacity of Largest Propane Tank:	<b>25,500</b>	USWG:	<b>47.7 tonnes</b>

**Notes:**

- 1 Gallon (US) = 0.00187 tonnes
- 1 Gallon (UK, Canadian, Imperial) = 0.000224 tonnes
- 1 Yard = 0.9144 meters
- 1 Litre = 0.000493 tonnes
- Density of liquid propane at 25°C = 0.493 KG/L
- Storage capacity is to be calculated based on 85% of container capacity (legal maximum).

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*Document Uncontrolled if Printed – Controlled Copies are Maintained on the Superior Intranet.*

The National Emergency Response Guidebook (NARG) is used by Fire Fighters, Police and other Emergency Services Personnel who may be the first to arrive at the scene of an incident. It is primarily a guide to aid first responders in quickly identifying the generic hazards of the materials involved in the incident and the protecting of themselves and the general public during the initial response phase of the incident.

The NARG references distances affected if a large-scale Emergency were to occur:

- Worst case scenario: 800 - 1600 metres (NARG);
- Alternate large-scale scenario: Up to 800 metres (NARG);
- Alternate controllable small-scale scenarios: Within confines of property. No evacuation necessary (Superior).

### Prevention:

An excerpt from Superior's Environmental Health and Safety Policy is below:

- We are committed to meeting or exceeding legislative requirements while responding to the safety, moral and ethical obligations we hold for our Employees, Customers, Contractors and the Communities in which we conduct business.
- We provide the leadership, support and resources to achieve and maintain proactive, Industry leading, Health, Safety and Environmental Protection.
- Leadership is accountable for establishing Systems which support our ultimate goal of an injury and incident free workplace.
- Managers are accountable for maintaining the Health and Safety of the workplace and for ensuring all work is conducted in an environmentally responsible manner.
- Employees are accountable for working safely in accordance with legislation and procedures. Employees shall recognize and correct unsafe situations or conditions. Ensuring the safety of others and refusing work that is unsafe, or may endanger others is an expectation we have of all Employees.
- We are committed to ensuring open communication and consultation through functioning Health and Safety Committees and the National Safety Council.

Elements within Superior's Safety Handbook and Guardian Health Safety & Environment Management System provide additional detail.

### Certification and Training:

All Employees **MUST** be trained and certified as per provincial legislation to install, maintain and operate propane transfer facilities, trucks and end user systems. Superior Employees are also required to meet internal training standards based on job function

Do Territory Employees meet the training requirements above? ☒ Yes ☐ No

### Installation and Operation of Territory Facilities:

The installation and operation of plant storage tanks and equipment **MUST** comply with municipal zoning bylaws and applicable legislation. This legislation includes the Propane Storage and Handling CSA B149 Code. This is a National Standard of Canada that is adopted into law in all provinces.

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**Inspection of Facility:**

Is the monthly Facility inspection completed as required by Company Standard?

☒ Yes ☐ No

Do you dispose of all empty propane containers in a safe manner?

☒ Yes ☐ No

**Employee Awareness:**

Are Territory Employees and/or anyone else who may be responsible for implementing this Emergency Plan aware of their responsibilities and have the necessary skills/training?

☒ Yes ☐ No

**Territory Preparedness:**

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The Territory level component of the Emergency Response Plan will consist of establishing and maintaining 24-hour Emergency Response Capability utilizing Territory Staff and/or Contractors. These resources will generally respond to small-scale events. Resources for responding to large scale events on a National basis are contracted to the LPG Emergency Response Corporation (and others as determined by the HSE Team) through Superior's Corporate Office.

Are Employees at the Site aware of their responsibilities under this plan? ☒ Yes ☐ No

Does the Territory have a process in place to provide 24 hour Emergency Response Capability? ☒ Yes ☐ No

Does the Territory have a process in place to ensure that the NOC/SAC have current after hours Contact information? ☒ Yes ☐ No

Does the Territory have a process in place to notify Employees (and others) that an Emergency has occurred at the Territory Facility in order to evacuate and notify neighbours as necessary? ☒ Yes ☐ No

- **If Yes** - Describe the process: Daily checks by Superior staff in conjunction with multiple checks by mine security.
- **If No** – What is the date for completion?  
 \_\_\_\_/\_\_\_\_/\_\_\_\_  
 (month) (day) (year)

The local Fire Department **MUST** be contacted annually and invited to visit the facility to review Emergency Procedures. This **MUST** be documented in the monthly Territory Safety Committee minutes.

Has this been completed within the last 12 months? ☐ Yes ☒ No

- **If Yes** – Date of completion:  
 \_\_\_\_/\_\_\_\_/\_\_\_\_  
 (month) (day) (year)
- **If No** – What is the reason for lack of attendance?

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**Site Information:**

The existing sketch of the Territory/Satellite evacuation plan **MUST** be attached.  
The following information **MUST** be shown:

- All on-site buildings and plant storage tanks
- The location of the railway right-of-way
- Property line
- Fences
- Gates
- Adjacent roadways
- Adjacent properties (c/w buildings and uses)
- Contact information for neighbours.

**Equipment Information:**

Superior may respond using a wide variety of equipment depending upon the severity of the event.  
Examples include:

- Gas detection equipment
- Bulk trucks
- Cargo liners
- Crane trucks
- Service vehicles
- Pumps
- Compressors
- Hose Fittings
- Flare stacks etc.

Additional equipment may be obtained from local third party contractors. For large-scale stationary and transportation events Territory Resources may be supplemented by LPG Emergency Response Corporation Teams and equipment.

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### Territory Response Equipment:

List of equipment:

**Bulk trucks, Liquid and Vapor lines, Liquid and Vapor Flares, Mobile Compressor (gas powered), Leak Detectors**

Has a process been established and followed to ensure that the equipment is maintained and ready for use should an event occur?

☒ Yes ☐ No

- **If Yes** - Describe the process:  
**Monthly inspections as well as run ups on portable equipment.**
- **If No** - What is the date for completion?  
/ /  
(month) (day) (year)

### Field Operations Manager/Supervisor or Designate:

Is responsible to ensure that the appropriate Territory Business Processes are established and followed by Territory Staff to ensure compliance with this plan.

A copy of the accompanying standard and a completed and current version of this completed "Territory Template – Emergency Plan for LPG " **MUST** be posted at each Territory Facility and Satellites for Employees.

Territory responders may be Employees or Contractors.

### Number of Superior Employees in positions below at this Territory location?

Gas Fitters: **3**

Bulk Drivers: **3**

Plant/Utility: **2**

Other Employees who may respond: **1**

### Contractor Resources: (Please List Contractor Name, Current Contact Number and Capability)

Crane Operators	Name: <b>RTL Robinson</b>	Phone:	<b>(867) 873-6271</b>	Capability:	<b>Loaders, Cranes, Transport Recovery</b>
	Name: <b>Carter Industries</b>	Phone:	<b>(867) 874-6574</b>	Capability:	
Wrecker/Tow Truck Operators	Name:	Phone:		Capability:	
Equipment Rental Company	Name:	Phone:		Capability:	
Other Service Resources	Name:	Phone::		Capability:	

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**Response:**

The Emergency Response Activation and Notification Process is driven from the Territory level and escalates as follows:

- The initial call is generally received directly by the Territory or the Call Centre
- The Territory will respond with personnel and equipment to deal with small-scale events and notify appropriate authorities

Territory responders attend the scene and provide advice and assistance that may involve (but is not limited to) such things as follows:

- Escalating response to Level 2 or 1 (if required) as determined by their initial assessment
- Providing technical and product advice in regard to the LPG involved
- Sourcing and procuring any equipment, personnel and materials needed to handle the LPG involved
- Inspecting LPG Systems to establish the presence of damage or leaks
- Making recommendations to officials at the Emergency Site (if applicable) on actions to be taken With respect to the LPG and the container if damage or leaks are found
- Securing valves and plugs, fixing minor leaks
- Coordinating the transfer, flaring, purging or other handling of LPG
- Coordinating Emergency repairs of LPG Systems

Superior's Territory responders and Corporate Resources Role is to assist the LPGERC responders (if activated)

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## Recovery and Contacts:

Recovery from an Environmental Emergency includes activities designed to return the surrounding Environment to safe and acceptable condition after damage from released product(s).

Due to the inherent physical characteristics of LPG (propane and butane), recovery activities are limited to the removal of debris such as tanks and other equipment.

## Emergency phone numbers as required:

Initial & Immediate Contact #'s (as applicable)	Phone Number
Fire Department:	(867) 873-2222
Police:	(867) 669-1111
Environment Canada Regional Office:	(877) 944-0313
Transport Canada (ERP # 2 – 1679) Canutec:	(613) 996-6666 (Cell *666)
Provincial Gas Regulatory Authorities:	(800) 421-6929
LPG Emergency Response Corporation Activation:	(800) 265-0212
Internal Contact #'s (as applicable)	
Safety & Technical Specialist HSE Team Contact for ALL level 1 & 2 events:	
<b>Russel Cardott</b>	Cell: (403) 701-8715 Office: (403) 343-6419
Fleet Specialist:	
<b>David Webster</b>	Cell: (403) 651-7844 Office: (403) 730-6909
OH & S Specialist:	
<b>Ralph Gubler</b>	Cell: (403) 801-8219 Office: (403) 730-6953
General Manager:	
<b>Bruce Johnson</b>	Cell: (306) 531-7318 Office: (403) 730-5817
Alberta Regional Service Manager:	
<b>Trevor Todd</b>	Cell: (403) 921-3440 Office: (403) 730-5817
Key Account Manager:	
<b>Ken Yoder</b>	Cell: (867) 444-1327 Office: (867) 766-6120

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Alberta Delivery & Service Manager: <b>Mac Sutherland</b>	Cell: (905) 979-1129 Office: (519) 780-5785
Superior Insurance Adjuster: <b>Denis Rochette &amp; Interspect Inc.</b>	Office: (888) 744-0807 (ext 242)
Neighbours: <b>RTL Robinson</b> <b>Yellowknife Chrysler</b>	Bus: (867) 873-6271 Bus: (867) 873-4222
Others:	( )
	( )
	( )

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### Written Report Requirements:

- Superior Incident Report and Investigation (as required by Company Standards)
- Transport Canada (30 day Dangerous Occurrence Report) – Territory Responsible, Regional & National Safety & Technical Specialist to assist
- Environment Canada (30 day E2 Report) - Territory Responsible, Regional & National Safety & Technical Specialist to assist

Has a process been established and responsibilities assigned to facilitate initial and written notification

☒ Yes ☐ No

- **If Yes** - Describe the process:  
**As per Superior Propane's guidelines.**

- **If No** – What is the date for completion?

      /      /        
(month) (day) (year)

### Territory Plan MUST be Reviewed Monthly and Updated as Changes Occur:

Date of Territory Plan:	<u>August/17/2009</u> (month) (day) (year)
Field Operations Manager/Supervisor (Print Name & Date):	Ken Yoder <u>Spet/08/09</u> (month) (day) (year)
Health, Safety & Environment Representative (Interim approval subject to audit) (Print Name & Date):	<u>Sept/08/09</u> (month) (day) (year)

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## **Appendix E**

### **Guide for Management of Hazardous Waste**

# **Guideline for the General Management of Hazardous Waste in the NWT**

## **1 Introduction**

### **1.1 Definitions**

## **2 Roles and Responsibilities**

### **2.1 Environmental Protection Service**

### **2.2 Generators of Hazardous Waste**

### **2.3 Carriers of Hazardous Waste**

### **2.4 Receivers of Hazardous Waste**

### **2.5 Other Regulatory Agencies**

## **3 Storage and Management of Hazardous Waste**

### **3.1 General**

### **3.2 General Requirements for Storage Containers**

### **3.3 General Requirements for Storage Facilities**

### **3.4 Registering a Hazardous Waste Management Facility**

### **3.5 Registering Hazardous Waste Generators, Carriers and Receivers**

### **3.6 Waste Manifest Requirements**

## **4 Waste Management**

### **4.1 Pollution Prevention**

### **4.2 Treatment or Disposal**

### **4.3 Disposal Outside of the Northwest Territories**

### **4.4 Alternative Management Methods**

## **5 Conclusion**

**Schedule I: Registration Volumes**

## **6 Bibliography**

## **Appendices**

**February 1998**

# Guideline for the General Management of Hazardous Waste in the NWT

## 1 Introduction

Waste is produced in the normal course of operation of any industrial, commercial or institutional operation. Because of their chemical, physical or biological properties, some wastes are more dangerous than others. These are known as a hazardous waste and require special handling and disposal to prevent impact on human health and the environment.

This guideline has been developed by the Environmental Protection Service of the Department of Resources, Wildlife and Economic Development. Its intent is to:

- ? provide information for the proper management of hazardous waste in the Northwest Territories,
- ? increase awareness of hazardous waste in the Northwest Territories, and
- ? establish a "cradle to grave" monitoring system for hazardous waste from generation to final disposal.

Section 2.2 of the *Environmental Protection Act* (EPA) gives the Minister of Resources, Wildlife and Economic Development of the Government of the Northwest Territories (GNWT) the authority to develop, coordinate and administer guidelines. This guideline complements existing acts and regulations concerning hazardous waste which should be consulted for interpretation and application. Section 2.5 of the guideline provides additional information on regulatory roles and responsibilities.

This guideline is for the general management of hazardous waste and should be read in conjunction with applicable specific hazardous waste guidelines. Contact the Environmental Protection Service for a listing of these guidelines.

### 1.1 Definitions

<i>Carrier</i>	Any person engaged in the transport of hazardous waste whether or not for hire or reward.
<i>Commercial</i>	Actions undertaken for hire or reward.
<i>Commissioner's Land</i>	Lands in the Northwest Territories that have been transferred by Order-in-Council to the Government of the Northwest Territories. This includes highways, block land transfers and most lands within municipalities.
<i>Consignor</i>	A person who offers a consignment of hazardous waste for transport.
<i>Contaminant</i>	Any noise, heat, vibration or substance and includes such other substances as the Minister may prescribe that, where discharged into the environment, (a) endangers the health, safety or welfare of persons,

- (b) interferes or is likely to interfere with normal enjoyment of life or property,
- (c) endangers the health of animal life, or
- (d) causes or is likely to cause damage to plant life or property.

**Environmental Protection Act**

<i>Dangerous goods</i>	Any product, substance or organism included by its nature or by the <i>Transportation of Dangerous Goods Regulations</i> (TDGR) in any of the classes listed in the schedule provided in the <i>Transportation of Dangerous Goods Act</i> (TDGA).
	<b>Transportation of Dangerous Goods Act (Canada)</b>
<i>Empty container</i>	A container that has been emptied, to the greatest extent possible, using regular handling procedures, but its contents shall not exceed 1% of the container's original capacity or 2 litres, whichever is less. This does not include containers which previously contained mercury or class 2.3, 5.1, or 6.1 materials of TDGR.
<i>Generator</i>	The owner or person in charge, management or control of a hazardous waste at the time it is generated or a facility that generates hazardous waste.
<i>Hazardous waste</i>	<p>A contaminant which is a dangerous good that is no longer used for its original purpose and is intended for recycling, treatment, disposal or storage.</p> <p>A hazardous waste does not include a contaminant that is:</p> <ul style="list-style-type: none"> <li>(a) household in origin;</li> <li>(b) included in class 1, Explosives or class 7, Radioactive materials of TDGR;</li> <li>(c) exempted as a small quantity;</li> <li>(d) an empty container; or</li> <li>(e) intended for disposal in a sewage system or by landfilling that meet the applicable standards set out in schedules I, III or IV of the <u>Guideline for Industrial Waste Discharges in the NWT</u>.</li> </ul>
<i>Hazardous waste management facility</i>	A facility which is used for the collection, storage, treatment, recycling or disposal of hazardous waste.
<i>Incompatible waste</i>	Hazardous wastes which, when in contact with one another or other substances under normal conditions of storage or transportation, could react to produce heat, gas, fire, explosion, corrosive substances or toxic substances.
<i>Landfilling</i>	The deposit of waste, on land, as described in the GNWT Department of Municipal and Community Affairs' document <u>Guidelines for the Planning, Design, Operation &amp; Maintenance of Solid Waste Modified Landfill Sites in the Northwest Territories</u> .

<i>Long term storage</i>	The storage of hazardous waste for a period of 180 days or more but does not include materials in transit.
<i>Manage</i>	To handle, transport, store, recycle, treat, destroy or dispose of hazardous waste.
<i>Receiver</i>	A person to whom a quantity of hazardous waste is being or intended to be transported. Also referred to as a consignee.
<i>Sewage system</i>	A system for the collection, transmission, treatment or disposal of any liquid waste containing animal, vegetable, mineral, human or chemical matter in solution or in suspension.
<i>Small quantity</i>	Hazardous waste that is generated in an amount that is less than 5 kilograms per month if a solid or 5 litres per month if a liquid; and where the total quantity accumulated at any one time does not exceed 5 kilograms or 5 litres. This does not apply to wastes that are mercury or in classes 2.3, 5.1 or 6.1 of TDGR. These wastes must be generated in an amount less than 1 kilogram per month if a solid or 1 litre per month if a liquid; and where the total quantity accumulated at any one time does not exceed 1 kilogram or 1 litre.
<i>Transport authority</i>	<p>The regulations controlling the management of hazardous waste under that mode of transport. These include:</p> <p>Road and rail - <i>Transportation of Dangerous Goods Act (TDGA) and Regulations (TDGR)</i>.</p> <p>Air - <i>International Civil Aviation Organization Technical Instructions (ICAO)</i>.</p> <p>Marine - <i>International Maritime Dangerous Goods Code (IMDG)</i>.</p>
<i>TDGA/TDGR</i>	The <i>Transportation of Dangerous Goods Act and Regulations (Canada)</i> .
<i>Treatment or Treat</i>	<p>The handling or processing of a hazardous waste in such a manner as to change the physical, chemical or biological character or composition of the hazardous waste in order to eliminate or reduce:</p> <p>(a) one or more environmental hazard of the waste; and/or</p> <p>(b) the volume.</p>



## 2 Roles and Responsibilities

### 2.1 Environmental Protection Service

The Environmental Protection Service (EPS) of the Department of Resources, Wildlife and Economic Development is the Government of the Northwest Territories' (GNWT) agency responsible for initiatives which control the discharge of contaminants and their impact on the natural environment. EPS is responsible for ensuring that environmentally acceptable management procedures, emission levels and disposal methods are maintained. By practise EPS programs are applied primarily to Commissioner's Land, lands administered by municipal governments or GNWT undertakings. Legislative authority is provided by the *Environmental Protection Act* (EPA) and *Pesticide Act*. Contact EPS for a listing of relevant regulations and guidelines.

EPS monitors the movement of hazardous waste from the generator to final disposal through use of a tracking document called a waste manifest. A waste manifest form must accompany all hazardous waste in transit regardless of the means of transport. In order to complete the manifesting requirements, all parties (the generator, carrier, receiver) must be registered by EPS and the registration number entered in the appropriate location on the waste manifest form. Registration numbers and waste manifest forms are available from EPS.

Under the EPA, the *Spill Contingency Planning and Reporting Regulations* set the standards for reporting spills of contaminants and preparing spill contingency plans.

### 2.2 Generators of Hazardous Waste

**The responsibility for proper waste management rests with the generator and should be considered part of the cost of doing business.**

The generator is ultimately responsible for ensuring hazardous waste will be properly managed from the time it is generated to final disposal. Waste must be properly stored, transported, treated and disposed. Contractors can manage waste on behalf of the generator however, the generator is responsible for ensuring, in advance, that the waste management method is acceptable.

In general, the generator is responsible for the following:

- ? Classifying, labelling and storing the hazardous waste properly.
- ? If waste is to be transported off site the generator should:
  - register as a generator of hazardous waste;
  - ensure a waste manifest is properly completed and accompanies the shipment; and
  - ensure the waste is transported by a registered hazardous waste carrier to a registered receiver.
- ? Registering their hazardous waste management facility, if required.
- ? Ensuring the proper disposal of hazardous waste by an acceptable method.

- ? Ensuring workers are trained in the management of hazardous waste including emergency response in the event of a discharge.
- ? Complying with all other regulatory requirements for hazardous waste management including transportation, occupational health and public health.

## **2.3 Carriers of Hazardous Waste**

Carriers must be registered with EPS prior to transporting hazardous waste. Hazardous waste must be transported in accordance with the appropriate transport authority: *Transportation of Dangerous Goods Regulations* (TDGR); *International Civil Aviation Organization* (ICAO) or *International Maritime Dangerous Goods Code* (IMDG). TDGR requires that drivers be trained in the aspects of transporting dangerous goods related to their assigned duties.

## **2.4 Receivers of Hazardous Waste**

Receivers (consignees) of hazardous waste in the NWT must be registered with EPS as a receiver. The operator of a hazardous waste management facility in the NWT may be required to register the facility with EPS. Section 3.4 provides information on registering a hazardous waste management facility.

## **2.5 Other Regulatory Agencies**

The following agencies are involved in activities relevant to hazardous waste management in the NWT:

The Motor Carrier Services of the GNWT Department of Transportation is responsible for administering the *Transportation of Dangerous Goods Act and Regulations* (NWT). The Department is also responsible for driver, vehicle and load safety under additional transport legislation.

Under the NWT *Safety Act*, *Occupational Health and Safety Regulations* address the safety of workers and the work place. The Act states that the employer shall maintain their establishment and take all reasonable precautions to ensure the safety and health of every person in the establishment. The Regulations also prescribe standards for protective clothing and equipment to be used by workers. *Work Site Hazardous Materials Information System Regulations* (WHMIS) were adopted to ensure employee training and safe storage and handling of controlled products at the employer's work site. Consultation with a Safety Officer from the Prevention Services Division of the Workers' Compensation Board is the responsibility of every waste generator or employer.

The Office of the Fire Marshal has authority over the storage of flammable, combustible and hazardous materials under the National Fire Code. Consult with the GNWT Department of Municipal and Community Affairs' regional Fire Marshal or your community Fire Chief.

Waste management activities may affect public health. Environmental Health Officers of the regional Public Health Boards should be consulted regarding requirements under the *Public Health Act*.

The GNWT Department of Municipal and Community Affairs (MACA) administers Commissioner's Lands. MACA's responsibility includes the granting of leases, licences and land use permits on these lands and is also involved in the planning, funding, operation and maintenance of municipal infrastructure such as landfills and sewage treatment systems.

Indian and Northern Affairs Canada is responsible for hazardous waste management on federal lands through the *Territorial Lands Act* and *Northwest Territories Waters Act*.

Environment Canada is responsible for the management of hazardous waste from federal facilities and lands under the *Canadian Environmental Protection Act* (CEPA). CEPA regulates the release to the environment and storage of polychlorinated biphenyls (PCBs) under the *Chlorobiphenyls Regulations* and *Storage of PCB Material Regulations*. Because they regulate these areas, sections 3.2, 3.3, 3.4 and 4.4 of this guideline do not apply to PCBs. International shipments of waste dangerous goods are monitored under the *Export and Import of Hazardous Waste Regulations*.

The National Energy Board regulates frontier exploration, drilling, production and inter-jurisdictional transmission in the oil and gas industry. The management of land based drill sumps is in conjunction with the appropriate land regulator.

Natural Resources Canada has the authority to administer explosives under the *Explosive Act*. Atomic Energy Control Ltd. (AECL) administers the handling and disposal of radioactive materials in Canada. The Atomic Energy Control Board (AECB) licenses institutions and companies to possess and use radioactive materials.

Under land claim agreements, renewable resource management institutions have been given broad authority for land use planning, impact assessment, and administration of land and water activities in settlement areas outside municipal boundaries. Through the setting of terms and conditions in licensing and permitting procedures, such institutions will have authority over waste disposal.

Figure 1 provides a flow chart to assist in determining the primary regulatory contact for hazardous waste management. Contact the Environmental Protection Service if assistance is required.

### **3 Storage and Management of Hazardous Waste**

#### **3.1 General**

The definition of hazardous waste in this guideline incorporates the term "dangerous goods" which is defined in the Transportation of *Dangerous Goods Act* (Canada). The Transportation of Dangerous Goods Regulations (TDGR) has a system for classifying dangerous goods. Because the term "dangerous goods" is used in the definition of hazardous waste, the classification system used in TDGR can be applied to hazardous waste. Appendix A indicates the 9 chemical classes used.

Hazardous waste must not be mixed or diluted with any substance or divided into smaller quantities to avoid meeting the definition of a hazardous waste.

Figure 2 is a flow chart illustrating the decision process for managing a hazardous waste under this guideline.

#### **3.2 General Requirements for Storage Containers**

Hazardous waste should be stored in containers according to the following:

- ? In the original containers, where possible, or in containers manufactured for the purpose of storing hazardous waste. The containers must be sound, sealable and not damaged or leaking. The Transport Authority regulates container specifications.
- ? Clearly labelled according to the requirements of the Work Site Hazardous Materials Information System (WHMIS) of the *Safety Act* or the relevant Transport Authority, if transport is planned.

- ? Bulked into 16 gauge or equivalent metal or plastic 205 litre drums, as appropriate.
- ? The containers should be sealed or closed at all times, unless in use.

### **3.3 General Requirements for Storage Facilities**

**The storage of hazardous waste is not an acceptable long term waste management solution.**

Hazardous waste must be stored in a safe and secure manner. In general, hazardous waste should be stored according to the following:

- ? Drainage into and from the site is controlled to prevent spills or leaks from leaving the site and to prevent run off from entering the site.
- ? Incompatible wastes are segregated by chemical compatibility to ensure safety of the public, workers and facility.
- ? In a secure area with controlled access. Only persons authorized to enter and trained in waste handling procedures should have access to the storage site.
- ? Regular inspections are performed and recorded. Containers are placed so that each container can be inspected for signs of leaks or deterioration. Leaking or deteriorated containers should be removed and their contents transferred to a sound container.
- ? Maintain a record of the type and amount of waste in storage.
- ? Storage sites have emergency response equipment appropriate for the hazardous waste stored on site.
- ? Where the site is to be used for long term storage and the amount of waste in storage exceeds the quantity requirements set out in Schedule I, the site should be registered in accordance with Section 3.4 of this guideline.
- ? Storage sites are expected to meet all local bylaw and zoning requirements. It is recommended that the local Fire Chief be advised of the storage facility and its content for emergency planning and response purposes.

### **3.4 Registering a Hazardous Waste Management Facility**

Hazardous waste management facilities may require registration with the Environmental Protection Service.

#### **Storage Facility:**

A storage facility can be a building, locker, compound or area used to store hazardous waste. A storage facility should be registered with EPS if:

- ? The facility is used or is intended for the storage of hazardous waste for a period of 180 days or more, and
- ? quantities to be stored exceed the quantities set out in Schedule I for individual waste classes or if the aggregate quantity for all classes of waste stored exceed 5000 Kg/L.

When registering a storage facility the following information should be provided:

- ? Company name, address, phone number and contact person, including position.
- ? Location and description of the facility.
- ? Expected types, quantities and method of storage of the hazardous waste.
- ? Approvals required to operate and occupy the land for that purpose.

This information should also be provided to the local Fire Chief for emergency planning and response purposes.

#### Management Facility other than Storage:

Hazardous waste management facilities, other than a storage facility, which manage hazardous waste for commercial purposes require registration with EPS prior to operation. These include facilities which treat, reprocess, consolidate, destroy or recycle hazardous waste. When registering a facility the following information should be provided:

- ? Company name, address, phone number and contact person, including position.
- ? Location and description of the facility.
- ? A description of the waste management activities to be conducted.
- ? Expected types, quantities and method of storage of the hazardous waste.
- ? Approvals required to operate and occupy the land for that purpose.

The information requirements for an environmental review of a hazardous waste management facility may be found in the Environmental Information Guide For Industrial Projects on Commissioners Lands. The Guide provides the information requirements for relevant GNWT agencies to review the environmental impacts of a project. A proponent should review the Guide and contact EPS before making a submission.

### **3.5 Registering Hazardous Waste Generators, Carriers and Receivers**

If hazardous waste is to be transported off site, the generator, carrier and receiver must be registered with EPS. Once registered, an identification number will be assigned which is required to complete the waste manifest under TDGR. A carrier or receiver may either be registered in the NWT or in the province or territory in which the company is based.

The following information should be provided when applying for a registration number:

Generator:

- ? Company name, address, phone number and contact person, including position.
- ? Location and description of the activity taking place which results in the generation of the hazardous waste.
- ? Expected type, quantity and method of storage of hazardous waste.

Carrier:

- ? Company name, address, phone number and contact person, including position.
- ? Proof of transport liability insurance.
- ? Operating authority for transport in the NWT.
- ? Confirmation that the company meets the training requirements of the transport authority.

Receiver:

- ? Company name, address, phone number and contact person, including position.
- ? Location and description of the management facilities and activities for hazardous waste.
- ? Expected type, quantity and method of storage of hazardous waste.

### **3.6 Waste Manifest Requirements**

The *Transportation of Dangerous Goods Regulations* require that a completed hazardous waste manifest form accompany shipments of hazardous waste. Manifests are available from EPS.

The completed manifest form provides:

- ? Detailed information on the types and amounts of hazardous waste shipped;
- ? A record of the firms or individuals involved in the shipment; and
- ? Information on the storage, treatment or disposal of the waste and confirmation that they reached their intended final destination.

The Generator (Consignor), Carrier and Receiver (Consignee) must each complete their portion of the manifest. The information provided on the manifest as well as other TDGR requirements (ie: labelling and placarding) are also intended to assist first responders (police, ambulance, fire fighters) with hazard information should a transportation accident occur.

Waste manifest completion instructions are provided on the reverse side of each manifest. Further assistance in completing a waste manifest may be obtained by referring to the User's Guide for the Hazardous Waste Manifest produced by Environment Canada or by contacting the Motor Carrier Services of the GNWT Department of Transportation.

## **4 Waste Management**

Waste management is intended to reduce or eliminate the effects of waste on the environment, to provide for public and worker safety and to maximize the efficient use of resources. Once hazardous waste has been created the proper treatment and disposal can be expensive. While it is the responsibility of the waste generator to pay for all disposal costs, various waste management options are available to reduce the cost and volume of waste requiring treatment.

A more effective and proactive management practise is to eliminate or reduce the generation of the waste. This is referred to as pollution prevention.

**Minimizing or avoiding the creation of pollutants and waste can be more effective in protecting the environment than treating them, or cleaning them up after they have been created.**

Canadian Council of Ministers of the Environment

#### **4.1 Pollution Prevention**

Pollution prevention methods are designed to eliminate the creation of waste. Whereas pollution control options treat waste after it has been created, pollution prevention measures avoid the creation of waste.

Waste generators in the NWT can reduce costs and prevent pollution by implementing reduction, reuse and recycling programs through changes in operational procedures, maintenance practices and raw material usage. An overall waste management plan should incorporate these ideas.

##### **1. Reduce**

The aim of reduction is to eliminate the production of a hazardous waste by using raw materials more efficiently. Methods of reduction include substitution or reduction of a raw material, production redesign, process changes, and improved maintenance activities. Methods which are technically and economically practical in any given situation should be used to reduce or eliminate waste streams.

##### **2. Reuse and Recycle**

Reusing or recycling hazardous waste in operating processes within the generating facility is another means of pollution prevention. Alternatively other users may be found to reuse the material that would otherwise require treatment or disposal. The Department of Resources, Wildlife and Economic Development encourages the reuse and recycling of hazardous waste in the following ways:

- (a) Waste exchanges and associations offer some opportunity for the reuse or recycle of waste. Waste exchanges put potential users of waste materials in contact with waste generators. Appendix B lists a number of waste material exchanges and management associations.
- (b) Recycle programs are in place for some hazardous wastes such as waste oil, waste fuels and solvents. For information on recycling programs, contact the waste management associations in Appendix B or EPS.



## 4.2 Treatment or Disposal

**It is not acceptable for hazardous waste to be abandoned, poured down sewers, dumped on land or discarded at a landfill.**

Treating hazardous waste to reduce or eliminate their hazard is the final option after implementing appropriate pollution prevention options. It is the responsibility of the generator to treat or dispose of their hazardous waste properly. Although a discussion of treatment and disposal methods is beyond the scope of this guideline, the following are general points for consideration:

- ? The generator is required to determine and follow the proper management method for their waste. Sources of assistance include:
  - the manufacturers Material Safety Data Sheet (MSDS) provided with the raw materials.
  - the manufacturer.
  - complying with this guideline and other relevant legislation.
  - waste management consultants and associations.
- ? **Open burning of hazardous waste is not acceptable.**
- ? Treated hazardous waste may be directed for landfilling or to a municipal sewage system providing that the standards outlined in the Guideline for Industrial Waste Discharges in the NWT are met. The municipal authority and the facility's water licence should also be consulted.
- ? Different types of hazardous wastes should not be mixed together in the same container. It is important to control the quality of any waste to ensure it can be recycled or disposed of properly. Contaminating wastes with other wastes may prevent reuse/recycling options and increase disposal costs.
- ? Hazardous waste containers must be properly managed. Containers should be emptied, to the greatest extent possible, using regular handling procedures, or by triple rinsing with an appropriate cleaning agent. They should be rendered unusable by puncturing or crushing prior to disposal. This is especially of concern for containers which could eventually be used for water or food storage. Rinsings must be managed according to their waste characteristics.

## 4.3 Disposal Outside of the Northwest Territories

Hazardous waste can be sent to a hazardous waste management facility outside of the NWT if the receiving facility is registered in the receiving province or territory and is approved to manage that waste.

Environment Canada monitors international shipments through the *Export and Import of Hazardous Waste Regulations* (EIHW) of CEPA. The International Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal controls the shipment of hazardous waste across international borders. Contact Environment Canada when considering international shipments.



6. Population Health  
Department of Health and Social Services  
Box 1320  
Yellowknife, NT, X1A 2L9  
Phone: (867) 920-8877 Fax: (867) 873-0122
7. Indian and Northern Affairs Canada  
Box 1500  
Yellowknife, NT, X1A 2R3  
Phone: (867) 669-2589 Fax: (867) 669-2716
8. Environmental Protection Branch  
Environment Canada  
Box 2970  
Yellowknife, NT, X1A 2R2  
Phone: (867) 669-4700 Fax: (867) 873-8185
9. Environment Branch  
National Energy Board  
444 Seventh Ave. S.W.  
Calgary, AB, T2P 0X8  
Phone: (403) 299-3676 Fax: (403) 292-5503
10. Explosives Division, Western Region  
Natural Resources Canada  
Unit 244, 755 Lake Bonavista Dr. S.E.  
Calgary, AB, T2P 0N3  
Phone: (403) 292-4766 Fax: (403) 292-4689
11. Western Regional Office  
Canadian Nuclear Safety Commission  
850, 220 - 4th Avenue SE  
Calgary, AB, T2G 4X3  
Phone: (403) 292-5181 Fax: (403) 292-6985  
Nuclear Emergency (24 Hour) (613) 995-0479

## Schedule I: Registration Volumes

Minimum quantity of hazardous waste<sup>1</sup> necessary for registration as a Hazardous Waste Storage Facility.

<u>Waste Classification TDG</u>		<u>Quantity<sup>2</sup> (Kg or L)</u>
1	Explosives	50 <sup>3</sup>
2.1	Compressed Gas (flammable)	500 <sup>4</sup>
2.2	Compressed Gas (non-corrosive, non-flammable non-toxic)	5000 <sup>4</sup>
2.3	Compressed Gas (toxic)	200 <sup>4</sup>
2.4	Compressed Gas (corrosive)	500 <sup>4</sup>
3.1	Flammable Liquids (flash-point < -18°C)	1000
3.2	Flammable Liquids (flash-point > -18°C < 23°C)	2000
3.3	Flammable Liquids (flash-point > 23°C < 61°C)	4000
4.1	Flammable Solids	5000
4.2	Spontaneously Combustible Solids	1000
4.3	Solids which React Violently with Water	500
5.1	Oxidizing Substances	1000
5.2	Organic Peroxides	50
6.1	Poisonous Substances	1000
6.2	Infectious Substances	500 <sup>4</sup>
7	Radioactive	any amount <sup>3</sup>
8	Corrosive Substances	1000
9.1	Miscellaneous	1000
9.2	Environmentally Hazardous	50 <sup>5</sup>
9.3	Dangerous Waste	5000
Total Aggregate Quantity of Hazardous Waste		5000

<sup>1</sup> This applies to hazardous waste and not dangerous goods.

<sup>2</sup> Quantity refers to liquids when the amount is expressed in litres (L) and solids when expressed in kilograms (Kg).

<sup>3</sup> Controlled under the authority of the Federal *Explosives Act* or *Atomic Energy Control Act*.

<sup>4</sup> Total liquid volume capacity of the container.

<sup>5</sup> PCB storage is regulated by Environment Canada under the *Canadian Environmental Protection Act*.

## 6 Bibliography

Government of Alberta, Alberta Environmental Protection - Alberta User Guide for Waste Managers, Edmonton, (1995).

Government of Northwest Territories, Department of Renewable Resources - Guideline for Industrial Waste Discharge, Yellowknife, (1995).

Government of Northwest Territories, Department of Renewable Resources - Environmental Information Guide For Industrial Projects, Yellowknife, (1995).

Heinke, G. and Wong, J., Guidelines for the Planning, Design, Operation & Maintenance of Solid Waste Modified Landfill Sites in the NWT, Volume 1 & 2. Department of Municipal and Community Affairs, Yellowknife, (1990).

NWT Water Board, Northwest Territories Waters Act, Canadian Gazette Part II, Vol.127, No.13, (1993).

## **Appendix A: Dangerous Goods Classifications**

### **Class 1: Explosives<sup>1</sup>**

### **Class 2: Compressed Gases**

- Division 2.1: Flammable Gases
- Division 2.2: Non-Flammable Gases
- Division 2.3: Poison Gases
- Division 2.4: Corrosive Gases

### **Class 3: Flammable Liquids**

- Division 3.1: Flash Point < -18°C
- Division 3.2: Flash Point > -18°C and < 23°C
- Division 3.3: Flash Point > 23°C and < 61°C

### **Class 4: Flammable Solids, Substances Liable To Spontaneous Combustion, Dangerous When Wet**

- Division 4.1: Flammable Solids
- Division 4.2: Spontaneously Combustible
- Division 4.3: Dangerous When Wet

### **Class 5: Oxidizers, Organic Peroxides**

- Division 5.1: Oxidizers
- Division 5.2: Organic Peroxides

### **Class 6: Poisonous, Infectious Substances**

- Division 6.1: Poisonous
- Division 6.2: Infectious Substances

### **Class 7: Radioactive Materials<sup>1</sup>**

### **Class 8: Corrosives**

### **Class 9: Miscellaneous Dangerous Goods**

- Division 9.1: Miscellaneous Dangerous Goods
- Division 9.2: Hazardous to the Environment
- Division 9.3: Dangerous Wastes

<sup>1</sup> - Class 1 and 7 are regulated under federal legislation and not subject to this guideline.

## **Appendix B: Waste Exchanges and Associations**

### Exchanges

Alberta Waste Materials Exchange	(403) 450-5000
British Columbia Waste Exchange	(604) 731-7222
Canadian Waste Materials Exchange	(905) 822-4111 ext 265
Canadian Chemical Exchange	(514) 229-6511 (514) 229-5344 Fax
Manitoba Waste Exchange	(204) 942-7781
Ontario Waste Exchange	(905) 822-4111 ext 656
Quebec Waste Materials Exchange	1-800-668-6686 (514) 762-9012
Saskatchewan Waste Materials Exchange	(306) 931-3242

### Associations

Assn. Québécoise des Techniques de L'eau	(514) 874-3700
Canadian Chemical Producers Association - Chemical Referral Centre	1-800-267-6666
Canadian Water & Wastewater Association	(613) 238-5692
Environmental Services Association of Alberta	1-800-661-9278 (403) 439-6363
Northwest Territories Water and Waste Association	(867) 873-4058 Fax
Ontario Waste Management Association	(416) 236-0172
Water Environment Association of Ontario	(416) 502-1440
Western Canada Water & Wastewater Association	(403) 259-4041

## **Appendix F**

### **Equipment Lists and Rates**



## FAX COVER SHEET

**ACE ENTERPRISES LTD.**  
**P.O. Box 724**  
**Yellowknife, NT, X1A 2N5**  
**Ph.(867)920-2082**  
**Fax(867)873-6572**

<b>SEND TO</b>		<b>Emergency</b>	<b>From</b>
Company name		Giant Mine Spill Response	ICIM
Attention		Katrina	Date
Fax number		669-3701	Phone number
			920-2082

☐ Urgent ☐ Reply ASAP ☐ Please comment ☐ Please review ☐ For your information


Total pages, including cover:

3. \* Re.: Equipment Rates for 2010

## COMMENTS

Hi,  
following are Ace's <sup>current</sup> equipment rates  
to be added to a list of contractors  
for an emergency response program.  
A 24 hour contact person for  
Ace Ent. is; Alain Rossignol (owner)  
\* Home Ph.) 873-9165 (cell.) 445-9300  
or Kim Rossignol Ph.) 873-4380  
(cell.) 445-9301 (Manager)  
The Office Phone # is 920-2082.

Thanks,

Gunn 

**ACE ENTERPRISES LTD.**

P.O. Box 724  
Yellowknife, NT., X1A-2N5

---

Phone (867)920-2082

Fax (867)873-6572

February 5, 2010

**\*GIANT MINE**  
**Emergency Response Program**

**HOURLY EQUIPMENT RATES: (All c/w Operator)**

**220 Komatsu Excavator (tracked back hoe) \$ 155.00 per hour**  
**(bucket capacity = 1 1/2 y3)**

**9030B Case Excavator (tracked back hoe) \$ 155.00 per hour**  
**(bucket capacity = 1 1/4 y3)**

**330LC5 Hitachi Excavator (tracked back hoe) \$ 175.00 per hour**  
**(bucket capacity = 2 y3)**

**W-24C Case Loader (bucket capacity = 3.3 y3) \$ 110.00 per hour**

**WA250 Komatsu Loader (bucket capacity = 3 y3) \$ 110.00 per hour**

**580L Back hoe/Loader \$ 110.00 per hour**  
**(loader bucket capacity = 1.5 y3 and back hoe bucket capacity**  
**= 0.5 y3)**

**60XT Case Bobcat (bucket capacity = 3/4 y3) \$ 85.00 per hour**

**Tandem Axle Dump Truck (capacity 10 y3) \$ 90.00 per hour**

**Tractor w/End Dump Trailer (truck) \$ 110.00 per hour**  
**(capacity 20 y3)**

**Ingersoll Rand Smooth Drum Packer \$ 85.00 per hour**

**D65-EX Bull Dozer \$ 145.00 per hour**

**988B Cat Loader \$ 185.00 per hour**

**\*All Prices are Plus G.S.T.**

**MATERIAL PRICE LIST: SUPPLY and DELIVERY**  
**(All Loads Mentioned are 10 cubic yards/Tandem Dump Truck Load)**

<b>Blast Rock (0 - 24")</b>	<b>\$ 150.00 per load \$ 15.00 y3</b>
<b>2" Minus Crush</b>	<b>\$ 220.00 per load \$ 22.00 y3</b>
<b>3/4" Minus Crush</b>	<b>\$ 240.00 per load /\$ 24.00 per y3</b>
<b>5/8" Minus Crush</b>	<b>255.00 per load \$ 25.50 per y3</b>
<b>Sand (not screened)</b>	<b>190.00 per load</b>

**(Loose Truck Box Measurement)**

<b>Foreman and Pick-up</b>	<b>\$ 80.00 per hour</b>
<b>Labourer and Pick-up</b>	<b>\$ 70.00 per hour</b>
<b>Supervisor and Pick-up</b>	<b>\$ 90.00 per hour</b>

**\*NOTE: Any City of Yellowknife dumping fee tickets will have a 10 % mark-up on the actual cost. All copies of tickets will be submitted to the customer.**

**\*ALL PRICES MENTIONED ABOVE ARE PLUS G.S.T.**

**\*These Prices Are Subject to Change and Expiry**

**\*Our Payment Terms are 30 Days.**

***\*Thank-you***



Box 1949 Yellowknife NWT X1A 2P5

Office (867) 873-9801 - Fax (867) 873-9803

[weatherbytruckingltd@netkaster.ca](mailto:weatherbytruckingltd@netkaster.ca)

Deton`cho Nuna Joint Venture  
Giant Mine Remediation Project  
Box 2951  
Yellowknife NT  
X1A 2R2

February 15, 2010

Attention: Katrina

As per our earlier conversation concerning your requirements for an Emergency Spill Response Equipment Price List I have included our most recent list for your records. Please note that this list is based on an hourly price and all rates apply during regular business hours of 6:00am – through 6:00pm. In the unlikely event that we are called out in an emergency after these regular hours an overtime rate will apply which will be a \$20.00 per hour adjustment to those rates. Also note that a 4 hour minimum will be charged on Sunday regardless of time called out. If you have any further questions please do not hesitate to call me at the numbers above or directly on my cell at (867)-445-1667.

Thank you in advance

Blair Weatherby

DETON'CHO NUNA JOINT VENTURE  
WEATHERBY TRUCKING LTD.

<u>CLASS</u>	<u>EQUIPMENT</u>	<u>RATE</u>
LOADERS	MUTLI TERRAIN 277B	\$95.00
	IT28G	\$125.00
	966F	\$135.00
	988A	\$185.00

ALL LOADERS COME WITH Q/C AND FORKS, BUCKET AND JIB

EXCAVATORS	KOBELCO SK100 RUBBER TIRED	\$120.00
	CAT 325 WITH THUMB	\$155.00
	JOHN DEERE 892	\$165.00
	CAT 330 with Hammer	\$165.00 \$225.00

ALL EXCAVATORS COME WITH BUCKETS 36" - 72" DIGGING AND CLEANUP

TRUCK/TRAILERS	TANDEM GRAVEL	\$95.00
	TANDEM END DUMP	\$125.00
	TRIDEM END DUMP	\$140.00

DOZER	KOMATSU D60E	\$125.00
-------	--------------	----------

ROCK TRUCKS	CAT D250 ARTICULATING	\$150.00
-------------	-----------------------	----------

WITH TAILGATES /1 WITH HEATED BOX

WINCH TRUCKS 30T		\$140.00
WITH SCISSORNECK LOWBOY		\$165.00
WITH 8 AXLE JEEP		\$220.00
320" BED TRUCK		\$200.00

WATER TRUCK 6X6		\$100.00
-----------------	--	----------

OFF SITE ADMINISTRATION		3.50%
-------------------------	--	-------

SUPERVISOR / CERTIFICATION		\$90.00
----------------------------	--	---------

HILLMAN ROLLERS 40T	NEGOTIABLE
20 MAN CAMP	NEGOTIABLE
70 T TRUCK SCALE	NEGOTIABLE
ASBESTOS ABATEMENT WASHCAR	NEGOTIABLE

PLEASE ALSO NOTE THAT ALL OUR EMPLOYEES TO DATE CARRY:

FIRST AID /CPR B

DANGEROUS GOODS

HAZOURDOUS GOODS

WHMIS

ALL FULLY OREINTATED AT BOTH CON AND GIANT MINE

BLAIR HAS MINE SUPERVISOR LEVEL 2 CERTIFICATION

WORKERS COMPENSATION AND INSURANCE LIABILITY AVAILABLE ON REQUEST

PRICES ARE SUBJECT TO CHANGE - 30 DAYS NOTICE TO BE GIVEN

ALL RATES INCLUDE OPERATORS

DISCOUNTS NEGOTIABLE FOR HIGH VOLUME WORK

REVISED NOVEMBER 1, 2009

# Camco Construction Ltd

Box 2727, 102 Etthen Drive - Yellowknife, NT X1A 2R1

Telephone: (867) 873-8522; Cell: (867) 444-8522; Fax: (867) 873-8518

email: camco@ssimicro.com

FAX No.

669-3701

DATE:

Feb 11/10

COMPANY:

TO:

KATANA

FROM:

RAEONA

TOTAL SENT

2

Page(s)

## FAX MESSAGE:

AS per your request  
Equipment Prices

March 2010 to March 31/2011

CONTACTS # See Above

Raeona

# CAMCO CONSTRUCTION EQUIPMENT RATES

No.	Equipment Description	Rate	Per
<b>TRACK HOES</b>			
	892 John Deer - with Thumb (volume \$138.00)	\$160.00	Hour
	230 John Deer - with Thumb	\$155.00	Hour
	Komatsu PC 220 w / thumb-clean & dig bucket	\$150.00	Hour
	1404 Atlas	\$140.00	Hour
	1404 Atlas with Hammer	\$190.00	Hour
	EX-60 Hitachi	\$115.00	Hour
	EX-40 Hitachi	\$110.00	Hour
2	KX-41 Kubota (2 available)	\$100.00	Hour
	35D John Deere - Bucket	\$110.00	Hour
	35D John Deere -200 lb hammer	\$155.00	Hour
	35D John Deere-500 lb hammer	\$180.00	Hour
<b>LOADERS</b>			
	W-14 Case- 1 3/4 yard Bucket/Forks	\$105.00	Hour
	SL-150 Samsung - 3 1/2 yard Bucket/Forks	\$110.00	Hour
	JD-350 John Deere Crawler/Bulldozer	\$125.00	Hour
<b>GRAVEL TRUCKS</b>			
2	Tandem Ford 8000 (2 available)	\$95.00	Hour
	End Dump Tridem	\$120.00	Hour
	End Dump Tandem	\$115.00	Hour
	Ford 700	\$90.00	Hour
<b>TRIDEMS</b>			
	Tridem Low Boy with Tractor	\$120.00	Hour
	Tandem High Boy with Tractor	\$115.00	Hour
<b>TANDEMS</b>			
	Winch Tractor LTL 9000	\$160.00	Hour
	Tandem Low Boy with Tractor	\$115.00	Hour
<b>TRUCK &amp; TRAILERS</b>			
	One Ton Truck with no trailer	\$85.00	Hour
	One Ton with 30" Trailer/Tandem Fifth Wheel	\$100.00	Hour
<b>PILOT CAR</b>			
	Pilot Car	\$85.00	Hour
<b>LABOUR</b>			
	Per Man	\$65.00	Hour
	Over Time	\$80.00	Hour
	Foreman/Supervisor	\$80.00	Hour
	Welder-Journeyman	\$95.00	Hour
<b>EQUIPMENT</b>			
	Air Compressor	\$180.00	Day
	Compactor - 1000 lb Diesel	\$180.00	Day
28	Compactor - 1000 lb Diesel	\$700.00	Week
	Waiting Time	\$110.00	Hour
	Waiting time when equipment is involved	\$110.00	Hour

Prices subject to change without notice.

Rentals for fence panels no door \$15 with door \$20 per month

Overtime rate is charged on hours worked over 8 hrs/day or over 40/week and on holidays

Add \$25 /hr for overtime rates on equipment

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