Tahera Diamond Corporation Inc.

LANDFILL DESIGN, WASTE AND HAZARDOUS MATERIALS MANAGEMENT PLAN
JERICHO DIAMOND MINE
NUNAVUT

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1.0 INTRODUCTION

1.1 BACKGROUND

This report provides an updated Landfill and Hazardous Materials Management Plan for landfill facilities and Hazardous Materials Management Programs in operation at the Jericho Diamond Mine pursuant to requirements of Part D, Item 6 of Water Licence NWB1JER0410 issued to Tahera Diamond Corporation. The landfill is operated as an industrial dry waste landfill and not a municipal solid waste landfill. Food waste and food contaminated materials are separated and incinerated from solid waste destined for the landfill.

The Hazardous Materials Management Plan incorporated within this document provides information on the safe and environmentally sound storage and handling of the major hazardous products used at the Jericho Diamond Mine with the exception of explosives which are detailed in other documents (Ammonium Nitrate and Explosive Management Plan). The Hazardous Materials Management Plan also works in conjunction with The Emergency Response, and Spill Prevention, Countermeasures and Control Plan and provides direction on activities that include prevention, detection, containment, response, and mitigation of accidents resulting from hazardous materials handling.

The Jericho Diamond Mine is located in the West Kitikmeot region of Nunavut, approximately 350 km southwest of Cambridge Bay, Nunavut.

A camp to accommodate 100 people has been established at the Jericho site. The camp is owned and operated by Tahera Diamond Corporation. Mining and mobile equipment maintenance is under the supervision of the mining contractor. Tahera Corporation will operate the processing plant and retain overall responsibility for the site.

The mine generates a variety of wastes, both hazardous and non-hazardous. A landfill is used to dispose of non-hazardous wastes that cannot be recycled and is the subject of this landfill management plan. Food wastes are incinerated and hazardous materials are separated, stored and sent off site for disposal or for the recycling of hazardous recyclables via the winter road.

1.2 TAHERA ENVIRONMENTAL POLICY

Tahera's environmental policy will apply to all activities undertaken at the Jericho site.

It is Tahera's policy to achieve a high standard of environmental care in conducting its business as a resource company contributing to society's material needs. Tahera's approach to environmental management seeks continuous improvement in performance by taking account of evolving knowledge and community expectations.

Specifically, it is Tahera's policy to:

- Comply with all applicable laws, regulations and standards; uphold the spirit of the law; and where laws do not adequately protect the environment, apply standards that minimize any adverse environmental impacts resulting from its operations.
- Communicate openly with government and the community on environmental issues, and contribute to the development of policies, legislation and regulations that may affect Tahera.
- Ensure that its employees and suppliers of goods and services are informed about this policy and are aware of their environmental responsibilities in relation to Tahera's operations.
- Ensure that it has management systems to identify, control, and monitor environmental risks arising from its operations and to prevent environmental impacts prior to their occurrence.
- Conduct research and establish programs to conserve resources, minimize wastes, improve processes and protect the environment.
- Take appropriate corrective actions should unexpected environmental impacts occur. Appropriate actions will be taken to prevent reoccurrence of such unexpected impacts.

For the Jericho Diamond Project, Tahera's environmental policy will apply, where appropriate, to all its contractors. Environmental clauses outlining contractor responsibilities will be included in contracts for the Jericho Mine.

2.0 REGULATORY SETTING

2.1 WASTE MANAGEMENT

Waste management is regulated under the Nunavut *Public Health Act*, the Nunavut *Environmental Protection Act* and the federal *Environmental Protection Act*. In addition to mandatory requirements, a number of waste management guidelines are commonly used in the NWT. The most recent of these was developed for municipal solid waste, and is titled "Guidelines for the Planning, Design, Operations and Maintenance of Modified Solid Waste Sites in the NWT" (Ferguson Simek Clark, April 2003, on behalf of the Department of Municipal and Community Affairs, Government of Northwest Territories). While all of the recommendations provided in this guideline may not necessarily be appropriate for the management of industrial waste such as that generated at the Jericho Diamond Mine, those principals that are applicable have been adopted in the design and operation of the landfill.

Specifically, Schedule D, item 6, of the requirements of the Water Licence NWB1JER0410 are addressed in the following sections.

2.2 HAZARDOUS MATERIALS MANAGEMENT

Both federal and territorial legislation regulates hazardous materials that will be used at the Jericho Diamond Mine. Acts, regulations and guidelines are listed below:

Federal

- Transportation of Dangerous Goods Act and Regulations
- Explosives Act
- National Fire Code
- CCME Guidelines for Above-Ground Storage Tanks

Territorial

- Transportation of Dangerous Goods Act (RSNWT 1988) and Regulations
- Explosive Use Act and Regulations
- Fire Prevention Act and Regulations
- Mine Health and Safety Act and Regulations
- Work Site Hazardous Materials Information System Regulations

Relevant acts will be kept on file at the mine site and an overview understanding of their regulation will be given to employees as part of training.

3.0 LANDFILL DESIGN FACTORS

As noted in Schedule D, item 6a of the Water Licence, the landfill has been designed to conform to the requirements of the "Guidelines for the Planning, Design, Operations and Management of Modified Solid Waste Sites in NWT" (Ferguson, Simck and Clark, April 2003). In accordance with this guide the following elements are identified for the landfill.

3.1 DESIGN LIFE

The landfill resides in Waste Rock Dump No. 2. It will remain there for the life of the mine operations. Currently the Mine Operations are identified as occurring between 2005 and 2012 at which time production is envisioned to stop. Figure 1 provides an overview of site and waste dump configuration. Figure 2 illustrates the location of the landfill within the waste dump No. 2 and other site material staging areas. Figure 3 provides a plan and cross section of the landfill development based upon an area fill concept and operation in accordance with the above guideline. The landfill has associated with it a burn pit and sludge pit.

3.2 PERMAFROST ENCAPSULATION DURING OPERATION AND CLOSURE

As noted in Section 4.0 the site is located in a region of continuous permafrost. Based upon the local geological conditions it is expected that permafrost will develop through the waste. Unfrozen waste will be present during operation in the summer months. In order to ensure encapsulation, the final layer of cover material will be a minimum of 4.6 m thickness of waste rock. Thermal analysis to support the design is presented in Appendix C. Global warming has been considered in the design as discussed in Appendix C. This method of encapsulation is consistent with the design, operation and closure of other landfill sites under licence in the Northwest Territories and Nunavut. Ongoing daily operation through the life of the landfill will be such that frozen waste will be covered in the spring to reduce the movement of seasonal thaw in the material.

3.3 DEVELOPMENT METHOD

The area fill method is the selected design method since permafrost, and geological rock conditions prevent development of trenches. In this case waste will be deposited upon a prepared rock fill base and side berms. The side berms used to develop the area fill will be approximately 3.0 m in height. Berm shoulders will have stabilized side slopes of 2:1 typical on the outside and inside of the berm.

As the development of the landfill is located within the waste Rock Dump, the landfill in cross section will resemble the cross section Figure 3-4 Mounding Concept, as illustrated in the Guidelines for Planning, Design, Operations and Maintenance (FSC Group, April 2003). Figure 3 provides a plan and cross section of the landfill development at Jericho Diamond Mine through its life. The landfill has been developed along the east rock face and advances westward as rock waste is deposited. The landfill will increase in depth as rock waste material is deposited on site. Encapsulated waste cells will develop as waste materials are deposited and covered. Successive layers will ensure permafrost will develop within the landfill. Final cover material will provide protection from animal incursion and maintain the permanent permafrost conditions.

3.4 FENCING

Fencing is not required for the site as the only materials entering the landfill are residue solid waste that will have no organic or food related items. Waste placed in the site will be covered regularly and particularly when wind conditions are elevated.

3.5 BURNING

The Landfill Management Plan allows for burning of certain wastes. Scrap, clean wood and paper are proposed for burning to reduce the quantity of material that requires burying. Burning will be controlled as an authorized activity on site. Further discussion of materials authorized to be burnt follow later in the document. The location of the burn pit is shown on Figure 3.

3.6 SLUDGE PIT

The landfill management plan provides for disposal of solids received from the wastewater clarifier. The solids are placed into a pit adjacent to the landfill within the waste rock dump. Downslope groundwater water quality monitoring is used to maintain a review of any potential changes to surface and subsurface water quality from flows that may come from the rock dump area. All downslope flow is directed to the pit catchment area.

3.7 SURFACE WATER SAMPLING

Surface water is sampled at several locations around the site. Currently sampling of surface water or seepage water (dictated by the Water Licence) is at three locations. One location in the pit, one location off the crusher and the third location off (down slope) of the till dump (Waste Dump No. 2) where the landfill is located. Should any seepage occur resulting from water seeping through the landfill waste, it will be observed at the down slope monitoring location.

3.8 HAZARDOUS WASTE STORAGE FACILITIES

Hazardous materials are not deposited in the dry waste landfill. These are separated, packaged and stored at the hazardous materials compound away from the landfill area. Hazardous waste storage facilities are addressed in Section 7.0, the Hazardous Waste Management Plan. Figure 1, which provides an overview of the mine shows the waste transfer area for hazardous and hydrocarbon storage. North of the Mine Development area near the laydown storage pad area. The Hazardous Materials storage and the hydrocarbon storage area has been constructed using a geotextile 60 mil HDPE liner with geotextile and granular wear surface and confinement berms. Figure 4 Hazardous Materials, New and Used Oil Storage, illustrates these storage compounds. Photos in the Photo section of the report illustrate this area with segregated band and cube storage containers.

4.0 LANDFILL LOCATION

The landfill will be located within Waste Dump No. 2 through the mine life. Figures 1 and 2 provided the location of the landfill relative to other current and proposed mine development activities. The Waste Dump No. 2 has been developed to accept overburden and waste rock. The Waste Rock Management Plan prepared by SRK Consulting (May 2005) describes the geology of the area.

The region consists of regionally extensive Achean granite rocks, which vary locally and over very short distances from granodiorite to syenogranite, with associated pegmatite phases. Pleistocene glacial sediments occur sporadically throughout the region, and provide 10 to 20 m cover over the Kimberlite pipe. Drilling results and the surficial geological mapping indicate that the foundation conditions at waste dump sites consist of bedrock with isolated soil deposits. The soil deposits typically range in thickness from 0.2 to 3.2 m

and consist of granular colluvial soils with, in some locations, a thin mantle of organic soil. Both waste dump sites are underlain by permafrost.

Regional permafrost maps, complemented by site-specific thermal data and data from the Lupin Mine, indicate the Jericho Diamond Project lies in a region of continuous permafrost (SRK Consulting, 2005). Permafrost is everywhere except beneath large lakes. Available data suggests that the permafrost depth is about 450 m, which is consistent with published data from the Jericho area. In surficial soils, the active layer typically ranges from less than one meter in organic soil to slightly more than three metres where well drained granular soils are present. The active layer thickness in exposed rock locally exceeds three meters (SRK Consulting, 2005).

The landfill design presented in this plan is based on the approach used at Ekati Diamond Mine™ whereby use is made of permafrost to minimize water leaching into the subsoil. The design also allows for the landfill to be fully encased in the permafrost as the site develops and the landfill closed.

5.0 LANDFILL OPERATION

The waste management operations consist of a number of activities that include: source separation of organic (food wastes), separation of materials for burning, separation of recyclables, hazardous recyclables and hazardous material. The materials that are not sent to the landfill are consolidated and stored until they can be returned for treatment and or disposal via the winter road. Further discussion of the type and handling practices for specific hazardous or hydrocarbon products and materials on site are addressed below.

5.1 TYPES AND QUANTITIES OF WASTE

Table 5.1 provides a summary of the anticipated types of waste to be generated at the Jericho Diamond Mine.

TABLE 5.1: TENTATIVE ANNUAL LANDFILL WASTE TYPES

Waste Type	Examples
Scrap metal	Structural steel, equipment guards, plate steel, steel pilings, tanks (decommissioned), bins, cladding, doors, rebar, filing cabinets, cable tray, metal furniture, wheels
Rubble	Broken concrete, masonry
Wood products	Timber dunnage, plywood and lumber from formwork and camp modules or burned in open burn pit
Rubber products	conveyor belting, floor mats
Construction	Construction and demolition debris

TABLE 5.1: TENTATIVE ANNUAL LANDFILL WASTE TYPES	
Waste Type	**Examples**
Glass	Cleaned bottles, jars, plate glass and mirrors
Piping	Steel and plastic piping (fuel and glycol piping clean), including insulation, heat trace cable and support brackets
Fabrics and liners	HDPE liner, woven geotextile, insulation (liners cut into strips for burial to prevent water containment)
Electrical	Cabling, cable support systems, electrical panels, switchgear, transformers (except oil-filled units)
Equipment (non-recyclable)	Non-hydrocarbon-contaminated and cleaned equipment: electric motors, boilers, fans, heaters, bearings, gearboxes, pumps, screens, truck parts, conveyor idlers and pulleys, truck shop equipment, appliances
Incinerator ash	Ash from the incinerator

5.2 RECYCLING OPPORTUNITIES

Recycling opportunities for non-hazardous wastes are limited at Jericho because of the remoteness of the site. However, the mine will take advantage of any practical recycling opportunities available. This will be largely determined by what is practical to backhaul over the winter road.

Currently there is limited opportunity for use of previously used materials on site; however, the following table provides some insight to the re-use that is currently being undertaken on site to minimize waste.

Waste Type	Re-use
Used Oil	Collected, filtered and used in waste oil burner
Used Tires	Used as runaway abutments. Potential to use as bunks for laydown of stock materials
Hydraulic, Differential and Transmission Oils	Filtered and cleaned for re-use
Metal	Pieces suitable for other projects is re-stocked
Wood	Pieces suitable for other projects is re-stocked

5.2.1 Recyclables Stored On Site

The mine will establish a 'bone yard' adjacent to one of the laydown areas where equipment will be stored pending possible re-use at the mine site. Large tires (e.g., those for ore trucks) when no longer useable on trucks will be used as roadside barriers which is typical of mine use for these items.

6.0 LANDFILL MANAGEMENT

6.1 GENERAL

Operation of the landfill will be under the direction of the mine operating superintendent. Ultimate responsibility will rest with the senior Tahera employee on site (mine manager). A waste control program will be implemented to avoid the disposal of inappropriate materials.

An area method of dumping will be used such that materials will be dumped in the landfill area, crushed with a dozer, track packed, and then buried regularly with waste rock as the dump elevations increase.

All kitchen wastes will be incinerated prior to landfilling to prevent attraction of wildlife, particularly foxes, wolverines and grizzly bears. Operation of the incinerator will be the responsibility of the site services contractor who will report incinerator operation and maintenance issues to the environmental coordinator or designate. The incinerators are sized to accept food wastes from the 100-person camp. Currently there are two incinerators available on site.

Incinerator ash will be subject to wind erosion and therefore when removed from the incinerator and taken to the landfill will be covered immediately with waste rock kept at the landfill.

Only clean equipment, that cannot be recycled or reused, will be landfilled. Burial on site of equipment that is drained of hydrocarbons is standard practice at mining operations.

Equipment containing petroleum hydrocarbons will be drained prior to landfilling. The waste petroleum products will be disposed of in waste oil cubes for backhaul on the winter road to a licensed hazardous materials disposal contractor or burned in a waste oil burner. If required, petroleum reservoirs in the equipment will be cleaned with solvent or steam prior to landfilling.

6.2 CLEAN WOOD AND PAPER

Clean wood and paper will be burned at the landfill area in a designated area where the fire can be controlled. Burning will only be done by personnel authorized by the senior site management or the environmental coordinator. No petroleum-stained wood or paper will be burned at the landfill. Burning will only be conducted at times when winds are low or calm.

Inspection of landfill operation will be the responsibility of the mine environmental coordinator. The environmental coordinator will monitor landfill operation and report issues to the site services contractor and mine manager. Inspection by the environmental coordinator will include:

- Housekeeping
- Evidence of unauthorized use of the landfill
- Evidence of ponding of water on berms, mounds or unused areas
- Any other items that may indicate problems with safe operation of the landfill

Problems will be reported to the mine manager for action. Issues will be addressed on a priority basis.

6.3 CLOSURE

The landfill will be capped and closed progressively as final elevations are achieved. Final elevations will be field fit so that stability of the dump is maintained and the crown mounded to facilitate slope drainage.

Final closure of the landfill will be undertaken once the site can no longer be used dictated by site conditions (not anticipated) or when the mine closes as part of mine closure activities. A minimum of 4.6 m of waste rock material will be used to finalize cover and ensure the development of permafrost within the landfill cell areas. Pursuant to regulations in force at the time of closure of the landfill, notification will be provided to the Nunavut Water Board, Department of Sustainable Development and DIAND and KIA in advance of closure. Current requirements are for six months pre-notification for municipal solid waste landfills.

7.0 HAZARDOUS MATERIALS MANAGEMENT

7.1 GENERAL

Hazardous waste materials are not landfilled. All hazardous waste materials generated on-site are stored in lined containment areas for backhaul on the winter road. Current quantities held on-site are noted in the table below.

TABLE 7.1 LIST OF PRODUCTS AND ON-HAND QUANTITIES

Substance	Estimates of On-Hand Quantities	Risk of Spill	Comments
Diesel	13 million litres	low	In fuel farm with containment berm
Ammonium Nitrate	3,000 tonnes	moderate	Powder, 1 t bags, 100% contained

TABLE 7.1 LIST OF PRODUCTS AND ON-HAND QUANTITIES

Substance	Estimates of On-Hand Quantities	Risk of Spill	Comments
Sodium Nitrite	9080 kg	low	25 kg bags, palletized in C-can
Package Explosives	30,000 kg	low	Stick powder in boxes in a magazine
Blasting caps	30,000 units	low	In boxes in a magazine
Ethylene Glycol	9,200 kg	moderate	230 kg drums, 100% contained
Acetic Acid	8,160 kg	moderate	204 kg drums, 100% contained
Nitric Acid	1,900 kg	moderate	77 kg kegs, 100% contained
N7 Emulsifier	14,280 kg	moderate	204 kg drums, 100% contained
N23 Emulsifier	12,670 kg	moderate	181 kg drums, 100% contained
Citric Acid	1,250 kg	low	25 kg bags
Sodium Thiocyanate	6,000 kg	low	22.7 kg bags, 100% contained
Soda Ash	114 kg	low	22.7 kg bags
Hydraulic Oil	9 - 1,200 L cubes	low	Stored in covered warehouse in silled area
Motor Oil	40 - 1,200 L cubes	low	In mine shop or lined containment area
Jet Fuel (Jet B)	180 - 205 L barrels	low	Stored at airstrip, no proximity to water
Jet Fuel (Jet A)	To be determined	low	Will be stored at airstrip in bermed tank
Gasoline	15 - 205 L barrels	low	In fuel farm with containment berm
Varsol™	3 - 205 L drums	low	In mine shop in silled area
Petroleum grease	8 - 1,200 L cubes	nil	In mine shop or cold storage containers
Gear Oil	30 - 205 L barrels	Moderate	In mine shop or cold storage
Transmission Oil	17 - 1,200 L cubes	low	In mine shop or lined containment area
Sulphuric acid (battery acid)	20 L	low	In mine shop in silled area
Ethylene glycol (vehicle antifreeze)	3 - 1,200 L cubes	low	In mine shop in silled area

TABLE 7.1 LIST OF PRODUCTS AND ON-HAND QUANTITIES			
Substance	Estimates of On-Hand Quantities	Risk of Spill	Comments
Ethylene glycol (heating system)	N/A	very low	In pipes in heating system
Ferrosilicon	200 tonnes, non-hazardous		
Hydrochloric acid	36 - 4 L jugs	low	In fume cupboard in plant
Nitric Acid	59 - 2.5 L jugs	low	In fume cupboard in plant
Potassium Nitrate	5 - 10 kg containers	low	In fume cupboard in plant
Sodium hydroxide	24 - 110 lb. drums	low	In pellet form, in lab in plant; in controlled drainage area
Sulfuric Acid	3 - 4 L jugs	low	In fume cupboard in plant
Sodium hydroxide	10 - 20 L containers	low	Solution, in fume cupboard in plant
Flocculent – Magnifloc 156, or equivalent	18 tonnes	low	In plant controlled drainage area
Coagulant	5 tonnes		In plant controlled drainage area
Floor Dry	50 kg	nil	In the accommodation complex and mine shop

Note: The hazardous materials inventory itemized in Table 7.1 supercedes the inventory included as Table 2.1 in the attached contingency plan (Appendix A).

With the exception of the explosive materials that are addressed under separate cover (noted above), the following subsections address the general handling of the following classifications of materials identified in Table 7.2.

TABLE 7.2 LIST OF MATERIALS COVERED BY THE PLAN	
Material	Plan Section
Fuel and lubricants	7.2
Ferrosilicon	7.3.1
Flocculants and Coagulants	7.3.2
Hydrochloric Acid	7.3.3

7.1.1 Procedures for Handling Empty Product Containers

Many chemical containers are not safe to dispose of directly and must be recycled, or require handling precautions identical to full containers. This information is supplemental to training given to chemical handlers through the *Workplace Hazardous Materials Information System*. Chemical users must be familiar with safe handling and storage procedures provided by manufacturers in Material Safety Data Sheets (MSDS). These procedures for the major products used at the Jericho Mine site are contained in this plan for reference. Figure 4 provides plan and cross-sections of the clean and used oil storage compounds.

7.1.2 Procedures for Handling Used Petroleum Products

Used oil is a hazardous waste. All used petroleum products will be collected in the oil cubes used for delivery of the new product and back hauled during the winter resupply to the petroleum products supplier. Empty petroleum containers will, unless otherwise directed, be stored on site in a designated area and returned to the supplier on back hauls during the winter resupply.

7.2 FUELS AND LUBRICANTS

7.2.1 Hazard Class and Potential Impact

Fuels and lubricants that will be at the Jericho Mine are classified as per Table 7.3, which also lists potential environmental impacts.

TABLE 7.3 FUELS AND LUBRICANTS HAZARD CLASSES AND POTENTIAL IMPACTS

Material	Class	Potential Impact
Diesel	3	Water and soil contamination
Motor Oil	Not regulated	Water and soil contamination
Jet Fuel	3	Water and soil contamination
Propane	2	Fire/explosion
Aviation Gasoline	3	Water and soil contamination
Unleaded Gasoline	3	Water and soil contamination
Hydraulic Fluid	Not regulated	Water and soil contamination
Varsol	3	Water and soil contamination
Automotive Grease	Not regulated	Negligible risk with proper handling
Ethylene Glycol	Not regulated	Water and soil contamination

7.2.2 Products Handling and Storage Procedures

7.2.2.1 Personal Protective Equipment

Personal protective equipment recommended by manufacturers in Material Safety Data Sheets (MSDS) is listed for each product in Table 7.4.

TABLE 7.4 PERSONAL PROTECTIVE EQUIPMENT FOR FUEL PRODUCTS

		Personal Protective Equipment	
Product	Eyes	Skin	Respiration
Diesel	For splash protection use chemical goggles	Neoprene or nitrile gloves; protective garments	None usually required
Motor Oil	For splash protection use chemical goggles	Neoprene or nitrile gloves; protective garments	None usually required
Jet Fuel	For splash protection use chemical goggles	Neoprene or nitrile gloves; protective garments	None usually required; ensure adequate ventilation
Aviation Gasoline	For splash protection use chemical goggles	Neoprene or nitrile gloves; protective garments	None usually required; ensure adequate ventilation
Unleaded Gasoline	For splash protection use chemical goggles	Neoprene or nitrile gloves; protective garments	None usually required; ensure adequate ventilation
Hydraulic Fluid	For splash protection use chemical goggles	None usually required	None usually required
Varsol	For splash protection use chemical goggles	Rubber gloves	None usually required; ensure adequate ventilation
Automotive Grease	For splash protection use chemical goggles	Neoprene or nitrile gloves; protective garments	None usually required; ensure adequate ventilation
Ethylene Glycol	For splash protection use chemical goggles	Neoprene or nitrile gloves; protective garments	None usually required; ensure adequate ventilation

7.2.3 Safe Handling

Table 7.5 lists safe handling procedures for the products listed in Table 7.2.

TABLE 7.5 SAFE HANDLING PROCEDURES FOR FUEL PRODUCTS

Product	Handling Procedures
Diesel	Do not get in eyes, on skin or on clothing. Avoid breathing vapours, mist, fume or dust. Do not swallow. May be aspirated into lungs. Wear protective equipment and/or garments if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse. Use with adequate ventilation. Keep away from heat, sparks, and flames. Store in a well-ventilated area. Store in a closed container. Bond and ground during transfer.

TABLE 7.5 SAFE HANDLING PROCEDURES FOR FUEL PRODUCTS	
Product	Handling Procedures
Motor Oil	Wear protective clothing and impervious gloves when working with used motor oils.
Jet Fuel	Avoid skin contact. Launder contaminated clothing before reuse. Store in a flammable liquids area. Store away from heat, ignition sources and open flames.
Aviation Gasoline	See Diesel
Unleaded Gasoline	See Diesel
Hydraulic Fluid	Keep container closed until ready for use.
Varsol	Avoid eye contact. Use with adequate ventilation. Wash thoroughly after handling. Empty container retains residue. Follow label instructions. Avoid repeated skin contact. Store in cool, ventilated area, away from ignition sources and incompatibles. Keep container tightly closed.
Automotive Grease	Minimize breathing vapor, mist or fumes. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before re-use. Remove contaminated shoes and thoroughly clean before re-use; discard if oil-soaked. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water. To prevent fire or explosion risk from static accumulation and discharge, effectively ground product transfer system in accordance with the National Fire Code. Keep containers closed when not in use. Do not store near heat, sparks, flame or strong oxidants.
Ethylene Glycol	Use adequate ventilation, wear protective gloves and chemical safety goggles if possibility of eye contact. Keep in tightly closed container, stored in a cool, dry, ventilated area. Separate from acids and oxidizing materials. Containers of this product may be hazardous when empty since they retain product residues (vapours; liquids).

7.2.4 Storage Locations

Storage locations for fuel products and volumes held were listed in Table 7.1.

7.2.5 Inspection

Table 7.6 lists the inspection schedule to be followed. All inspections will be logged with the date and time of inspection, facility inspected, and the name of the person making the inspection.

TABLE 7.6 INSPECTION SCHEDULE FOR PETROLEUM STORAGE SITES	
Fuel Tanks	Quarterly by the mine contractor Operating Supervisor; annually by Tahera's Environmental Manager
Diesel Generator Building	Monthly by Powerhouse operators as part of internal environmental audit
Other Fuelling Stations	Weekly by the mine contractor Operating Supervisor as part of internal environmental audit
Spill Kits	Quarterly by the mine contractor Operating Supervisor; annually by Tahera's Environmental Manager
Other Hazardous Materials Storage	Monthly by the mine contractor Operating Supervisor when materials are on site

Table 7.7 lists inspection procedures to be used for containment facilities.

TABLE 7.7 INSPECTION PROCEDURE FOR PETROLEUM STORAGE SITES	
Fuel Tanks	Repair leaks and report promptly. Inspections will be reported and filed with the mine contractor Operating Supervisor and Tahera's Environmental or Lands Manager.
Diesel Generator Building	Inspections will be reported and filed as above.
Other Fuelling Stations	Inspections will be reported and filed as above.

Any accidental damage to containment structures will be inspected immediately and appropriate repairs undertaken. The extent of damage will be reported in writing to the mine contractor Operating Supervisor and Tahera's Diamond Processing Plant Engineer, or alternate, as well as remedial repairs affected together with the date of repairs and any follow up inspection.

7.2.6 Fuel Truck Transfer Procedures

Fuel tanks in the main fuel farm will be filled by a contract supplier and fuelling is the contractor's responsibility. Fuel transfer will take place on a lined container pad; general procedures to be followed are presented below. For fuelling station tanks, if they are used, similar procedures will be followed:

1. Before fuel transfer, verify that:
    a. all fuel transfer hoses have been connected properly and couplings are tight.
    b. transfer hoses are not obviously damaged.
    c. fuel transfer personnel are familiar with procedures.
    d. for fuelling stations, personnel are located at both the fuel truck and fuel transfer tank(s) and have the ability to shut off fuel flow manually.

e. a means of communication has been established between the two people transferring fuel.

A high liquid level shutoff device can be substituted for the person at the delivery tank. In which case operation of the shutoff should be verified each time it is used.

2. Transfer fuel as per established procedures of the fuelling contractor.

3. Contractor (or mine employee in the case of fuelling station tanks) will report any accidents or spills immediately to the mine contractor Operating Supervisor and Mine Manager. The Supervisor will provide a written report to Tahera's Environmental Manager.

A contract supplier will fill fuel tanks in the main fuel farm; fuelling is the contractor's responsibility. Details on fuel transfer are discussed in the Jericho Diamond Project Spill Prevention and Emergency Response Plan (Contingency Plan, April 2005) included in Appendix A.

7.3 PROCESSING PLANT CONSUMABLES

7.3.1 Ferrosilicon

7.3.1.1 Hazard Class and Potential Impact

Ferrosilicon is not a hazardous substance. There is negligible potential for impact with proper handling.

7.3.1.2 On-Hand Quantities

During full production of the processing plant, 200 tonnes of ferrosilicon will be used annually. Ferrosilicon will be transported by truck to site during the annual winter supply.

7.3.1.3 Product Handling and Storage Procedures

7.3.1.3.1 Personal Protective Equipment

In well-ventilated open areas use a respirator equipped with combination organic vapour/acid gas/HEPA cartridges and dust/mist prefilter. Wear protective gloves and safety goggles; avoid contamination of working clothing.

7.3.1.3.2 Safe Handling

Avoid generation of airborne dusts. Keep dry when storing for long periods of time. Avoid adding wet product to molten metal.

7.3.1.4 Storage Locations

Ferrosilicon will be stored covered adjacent to the processing plant.

7.3.2 Flocculants and Coagulants

7.3.2.1 Hazard Class and Potential Impact

Magnafloc 156 flocculant (formerly Percol E-10, and list as such in previous version of this plan) will be used in the processing plant. If required, Magnafloc 368 (formerly Percol 368 coagulant) may also be used. Neither have hazardous ingredients, as classified by the *Transportation of Dangerous Goods Regulation*. Impacts if products are handled properly will be negligible. Products will be used in a controlled drainage area and any spill that escaped the plant would be contained and not reach a water body. Coagulants are potentially toxic to fish. There will be negligible risk of the coagulant reaching fish-bearing waters in toxic concentrations.

7.3.2.2 List of Products and On-Hand Quantities

Eighteen tonnes of Magnafloc 156 and 5 tonnes of coagulant will be required annually.

7.3.2.3 Product Handling and Storage Procedures

7.3.2.3.1 Personal Protective Equipment

For both products, use splash goggles where eye contact may occur. Use gloves to prevent prolonged skin contact. Use a dust make if handled in bulk to prevent inhalation of airborne particles.

7.3.2.3.2 Safe Handling

Dust generated in handling of Magnafloc 156 and 368 can be explosive if sufficient quantities are missed in air, in which case ignition sources should be avoided.

7.3.2.4 Storage Locations

Both products will be stored in a dry area on a concrete floor in the processing plant.

7.3.3 Hydrochloric Acid

7.3.3.1 Hazard Class and Potential Impact

Hydrochloric acid is a Class 8 (corrosive) substance. With proper handling, potential for environmental impact is negligible. The product will be stored in a controlled drainage area. The primary concern is for safety of chemical handlers.

7.3.3.2 On-Hand Quantities

Up to 50 L of hydrochloric acid may be stored on site.

7.3.3.3 Product Handling and Storage Procedures

7.3.3.3.1 Personal Protective Equipment

Use in an adequately ventilated area to keep levels below 5 ppm. If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn. Wear rubber or neoprene gloves, impervious boots, apron or coveralls, as needed in areas of unusual exposure to prevent skin contact. Use chemical safety goggles and/or a full face shield where splashing is possible.

7.3.3.3.2 Safe Handling

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty, since they retain product residues (vapours, liquid).

7.3.3.4 Storage Locations

Hydrochloric acid will be stored in a controlled area in the processing plant near where it will be used for rough diamond cleaning. Only persons with training in handling the product will have access to it.

7.3.4 Hazardous Wastes

7.3.4.1 Petroleum Contaminated Soils, Snow and Ice

Handling and disposal of petroleum contaminated soils, snow and ice are covered in the Spill Prevention and Emergency Response - Contingency Plan (Contingency Plan) for the Jericho Mine. All these materials will be collected and stored on site to be shipped off site for treatment at the discretion of the mine manager. Petroleum contaminated soils, snow and ice will be stored in the hazardous materials storage area. Soil will be backhauled to a licensed disposal facility on the winter road. To date, limited quantities of petroleum contaminated snow and ice have resulted from operations. These materials will be allowed to be melted on an annual basis inside the hazardous material storage area.

7.3.4.2 Waste Oil

Waste oil will be collected from generation sites and placed in waste oil cubes to be backhauled during the winter resupply, smaller quantities will be reused on site in the waste oil burner. An inventory will be kept of the approximate volume of waste oil accumulated between resupply periods. This will be the responsibility of the environmental co-ordinator or designate.

7.3.4.3 Small Volume Hazardous Wastes

Table 7.8 lists expected small volume hazardous wastes, their temporary storage location and ultimate disposal.

TABLE 7.8 SMALL VOLUME HAZARDOUS WASTE MANAGEMENT

Waste	Temporary Storage	Disposal
Used Paint	Hazardous materials storage area on pallets in a segregated area	Backhaul to a licensed disposal contractor
Used Oil Filters/Grease Cartridges	Hazardous materials storage area in steel drum(s) on pallets in a segregated area	Backhaul to supplier for disposal
Used Rags and Sorbents	Temporarily stored in steel drum in mechanical shops; depending on volume moved to hazardous materials storage area in a segregated, well-ventilated area	Backhaul to licensed disposal contractor, or incinerated in the on-site incinerator

7.4 INVENTORY MANAGEMENT

Bulk materials, including those products discussed in this plan, will be transported to the Jericho Mine site over the winter road each year. Storage will be in areas indicated above. The division managers will reconcile total amounts received against amounts ordered. The senior manager for each division will regulate use:

- Mining by the mine superintendent.
- Processing by the plant manager.
- Catering by the catering manager.

7.4.1 Fuels and Lubricants

Fuel use will be automatically metered as it is distributed from bulk tanks. The metered volumes will be summarized daily and reconciled monthly against manual dipping of the tanks.

Jet fuel and aviation gasoline will be dispensed from 205 L barrels as required. Use and on hand volumes will be reconciled monthly, or more frequently during high use periods.

Lubricant and other petroleum products will be inventoried monthly.

7.4.2 Processing Plant Consumables

Processing plant consumables will be reconciled on receipt. A daily consumables sheet will be filled by the senior dayshift plant operator and provided to the plant manager.

7.5 INSPECTION

7.5.1 Fuels and Lubricants

The mine manager is ultimately responsible for petroleum storage inspection at the Jericho Diamond Mine. The mine manager will co-ordinate with the area supervisors and the catering manager with respect to any fuels or lubricants used in their areas of responsibility. An inspection procedure for petroleum storage containers was outlined in the Jericho Project Spill Prevention and Emergency Response-Contingency Plan and previously in Table 7.6. Inspection schedules are listed in the spill prevention document found in Appendix B.

Table 7.9 lists the inspection schedule to be followed:

TABLE 7.9 INSPECTION SCHEDULE	
Fuel Tanks	Quarterly by the Site Services Supervisor; annually by Tahera's Environmental Manager
Diesel Generator Building	Monthly by the Powerhouse Operators as part of internal environmental audit
Other Fuelling Stations	Weekly by the Site Services Supervisor or designate, as part of internal environmental audit
Spill Kits	Quarterly by the Site Services Supervisor or designate; annually by Tahera's Environmental Manager
Other hazardous materials storage	Monthly by the Environmental Manager when materials are on site

All inspections will be logged with the date and time of inspection, facility inspected, and the name of the person making the inspection. A typical inspection form is included in Appendix B.

Any accidental damage to containment structures will be inspected immediately and appropriate repairs undertaken. The extent of damage will be reported in writing to the mine superintendent and mine manager, or designate, as well as remedial repairs affected together with the date of repairs and any follow up inspection.

7.5.2 Processing Plant Consumables

Processing plant operators are responsible for daily inspection (on each shift) and operation of consumables storage facilities in the plant. Any problems will be noted and reported to the plant manager. The plant manager will be responsible for weekly or monthly inspections of plant consumables and storage areas.

7.6 RECORDS

A procedure for tracking chemical purchase and use has been developed for the Jericho Mine site.

7.6.1 Fuels and Lubricants

Records of fuels and lubricants are required by the Canadian Council of Ministers of the Environment (CCME) and the Fire Marshal (under the *National Fire Code*). Records will be kept under the supervision of the mine manager, in consultation with the mine superintendent, for the following:

- Reconciled bulk inventory from winter resupply
- Weekly use summaries
- Weekly reconciliation for each storage tank
- Overfill alarm tests (where applicable)
- Pressure tests (if applicable)
- Inspections and maintenance checks of storage tank system, piping and delivery system
- Any alteration to the system
- Reports of leaks or losses
- Reports of spill responses
- Records of training

7.6.2 Processing Plant Consumables

The plant manager is responsible for reconciling winter resupply inventory. The plant operators will keep daily records of use. Weekly and monthly summaries will be provided to the plant manager for records keeping.

7.7 TRAINING

Some training requirements will apply to all staff and contractors at the Jericho Diamond Mine. Additional job-specific training may be required as outlined in this section. All staff will receive the following training:

- WHMIS
- Emergency and spill response
- Operations overview

Mine employees will receive additional training in mine safety as specified by the NWT *Mine Health and Safety Act and Regulations*. This will be the responsibility of the area supervisors.

Plant employees will receive additional training specific to their area of work and duties, including safe operating practices, safe handling and storage of chemicals, and so forth. This training will be the responsibility of Tahera Diamond Corporation.

Catering employees job-specific training, if required, will be the responsibility of the catering contractor.

Periodically, Jericho staff will carry out fire drills. Drills will be arranged so as not to disrupt work and will test emergency response procedures. Results of drills will be recorded and forwarded to the mine and plant managers and the Health and Safety Committee. Drill results may indicate additional, or refresher, training is required. Safety Committee recommendations will be enacted expeditiously.

Emergency first-responders, e.g., medical staff, mine rescue staff, etc. will periodically test their emergency response procedures. Reports on drills will be provided to the mine and plant managers for action as required.

7.7.1 Fuels and Lubricants Handlers

Fuel and lubricants handlers will be expected to be conversant with relevant MSDS. As well, these personnel will be given training in the following:

- Transportation of dangerous goods (TDGA).
- Tahera's fuel handling procedures (outlined in Section 7.2).
- Spill response and cleanup procedures for petroleum (see Jericho Project Spill Prevention, Countermeasures and Control Plan in the Environmental Impact Statement, Appendix D.2.4, for more details).
- Emergency response, especially fire fighting procedures.

7.7.2 Plant Employees

Basic training will be provided to identify procedures relating spill occurrence and contacting the appropriate response unit to handle the issue.

7.8 PLAN EVALUATION AND CONTINUAL IMPROVEMENT

Despite careful planning, it is highly probable that certain components of the Hazardous Materials Management Plan will need to be modified. It will therefore be necessary to audit or review the plan to pinpoint those components that need to be corrected, adjusted, or upgraded. Most important will be review of aspects of the plan affecting safety of employees at the facility and the general public. Not only will the operational aspects of the plan, but any paperwork that deals with the plan, be reviewed. A goal will be to continuously audit all aspects of the plan for effectiveness.

Formal evaluations of the Hazardous Materials Management Plan will be documented, deficiencies noted in the report and progress in addressing deficiencies tracked in writing. Responsibilities to address deficiencies and accountabilities will be assigned and deadlines for addressing required changes will be set. The Jericho Mine manager will assume overall responsibility for the process.

8.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

EBA Engineering Consultants Ltd.

REGISTERED PROFESSIONAL ENGINEER
W. T. HORNE
LICENSEE
N.W.T.

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/dlm

THE ASSOCIATION OF
PROFESSIONAL ENGINEERS,
GEOLOGISTS and GEOPHYSICISTS
OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
Jan 29/07 **P 018**
EBA ENGINEERING
CONSULTANTS LTD.

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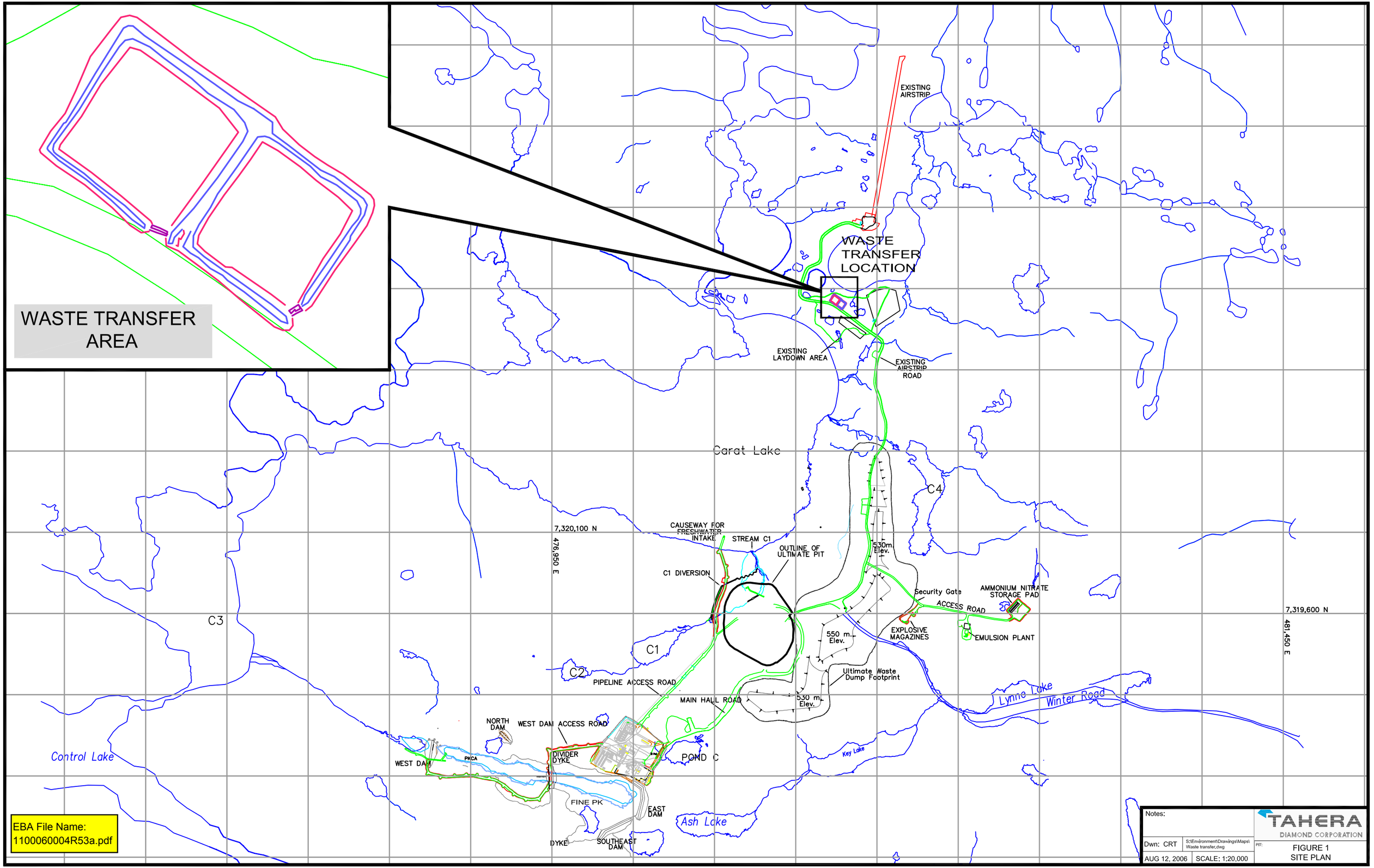
FIGURES



EBA File Name:
1100060004R53a.pdf

Notes:

TAHERA DIAMOND CORPORATION

Dwn: CRT	S:\Environment\Drawings\Maps\ Waste transfer.dwg	PIT:
AUG 12, 2006	SCALE: 1:20,000	FIGURE 1 SITE PLAN

476000E
476500E
477000E
477500E
478000E
478500E
479000E
479500E
7320000N
7319500N
7319000N
7318500N

CARAT LAKE

CAUSEWAY FOR FRESHWATER INTAKE

STREAM C1

C1 DIVERSION

POND A

OVERFLOW

CATCHMENT AREA A

DITCH C4

DITCH C4 CATCHMENT AREA

CROWN LAND
INUIT LAND

AMMONIUM NITRATE STORAGE PAD

EXPLOSIVE MAGAZINES

EMULSION PLANT

WASTE DUMP SITE 1

OPEN PIT

PIT CATCHMENT AREA

CATCHMENT AREA C1

Lake C1

Lake C2

OVERFLOW

OVERFLOW

POND B

POND C

CATCHMENT AREA B

TILL DUMP
(INSIDE WASTE DUMP)

WASTE DUMP SITE 2

PROPOSED WINTER ROAD

Lynne Lake

APPROXIMATE LANDFILL LOCATION

Key Lake

SETTLING DAM (OPTIONAL)

ADDITIONAL SETTLING POND (OPTIONAL)

NORTH DAM (FUTURE)

COARSE PK STOCKPILE 3

PLANT SITE CATCHMENT AREA

EAST SUMP

CELL C

WEST DAM

ORE STOCKPILE

COARSE PK STOCKPILE 4

CELL B

DIVIDER DYKE A

WEST DAM ACCESS ROAD (APPROXIMATE LOCATION)

DIVIDER DYKE B (FUTURE)

CELL A

PKCA CATCHMENT AREA

EAST DAM

COARSE PK STOCKPILE 2

SOUTHEAST DAM

Ash Lake

COARSE PK STOCKPILE 1

CROWN LAND
INUIT LAND

0 500
metres

PERMIT

PROFESSIONAL SEAL

CLIENT

TAHERA
Diamond Corporation

Jericho Project
Waste Management Plan

Waste Management Site

EBA Engineering Consultants Ltd.

PROJECT NO./FILE NO.	DWN	CKD	REV
1100060.004 1100060004Q02c.dwg	DBD	KA	A
OFFICE: EBA-EDM	DATE: December 20, 2006		

FIGURE 2

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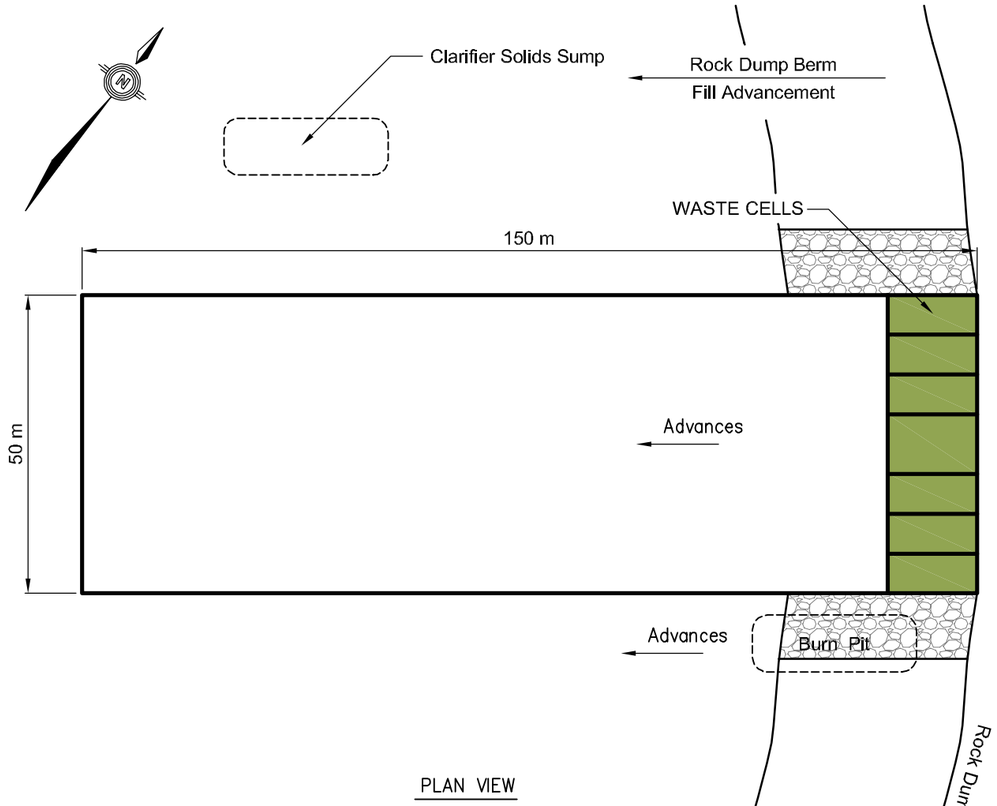
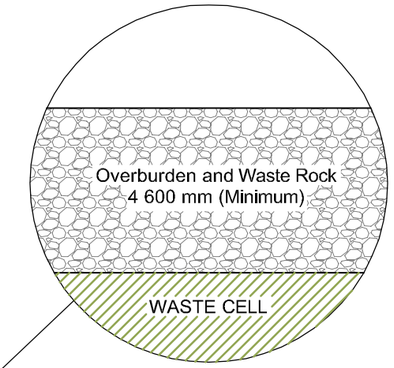
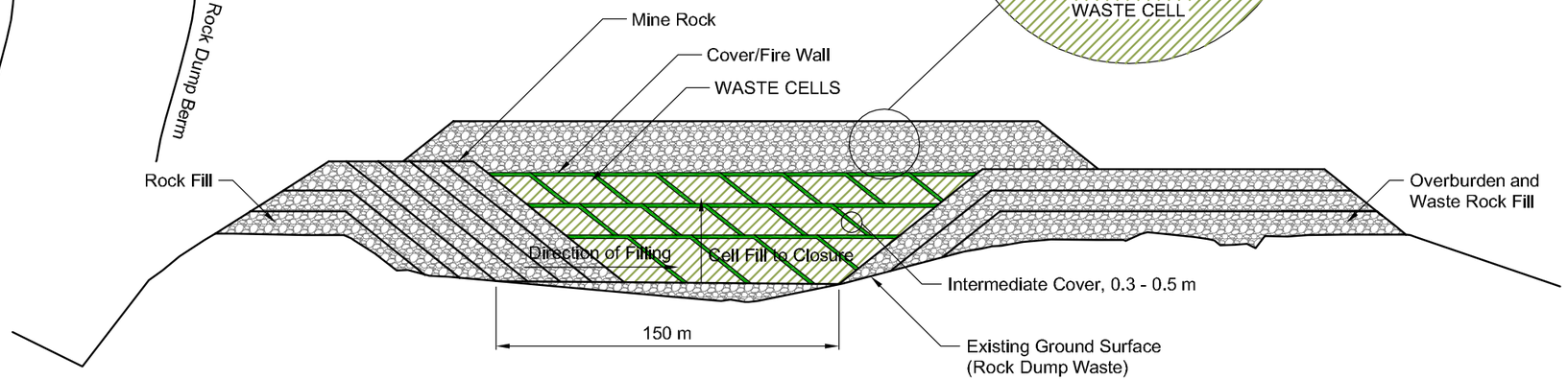


PLAN VIEW





NOTES:

1. Landfill base approximately 150 m X 50 m
2. Layer depth 3 m approximately.

TYPICAL PROFILE

Not To Scale

PERMIT

PROFESSIONAL SEAL

CLIENT

TAHERA
Diamond Corporation

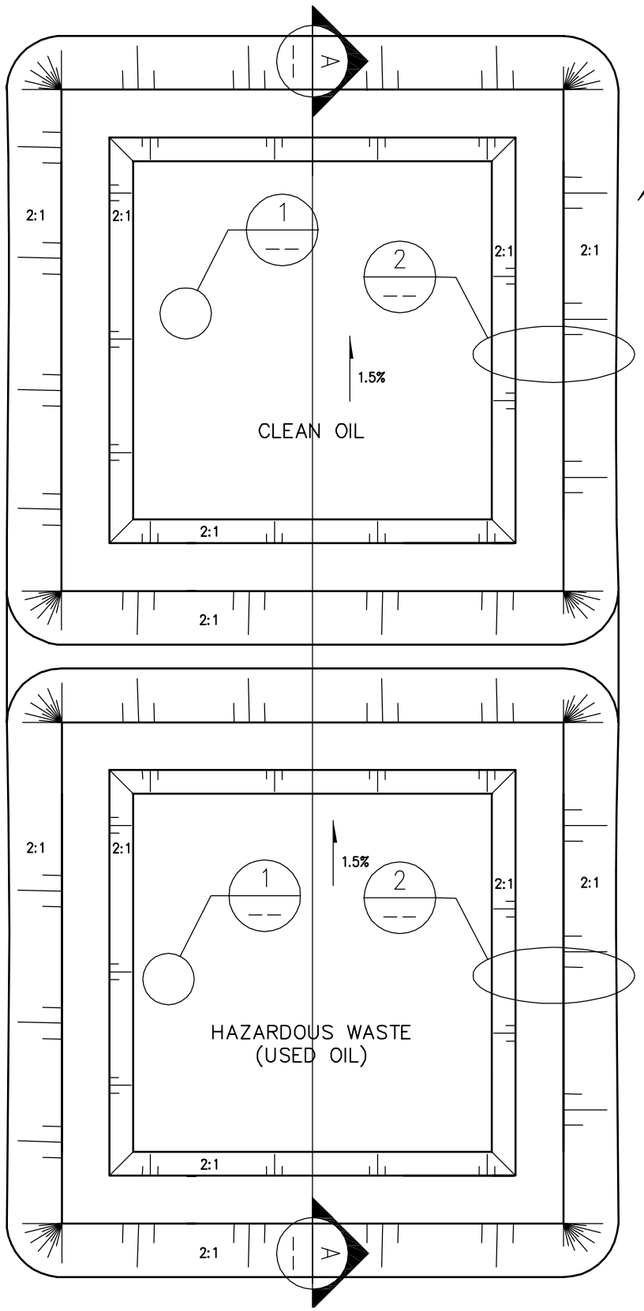
Jericho Project
Waste Management Plan

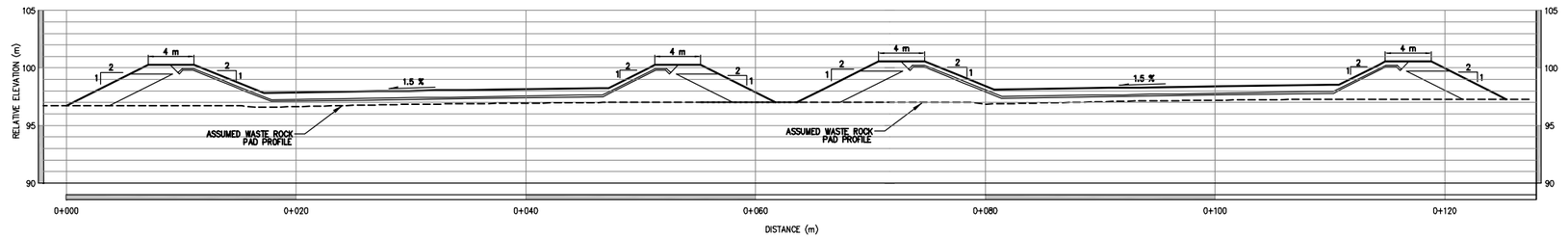
Schematic of
Landfill Development and Stability Plan
Plan View and Typical Profile

EBA Engineering Consultants Ltd.

PROJECT NO./FILE NO.	DWN	CKD	REV
1100060.004 1100060004R53a.dwg	BR	KEA	A
OFFICE: EBA-EDM	DATE: January 29, 2007		

FIGURE 3





SECTION A

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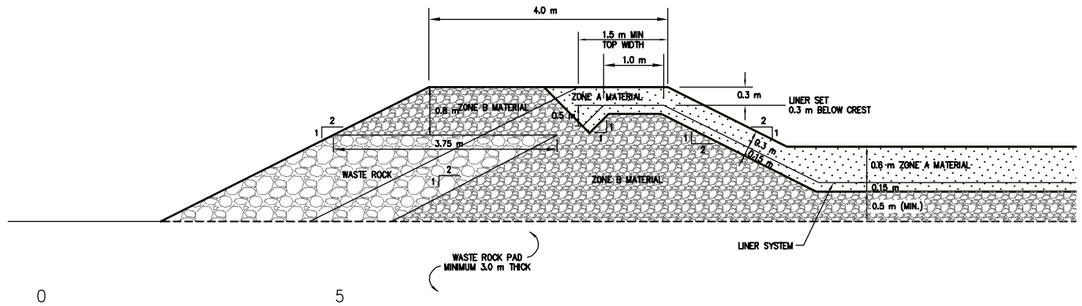

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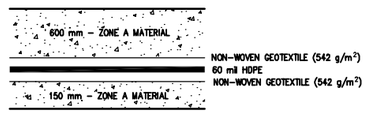
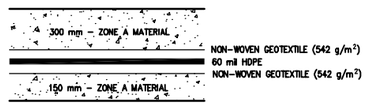
SECTION – TYPICAL



DETAIL – LINER SYSTEM (BASE) 1

N.T.S.



DETAIL – LINER SYSTEM (BERMS) 2

N.T.S.

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Scale: 1: 500 (metres)

PERMIT

PROFESSIONAL SEAL

CLIENT

TAHERA
Diamond Corporation

Jericho Project
Waste Management Plan

Hazardous Materials
New and Used Oil Storage

EBA Engineering Consultants Ltd.

PROJECT NO./FILE NO.	DWN	CKD	REV
1100060.004 1100060004R52b.dwg	BR	KEA	A
OFFICE: EBA-EDM	DATE: December 20, 2006		

FIGURE 4

PHOTOGRAPHS

Photo 1
Hazwaste Waste Oil Storage

Photo 2
Oil Storage Compound

Photo 3
Waste Oil Storage Compound

Photo 4
New Oil Storage Component

Photo 5
Overburden and Waste Rock Dump 2 Burning Pit

Photo 6
Area Fill at Rock Dump No. 2, Nonburnable Waste

Photo 7
Waste Oil and Waste Storage

Photo 8
Waste Oil and Storage

Photo 9
New Oil Storage Compound

Photo 10
New Oil Storage Compound

Photo 11
Contaminated Soil Compound

Photo 12
Waste Lubricants Storage

Photo 13
Landfill Area Fill Face

Photo 14
Non Burnable Landfill Face

Photo 15
Landfill Cover Material

Photo 16
Burn Pit Area - Rock Dump #2

Photo 17
Burn Pit Area - Rock Dump #2

Photo 18
Burn Pit Area - Rock Dump #2

APPENDIX

APPENDIX A JERICHO DIAMOND PROJECT CONTINGENCY PLAN, APRIL 2005

The following list of products itemizes the hazardous materials currently stored on-site. This list of materials supercedes the list contained in Table 2.1 of the following:

TABLE 2.1 LIST OF PRODUCTS AND ON-HAND QUANTITIES

Substance	Estimates of On-Hand Quantities	Risk of Spill	Comments
Diesel	13 million litres	low	In fuel farm with containment berm
Ammonium Nitrate	3,000 tonnes	moderate	Powder, 1 t bags, 100% contained
Sodium Nitrite	9080 kg	low	25 kg bags, palletized in C-can
Package Explosives	30,000 kg	low	Stick powder in boxes in a magazine
Blasting caps	30,000 units	low	In boxes in a magazine
Ethylene Glycol	9,200 kg	moderate	230 kg drums, 100% contained
Acetic Acid	8,160 kg	moderate	204 kg drums, 100% contained
Nitric Acid	1,900 kg	moderate	77 kg kegs, 100% contained
N7 Emulsifier	14,280 kg	moderate	204 kg drums, 100% contained
N23 Emulsifier	12,670 kg	moderate	181 kg drums, 100% contained
Citric Acid	1,250 kg	low	25 kg bags
Sodium Thiocyanate	6,000 kg	low	22.7 kg bags, 100% contained
Soda Ash	114 kg	low	22.7 kg bags
Hydraulic Oil	9 - 1,200 L cubes	low	Stored in covered warehouse in silled area
Motor Oil	40 - 1,200 L cubes	low	In mine shop or lined containment area
Jet Fuel (Jet B)	180 - 205 L barrels	low	Stored at airstrip, no proximity to water
Jet Fuel (Jet A)	To be determined	low	Will be stored at airstrip in bermed tank
Gasoline	15 - 205 L barrels	low	In fuel farm with containment berm
Varsol™	3 - 205 L drums	low	In mine shop in silled area
Petroleum grease	8 - 1,200 L cubes	nil	In mine shop or cold storage containers
Gear Oil	30 - 205 L barrels	Moderate	In mine shop or cold storage

TABLE 2.1 LIST OF PRODUCTS AND ON-HAND QUANTITIES

Substance	Estimates of On-Hand Quantities	Risk of Spill	Comments
Transmission Oil	17 - 1,200 L cubes	low	In mine shop or lined containment area
Sulphuric acid (battery acid)	20 L	low	In mine shop in silled area
Ethylene glycol (vehicle antifreeze)	3 - 1,200 L cubes	low	In mine shop in silled area
Ethylene glycol (heating system)	N/A	very low	In pipes in heating system
Ferrosilicon	200 tonnes, non-hazardous		
Hydrochloric acid	36 - 4 L jugs	low	In fume cupboard in plant
Nitric Acid	59 - 2.5 L jugs	low	In fume cupboard in plant
Potassium Nitrate	5 - 10 kg containers	low	In fume cupboard in plant
Sodium hydroxide	24 - 110 lb. drums	low	In pellet form, in lab in plant; in controlled drainage area
Sulfuric Acid	3 - 4 L jugs	low	In fume cupboard in plant
Sodium hydroxide	10 - 20 L containers	low	Solution, in fume cupboard in plant
Flocculent – Magnifloc 156, or equivalent	18 tonnes	low	In plant controlled drainage area
Coagulant	5 tonnes		In plant controlled drainage area
Floor Dry	50 kg	nil	In the accommodation complex and mine shop

JERICHO DIAMOND PROJECT

CONTINGENCY PLAN

Tahera Diamond Corporation
Suite 803
121 Richmond Street West
Toronto, Ontario
M5H 2K1

Prepared by:
AMEC Earth & Environmental
2227 Douglas Road
Burnaby, BC

April 2005
VE51295

TAHERA DIAMOND CORPORATION

JERICHO DIAMOND MINE
CONTINGENCY PLAN

Manual Number: 1

ISSUED TO: _____

RECIPIENT'S NAME: _____

JOB TITLE: _____

LOCATION: _____

DATE OF ISSUE: _____

ISSUED BY: _____

As the registered recipient of this manual, you are responsible for keeping it up to date through the filing of all revisions and for returning the manual should you transfer job, location, or leave the company.

PREAMBLE

The Contingency Plan is effective from start-up of mine construction and applies to the Jericho Diamond Project Mine Site (operated by Tahera Diamond Corporation at Carat Lake, Nunavut), all ancillary facilities including the mine and plant site, and all activities associated with operation of the Mine. The mine extracts and processes diamonds at an approximate rate of 800 metric tonnes per day. The mine is located approximately 420 km north-northeast of Yellowknife at 65°59'50" N latitude, 111°28'30" W longitude.

The following formal distribution has been made of this Plan:

Nunavut Water Board
PO. Box 119
Gjoa Haven, NT, X0E 1J0

Indian and Northern Affairs Canada
Building 918, P.O. Box 100
Iqaluit, NU, X0A 0H0

Nunavut Government, Department of Environment
Environmental Protection Service
P.O. Box 1000, Station 1360
Iqaluit, NU, X0A 0H0

Additional copies and updates of this Plan may be obtained by writing to:

Tahera Diamond Corporation
Suite 803, 121 Richmond Street West
Toronto, Ontario, M5H 2K1
Attn: Vice-President, Nunavut and Regulatory Affairs

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1.0 INTRODUCTION

This plan is written to meet Tahera Diamond Corporation's (Tahera's) requirements for a contingency plan for the Jericho Diamond Project (Jericho) Mine Site at Carat Lake, 29 km north of the Lupin Mine. It covers the following key areas:

- Tahera policy statement;
- purpose and scope of the plan;
- pre-emergency planning;
- emergency recognition, prevention and response;
- training and practice;
- plan evaluation; and
- plan updates.

The plan will be updated if required annually. The plan is consistent with the requirements for spill response plans and reporting as set out in *Spill Contingency Planning and Reporting Regulations R-068-93,* April 1, 1999 and addresses the requirements as set out in NWT Water Board*, Guidelines for Contingency Planning,,* January 1987. As well, this plan addresses the requirements as set out in Nunavut Environmental Protection Service*, Environmental Guidelines for General Management of Hazardous Waste, January 2002,* and Nunavut Environmental Protection Service*, Nunavut Hazardous Waste Disposal Manual.*

1.1 TAHERA'S ENVIRONMENTAL POLICY STATEMENT

It is Tahera's policy to achieve a high standard of environmental care in conducting its business as a resource company contributing to society's material needs. Tahera's approach to environmental management seeks continuous improvement in performance by taking account of evolving knowledge and community expectations.

Specifically, it is Tahera's policy to:

- Comply with all applicable laws, regulations and standards; uphold the spirit of the law; and where laws do not adequately protect the environment, apply standards that minimize any adverse environmental impacts resulting from its operations;
- Communicate openly with government and the community on environmental issues, and contribute to the development of policies, legislation and regulations that may affect Tahera;
- Ensure that its employees and suppliers of goods and services are informed about this policy and are aware of their environmental responsibilities in relation to Tahera's operations;
- Ensure that it has management systems to identify, control and monitor environmental risks arising from its operations and to prevent environmental impacts prior to their occurrence;
- Conduct research and establish programs to conserve resources, minimize wastes, improve processes and protect the environment;
- Take appropriate corrective actions should unexpected environmental impacts occur. Appropriate actions will be taken to prevent reoccurrence of such unexpected impacts.

1. PURPOSE AND SCOPE OF THE PLANERROR! BOOKMARK NOT DEFINED.

The purpose of this plan is threefold:

- to provide a practical source of information required to assess spill risks, develop an effective countermeasures program, and respond in a safe and effective manner to spill incidents;
- to set out procedures and processes to be followed in the event of an emergency at the mine; and
- to provide procedures for handling hazardous materials.

The plan covers the mining, processing, and ancillary operations (airstrip, sewage treatment plant, explosives manufacture, catering). It encompasses the activities of all Tahera and contractor employees as well as visitors to the mine site.

The main goals of the plan are:

- to provide education and training for staff at the Jericho Mine in emergency preparedness;
- to enable staff to respond to an emergency in a co-ordinated manner minimizing injury and loss of property; and
- to allow the Jericho Mine to maintain operations at a level as close as possible to normal and restore normal operations quickly and efficiently.

The plan was specifically developed for the Jericho Mine Site operations and is not intended to be used, without careful assessment of applicability, by people trained in spill response at other facilities operated by Tahera or a third party.

1.3 PLAN USE AND DISTRIBUTION

The appropriate procedures in this plan are to be followed in the case of any product spills or emergency, whether reportable to external authorities or not. The responsible supervisor will decide what further action is appropriate in each case.

All persons issued this plan must become familiar with its contents relevant to their responsibilities. It is important that you understand your area of responsibility and the appropriate actions to take in the case of a spill. If you do not understand a procedure, clarify the procedure with your supervisor.

This plan includes a discussion of general preventive measures that can be taken to ensure spills do not happen. Your participation in this activity is key to preventing spills. You should:

- follow the suggestions contained in this plan where they apply; and
- inform your supervisor of any additional measures or better ways of handling hazardous wastes and preventing spills.

1.4 UPDATE PROCEDURES AND SCHEDULE

This plan will be reviewed for accuracy and completeness annually. Changes to procedures, or in chemicals/raw materials used and the locations used will be incorporated as amendments to the plan. The internal contacts list will be updated every 90 days (once the mine is in operation), and the date of update noted on the contact list (Section 3.0).

1.5 REGULATORY FRAMEWORK

Regulatory requirements are outlined in this section. Regulations pertinent to emergency response are those governing mine health and safety and spill response. Regulations pertinent to hazardous substances and wastes are federal and territorial acts and regulations dealing with these substances.

1.5.1 Mine Safety

This plan conforms in general to requirements as set out in NWT legislation, specifically Part VIII, Division 3 of the *NWT Mine Health and Safety Regulations*, and includes the following:

- a list of the hazards;
- possible major consequences of each;
- required countermeasures;
- inventory of resources needed to carry out the planned actions; and
- make provision for establishment of the necessary emergency organization and procedures (to be completed once a mining contractor has been engaged).

Tahera Diamond Corporation will comply with provisions of the Act and Regulations in a proactive manner. Management and employees through the Occupational Health and Safety Committee will evaluate previous accidents and the potential for serious accidents and injuries in assigning inspection frequencies beyond those mandated in the Act.

1.5.2 Spill/Emergency Response

Under the *Spill Contingency Planning and Reporting Regulations* of the *Environmental Protection Act*, storage of "contaminants", by which is meant hazardous substances as defined by the *Transportation of Dangerous Goods Act*, requires preparation and filing of a spill contingency plan that meets the requirements of the *Regulation*, Section 4(2). Requirements of the *Regulation* are similar to those of the *Mine Health and Safety Act*.

1.5.3 Transportation and Handling of Hazardous Materials

Transportation of hazardous materials is governed by the federal *Transportation of Dangerous Goods Act (TDGA)* and *Regulation*. Transportation of all good to the mine will be the responsibility of carriers who must be appropriately licensed. Mine personnel handling hazardous materials will receive TDGA training. All mine employees will obtain *Workplace Hazardous Materials Information System (WHMIS)* training which includes

familiarization with Material Safety Data Sheets (MSDS) for materials they handle. Employees who handle hazardous materials (other than explosives which requires special training and certification) will be made familiar with the mine's Hazardous Materials Management Plan which sets out procedures for handling these materials and wastes that result from routine use.

1.6 METHODS FOR INTERNAL EVALUATION OF THE PLAN

The mine and plant occupational health and safety committee will be responsible for evaluation of the plan with direction from the plant manager and the mining contractor's mine supervisor. The continual improvement approach to evaluation will be followed. Suggestions will be solicited and welcomed from all employees. Emergency preparedness will be formally evaluated by the occupational health and safety committee who will provide verbal and written reports immediately following the evaluation.

All emergency incidents will be reviewed by site management and the occupational health and safety committee immediately following the incident. Emergency response will be reviewed for adequacy. Any deficiencies will be addressed as a priority and the emergency response plan modified as appropriate.

2.0 PRE-EMERGENCY PLANNING

2.1 HAZARD IDENTIFICATION

2.1.1 Toxicological and Physiochemical Properties of Major Chemicals Handled

2.1.1.1 Toxicology

Toxicological impacts to the environment affecting other organisms are governed on federal lands in Nunavut by Environment Canada and Fisheries and Oceans Canada through the *Canadian Environmental Protection Act*, the *Fisheries Act*, and the *CCME Canadian Soil Quality Guidelines*. Clean up of contaminated sites must meet the criteria as set out in the latter document, or be managed on a risk-based basis. The Jericho Mine will be on federal lands and Inuit Owned Lands (IOLs).

On lands within the jurisdiction of the Nunavut government (usually defined as Commissioner's Lands), Department of Environment, Environmental Protection Service is responsible for spills, contaminated sites and hazardous wastes.

Table 2.1 lists major chemicals that will be used at the Jericho Mine Site together with their toxicity. Further information is contained in the MSDS (Appendix 2.1). Toxicological properties of chemicals stored at Jericho are further elaborated in Appendix 2.2. Chemical handlers must familiarize themselves with the general toxicological properties of substances they handle. If you have questions or concerns, discuss them with your supervisor.

Table 2.1 Hazardous Substances Inventory – Jericho Mine Site

Substance	Estimates of On Hand Quantities	Risk of Spill	Comments
Diesel	10 million litres	low	In fuel farm with containment berm
Ammonium Nitrate	3000 tonnes	moderate	Powder, 1 t bags, 100% contained
Sodium Nitrite	2700 kg	low	25 kg bags, palletized in C-can
Package Explosives	75 tonnes	low	Stick powder in boxes in a magazine
Blasting caps	To be determined	low	In boxes in a magazine
Ethylene Glycol	23 tonnes	moderate	230 kg drums, 100% contained
Acetic Acid	7200 kg	moderate	204 kg drums, 100% contained
Nitric Acid	1900 kg	moderate	77 kg kegs, 100% contained
N7 Emulsifier	15 tonnes	moderate	204 kg drums, 100% contained
N23 Emulsifier	27 tonnes	moderate	181 kg drums, 100% contained
N4 Emulsifier	8000 kg	low	22.7 kg bags, 100% contained
Hydraulic Oil	6 - 205 L barrels	low	Stored in covered warehouse in silled area
Motor Oil	5 - 205 L barrels	low	In mine shop in a silled area or outside the mine shop
Jet Fuel	24 - 205 L barrels	low	Stored at airstrip, no proximity to water
Gasoline	up to 10,000 litres	low	In fuel farm with containment berm

Substance	Estimates of On Hand Quantities	Risk of Spill	Comments
Varsol	205 L	low	In mine shop in silled area
Petroleum grease	50 - 20 L pails	nil	In mine shop or cold storage containers
Transmission Oil	6 - 205 litre barrels	low	In mine shop in silled area
Sulphuric acid (battery acid)	small quantities	low	In mine shop in silled area
Ethylene glycol (vehicle antifreeze)	6 – 205 litre barrels	low	In mine shop in silled area
Ethylene glycol (heating system)	not applicable	very low	In pipes in heating system
Ferrosilicon	120 t, non-hazardous		
Hydrofluoric acid	small quantities	low	In fume cupboard in plant
Hydrochloric acid	small quantities	low	In fume cupboard in plant
Sodium hydroxide	small quantities	low	In lab in plant; in controlled drainage area
Acetone	small quantities	low	In fume cupboard in plant
Flocculent – Magnifloc 156, or equiv.	2 t, non-hazardous	low	In plant controlled drainage area
Slaked lime	to 10 t	low	Powder in bags on pallets and in container for use in controlled drainage area of plant
Floor Dry	small quantities	nil	In the accommodation complex and mine shop

2.1.1.2 Human Health

The human health effects of chemicals handled at the Jericho Mine site are discussed in appropriate sections of the Material Safety Data Sheets (MSDSs) and are part of mandatory Work Place Hazardous Materials Information System (WHMIS) training. The MSDS, some of the background behind information in the MSDS, and definitions of exposure limits will be attached in the SPCC plan required as part of the mine's Water Licence. Appropriate personal protective equipment and procedures in handling hazardous substances are essential to prevent accidental exposure that may have short- or long-term health effects.

2.1.1.3 Physicochemical Properties

Table 2.2 lists the key physicochemical properties of major chemicals to be used at Jericho. Material for Table 2.2 was taken from the MSDS.

Table 2.2 Physicochemical Properties of Major Hazardous Substances to be used at the Jericho Mine

Substance	Properties
Diesel	Stable; incompatible with oxygen and strong oxidizing agents; decomposes to carbon and sulfur oxides and various hydrocarbons when burned; human and animal toxin; flash point >54°C; fire extinguishing media dry chemical, foam or carbon dioxide
Ammonium Nitrate	Colourless to white solid; decomposes below boiling point at 210°C; melting point 170°C; becomes shock sensitive when mixed with organic materials; heating may cause violent combustion or explosion; decomposes on heating or on burning producing toxic fumes (nitrogen oxides); strong oxidant and reacts with combustible and reducing materials; fire extinguishing by flooding with water

Substance	Properties
Sodium Nitrite	Odourless or white crystals or powder; decomposes below 380°C; melting point 307°C; flash point 538°C (explodes); heating may cause violent combustion or explosion; strong oxidant and reacts with combustible and easily oxidizable materials; fire extinguishing by flooding with water in early stages
Acetic Acid	Colourless liquid; pungent, makes eyes water; flash point 40°C; completely miscible in water; decomposition will not occur if used and stored according to specifications; fire extinguishing by carbon dioxide, fire-extinguishing powder or foam; carbon monoxide can be released by fire.
Nitric Acid	Clear, colourless liquid; pungent odour; boiling point 121°C; stable, no spontaneous self-reaction; firefighters wear SCBA, extinguish with water.
Hydraulic Oil	Stable; liquid at room temperature; flash point > 32°C; fire extinguishing by water fog; inhalation of mist may cause irritation
Motor Oil	See hydraulic oil
Ethylene Glycol	Odourless, clear oily liquid; melting point -13°C; boiling point 197.6°C; flash point 111°C, above flash point vapour-air mixtures are explosive; harmful or fatal if swallowed; fire extinguishing with dry chemical, foam or carbon dioxide.
Jet Fuel	Stable; liquid at room temperature; flash point -23°C; LEL 1.3%; UEL 8%; decomposes to carbon monoxide, carbon dioxide, unidentified organic compounds; fire extinguishing by dry chemical, carbon dioxide, halogenated agents, foam, steam and water fog;
Gasoline	Stable; liquid at room temperature; incompatible with oxidizing agents, combustion of nitric and sulphuric acids; flash point -40°C, LEL 1.4%; UEL 7.4%; extinguish fire by dry chemical, carbon dioxide, halogenated agents, foam, water fog
Varsol™/Solvent	Stable; liquid at room temperature; incompatible with strong oxidizing agents, molten sulfur, halogens; flash point 40°C; LEL 2.3%; UEL 14.4%; decomposes to carbon monoxide, carbon dioxide upon burning; extinguish fire by carbon dioxide, sand, water spray, foam/dry chemical

2.1.2 Toxicological and Physiochemical Properties of Minor Chemicals Handled

2.1.2.1 Toxicology

Minor chemicals lists for the Jericho Mine site have not been completed. They will be added to the plan manual prior to mine operation.

2.1.2.2 Human Health

See Section 2.1.2.1.

2.1.2.3 Physiochemical Properties

See Section 2.1.2.1.

2.1.3 Fire

Fire could occur at the Jericho Mine site at a number of locations listed in Table 2.3.

Table 2.3 Possible Fire Locations at Jericho

Location	Precautions
Accommodation Complex	Fire mains with hose stations as primary system, sprinkler system, fire extinguishers, fire alarms
Plant	Fire mains with hose stations as primary system, sprinkler system, fire extinguishers, fire alarms
Power House	Dry or CO_2 extinguisher system, fire extinguishers
Truck Shop	Fire mains with hose stations as primary system, sprinkler system, fire extinguishers
Fuel Farm	Fire extinguishers, fire hose connected to water supply
Explosives Storage	Fire extinguishers
Vehicles	Fire extinguishers
Exploration Camp	Fire extinguishers, fire alarms
Sewage Treatment Plant	Fire extinguishers, fire alarms
Airstrip Terminal Building	Fire extinguishers

All precautions possible will be taken to prevent fires at the site, because of the difficulty in effectively fighting fires at this remote location, especially during winter. Fire drills will be held on a periodic basic to check personnel preparedness. Locations of fire alarms and evacuation routes (if not obvious, e.g. only one door) will be posted in all work areas; fire alarms, fire extinguishers, and fire hoses will be clearly marked in an approved manner.

In the case of the plant there is a risk of exposure to a radioactive prescribed substance in the density meters located in the DMS plant (permit PJ-015) and on the tailings line thickener underflow.

In the case of emergency that may have damaged the meters containing the radioactive sources, the following steps must be taken:

- Cease work immediately.
- If the gauge has been partially damaged or destroyed, keep people at least 5 m away until the source is replaced or shielded, or until radiation levels are known to be safe.
- If possible, shutters on the sources in the density meters must be closed and the meters removed from danger of fire exposure if time permits. These procedures must be carried out by personnel trained in the safe use of radioactive prescribed substances.
- Have leak test performed after any incident that may result in source damage.
- In case of an accident or fire, do not use the gauge until any danger from, or damage to, the source is assessed.
- In the case of damage to meters, notify the Atomic Energy Control Board within 24 hours and file a report in accordance with licence conditions. The report, if required, will be prepared by the plant manager or designate.

2.1.4 Uncontrolled Explosion

Controlled explosions (blasting) are part of the mining process and will be undertaken by qualified personnel only. Uncontrolled explosions from misuse of explosives, although extremely unlikely, are possible. As well, any flammable liquids or gases (diesel, gasoline, propane) at concentrations between the lower and upper explosives

limits could potentially explode. From these considerations, there are a limited number of areas where uncontrolled explosions have any risk of occurrence. These include:

- powder magazine;
- accommodation complex kitchen;
- fuel farm;
- power house;
- airstrip power generator;
- vehicle refuelling; and
- exploration camp.

Risk of occurrence is assessed to be very low based on the frequency of occurrence of such accidents at other industrial locations. The consequences would be very high with possible loss of life and probable disruption of operations for an indeterminate length of time.

2.1.5 Medical Emergency

Medical emergencies can occur at any time and would be due to accidents or ill health. Medical evacuations will be accomplished by means of fixed wing medivac to Yellowknife. Paramedics/nurses will be on staff full time at the mine and will be able to provide first aid and to fully treat more minor injuries. A satellite phone system is installed at Jericho and will provide reliable telephone communications in the event of a medical emergency requiring consultation with outside medical help and/or requesting a plane for medivac.

Section 11.0 provides a list of emergency contacts for outside resources available for assistance with medical and other emergencies.

2.1.6 Extreme Weather

Weather extremes include blizzards in winter from snow storms and flooding in summer from rain storms. Extreme cold is a normal part of Arctic winter and the Jericho operation is designed to operate in this environment; thus cold extremes are considered to have a very low risk of resulting in an emergency situation and will not be considered further.

Blizzards may become problematic under extreme conditions. However, the plant and the accommodation complex will be connected by an Arctic corridor and thus weather extremes will not prevent movement between the accommodations and the processing plant. The open pit mine may operate 24-hours per day 7-days per week and thus miners could be working at the open pit during blizzard conditions. Supervisory personnel will be experienced Arctic miners and will be able to judge when conditions deteriorate to the extent that work should cease and crews return to the accommodation complex. Radio contact will be available throughout the mine and thus senior

supervisory personnel can be advised at any time of deteriorating weather situations and the status of crews working outside.

Floods are likely to be less of a problem at Jericho as the climate is relatively dry. Water handling structures at Jericho will be designed to handle flood conditions. Should extreme rainfall, possibly combined with snow melt, result in flooding, the first steps to be taken will be to ensure the integrity of dams, dikes and ditches. Well in advance of overtopping of water management facilities, emergency pumps will be employed to route water to holding structures with excess storage capacity, e.g., the PKCA.

Overtopping of water management structures and uncontrolled release of water to the environment is considered a spill by government regulators and must be reported to INAC and the Nunavut Water Board.

The NWT/Nunavut Spill report number is:

(867) 920-8130

2.1.7 PKCA Dam Failure

This manual is confined to a discussion of emergency response to a dam break and risk assessment (Section 2.2).

A number of recent tailings dam failures have occurred from a combination of occurrences such as the failure to maintain sufficient freeboard, increase in monthly quantities, or inadequate monitoring, coupled with a peak storm event (SRK 2001). All but the last cited are within the control of mine management and thus preventable. The most common failure modes of earth embankments are (Baecher 1998):

- overtopping;
- embankment and foundation piping;
- embankment and foundation slides;
- differential settlement leading to cracking;
- earthquake damage including liquefaction; and
- reservoir wave action causing upstream slope erosion.

Historically, modern, well-constructed dams have failed at an annual rate of 10^{-4} to 10^{-5} per dam per year (Baecher 1998). Half these failures occur within the first five years and the rest spread evenly throughout dam life. The list above is in descending order of failure occurrence world wide, but is not a good predictor of the most probable cause of dam failure at Jericho. Earthquake damage is remote given the very low probability of earthquakes that could cause liquefaction at Jericho (see Seismic Risk Analysis, Attachment 1.1 in the Environmental Impact Assessment, Appendix B.2.1). Since solids will be spigotted against dams in the PKCA, wave action erosion is not possible.

Dams will be inspected daily by Tahera site personnel and annually by a qualified geotechnical engineer as part of Water Licence requirements. Downstream seepage of external dams will be monitored continuously during the summer by means of piezometers. Any significant increase in seepage will be cause for corrective action. A periodic review of the consequences of dam failure will be made to ascertain whether consequences have changed. Reviews will be coincident with any significant (greater than one metre) dam raises.

The emergency spillway of dams will be designed for a probable maximum flood and, through daily inspections, be kept free of ice that could significantly block flows in the event of a flood.

2.1.8 PK Fines (Tailings) Line Break

A PK fines line break would occur completely within a controlled drainage area of the mine. A line break would be noticed by the Plant Operator almost immediately due to a drop in line pressure. As soon as practical, the plant operation would be shut down, the plant manager or plant engineer informed, and the broken section of the line bypassed, or bridged. Once repairs were made to the line, it would be reconnected.

Clean up would be affected by pumping the spilled fine PK (if practical) to the PKCA. Any remaining solids would be scraped up with the front end loader and deposited in the PKCA. An internal spill report would be generated and the incident reported on the 24-hour spill line.

No safety issues are related to this event.

2.2 RISK ANALYSIS

2.2.1 Identification of Potential Failures

Table 2.1 summarizes products that will or have a high likelihood of being used at the Jericho Mine and diamond processing plant. The list is not inclusive pending finalization of procurement requirements, but includes all major materials required for operation. Quantities listed are estimates and will be amended by actual on-hand quantities at full operation of the mine. Products that have a spill potential are listed. The potential to reach the environment and toxicity are also listed.

Petroleum product spills at Jericho could occur in the following locations (Drawing 1CT004.06-G12 [end of plan]):

- fuel farm;
- diesel generator buildings;
- mechanical shop;
- explosives truck shop;
- helicopter pad (existing exploration camp);
- airstrip;
- at any location where portable containers carrying petroleum products are spilled accidentally, or fail.

Fuel tanks at the fuel farm will be behind an impermeable berm capable of holding a minimum of 110% of the capacity of the largest tank. If small fuel tanks (not including 205 L barrels) are required for refuelling they will also have either a containment berm, a silled concrete containment area, or be double-walled construction. All areas where petroleum products are stored or handled will have spill kits in clearly visible areas. Spill kit barrels are bright yellow.

Spills from portable containers will likely be small.

The second largest hazardous material handled at the mine will be ammonium nitrate used for explosives and stored on the explosives magazine road. Ammonium nitrate will be delivered during the winter haul in tote bags and stacked at the storage site in a covered building on a gravel pad in a bermed area or covered with tarps in the absence of a building. Spills (from torn bags) will be cleaned up immediately and reported to the mine manager. All partially full contaminated or ripped bags of prill, spilled prill will be recovered and used at the mine; used empty bags will be collected and burned on site or stored in a dedicated contained location for shipment out on the winter backhaul. A Sea Can adjacent to the ammonium nitrate storage area would be employed for this purpose.

Caps and stick powder will be stored in steel waterproof containers approved by the NWT Worker's Compensation Board at the explosives magazine. Employees of the mining contractor, who are trained and have approved blasting certificates, will handle explosives. Spills are not an issue for either caps or stick powder.

Ethylene glycol and emulsifiers will also be in relatively large on-hand volumes. These materials will be stored on the explosives spur road in an area with secondary containment (double-walled tanks, bermed area or other designated secondary spill containment) where any spills would be fully contained. Clean up would be done by explosives certified personnel at the mine.

2.2.2 Estimation of Potential Quantities of Materials Released

Potential quantities of products released are determined by the size of containers. Table 2.1 lists the size of on hand containers known at this time; this quantity sets the limit of spill volumes for a single container leak or failure. Where secondary containment is provided, this is listed in the table.

2.2.3 Health Risk Assessment

2.2.3.1 Hazard Identification

Health hazards of materials to be used at the Jericho mine will be contained in the MSDS provided at the mine camp, mine offices and shops in conformance with Workplace Hazardous Materials Information System (WHMIS) guidelines.

2.2.3.2 Dose-Response

Dose-response information is provided in the MSDS.

2.2.3.3 Exposure Assessment

There are three principal routes of exposure:

- ingestion (unlikely in the work environment with adequate precaution in areas where food is processed and/or eaten);
- inhalation; and
- skin exposure.

While direct ingestion is unlikely food should not be consumed while handling or near these products.

Exposure from inhalation will occur for spilled products that readily volatilize (form a gas or vapour) at ambient temperature and from products, such as fine dust, which readily become airborne.

Skin exposure is possible in handling other products without protective clothing.

The MSDS should be referred to for additional information.

2.2.4 Qualitative Risk Assessment

A qualitative risk analysis was carried out for the emergencies identified in Section 2.1 as outlined in Manitoba Industrial Accident Council (MIAC) (1996) (reproduced in full in Appendix 2.3). Table 2.4 lists the results of this analysis (see the MIAC reference for the basis of the categories chosen).

Table 2.4 Rish Analysis Worksheet

Risk	Frequency	Consequences			Result
		Pers	Env	Fac	(F x C)
Hazardous Substance Spill					
Fuel Farm	C	d	d	d	Cd
Explosives Storage	D	b	c	c	Db
Plant	D	c	d	d	Dc
Access Roads	C	d	c	d	Cc
Open Pit	C	c	d	d	Cc
Airstrip	D	d	c	d	Dc
Power House	C	c	d	d	Cc
Truck Shop	C	c	d	d	Cc
Accommodation Complex	D	c	c	c	Dc
Exploration Camp	D	c	c	d	Dc
Fire					
Accommodation Complex	C	a	d	b	Ca
Plant	D	a	d	a	Da

Risk	Frequency	Consequences			Result
		Pers	Env	Fac	(F x C)
Power House	C	b	d	b	Cb
Truck Shop	C	c	d	c	Cc
Fuel Farm	C	a	b	b	Ca
Explosives Storage	D	a	c	a	Da
Vehicles	D	a	c	c	Da
Exploration Camp	C	a	c	c	Ca
Sewage Treatment Plant	D	a	c	b	Da
Airstrip Terminal Building	D	a	c	c	Da
Uncontrolled Explosion					
Explosives Storage	D	a	d	a	Da
Accommodation Complex (propane facilities)	D	a	d	a	Da
Fuel Farm	D	a	d	b	Da
Vehicle Refuelling	D	a	d	d	Da
Exploration Camp (propane facilities)	D	a	d	d	Da
Medical Emergency	A	a	d	d	Aa
Extreme Weather	B	b	d	c	Bb
Dam Failure	D	c	a	b	Da

Frequency	
Highly Likely	A
Likely	B
Possible	C
Unlikely	D
Category (personnel, environment, facility)	
Catastrophic	a
Critical	b
Marginal	c
Negligible	d

2.3 SPILL REPORTING QUANTITIES

Quantities that must be reported under the Spill Reporting Regulation are listed in Table 2.5.

Table 2.5 Spill Reporting Quantities

Substance	TDGA Class	Reportable Amount
Explosives	1	Any amount
Compressed gas (flammable)	2.1	Any amount of gas from containers with a capacity greater than 100 L
Compressed gas (non-corrosive, non flammable)	2.2	Any amount of gas from containers with a capacity greater than 100 L
Compressed gas (toxic)	2.3	Any amount
Compressed gas (corrosive)	2.4	Any amount
Flammable liquid	3.1, 3.2, 3.3	100 L
Flammable solid	4.1	25 kg
Spontaneously combustible solids	4.2	25 kg
Water reactant solids	4.3	25 kg
Oxidizing substances	5.1	50 L or 50 kg
Organic Peroxides	5.2	1 L or 1 kg
Poisonous substances	6.1	5 L or 5 kg
Infectious substances	6.2	Any amount
Radioactive	7	Any amount
Corrosive substances	8	5 L or 5 kg
Miscellaneous products or substances excluding PCB mixtures	9.1 (part)	50 L or 50 kg
Environmentally hazardous	9.2	1 L or 1 kg
Dangerous wastes	9.3	5 L or 5 kg
PCB mixtures of 5 or more parts per million	9.1 (part)	0.5 L or 0.5 kg
Other contaminants	None	100 L or 100 kg

3.0 RESPONSE ORGANIZATION

3.1 EMERGENCY RESPONSE ORGANIZATION

The Jericho Mine response organization is shown in Figure 3.1. The figure will be completed prior to mine operation. The figure provides the chain of command in the upper five boxes and agencies that may require contacting in case of an emergency in the lower boxes.

Tahera Diamond Corporation's senior executive in change of the Jericho Diamond Mine and media contact is:

Mr. Dan Johnson
Executive Vice-President, Operations
Suite 803, 121 Richmond Street West
Toronto, Ontario M5H 2K1
Tel. 416-777-1998

Tahera's on-site senior manager is:

Mr. Allan Reeves
Acting Mine Manager
604-881-6712

3.2 EMERGENCY ASSESSMENT

An attempt to confirm the answers to the questions in Table 3.1 will be made by personnel attending the emergency.

FIGURE 3.1
JERICHO MINE SITE EMERGENCY RESPONSE ORGANIZATION

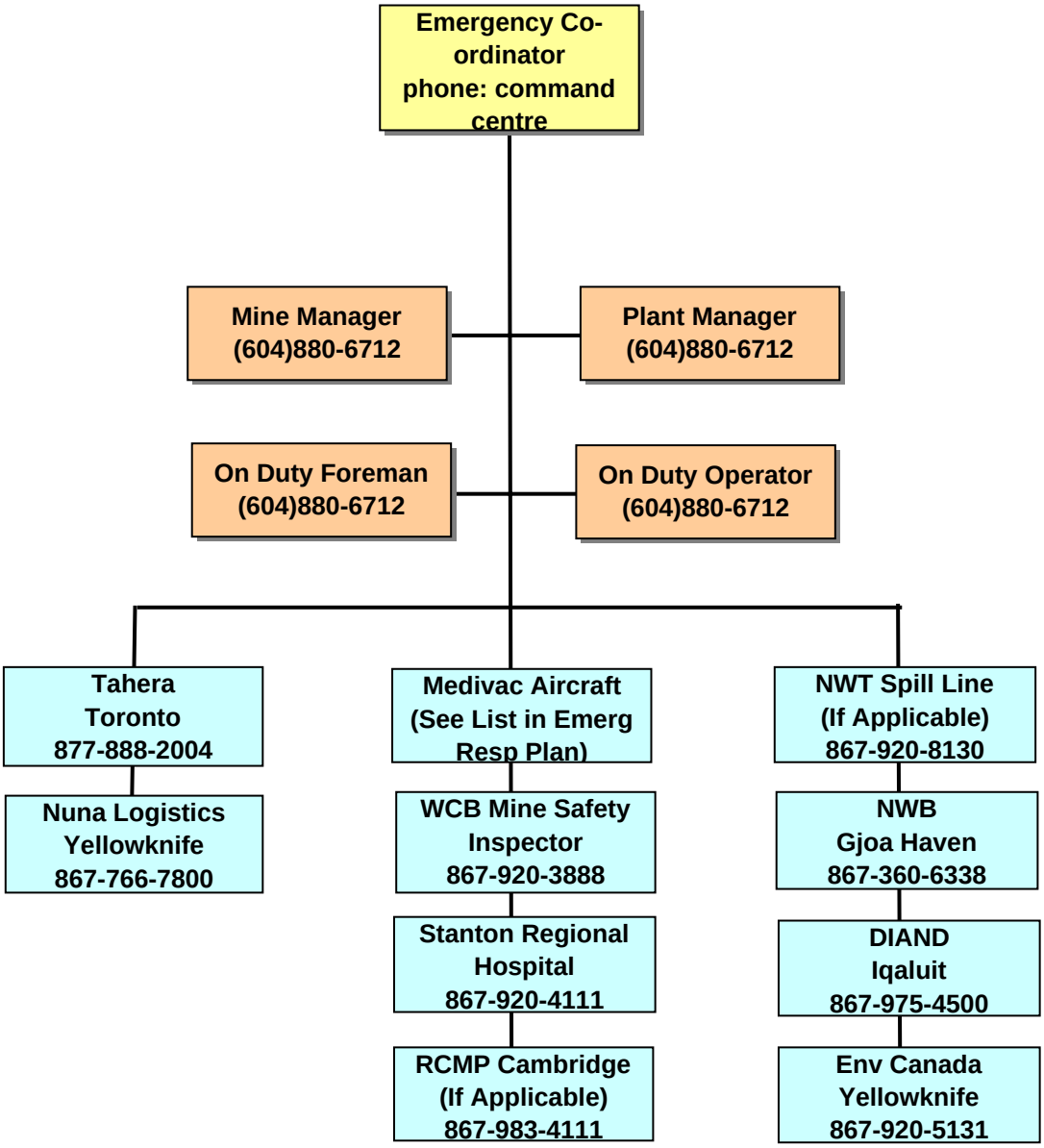

Table 3.1 Emergency Assessment

What type of incident is it Accident Spill Fire Explosion Weather Emergency Dam Break	**What type of container if any** Bulk container Bags Drums Other	**Why type of chemicals are involved** Name Are they toxic Are other chemicals involved Are they liquid, solid, solutions or gases Class of chemical (TDG or WHMIS)
Are chemicals leaking Fast Slow Don't know Water Hazards, e.g. drainage ditches, proximity to river or lake Quantity discharged	**Location of Incident** Inside a building (what building) Outside a building (location) Entered water or has potential to Location Accessibility	**Personnel Injuries** Physical Contamination with product
Who is in charge Operator Supervisor Other	**What is the physical situation** Physical description Weather (if spill is outside) Approximate temperature (if outside) Direction spill is moving (if liquid) Spill continuing or stopped	**Environmental Impact** Wildlife potentially involved Fish potentially involved

4.0 EMERGENCY RECOGNITION, PREVENTION AND RESPONSE

4.1 EMERGENCY RECOGNITION AND PREVENTION

Possible emergency situations that could occur at the Jericho Mine are discussed in this plan (refer to Section 2.1). Being aware of these potential situations is the first step in emergency recognition and prevention. All employees will be made aware of potential emergencies at the Jericho Mine in their initial orientation training. Periodic emergency preparedness update training will also be provided to all employees at the mine and plant.

Most emergencies at industrial sites are due to worker injury caused by accidents. An effective safety and accident prevention program therefore is a key component of emergency prevention and will be established at the Jericho Mine through the Occupational Health and Safety Plan. An effective safety program is also a necessary component of an emergency preparedness plan. Standard operating procedures (SOPs) will be established for all work conducted at the Jericho Mine and will incorporate safety as the number one consideration.

4.2 EMERGENCY RESPONSE

Emergency response contact telephone numbers are listed in Section 11.0 and Figure 3.1. Schedule 1 provides a list (as of the date shown on the list) of Jericho Mine personnel trained in emergency response. The numbers will be posted at telephones at the mine. When an emergency is recognized the first step is to alert all potentially affected personnel by use of the fire alarm system, telephone and/or two-way radios as appropriate. The second step is to notify the shift supervisor or contact the emergency and spill co-ordinator who will assume charge of the emergency. It is the responsibility of all personnel to follow the instructions of the emergency and spill co-ordinator.

All employees will record any information they receive as soon as they have an indication that an emergency may exist. The information is essentially the same as will be gathered for the emergency assessment.

Details listed in Table 4.1 will be provided. This information will always be taken before the details on the nature and extent of emergency, in case of interruption of call or the need to clarify the situation. Many emergencies are often initially overstated or understated, one of the most difficult tasks is to get a true appraisal of the situation. To this end all available resources must be used to get knowledgeable persons to the scene as quickly as possible.

Emergency-specific procedures for potential emergencies that could arise at the Jericho Mine are attached in Appendix 4.1. Summary procedure flow charts are included as well and these charts will be posted at appropriate work stations throughout the mine site.

Table 4.1 Emergency Reporting Requirements

Who is reporting? How can they be contacted	**Nature of Emergency**
Date, time	Location
Person calling, title	Type of emergency
Telephone number (if applicable)	Spill of hazardous substance
	Fire
	Uncontrolled explosion
Who has been notified	Accident/medical emergency
(refer to ER Organization Chart)	Weather emergency
	Dam break
	Other
Who is in charge of the spill	Injury or death
Name	If yes, number, names
Phone number	If hazardous substance spill
	Type of container (if applicable)
	Material involved (if known)
	Leaking (if applicable)
	How quickly (if applicable)
	Contamination of soil
	Contamination of surface water
	Contamination of air
	Type of incident
	Other materials involved (if applicable)
	Wildlife or fish involved

4.3 COMMUNICATIONS

For emergency situations it is imperative that people who are responsible for responding, or will direct emergency operations, are notified as rapidly as possible. In addition there may be a requirement to notify people or organizations off the mine site.

4.3.1 Internal

For most emergency communications the site phone and two-way radio systems will be used. Immediate evacuation alarms will be incident-specific and are discussed briefly below.

24-hour emergency phone and/or radio contacts are posted throughout the mine site. All employees must familiarize themselves with the locations of these notices in their work areas.

At the plant, accommodation complex, power house, waste water treatment plant, explosives storage, and truck shops fire alarms will be equipped with bells that will ring continuously when activated, until reset.

In the pit an immediate requirement to evacuate will be signalled by the blast horn (or other definitive signal as determined by the mining contractor). Personnel in other areas will be alerted by radio or phone, as appropriate.

4.3.2 External

External communications regarding Jericho Mine emergencies will be principally of two types:

- those requesting aid or assistance; and
- those providing the outside world with information.

Requests for aid may be made by any employee, as appropriate, but should normally be channelled through the most senior on-site manager. Unless otherwise authorized by the plant or mine superintendent, external communications providing information on Jericho Mine emergencies will be handled by the Mr. Dan Johnson, Executive Vice-President, Operations for Tahera or the Mine Manager or designate.

4.4 PERSONAL PROTECTION EQUIPMENT

4.4.1 Equipment Availability

A list of personal protection equipment available at the Jericho mine and location of equipment will be included in the Plan update prepared prior to mine operation. The equipment will include at least that listed in Table 4.2.

Table 4.2 Jericho Mine Site Personal Protective Equipment Inventory

Equipment	Mine Site	Plant	Accommodation
slickers/coveralls	√	√	
goggles	√	√	
gloves	√	√	
respirators	√	√	√
self-contained breathing apparatus	√	√	
first aid kit	√	√	√
fire extinguisher	√	√	√

4.5 SAFE HANDLING PROCEDURES

4.5.1 Hazardous Materials

Table 4.3 lists safe handling procedures for the products listed in Table 2.1.

Table 4.3 Safe Handling Procedures for Hazardous Products

Product	Handling Procedures
Diesel	Do not get in eyes, on skin or on clothing. Avoid breathing vapors, mist, fume or dust. Do not swallow. May be aspirated into lungs. Wear protective equipment and/or garments if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse. Use with adequate ventilation. Keep away from heat, sparks, and flames. Store in a well-ventilated area. Store in a closed container. Bond and ground during transfer.
Ammonium Nitrate	Wear protective clothing and impervious gloves. Do not eat, drink or smoke while handling. Keep away from combustible or reducing agents. Prevent dispersion of dust.
Sodium Nitrite	Wear protective clothing, impervious gloves and eye protection. Store in a cool, dry location away from combustible and oxidizable materials.
Ethylene Glycol	Use adequate ventilation, wear protective gloves and chemical safety goggles if possibility of eye contact. Keep in tightly closed container, stored in a cool, dry, ventilated area. Separate from acids and oxidizing materials. Containers of this product may be hazardous when empty since they retain product residues (vapours; liquids).
Acetic Acid	Keep away from sources of ignition. Do not smoke while handling. Wear protective equipment, chemical resistant gloves and eye protection while handling.
Nitric Acid	Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from direct sunlight or strong incandescent light. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Avoid contact with a combustible material (wood, paper, oil, clothing...). Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible.). Do not allow water to get inside container because of violent reaction. May catch fire in contact with combustible materials. May develop pressure; vent periodically.
Motor Oil/Hydraulic Oil/Transmission Fluid	Wear protective clothing and impervious gloves when working with used oils and transmission fluids.
Jet Fuel	Avoid skin contact. Launder contaminated clothing before reuse. Store in a flammable liquids area. Store away from heat, ignition sources and open flames.
Aviation Gasoline	See Diesel
Unleaded Gasoline	See Diesel
Hydraulic Fluid	Keep container closed until ready for use.

Product	Handling Procedures
Varsol	Avoid eye contact. Use with adequate ventilation. Wash thoroughly after handling. Empty container retains residue. Follow label instructions. Avoid repeated skin contact. Store in cool, ventilated area, away from ignition sources and incompatibles. Keep container tightly closed.
Automotive Grease	Minimize breathing vapor, mist or fumes. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before re-use. Remove contaminated shoes and thoroughly clean before re-use; discard if oil-soaked. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water. To prevent fire or explosion risk from static accumulation and discharge, effectively ground product transfer system in accordance with the National Fire Code. Keep containers closed when not in use. Do not store near heat, sparks, flame or strong oxidants.
Sulphuric Acid	See nitric acid
Hydrochloric Acid	Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.
Hydrofluoric Acid	Keep in tightly closed polyethylene containers. Store in a cool, dry place with adequate ventilation separated from other chemicals. Protect from physical damage. Storage facilities should be constructed for containment and neutralization of spills. Handling and storage of HF requires special materials and technology for containers, pipes, valves, etc., which is available from suppliers. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.
Sodium Hydroxide	Store in a dry place indoors. Keep containers closed & labelled correctly when not in use. Wash thoroughly after handling. When handling, wear safety goggles & face shield, rubber gloves, rubber boots, rubber apron, polyvinyl chloride clothing and plastic hard hat. Wear NIOSH/MSHA approved, dust type respirator, where dust or mists may be generated. Never touch eyes or face with hands or gloves that may be contaminated with Caustic Soda.
Slaked Lime	Wear clean, dry gloves, full length pants over boots, long sleeved shirt buttoned at the neck, head protection and approved eye protection. After handling lime, employees must shower. If exposed daily, use oil Vaseline, silicone base crème, etc. to protect exposed skin, particularly neck, face and wrists. Store in a well-ventilated place.

4.5.2 Fuel Handling

A contract supplier will fill fuel tanks in the main fuel farm; fuelling is the contractor's responsibility. Fuel transfer will take place inside the bermed area; general procedures to be followed are presented below. For fuelling station tanks, if they are used, similar procedures will be followed:

1. Before fuel transfer verify that:
    a. all fuel transfer hoses have been connected properly and couplings are tight;
    b. transfer hoses are not obviously damaged;
    c. fuel transfer personnel are familiar with procedures;
    d. for fuelling stations, personnel are located at both the fuel truck and fuel transfer tank(s) and have the ability to shut off fuel flow manually; and
    e. means of communication has been established between the two people transferring fuel.
2. A high liquid level shutoff device can be substituted for the person at the delivery tank, in which case operation of the shutoff should be verified each time it is used.
3. Transfer fuel as per established procedures of the fuelling contractor.
4. Contractor (or mine employee in the case of fuelling station tanks) will report any accidents or spills immediately to the mine or plant superintendent and in writing to Tahera's Vice-President Nunavut and Regulatory Affairs.

4.5.3 Used Petroleum Products

Used oil is a hazardous waste. All used petroleum products (excepting empty containers – see Appendix 4.2) will be collected in tanks marked “Waste Oil” and disposed of under the direction of the processing plant manager. Empty petroleum containers will, unless otherwise directed, be stored on site in a designated area and returned to the supplier on back hauls during the winter resupply.

4.5.4 Explosives

Explosives are dealt with in detail in the Ammonium Nitrate and Explosives Management Plan. A summary is provided here.

Note: Ammonium nitrate and explosives will only be handled by a qualified explosives contractor’s representative at the Jericho Mine. Table 4.4 provides safe handling procedures for explosives products used at Jericho Mine.

Table 4.4 Safe Handling Procedures for Explosives Products

Product	Handling Procedure
Ammonium Nitrate	Separate from all organic materials or other possible contaminants that are not compatible. Store in well-ventilated buildings, preferably of non-combustible construction and preferably equipped with automatic sprinkler protection.
Stick Powder (High Explosives)	Store under dry conditions in a well ventilated magazine. Keep away from heat, sparks and flames. Keep containers closed.
Blasting Caps	Store in cool, well ventilated area in an approved magazine. Do not store with other explosives.

4.5 DECONTAMINATION PROCEDURES

A decision as to whether the spill warrants decontamination procedures will be based on the following. If the answer is yes to one, or all of the following, decontamination procedures must be followed.

A DON'T KNOW ANSWER MUST BE TREATED AS A YES.

Is the product at IDLH (Immediately Dangerous to Life and Health) concentration?

Does the product constitute a Hazardous Waste? Potentially any substance covered under the *Transportation of Dangerous Goods Regulation* (e.g. diesel or gasoline), if spilled, could be considered a hazardous waste.

Would spread of even a small amount of the product lead to health or environmental risks?

4.6 PETROLEUM SPILL CLEANUP

4.6.1 General

The first priority in an effective control program is to make all possible efforts to limit the spread of the oil/petroleum mass. Proper response and speed of response are indispensable elements of effective control of an oil spill. Reference should be made to the Jericho Mine Emergency Response Organization Chart (Figure 3.1). Petroleum spills within contained areas can be cleaned up as personnel are available; other spills will be cleaned up immediately. Spills on water are discussed in detail in Section 4.5.2. Spills on land are discussed in Section 4.5.3.

4.6.2 Water-Based Spills

Water-based spills at Jericho Mine are a remote possibility, as bulk fuel will be transferred during winter when water surfaces are frozen and the fuel farm will be behind a berm. Furthermore, fuel will be delivered by contractor's truck to the fuel tanks. Any spills on lake ice would be the responsibility of the fuel contractor. All assistance possible would be provided by Jericho Mine personnel, if the spill occurred proximate to the facility.

4.6.2.1 Clean Up Equipment and Supplies

Some, or all of the following will be available, either through the fuel supply contractor, or at the Jericho Mine:

- booms for containment of oil on water;
- hand tools as appropriate for clean up; and
- sorbent materials of sufficient quantity to absorb the petroleum product.

4.6.2.2 Procedures

Clean up will involve either or both water contained within the containment booms and the shoreline. Clean up of water and materials contained within booms should not result in the spread of oil pollution outside the containment zone. The method of disposal of oil-contaminated absorbent materials and oil-water mixtures will be acceptable to and approved by NWB, Environment Canada and/or DIAND.

Shoreline cleanup is usually most efficiently completed with small teams equipped with hand equipment: shovels, buckets, portable burners and incinerators. The most important factor for shoreline cleanup decisions is the identification of the coastal land form, beach type and shoreline processes. The following procedures are applicable to Jericho Mine:

Shoreline	Manual Removal	Mechanical Removal	Burning	Chemical Dispersants[1]	Mixing	Sorbents[2]
Gravel	Recommended	Recommended	Applicable	Applicable	Applicable	Applicable
Sand	Recommended	Recommended	Applicable	Applicable	Applicable	Not Applicable

Manual Removal

Manual removal of oil is labour intensive, utilizing small teams of people, buckets and shovels. Manpower and disposal facilities are the major limiting factors. Manual recovery techniques tend to cause the least impact on the shoreline and are recommended for sand and gravel beaches.

Mechanical Removal

On sand beaches, graders or front end loaders can remove large amounts of stranded surface oil. The most common technique for removal of surface oils is to form windrows of the sand and oil mixture with a grader, and then remove the windrows for disposal or cleaning with an elevating scraper. Mechanical removal of oil from coarse sediments is generally more difficult because oil penetrates to a greater depth and heavy equipment is less stable. During cleaning, heavy equipment should be carefully controlled. Excessive removal of material may disrupt normal beach processes.

1 use of chemical dispersants along shorelines requires government permission.

2 sorbents should only be used as a final touch up during cleanup operations.

Burning

In situ burning, while effective for heavy oil products, is unlikely to be an effective disposal method for diesel. Burning is not necessarily a cleanup technique, but rather a stabilizing factor, i.e., the toxic light ends are burned, leaving a heavy residue. It causes air pollution and enables various components of the oil to penetrate into the substrate as burning progresses, but burning will leave the contaminated shoreline less sensitive to birds. Various portable incinerators have been constructed to burn oil-soaked debris.

Chemical Dispersants

With government approval, low toxicity chemical dispersants could be sprayed on gravel and sand beaches. Water would then be required to be sprayed on the beaches to move the oil-dispersant mixture to the water surface where it can be boomed and vacuumed up. The decision to use dispersants will likely have to be made on site by government regulators and their use, even if approved, should not be undertaken without consultation with regulatory authorities.

Mixing

Mixing the polluted surface sediments with rakes and harrows will increase weathering processes and speed up the natural degradation of oil. This method is most effective with low viscosity oils that contain a high proportion of volatile components, e.g. diesel.

Sorbents

Sorbents are materials that recover oil through either absorption or adsorption and are commonly used for final cleanup of small amounts of oil. They have been used with some success on gravel beaches and mud flats. There are: natural organic sorbents (e.g. peat moss, straw, hay, sawdust); mineral based sorbents (e.g. vermiculite, volcanic ash, perlite); and synthetic organic sorbents (e.g. foam, polystyrene, polyester, rubber).

4.6.2.3 Spills on Ice

Spills on ice would be the responsibility of the fuel delivery contractor. If assistance were provided by Jericho Mine personnel, they would operate under the direction of the contractor's representative at the spill site.

All petroleum contaminated ice would be collected and disposed of at an approved treatment facility on land. Once melted, the oil-contaminated water may be amenable to treatment in an oil-water separator to reduce concentrations to levels acceptable for discharge, or the petroleum product may be separated from the water and incinerated in an approved facility.

4.6.3 Land-Based Spills

4.6.3.1 Containment

Containment is achieved by using one or more of the following:

- diking;
- trenching;
- ditches and small streams;
- weir;
- dams; and
- culvert weir.

The containment method used may entirely depend on circumstances and materials at hand. The primary aim, after safety and rapid containment, is to prevent (where possible) loss of the spilled material(s) to the environment.

Diking

Dikes can be constructed using commercially available units or surrounding soil and other similar materials. Construction equipment can range from hand shovels to backhoes. When flammable products are to be diked, great care must be taken to avoid ignition from the electrical components and moving parts of the unit. This often prohibits the use of larger, mechanical units. Dikes should be constructed a safe distance away from the leading edge of a flammable product.

Two common errors made in constructing or laying dikes are:

- Attempting to contain too large an amount of product in a given area.
- Deploying the dike too close to the leading edge of the spill.

The former leads response personnel to build dikes that are too big and unable to withstand the pressures exerted on them by the liquids they contain. The latter causes breaching of the dike due to incomplete construction or deployment. Dikes should be twice the height of the liquid they are to contain and have a 2:1 slope (i.e. four times the width at the base as the height of liquid that is to be contained).

Initial efforts at construction of dikes will primarily involve the placement of soil or sand. Response personnel should aim to refine the dike construction, as circumstances permit. Typically this involves increasing the amount of material in a dike, adding an impermeable layer (i.e., geomembrane), and constructing secondary barriers.

No dike will ever totally prevent product movement, but significant restrictions and temporary containment can be achieved. Depending on wind conditions and product volatility, dikes may also help to restrict vapour movement.

Once the product is contained, immediate procedures for recovery must be implemented, especially with a low-viscosity product in an area of high soil permeability.

Trenching

The exact method of construction and maintenance of trenches will depend on issues such as soil porosity, product solubility, etc. For example, the most effective method of preventing diesel oil permeating a trench bottom is to allow a certain amount of water to enter the trench. If water is not available, then an alternative is to totally line the trench. Interceptor trenches and dikes may still be useful for nonsoluble products and those with a relative density greater than water, but effectiveness will be significantly reduced. Once trenches are constructed, monitoring is required to prevent overtopping.

Ditches

Spills may collect in pre-constructed ditches. In such circumstances, the primary aim is to control movement of product along the ditch, without hindering the movement of water. This is accomplished by the construction of dams or weir-type arrangements at strategic points.

Culvert Weir

If a ditch or stream passes through a culvert an effective weir can be constructed from plywood or similar materials.

4.6.3.2 Small Spill from Equipment

Small spills from equipment occur from careless refuelling or from leaks on the equipment from hoses or fluid reservoirs. If the spill occurs in the mechanical shop or other concrete surfaced areas clean up will consist of using sorbent to soak up the spill and disposal of the sorbent as a hazardous waste through a contractor as detailed in Section 11. Final cleanup will be with solvent such as varsol and sorbent. If the spill occurs on soil, the soil will be removed down to a clean surface and placed in the landfarm or shipped off site with sorbents. In the case of any spill it will be reported to the on-duty supervisor and an incident report will be filled out immediately, or at the latest by shift end, by the employee experiencing the spill and signed by his supervisor. The incident report will be filed with the mine manager. The supervisor will decide whether the spill must be reported on the spill line and if so, advise the mine manager or alternate when the mine manager is off shift. If a reportable spill has occurred the mine manager or alternate will phone the spill line and report the incident. A spill report form will be filled out and faxed within 24 hours to the spill report centre.

4.6.3.3 Recovery of Land-Based Spills

Recovery of land-based spills is usually two phased: re-containment of spilled product and cleaning or removal of contaminated substrate (soil, concrete, asphalt, etc.). Re-contained product may be used for its intended purpose or disposed of. If disposed of, and the product is a hazardous substance under the *Transportation of Dangerous Goods*

Regulation (which is indicated on the MSDS), disposal must be through a contract service licensed to handle hazardous wastes. As well, management must verify that the disposal site is licensed by the Territory to handle wastes of the type being removed from the spill site. Clean up is discussed in Section 11. Alternately, and preferably, the waste petroleum product can be incinerated at the Jericho Mine site.

4.6.3.3 Temporary Storage

Emergency Containers

- Drums can be used for small volumes of product.
- The spill coordinator will ensure that the drums to be used for storage are compatible with the recovered product.
- To use, the drum lid must be removed, or commercial drums with removable lids kept on site. Such drums, either plastic or metal, are standard parts of commercially available spill kits.

Lugger Boxes

Lugger boxes are available from waste management companies. Units can be in either closed or open-top configurations. Lugger boxes are bigger than drums (205 L barrels) which may make locating the boxes in proximity to the spill difficult. Lugger boxes are frequently used to transport drums that have been physically altered or damaged.

Portable Tanks

Portable tanks vary from 1895 to 37,900 L (500 to 10,000 gallons) capacity. Construction is either bladder or frame and liner. When using portable tanks the user will:

- Never exceed the tank's rated capacity.
- Ensure that the liner material is compatible with the product to be recovered.
- Remove stones, sticks and any other protuberances from the area where the tank will be sited to avoid the risk of tank puncture.
- Keep one person at the tank at all times to monitor the liquid level.

Drums and Cylinders

This section deals with drums and cylinders involved in spill incidents, rather than temporary containers of spilled product.

Drums

All drums that contain hazardous materials require safety marks to be applied. These marks are dictated by Canadian statutes, and are designed to indicate the hazardous nature of the drum contents. Both *Transportation of Dangerous Goods Regulation* and WHMIS/Right to Know labels may be affixed.

Spill incidents involving drums will follow the procedures below:

- Approach the spill site and determine clearly the contents of each drum: note which drums are leaking. If the shipping document is available, try to compare it to the drums found.
- Consult appropriate technical data (MSDS) to assess the potential for reactivity (this should be done by all employees handling chemicals, for the chemicals under their responsibility, **prior** to an incident).
- Re-enter the site and stabilize any leaking units by repositioning if possible. That is, if a drum is holed and the hole is at ground level, attempt to rotate it until the hole is adjacent to the vapour space.

The next stage involves carrying out temporary repairs to damaged drums and over packing. If there is insufficient over pack drums available to allow over packing of all units, all temporary repairs will be designed to permit safe transportation to a site where the drum contents can be handled.

Another alternative to be considered before patching will be transferring the contents of a damaged drum into an intact unit, but again, this will depend on the availability of clean drums. Where drum repair is attempted, one of several commercially available kits designed specifically for these techniques will be used. Additionally, various types of chemical patch kits are available. These either require the mixing of two chemicals to form a malleable material that sets hard, or a single malleable material that sets hard upon exposure to air.

Cylinders

Cylinders containing compressed gases are usually not safe to handle until the gas has escaped. Evacuate the area and notify your supervisor. Once the gas has escaped and vapour is no longer explosive or at toxic levels (refer to MSDS), the cylinder can be handled.

Decontamination procedures are discussed further in Section 11 of this plan.

4.7 AMMONIUM NITRATE AND EMULSIONS

4.7.1 Ammonium Nitrate

Ammonium is the only other large bulk material used at the Jericho Mine. Ammonium nitrate will be delivered in one tonne bags and stored in a designated area on the explosives spur road. Spills on winter transport will be cleaned up by the transport contractor according to the contractor's spill plan. Spills at the Jericho Mine will be cleaned up by mine personnel. Spills could occur from ripping or forcefully dropping tote bags or from the explosives truck. All spills will be reported to your supervisor and cleaned up immediately as directed by your supervisor. A spill report form will be completed. All spilled prill will be recorded on a spill report and all bags will be inspected by the mine manager, or designate, and condition accounted for receiving and shipping offsite. These data will be provided to the plant superintendent and will be kept as part of inventory reconciliation and in the environmental database.

Tote bags will be loaded onto a flatdeck and taken to the emulsion plant where they are opened and transferred by augur to the ANFO truck. The emulsion plant floor is concrete and spills will be controlled. A spill of ammonium nitrate on mine roads is highly unlikely, however, accidental spills of ammonium nitrate from an explosives truck will be cleaned up immediately and reported to the mine manager and logged as required by law. Clean up will be done by employees licensed to handle explosives. Cleaned up ammonium nitrate will be handled as above.

Any reportable spills of ammonium nitrate will be reported by Tahera's mine manager as required by the Nunavut spill reporting regulations (see Section 11).

4.7.2 Emulsion Materials

Emulsion materials will be stored in Sea Cans at the Emulsion Plant. Any spills in the area or in the Sea Cans will be cleaned up by employees licensed to handle explosives. Cleaned up materials will be segregated in an appropriate area (likely an empty Sea Can); incompatible materials will not be stored together, pursuant to MSDS and WCB regulations. A spill report will be filed with the explosives contractor, mining contractor operating supervisor and Tahera's plant manager. If spills exceed reportable quantities, notification will be made under the spill reporting regulations applicable in Nunavut.

4.8 OTHER PRODUCTS

Relatively small quantities of other products will be on hand at the Jericho Mine. Chemical handlers will be familiar with procedures listed on MSDS for spill clean up and these procedures will be used. A spill report form will be completed.

4.10 ACCOUNTING FOR EMPLOYEES

It is the Emergency and Spill Co-ordinator's responsibility to account for all personnel at the assembly points. If any are missing, the Emergency and Spill Co-ordinator must be notified immediately of the name and last known location. The Co-ordinator will then arrange with the emergency response team to locate the missing personnel

consistent with their own personal safety. Employees must be told not to try to re-enter the area until the all-clear signal is given by the Emergency and Spill Co-ordinator.

4.10 REMOVAL OF INJURED EMPLOYEES

If injured employees are found, they should be carefully moved out of the area of concern only by the emergency response team who must be wearing proper PPE. Depending on the injury it may be necessary to wait until an ambulance arrives.

4.11 ASSESSMENT OF EMERGENCY

The Emergency and Spill Co-ordinator will determine whether assistance is required to make an assessment of the emergency situation.

4.12 INITIAL CALLS TO OUTSIDE RESOURCES AND AGENCIES

If immediate assistance is needed, reference should be made to the Emergency Response Organization Chart (Figure 3-1). Communication is discussed in Section 4.3.

4.13 SHUT DOWN OF CERTAIN SERVICES AND UNTILITIES

During an emergency it may be necessary to shut down services. The plant and mine superintendents will make this decision with input from others, such as the catering department. Care must be taken to not shut down too much, as this may hamper resolution of the emergency.

4.14 POST INCIDENT REVIEW

The emergency co-ordinator or shift supervisor, management representatives, environmental/ health/safety representatives, and agencies involved will hold a meeting after the incident is over to discuss problems, assess responsiveness to the emergency, and suggest corrective measures to minimize future occurrence. Certain results of the meeting will be related to the affected employees to help relieve anxiety.

4.15 PLAN ACTIVATION AND RESPONSE MOBILIZATION

As part of initial preparedness for emergency response, a spill response team will be designated. The plant manager and mine superintendent will be responsible for activation of the emergency response plan. These persons will be familiar with the resources available to mobilize in the case of a specific incident, as well as the appropriate response.

The emergency plan activation and response mobilization will depend on the nature of the emergency and its location.

4.16 ROUTINE INSPECTIONS AND PREPAREDNESS

A key part of preparedness for emergencies is to ensure that all preparations and emergency equipment are in place and functioning as intended. There are two aspects to this:

- routine site inspections; and.
- training updates (discussed in Section 12.0).

A building inspection form for monthly (or more frequent) inspections is provided in Schedule 2 and will be amended if required at commencement of full mine operation. Inspection forms for all aspects of the Jericho Mine operation will be developed prior to mine construction and will form an integral part of the Emergency Response Plan.

4.17 PLAN ACTIVATION AND RESPONSE MOBILIZATION

As part of initial preparedness for spill and emergency response, an emergency response team will be designated. The mine manager and Diamond Process Plant Engineer will be responsible for activation of the spill response plan. These persons will be familiar with the resources available to mobilize in the case of a specific incident, as well as the appropriate response for the emergency or product spilled.

The plan activation and response mobilization will depend on the nature of the emergency or spill, substances involved, and the location. Plan activation is best handled by reduction of responses to scenarios and modification as required to suit the specific incident.

5.0 INSPECTION

5.1 FUELS AND LUBRICANTS

The mine superintendent is ultimately responsible for petroleum storage inspection at the Jericho Diamond Mine. The mine superintendent, or designate, will co-ordinate with the plant superintendent and the catering manager with respect to any fuels or lubricants used in their areas of responsibility. An inspection procedure for petroleum storage containers is provided in Tables 5.1 and 5.2.

Table 5.1 lists the inspection schedule to be followed:

Table 5.1 Inspection Schedule for Petroleum Storage Sites

Fuel Tanks	Quarterly by the plant manager; annually by Tahera's Environmental Manager
Diesel Generator Building	Monthly by the plant manager as part of internal environmental audit
Other Fuelling Stations	Weekly by the plant manager, or designate, as part of internal environmental audit
Spill Kits	Quarterly by the plant manager or designate; annually by Tahera's Environmental Manager
Other hazardous materials storage	Monthly by the plant manager when materials are on site

All inspections will be logged with the date and time of inspection, facility inspected, and the name of the person making the inspection.

Table 5.2 lists inspection procedures to be used for containment facilities:

Table 5.2 Inspection Procedures for Petroleum Storage Sites

Fuel Tanks	Repair leaks and report promptly. Inspections will be reported and filed with the mine or plant superintendent and Tahera's Vice-President, Nunavut and Regulatory Affairs.
Diesel Generator Building	Inspections will be reported and filed as above.
Other Fuelling Stations	Inspections will be reported and filed as above.

Any accidental damage to containment structures will be inspected immediately and appropriate repairs undertaken. The extent of damage will be reported in writing to the mine and plant superintendent, or designate, as well as remedial repairs affected together with the date of repairs and any follow up inspection.

5.2 EXPLOSIVES AND EMULSIFIERS

Explosives and emulsifiers will be under the exclusive control of the explosives subcontractor operating under the authority of the mine manager. The subcontractor will be responsible for inspection of all explosives facilities including:

- ammonium nitrate storage;

- emulsifiers storage;
- powder and caps magazines; and
- explosives truck wash.

The explosives subcontractor will be responsible for the safe operation of explosives equipment. Any concerns/issues will be discussed immediately with the mine manager and, if necessary, with the plant manager, who will be the senior Tahera representative at the Jericho Mine site.

5.3 PROCESSING PLANT CONSUMABLES

Processing plant operators are responsible for daily inspection (on each shift) and operation of consumables storage facilities in the plant. Any problems will be noted and reported to the plant manager. The plant manager will be responsible for weekly or monthly inspections of plant consumables and storage areas.

6.0 SAFE DISTANCES AND PLACES OF REFUGE

6.1 SAFE DISTANCES

Safe distances are entirely situation dependent. Safe distances for a mine emergency will be determined by the emergency and spill co-ordinator, or designate. If in doubt, ask your supervisor. The emergency and spill co-ordinator will set up exclusion zones if required for the emergency or spill. All personnel, without exception, not directly involved in the emergency response are to remain outside the exclusion zone, unless authorized to enter by the emergency and spill co-ordinator or his designate.

The emergency and spill co-ordinator will decide when it is safe to enter the exclusion zone, i.e., when it may be removed. All employees on site will be notified when the emergency exclusion zone is once again safe to enter.

As a rough guide in the absence of instruction the distances in Table 6.1 provide minimum safe distances.

Table 6.1 Minimum Distance Guide for Non-Emergency Response Personnel

Emergency	Nature	Airborne Contaminants	Minimum Distance
Hazardous substance spill	Liquid Spill, no danger of fire	None	Outside the spill area
	Liquid spill, no danger of fire	Visible or probable (see MSDS)	Outside of the confined space or upwind if outside
	Liquid spill, flammable	None	Outside the spill area if no immediate danger of combustion; combustion greater than 25 m; explosion greater than 500 m.
Fire	Flammable substance, no danger of explosion	Visible or probable	Outside of confined space or upwind at least 50 m if outside
	Flammable substance, danger of explosion		Evacuate a minimum area of 500 m
	Building		Evacuate the building and maintain a minimum distance of the building height plus 10 m.
Explosion	No danger of further explosion or collapse of structures		Beyond the impact area
	No danger of further explosion but structures could collapse		Beyond the periphery of where collapse could impact
	Danger of further explosion		Evacuate a minimum distance of 500 m
Medical Emergency			Not applicable

Emergency	Nature	Airborne Contaminants	Minimum Distance
Weather Emergency			Not applicable
Dam Break			Evacuate any area downslope of the affected dam

6.2 REFUGES

Refuges will be established after detailed engineering (including development of detailed site arrangement plans) and prior to operation. As a general rule, any building that is heated (optional in summer) can be used as a refuge if it is at least the minimum required distance from an emergency site. The exploration camp will provide emergency accommodation during mine construction should fire or other disaster make the accommodation complex temporarily unusable. The maintenance shop could be used as the main muster station in the event of an accommodations complex fire. Process plant personnel would muster at the office outside the plant.

7.0 SITE SECURITY AND CONTROL

During an emergency, proper security measures will be established to limit the movement of unauthorized personnel not involved in the response into the incident site. The emergency and spill co-ordinator will be primarily responsible for establishing a security zone. The co-ordinator is authorized to employ whatever resources are necessary to establish and police the zone. The nature of the zone and methods of exclusion will depend on the emergency and will be at the discretion of the co-ordinator, in consultation with the plant or mine superintendent, if the co-ordinator is other than one of these two people. All employees will be informed of the situation through their supervisors in order to facilitate understanding and compliance with the emergency security measures.

It is the sole discretion of the co-ordinator as to when security may be relaxed or removed. The primary consideration will be safety of personnel, limiting to the greatest extent possible any negative environmental impacts, and effective control and elimination of the emergency conditions as quickly as possible.

In the case of a police investigation, these decisions will be made by the investigating police officer in charge. All personnel will be expected to extend full co-operation to police in their investigation.

Exclusion zones will normally be established at the safe distance line from the emergency (see Section 6.0). Where appropriate, and always in the case of spills of hazardous substances, the emergency site will be divided into three areas:

- exclusion zone;
- contamination reduction zone; and
- support zone.

Only necessary rescue and response personnel will be allowed into the exclusion zone. A check point or check points will be established through which all personnel entering or exiting the emergency site must pass. Check point information will include:

- name (position at Jericho Mine or affiliation);
- time of entry/exit;
- zone(s) or areas to be entered;
- tasks to be performed; and
- protective equipment worn and air time remaining (if SCBA required).

Only personnel trained in SCBA use will be issued this equipment. Whenever SCBA equipment is required a buddy system must be established, whereby a suitably trained person (equivalent or better training than the responder) must remain in a safe location as a standby to assist in emergency rescue and decontamination, if necessary. Radio or visual contact will be maintained between buddies at all times.

8.0 EVACUATION ROUTES AND PROCEDURES

There are a several levels of evacuation that may be required at the Jericho Mine site, depending on the emergency:

- building evacuation;
- area evacuation;
- mine site evacuation; and
- Carat Lake site evacuation.

Building evacuation may be required in the case of fire or spill of a hazardous substance. Emergency exit doors will be clearly marked with an illuminated "Exit" sign on all buildings. Employees working in buildings will be made aware of building exits as part of job training; as well, periodic evacuation drills will be conducted to test emergency preparedness. Response will be recorded and the Occupational Health and Safety Committee will evaluate with respect to adequacy of drills and improvement required.

If outside areas of the mine become unsafe due to ground instability, flooding, or other natural cause, or if a hazardous substance spill occurs, evacuation from the affected area may be required. This determination will be made by the shift supervisor, but if any employee feels a work area is unsafe they may refuse to work in the area without penalty and report the unsafe condition to the Occupational Health and Safety Committee and/or the mine or plant superintendent. Evacuation from outside areas will normally be by existing access roads (see Site Map). In the event evacuation by that route is cut off, personnel may be required to walk to an alternate exit route or await rescue, e.g., by heavy equipment clearing a normal access route.

If the immediate area of the mine and/or plant become unsafe, it may be necessary to evacuate personnel to refuge sites, e.g., the exploration camp, until normal conditions can be restored. Should this condition occur, all personnel will be notified as quickly as possible and transported to the exploration camp. The Emergency and Spill Co-ordinator will establish headquarters at the refuge site and direct emergency operations from that location, if appropriate. The mine contractor and Mr. Dan Johnson at Tahera Diamond Corporation head offices must be notified.

Under exceptional circumstances it may be necessary to evacuate the entire Carat Lake area of all personnel. This evacuation would be co-ordinated by the plant and mine superintendent, or their designate, and would require aircraft support from Yellowknife or Cambridge Bay where air charter companies are headquartered. The mine contractor and Mr. Dan Johnson at Tahera Diamond Corporation head offices would be notified. Likely civil defence, police, and possibly medical organizations would need to be enlisted to provide support.

This last evacuation scenario is extremely unlikely as the mine site will be self supporting over extended periods (weeks to a month or more) if required.

9.0 INVENTORY MANAGEMENT

Bulk materials, including those products discussed in this plan, will be transported to the Jericho Mine site over the Lupin winter road each year. Storage will be in areas indicated above. The division managers will reconcile total amounts received against amounts ordered. The senior manager for each division will regulate use:

- mining by the mine superintendent;
- processing by the plant superintendent; and
- catering by the catering manager.

9.1 FUELS AND LUBRICANTS

Fuel and gasoline use will be automatically metered as it is distributed from bulk tanks. The metered volumes will be summarized weekly and reconciled against manual dipping of the tanks. The exception will be use for power generators where weekly fuel use will be recorded.

Jet fuel and aviation fuel will be dispensed from 205 L barrels as required under the supervision of aircraft personnel. Use and on hand volumes will be reconciled monthly.

Lubricant and other petroleum products will be inventoried monthly.

9.2 EXPLOSIVES

Ammonium nitrate, emulsifiers and high explosives daily use will be recorded by the explosives subcontractor and checked weekly by the mine superintendent. Inventory reconciliation will be undertaken monthly by the mine superintendent.

9.3 PROCESSING PLANT CONSUMABLES

Processing plant consumables will be reconciled on receipt. A daily consumables sheet will be filled by the senior dayshift plant operator and provided to the plant manager.

10.0 RECORDS

A procedure for tracking chemical purchase and use has been developed for the Jericho Mine site. A copy of the procedure is shown in Appendix 10.1. Specific records requirements are discussed further in this section.

10.1 FUELS AND LUBRICANTS

Records of fuels and lubricants are required by the Canadian Council of Ministers of the Environment (CCME) and the Fire Marshal (under the *National Fire Code*). Records will be kept under the supervision of the plant manager, in consultation with the mine superintendent, for the following:

- reconciled bulk inventory from winter resupply;
- weekly use summaries;
- weekly reconciliation for each storage tank;
- overfill alarm tests;
- pressure tests (if applicable);
- inspections and maintenance checks of storage tank system, piping and delivery system;
- any alteration to the system;
- reports of leaks or losses;
- reports of spill responses; and
- records of training.

10.2 EXPLOSIVES

The federal *Explosives Act* requires the following records:

- the quantity of each explosive manufactured including its strength;
- the quantity of explosive in possession; and
- the quantity of explosive issued from the factory including the date of shipment.

Weekly reports will be provided by the explosives subcontractor to the mining superintendent and will include:

- staffing;
- safety concerns or incidents;
- total explosives consumption;
- a count of the remaining ammonium nitrate; and
- other explosives and accessories audited for fiscal month-end balances.

10.3 PROCESSING PLANT CONSUMABLES

The plant manager is responsible for reconciling winter resupply inventory. The plant operators will keep daily records of use. Weekly and monthly summaries will be provided to the plant manager for records keeping.

11.0 INCIDENT REPORTING PROCEDURE

11.1 REPORTING

The following reporting procedure will be posted at telephones and other locations at the Jericho Mine:

When a spill of any size has been discovered:

1. The person finding the spill must report the spill to:

   - The mine manager for mine area spills and the plant chief engineer or manager for plant area spills.

   - The appropriate supervisor will assume the responsibilities of the on site spill coordinator.

2. The On Site Spill Coordinator will report the spill to the following:

   - If the spill is of reportable size, to the GNWT 24-hour spill line

   (867) 920-8130

   - The mine contractor head office (as determined by the contractor's reporting procedures)

   - Tahera's Environmental Manager at 1-877-888-2004, fax 1-416-777-1898.

Other Important Phone Numbers (all area code 867) are listed in Table 11.1:

Table 11.1 External Emergency Contact Numbers

Stanton Regional Hospital	920-4111
Yellowknife RCMP	669-1111
Cambridge Bay RCMP	983-2111
GN, Environmental Protection Service, Iqaluit	975-5900
Nunavut Water Board Inspector, Gjoa Haven	360-6338
Indian and Northern Affairs Canada, Iqaluit	975-4500
INAC Inspector, Iqaluit	975-4500
Environment Canada, Environmental Protection Branch, Yellowknife	920-5131
Fisheries and Oceans Canada, Iqaluit	979-8000
Emergency Measures Organization of the NWT, Yellowknife	873-7554
Workers' Compensation Board, Yellowknife	920-3888
Fire Marshall's Office, Yellowknife	873-7944
Department of Environmental Health, Cambridge Bay	983-7328
Mackenzie Regional Health Services, Yellowknife	920-6592

11.2 OTHER EMERGENCY CONTACTS

Additional emergency contact numbers are provided in Table 11.2, below.

Table 11.2 Additional Emergency Contacts

Poison Control Centre, Yellowknife	920-4111
GNWT Spill Report Fax Line	873-6924
CANUTEC (Spill Support Information)	613-996-6666
Charter Aircraft (for Evacuation)	
Air Tindi, Yellowknife	669-8200
First Air, Yellowknife	983-2077
Arctic Sun West, Yellowknife	873-4464
Nunasi Helicopters, Yellowknife	873-3306
Canadian Helicopters, Yellowknife	669-9604
Great Slave Helicopters, Yellowknife	873-2081
Adlair Aviation, Cambridge Bay	983-2569

11.3 SPILL REPORT

A Nunavut Spill Report Form will be completed. A copy of the form is shown in Figure 11.1.

A copy of the Nunavut Spill Report will be filed with the mine contractor's head office (as per contractor's internal reporting procedures) and with Tahera's Environmental Manager (fax: 1-416-777-1898). The mine contractor operations supervisor or diamond plant manager will retain a copy on site.

Figure 11.1 Nunaut Spill Report Form

NUNAVUT SPILL REPORT (Oil, Gas, Hazardous Chemicals or other Materials)
NUNAVUT KUVIHIMAYMIK UNIUT (Ukhukyuak, Gasiliik, Hivuganaktun Aavughat Aalaatluniit)

24-Hour Report Line Uumiyuituk Unikhiut Hivayaut
Phone/Hivayaut (867) 920-8130
Fax/Kayumiktuk (867) 873-6924

A Report Date and Time Uniutim Ublua Ublukhiutalu	**B** Date and Time of Spill(if known) Ublua Ublukhiutalu Kuvinium(ilihimayaukpan)	**C** Original Report Hivulikpak Uniut Update No. _____ Ilihimapkangnik Napa.	Spill Number Kuvinium Napa

D Location and Map Coordinates (if known) and Direction (if moving) Humiituk Nunauyamilu Pakitjutaa (ilihimayaukpan) Humungaulikalu (kugluakan)

E Party Responsible for Spill (Full Name and Address) Kitkuut Kuvipkaiyun (Tamaita Atiin Nunakakviangalu)

F Product(s) Spilled and Estimated Quantities(provide metric volumes/weights if possible) Hunat Kuviyun Angiklilangiitlu(tunilugin kafi kaalanlu/ukumaitilangalu ilihimagungi)

G Cause of Spill Huuk kiviyuk

H Is Spill Terminated? Kuvihuikaa? Yes/Hii No/Imaanak	**I** If Spill is Continuing, give Estimated Rate Kuvigaanginakan kayumilanguta ukaguk	**J** Is Further Spillage Possible? Kuvifakniagungnaghivaa? Yes/Hii No/Imaanak	**K** Extent of Contaminated Area(in square metres if possible) Angiklilanga halumaighimanuim(uuktuut kikagituk miitusni ilihimagungni)

L Factors Affecting Spill or Recovery(weather conditions, terrain, snow cover, etc.) Huunat Havaluatilimaijutin Kuvinikmun Halumaghinikmunlu(hilakluknik, nunap kaanga, apuutpalaknik, atlatlu)	**M** Containment(natural depression, dykes, etc.) Katitikvia (iitighak, maghakviit,alatlu)

N Action, if any, taken or Proposed to Contain, Recover, Clean up or Dispose of Product(s) and Contaminated Materials Hulivin, huliguvin, Kanuklu Kaatitiniaka, Pifaklugu, Halumaktiklugu Igitlugiitluniit Kuvihimayut

O Do You Require Assistance? Ikayuktauyumaviin? No/Imaanak Yes/Hii, describe: Kaanuk:	**P** Possible Hazards to Persons, Property or Environment e.g. fire, drinking water, fish or wildlife. Hivuganakniagungnaghivun Inuknun, Tamayanun Avatimunluniit e.g. ikualak, iimiktakvik, ikaluit hugajutinluniit.

Q Comments and/or Recommendations Ukagiyain uvvalu/unaluniit Pitkuugaluaktain

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FOR SPILL LINE USE ONLY KUVINIUM HIVAYAUTAGINATA ATUKTAGHA

Lead Agency Hivulik Havakvik

.....

Spill Significance Kivunium Angingninga

.....

Lead Agency Contact and Time Hivulium Havakviim Ukakatigiluagha Humungakanlu

.....

.....

.....

Is this file now closed? Una tutkumavia umikpaa?

.....

Reported By Unikhiukti	Position, Employer, Location Haavanga, Havakvia, Humi	Telephone Hivayaut

Reported To Unikhiuktuk Kinamun	Position, Employer, Location Haavanga, Havakvia, Humi	Telephone Hivayaut

12.0 ENVIRONMENTAL MAPPING

Contaminated materials from spills will be placed in suitable containers and removed from the site or, if a petroleum product, remediated on site. The ammonium nitrate cold storage warehouse and the explosives magazines will be fireproof construction. All buildings housing personnel or where personnel work will be equipped with automatic fire suppression systems (wet or dry). The mine camp will meet current fire protection regulations including required sensors, sprinklers and separation halls and doors.

12.1 SITE GENERAL ARRANGEMENT

Drawing 1CT004.06-G12 is a site arrange for Jericho. Spill clean up materials will be kept at all facilities where spills could occur and were discussed in Section 4.0.

Hazardous substances will be stored in the locations listed in Table 12.1 (refer to Drawing 1CT004.06-G12); on-hand quantities are listed in Table 2.1:

Table 12.1 Location of Hazardous Substances Storage

Facility	Location	Material
Fuel farm	Plant site	Diesel; gasoline; lubricants; jet fuel
Power station	Plant site	Diesel, lubricants
Processing plant	Plant site	Miscellaneous chemicals – see Table 2.1
Mining laydown	Plant site	Miscellaneous – temporary storage
Processing laydown	Plant site	Miscellaneous – temporary storage
Mechanical shop	Plant site	Diesel; gasoline; lubricants; solvents – small quantities (205L or less)
Mechanical shop	Plant site	Waste oil - ~1500 L – temporary storage in cubes
Ammonium nitrate cold storage	Explosives road	Ammonium nitrate, sodium nitrite, emulsions
Caps magazine	Explosives road	Blasting caps
Powder magazine	Explosives road	Stick powder
Explosives truck wash	Explosives road	Diesel, lubricants, solvents – small quantities (205 L or less)
Exploration camp	Airstrip road	Diesel, stove oil, lubricants, gasoline – small quantities
Airstrip building	Airstrip	Jet fuel – small quantities
Helipad	Exploration camp	Jet fuel – small quantities

Storage location and quantities for petroleum products are listed in Table 12.2.

Table 12.2 Fuel Products Storage Locations

Product	Storage Location
Diesel	Fuel farm: bulk of 10 million L; bermed PowerHouse: 5000 L silled tank Construction: 1000 L bermed tank at crusher (waste dump 1 or 2) Exploration Camp: 1000 L in barrels Airstrip: 250 L silled tank Mechanical Shop: 1000 L silled tank Explosives Truck Shop: 1000 L silled tank
Motor Oil	Mechanical Shop: 500 L in barrels Power House: 205 L in barrel Exploration Camp: 205 L in barrel
Jet Fuel	Airstrip: 5000 L in barrels Helipad (exploration camp): 1000 L in barrels
Propane	Accommodation complex: tank size to be determined
Aviation Gasoline	Airstrip: 1000 L in barrels
Unleaded Gasoline	Fuel Farm: 10,000 L bermed tanks Exploration Camp: 205 L in barrel
Hydraulic Fluid	Mechanical Shop: 500 L in barrels Power House: 205 L in barrel Plant: 205 L in barrel
Varsol	Mechanical Shop: 205 L in barrel and solvent recycler
Automotive Grease	Mechanical Shop: 50 – 20 L pails
Ethylene Glycol	Mechanical Shop: 205 L in barrel Explosives storage: 23 tonnes in 230 kg drums

12.2 EMERGENCY EVACUATION ROUTE

In the event of a fire at the mine accommodation, the exploration camp facilities would be used as emergency shelter, pending removal of personnel (if required) and repair or replacement of facilities. All mine roads are shown on Drawing 1CT004.06-G12. All buildings at the mine site will be connected by roads that will be kept passable year round and thus provide escape routes in case of an emergency.

13.0 RESOURCE INVENTORY

13.1 EMERGENCY EQUIPMENT LOCATIONS

Tahera's spill response resource inventory is listed in Table 13.1. Automatic fire suppression equipment (automatic ceiling sprinklers) will be in place in all buildings occupied by personnel. Fire extinguishers will be located in clearly marked locations in accommodations, shops, fuelling stations, the cold storage warehouse, the airstrip generator building, helicopter pad and other areas where flammable substances are stored and/or handled. Spill kits will be located at the fuel farm, fuelling stations, airstrip, helicopter pad and other locations where spills of hazardous substances could occur.

Table 13.1 Jericho Mine Site Resource Inventory

24 HOUR RESPONSE EQUIPMENT	**Number**
Front end loaders	3
Aluminum boats	2
Tandem axle trucks	up to 7
Single axle truck	1
Tractor dozers / snow plough	3
3/4 Ton Trucks	5
SPILL EQUIPMENT	**Availability**
Fuel detention boom	√
Sorbent booms	
Sorbent pillows	√
Sorbent material	√
Portable oil skimmer	
Portable pumps and hoses	√
Shop vac	√
Used oil cubes (1600 litre capacity)	√
Ice auger	√
Tiger torch	√
Chain saw	√
Hand tools (shovels, rakes)	√
Spill kits (205 L overpack drum type)	√

13.2 AID AGREEMENTS

No aid agreements are in place at present. Any such agreements that are put in place would be developed prior to mine construction and/or operation, as appropriate.

14.0 CONTAMINANT AND DEBRIS DISPOSAL

14.1 STORAGE OF CONTAMINANTS

Contaminants from the cleanup site will be stored in a secured area and appropriately labelled. **Materials will be considered to be hazardous, unless confirmed otherwise.**

If contaminants are a hazardous substance or waste, removal and disposal will be carried out by carriers licensed to carry and dispose of hazardous wastes. Contractors should have pre-designated waste handling facilities for the types of waste generated by the spill.

There will be a secure area designated for storage of contaminated soils at the Jericho Mine facility (landfarm). The area will be fenced and signed and will be lined. Any runoff adjacent to the site will be directed to the open pit or waste rock dump sedimentation pond. Water within the site will be collected, treated to remove oil if necessary and placed in the PKCA. Most spills should be able to be contained before the spill reaches surface water bodies, i.e. Carat Lake. Any contaminated sorbent material on site will be collected in garbage bags, used oil cubes, or other suitable container and removed from the Jericho site by a licensed contractor. Removal would normally occur during the winter resupply. Contaminated sorbents would be stored in the secure area at the landfill in the interim; contaminated soil may be landfarmed.

14.2 DECONTAMINATION OF EQUIPMENT

All equipment used in handling an incident will be properly decontaminated and passed as fit for reuse prior to final storage. Decontamination procedures will depend on the product being handled, but may include solvent washing, detergent washing, rinsing, drying, and finally wipe testing. All equipment that cannot be properly cleaned will be disposed of as contaminated material. Damaged equipment will be decontaminated prior to being disposed of.

14.3 SITE INSPECTION

If soil contamination has occurred, once contaminated soil has been removed, the soil surface remaining will be tested for contamination. Once the soil is clean, as defined by the *Canadian Soil Quality Guidelines* (CCME 2003) for industrial sites, clean fill can be placed at the site.

14.4 PROCESSED KIMBERLITE

Spills of processed kimberlite (due, e.g., to dam failure) are a special case of hazardous substance spills. Kimberlite is a low toxicity substance that will cause more physical than toxicological damage, if accidentally released to the environment (EIA, Appendix B.2.1). Both water (PK supernatant) and solids (PK slimes) could be released due to dam failure. Typical tailings dam failures could result in up to 25% of the impoundment tailings being spilled. The volume at Jericho would depend on the stage of mining when the dam failure occurred. However, because of the nature of the impoundment basin (long and narrow) likely less than 25% of the PK fines would be released.

If liquid only is released it is very likely the front of the release would reach a receiving lake prior to a coffer dam being constructed. One of the mine crawler tractors and front end loaders would be moved to a down slope site as quickly as possible and a temporary dam constructed across the drainage path of the released PK liquid to contain any remaining liquid. Water released to the east would drain to unnamed lake, be mixed with lake water and then possibly flow into Key, Lynne and Contwoyto lakes (depending on the volume of water released). Little decontamination would be possible and the system would have to naturally decontaminate. Water released to the west (from the PK west pond) would first enter the unnamed lake west of the West Dam. If of sufficient volume water from this lake would be released into Stream C3 where it would flow to Lake C3. Again, natural decontamination is the only possible remediation.

A worst-case spill of PK slimes to the east would inundate the west side of unnamed lake. Lesser volumes would flow toward but not reach unnamed lake, except by erosion from water flowing through the slimes toward unnamed lake. In the case of slimes release, a coffer dam would be constructed down slope of the slimes and the material pumped back into the PKCA once dam repairs had been effected.

A worst-case spill of PK slimes to the west would likely do no more than inundate the unnamed lake, given the basin nature of the PKCA. If slimes overtopped this lake, they would travel some distance down Stream C3 toward Lake C3, but are unlikely to escape in sufficient volume to reach Lake C3. Again, a coffer dam would be constructed down slope of the slimes front and slimes pumped back to the PKCA after dam repairs had been completed.

15.0 PREPAREDNESS AND TRAINING

Two levels of training will be given to Jericho Mine employees, depending on their role in emergency response:

- emergency responder training; and
- emergency awareness and preparedness training for all employees.

Emergency responder training will be provided for all first-aid personnel, for the mine rescue team, and for designated processing plant employees. The training for the mine rescue team will be the responsibility of the mine contractor, although Tahera Diamond Corporation will retain the ultimate responsibility to ensure effective training is provided. All other training will be the responsibility of Tahera Diamond Corporation.

Training for all employees will include:

- evacuation procedures and routes;
- alarm systems;
- when to attempt immediate response to an emergency and when to call for help;
- reporting procedures for personnel;
- shutdown procedures for equipment and electrical systems;
- types of potential emergencies;
- procedures for handling flammable liquids;
- importance of good housekeeping;
- importance of safe work habits;
- procedures for control and cleanup of leaks and spills; and
- procedures for disposal of waste materials.

Training programs will be provided on the following schedule:

- for all new employees;
- annually as a refresher;
- when new equipment, materials, or processes are introduced;
- when procedures have been updated or revised; and
- when analysis of drill responses by the Occupational Health and Safety Committee results in a recommendation for refresher training in any or all areas.

Emergency responder training will be specific to their area of responsibility: processing plant, open pit mine, underground mine, power house, sewage treatment plant, etc. Industrial first aid certification will be a requisite and confined space entry certification may be required. Emergency responders will obtain hands on training in use of fire suppression equipment (fire extinguishers, hoses, etc.), correct procedures for safe handling and clean up of

hazardous chemicals used in their work area, and familiarity with MSDS and use of SCBA or air purifying respirators (where appropriate). Mine safety rescue teams will meet the requirements of the NWT Mine Health and Safety Regulations as a minimum. Emergency responder training will be conducted as required by legislation or, at a minimum, annually. Drills for emergency response teams will also be conducted as required by legislation or, at a minimum, semi-annually.

Training will be provided by a combination of trained, qualified Tahera staff and outside training service organizations, as appropriate. Training manuals will be developed prior to mine operation.

16.0 SITE RESTORATION

Whether site restoration is required will depend on the spill or other emergency and the substance(s) involved. Therefore no specific directions are appropriate in this section. If site restoration is an issue, it will be undertaken within the framework of the *Canadian Soil Quality Guidelines*, previously mentioned. The amount of restoration, if any, will be dependent on the nature of the spill or emergency. For sites that will likely require restoration, a third party inspection and restoration by a competent, licensed, contractor will be considered.

Minor restoration will include the following:

- Confirm that the site is decontaminated.
- Replace removed contaminated soil with clean fill.
- Top dress the location, available from the overburden stockpile (as appropriate).

17.0 PLAN EVALUATION AND CONTINUAL IMPROVEMENT

Despite careful planning, it is highly probable that certain components of the spill plan will need to be modified. Therefore, it will be necessary to audit or review the plan to pinpoint those components needing correction, adjustment, or upgrading. Of most importance will be review of aspects of the plan affecting safety of employees of the facility and the general public. Operational aspects of the plan, as well as any paperwork that deals with the plan, will be reviewed. A goal will be to continuously audit all aspects of the plan for effectiveness.

Formal evaluations of the spill plan will be documented, deficiencies noted in the report, and progress in addressing deficiencies tracked in writing. Responsibilities to address deficiencies and accountabilities will be assigned and deadlines for addressing required changes will be set. The Jericho Mine site supervisor (mining contractor or Tahera employee to be determined) will assume overall responsibility for the process; authorization for expenditures may be required from other management personnel.

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SCHEDULE 1:TRAINED EMERGENCY PERSONNEL

The table below lists the names, departments and qualifications of trained emergency personnel at Jericho Mine. Date of last update is provided.

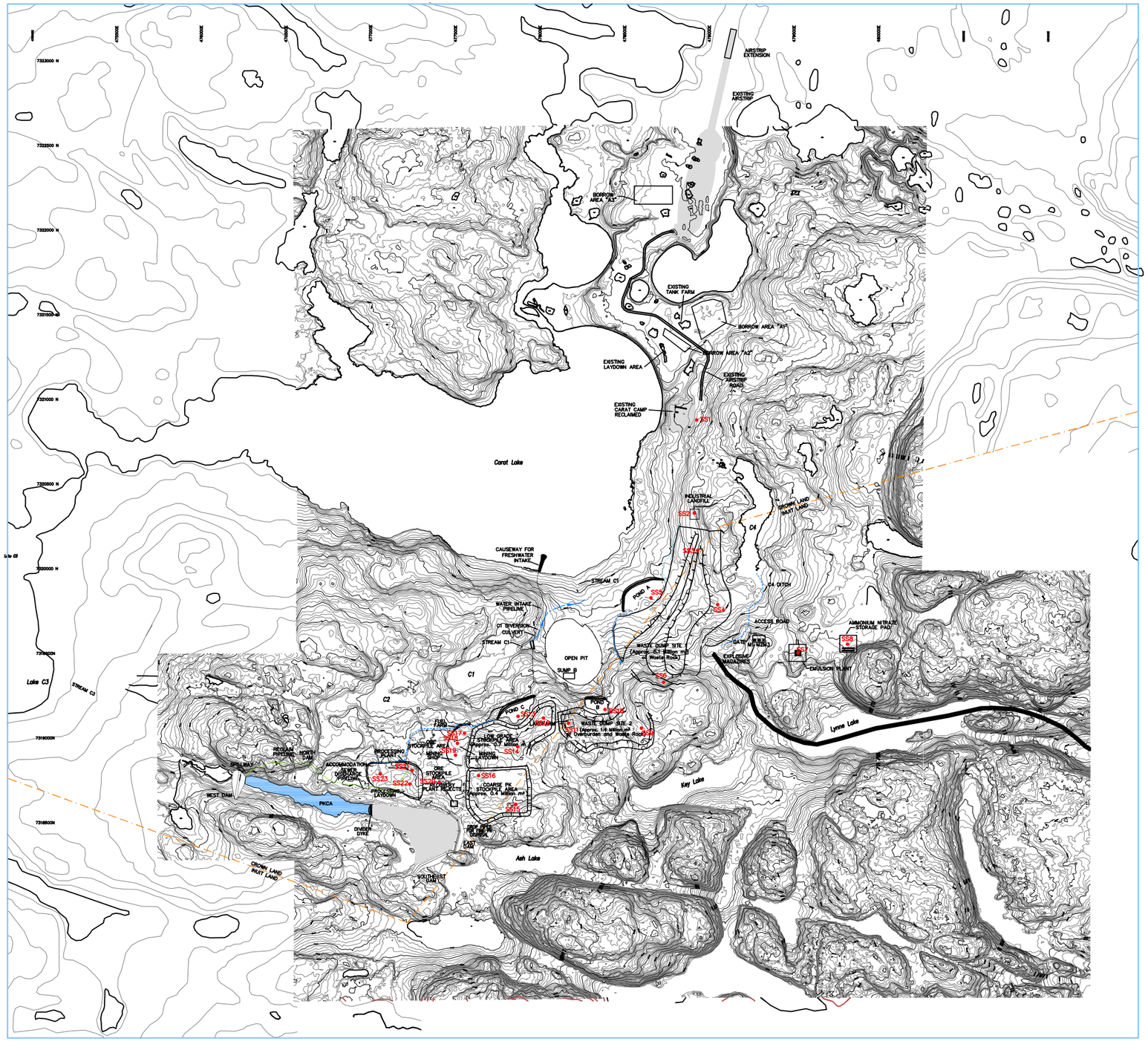
Date of Last Update: _____

Name	Department	Training Completed

SCHEDULE 2:BUILDING INSPECTION CHECKLIST

Assigned Area:
Assigned Supervisor:
Inspection Date:

X	Item	Comments/Deficiencies
	Are all worksites clean and orderly?	
	Are all exits kept free of obstructions?	
	Are all exits marked with an exit sign and illuminated by a reliable light source?	
	Are aisleways kept clear to allow unhindered passage?	
	Are combustible scrap, debris, and waste materials stored in covered metal receptacles and removed from the worksite promptly?	
	Are all flammable liquids kept in closed containers when not in use?	
	Are all extinguishers free from obstructions or blockage?	
	Are all extinguishers charged? **Note date and time tested and initial on extinguisher tag.**	
	Are "No Smoking" rules followed in areas involving storage and use of flammable materials?	
	Are all spilled materials or liquids cleaned up immediately?	
	Are all work areas adequately illuminated?	
	Are emergency telephone numbers posted where they can be readily found in case of emergency?	
	Are all fire doors in good condition?	
	Is there anything to hinder the door from completely closing?	
	Is the fire alarm system in good working order? **Note date and time tested & initial.**	



DRAWING G-9	AMMONIUM NITRATE STORAGE LAYOUT													
DRAWING G-8	BORROW AREAS PLAN & SECTION													
DRAWING G-7	TERRAIN EVALUATION MAP													
DRAWING G-6	BEDROCK GEOLOGY MAP													
DRAWING G-5	QUATERNARY GEOLOGY MAP													
DRAWING G-4	EXISTING THERMISTOR INSTALLATION PLAN	DRAWING G-14	CLOSURE CONCEPTS											
DRAWING G-3	SITE INVESTIGATION MAP	DRAWING G-13	GENERAL ARRANGEMENT APRIL 2013											
DRAWING G-2	SITE VICINITY MAP	DRAWING G-11	GENERAL ARRANGEMENT APRIL 2007											
DRAWING G-1	PROJECT LOCATION AND DRAWING INDEX	DRAWING G-10	GENERAL ARRANGEMENT APRIL 2006							A	WATER LICENSE APPLICATION	CCS		JULY 2004
DRAWING NO.	DRAWING TITLE	DRAWING NO.		No.	DESCRIPTION	CHK'D	APP'D	DATE	REV.	ISSUE PURPOSE		AUTH. BY		DATE
REFERENCE DRAWINGS				REVISIONS					ISSUE AUTHORIZATION					

WATER LICENSE APPLICATION

\\Slfile\GIS_Projects\Acad_R2000_Templates\Jpk Consulting.jpg

DESIGNED BY: CCS	DRAWN BY: JM
DATE: JULY 2004	DATE: JULY 2004
CHECKED BY: CCS	DISCIP. ENGR.
DATE: JULY 2004	DATE:
PROJ. MGR:	PROJ. ENGR.
DATE	DATE
SRK PROJECT NUMBER: 1CT004.06	

F:\Tahera (Lytton Minerals)\Mapping & Drawings-Acad-2004\Tahera_logo_small_blue_RGB.JPG

JERICHO PROJECT

GENERAL ARRANGEMENT AT END OF APRIL 2008

DRAWING NUMBER: 1CT004.06 – G12

REV.: A

FILE NAME: F:\Tahera Corp (Lytton minerals)\Mapping and Drawings-2004 dwgs\general-figures(2004)\figureGA-year1

APPENDICES

APPENDIX 2.1

MSDS

(NOTE: list of hazardous substances)

Valid 05/2003 - 07/2003

Aldrich Chemical Co., Inc.
1001 West St. Paul
Milwaukee, WI 53233 USA
Phone: 414-273-3850

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1. - - - - - - - - - CHEMICAL IDENTIFICATION- - - - - - - - - -

CATALOG #: 109088
NAME: ACETIC ACID, 99.8%

SECTION 2. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -

CAS #: 64-19-7
MF: C2H4O2
EC NO: 200-580-7

SYNONYMS

ACETIC ACID (ACGIH:OSHA) * ACETIC ACID, GLACIAL * ACIDE ACETIQUE (FRENCH) * ACIDO ACETICO (ITALIAN) * AZIJNZUUR (DUTCH) * ESSIGSAEURE (GERMAN) * ETHANOIC ACID * ETHYLIC ACID * GLACIAL ACETIC ACID * KYSELINA OCTOVA (CZECH) * METHANECARBOXYLIC ACID * OCTOWY KWAS (POLISH) * VINEGAR ACID *

SECTION 3. - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - - -

LABEL PRECAUTIONARY STATEMENTS

COMBUSTIBLE (USA)
FLAMMABLE (EU)
CORROSIVE
CAUSES SEVERE BURNS.
HARMFUL IN CONTACT WITH SKIN.
LACHRYMATOR.
TARGET ORGAN(S):
TEETH
KIDNEYS
COMBUSTIBLE.
KEEP AWAY FROM SOURCES OF IGNITION - NO SMOKING.
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.

SECTION 4. - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - - -

IF SWALLOWED, WASH OUT MOUTH WITH WATER PROVIDED PERSON IS CONSCIOUS.
CALL A PHYSICIAN.
DO NOT INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF SKIN CONTACT, FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES. CALL A PHYSICIAN.
IN CASE OF CONTACT WITH EYES, FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. ASSURE ADEQUATE FLUSHING BY SEPARATING THE EYELIDS WITH FINGERS. CALL A PHYSICIAN.

SECTION 5. - - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - -

EXTINGUISHING MEDIA

CARBON DIOXIDE, DRY CHEMICAL POWDER OR APPROPRIATE FOAM.

SPECIAL FIREFIGHTING PROCEDURES

WEAR SELF-CONTAINED BREATHING APPARATUS AND PROTECTIVE CLOTHING TO PREVENT CONTACT WITH SKIN AND EYES.

UNUSUAL FIRE AND EXPLOSIONS HAZARDS

EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION 6. - - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -

WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

COVER WITH DRY LIME OR SODA ASH, PICK UP, KEEP IN A CLOSED CONTAINER AND HOLD FOR WASTE DISPOSAL.

VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICKUP IS COMPLETE.

EVACUATE AREA.

SECTION 7. - - - - - - - - - - HANDLING AND STORAGE- - - - - - - - - - -

REFER TO SECTION 8.

SECTION 8. - - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - - -

SAFETY SHOWER AND EYE BATH.

USE ONLY IN A CHEMICAL FUME HOOD.

WASH CONTAMINATED CLOTHING BEFORE REUSE.

DISCARD CONTAMINATED SHOES.

WASH THOROUGHLY AFTER HANDLING.

DO NOT BREATHE VAPOR.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.

AVOID PROLONGED OR REPEATED EXPOSURE.

NIOSH/MSHA-APPROVED RESPIRATOR.

COMPATIBLE CHEMICAL-RESISTANT GLOVES.

CHEMICAL SAFETY GOGGLES.

FACESHIELD (8-INCH MINIMUM).

KEEP TIGHTLY CLOSED.

STORE IN A COOL DRY PLACE.

SECTION 9. - - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - - -

PHYSICAL PROPERTIES

BOILING POINT: 117 C TO 118 C

MELTING POINT: 16.2 C

FLASHPOINT 104 F

EXPLOSION LIMITS IN AIR:

UPPER 16% 92 C

LOWER 4% 59 C

AUTOIGNITION TEMPERATURE: 800 F

VAPOR PRESSURE: 11.4MM 20 C

SOLUBILITY:

WATER -Z1079

MISCIBLE WITH A GLYCEROL, ACETO

SPECIFIC GRAVITY: 1.049

VAPOR DENSITY: 2.07

FREEZING POINT: 16.7 C

PH: 2.4

SWISS POISON CLASS: 3

SECTION 10. - - - - - - - - -STABILITY AND REACTIVITY - - - - - - - - -

STABILITY

STABLE.

INCOMPATIBILITIES

PROTECT FROM MOISTURE.

OXIDIZING AGENTS

SOLUBLE CARBONATES AND PHOSPHATES
HYDROXIDES
OXIDES
METALS
PEROXIDES
PERMANGANATES
AMINES
ALCOHOLS

HAZARDOUS COMBUSTION OR DECOMPOSITION PRODUCTS

CARBON MONOXIDE, CARBON DIOXIDE

HAZARDOUS POLYMERIZATION

WILL NOT OCCUR.

SECTION 11. - - - - - - - - - TOXICOLOGICAL INFORMATION - - - - - - - -

ACUTE EFFECTS

CAUSES BURNS.
HARMFUL IF ABSORBED THROUGH SKIN.
MAY BE HARMFUL IF INHALED.
MATERIAL IS EXTREMELY DESTRUCTIVE TO THE TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT.
MAY BE HARMFUL IF SWALLOWED.
MATERIAL IS EXTREMELY DESTRUCTIVE TO TISSUE OF THE MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT, EYES AND SKIN.
INHALATION MAY RESULT IN SPASM, INFLAMMATION AND EDEMA OF THE LARYNX AND BRONCHI, CHEMICAL PNEUMONITIS AND PULMONARY EDEMA.
SYMPTOMS OF EXPOSURE MAY INCLUDE BURNING SENSATION, COUGHING, WHEEZING, LARYNGITIS, SHORTNESS OF BREATH, HEADACHE, NAUSEA AND VOMITING.
INGESTION OR INHALATION OF CONCENTRATED ACETIC ACID CAUSES DAMAGE TO TISSUES OF THE RESPIRATORY AND DIGESTIVE TRACTS. SYMPTOMS INCLUDE: HEMATEMESIS, BLOODY DIARRHEA, EDEMA AND/OR PERFORATION OF THE ESOPHAGUS AND PYLORUS, HEMATURIA, ANURIA, UREMIA, ALBUMINURIA, HEMOLYSIS, CONVULSIONS, BRONCHITIS, PULMONARY EDEMA, PNEUMONIA, CARDIOVASCULAR COLLAPSE, SHOCK AND DEATH.
DIRECT CONTACT OR EXPOSURE TO HIGH CONCENTRATIONS OF VAPOR WITH SKIN OR EYES CAN CAUSE: ERYTHEMA, BLISTERS, TISSUE DESTRUCTION WITH SLOW HEALING, SKIN BLACKENING, HYPERKERATOSIS, FISSURES, CORNEAL EROSION, OPACIFICATION, IRITIS, CONJUNCTIVITIS AND POSSIBLE BLINDNESS.
TO THE BEST OF OUR KNOWLEDGE, THE CHEMICAL, PHYSICAL, AND TOXICOLOGICAL PROPERTIES HAVE NOT BEEN THOROUGHLY INVESTIGATED.

CHRONIC EFFECTS

TARGET ORGAN(S):
TEETH
KIDNEYS

RTECS #: AF1225000

ACETIC ACID

IRRITATION DATA

SKN-HMN 50 MG/24H MLD	TXAPA9 31,481,1975
SKN-RBT 525 MG OPEN SEV	UCDS** 8/7/1963
SKN-RBT 50 MG/24H MLD	TXAPA9 31,481,1975
EYE-RBT 5 MG/30S RINSE MLD	TXCYAC 23,281,1982

TOXICITY DATA

UNR-MAN LDLO:308 MG/KG	85DCAI 2,73,1970
ORL-RAT LD50:3310 MG/KG	DMDJAP 31,276,1959
IHL-MUS LC50:5620 PPM/1H	MELAAD 48,559,1957
IVN-MUS LD50:525 MG/KG	APTOA6 18,141,1961
SKN-RBT LD50:1060 UL/KG	UCDS** 8/7/1963

TARGET ORGAN DATA

SENSE ORGANS AND SPECIAL SENSES (OTHER OLFACTION EFFECTS)
SENSE ORGANS AND SPECIAL SENSES (OTHER EYE EFFECTS)
BEHAVIORAL (CONVULSIONS OR EFFECT ON SEIZURE THRESHOLD)
LUNGS, THORAX OR RESPIRATION (OTHER CHANGES)
GASTROINTESTINAL (CHANGES IN STRUCTURE OR FUNCTION OF ESOPHAGUS)
GASTROINTESTINAL (ULCERATION OR BLEEDING FROM SMALL INTESTINE)
GASTROINTESTINAL (ULCERATION OR BLEEDING FROM LARGE INTESTINE)
EFFECTS ON FERTILITY (MALE FERTILITY INDEX)
EFFECTS ON NEWBORN (BEHAVIORAL)
ONLY SELECTED REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) DATA IS PRESENTED HERE. SEE ACTUAL ENTRY IN RTECS FOR COMPLETE INFORMATION.

SECTION 12. - - - - - - - - - - ECOLOGICAL INFORMATION - - - - - - - - - -

DATA NOT YET AVAILABLE.

SECTION 13. - - - - - - - - - - DISPOSAL CONSIDERATIONS - - - - - - - - - -

THIS COMBUSTIBLE MATERIAL MAY BE BURNED IN A CHEMICAL INCINERATOR EQUIPPED WITH AN AFTERBURNER AND SCRUBBER.
OBSERVE ALL FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

SECTION 14. - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - - -

CONTACT ALDRICH CHEMICAL COMPANY FOR TRANSPORTATION INFORMATION.

SECTION 15. - - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - -

EUROPEAN INFORMATION

EC INDEX NO: 607-002-00-6
FLAMMABLE
CORROSIVE
R 10
FLAMMABLE.
R 35
CAUSES SEVERE BURNS.
S 26
IN CASE OF CONTACT WITH EYES, RINSE IMMEDIATELY WITH PLENTY OF WATER AND SEEK MEDICAL ADVICE.
S 36/37/39
WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES AND EYE/FACE PROTECTION.
S 45
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY (SHOW THE LABEL WHERE POSSIBLE).

REVIEWS, STANDARDS, AND REGULATIONS

OEL=MAK
ACGIH TLV-STEL 15 PPM DTLVS* TLV/BEI,1999
ACGIH TLV-TWA 10 PPM DTLVS* TLV/BEI,1999
EPA FIFRA 1988 PESTICIDE SUBJECT TO REGISTRATION OR RE-REGISTRATION
FEREAC 54,7740,1989
MSHA STANDARD-AIR:TWA 10 PPM (25 MG/M3)
DTLVS* 3,2,1971
OSHA PEL (GEN INDU):8H TWA 10 PPM (25 MG/M3)
CFRGBR 29,1910.1000,1994
OSHA PEL (CONSTRUC):8H TWA 10 PPM (25 MG/M3)
CFRGBR 29,1926.55,1994
OSHA PEL (SHIPYARD):8H TWA 10 PPM (25 MG/M3)
CFRGBR 29,1915.1000,1993
OSHA PEL (FED CONT):8H TWA 10 PPM (25 MG/M3)
CFRGBR 41,50-204.50,1994
OEL-AUSTRALIA: TWA 10 PPM (25 MG/M3), STEL 15 PPM, JAN1993
OEL-AUSTRIA: MAK 10 PPM (25 MG/M3), JAN1999
OEL-BELGIUM: TWA 10 PPM (25 MG/M3), STEL 15 PPM, JAN1993

OEL-DENMARK: TWA 10 PPM (25 MG/M3), JAN1999
OEL-FINLAND: TWA 10 PPM (25 MG/M3), STEL 15 PPM (37 MG/M3), SKIN, JAN1993
OEL-FRANCE: VLE 10 PPM (25 MG/M3), JAN1999
OEL-GERMANY: MAK 10 PPM (25 MG/M3), JAN1999
OEL-HUNGARY: TWA 10 MG/M3, STEL 20 MG/M3, JAN1993
OEL-INDIA: TWA 10 PPM (25 MG/M3), STEL 15 PPM (37 MG/M3), JAN1993
OEL-JAPAN: OEL 10 PPM (25 MG/M3), JAN1999
OEL-THE NETHERLANDS: MAC-TGG 10 PPM (25 MG/M3), JAN1999
OEL-NORWAY: TWA 10 PPM (25 MG/M3), JAN1999
OEL-THE PHILIPPINES: TWA 10 PPM (25 MG/M3), JAN1993
OEL-POLAND: MAC(TWA) 5 MG/M3, MAC(STEL) 35 MG/M3, JAN1999
OEL-RUSSIA: TWA 10 PPM, STEL 5 MG/M3, SKIN, JAN1993
OEL-SWEDEN: NGV 5 PPM (13 MG/M3), KTV 10 PPM (25 MG/M3), JAN1999
OEL-SWITZERLAND: MAK-W 10 PPM (25 MG/M3), KZG-W 20 PPM (50 MG/M3), JAN1999
OEL-THAILAND: TWA 10 PPM (25 MG/M3), JAN1993
OEL-TURKEY: TWA 10 PPM (25 MG/M3), JAN1993
OEL-UNITED KINGDOM: TWA 10 PPM (25 MG/M3), STEL 15 PPM (37 MG/M3), SEP2000
OEL IN ARGENTINA, BULGARIA, COLOMBIA, JORDAN, KOREA CHECK ACGIH TLV;
OEL IN NEW ZEALAND, SINGAPORE, VIETNAM CHECK ACGIH TLV
NIOSH REL TO ACETIC ACID-AIR:10H TWA 10 PPM;STEL 15 PPM
NIOSH* DHHS #92-100,1992
NOHS 1974: HZD 01568; NIS 264; TNF 51469; NOS 150; TNE 486503
NOES 1983: HZD 01568; NIS 266; TNF 49403; NOS 169; TNE 907205; TFE 322123
EPA GENETOX PROGRAM 1988, NEGATIVE: HISTIDINE REVERSION-AMES TEST
EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
EPA TSCA SECTION 8(D) UNPUBLISHED HEALTH/SAFETY STUDIES
EPA TSCA SECTION 8(E) RISK NOTIFICATION, 8EHQ-0892-9237;8EHQ-0892-9238
EPA TSCA TEST SUBMISSION (TSCATS) DATA BASE, JANUARY 2001
NIOSH ANALYTICAL METHOD, 1994: ACETIC ACID, 1603
OSHA ANALYTICAL METHOD #ID-118

SECTION 16. - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - -

THE ABOVE INFORMATION IS BELIEVED TO BE CORRECT BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. SIGMA, ALDRICH, FLUKA SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT. SEE REVERSE SIDE OF INVOICE OR PACKING SLIP FOR ADDITIONAL TERMS AND CONDITIONS OF SALE.

ACETONE

MSDS Number: A0446 --- *Effective Date: 04/09/98*

1. Product Identification

Synonyms: Dimethylketone; 2-propanone; dimethylketal
CAS No.: 67-64-1
Molecular Weight: 58.08
Chemical Formula: (CH3)2CO
Product Codes:
J.T. Baker: 5356, 5580, 5805, 9001, 9002, 9003, 9004, 9005, 9006, 9007, 9008, 9009, 9010, 9015, 9036, 9125, 9254, 9271, A134
Mallinckrodt: 0018, 2432, 2435, 2437, 2438, 2440, 2443, 2445, 2850, H451, H580

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Acetone	67-64-1	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 1 - Slight
Flammability Rating: 4 - Extreme (Flammable)
Reactivity Rating: 2 - Moderate
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors irritates the respiratory tract. May cause coughing, dizziness, dullness, and headache. Higher concentrations can produce central nervous system depression, narcosis, and unconsciousness.
Ingestion:
Swallowing small amounts is not likely to produce harmful effects. Ingestion of larger amounts may produce abdominal pain, nausea and vomiting. Aspiration into lungs can produce severe lung damage and is a medical emergency. Other symptoms are expected to parallel inhalation.
Skin Contact:
Irritating due to defatting action on skin. Causes redness, pain, drying and cracking of the skin.
Eye Contact:
Vapors are irritating to the eyes. Splashes may cause severe irritation, with stinging, tearing, redness and pain.
Chronic Exposure:
Prolonged or repeated skin contact may produce severe irritation or dermatitis.
Aggravation of Pre-existing Conditions:
Use of alcoholic beverages enhances toxic effects. Exposure may increase the toxic potential of chlorinated hydrocarbons, such as chloroform, trichloroethane.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower

eyelids occasionally. Get medical attention.

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5. Fire Fighting Measures

Fire:
Flash point: -20C (-4F) CC
Autoignition temperature: 465C (869F)
Flammable limits in air % by volume:
lel: 2.5; uel: 12.8
Extremely Flammable Liquid and Vapor! Vapor may cause flash fire.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. This material may produce a floating fire hazard. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB(tm) solvent adsorbent is recommended for spills of this product.

---

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred.

Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Acetone:
-OSHA Permissible Exposure Limit (PEL):
1000 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):
500 ppm (TWA), 750 ppm (STEL) A4 - not classifiable as a human carcinogen
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Clear, colorless, volatile liquid.
Odor:
Fragrant, mint-like
Solubility:
Miscible in all proportions in water.
Specific Gravity:

0.79 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
56.5C (133F) @ 760 mm Hg
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
2.0
Vapor Pressure (mm Hg):
400 @ 39.5C (104F)
Evaporation Rate (BuAc=1):
ca. 7.7

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Concentrated nitric and sulfuric acid mixtures, oxidizing materials, chloroform, alkalis, chlorine compounds, acids, potassium t-butoxide.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Oral rat LD50: 5800 mg/kg; Inhalation rat LC50: 50,100mg/m3; Irritation eye rabbit, Standard Draize, 20 mg severe; investigated as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

	---NTP Carcinogen---		
Ingredient	Known	Anticipated	IARC Category
Acetone (67-64-1)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released into water, this material is expected to readily biodegrade. When released to water, this material is expected to quickly evaporate. This material has a log octanol-water partition coefficient of less than 3.0. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material may be moderately degraded by photolysis. When released into the air, this material is expected to be readily removed from the atmosphere by wet deposition.
Environmental Toxicity:
This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: ACETONE
Hazard Class: 3
UN/NA: UN1090
Packing Group: II
Information reported for product/size: 350LB

International (Water, I.M.O.)

Proper Shipping Name: ACETONE
Hazard Class: 3.1
UN/NA: UN1090
Packing Group: II
Information reported for product/size: 350LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

Ingredient	TSCA	EC	Japan	Australia
Acetone (67-64-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Acetone (67-64-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Acetone (67-64-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
Acetone (67-64-1)	5000	U002	No

Chemical Weapons Convention: No TSCA 12(b): Yes CDTA: Yes

SARA 311/312: Acute: Yes Chronic: No Fire: Yes Pressure: No

Reactivity: No (Pure / Liquid)

Australian Hazchem Code: 2[Y]E
Poison Schedule: No information found.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **1** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Label First Aid:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8.
Disclaimer:
****

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

International Chemical Safety Cards

AMMONIUM NITRATE

ICSC: 0216

AMMONIUM NITRATE
Nitric acid, ammonium salt
NH_4NO_3
Molecular mass: 80.1

CAS # 6484-52-2
RTECS # BR9050000
ICSC # 0216
UN # 1942

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible but enhances combustion of other substances. Explosive. Gives off irritating or toxic fumes (or gases) in a fire.	NO contact with combustable or reducing agents.	Water in large amounts. NO other extinguishing agents. In case of fire in the surroundings: use flooding amounts of water in the early stages.
EXPLOSION	Risk of fire and explosion under confinement and high temperatures.		In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position. Evacuate danger area.
EXPOSURE		PREVENT DISPERSION OF DUST!	
• **INHALATION**	Cough. Headache. Sore throat (see Ingestion).	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
• **SKIN**	Redness.	Protective gloves.	First rinse with plenty of water, then remove contaminated clothes and rinse again. Refer for medical attention.
• **EYES**	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	Abdominal pain. Blue lips or fingernails. Blue skin. Convulsions. Diarrhoea. Dizziness. Vomiting. Weakness (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into non-combustible containers. Wash away remainder with plenty of water.	Provision to contain effluent from fire extinguishing. Separated from combustible and reducing substances. Dry.	UN Hazard Class: 5.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0216

International Chemical Safety Cards

AMMONIUM NITRATE

ICSC: 0216

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
ODOURLESS, HYGROSCOPIC, COLOURLESS TO WHITE SOLID IN VARIOUS FORMS.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Heating may cause violent combustion or explosion. The substance decomposes on heating or on burning producing toxic fumes (nitrogen oxides). The substance is a strong oxidant and reacts with combustible and reducing materials.

OCCUPATIONAL EXPOSURE LIMITS (OELs):
TLV not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance irritates the eyes, the skin and the respiratory tract. The substance may cause effects on the the blood , resulting in formation of methaemoglobin.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

PHYSICAL PROPERTIES	Decomposes below boiling point at c.a. 210°C Melting point: 170°C	Relative density (water = 1): 1.7 Solubility in water, g/100 ml at 20°C: 192
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to water.	

NOTES

Becomes shock-sensitive when mixed with organic materials. Rinse contaminated clothes (fire hazard) with plenty of water.

Transport Emergency Card: TEC (R)-51G09
NFPA Code: H 2; F 0; R 3;

ADDITIONAL INFORMATION

ICSC: 0216	**AMMONIUM NITRATE**

IMPORTANT LEGAL NOTICE:	Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.

EXPLOSIVES TECHNOLOGIES INTERNATIONAL -- ANFO P - DRY BLASTING AGENTS
MATERIAL SAFETY DATA SHEET
NSN: 137500N017822
Manufacturer's CAGE: 0E5W7
Part No. Indicator: A
Part Number/Trade Name: ANFO P

General Information

Item Name: DRY BLASTING AGENTS
Company's Name: EXPLOSIVES TECHNOLOGIES INTERNATIONAL
Company's Street: 501 CARR ROAD
Company's City: WILMINGTON
Company's State: DE
Company's Country: US
Company's Zip Code: 19809
Company's Emerg Ph #: 800-424-9300(CHEMTREC)
Company's Info Ph #: 800-255-8384
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 01MAR91
Safety Data Review Date: 18SEP95
MSDS Serial Number: BLTDQ
Hazard Characteristic Code: D1

Ingredients/Identity Information

Proprietary: NO
Ingredient: AMMONIUM (1) NITRATE (1:1); (AMMONIUM NITRATE) (SARA III).
LD50:(ORAL,RAT) 3732 MG/KG.
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: BR9050000
CAS Number: 6484-52-2
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: OIL. LD50: (ORAL,RAT)>43 MG/KG.
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: 1000107OI
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: EFTS OF OVEREXP: LIVER/KIDNEY EFTS. IN LIFETIME SKIN PAINTING STUDY IN MICE, NO. 2 BURNER FUEL REPORTEDLY (ING 4)
Ingredient Sequence Number: 03

NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 3:SHOWED WEAK CARCIN ACTIVITY. TESTS FOR MUTAGENIC ACTIVITY IN BACTERIAL & MAMMALIAN CELL CULTURES HAVE BEEN(ING 5)
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 4: INCONCLUSIVE. HUMAN HLTH EFTS FROM OVEREXP BY INHAL/ INGEST, OR SKIN/EYE CONT MAY INITIALLY INCL SKIN IRRIT(ING 6)
Ingredient Sequence Number: 05
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 5: W/DISCOMFORT/RASH & EYE IRRIT W/DISCOMFORT, TEAR/ BLURRING OF VISION. NITROGEN OXIDE FUMES FROM DETONATION:(ING 7)
Ingredient Sequence Number: 06
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 6:NO*X ARE SKIN/EYE & RESP SYS IRRITANTS. SYSTEMIC TOX RSLT FROM OXIDN OF LUNG TISSUE INCL EMPHYSEMA, (ING 8)
Ingredient Sequence Number: 07
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 7:BRONCHITIS & BRONCHOPNEUMONIA. ACUTE EXPOSURE CAN LEAD TO DEATH FROM ASPHYXIA/PULM EDEMA. IN ANIMALS, N (ING 9)
Ingredient Sequence Number: 08
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 8:OXIDE CAUSED METHEMOGLOBINEMIA, WAS NOT CARCIN, BUT CAUSED EMBRYOTOXICITY & REPRODUCTIVE EFFECTS.
Ingredient Sequence Number: 09

NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: SUPP DATA: CONSUME FOOD, DRINK OR TOBACCO IN AREAS WHERE THEY MAY BECOME CONTAMD W/MATL. DO NOT STORE W/(ING 11)
Ingredient Sequence Number: 10
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 10: OTHER EXPLOSIVES. STORE I/A/W NATL FIRE PROT ASSOC & FED REGS. STORE IN APPROVED TYPE MAGAZINE.
Ingredient Sequence Number: 11
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: FIRST AID PROC:CAUSES PHYSICAL INJURY, GET MEDICAL ATTENTION IMMEDIATELY.
Ingredient Sequence Number: 12
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: SPILL PROC:HEAT/IMPACT. PICK UP BY HAND FOR DISPOSAL USING NON-SPARKING TOOLS. DO NOT USE POWER EQUIPMENT.
Ingredient Sequence Number: 13
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: OTHER PREC:REGS. STORE I/A/W FEDERAL REGS. STORE IN APPROVED MAGAZINE.
Ingredient Sequence Number: 14
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Physical/Chemical Characteristics

Appearance And Odor: FREE-FLOWING SOLID, CREAMY WHITE/PINK/ORANGE/GREEN; SLIGHT FUEL ODOR.

Specific Gravity: 0.8-1.1

Fire and Explosion Hazard Data

Flash Point: BLASTING AGENT
Extinguishing Media: DELUGE W/WATER. DO NOT FIGHT LARGE FIRE.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP (FP N). KEEP PERS REMOVED & UPWIND. ISOLATE AREA. EVACUATE TO SAFE AREA. GUARD AGAINST INTRUDERS.
Unusual Fire And Expl Hazrds: WILL DETONATE IF SUITABLY PRIMED (SEVERE IMPACT, HEAT, FLAME).

Reactivity Data

Stability: NO
Cond To Avoid (Stability): UNSTABLE W/HEAT OR SHOCK.
Materials To Avoid: ACIDS, ALKALIES, OXIDANTS.
Hazardous Decomp Products: HAZARDOUS GASES PRODUCTS ARE NITROGEN OXIDES, SILICA, ALUMINA FUMES.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: SEE INGREDIENTS.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: BLASTING AGENTS ARE MIXTS & HAVE NOT BEEN TESTED FOR TOX. DETONATION MAY CAUSE SEV PHYSICAL INJURY, INCL DEATH. OVEREXP MAY CAUSE HLTH EFTS DESCRIBED FOR COMPONENTS:ING 1:AMMONIUM NITRATE IS SKIN & EYE IRRIT. TOX EFTS IN ANIMALS FROM ACUTE EXPOS BY INGEST INCL NEUROLOGICAL EFTS & NONSPECIFIC EFTS SUCH (EFTS OF OVEREXP)
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT
Signs/Symptoms Of Overexp: HLTH HAZ:AS WT LOSS & IRRIT. HUMAN HLTH EFTS FROM OVEREXP BY SKIN/EYE CONT/INGEST MAY INITIALLY INCL SKIN IRRIT W/ DISCOMFORT/RASH & EYE IRRIT W/DISCOMFORT, TEARING/BLURRING OF VISION. ING 2:MATL IS SKIN IRRIT. TOX EFTS DESCRIBED IN ANIMALS FROM EXPOS BY INHAL INCL LIVER & KIDNEY EFTS. IN LIFETIME SKIN PAINTING (SUPDAT)
Med Cond Aggravated By Exp: INDIVIDUALS W/PRE-EXISTING DISEASES OF THE LUNGS MAY HAVE INCREASED SUSCEPTIBILITY TO TOXICITY OF EXCESSIVE EXPOSURES.
Emergency/First Aid Proc: INHAL:IF DETONATION FUMES ARE INHALED, REMOVE TO FRESH AIR. IF NOT BRTHG, GIVE ARTF RESP, PREF MOUTH-TO-MOUTH. IF BRTHG IS DFCLT, GIVE OXYGEN. CALL MD. SKIN:FLUSH W/WATER. EYE:IMMED FLUSH W/PLENTY OF WATER FOR AT LST 15 MINS. CALL MD. INGEST:INDUCE VOMIT IMMED BY GIVING 2

GLASSES OF WATER & STICKING FINGER DOWN THROAT. NEVER GIVE ANYTHING BY MOUTH TO UNCON PERS. CALL MD. NOTE:IF DETONATION(ING 12)

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REVIEW FIRE & EXPLO HAZS & SAFETY PRECS BEFORE PROCEEDING W/CLEAN UP. USE APPROP PROT EQUIP DURING CLEAN UP. DIKE SPILL. PVNT LIQ FROM ENTERING SEWERS, WATER WAYS/LOW AREAS. DO NOT USE DMGD/WET MATL. CTL ACCESS TO AREA & REMOVE SOURCES OF (ING 13)

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: RECOVER FOR RECLAMATION. CONSULT EXPLOSIVES MFR FOR RECOM METHODS OF DESTROYING EXPLOSIVE MATLS. COMPLY W/APPLIC LOCAL, STATE & FEDERAL REGS UNDER AUTH OF RCRA (40 CFR, PARTS 260-271). DO NOT FLUSH TO SURF WATER/SANITARY SEWER SYSTEM.

Precautions-Handling/Storing: AVOID BRTHG VAPS/MIST. AVOID CONT W/EYES, SKIN & CLTHG. USE/STORE ONLY W/ADEQ VENT. KEEP AWAY FROM HEAT, SPKS & FLAMES. KEEP CNTNR IN A COOL PLACE.

Other Precautions: DO NOT MIX W/ACIDS, ALKALIES, OXIDANTS. CONSULT "ALWAYS' & NEVER'S" ON CASE INSERT SUPPLIED W/PROD. DO NOT CONSUME/STORE FOOD, DRINK/TOBACCO IN AREAS WHERE THEY MAY BECOME CONTAM W/MATL. DO NOT STORE W/OTHER EXPLOS. STORE I/A/W NFPA(ING 14)

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation: USE ONLY W/ADEQUATE VENTILATION.

Protective Gloves: NEOPRENE GLOVES.

Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).

Other Protective Equipment: PROTECTIVE CLOTHING IF SPLASH IS LIKELY.

Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING. WASH CLOTHING AFTER USE.

Suppl. Safety & Health Data: EFTS OF OVEREXP:STUDY IN MICE, NO.2 BURNER FUEL REPORTEDLY SHOWED WEAK CARCIN ACTIVITY. TESTS FOR MUTAGENIC ACTIVITY IN BACTERIAL & MAMMALIAN CELL CULTURES HAVE BEEN INCONCLUSIVE. HUMAN HLTH EFTS FROM OVEREXP BY INHAL, INGEST, SKIN/EYE CONT MAY INITIALLY INCL SKIN IRRIT W/DISCOMFORT/RASH & EYE IRRIT W/ (ING 5)

Transportation Data

Trans Data Review Date: 92093

DOT PSN Code: LDP

DOT Proper Shipping Name: OXIDIZING SOLID, N.O.S.

DOT Class: 5.1

DOT ID Number: UN1479

DOT Pack Group: II

DOT Label: OXIDIZER

IMO PSN Code: LBH

IMO Proper Shipping Name: OXIDIZING SOLID, N.O.S. o
IMO Regulations Page Number: 5163
IMO UN Number: 1479
IMO UN Class: 5.1
IMO Subsidiary Risk Label: -
IATA PSN Code: SVU
IATA UN ID Number: 1479
IATA Proper Shipping Name: OXIDIZING SOLID, N.O.S. *
IATA UN Class: 5.1
IATA Label: OXIDIZER
AFI PSN Code: SVU
AFI Prop. Shipping Name: OXIDIZING SOLID, N.O.S.
AFI Class: 5.1
AFI ID Number: UN1479
AFI Pack Group: II
AFI Basic Pac Ref: 9-10

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 08OCT92
Label Date: 08OCT92
Label Status: G
Common Name: ANFO P
Chronic Hazard: YES
Signal Word: DANGER!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Moderate: X
Reactivity Hazard-Severe: X
Special Hazard Precautions: BLASTING AGENT. DETONATES UPON SEVERE IMPACT, HEAT, FLAME. AVOID ACIDS, ALKALIES, OXIDANTS. DETONATION MAY CAUSE SEVERE PHYSICAL INJURY, INCLUDING DEATH. COMPONENTS OF PRODUCT MAY CAUSE THE FOLLOWING HEALTH EFFECTS:ACUTE: CONTACT:EYE/SKIN IRRITATION, RASH, TEARING/ BLURRED VISION. INHAL:PULMONARY EFFECTS, LUNG IRRITATION, COUGH, DIFFICULT BREATHING. INGEST:WEIGHT LOSS, GI IRRITATION, NEUROLOGICAL EFFECTS. CHRONIC:WEIGHT LOSS, CHRONIC LUNG DISORDERS, LUNG INSUFFICIENCY, EMPHYSEMA, ETC, LIVER/KIDNEY EFFECTS.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: EXPLOSIVES TECHNOLOGIES INTERNATIONAL
Label Street: 501 CARR ROAD
Label City: WILMINGTON
Label State: DE

Label Zip Code: 19809
Label Country: US
Label Emergency Number: 800-424-9300(CHEMTREC)

AMERADA HESS -- REGULAR UNLEADED GASOLINE
MATERIAL SAFETY DATA SHEET
NSN: 913000N023616
Manufacturer's CAGE: 4N717
Part No. Indicator: A
Part Number/Trade Name: REGULAR UNLEADED GASOLINE

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General Information

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Company's Name: AMERADA HESS CORP
Company's Street: 1 HESS PLAZA
Company's City: WOODBRIDGE
Company's State: NJ
Company's Country: US
Company's Zip Code: 07095
Company's Emerg Ph #: 800-424-9300(CHEMTREC)
Company's Info Ph #: 201-750-6000
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 13JAN89
Safety Data Review Date: 08JAN92
MSDS Serial Number: BLZXH
Hazard Characteristic Code: F2

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: GASOLINE
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: LX3300000
CAS Number: 8006-61-9
OSHA PEL: 300 PPM;500 PPM STEL
ACGIH TLV: 300 PPM;500 PPM STEL

Proprietary: NO
Ingredient: TERT-AMYL METHYL ETHER (BLEND OF ING 2&3 FOR A TOTAL OF 15% OF PRODUCT)
Ingredient Sequence Number: 02
Percent: MIX
NIOSH (RTECS) Number: 1007422AM
CAS Number: 994-05-8
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ETHER,TERT-BUTYL METHYL; (METHYL TERT-BUTYL ETHER)

Ingredient Sequence Number: 03
Percent: MIX
NIOSH (RTECS) Number: KNS525000
CAS Number: 1634-04-4
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: TOLUENE
Ingredient Sequence Number: 04
Percent: 6-<3015
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293

Proprietary: NO
Ingredient: XYLENE
Ingredient Sequence Number: 05
Percent: 8.5-<15
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM;150 PPM STEL
ACGIH TLV: 100 PPM;150 PPM STE

Proprietary: NO
Ingredient: BENZENE
Ingredient Sequence Number: 06
Percent: 0.1-<5
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1 PPM; 5 STEL (MFR)
ACGIH TLV: 10 PPM

Proprietary: NO
Ingredient: BENZENE, ETHYL; (ETHYL BENZENE)
Ingredient Sequence Number: 07
Percent: <3
NIOSH (RTECS) Number: DA0700000
CAS Number: 100-41-4
OSHA PEL: 100 PPM;125 PPM STEL
ACGIH TLV: 100 PPM;125 PPM STEL

Proprietary: NO
Ingredient: BENZENE,1,2,4-TRIMETHYL-; (1,2,4-TRIMETHYLBENZENE)
Ingredient Sequence Number: 08
NIOSH (RTECS) Number: DC3325000
CAS Number: 95-63-6

OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: SUPP DATA:IN AIR. HVR/AIR VAP CAN FLOW ALONG SURF TO DISTANT SOURCES OF IGNIT/FLASHBACK. FLOW GASOLINE CAN BE (ING 10)
Ingredient Sequence Number: 09
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 9:IGNITED BY SELF-GENERATED STATIC ELEC. RUNOFF TO SEWERS MAY CREATE FIRE &/OR EXPLOS HAZ.
Ingredient Sequence Number: 10
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: EFTS OF OVEREXP:WILL FATG OLFACTORY SENSES. IMMED DANGER TO HLTH/LIFE IS REPRESENTED BY 2 THOUSANDS(2000)PPM. (ING 12)
Ingredient Sequence Number: 11
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 11:INGEST/INHAL OF LIQ &/OR EXCESS VAP CAN HAVE AN ANESTH EFT, CAUSING VERTIGO, BLURRED VISION, VOMIT & (ING 13)
Ingredient Sequence Number: 12
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 12:CYANOSIS. OVEREXP MAY CAUSE CNS DEPRESSION.
Ingredient Sequence Number: 13
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: SPILL PROC:ACQUATIC LIFE. CAUTION-EVACUATE ALL NON-ESSENTIAL PERS. SPILLED MATL MAY CAUSE SLIPPERY CNDTN. OPEN (ING 15)
Ingredient Sequence Number: 14
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE

ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 14:SPILLS MAY EMIT FLAM VAP. APPROACH FROM UPWIND IF POSS. AVOID BRTHG EMITTED VAP. WEAR SCBA IF REQ TO PVNT(ING 16)
Ingredient Sequence Number: 15
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 15:INHAL OF VAPORS.
Ingredient Sequence Number: 16
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: WASTE DISP METH:FLAMMABLE, VAPORS.
Ingredient Sequence Number: 17
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: HNDLG/STOR PREC:BONDED/GROUNDED TO PVNT POTNTL ACCUMULATION OF STATIC ELEC. NO SMOKING IN AREAS OF HNDLG/STOR. (ING 19)
Ingredient Sequence Number: 18
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 18:STOR SHOULD BE TIGHTLY CLSD CONTR IN COOL/DRY/ISOLATED & WELL VENTD AREA AWAY FROM POTNTL SOURCES OF IGNITION.
Ingredient Sequence Number: 19
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: OTHER PREC:REGULAR/FREQUENT BASIS. VENT MUST BE SUFFICIENT TO PVNT ACCUMULATION OF TOX/FLAM CONC OF VAP IN AIR. (ING 21)
Ingredient Sequence Number: 20
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 20:EMPTY CONTR MAY CNTN TOX/FLAM/COMBUST RESIDUE/VAP. DO NOT CUT/GRIND/DRILL/WELD OR REUSE CONTR UNLESS ADEQ(ING 22)
Ingredient Sequence Number: 21
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 21:PRECAUTIONS AGAINST THESE HAZARDS ARE TAKEN.
Ingredient Sequence Number: 22
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: HYGIENE PRACT: UPPWIND OF VAPOR OR MIST RELEASE, SPILL OR LEAK.
Ingredient Sequence Number: 23
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Physical/Chemical Characteristics

Appearance And Odor: CLEAR LIQ W/STRONG AROMATIC HYDROCARBON ODOR. MAY BE DYED CHARACTERISTIC(SUPDAT)
Boiling Point: 85.0F,29.4C
Vapor Pressure (MM Hg/70 F): SUPP DATA
Vapor Density (Air=1): 3.0-4.0
Specific Gravity: 0.76
Evaporation Rate And Ref: 10-11(BUTYL ACETATE=1)
Solubility In Water: SLIGHT
Percent Volatiles By Volume: 100

Fire and Explosion Hazard Data

Flash Point: -40F,-40C
Flash Point Method: TCC
Lower Explosive Limit: 1.4%
Upper Explosive Limit: 7.4%
Extinguishing Media: ANY APPRVD EXTING AGENT FOR CLASS B FIRES/DRY CHEM/ FOAM/CO*2 OR HALON. H*2O IS NOT ORD EFT. HOWEVER, H*2O FOG(SUPP DATA)
Special Fire Fighting Proc: NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP(FP N). AVOID INHAL OF VAP. H*2O SHOULD BE USED TO KEEP EXPOS CONTR COOL. APPROACH FROM UPWIND IF POSSIBLE.
Unusual Fire And Expl Hazrds: CLASS 1A FLAM LIQ. KEEP AWAY FROM HEAT/ SOURCES OF IGNIT/OXIDIZERS. BURN MAY CAUSE EMISSION OF TOX PROD OF COMBUST.

EMPTY PROD CONTR/VESSELS MAY CNTN (SUPP DATA)

Reactivity Data

Stability: YES
Cond To Avoid (Stability): AVOID HANDLING OR STORING NEAR HEAT, SPARKS OR OPEN FLAME.
Materials To Avoid: OXIDIZING AGENTS. COMBUSTION OF NITRIC AND SULFURIC ACIDS.
Hazardous Decomp Products: CONTACT W/NITRIC & SULFURIC ACIDS WILL FORM NITROCRESOLS THAT CAN DECOMPOSE VIOLENTLY.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: LD50:ORAL(RBT)5 ML/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE/CHRONIC:HARMFUL/FATAL IF SWALLOW/ASPIRATED. LONG TERM EXPOS TO VAP HAS CAUSED CANCER IN SOME LAB ANIMALS. INGEST MAY CAUSE GI DISTURB. ASPIR INTO LUNGS MAY CAUSE PNEUM. PRLNG CONT W/SKIN MAY RSLT IN DEFAT/RED/ITCH/INFLAM/CRACK & POSS SECONDARY INFECTION. HAS LOW ORDER OF ACUTE ORAL TOX IF (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: GASOLINE - IARC 2B; BENZENE, A CONSTITUENT OF GASOLINE:OSHA REGULATED, GROUP 1 (IARC,NTP).
Signs/Symptoms Of Overexp: HLTH HAZ:INGESTED, BUT MIN AMT ASPIR DURING SUCH INGEST MAY CAUSE DEATH. HIGH PRESS SKIN INJECTIONS ARE SERIOUS MED EMER. RPTD/PRLNG EXPOS TO VAP CNTN HIGH CONC OF BENZENE MAY CAUSE ANEMIA & OTHER BLOOD DISEASES, INCL LEUKEMIA. INHAL TO 100PPM MAY CAUSE SLIGHT DROW/HDCH. 100-200PPM MAY CAUSE FATG/NAUS/ITCH & (ING 11)
Med Cond Aggravated By Exp: OPEN WOUNDS, SKIN DISORDERS, CHRONIC RESPIRATORY DISEASE OR PRE-EXISTING CENTRAL NERVOUS SYSTEM DISEASE.
Emergency/First Aid Proc: INHAL:REMOVE TO FRESH AIR, PROVIDE O*2 THERAPY &/OR RESUSCITATION AS INDICATED. SKIN: REMOVE CONTAMINATED CLOTHING AND FLUSH WITH SOAP AND WATER. EYE: FLUSH WITH WATER FOR AT LEAST 15 MIN. INGEST: RINSE MOUTH WITH WATER. KEEP CALM AND WARM. DO NOT INDUCE VOMIT! ASPIRATION OF MATERIAL INTO LUNGS MAY CAUSE CHEMICAL PNEUMONIA. CALL PHYS IMMED.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: CNTN ALL SPILLS. ABSORB ALL FREE LIQ. REMOVE ALL IGNIT SOURCES/SAFELY STOP FLOW OF SPILL. PVNT FROM ENTER ALL BODIES OF

H*2O. COMPLY W/ALL APPLIC LAWS/REGS. ABSORB MATL/PADS/SAND/EARTH MAY BE USED. CONTAMD H*2O/SOIL MAY BE HAZ TO ANIMAL/ (ING 14)
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF PROD/CONTAMD MATL AS EPA "IGNITABLE HAZ WASTE". USE ONLY APPRVD TRTMT TRANSPORTERS & DISP SITE IN COMPLIANCE W/ALL APPLICA FED/ST/LOC REGS. MAINTAIN SURVEILLANCE OF ABSORBED MATL UNTIL FINAL DISP TO OBSERVE FOR EMISSION OF VOLAT, (ING 17)
Precautions-Handling/Storing: KEEP AWAY FROM HEAT/SPARKS/OPEN FLAME. AVOID BRTHG VAP/MIST. AVOID SKIN/EYE CONT. KEEP CONTR CLSD & PLAINLY LBLD. TRANSFER LINES MUST BE (ING 17)
Other Precautions: USE ONLY AS MOTOR FUEL. HNDL/TRANSPORT/STORE IN ACCORD W/APPLIC LAWS/REGS. ELEC EQUIP SHOULD BE APPRVD FOR CLASSIFIED AREA. REMOVE SOILED CLTHG/LAUNDER BEFORE RE-USE. DISCARD OIL SOAKED SHOES. WEAR FULL LNGTH CLTHG/LAUNDER ON (ING 18)

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED SCBA IN CONFINED SPACES OR WHEN EXPOSED TO HEAVY MIST.
Ventilation: LOCAL EXHAUST:GENERALLY NOT REQUIRED. MECH(GEN): EXPLOSION PROOF(APPROVED FOR CLASSIFIED AREA).
Protective Gloves: IMERVIOUS GLOVES.
Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).
Other Protective Equipment: IMPERVIOUS CLOTHING, EYEWASH/BATH.
Work Hygienic Practices: WASH SKIN THORO W/SOAP/H*2O BEFORE EAT/DRINK/ SMOKING. VENT MAY BE USED TO CTRL/REDUCE AIRBORNE CONC. STAND (ING 23)
Suppl. Safety & Health Data: VP: 275-475@68F. APPEAR/ODOR:COLOR FOR IDENTIFICATION(CLEAR RED/BRONZE/YELLOW ARE TYPICAL). EXTING MEDIA:MAY BE USED BY EXPER FIRE FIGHT FOR INTENSITY CTRL/TO COOL EXPOS AREAS. EXPLOS HAZ:EXPLOS VAP. DO NOT PRESSURIZE/CUT/HEAT/WELD/EXPOSE SUCH CONTR OR VESSELS TO SOURCES OF IGNIT. VAP CAN READILY FORM EXPLOS MIX(ING 9)

Transportation Data

Trans Data Review Date: 92072
DOT PSN Code: GTN
DOT Proper Shipping Name: GASOLINE
DOT Class: 3
DOT ID Number: UN1203
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HRV
IMO Proper Shipping Name: GASOLINE
IMO Regulations Page Number: 3141
IMO UN Number: 1203
IMO UN Class: 3.1
IMO Subsidiary Risk Label: -
IATA PSN Code: RMF

IATA UN ID Number: 1203
IATA Proper Shipping Name: MOTOR SPIRIT
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MUC
AFI Prop. Shipping Name: GASOLINE
AFI Class: 3
AFI ID Number: UN1203
AFI Pack Group: II
AFI Basic Pac Ref: 7-7

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Disposal Data

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Label Data

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Label Required: YES
Label Status: G
Common Name: REGULAR UNLEADED GASOLINE
Special Hazard Precautions: ACUTE/CHRONIC:HARMFUL/FATAL IF SWALLOW/ ASPIRATED. LONG TERM EXPOS TO VAP HAS CAUSED CANCER IN SOME LAB ANIMALS. INGEST MAY CAUSE GI DISTURB. ASPIR INTO LUNGS MAY CAUSE PNEUM. PRLNG CONT W/SKIN MAY RSLT IN DEFAT/RED/ITCH/INFLAM/CRACK & POSS SECONDARY INFECTION. HAS LOW ORDER OF ACUTE ORAL TOX IF (EFTS OF OVEREXP) HLTH HAZ: INGESTED, BUT MIN AMT ASPIR DURING SUCH INGEST MAY CAUSE DEATH. HIGH PRESS SKIN INJECTIONS ARE SERIOUS MED EMER. RPTD/PRLNG EXPOS TO VAP CNTN HIGH CONC OF BENZENE MAY CAUSE ANEMIA & OTHER BLOOD DISEASES, INCL LEUKEMIA. INHAL TO 100PPM MAY CAUSE SLIGHT DROW/HDCH. 100-200PPM MAY CAUSE FATG/NAUS/ ITCH & (ING 11)
Label Name: AMERADA HESS CORP
Label Street: 1 HESS PLAZA
Label City: WOODBRIDGE
Label State: NJ
Label Zip Code: 07095
Label Country: US
Label Emergency Number: 00-424-9300(CHEMTREC)

ADVANTAGE BATTERY -- ADVANTAGE BATTERY - BATTERY,STORAGE,LEAD ACID,WET CHARGED,MAINTENANCE FREE
MATERIAL SAFETY DATA SHEET
NSN: 6140012038980
Manufacturer's CAGE: 0VW59
Part No. Indicator: A
Part Number/Trade Name: ADVANTAGE BATTERY

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General Information

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Item Name: BATTERY,STORAGE,LEAD ACID,WET CHARGED,MAINTENANCE FREE
Company's Name: ADVANTAGE BATTERY CORP
Company's Street: 8701 BEDFORD-EULESS RD SUITE 501
Company's City: HURST
Company's State: TX
Company's Country: US
Company's Zip Code: 76053
Company's Emerg Ph #: 800-367-1407
Company's Info Ph #: 800-367-1407
Distributor/Vendor # 1: CELL ENERGY INC (916-484-7974)
Distributor/Vendor # 1 Cage: 1U269
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 29APR94
Safety Data Review Date: 11MAR96
Supply Item Manager: CX
MSDS Preparer's Name: ROBERTA JONES
Preparer's Company: ADVANTAGE BATTERY CO
MSDS Serial Number: BYFZW
Specification Number: W-B-131
Hazard Characteristic Code: C1
Unit Of Issue: EA
Unit Of Issue Container Qty: 1 EACH
Type Of Container: BATTERY
Net Unit Weight: UNKNOWN

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: SULFURIC ACID (SARA 302/313) (CERCLA), BATTERY ACID, ELECTROLYTE
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: WS5600000
CAS Number: 7664-93-9
OSHA PEL: 1 MG/M3
ACGIH TLV: 1 MG/M3/3 STEL; 9495
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS, ODORLESS LIQUID.
Boiling Point: 230F,110C
Specific Gravity: 1.24 @80F
Solubility In Water: 100%

Fire and Explosion Hazard Data

Lower Explosive Limit: NONE
Upper Explosive Limit: NONE
Extinguishing Media: WATER, CARBON DIOXIDE, DRY CHEMICAL. SULFURIC ACID NOT COMBUSTIBLE.
Special Fire Fighting Proc: SULFURIC ACID NOT COMBUSTIBLE. USE WATER, CARBON DIOXIDE, OR DRY CHEMICAL ON FIRES.
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): AVOID SHORTING. USE ONLY APPROVED CHARGING METHODS. DO NOT PUNCTURE BATTERY CASE.
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomp Products: NONE SPECIFIED BY MANUFACTURER.
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

LD50-LC50 Mixture: UNKNOWN
Route Of Entry - Inhalation: NO
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: NOT APPLICABLE FOR FINISHED PRODUCT USED IN NORMAL CONDITIONS. WHEN BATTERY CASE BROKEN/LEAKING ELECTROLYTE SEVERE BURNS TO ALL TISSUE MAY OCCUR.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Signs/Symptoms Of Overexp: SEVERE BURNS TO ALL TISSUES FROM SULFURIC ACID.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: IMMED APPLICATION OF A LARGE QUANTITY OF RUNNING WATER.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WEAR SAFETY GLASSES, ACID-RESISTNAT GLOVES & FULL COVARAGE ACID RESISTANT CLOTHING. USE SODA ASH TO NEUTRALIZE. FLUSH W/

LARGE AMTS OF WATER.
Neutralizing Agent: SODA ASH.
Waste Disposal Method: PLACE IN AICD RESISTANT CONTAINERS. DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. DO NOT INCINERATE.
Precautions-Handling/Storing: STORE IN WELL VENTILATED & COOL AREA.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: NOT APPLICABLE FOR FINISHED PRODUCT.
Ventilation: NOT APPLICABLE FOR FINISHED PRODUCT.
Protective Gloves: ACID RESISTANT GLOVES.
Eye Protection: SAFETY GLASSES.
Other Protective Equipment: ACID RESISTANT CLOTHING.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Trans Data Review Date: 96071
DOT PSN Code: BQN
DOT Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID
DOT Class: 8
DOT ID Number: UN2794
DOT Pack Group: III
DOT Label: CORROSIVE
IMO PSN Code: BWD
IMO Proper Shipping Name: BATTERIES,WET,FILLED WITH ACID
IMO Regulations Page Number: 8120
IMO UN Number: 2794
IMO UN Class: 8
IMO Subsidiary Risk Label: -
IATA PSN Code: CZM
IATA UN ID Number: 2794
IATA Proper Shipping Name: BATTERIES, WET, FILLED WITH ACID
IATA UN Class: 8
IATA Label: CORROSIVE
AFI PSN Code: CZM
AFI Prop. Shipping Name: BATTERIES, WET, FILLED WITH ACID
AFI Class: 8
AFI ID Number: UN2794
AFI Pack Group: III
AFI Basic Pac Ref: A12.5
BATTERY,WET,FILLED W/ACID.

Disposal Data

Label Data

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Label Required: YES
Technical Review Date: 11MAR96
Label Status: F
Common Name: ADVANTAGE BATTERY
Signal Word: WARNING!
Acute Health Hazard-Slight: X
Contact Hazard-Moderate: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: NOT APPLICABLE FOR FINISHED PRODUCT USED IN NORMAL CONDITIONS. WHEN BATTERY CASE BROKEN/LEAKING ELECTROLYTE SEVERE BURNS TO ALL TISSUE MAY OCCUR. STORE IN WELL VENTILATED & COOL AREA. FIRST AID: IMMED APPLICATION OF A LARGE QUANTITY OF RUNNING WATER. FIRE:USE WATER, CARBON DIOXIDE, DRY CHEMICAL. SPILL/DISPOSAL:WEAR SAFETY PERSONNEL PROTECTIVE EQPMT. USE SODA ASH TO NEUTRALIZE ELECTROLYTE. FLUSH W/LG AMTS OF WATER. PLACE IN ACID RESISTANT CONTNRS. DISPOSE OF IN ACCORDANCE W/ LOCAL, STATE AND FEDERAL REGULATIONS.
Protect Eye: Y
Protect Skin: Y
Label Name: ADVANTAGE BATTERY CORP
Label Street: 8701 BEDFORD-EULESS RD SUITE 501
Label City: HURST
Label State: TX
Label Zip Code: 76053
Label Country: US
Label Emergency Number: 800-367-1407
Year Procured: 1996

AGE REFINING & MARKETING -- DIESEL FUEL OIL - DIESEL FUEL
MATERIAL SAFETY DATA SHEET
NSN: 9140002865295
Manufacturer's CAGE: 0T116
Part No. Indicator: A
Part Number/Trade Name: DIESEL FUEL OIL

General Information

Item Name: DIESEL FUEL
Company's Name: AGE REFINING AND MARKETING
Company's Street: 7811 S PRESA
Company's City: SAN ANTONIO
Company's State: TX
Company's Country: US
Company's Zip Code: 78223-3531
Company's Emerg Ph #: 512-532-5300
Company's Info Ph #: 512-532-5300
Record No. For Safety Entry: 020
Tot Safety Entries This Stk#: 092
Status: SE
Date MSDS Prepared: 13APR92
Safety Data Review Date: 11AUG93
Supply Item Manager: KY
MSDS Serial Number: BRJJH
Specification Number: VV-F-800
Spec Type, Grade, Class: GRADE DF-2
Hazard Characteristic Code: F4
Unit Of Issue: DR
Unit Of Issue Container Qty: 5 GAL
Type Of Container: CAN
Net Unit Weight: 33.8 LBS

Ingredients/Identity Information

Proprietary: NO
Ingredient: LIGHT HYDROCARBON BLEND, CAS NO. 8008-20-6 CAS NO. 64741-44-2 CAS NO. 64742-88-7
Ingredient Sequence Number: 01
Percent: 100%
NIOSH (RTECS) Number: 1000011HC
OSHA PEL: UNKNOWN
ACGIH TLV: UNKNOWN
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR TO YELLOW, TYPICAL HYDROCARBON ODOR.

Boiling Point: 360-572F
Melting Point: NA
Vapor Pressure (MM Hg/70 F): 0.1
Vapor Density (Air=1): NA
Specific Gravity: 0.81-0.86
Decomposition Temperature: NA
Evaporation Rate And Ref: NA
Solubility In Water: TRACE
Percent Volatiles By Volume: 100
pH: NA
Corrosion Rate (IPY): NA

Fire and Explosion Hazard Data

Flash Point: 100F,38C
Flash Point Method: PMCC
Lower Explosive Limit: 1
Upper Explosive Limit: 5
Extinguishing Media: FOAM, DRY CHEMICAL, CARBON DIOXIDE. WATER MAY BE INEFFECTIVE. USE WATER TO COOL & PROTECT MATERIAL & MEN, FLUSH SPILL.
Special Fire Fighting Proc: MINIMIZE BREATHING GASES, VAPOR, FUMES OR DECOMPOSITION PRODUCTS. USE SUPPLIED AIR BREATHING APPARATUS IN ENCLOSED OR CONFINED AREAS OR AS OTHERWISE NEEDED.
Unusual Fire And Expl Hazrds: NA

Reactivity Data

Stability: YES
Cond To Avoid (Stability): UNDER NORMAL CONDITIONS, THE MATERIAL IS STABLE.
Materials To Avoid: STRONG OXIDANTS SUCH AS LIQUID CHLORINE, CONCENTRATED OXYGEN, SODIUM HYPOCHLORITE OR CALCIUM HYPOCHLORITE.
Hazardous Decomp Products: FUMES, SMOKE, CARBON MONOXIDE, ALDEHYDES AND OTHER DECOMPOSITION PRODUCTS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): MATERIAL IS NOT KNOWN TO POLYMERIZE.

Health Hazard Data

LD50-LC50 Mixture: ORAL LD50 (RAT) IS = 5-15 G/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: ACUTE: CENTRAL NERVOUS SYSTEM DEPRESSION WITH EXTREME EXPOSURE; EFFECTS MAY INCLUDE ANESTHESIA, COMA, RESPIRATORY ARREST, AND IRREGULAR HEART RATE. OXYGEN DEPRIVATION IS POSSIBLE IF WORKING IN A CONFINED AREA. CHRONIC: NO KNOWN MAJOR CUMULATIVE OR LATENT EFFECTS HAVE BEEN REPORTED.

Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT CARCINOGENIC.
Signs/Symptoms Of Overexp: INHALATION-IRRITATION OF THE UPPER RESPIRATORY TRACT, DEPRESSION, DIZZINESS, HEADACHE, UNCOORDINATION, ANESTHESIA, COMA & RESPIRATORY ARREST. SKIN-DEFATTING, IRRITATION & BURNING SENSATION & SWELLING OF LIDS. EYE-SEVERE BURNING SENSATION. INGESTION- IRRITATION OF THROAT, ESOPHAGUS & STOMACH, VOMITING.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES-FLUSH EYES WITH LARGE AMOUNTS OF WATER FOR 15 MIN. SEEK MEDICALA TTENTION. SKIN-WASH WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHES & FOOTWARE. SEEK MEDICAL ATTENTION. INHALATION-REMOVE TO FRESH AIR; RESTORE BREATHING IF NEEDED; ADMINISTER OXYGEN; SEEK MEDICAL HELP. INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS, KEEP AIRWAY CLEAR. SEEK MEDICAL ATTENTION IMMEDIATELY.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ELIMINATE SOURCES OF IGNITION. CONFINE AREA TO CLEANUP PERSONNEL. VENTILATE CONFINED AREAS. USE EXPLOSION PROOF EQUIPMENT. ABSORB &/OR CONFINE LIQUID WITH SAND, EARTH OR OTHER SUITABLE MATERIAL. KEEP PRODUCT OUT OF SEWERS OR WATERCOURSES.
Waste Disposal Method: DISPOSAL OF WASTE MATERIAL ARE REGULATED AND ACTION TO HANDLE OR DISPOSE OF SPILLED OR RELEASED MATERIALS MUST MEET ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
Precautions-Handling/Storing: PROTECT AGAINST PHYSICAL DAMAGE. OUTSIDE OR DETACHED STORAGE PREFERRED. STORE IN COOL, WELL-VENTILATED AREA AWAY FROM IGNITION SOURCES & OXIDIZERS.
Other Precautions: TO PREVENT FIRE OR EXPLOSION RISK FROM STATIC ACCUMULATION & DISCHARGE, GROUND PRODUCT TRANSFER SYSTEM IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION FOR PETROLEUM PRODUCTS.

Control Measures

Respiratory Protection: RESPIRATORY PROTECTION NOT REQUIRED UNDER NORMAL USE. USE NIOSH.MSHA APPROVED ORGANIC VAPOR RESPIRATOR FOLLOWING MANUFACTURERS RECOMMENDATIONS WHERE SPRAY, MIST OR VAPORS MAY CAUSE SUGGESTED TLV TO BE EXCEEDED.
Ventilation: WORK IN VENTILATED AREAS. SPECIAL VENTILATION IS NOT REQUIRED UNDER NORMAL USE.
Protective Gloves: IMPERVIOUS GLOVES.
Eye Protection: FACE SHIELD & GOGGLES, CHEMICAL GOGGLES.
Other Protective Equipment: STANDARD WORK CLOTHING. CLOTHES OR FOOTWARE THAT CANNOT BE DECONTAMINATED SHOULD BE DISCARDED.
Work Hygienic Practices: SHOWER AND EYE WASH FACILITIES SHOULD BE ACCESSIBLE.
Suppl. Safety & Health Data: NOTE TO PHYSICIAN-GASTRIC LAVAGE ONLY IF

LARGE QUANTITIES HAVE BEEN INGESTED. GUARD AGAINST ASPIRATION INTO LUNGS WHICH MAY RESULT IN CHEMICAL PNEUMONITIS. IRREGULAR HEART BEAT MAY OCCUR; USE OF ADRENALIN IS NOT ADVISABLE. TREAT SYMPTOMATICALLY.

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Transportation Data

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Trans Data Review Date: 93223
DOT PSN Code: GJL
DOT Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
DOT Class: 3
DOT ID Number: UN1993
DOT Pack Group: III
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HIA
IMO Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. o
IMO Regulations Page Number: 3345
IMO UN Number: 1993
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: MCA
IATA UN ID Number: 1993
IATA Proper Shipping Name: FLAMMABLE LIQUID, N.O.S. *
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MCA
AFI Prop. Shipping Name: FLAMMABLE LIQUIDS, N.O.S.
AFI Class: 3
AFI ID Number: UN1993
AFI Pack Group: III
AFI Basic Pac Ref: 7-7
MMAC Code: NR

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 11AUG93
Label Status: F
Common Name: DIESEL FUEL OIL
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X
Special Hazard Precautions: IN CASE OF SPILL: ELIMINATE SOURCES OF

IGNITION. CONFINE AREA TO CLEANUP PERSONNEL. VENTILATE CONFINED AREAS. USE EXPLOSION PROOF EQUIPMENT. ABSORB &/OR CONFINE LIQUID WITH SAND, EARTH OR OTHER SUITABLE MATERIAL. KEEP PRODUCT OUT OF SEWERS OR WATERCOURSES. FIRST AID: EYES-FLUSH EYES WITH LARGE AMOUNTS OF WATER FOR 15 MIN. SEEK MEDICALA TTENTION. SKIN-WASH WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHES & FOOTWARE. SEEK MEDICAL ATTENTION. INHALATION-REMOVE TO FRESH AIR; RESTORE BREATHING IF NEEDED; ADMINISTER OXYGEN; SEEK MEDICAL HELP. INGESTION-DO NOT INDUCE VOMITING. IF VOMITING OCCURS, KEEP AIRWAY CLEAR. SEEK MEDICAL ATTENTION IMMEDIATELY.
Protect Eye: Y
Protect Skin: Y
Label Name: AGE REFINING AND MARKETING
Label Street: 7811 S PRESA
Label City: SAN ANTONIO
Label State: TX
Label Zip Code: 78223-3531
Label Country: US
Label Emergency Number: 512-532-5300

SHIELDALLOY METALLURGICAL -- FERROSILICON
MATERIAL SAFETY DATA SHEET
NSN: 963000N052684
Manufacturer's CAGE: IN758
Part No. Indicator: A
Part Number/Trade Name: FERROSILICON

General Information

Company's Name: SHIELDALLOY METALLURGICAL CORP
Company's Street: 12 WEST BLVD
Company's P. O. Box: 768
Company's City: NEWFIELD
Company's State: NJ
Company's Country: US
Company's Zip Code: 08344
Company's Emerg Ph #: 800-424-9300 (CHEMTREC)
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 01SEP89
Safety Data Review Date: 06SEP94
MSDS Serial Number: BVMSN
Hazard Characteristic Code: NK

Ingredients/Identity Information

Proprietary: NO
Ingredient: IRON
Ingredient Sequence Number: 01
Percent: BALANCE
NIOSH (RTECS) Number: NO4565500
CAS Number: 7439-89-6
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: SILICON
Ingredient Sequence Number: 02
Percent: 47-76
NIOSH (RTECS) Number: VW0400000
CAS Number: 7440-21-3
OSHA PEL: 10 MG/M3 TDUST
ACGIH TLV: 10 MG/M3 TDUST

Physical/Chemical Characteristics

Appearance And Odor: SILVER METALLIC, POWDER, ODORLESS

Boiling Point: N/A
Melting Point: >2192F,>120
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: 2-5
Evaporation Rate And Ref: NOT APPLICABLE
Solubility In Water: INSOLUBLE/NEGLIGIBLE
Percent Volatiles By Volume: N/A

Fire and Explosion Hazard Data

Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: CLASS D FIRE:DO NOT USE WATER. USE DRY CHEMICAL, DRY SAND OR CO*2 TO SMOTHER FIRE.
Special Fire Fighting Proc: NIOSH/MSHA APPRVD SCBA & FULL PROT EQUIP (FP N).FIRE MAY BE ISOLATED & ALLOWED TO BURN ITSELF OUT. DO NOT DISTURB BURNING METAL WHILE EXTING THE FIRE.
Unusual Fire And Expl Hazrds: FIRES/EXPLOSIONS MAY BE INITIATED BY EXPOSING ANY CONCENTRATED DUST SUSPENSION IN AN ENCLOSED AREA TO SPARK/ FLAME.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NOT APPLICABLE
Materials To Avoid: ACIDS, STRONG OXIDIZERS, STRONG BASES.
Hazardous Decomp Products: NONE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE:EFFECTS ASSOCIATED W/OVEREXPOSURE TO METAL DUSTS MAY INCLUDE RESPIRATORY IRRITATION, CONJUNCTIVITIS, PNEUMOCONIOSIS, ETC.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT.
Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INGEST:CALL MD IMMEDIATELY (FP N). INHAL:IF

IRRITATION OCCURS, REMOVE TO FRESH AIR. CONT PHYS. SKIN:IF IRRITATION OCCURS, WASH SKIN. CONT PHYS. EYES:IF IRRITATION OCCURS, FLUSH EYES FOR AT LEAST 15 MINUTES. CONT PHYS.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: NO SPECIAL STEPS NECESSARY.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSE OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.
Precautions-Handling/Storing: AVOID AND CONTROL OPERATIONS WHICH CREATE DUSTING.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: IN DUSTY AREAS, USE NIOSH/MSHA APPROVED SCHEDULED 21-C RESPIRATOR.
Ventilation: LOCAL EXHAUST:RECOMMENDED WHERE DUSTING MAY OCCUR. MECHANICAL (GENERAL):USE FOR GENERAL AREA CONTROL.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Trans Data Review Date: 94249

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 06SEP94
Label Date: 08SEP94
Label Status: G
Common Name: FERROSILICON
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE:EFFECTS ASSOCIATED WITH OVEREXPOSURE TO METAL DUST MAY INCLUDE RESPIRATORY IRRITATION, CONJUNCTIVITIS, AND

PNEUMOCONIOSIS (LUNG DISEASE-BLACK LUNG). CHRONIC:LUNG DISEASE.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: SHIELDALLOY METALLURGICAL CORP
Label Street: 12 WEST BLVD
Label P.O. Box: 768
Label City: NEWFIELD
Label State: NJ
Label Zip Code: 08344
Label Country: US
Label Emergency Number: 800-424-9300 (CHEMTREC)

EAGLE-PICHER INDUSTRIES -- FLOOR DRY, CELATOM
MATERIAL SAFETY DATA SHEET
NSN: 962000N030696
Manufacturer's CAGE: 0PXU6
Part No. Indicator: B
Part Number/Trade Name: FLOOR DRY, CELATOM

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General Information

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Company's Name: EAGLE-PICHER INDUSTRIES INC
Company's Street: 1755 E PLUMB LANE SUITE 151
Company's City: RENO
Company's State: NV
Company's Country: US
Company's Zip Code: 89510
Company's Emerg Ph #: 702-333-7600
Company's Info Ph #: 702-322-3331; 702-333-7632
Record No. For Safety Entry: 002
Tot Safety Entries This Stk#: 002
Status: SMJ
Date MSDS Prepared: 01JUL93
Safety Data Review Date: 14JUL95
MSDS Preparer's Name: PATRICK T. FLYNN, JR.
Preparer's Company: SAME
MSDS Serial Number: BXZPX

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: DIATOMACEOUS EARTH (DIATOMACEOUS SILICA); (DIATOMACEOUS EARTH, CALCINED)
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: 1000784CE
CAS Number: 91053-39-3
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: SILICA, CRYSTALLINE - CRISTOBALITE; (CRYSTALLINE SILICA (CRISTOBALITE))
Ingredient Sequence Number: 02
Percent: <1
NIOSH (RTECS) Number: VV7325000
CAS Number: 14464-46-1
OSHA PEL: N/K (FP N)
ACGIH TLV: 0.05 MG/M3 RDUST

Proprietary: NO
Ingredient: SILICA, CRYSTALLINE - QUARTZ; (CRYSTALLINE SILICA (QUARTZ))
Ingredient Sequence Number: 03
Percent: <1
NIOSH (RTECS) Number: VV7330000
CAS Number: 14808-60-7
OSHA PEL: N/K (FP N)
ACGIH TLV: 0.1 MG/M3 RDUST

Proprietary: NO
Ingredient: SUPDAT: MOST IMPORTANT CONTRIBUTORS TO EXCESS IN NMRD & LUNG CANCER. ALSO, IMPROVEMENTS IN DUST CTL IN INDUSTRY (ING 5)
Ingredient Sequence Number: 04
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 4: APPEAR TO HAVE ABATED EXCESS RISK OF SILICOSIS & LUNG CANCER IN TODAY'S WORK ENVIRON. TARGET ORGAN: LUNGS.
Ingredient Sequence Number: 05
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: RESP PROT: DUST CONC IS GREATER THAN 10 TIMES & LESS THAN 100 TIMES PEL USE FULL FACEPLATE RESP W/REPLACEABLE (ING 7)
Ingredient Sequence Number: 06
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 6: DUST FILTER; IF GREATER THAN 100 & LESS THAN 200 TIMES PEL USE POWER AIR-PURIFYING (POS PRESS) RESP (ING 8)
Ingredient Sequence Number: 07
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 7: W/REPLACEABLE FILTER; IF GREATER THAN 200 TIMES PEL USE TYPE C, SUPPLIED-AIR RESP, CONTINUOUS FLOW TYPE (ING 9)
Ingredient Sequence Number: 08
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 8: (POS PRESS) WITH FULL FACEPIECE, HOOD OR HELMET.
Ingredient Sequence Number: 09
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Physical/Chemical Characteristics

Appearance And Odor: ODORLESS, GRANULAR PRODUCT, BUFF TO OFF-WHITE.
Boiling Point: N/A
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: 2.2
Solubility In Water: <2%
pH: SUPDAT

Fire and Explosion Hazard Data

Extinguishing Media: MEDIA SUITABLE FOR SURROUNDING FIRE (FP N).
Special Fire Fighting Proc: USE NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: HYDROFLUORIC ACID; PRODUCTS CONTAINING SILICA MAY REACT VIOLENTLY WITH HYDROFLUORIC ACID.
Hazardous Decomp Products: NOT APPLICABLE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE: INHAL: UPPER RESP IRRIT. MAY CAUSE COUGH/THROAT IRRIT. CAN CAUSE DRYNESS OF NASAL PASSAGES & CONGESTION OF UPPER RESP TRACT. SKIN: NOT ABSORBED BY SKIN. MAY CAUSE DRYNESS. EYES: MAY CAUSE IRRIT/INFLAMM. INGEST: SHORT-TERM EXPOS NOT CONSIDERED HARMFUL. CHRONIC:INHAL OF CRYSTALLINE SILICA DUST IN (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: NO
IARC MONO, SUPP, VOL 7, PG 341, 1987:GRP 2A. NTP 7TH ANNUAL RPT (SUPDAT)
Signs/Symptoms Of Overexp: HLTH HAZ: EXCESS OF TLV/PEL OVER EXTENDED NUMBER OF YRS MAY CAUSE SILICOSIS, PROGRESSIVE SOMETIMES FATAL LUNG DISEASE. MFR W/OTHER MEMBERS OF INTERNATL DIATOMITE PRODUCERS ASSOC SPONSORED STUDY TO EXAMINE LONG TERM HLTH EFTS AMONG CERTAIN WORKERS IN DIATOMACEOUS EARTH (DE) INDUSTRY. REPORT CONCLUDED AN INCR IN (SUPDAT)
Med Cond Aggravated By Exp: PRE-EXISTING DISEASES OF THE UPPER RESPIRATORY TRACT AND LUNG SUCH AS BRONCHITIS, EMPHYSEMA AND ASTHMA.
Emergency/First Aid Proc: SKIN: USE MOISTURE RENEWING LOTIONS IF DRYNESS OCCURS. EYES: WASH WITH GENEROUS QUANTITIES OF WATER FOR AT LEAST 15 MINUTES. CONSULT MD IF IRRITATION PERSISTS. INHAL: REMOVE TO FRESH AIR. INGEST: DRINK GENEROUS AMOUNTS OF WATER TO REDUCE BULK AND DRYING EFFECTS.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: VACUUM CLEAN SPILLAGE, WET SWEEP OR WASH AWAY. AVOID CREATING DUST.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSAL MUST BE IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS (FP N). NON-BIODEGRADABLE. USE SOLID WASTE DISPOSAL COMMON TO LANDFILL TYPE OPERATIONS OR IN SLURRY TO DUMPS. NOT CONSIDERED A HAZARDOUS WASTE UNDER RCRA (40 CFR PART 261).
Precautions-Handling/Storing: AVOID CREATING DUST. REPAIR OR PROPERLY DISPOSE OF BROKEN BAGS. STORE IN A DRY PALCE TO MAINTAIN PRODUCT QUALITY.
Other Precautions: MAINTENANCE OF CRYSTALLINE SILICA DUST CONCENTRATIONS AT OR BELOW LEVELS SET BY OCCUPATIONAL STANDARD SETTING AGENCIES WILL MINIMIZE/ELIMINATE POTENTIAL RISK OF NON-MALIGNANT RESPIRATORY DISEASE (NMRD) OR LUNG CANCER.

Control Measures

Respiratory Protection: NIOSH/MSHA APPRVD RESPS FOR PROT AGAINST PNEUMOCONIOSIS PRODUCING DUSTS RECOM WHEN DUST IS PRESENT. IF DUST CONC IS LESS THAN 10 TIMES PEL USE QUARTER OR HALF MASK RESP W/REPLACEMENT DUST FILTER/SINGLE USE DUST RESP W/VALVE. IF (ING 6)
Ventilation: LOCAL. CONTROL W/IN RECOM TLV/PEL. REFER TO ACGIH PUB "INDUSTRIAL VENT" OR SIMILAR PUBS FOR DESIGN OF VENT SYSTEMS.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES (FP N).
Other Protective Equipment: PROTECTIVE CLOTHING/FOOTWEAR NOT NORMALLY NECESSARY.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: PH: 7 (10% SLURRY). EXPLAN OF CARCIN: ON CARCINS, 1994:ANTIC TO BE CARCIN. EFTS OF OVEREXP: NON-MALIGNANT RESP DISEASE (NMRD) & LUNG CANCER INCIDENCE AMONG DE WORKERS STUDIED WHEN COMPARED TO NATL & REGIONAL POPULATIONS. IT FURTHER CONCLUDED RELATIVELY INTENSE EXPOS THAT OCCURRED BEFORE 1950'S WERE PROBABLY (ING 4)

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 13JUL95
Label Date: 03JUL95
Label Status: G
Common Name: FLOOR DRY, CELATOM
Chronic Hazard: YES
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE: INHALATION: UPPER RESPIRATORY TRACT IRRITANT. MAY CAUSE COUGHING OR THROAT IRRITATION. SKIN: MAY CAUSE DRYNESS. EYES: MAY CAUSE IRRITATION OR INFLAMMATION. CHRONIC: CANCER HAZARD. CONTAINS SILICA, CRYSTALLINE-CRISTOBALITE AND -QUARTZ WHICH ARE LISTED AS ANIMAL LUNG CARCINOGENS (FP N). CRYSTALLINE SILICA MAY CAUSE SILICOSIS, A PROGRESSIVE SOMETIMES FATAL LUNG DISEASE.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: EAGLE-PICHER INDUSTRIES INC
Label Street: 1755 E PLUMB LANE SUITE 151
Label City: RENO
Label State: NV
Label Zip Code: 89510
Label Country: US
Label Emergency Number: 702-333-7600

ETHYLENE GLYCOL

MSDS Number: E5125 --- *Effective Date: 02/25/99*

1. Product Identification

Synonyms: 1,2-Ethanediol; glycol; 1,2-Dihydroxyethane; Ethylene Alcohol; Ethulene Dihydrate
CAS No.: 107-21-1
Molecular Weight: 62.07
Chemical Formula: CH2OHCH2OH
Product Codes:
J.T. Baker: 5387, 5574, 5845, 9140, 9298, 9300, 9346, 9349, 9356, L715
Mallinckrodt: 5001, 5037

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Ethylene Glycol	107-21-1	99 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
Vapor inhalation is generally not a problem unless heated or misted. Exposure to vapors over an extended time period has caused throat irritation and headache. May cause nausea, vomiting, dizziness and drowsiness. Pulmonary edema and central nervous system depression may also develop. When heated or misted, has produced rapid, involuntary eye movement and coma.

Ingestion:
Initial symptoms in massive dosage parallel alcohol intoxication, progressing to CNS depression, vomiting, headache, rapid respiratory and heart rate, lowered blood pressure, stupor, collapse, and unconsciousness with convulsions. Death from respiratory arrest or cardiovascular collapse may follow. Lethal dose in humans: 100 ml (3-4 ounces).

Skin Contact:
Minor skin irritation and penetration may occur.

Eye Contact:
Splashes may cause irritation, pain, eye damage.

Chronic Exposure:
Repeated small exposures by any route can cause severe kidney problems. Brain damage may also occur. Skin allergy can develop. May damage the developing fetus.

Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye problems, or impaired liver, kidney, or respiratory function may be more susceptible to the effects of this substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:
Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:
Give sodium bicarbonate intravenously to treat acidosis. Urinalysis may show low specific gravity, proteinuria, pyuria, cylindruria, hematuria, calcium oxide, and hippuric acid crystals. Ethanol can be used in antidotal treatment but monitor blood glucose when administering ethanol because it can cause hypoglycemia. Consider infusion of a diuretic such as mannitol to help prevent or control brain edema and hemodialysis to remove ethylene glycol from circulation.

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5. Fire Fighting Measures

Fire:
Flash point: 111C (232F) CC
Autoignition temperature: 398C (748F)
Flammable limits in air % by volume:
lel: 3.2; uel: 15.3
Slight to moderate fire hazard when exposed to heat or flame.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Containers may explode when involved in a fire.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Toxic gases and vapors may be released if involved in a fire.

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Separate from acids and oxidizing materials. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
50 ppm Ceiling

-ACGIH Threshold Limit Value (TLV):
50 ppm Ceiling (vapor)
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear protective gloves and clean body-covering clothing.

Eye Protection:
Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Clear oily liquid.

Odor:
Odorless.

Solubility:
Miscible in water.

Specific Gravity:
1.1 @20C/4C

pH:
No information found.

% Volatiles by volume @ 21C (70F):
100

Boiling Point:
197.6C (388F)

Melting Point:
-13C (9F)

Vapor Density (Air=1):
2.14

Vapor Pressure (mm Hg):
0.06 @ 20C (68F)

Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition. May produce acrid smoke and irritating fumes when heated to decomposition.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Strong oxidizing agents. Reacts violently with chlorosulfonic acid, oleum, sulfuric acid, perchloric acid. Causes ignition at room temperature with chromium trioxide, potassium permanganate and sodium peroxide; causes ignition at 212F(100C) with ammonium dichromate, silver chlorate, sodium chloride and uranyl nitrate.

Conditions to Avoid:
Heat, flames, ignition sources, water (absorbs readily) and incompatibles.

11. Toxicological Information

Toxicological Data:
Oral rat LD50: 4700 mg/kg; skin rabbit LD50: 9530 mg/kg.
Irritation - skin rabbit: 555mg(open), mild; eye rabbit: 500mg/24H, mild.
Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown teratogenic effects in laboratory animals.

--------\Cancer Lists\----------

	---NTP Carcinogen---		
Ingredient	Known	Anticipated	IARC Category
Ethylene Glycol (107-21-1)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is expected to readily biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is not expected to evaporate significantly. When released into water, this material is expected to readily biodegrade. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. When released into water, this material is not expected to evaporate significantly. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.
Environmental Toxicity:
The LC50/96-hour values for fish are over 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------------------------------

Ingredient	TSCA	EC	Japan	Australia
Ethylene Glycol (107-21-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Ethylene Glycol (107-21-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Ethylene Glycol (107-21-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
Ethylene Glycol (107-21-1)	5000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No

SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No

Reactivity: No (Pure / Liquid)

Australian Hazchem Code: No information found.
Poison Schedule: No information found.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **1** Flammability: **1** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. MAY CAUSE ALLERGIC SKIN REACTION. MAY CAUSE IRRITATION TO SKIN, EYES, AND RESPIRATORY TRACT. AFFECTS CENTRAL NERVOUS SYSTEM.
Label Precautions:
Do not breathe vapor or mist.
Use only with adequate ventilation.
Keep container closed.
Avoid contact with eyes, skin and clothing.
Wash thoroughly after handling.
Label First Aid:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Call a physician if irritation develops or persists. If swallowed, give water or milk to drink and induce vomiting. Never give anything by mouth to an unconscious person. In all cases call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 8.
Disclaimer:
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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

AMOCO OIL -- HYDRAULIC FLUID - HYDRAULIC FLUID, PETROLEUM BASE
MATERIAL SAFETY DATA SHEET
NSN: 9150001181112
Manufacturer's CAGE: 15965
Part No. Indicator: A
Part Number/Trade Name: HYDRAULIC FLUID

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General Information

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Item Name: HYDRAULIC FLUID, PETROLEUM BASE
Company's Name: AMOCO OIL CO
Company's Street: 200 EAST RANDOLPH DRIVE
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601
Company's Emerg Ph #: 800-447-8735, CHEMTREC 800-424-9300
Company's Info Ph #: 312-856-3907
Distributor/Vendor # 1: FERGUSSON ALEX C CO ( )
Distributor/Vendor # 1 Cage: 72391
Distributor/Vendor # 2: MASSEY-FERGUSON INC. GEAR AND SHIFT PLAN
Distributor/Vendor # 2 Cage: 14398
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 005
Status: SE
Date MSDS Prepared: 24JUL89
Safety Data Review Date: 13NOV91
Supply Item Manager: CX
MSDS Preparer's Name: GERALD BRESNICK
MSDS Serial Number: BLHFX
Spec Type, Grade, Class: TYPE II
Hazard Characteristic Code: N1
Unit Of Issue: DR
Unit Of Issue Container Qty: 55.0 GALLONS
Type Of Container: DRUM
Net Unit Weight: 407.6 LBS

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: REFINED HEAVY PARAFFINIC DISTILLATES
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: 1003331RP
CAS Number: 64741-88-4
OSHA PEL: 5 MG/M3 (OIL MIST)
ACGIH TLV: 5 MG/M3 (OIL MIST)
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: ZINC DIALKYL DITHIOPHOSPHATE
Ingredient Sequence Number: 02
NIOSH (RTECS) Number: 1001213ZD
CAS Number: 68457-79-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

Appearance And Odor: DARK OILY WITH MINERAL OIL ODOR
Specific Gravity: 0.890
Decomposition Temperature: UNKNOWN
Solubility In Water: NEGLIGIBLE,<0.1%
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: >90F,>32C
Flash Point Method: COC
Extinguishing Media: USE WATER FOG, CARBON DIOXIDE, FOAM, DRY CHEMICAL, EARTH OR SAND.
Special Fire Fighting Proc: WEAR FIRE FIGHTING PROTECTIVE EQUIPMENT AND FULL FACED SELF CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WI WATER SPRAY. CONTAIN RUNOFF.
Unusual Fire And Expl Hazrds: DENSE SMOKE

Reactivity Data

Stability: YES
Cond To Avoid (Stability): OPEN FLAMES
Materials To Avoid: STRONG OXIDIZERS SUCH AS HYDROGEN PEROXIDE, BROMINE, AND CHROMIC ACID.
Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE, OXIDES OF PHOSPHOROUS, SULFUR, AND POSSIBLY HYDROGEN SULFIDE.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT APPLICABLE

Health Hazard Data

LD50-LC50 Mixture: UNKNOWN
Route Of Entry - Inhalation: NO
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE-INHALATION OF MIST MAY CAUSE IRRITATION. INGESTION:NO ILL EFFECTS EXPECTED. MINUTE AMOUNTS ASPIRATED INTO LUNGS MAY CAUSE PULMONARY INJURY. EYE: IRRITATION. SKIN: NOT NORMALLY

EXPECTED TO CAUSE ILL EFFECTS. CHRONIC-PROLONGED/REPEATED SKIN CONTACT MAY CAUSE IRRITATION.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE OF THE COMPOUNDS IN THIS PRODUCT IS LISTED BY IARC, NTP, OR OSHA AS A CARCINOGEN.
Signs/Symptoms Of Overexp: SKIN AND EYE IRRITATION.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR 15 MINUTES HOLDING EYELIDS OPEN. GE MEDICAL ATTENTION. SKIN: REMOVE EXCESS WITH CLOTH OR PAPER. WASH THOUROUGHLY WITH SOAP AND WATER. INGESTION: GET IMMEDIATE MEDICAL ATTENTION. DO NOT INDUCE VOMITING.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: RECOVER BULK OF MIXTURE INTO ANOTH CONTAINER. ABSORB RESIDUE WITH AN INERT MATERIAL SUCH AS EARTH, SAND, OR VERMICULITE. SWEEP UP AND DISPOSE AS SOLID WASTE.
Neutralizing Agent: NOT APPLICABLE.
Waste Disposal Method: DISPOSAL SHOULD BE MADE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS.
Precautions-Handling/Storing: KEEP CONTAINER CLOSED UNTIL READY FOR USE.
Other Precautions: NONE

Control Measures

Respiratory Protection: NONE REQUIRED UNDER NORMAL USE. IF MIST IS BEING GENERATED OR VAPORS ARE BEING PRODUCED AT HIGH TEMPERATURES, USE NIOSH APPROVED ORGANIC VAPOR MASK.
Ventilation: NONE
Protective Gloves: NONE
Eye Protection: SAFETY GOGGLES WITH OPTIONAL FACE SHIELD
Other Protective Equipment: NONE
Work Hygienic Practices: OBSERVE GOOD PERSONAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES. DO NOT WEAR CONTAMINATED CLOTHING OR FOOTWEAR.
Suppl. Safety & Health Data: NONE

Transportation Data

Trans Data Review Date: 91317
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ

AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
Additional Trans Data: NON-HAZARDOUS PER MFR.

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Disposal Data

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Label Data

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Label Required: NO
Technical Review Date: 13NOV91
MFR Label Number: UNDATED
Label Status: F
Common Name: HYDRAULIC FLUID
Signal Word: CAUTION!
Acute Health Hazard-Slight: X
Contact Hazard-Slight: X
Fire Hazard-Slight: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE-INGESTION:NO ILL EFFECTS EXPECTED. INHALATION OF MIST MAY CAUSE IRRITATION. MINUTE AMOUNTS ASPIRATED INTO LUNGS MAY CAUSE PULMONARY INJURY. EYE: IRRITATION. SKIN: NOT NORMALLY EXPECTED TO CAUSE ILL EFFECTS. CHRONIC-PROLONGED/REPEATED SKIN CONTACT MAY CAUSE IRRITATION,DERMATITIS. RECOVER FREE PRODUCT, OR ABSORB WITH DIATOMACEOUS EARTH OR OTHER INERT MATERIAL. STORE IN APPROPRIATE CONTAINER FOR DISPOSAL. AVOID STORAGE NEAR OPEN FLAME OR OTHER SOURCES OF IGNITION, AND STRONG OXIDANTS. DANGEROUS TO REUSE EMPTY CONTAINER.FIRST AID-EYE:FLUSH WITH WATER FOR 15 MIN. SKIN:WASH WITH SOAP AND WATER. INGESTION:CONSULT A PHYSICIAN.
Protect Eye: Y
Protect Skin: Y
Label Name: AMOCO OIL CO
Label Street: 200 EAST RANDOLPH DRIVE
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601
Label Country: US
Label Emergency Number: 800-447-8735, CHEMTREC 800-424-9300
Year Procured: 1991

HYDROCHLORIC ACID, 33 - 40%

MSDS Number: H3880 --- *Effective Date: 11/17/99*

1. Product Identification

Synonyms: Muriatic acid; hydrogen chloride, aqueous
CAS No.: 7647-01-0
Molecular Weight: 36.46
Chemical Formula: HCl
Product Codes:
J.T. Baker: 5367, 5537, 5575, 5800, 5814, 5839, 6900, 7831, 9529, 9530, 9534, 9535, 9536, 9537, 9538, 9539, 9540, 9544, 9548
Mallinckrodt: 2062, 2612, 2624, 2626, 5587, H611, H613, H615, V078, V628

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hydrogen Chloride	7647-01-0	33 - 40%	Yes
Water	7732-18-5	60 - 67%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Poison)
Flammability Rating: 0 - None

Reactivity Rating: 2 - Moderate
Contact Rating: 3 - Severe (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Inhalation:
Corrosive! Inhalation of vapors can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure, and death.
Ingestion:
Corrosive! Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea. Swallowing may be fatal.
Skin Contact:
Corrosive! Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolor skin.
Eye Contact:
Corrosive! Vapors are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
Chronic Exposure:
Long-term exposure to concentrated vapors may cause erosion of teeth. Long term exposures seldom occur due to the corrosive properties of the acid.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye disease may be more susceptible to the effects of this substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion:
DO NOT INDUCE VOMITING! Give large quantities of water or milk if available. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

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5. Fire Fighting Measures

Fire:
Extreme heat or contact with metals can release flammable hydrogen gas.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:
If involved in a fire, use water spray. Neutralize with soda ash or slaked lime.
Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from ends of tanks. Cool tanks with water spray until well after fire is out.

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6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker NEUTRASORB(R) or TEAM(R) 'Low Na+' acid neutralizers are recommended for spills of this product.

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7. Handling and Storage

Store in a cool, dry, ventilated storage area with acid resistant floors and good drainage. Protect from physical damage. Keep out of direct sunlight and away from heat, water, and incompatible materials. Do not wash out container and use it for other purposes. When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing. When opening metal containers, use non-sparking tools because of the possibility of hydrogen gas being present. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
5 ppm Ceiling
-ACGIH Threshold Limit Value (TLV):
5 ppm Ceiling

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Colorless, fuming liquid.
Odor:
Pungent odor of hydrogen chloride.
Solubility:
Infinite in water with slight evolution of heat.
Density:
1.18
pH:
For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
53C (127F) Azeotrope (20.2%) boils at 109C (228F)
Melting Point:
-74C (-101F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
190 @ 25C (77F)
Evaporation Rate (BuAc=1):
No information found.

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A strong mineral acid, concentrated hydrochloric acid is incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulfides, sulfites, and formaldehyde.
Conditions to Avoid:
Heat, direct sunlight.

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11. Toxicological Information

Inhalation rat LC50: 3124 ppm/1H; oral rabbit LD50: 900 mg/kg (Hydrochloric acid concentrated); investigated

as a tumorigen, mutagen, reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Hydrogen Chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material may leach into groundwater.
Environmental Toxicity:
This material is expected to be toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 475LB

International (Water, I.M.O.)

Proper Shipping Name: HYDROCHLORIC ACID
Hazard Class: 8
UN/NA: UN1789
Packing Group: II
Information reported for product/size: 475LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------------------------------

Ingredient	TSCA	EC	Japan	Australia
Hydrogen Chloride (7647-01-0)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Hydrogen Chloride (7647-01-0)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Hydrogen Chloride (7647-01-0)	5000	500*	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------------

		-RCRA-	-TSCA-
Ingredient	CERCLA	261.33	8(d)
Hydrogen Chloride (7647-01-0)	5000	No	No

Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: Yes

SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No

Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: No information found.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR INHALED. INHALATION MAY CAUSE LUNG DAMAGE.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor or mist.
Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Remove and wash contaminated clothing promptly.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases get medical attention immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No changes.
Disclaimer:
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WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

HYDROFLUORIC ACID

MSDS Number: H3994 --- *Effective Date: 07/15/98*

1. Product Identification

Synonyms: Fluorohydric acid; fluoric acid; Hydrogen fluoride solution
CAS No.: 7664-39-3
Molecular Weight: 20.01
Chemical Formula: HF in Aqueous Solution.
Product Codes:
J.T. Baker: 5368, 5659, 5818, 5823, 5824, 5840, 6904, 9559, 9560, 9563, 9564, 9567, 9572, 9573, 9574, 9575
Mallinckrodt: 2640, 2648, V580

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Hydrogen Fluoride	7664-39-3	48 - 52%	Yes
Water	7732-18-5	48 - 52%	No

3. Hazards Identification

Emergency Overview

POISON! DANGER! CORROSIVE. EXTREMELY HAZARDOUS LIQUID AND VAPOR. CAUSES SEVERE BURNS WHICH MAY NOT BE IMMEDIATELY PAINFUL OR VISIBLE. MAY BE FATAL IF SWALLOWED OR INHALED. LIQUID AND VAPOR CAN BURN SKIN, EYES AND RESPIRATORY TRACT. CAUSES BONE DAMAGE. REACTION WITH CERTAIN METALS GENERATES FLAMMABLE AND POTENTIALLY EXPLOSIVE HYDROGEN GAS.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 4 - Extreme (Poison)

Flammability Rating: 0 - None
Reactivity Rating: 2 - Moderate
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: White (Corrosive)

Potential Health Effects

Exposure to hydrofluoric acid can produce harmful health effects that may not be immediately apparent.

Inhalation:
Severely corrosive to the respiratory tract. May cause sore throat, coughing, labored breathing and lung congestion/inflammation.
Ingestion:
Corrosive. May cause sore throat, abdominal pain, diarrhea, vomiting, severe burns of the digestive tract, and kidney dysfunction.
Skin Contact:
Corrosive to the skin. Skin contact causes serious skin burns which may not be immediately apparent or painful. Symptoms may be delayed 8 hours or longer. The fluoride ion readily penetrates the skin causing destruction of deep tissue layers and even bone.
Eye Contact:
Corrosive to the eyes. Symptoms of redness, pain, blurred vision, and permanent eye damage may occur.
Chronic Exposure:
Intake of more than 6 mg of fluorine per day may result in fluorosis, bone and joint damage. Hypocalcemia and hypomagnesemia can occur from absorption of fluoride ion into blood stream.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye problems, or impaired kidney or respiratory function may be more susceptible to the effects of this substance.

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4. First Aid Measures

For any route of contact: Detailed First Aid procedure should be planned before beginning work with HF.
Inhalation:
Get medical help immediately. If patient is unconscious, give artificial respiration or use inhalator. Keep patient warm and resting, and send to hospital after first aid is complete.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
FOR ACID BURNS TO THE BODY: 1) Remove the victim from the contaminated area and immediately place him under a safety shower or wash him with a water hose, whichever is available. 2) Remove all contaminated clothing. 3) Keep washing with large amounts of water for a minimum of 15 to 20 minutes. 4) Have someone make arrangements for medical attention while you continue flushing the affected area with water. 5) a) If available, after thorough washing, the burned area should be immersed in a solution of 0.2% iced aqueous Hyamine 1622 or 0.13% iced aqueous Zephiran Chloride. If immersion is not practical, towels should be soaked with one of the above solutions and used as compresses for the burn area. Ideally compresses should be changed every 2 minutes. 5) b) An alternative treatment to 5a is for the physician to inject sterile 10% aqueous calcium gluconate solution subcutaneously beneath, around, and in the burned area. Initially use no more than 0.5 cc per square centimeter and do not distort appearance of skin. If pain is not completely relieved, additional treatment is indicated. 6) Seek medical attention as soon as possible for all burns regardless of how minor they may appear initially. Hyamine 1622 is a trade name for Tetracaine Benzethonium Chloride, Merck Index Monograph 1078, a

quaternary ammonium compound sold by Rohm & Haas, Philadelphia. Zephiran Chloride is a trade name for Benzalkonium Chloride, Merck Index Monograph 1059, also a quaternary ammonium compound, sold by SANOFI Winthrop Pharmaceutical, New York, NY.

Eye Contact:

FOR ACID IN THE EYES: 1) Irrigate eyes for at least 30 minutes with copious quantities of water, keeping the eyelids apart and away from eyeballs during irrigation. 2) Get competent medical attention immediately, preferably an eye specialist. 3) If a physician is not immediately available, apply one or two drops of 0.5% Pontocaine Hydrochloride solution. 4) Do not use oily drops or ointment. Place ice pack on eyes until reaching emergency room.

Note to Physician:

For burns of large skin areas, (greater than 25 square inches), for ingestion and for significant inhalation exposure, severe systemic effects may occur. Monitor and correct for hypocalcemia, cardiac arrhythmias, hypomagnesemia and hyperkalemia. In some cases renal dialysis may be indicated. For certain burns, especially of the digits, use of intra-arterial calcium gluconate may be indicated. Treat as chemical pneumonia. Monitor for hypocalcemia, 2.5% calcium gluconate in normal saline by nebulizer or by IPPB with 100% oxygen may decrease pulmonary damage. Bronchodilators may also be administered. Medical Surveillance: Provide phycical examinations of exposed personnel every six months including fluoride determinations in urine, studies of liver and kidney function: chest X-ray, annually. Protect from exposure those individuals with diseases of kidneys, liver, and lung. (ITII. Toxic and Hazardous Industrial Chemicals Safety Manual). AN ALTERNATIVE FIRST AID PROCEDURE: Hydrofluoric Acid (HF) is a highly corrosive and toxic acid, even in a dilute form. It can severely damage the skin and eyes causing severe burns which are extremely painful. Additionally, the vapor from anhydrous HF or its concentrated solutions can cause damage to skin, eyes and the respiratory system. HF differs from other strong acids in that it not only causes surface burns but rapidly penetrates the skin, even in dilute solution, and causes destruction of underlying tissue and even bone by the extraction of Calcium. For this reason, washing the burn with water is not sufficient. A neutralizing agent which will also penetrate the skin is required. The effect of HF, i.e. onset of pain, particularly in dilute solutions, may not be felt for up to 24 hours. It is important, therefore, that persons using HF have immediate access to an effective antidote even when they are away from their work place in order that first aid treatment can be commenced immediately while the patient seeks medical advice. HOW TO TREAT HYDROFLUORIC ACID BURNS: It has been conclusively shown (references 1,2,3 and 4 below) that flushing the affected area with water for one minute and then massaging HF Antidote Gel into the wound until there is a cessation of pain is the most effective first aid treatment available. HF Antidote Gel contains Calcium Gluconate which combines with HF to form insoluble Calcium Fluoride, thus preventing the extraction of Calcium from the body tissue and bones. HF Antidote Gel is available in 25g tubes, and since the effects of the dilute acid may not be apparent for some hours, we recommend that any person in contact with HF should carry, or have access to a tube of HF Antidote Gel at all times; ideally with one tube at the work place, one on the person and one at home. For safety's sake, we believe that HF Antidote Gel should be issued to all employees who may come into contact with HF. EYE INJURIES: Irrigate the affected part immediately with copious amounts of cold water. Urgent medical advice must be sought. HF Antidote Gel is NOT for use in the eye. It is imperative that any person who has been contaminated by HF should seek medical advice even when the treatment by HF Antidote Gel has been applied. REFERENCES: 1. Browno, T.D. Treatment of Hydrofluoric Acid Burns 2. Sprout, W.L. et al Treatment of Severe Hydrofluoric Acid Exposures (Journal of American Occupational Medicine 25:12, 1993) 3. Bracken, W.M. et al Comparative Effectiveness of Topical Treatments for Hydrofluoric Acid Burns, University of Kansas (Journal of Occupational Medicine 27:10:1985) 4. Burke, W.J. , et al Systemic Fluoride Poisoning Resulting from A Fluoride Skin Burn (Journal of Occupational Medicine (5,39:1973) HF ANTIDOTE GEL: Distributed by PHARMASCIENCE INC. Montreal, Canada. Phone: (514) 340 - 1114 Fax: (514) 342 - 7764

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5. Fire Fighting Measures

Fire:

Not considered to be a fire hazard. Fire may produce poisonous or irritating gases.

Explosion:

Violent exothermic reaction occurs with water. Sufficient heat may be produced to ignite combustible materials.

Reacts with metals forming flammable Hydrogen gas.
Fire Extinguishing Media:
Keep upwind of fire. Use water or carbon dioxide on fires in which Hydrofluoric Acid is involved. Halon or foam may also be used. In case of fire, the sealed containers can be kept cool by spraying with water.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Avoid getting water in tanks or drums; water can cause generation of heat and spattering. In contact with air, the acid gives off corrosive fumes which are heavier than air.

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6. Accidental Release Measures

Notify safety personnel, provide adequate ventilation, and remove ignition sources since hydrogen may be generated by reactions with metals. Wear appropriate personal protective equipment as specified in Section 8. Do not flush to sewers or waterways. Spills: Evacuate the danger area. Apply magnesium sulfate (dry) to the spill area. Follow up with inert absorbent and add soda ash or magnesium oxide and slaked lime. Collect in appropriate plastic containers and save for disposal. Wash spill site with soda ash solution. NOTE: Porous materials (concrete, wood, plastic, etc.) will absorb HF and become a hazard for an indefinite time. Such spills should be cleaned and neutralized immediately. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker TEAM(R) 'Low Na+' acid neutralizer is recommended for spills of this product.

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7. Handling and Storage

Keep in tightly closed polyethylene containers. Store in a cool, dry place with adequate ventilation separated from other chemicals. Protect from physical damage. Storage facilities should be constructed for containment and neutralization of spills. Handling and storage of HF requires special materials and technology for containers, pipes, valves, etc., which is available from suppliers. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Hydrogen fluoride:
-OSHA Permissible Exposure Limit (PEL):
3 ppm (TWA)
ACGIH Threshold Limit Value (TLV):
3 ppm Ceiling as F
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures as low as possible. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect

workers in oxygen-deficient atmospheres. Since the IDLH is low (30 ppm), the above cartridge system is not specifically approved for HF. (3M Respirator Selection Guide)

Skin Protection:

Wear protective clothing, including boots or safety shoes with polyvinyl chloride (PVC) or neoprene. Use chemical goggles and/or a full face shield. Wear coveralls with long sleeves, gauntlets and gloves of PVC or neoprene. A high degree of protection is obtained with an air-inflated suit with mask and safety belt. Use protection suitable for conditions.

Eye Protection:

Use chemical safety goggles and/or full face shield where splashing is possible. Maintain eye wash fountain and quick drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:

Colorless, fuming liquid.

Odor:

Acrid odor. Do not breathe fumes.

Solubility:

Infinitely soluble.

Specific Gravity:

1.15 -1.18

pH:

1.0 (0.1M solution)

% Volatiles by volume @ 21C (70F):

100 (as water and acid)

Boiling Point:

108C (226F)

Melting Point:

< -36C (< -33F)

Vapor Density (Air=1):

1.97

Vapor Pressure (mm Hg):

25 @ 20C (68F)

Evaporation Rate (BuAc=1):

No information found.

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10. Stability and Reactivity

Stability:

Stable at room temperature (68F) when stored and used under proper conditions.

Hazardous Decomposition Products:

On contact with metals, liberates hydrogen gas. On heating to decomposition, could yield toxic fumes of fluorides. Attacks glass and other silicon containing compounds. Reacts with silica to produce silicon tetrafluoride, a hazardous colorless gas.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Hydrofluoric acid is incompatible with arsenic trioxide, phosphorus pentoxide, ammonia, calcium oxide, sodium hydroxide, sulfuric acid, vinyl acetate, ethylenediamine, acetic anhydride, alkalis, organic materials, most common metals, rubber, leather, water, strong bases, carbonates, sulfides, cyanides, oxides of silicon, especially glass, concrete, silica, fluorine. Will also react with steam or water to produce toxic fumes.

Conditions to Avoid:

Moisture and incompatibles.

11. Toxicological Information

Hydrofluoric acid: Inhalation rat LC50: 1276 ppm/1H; Investigated as a mutagen, reproductive effector.

--------\Cancer Lists\----------

	---NTP Carcinogen---		
Ingredient	Known	Anticipated	IARC Category
Hydrogen Fluoride (7664-39-3)	No	No	None
Water (7732-18-5)	No	No	None

12. Ecological Information

Environmental Fate:
If the pH is > 6.5, soil can bind fluorides tightly. High calcium content will immobilize fluorides, which can be damaging to plants when present in acid soils.
Environmental Toxicity:
This material is expected to be slightly toxic to aquatic life. 60 ppm/*/Fish/Lethal/Fresh Water *=time period not specified. > 300ppm/48hr./Shrimp/LC50/Aerated Saltwater

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: RQ, HYDROFLUORIC ACID (WITH NOT MORE THAN 60% STRENGTH)
Hazard Class: 8, 6.1
UN/NA: UN1790
Packing Group: II
Information reported for product/size: 250LB

International (Water, I.M.O.)

Proper Shipping Name: HYDROFLUORIC ACID (WITH NOT MORE THAN 60% STRENGTH)
Hazard Class: 8, 6.1
UN/NA: UN1790
Packing Group: II
Information reported for product/size: 250LB

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------------------------------

Ingredient	TSCA	EC	Japan	Australia
Hydrogen Fluoride (7664-39-3)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------------------------------

		--Canada--		
Ingredient	Korea	DSL	NDSL	Phil.
Hydrogen Fluoride (7664-39-3)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\---------------

	-SARA 302-		------SARA 313------	
Ingredient	RQ	TPQ	List	Chemical Catg.
Hydrogen Fluoride (7664-39-3)	100	100	Yes	No
Water (7732-18-5)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\---------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Hydrogen Fluoride (7664-39-3)	100	U134	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: Yes TSCA 12(b): No CDTA: No

SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No

Reactivity: Yes (Mixture / Liquid)

Australian Hazchem Code: 2R
Poison Schedule: S7
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **4** Flammability: **0** Reactivity: **1**
Label Hazard Warning:
POISON! DANGER! CORROSIVE. EXTREMELY HAZARDOUS LIQUID AND VAPOR. CAUSES SEVERE BURNS WHICH MAY NOT BE IMMEDIATELY PAINFUL OR VISIBLE. MAY BE FATAL IF SWALLOWED OR INHALED. LIQUID AND VAPOR CAN BURN SKIN, EYES AND RESPIRATORY TRACT. CAUSES BONE DAMAGE. REACTION WITH CERTAIN METALS GENERATES FLAMMABLE AND POTENTIALLY EXPLOSIVE HYDROGEN GAS.
Label Precautions:
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Cool before opening.
Use only with adequate ventilation.
Wash thoroughly after handling.
Store in a tightly closed container.
Label First Aid:
IN ALL CASES, CALL PHYSICIAN IMMEDIATELY. First Aid procedures should be pre-planned for HF emergencies. A supply of 50:50 water/magnesium sulfate paste or 2 1/2% Calcium Gluconate paste should be available where first aid medications are administered. If ingested, DO NOT INDUCE VOMITING. If patient is conscious, give large quantities of milk or water and send to hospital. If inhaled and patient is unconscious, give artificial respiration or use inhalator and send to hospital. In case of eye contact, wash open eyes with large but gentle stream of water for 15 minutes. Place ice pack on eyes until reaching emergency room. In case of skin contact, remove contaminated clothing and wash burn area with plenty of water to remove acid. Cover burn area

with a poultice of 50:50 water/magnesium sulfate paste or 2 1/2% calcium gluconate paste. Leave in place until medical help arrives or patient is transferred to hospital.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 4.

Disclaimer:

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Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

AMOCO OIL -- JET FUEL JP-4 - TURBINE FUEL, AVIATION
MATERIAL SAFETY DATA SHEET
NSN: 9130002568613
Manufacturer's CAGE: 15958
Part No. Indicator: B
Part Number/Trade Name: JET FUEL JP-4

General Information

Item Name: TURBINE FUEL, AVIATION
Company's Name: AMOCO OIL CO
Company's Street: 200 E RANDOLPH DR MC 1408
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601-6401
Company's Emerg Ph #: 800-447-8735 (HEALTH)
Company's Info Ph #: 312-856-3907
Record No. For Safety Entry: 022
Tot Safety Entries This Stk#: 063
Status: FE
Date MSDS Prepared: 24SEP93
Safety Data Review Date: 29SEP94
Supply Item Manager: CX
MSDS Preparer's Name: G. I. BRESNICK
MSDS Serial Number: BNBZX
Specification Number: MIL-T-5624
Spec Type, Grade, Class: GRADE JP-4
Hazard Characteristic Code: F2
Unit Of Issue: GL
Unit Of Issue Container Qty: BULK
Type Of Container: NOT KNOWN
Net Unit Weight: NOT KNOWN

Ingredients/Identity Information

Proprietary: NO
Ingredient: JET FUEL JP-4 (A WIDE BOILING ALIPHATIC AND AROMATIC DISTILLATE) SEE THE FOLLOWING IDENTIFIABLE COMPONENTS.
Ingredient Sequence Number: 01
Percent: 100
NIOSH (RTECS) Number: NY9340000
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: USAF 8HR TWA 200 PPM

Proprietary: NO
Ingredient: TOLUENE (SARA III)

Ingredient Sequence Number: 02
Percent: 22 %
NIOSH (RTECS) Number: XS5250000
CAS Number: 108-88-3
OSHA PEL: 200 PPM/150 STEL
ACGIH TLV: 50 PPM; 9293
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 03
Percent: 10 %
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150STEL;9192
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: ETHYL BENZENE (SARA III)
Ingredient Sequence Number: 04
Percent: 2 %
NIOSH (RTECS) Number: DA0700000
CAS Number: 100-41-4
OSHA PEL: 100 PPM/125 STEL
ACGIH TLV: 100 PPM/125STEL 9192
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: BENZENE (SARA III)
Ingredient Sequence Number: 05
Percent: 4 %
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: 1PPM/5STEL;1910.1028
ACGIH TLV: 10 PPM; A2; 9192
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: CYCLOHEXANE (SARA III)
Ingredient Sequence Number: 06
Percent: 5 %
NIOSH (RTECS) Number: GU6300000
CAS Number: 110-82-7
OSHA PEL: 300 PPM
ACGIH TLV: 300 PPM, 9192
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: METHYL TERT-BUTYL ETHER (SARA III)
Ingredient Sequence Number: 07
Percent: 7 %
NIOSH (RTECS) Number: KN5250000
CAS Number: 1634-04-4
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

Appearance And Odor: COLORLESS LIQUID, FUEL OIL ODOR
Boiling Point: 250-549F
Melting Point: NOT GIVEN
Vapor Pressure (MM Hg/70 F): 2-3 PSI
Vapor Density (Air=1): NOT GIVEN
Specific Gravity: 0.75 -0.8
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: NOT GIVEN
Solubility In Water: NEGLIGIBLE
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: 468F

Fire and Explosion Hazard Data

Flash Point: -10F,-23C
Flash Point Method: CC
Lower Explosive Limit: 1.3 %
Upper Explosive Limit: 8 %
Extinguishing Media: AGENTS APPROVED FOR CLASS B HAZARDS (DRY CHEMICAL, CARBON DIOXIDE, HALOGENATED AGENTS, FOAM, STEAM) AND WATER FOG.
Special Fire Fighting Proc: FIRE FIGHTERS SHOULD USE NIOSH APPROVED SCBA & FULL PROTECTIVE EQUIPMENT WHEN FIGHTING CHEMICAL FIRE. USE WATER SPRAY TO COOL NEARBY CONTAINERS EXPOSED TO FIRE.
Unusual Fire And Expl Hazrds: DO NOT USE DIRECT STREAM OF WATER ON FIRE. TOXIC GASES ARE RELEASED DURING COMBUSTION. VAPOR MAY EXPLODE IF IGNITED IN ENCLOSED AREA.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HEAT, OPEN FLAME, SPARKS
Materials To Avoid: STRONG OXIDIZING AGENTS
Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE, UNIDENTIFIED ORGANIC COMPOUNDS.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NONE. WILL NOT OCCUR.

Health Hazard Data

LD50-LC50 Mixture: NOT GIVEN FOR PRODUCT AS A WHOLE
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: MAY BE MILDLY IRRITATING TO THE EYES. PROLONGED OR REPEATED CONTACT MAY CAUSE DERMATITIS. VAPORS MAY IRRITATE THE NOSE, THROAT AND UPPER RESPIRATORY TRACTAND CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION. ASPIRATION HAZARD.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: CONTAINS Benzene [71-43-2] WHICH IS LISTED BY NTP AND IARC AND REGULATED BY OSHA AS A CARCINOGEN.
Signs/Symptoms Of Overexp: EYE IRRITATION, SKIN IRRITATION, DERMATITIS, UPPER RESPIRATORY TRACT IRRITATION, NAUSEA, VOMITING, DIARRHEA, HEADACHES, DIZZINESS, DROWSINESS.
Med Cond Aggravated By Exp: PRE-EXISTING SKIN AND/OR RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT.
Emergency/First Aid Proc: EYES: FLUSH WITH WATER FOR 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION. SKIN: REMOVE CONTAMINATED CLOTHING. WASH WITH SOAP AND WATER. IF IRRITATION PERSISTS, GET MEDICAL ATTENTION. INHALATION: REMOVE TO FRESH AIR. RESTORE BREATHING. GET MEDICAL ATTENTION. INGESTION: DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: ELIMINATE SOURCES OF IGNITION. EVACUATE AREA. WEAR PROPER PERSONAL PROTECTIVE EQUIPMENT. CONTAIN SPILL. STOP LEAK IF CAN DO SO WITHOUT RISK. ABSORB LIQUID WITH SUITABLE ABSORBENT MATERIAL. COLLECT FOR DISPOSAL.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: PREVENT WASTE FROM CONTAMINATING SURROUNDING ENVIRONMENT. DISCARD ANY PRODUCT, RESIDUE, DISPOSAL CONTAINER OR LINER IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS.
Precautions-Handling/Storing: STORE IN A FLAMMABLE LIQUIDS AREA. STORE AWAY FROM HEAT, IGNITION SOURCES AND OPEN FLAMES IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL RULES
Other Precautions: AVOID SKIN CONTACT. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.

Control Measures

Respiratory Protection: AVOID BREATHING VAPOR AND/OR MIST. USE WITH ADEQUATE VENTILATION. IF VENTILATION IS INADEQUATE, USE NIOSH/MSHA CERTIFIED RESPIRATOR WHICH WILL PROTECT AGAINST ORGANIC VAPOR/MIST.

Ventilation: LOCAL EXHAUST AND MECHANICAL (GENERAL) VENTILATION TO MAINTAIN EXPOSURE LEVELS.
Protective Gloves: IMPERVIOUS
Eye Protection: SAFETY GLASSES OR GOGGLES
Other Protective Equipment: PROTECTIVE CLOTHING AS REQUIRED TO AVOID SKIN CONTACT. AN EMERGENCY EYE WASH STATION AND SHOWER SHOULD BE AVAILABLE.
Work Hygienic Practices: WASH WITH SOAP AND WATER AFTER HANDLING PRODUCT AND BEFORE EATING DRINKING OR SMOKING.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Trans Data Review Date: 93222
DOT PSN Code: GNZ
DOT Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
DOT Class: 3
DOT ID Number: UN1863
DOT Pack Group: II
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HNV
IMO Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
IMO Regulations Page Number: 3271
IMO UN Number: 1863
IMO UN Class: 3.2
IMO Subsidiary Risk Label: -
IATA PSN Code: MMA
IATA UN ID Number: 1863
IATA Proper Shipping Name: FUEL, AVIATION, TURBINE ENGINE
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MMA
AFI Prop. Shipping Name: FUEL, AVIATION, TURBINE ENGINE
AFI Class: 3
AFI ID Number: UN1863
AFI Pack Group: II
AFI Basic Pac Ref: 7-7

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 06JUL92
MFR Label Number: UNKNOWN
Label Status: F
Common Name: TURBINE FUEL, AVIATION JP-4
Chronic Hazard: YES

Signal Word: DANGER!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-Severe: X
Reactivity Hazard-None: X
Special Hazard Precautions: EYE/SKIN/RESPIRATORY TRACT:IRRITATION. MOST HAZARDOUS IS EXPOSURE TO AIRBORNE MIST OR OTHER ASPIRATION INTO THE LUNGS. ONCE INTO THE LUNGS, THIS MATERIAL IS VERY DIFFICULT TO REMOVE AND CAN CAUSE DEATH. PROLONGED AND REPEATED EXPOSURES CAN CAUSE DAMAGES TO THE LIVER, KIDNEYS AND CENTRAL NERVOUS SYSTEM. THIS MATERIAL CONTAINS BENZENE, A KNOWN CARCINOGEN. STORE IN A COOL, DRY, WELL VENTILATED AREA AWAY FROM SOURCES OF IGNITION OR OXIDIZERS. KEEP CONTAINER CLOSED WHEN NOT IN USE. PROTECT FROM DAMAGE. FIRST AID: AVOID VOMITING. EYES/SKIN:REMOVE CONTAMINATED CLOTHING & FLUSH WITH WATER FOR 15 MINUTES. GET MEDICAL ATTENTION.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: AMOCO OIL CO
Label Street: 200 E RANDOLPH DR MC 1408
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601-6401
Label Country: US
Label Emergency Number: 800-447-8735/800-424-9300 CHEMTREC

AMOCO OIL -- AMOCO LDO SG MOTOR OIL 10W-40
MATERIAL SAFETY DATA SHEET
NSN: 9150001160506
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: AMOCO LDO SG MOTOR OIL 10W-40

General Information

Company's Name: AMOCO OIL CO
Company's Street: 200 E RANDOLPH DR
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601
Company's Emerg Ph #: 800-447-8735;800-424-9300(CHEMTREC)
Company's Info Ph #: 312-856-3907
Record No. For Safety Entry: 003
Tot Safety Entries This Stk#: 008
Status: SMJ
Date MSDS Prepared: 02OCT89
Safety Data Review Date: 28MAR95
Supply Item Manager: S9G
MSDS Serial Number: BKMWP
Hazard Characteristic Code: N1

Ingredients/Identity Information

Proprietary: NO
Ingredient: REFINED HEAVY PARAFFINIC DISTILLATES (SOLVENT REFINED PARAFFINIC PETROLEUM OIL) PEL/TLV AS OIL MIST.
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: 1003331RP
CAS Number: 64741-88-4
OSHA PEL: 5 MG/M3
ACGIH TLV: 5 MG/M3;10 MG/M3STEL

Physical/Chemical Characteristics

Appearance And Odor: PALE COLORED OILY LIQUID.
Specific Gravity: 0.88
Solubility In Water: <0.1%.

Fire and Explosion Hazard Data

Flash Point: 401F,205C
Flash Point Method: COC
Extinguishing Media: AGENTS APPROVED FOR CLASS B HAZARDS (E.G.,DRY

CHEMICAL, CARBON DIOXIDE, HALOGENATED AGENTS, FOAM, STEAM) OR WATER FOG.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA AND FULL PROTECTIVE EQUIPMENT (FP D).
Unusual Fire And Expl Hazrds: NONE.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: NONE SPECIFIED BY MANUFACTURER.
Hazardous Decomp Products: INCOMPLETE BURNING CAN PRODUCE CO AND/OR CO2 AND OTHER HARMFUL PRODUCTS.
Conditions To Avoid (Poly): NONE SPECIFIED BY MANUFACTURER.

Health Hazard Data

LD50-LC50 Mixture: LD50:(ORL,RAT)5 G/KG; (DRM,RBT)2 G/KG.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: ACUTE:EYE/INHAL/INGEST:NO SIGNIFICANT HEALTH HAZARDS IDENTIFIED. SKIN:NONE EXPECTED FOR SINGLE SHORT-TERM EXPOSURES. PRLNGD/RPTD CONTACT MAY PRODUCE SOME IRRITATION. CAUTION! CONTINUOUS LONG-TERM CONTACT W/USED MOTOR OILS HAS CAUSED CANCER IN ANIMAL TESTS. (MFR.)
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NOT RELEVANT
Signs/Symptoms Of Overexp: NONE SPECIFIED BY MANUFACTURER.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYE:FLUSH W/PLENTY OF WATER FOR AT LEAST 15 MINUTES. SKIN:NONE REQUIRED FOR UNUSED MOTOR OIL. CNTCT W/USED MOTOR OIL, WASH AREA THOROUGHLY W/SOAP & WATER OR USE WATERLESS HAND CLEANERS. DO NOT USE GASOLINE, THINNERS OR SOLVENTS. INHAL:IF ADVERSE EFFECTS OCCUR, REMOVE TO UNCONTAMINATED AREA. INGEST:IF LG AMT SWALLOWED, INDUCE VOMITING. GET MD.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: CONTAIN ON ABSORBENT MATERIAL (E.G., SAND, SAWDUST, DIRT, CLAY). KEEP OUT OF SEWERS AND WATERWAYS.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: DISPOSAL MUST BE I/A/W APPLICABLE FEDERAL, STATE, OR LOCAL REGULATIONS. ENCLOSED-CONTROLLED INCINERATION IS RECOMMENDED UNLESS DIRECTED OTHERWISE BY APPLICABLE ORDINANCES.
Precautions-Handling/Storing: WEAR PROTECTIVE CLOTHING AND IMPERVIOUS GLOVES WHEN WORKING W/USED MOTOR OILS.
Other Precautions: NONE SPECIFIED BY MANUFACTURER.

Control Measures

Respiratory Protection: NONE REQUIRED; HOWEVER, USE OF ADEQUATE VENTILATION IS GOOD INDUSTRIAL PRACTICE.
Ventilation: NONE SPECIFIED BY MANUFACTURER.
Protective Gloves: IMPERVIOUS GLOVES.
Eye Protection: CHEMICAL WORKERS GOGGLES (FP D).
Other Protective Equipment: PROTECTIVE CLOTHING.
Work Hygienic Practices: REMOVE OIL-SOAKED CLTHG, INCLUDING SHOES, & THOROUGHLY CLEAN & DRY BEFORE RE-USE.
Suppl. Safety & Health Data: NONE SPECIFIED BY MANUFACTURER.

Transportation Data

Trans Data Review Date: 91248
DOT PSN Code: ZZZ
DOT Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
IMO PSN Code: ZZZ
IMO Proper Shipping Name: NOT REGULATED FOR THIS MODE OF TRANSPORTATION
IATA PSN Code: ZZZ
IATA Proper Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
AFI PSN Code: ZZZ
AFI Prop. Shipping Name: NOT REGULATED BY THIS MODE OF TRANSPORTATION
Additional Trans Data: NOT REGULATED FOR TRANSPORTATION

Disposal Data

Label Data

Label Required: YES
Label Status: G
Common Name: AMOCO LDO SG MOTOR OIL 10W-40
Special Hazard Precautions: ACUTE:EYE/INHAL/INGEST:NO SIGNIFICANT HEALTH HAZARDS IDENTIFIED. SKIN:NONE EXPECTED FOR SINGLE SHORT-TERM EXPOSURES. PRLNGD/RPTD CONTACT MAY PRODUCE SOME IRRITATION. CAUTION! CONTINUOUS LONG-TERM CONTACT W/USED MOTOR OILS HAS CAUSED CANCER IN ANIMAL TESTS. (MFR.) NONE SPECIFIED BY MANUFACTURER.
Label Name: AMOCO OIL CO
Label Street: 200 E RANDOLPH DR
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601
Label Country: US
Label Emergency Number: 800-447-8735;800-424-9300(CHEMTREC)

MATERIAL SAFETY DATA SHEET
N4 Emulsifier (Sodium Thiocyanate)

I - COMPANY AND PRODUCT IDENTIFICATION

Company: Allchem Industries, Industrial Chemicals Group, Inc.
6010 NW First Place, Gainesville, FL 32607
Customer Service No.: 352-378-9696
Emergency Contact: CHEMTREC 800- 424-9300 (24 hours per day)

Product: Sodium Thiocyanate
CAS Number: 540-72-7
Synonyms: Sodium isocyanate; sodium rhodanate; thiocyanic acid, sodium salt; sodium rhodanide; sodium sulfocyanate
Formula: NaSCN
Molecular Weight: 81.08

II - TRANSPORTATION DATA

U.S. Department of Transportation - 49 CFR
Not regulated

III - PHYSICAL/CHEMICAL CHARACTERISTICS

Appearance: Crystals or Powder
Odor: Odorless
Boiling Point (@760 mm Hg): 126ºC
Melting Point: 287ºC (549ºF)
Vapor Pressure (mm Hg): No information found
Vapor Density (Air=1): No information found
Specific Gravity (@20ºC): 1.315 min
Solubility in Water: 139g/100 cc water @21ºC (70ºF)
Volatile by Volume: 0%
pH: 6.0 - 8.0
Flash Point: >1250C (2570F)
Crystal Point 130C min

IV- REACTIVITY DATA

Stability:
Stable under ordinary conditions of use and storage. Decomposes on exposure to light.

Hazardous Decomposition Products:
Burning may produce nitrogen oxides, sulfur compounds, and possibly cyanides.

Incompatibility:
Chlorates, nitrates, peroxides, strong acids, strong oxidizing agents, mineral acids.

Conditions to Avoid:
Incompatibles

Hazardous Polymerization:
( ) May Occur (X) Will Not Occur

V - FIRE AND EXPLOSION HAZARD DATA

Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.

Special Fire Fighting Procedures:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Poisonous gases are produced in fire.

VI - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps To Be Taken In Case Material Is Spilled Or Released:

Ventilate area of leak or spill. Wear appropriate personal protective equipment. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

Disposal Method:

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Handling and Storage:

Keep in a tightly closed light-resistant container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they contain product residues (mist, solids); observe all warnings and precautions listed for the product.

VII - HEALTH HAZARD DATA

WARNING! CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. HARMFUL IF SWALLOWED OR INHALED. MAY AFFECT THE HEART, BLOOD, THYROID AND CENTRAL NERVOUS SYSTEM.

Potential Health Effects:

Eye: Causes irritation, redness, and pain

Skin: Causes irritation to skin. Symptoms may include coughing and shortness of breath.

Ingestion: May cause vomiting, disorientation, weakness, low blood pressure, convulsions and death which may be delayed. The probable lethal dose is between 15-30 grams.

Inhalation: May cause irritation to the respiratory tract. Symptoms may include coughing and shortness of breath.

Chronic: Prolonged or repeated skin exposure may cause dermatitis. Repeated ingestion of small amounts may cause hives, abnormal bleeding, enlarged thyroid, weakness, confusion, diarrhea, psychosis, and collapse.

Threshold Limit Value (TLV):

LD50 oral rat: 764 mg/kg

First Aid Procedures:

Eye: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Skin: Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Ingestion: If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Respiratory Protection:

For conditions of use where exposure to the dust or mist is apparent, a half-face dust/mist respirator may be worn. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Ventilation:

In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.

Skin Protection:

Wear impervious protective clothing, including boots, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

VIII - REGULATORY INFORMATION

This chemical appears on the following lists:

(X) SARA Section 313
(X) TSCA

IX - ADDITIONAL INFORMATION

ALWAYS COMPLY WITH ALL APPLICABLE INTERNATIONAL, FEDERAL, STATE AND LOCAL REGULATIONS REGARDING THE TRANSPORTATION, STORAGE, USE AND DISPOSAL OF THIS CHEMICAL.

Due to the changing nature of regulatory requirements, the REGULATORY INFORMATION listed in Section X of this document should NOT be considered all-inclusive or authoritative. International, Federal, State and Local regulations should be consulted to determine compliance with all required reporting requirements.

The information in this MSDS was obtained from sources which we believe are reliable. **HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS**. The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond our knowledge. **FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS, DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT**. This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

Revised: April 24, 2000

MATERIAL SAFETY DATA SHEET

TRADE NAME : *N 7A Sorbitan Monotallate* | REFERENCE: 0085088

SYNONYMS : *N/A*

CHEMICAL IDENTITY : *Sorbitan monotallate*

FORMULA : *N/A*

CAS No. : *61791-48-8*
USE : *Surfactant*

PHYSICAL DATA

MELTING POINT : *N/D*
BOILING POINT : *> 149 C*
DECOMP. TEMP. : *N/D*
DENS/SPEC GRAV : *1.00 @ 25 C*
VISCOSITY : *N/D*
SOLUB.in WATER : *Dispersible*
ODOUR THRESHOLD: *N/D*

VAP.PRESSURE: *< 1 mmHg @ 25 C*
VAPOUR DENSITY(AIR=1): *> 1*
VOLATILES(%WT) : *< 1*
EVAPORATION RATE: (*N/A* =1) *N/A*
REFRACTIVE INDEX: *N/A*
PARTITION COEFF.: *N/D*
pH : *N/D*

APPEARANCE AND ODOUR: *Dark amber liquid with a mild ester odour*

HAZARDOUS INGREDIENTS

INGREDIENTS	% w/w	CAS No.	EXPOS. LIMIT	TOXICITY
This is not a WHMIS Controlled Product.				

FIRE AND EXPLOSION HAZARDS

FLASH POINT: *> 149 C* METHOD: *PMCC* AUTO-IGNITION TEMP.: *N/D*
FLAMMABLE LIMITS in AIR(% by volume): *N/D* LOWER: *N/D* UPPER: *N/D*
EXTING. MEDIA WATER ✓ WATER FOG ✓ CO2 ✓ FOAM ✓ DRY CHEMICAL
OTHER: *N/D* BURNING RATE : *N/D*
FIRE FIGHTING PROCEDURES : *Wear self-contained breathing apparatus in confined areas or when exposed to combustion products.*

UNUSUAL HAZARDS : *None known.*

HAZARDOUS COMBUSTION PRODUCTS: *N/D*

EMERGENCY PHONE NO. : CANUTEC (reverse charges) [613] 996-6666
During office hours (Toronto) [800] 454-2673

N 7A Sorbitan Monotallate

HEALTH DATA

TOXICITY: *N/D*

ROUTE OF ENTRY: ✓ EYE ✓ SKIN ✓ INGESTION ✓ INHALATION

EFFECTS OF ACUTE EXPOSURE:

Eye and skin contact may cause irritation. Ingestion may cause adverse health effects. Inhalation may cause irritation of the respiratory tract.

EFFECTS OF CHRONIC EXPOSURE:

There are no known chronic effects associated with this material.

SKIN IRRITATION: *N/D*
EYE IRRITATION : *N/D*
CARCINOGENICITY: *None known*
TERATOGENICITY : *None known*
MUTAGENICITY : *None known*
EXPOSURE LIMITS: *Not established*
REPRODUCTIVE EFFECTS: *None known*
OTHER HEALTH DATA : *N/D*

PROTECTION INFORMATION

VENTILATION: **General mechanical:** *Adequate* **Local exhaust:** *Preferred*
Other: *N/D*
RESPIRATORY PROTECTION: *Approved respirator if exposed to vapors or mist.*

GLOVES: *Rubber or plastic.* **EYE PROTECTION:** *Chemical goggles.*
OTHER PROTECTIVE MEASURES: *Impermeable apron and boots to prevent skin contact.*

FIRST AID

EYES : *Flush immediately with flowing water for at least 15 minutes and consult a physician if irritation develops.*

SKIN : *Wash with soap and water. Remove contaminated clothing and launder before reuse. Consult a physician if irritation develops.*

INGESTION : *Give 2 glasses of water and induce vomiting. Consult a physician immediately.*

NOTE : If victim is unconsoious, never induce vomiting nor give liquids. Place victim in a stable side position and keep warm.

INHALATION : *Remove to fresh air. Assist breathing if necessary. Consult a physician.*

N 7A Sorbitan Monotallate

REACTIVITY DATA

STABILITY: Stable ● Unstable ○

Conditions to avoid: *N/D*

INCOMPATIBILITY: *Strong oxidizers.*

HAZARDOUS DECOMPOSITION PRODUCTS:
N/D

HAZARDOUS POLYMERIZATION: May occur ○ Will not occur ●

Conditions to avoid: *N/A*

SPILL AND DISPOSAL PROCEDURES

SPILLS AND LEAKS:
Contain large spills and pump away. Small spills can be covered with absorbent material. Do not discharge into sewers or natural waters.

WASTE DISPOSAL:
Dispose of in a licensed facility. Observe local regulations.

STORAGE AND HANDLING

Avoid eye and skin contact. Avoid inhaling. Store in a cool, dry and well ventilated location. Keep containers tightly closed. Maintain temperature < 49 C. Store in metal or glass containers. Do not use plastic.

ECOLOGICAL DATA

BIODEGRADABILITY:
N/D

AQUATIC TOXICITY: N/D

INHIBITION OF BACTERIA IN EFFLUENT : *N/D*

No effect: *N/D* mg/l; **50% inhibition:** *N/D* mg/l.

N ?A Sorbitan Monotallate

HAZARDS CLASSIFICATIONS
WHMIS: Class:[-], Div.:[ ]; Class:[ ], Div.:[ ]; Class:[ ], Div.:[ ]. Class:[ ], Div.:[ ]; Class:[ ], Div.:[ ]; Class:[ ], Div.:[ ].

TRANSPORTATION:

UN/NA	CLASS	P.G.	SHIPPING NAME
TDG : *N/A*			
IATA: *N/A*			
IMDG: *N/A*			

Special Provision : *N/A*

WHMIS INFORMATION
N/A

c. = circa; N/D = no data; N/A = not applicable

PREPARATION INFORMATION :

Issued: *2001-01-09* Revised: *2003-10-21* Product Safety Dept., Phone: [416] 675-3611

Supplier: BASF Canada, 345 Carlingview Drive, Toronto, Ontario, M9W 6N9

MATERIAL SAFETY DATA SHEET

TRADE NAME : *N 23 P Emulsifier* | REFERENCE: 0085078

SYNONYMS : *7958664*

CHEMICAL IDENTITY : *Polycarboxylic acid amide & paraffin oil*

FORMULA : *Mixture*

CAS No. : *Mixture*

USE : *Emulsifier*

PHYSICAL DATA

MELTING POINT : *N/D*
BOILING POINT : *> 149 C*
DECOMP. TEMP. : *N/D*
DENS/SPEC GRAV : *0.9 @ 25 C*
VISCOSITY : *N/D*
SOLUB.in WATER : *Insoluble*
ODOUR THRESHOLD: *N/D*

VAP.PRESSURE: *< 1 mmHg @ 25 C*
VAPOUR DENSITY(AIR=1): *> 1*
VOLATILES(%WT) : *35 (by vol)*
EVAPORATION RATE: (*N/A* =1) *N/A*
REFRACTIVE INDEX: *N/A*
PARTITION COEFF.: *N/D*
pH : *N/D*

APPEARANCE AND ODOUR: *Dark viscous liquid with a mild hydrocarbon odour*

HAZARDOUS INGREDIENTS

INGREDIENTS	% w/w	CAS No.	EXPOS. LIMIT	TOXICITY
This is not a WHMIS Controlled Product.				

FIRE AND EXPLOSION HAZARDS

FLASH POINT: *c. 127 C* METHOD: *PMCC* AUTO-IGNITION TEMP.: *N/D*

FLAMMABLE LIMITS in AIR(% by volume): *N/D* LOWER: *N/D* UPPER: *N/D*

EXTING. MEDIA : WATER ✓ WATER FOG ✓ CO2 ✓ FOAM ✓ DRY CHEMICAL

OTHER: *N/D* BURNING RATE : *N/D*

FIRE FIGHTING PROCEDURES : *Wear self-contained breathing apparatus in confined areas or when exposed to combustion products.*

UNUSUAL HAZARDS : *None known.*

HAZARDOUS COMBUSTION PRODUCTS: *N/D*

EMERGENCY PHONE NO. : CANUTEC (reverse charges) [613] 996-6666
During office hours (Toronto) [800] 454-2673

N 23 P Emulsifier

HEALTH DATA

TOXICITY: *N/D*

ROUTE OF ENTRY: ✓ **EYE** ✓ **SKIN** ✓ **INGESTION** ✓ **INHALATION**

EFFECTS OF ACUTE EXPOSURE:

Eye and skin contact may cause irritation. Ingestion may cause adverse health effects. Inhalation may cause irritation of the respiratory tract.

EFFECTS OF CHRONIC EXPOSURE:

There are no known chronic effects associated with this material.

SKIN IRRITATION: *N/D*
EYE IRRITATION : *N/D*
CARCINOGENICITY: *None known*
TERATOGENICITY : *None known*
MUTAGENICITY : *Not mutagenic (Ames test)*
EXPOSURE LIMITS: *Not established*
REPRODUCTIVE EFFECTS: *None known*
OTHER HEALTH DATA : *N/D*

PROTECTION INFORMATION

VENTILATION: **General mechanical:** *Adequate* **Local exhaust:** *Preferred*
Other: *N/D*
RESPIRATORY PROTECTION: *Approved respirator if exposed to vapors or mist.*

GLOVES: *Rubber or plastic.* **EYE PROTECTION:** *Chemical goggles.*
OTHER PROTECTIVE MEASURES: *Impermeable apron and boots to prevent skin contact.*

FIRST AID

EYES : *Flush immediately with flowing water for at least 15 minutes and consult a physician if irritation develops.*

SKIN : *Wash with soap and water. Remove contaminated clothing and launder before reuse. Consult a physician if irritation develops.*

INGESTION : *Give 2 glasses of water and induce vomiting. Consult a physician immediately.*

NOTE : If victim is unconscious, never induce vomiting nor give liquids. Place victim in a stable side position and keep warm.

INHALATION : *Remove to fresh air. Assist breathing if necessary. Consult a physician.*

N 23 P Emulsifier

REACTIVITY DATA

STABILITY: Stable ● Unstable ○

Conditions to avoid: *N/D*

INCOMPATIBILITY: *Strong oxidizers.*

HAZARDOUS DECOMPOSITION PRODUCTS:
N/D

HAZARDOUS POLYMERIZATION: May occur ○ Will not occur ●

Conditions to avoid: *N/A*

SPILL AND DISPOSAL PROCEDURES

SPILLS AND LEAKS:
Contain large spills and pump away. Small spills can be covered with absorbent material. Do not discharge into sewers or natural waters.

WASTE DISPOSAL:
Dispose of in a licensed facility. Observe local regulations.

STORAGE AND HANDLING

Avoid eye and skin contact. Avoid inhaling. Store in a cool, dry and well ventilated location. Keep containers tightly closed. Store in metal or glass containers at temperatures < 49 C. Do not store in plastic.

ECOLOGICAL DATA

BIODEGRADABILITY:
N/D

AQUATIC TOXICITY: **N/D**

INHIBITION OF BACTERIA IN EFFLUENT : *N/D*

No effect: *N/D* **mg/l;** **50% inhibition:** *N/D* **mg/l.**

N 23 P Emulsifier

HAZARDS CLASSIFICATIONS

WHMIS: Class:[-], Div.:[ ]; Class:[ ], Div.:[ ]; Class:[ ], Div.:[ ].
Class:[ ], Div.:[ ]; Class:[ ], Div.:[ ]; Class:[ ], Div.:[ ].

TRANSPORTATION:

UN/NA	CLASS	P.G.	SHIPPING NAME
TDG : *N/A*			
IATA: *N/A*			
IMDG: *N/A*			

Special Provision : *N/A*

WHMIS INFORMATION

N/A

c. = circa; N/D = no data; N/A = not applicable

PREPARATION INFORMATION :

Issued: *1998-05-05* Revised: *2003-11-17* Product Safety Dept., Phone: [416] 675-3611

Supplier: BASF Canada, 345 Carlingview Drive, Toronto, Ontario, M9W 6N9

Material Safety Data Sheet

Anachemia

255 Norman.
Lachine (Montreal), Que
H8R 1A3

EMERGENCY NUMBERS:

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)
(CAN) CANUTEC : 1(613) 996-6666 (24hrs)
(USA) Anachemia : 1(518) 297-4444
(CAN) Anachemia : 1(514) 489-5711

WHMIS	Protective Clothing	TDG Road/Rail
WHMIS CLASS: E C D-1A		TDG CLASS: 8 5.1 6.1 9.2 PIN: UN2032 PG: I
		

Section I. Product Identification and Uses

Product name	**NITRIC ACID, 90%**
Chemical formula	HNO3 in H2O
Synonyms	Nitric acid red fuming, Red fuming nitric acid, AC-6527, 62800
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3
Material uses	For laboratory use only.

CI#	Not available.
CAS#	Not applicable.
Code	AC-6527
Formula weight	Not applicable.
Supersedes	

Section II. Ingredients

Name	CAS #	%	TLV
1) NITRIC ACID	7697-37-2	>90	Exposure limits: ACGIH TWA 2 ppm (5.2 mg/m3); STEL 4 ppm (10 mg/m3)
2) NITROGEN DIOXIDE	10102-44-0	7.5-12.7	Exposure limits: ACGIH TWA 3 ppm (5.6 mg/m3); STEL 5 ppm (9.4 mg/m3)
3) WATER	7732-18-5	Balance	Not established by ACGIH.

Toxicity values of the hazardous ingredients

NITRIC ACID:
ORAL (LDLo): Acute: 430 mg/m3 (Human).
UNREPORTED (LDLo): Acute: 110 mg/kg (Human).
NITRIC ACID, FUMING:
INHALATION (LC50): Acute: 67 ppm (Rat) (NO2) (4 hour(s)).
NITROGEN DIOXIDE:
GAS (LC50): Acute: 30 ppm (Guinea pig) (1 hour(s)). 88 ppm (Rat) (4 hour(s)). 315 ppm/15M (Rabbit).
GAS (LCLo): Acute: 200 ppm/1M (Human).

Section III. Physical Data

Physical state and appearance / Odor	Yellow to brown-red liquid. Pungent and suffocating acid odor.
pH (1% soln/water)	<7
Odor threshold	<5 ppm
Percent volatile	100% (V/V)
Freezing point	-42°C
Boiling point	83°C
Specific gravity	1.526-1.544 (Water = 1)
Vapor density	2.2 (Air = 1)
Vapor pressure	62 mm of Hg (@ 25°C)
Water/oil dist. coeff.	Not available.
Evaporation rate	Not available.
Solubility	Miscible in water.

Section IV. Fire and Explosion Data

Flash point	Not applicable.
Flammable limits	Not applicable.
Auto-ignition temperature	Not applicable.
Fire degradation products	Oxides of nitrogen (NO, NO2, N2O, N2O3) plus nitric acid mist or vapor.
Fire extinguishing procedures	Use flooding quantities of water. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode. Cool containing vessels with flooding quantities of water until well after fire is out.
Fire and Explosion Hazards	Powerful oxidizing agent; may ignite oxidizable materials. Contributes to combustion of other materials. Container explosion may occur under fire conditions or when heated. Contact with other material may cause fire and/or explosion. Flammable/explosive hydrogen gas may be formed upon contact of this product with metals. Emits toxic and corrosive fumes under fire conditions. Reacts violently with water.

Section V. Toxicological Properties

Routes of entry	Ingestion and inhalation. Eye contact. Skin contact.
Effects of Acute Exposure	May be fatal by ingestion, inhalation, or by skin absorption. Corrosive to skin and eyes on contact. Vapors, liquids and mists are extremely corrosive. Possible risks of irreversible effects. Effects may be delayed. Target organs: eyes, skin, respiratory system, lungs, teeth, cardiovascular system. 25 ppm (NO2) is immediately dangerous to life or health.
Eye	Vapors, liquids and mists are extremely corrosive to the eyes. Brief contact of the vapors will be severely irritating. Brief contact of the liquid or mist will severely damage the eyes and prolonged contact may cause permanent eye injury which may be followed by blindness.
Skin	Causes severe burns, blisters and yellow skin discoloration.
Inhalation	Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, laryngitis, bronchitis, dyspnea, headache, nausea, hypotension, cyanosis, and vomiting. May cause delayed lung injury.
Ingestion	Burns in mouth, pharynx and gastrointestinal tract. Risk of vomiting, nausea, diarrhea, abdominal pain, stomach perforation, hematemesis, hemoptysis, hypotension, nephritis, albuminuria, oliguria, anuria, hematuria, convulsions, kidney damage, coma and death.

Section V. Toxicological Properties

Effects of Chronic Overexposure	May cause erosion of the teeth, lesions of the skin, bronchial irritation, coughing, pneumonia, bronchitis, and lung damage. Repeated or prolonged exposure to the substance can produce target organs damage. Carcinogenic effects: Not available. Mutagenic effects: Not available. Teratogenic effects: Not available. Toxicity of the product to the reproductive system: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated.

Section VI. First Aid Measures

Eye contact	Immediate first aid is needed to prevent eye damage. Washing within 1 minute is essential to achieve maximum effectiveness. IMMEDIATELY flush eyes with copious quantities of water for at least 30 minutes holding lids apart to ensure flushing of the entire surface. Seek immediate medical attention. If irritation persists, repeat flushing.
Skin contact	Immediate first aid is needed to prevent skin damage. IMMEDIATELY flush skin with running water for at least 30 minutes. Remove contaminated clothing, protecting your own hands and body. Seek immediate medical attention. If irritation persists, repeat flushing. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport. Wash contaminated clothing before reusing.
Inhalation	Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Seek immediate medical attention.
Ingestion	If conscious, wash out mouth with water. Have conscious person drink several glasses of water or milk. Aim to dilute acid 100 times approximately. DO NOT induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious or convulsing person. Guard against aspiration into lungs. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water.

Section VII. Reactivity Data

Stability	Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination.
Hazardous decomp. products	Various nitrogen oxides, including (NO, NO2, N2O3, N2O) all mixed with nitric acid mist and vapor.
Incompatibility	Explosive reaction with reducing agents, combustible materials, wood, paper, cotton, and similar organic materials, organic chemicals, fluorine, phosphine, carbonates, diborane, hydrocarbons, dichromates, bases, alkalis, aluminum, iron, copper, resins, sulfides, ammonia, amines, alcohols, turpentine, hydrogen sulfide, metal powders, carbides, organic materials (acetone, acetic acid, methanol, formaldehyde, ether, etc..), non-metals (boron, phosphorus, carbon, etc..), hydrazine, acids, peroxides, silicides, phosphides, salicylates, non-metal oxides, thiols, nitrides, cyanates, ketones, interhalogens, boron phosphide, cyanides, acetylides, silver compounds, mercury(II) compounds, thiocyanates, ammonium nitrate, hexacyanoferrates, phosphorus compounds, zinc ethoxide, azides, metal oxides, ferricyanides, alkali metals. Reacts with most common metals to produce hydrogen. Heat.
Reaction Products	Reacts with water to produce heat, and toxic, corrosive fumes of nitrogen oxides. Contact with other material may cause fire and/or explosion. Corrosive to metals. Hazardous polymerization will not occur.

Section VIII. Preventive Measures

Protective Clothing in case of spill and leak	Wear self-contained breathing apparatus, neoprene boots and neoprene gloves. Full suit.
Spill and leak	Evacuate and ventilate the area. Eliminate all sources of ignition. Cover with soda ash or lime. Adequate ventilation is required for soda ash due to release of carbon dioxide gas. Place in a suitable container and mark for disposal. Wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material. Avoid contact with a combustible material (wood, paper, oil, clothing...). Stay upwind: Keep out of low areas.
Waste disposal	According to all applicable regulations. Harmful to aquatic life at very low concentrations. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.
Storage and Handling	Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from direct sunlight or strong incandescent light. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Avoid contact with a combustible material (wood, paper, oil, clothing...). Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible.). Do not allow water to get inside container because of violent reaction. May catch fire in contact with combustible materials. May develop pressure; vent periodically.

Section IX. Protective Measures

Protective clothing	Face shield and splash goggles. Impervious neoprene gloves, synthetic apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. Have available and use as appropriate: neoprene suits and boots. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. If more than TLV, do not breathe vapor. Wear self-contained breathing apparatus. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.
Engineering controls	Use only in a chemical fume hood to keep airborne levels below recommended exposure limits. Ventilation should be corrosion proof. Do not use in unventilated spaces.

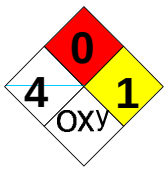
Section X. Other Information

Special Precautions or comments

Extremely corrosive liquid! Powerful oxidizing agent; may ignite oxidizable materials. Highly toxic! Causes severe burns which may be delayed! Risk of serious damage to eyes. Possible risks of irreversible effects. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use only in a chemical fume hood. Contact with other material may cause fire and/or explosion. Reacts violently with water. When diluting, always add acid to water, not water to acid. Heat is generated by dilution. Handle and open container with care. Container should be opened only by a technically qualified person.

Note to physician: Medical conditions that may be aggravated by exposure include asthma, bronchitis, emphysema, and other lung diseases and chronic nose, sinus, or throat conditions. In the event of skin or eye contact, rapid and thorough flushing is essential.

RTECS no. QU5900000.



NFPA

Prepared by MSDS Department/Département de F.S..

Validated 11-Dec-2001

Telephone# (514) 489-5711

GRAYMONT

MATERIAL SAFETY DATA SHEET

SECTION I - CHEMICAL PRODUCT AND COMPANY INFORMATION

Material Name / Identifier: **HYDRATED LIME**	**WHMIS CLASS E : CORROSIVE MATERIAL**

MANUFACTURER'S AND SUPPLIER'S NAME:		EMERGENCY TEL. No
GRAYMONT (NB) INC	P.O. Box 59, Havelock, New Brunswick, E0A 1W0.	**(506) 534-2311**
GRAYMONT (QC) INC.	25, rue De Lauzon, Boucherville (Québec), J4B 1E7.	**(450) 759-8361**
GRAYMONT (PA) INC.	P.O. Box 448 North Thomas St., Bellefonte, PA 16823	**(888) 472-9086**
GRAYMONT (WESTERN CANADA) INC.	190 – 3025 12 Street N.E., Calgary, Alberta, T2E 7J2	**(800) 424-9300 Chemtrec**
GRAYMONT (WESTERN US) INC.	3950 South 700 East, Suite 301, Salt Lake City, Utah 84107	**(800) 424-9300 Chemtrec**

Chemical Name	Chemical Family	Chemical Formula
Calcium hydroxide	**Alkaline earth hydroxide**	**Complex mixture - mostly $Ca(OH)_2$**
Molecular Weight	Trade Name and Synonyms	Material Use
$Ca(OH)_2$ = 74.096	**High Calcium Hydrated Lime, Lime, Slaked lime, Lime Putty, Lime Slurry, Milk of Lime, Calcium Hydroxide**	**Neutralization, Flocculation, Stabilization, absorption**

SECTION II - COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients	Approximate Concentration (% by weight)	C.A.S. Number	Exposure limits (mg/m^3)				
			OSHA PEL	ACGIH TLV	RQMT OEL	NIOSH REL	NIOSH IDLH
(Complex Mixture)			**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 10/40h**	
Calcium hydroxide	**> 92**	**1305-62-0**	**5**	**5**	**5**	**Not available**	**Not available**
Crystalline Silica, Quartz	**> 0.1**	**14808-60-7**	**10/(%SiO_2)+2 (respirable silica dust)**	**0.1 (respirable silica dust)**	**0.1 (respirable silica dust)**	**0.05 (respirable free silica)**	**50**

SECTION III - PHYSICAL AND CHEMICAL PROPERTIES

Physical State Gas ☐ Liquid ☐ Solid ☑	Odor and Appearance **No odor – Fine white powder**		Odor Threshold (p.p.m.) **Not applicable**	Specific Gravity **2.3 – 2.4**
Vapor Pressure (mm) **Not applicable**	Vapor Density (Air = 1) **Not applicable**	Evaporation Rate **Not applicable**	Boiling Point (°C) **Not applicable**	Freezing Point (°C) **Not applicable**
Solubility in Water (20°C) **0.165g/100g Sat.soln**	Volatiles (% by volume) **Not applicable**	pH (25 °C) **Sat. soln $Ca(OH)_2$ 12.45**	Density (kg/m^3) **320 - 690**	Coefficient of water/oil distribution **Not applicable**

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flammability If yes, under

Yes ☐ No ☑ which conditions:

Extinguishing Media

Calcium Hydroxide does not burn. Use extinguishing media appropriate to surrounding fire conditions.

Special Fire Fighting Procedures

Not applicable

Flash point (°C) and Method	Upper flammable limit (% by volume)	Lower flammable limit (% by volume)
Not applicable	**Not applicable**	**Not applicable**
Auto Ignition Temperature (°C)	TDG Flammability Classification	Hazardous Combustion Products
Not applicable	**Non-flammable**	**None**

Dangerous Combustion Products **None**

EXPLOSION DATA

Sensitivity to Chemical Impact	Rate of Burning	Explosive Power	Sensitivity to Static Discharge
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**

SECTION V - REACTIVITY DATA

Chemical Stability Yes ☐ No ☑	If no, under which conditions?	**Absorbs carbon dioxide in the air to form calcium carbonate.**
Incompatibility to other substances Yes ☑ No ☐	If so, which ones?	**Boron tri-fluoride, chlorine tri-fluoride, ethanol, fluorine, hydrogen fluoride, phosphorus pentoxide; and acids (violent reaction with generating heat and possible explosion in confined area).**
Reactivity Yes ☑ No ☐	If so, under which conditions?	**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.**
Hazardous Decomposition Products		**Thermal decomposition at 540°C will produce calcium oxide and water.**
Hazardous Polymerization Products		**Will not occur.**

SECTION VI - TOXICOLOGICAL INFORMATION

Route of Entry

☑ Skin Contact ☐ Skin Absorption ☑ Eye Contact ☑ Acute Inhalation ☐ Chronic Inhalation ☑ Ingestion

Effects of Acute Exposure to Product

Skin	**Mucous and skin corrosion, removes natural skin oils.**
Eyes	**Severe eye irritation, intense watering of the eyes, possible lesions, possible blindness when exposed for prolonged period. Eye-Rabbit-10mg/ 24 h – Severe.**
Inhalation	**If inhaled in form of dust, irritation of breathing passages, cough.**
Ingestion	**If ingested: pain, vomiting blood, diarrhea, collapse, drop in blood pressure (indicates perforation of esophagus or stomach).**

Effects of Chronic Exposure to Product **Contact dermatitis**

LD_{50} of Product (Specify Species and Route) (Food grade $Ca(OH)_2$: 7340mg/kg) (Rats, ingestion)	Irritancy of Product **Severe to moist tissues**	Exposure limits of Product **Unavailable**
LC_{50} of Product (Specify Species) **Unavailable**	Sensitization to Product **None**	Synergistic materials **None reported**

☑ Carcinogenicity ☐ Reproductive effects ☐ Tératogenicity ☐ Mutagenicity

Calcium Hydroxide is not listed on the MSHA, OSHA or IARC lists of carcinogens. However, hydrated lime could contain crystalline silica, which inhaled in the form of quartz or crystobalite from occupational sources, is classified by IARC as (Group 1) carcinogenic to humans.

SECTION VII - PREVENTIVE MEASURES

Personal Protective Equipment (PPE)	**Wear clean, dry gloves, full length pants over boots, long sleeved shirt buttoned at the neck, head protection and approved eye protection selected for the working conditions.**

Gloves (Specify)	Respiratory (Specify))	Eyes (Specify)	Footwear (Specify)
Gauntlets Cuff style	**NIOSH approved filtering anti-dust mask**	**Tight fitting goggles with side shields**	**Resistant to caustics**

Clothing (Specify)	Other (Specify)
Fully covering skin	**Evaluate degree of exposure and use PPE if necessary. After handling lime, employees must shower. If exposed daily, use oil Vaseline, silicone base creme etc. to protect exposed skin, particularly neck, face and wrists.**

Engineering Controls (e.g. ventilation, enclosed process, specify)

Enclose dust sources; use exhaust ventilation (dust collector) at handling points, keep levels below Max. Concentration Permitted.

Leak and Spill Procedure

Limit access to trained personnel. Use industrial vacuums for large spills. Ventilate area.

Waste Disposal

Transport to disposal area or bury. Review Federal, Provincial and local Environmental regulations.

Handling Procedures and Equipment

Avoid skin and eye contact. Minimize dust generation. Wear protective goggles and in cases of insufficient ventilation, use anti-dust mask. An eye wash station and safety shower should be readily available where this material or its water dispersions are used.

Storage Requirements

Keep tightly closed containers in a cool, dry and well-ventilated area, away from acids. Keep out of reach of children.

Special Shipment Information

Calcium Hydroxide is neither regulated by the Transportation of Dangerous Goods (TDG) Regulations (Canada) nor the Hazardous Materials Regulations (USA).

SECTION VIII - FIRST AID MEASURES

Skin

Carefully and gently brush the contaminated body surfaces in order to remove all traces of lime. Use a brush, cloth or gloves. Remove all lime-contaminated clothing. Rinse contaminated area with lukewarm water for 15 to 20 minutes. Consult a physician if exposed area is large or if irritation persists.

Eyes

Immediately rinse contaminated eye(s) with gently running lukewarm water for 15 to 20 minutes. In all cases, immediately contact a physician.

Inhalation

Move source of dust or move victim to fresh air. Obtain medical attention immediately. If victim does not breathe, give artificial respiration.

Ingestion

If victim is conscious, give 300 ml (10 oz) of water, followed by diluted vinegar (1 part vinegar, 2 parts water) or fruit juice to neutralize the alkali. Do not induce vomiting. Contact a physician immediately.

General Advise

Consult a physician for all exposures except minor instances of inhalation.

SECTION IX - REGULATORY INFORMATION

Regulatory Listings Reviewed:

Each component/ingredient of this product has been reviewed against the following regulatory listings:

- **CERCLA / SARA section 302 - Extremely Hazardous Substance List.**
- **CERCLA / SARA Title III section 304- Hazardous Substance and RQ List.**
- **SARA Title III section 313 - Toxic Chemical List.**

Component Calcium Hydroxide does not appear on any of the above regulatory listings.

SARA Title III Section 311/312 - Hazard Categories.

This product is regulated under CFR 1910.1200 (OSHA Hazard Communication) as Immediate (Acute) Health Hazards - Corrosive.

California Proposition 65

Component Calcium Hydroxide does not appear on the above regulatory listing. This product may contain small amounts of crystalline silica. Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986. (Proposition 65)

Transportation - Hazardous Materials Regulations (USA) & Transportation of Dangerous Goods (TDG) Regulations (Can).

Calcium Hydroxide does not appear on the above regulatory listings

Canadian Environmental Protection Act (CEPA) – Domestic Substances List (DSL).

Calcium Hydroxide appears on the above regulatory listing.

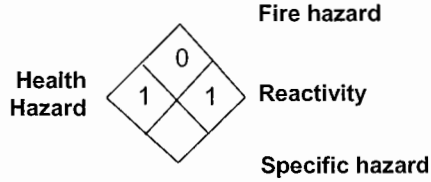
ANSI/NSF 60 - Drinking Water Treatment Additives.

This product has been investigated with respect to elements identified by EPA as toxic and it has been classified for use in direct contact with drinking water. (in accordance with Standard ANSI/NSF 60).

SECTION X - OTHER INFORMATION

Hazardous materials Identification System		
	Health Risks	①
	Flammability	⓪
	Reactivity	①
	Personal Protection	Ⓔ

National Fire Protection Association (U.S.)



WHMIS Classification: **"E" Corrosive Materials.**

Symbol:

WHMIS Classification: **"D2A" Materials causing other toxic effects.**

Symbol:

Additional Information/Comments:

The technical data contained herein is given as information only and is believed to be reliable.

GRAYMONT makes no guarantee of results and assumes no obligation or liability in connection therewith.

Sources Used:

NFPA, NLA, TDG, CSST, (LSRO-FASEB), Hazardous Products Act, Environment Canada, Enviroguide, OSHA, ACGIH, IARC, NIOSH, CFR, NTP.

Prepared by:	Telephone number	Date
Technical Services		**July 2001**
GRAYMONT (QC) INC.	**(450) 449-2262**	
GRAYMONT (WESTERN US) INC	**(801) 264-6879**	

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Phone#:(732) 888 8000
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MATERIAL SAFETY DATA SHEET

MSDS#: 96
Product Code: CAUSTICKAP
Date Printed: Dec 10, 2001
Review/Revision Date: 6-15-2001

Sodium Hydroxide, Anhydrous or Caustic Soda, Beads

SECTION I - GENERAL INFORMATION AND CHEMICAL PRODUCT IDENTIFICATION

Trade Name: Sodium Hydroxide, Anhydrous or Caustic Soda, Beads

Chemical Name: Caustic Soda, Beads
Chemical Formula: NaOH
Chemical Family: Alkaline Salts
Synonyms: Anhydrous Sodium Hydroxide, Sodium Hydroxide, Caustic Soda
CAS#: 1310-73-2
D.O.T. Ship Name: Sodium Hydroxide, Anhydrous

SECTION II - COMPOSITION/INFORMATION ON INGREDIENTS

CAS#:	Common Name:	ACGIH/PPM TWA	ACGIH/PPM STEL	OSHA/PPM PEL:	% by Wt
1310-73-2	Caustic Soda, Beads	none	none	2 mg/cu m	99.00%

SECTION III - HAZARD(S) IDENTIFICATION

Route(s) of Entry:

Inhalation, Ingestion and Dermal

Emergency Overview

This product is a CORROSIVE. It causes severe burns with permanent damage.
Ingestion may be fatal.
It is White to Slightly colored solid, odorless.
Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.
Product is not flammable or reactive.

Potential Health Effects:

Acute Eye: Causes severe burns. Small quantities can result in permanent damage and/or loss of vision.
Acute Skin: Corrosive action causes burns and frequently deep ulceration with subsequent scarring. Prolonged contact destroys tissue. Dust or mist from solutions can cause irritant dermatitis.
Acute Ingestion: Ingestion either in solid or liquid form can cause very serious damage to the mucous membranes or other tissues with which contact is made, and may be fatal.
Acute Inhalation: Inhalation of dusts or mists can cause damage to the upper respiratory tract and to the lung tissue depending on severity of exposure. Effects can range from mild irritation of mucous membranes, severe pneumonitis and destruction of lung tissue.
Chronic: The effects of long term, low level exposure to this product have not been determined. Safe handling of this material on a long term basis should emphasize the avoidance of all effects from repetitive acute exposures.

Signs & Symptoms Of Exposure:

Eye Contact: Causes severe burns; small quantities can result in permanent damage and/or loss of vision.
Skin Contact: Corrosive action causes burns & frequently deep ulceration with subsequent scarring. Prolonged contact destroys tissue. Dust or mist from solutions can cause irritant dermatitis.
Ingestion: Ingestion either in solid or liquid form can cause very serious damage to the mucous membranes or othertissues with which contact is made, and may be fatal.
Inhalation: Inhalation of dusts or mists can cause damage to the upper respiratory tract and to the lung tissue depending on severity of exposure. Effects can range from mild irritation of mucous membranes, severe pneumonitis and destruction of lung tissues.

SECTION IV - FIRST AID INFORMATION

Ingestion:

If conscious, drink large quantities of water or acidic beverages (tomato or orange juice, carbonated soft drinks). **DO NOT** induce vomiting. Take immediately to a hospital or physician. If vomiting occurs, administer additional water. If unconscious, or in convulsions, take immediately to a hospital. **Never give anything to eat or drink to someone who is unconscious, having consulsions, or unable to swallow.**

Eyes:

Flush eyes with large quantities of running water for a minimum of 15 minutes. If victim is wearing contact lenses, remove them. Hold eyelids apart during the flushing to ensure rinsing of entire surface of the eye and lids with water. DO NOT let victim rub eye(s). Do not attempt to neutralize with chemical agents. Oils/ointments should not be used at this time. Get medical attention if eye irritation occurs.

Skin:

Immediately flush skin with plenty of water while removing contaminated clothing and boots. Call a physician. If skin feels slippery, caustic may still be present in sufficient quantities to cause rash burn. Continue washing until slick skin feeling is gone. Thoroughly clean contaminated clothing and boots before reuse or discard.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen. Contact a physician.

SECTION V - FIRE AND EXPLOSION DATA

N.F.P.A. Hazard Ratings: **Health:** **Fire:** **Reactivity:** **Special:** N/A

0 = minimal 1 = slight 2 = moderate 3 = serious 4 = severe N/R = Not Rated

Flash Point: N/A **Methods Used:** N/A

Flammable Limits: Not Flammable **LEL:** N/A **UEL:** N/A

Autoignition Temp: N/A

Extinguisher Media:

Use extinguishing method suitable for surrounding fire.

Special Fire Fighting Procedures:

Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing. Keep unnecessary people away, isolate hazard area and deny entry. Evacuate residents who are downwind of fire. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.

Unusual Fire And Explosion Hazards:

Contact with some metals particularly magnesium, aluminum and zinc (galvanized) can rapidly generate hydrogen, which is explosive.

Hazardous Combustion Products:

Not known.

Emergency Response Guidebook Information: Guide # 154

SECTION VI- ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:

Only trained personnel equipped with NIOSH/MSHA approved, full face piece combination dust/mist and acid gas respirators should be permitted in area. For dry material, use appropriate methods, shovels, brooms, and vacuums to clean up the spill. If mixed with water, or likely to become mixed with water or any liquid, dike area to contain spill. Reclaim if possible. Or, dilute spill with large amounts of water then neutralize with dilute acid. Use vacuum truck to pick up neutralized liquid residues (ph 6 to 9) may be disposed of in waste water treatment facilities which allow the discharge of neutral salt solutions. After all visible traces have been removed, flush area with large amounts of water.
Runoff from fire control may cause pollution.

SECTION VII- HANDLING AND STORAGE

Handling And Storage:

Store in a dry place indoors. Keep containers closed & labeled correctly when not in use. Wash thoroughly after handling. When handling, wear safety goggles & face shield, rubber gloves, rubber boots, rubber apron, polyvinyl chloride clothing and plastic hard hat. Wear NIOSH/MSHA approved, dust type respirator, where dust or mists may be generated. Never touch eyes or face with hands or gloves that may be contaminated

respiration, where dust or mists may be generated. Never touch eyes or face with hands or gloves that may be contaminated with Caustic Soda. See additional Info.

SECTION VIII - EXPOSURE CONTROLS/PERSONAL PROTECTION

Skin Protection:

Nitrite, Neoprene, Natural Rubber

Respiratory Protection:

Use NIOSH/MSHA approved dust.mist filter respirator for routine work purpose when exposure to mists exceed the permissible exposure limits. The respirator use limitations made by NIOSH/MSHA or the manufacturer must be observed. Respiratory protection programs must be in accordance with 29 CFR 1910.134.

Eye Protection:

Close fitting chemical safety goggles with face shield

Other Protection:

Rubber boots with safety toes, rubber aprons, PVC clothing, plastic hard hat should be used when necessary to prevent skin contact. Personal protective clothing and use of equipment must be in accordance with 29 CFR 1910.133 and 29 CFR 1910.132.

Ventilation Protection:

Local exhaust is sufficient to maintain dust levels below permissible exposure limit.

Exposure Limits:

Caust Soda Beads (CAS # 1310-73-2)
ACGIH/PPM TWA: none STEL: none
OSHA/PPM PEL: 2 mg/cu m % by Wt.: 99.00%

Hygenic Practices:

All food / smoking materials should be kept in a separate area away from the storage/use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking or smoking, hands and face should be thoroughly washed. Facilities storing or using this material should be equipped with an eyewash and safety shower.

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight: N/A
Boiling Point: 1390 deg C
Melting Point: 590-608 deg. F
Specific Gravity: 2.130 (H20=1)
Vapor Pressure(mm/Hg): N/A
Vapor Density(air=1): N/A
Reactivity In Water: N/A
Solubility In Water: Appreciable 347 g/100 g water @ 100 deg C
Appearance And Odor: White to Slightly colored solid, no odor
Other: pH of Solutions: All solutions are strongly basic.
Bulk Density Compacted = 73 lb/ft3

CAUSTICKAP

SECTION X - STABILITY AND REACTIVITY

Stability:
This product is considered stable.

Conditions To Avoid:
Organic materials and concentrated acids. Caustic soda reacts with Magnesium, aluminum, zinc (Galvanized), tin, chromium, brass and bronze generating hydrogen which is explosive. Avoid humid areas.

Incompatable Materials:
Organic materials and concentrated acids. Caustic soda reacts with Magnesium, aluminum, zinc (Galvanized), tin, chromium, brass and bronze generating hydrogen which is explosive.

Hazardous Decomposition Products:
Reaction with various food sugars may form carbon monoxide. H2 Gas in contact w/alumnium, zinc, tin, or lead and their alloys.

Polymerization Conditions To Avoid:
Not known.

SECTION XI - TOXICOLOGICAL INFORMATION

Eye Effects:
No data found for product.

Skin Effects:
No data found for product.

Dermal Toxicity:
No data found for product.

Inhalation Effects:
No data found for product.

Sensitization:
No data found for product.

Ingestion Effects:
No data found for product.

Carcinogenicity/Mutagenicity:
This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be "probable" or "suspected" human carcinogens.

No data available for mutangenicity.

Reproductive Effects:
No data found for product.

Neurotoxicity:
No data found for product.

Target Organs:

No data found for product.

Additional Toxicological Information:
None

SECTION XII- ECOLOGICAL INFORMATION

Biodegradability:	No data found for product.
Ecotoxicity:	No data found for product.
Biological Oxygen Demand(BOD5):	No data found for product.
Chemical Oxygen Demand:	No data found for product.
Activated Sludge Respiration Inhibition Test:	No data found for product.

Additional Ecological Information:

None

SECTION XIII - DISPOSAL CONSIDERATIONS

Waste Disposal Methods:
After all visible traces have been removed, flush area with large amounts of water. PFG recommends disposal of dry residues in an approved hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, as well as any other relevant federal, state or local laws/regulations regarding disposal. Never enter a caustic soda storage tank or container even if it appears to be empty.

Container Disposal Information:
It is your duty to dispose of the containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and Recovery Act, as well as any other relevant federal, state or local laws/regulations regarding disposal. Never enter a caustic soda storage tank or container even if it appears to be empty.

SECTION XIV - TRANSPORT INFORMATION

Proper Shipping Name: Sodium Hydroxide, Anhydrous
D.O.T. Hazard Class: 8
Label Requirement: Corrosive
Placard: Corrosive
Packing Group: II

UN: 1823
RQ: 1000 lbs (454 kg)

CAS: 1310-73-2
CAUSTICKAP

SECTION XV - REGULATORY INFORMATION

State Right To Know Laws: The following ingredients are disclosed for compliance with State Right to Know Laws:

CAS#	Chemical Name	State RTK
1310-73-2	Sodium Hydroxide, Anydrous	NJ

SARA Title III Hazard Classes Sections 311/312:
Immediate (acute) health hazard
Reactive Hazard

OSHA Status:
This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910,1200.

SARA Title III Hazard Classes Section 302 - EXTREMELY HAZARDOUS SUBSTANCES:
This product does not contain ingredients listed in Appendix A and B as Extremely Hazardous substances.
none

TSCA Status:

Listed/Non-reportable

SARA Section 313 :

Not listed.

CAS#	Chemical Name:

CERCLA, 40 CFR 117, 302:
This product contains ingredients specified in the List of Extremely Hazardous Substances. These ingredients are listed below.
CERCLA listed substances are:

SARA Superfund Section 110:
This product does NOT contain ingredients listed as hazardous substances on the Priority List of CERCLA Hazardous substances.

California Proposition 65:
This product contains a chemical (or chemicals) known to the State of California to cause birth defects or other reproductive harm.

Michigan Critical Materials:

This product does NOT contain ingredients listed on the Michigan Critical Materials Register.

CAA:
CWA:
RCRA: Considered a hazardous waste, dispose of according to local regulations.
Canada CEPA:
Canada WHMIS:

SECTION XVI- OTHER INFORMATION

Product Code: CAUSTICKAP

Key Legend Information:

N/Av:	Not Available
N/Ap:	Not Applicable
N/R:	Not Rated
ND:	Not Determined
ACGIH:	American Conference of Govr'ntal Industrial Hygienists
OSHA:	Occupational Saftey and Health Administration
TLV:	Threshold Limit Value
PEL:	Permissable Exposure Limit
TWA:	Time Weighted Average
STEL:	Short Term Exposure Limit
NTP:	National Toxicology Program
IARC:	International Agency for Research on Cancer
SARA Title III:	Superfund Amendments and Reauthorization Act
CERCLA:	Comprehensive Response, Compensation and Liability Act
TSCA:	Toxic Substance Control Act

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind expressed or implied is made with respect to the information contained herein. This Material Safety Data Sheet was prepared to comply with OSHA Hazard Communication standard. (29 CFR 1910.1200). This supersedes any previous information. All LidoChem, Inc. MSDS's are reviewed ever three years or sooner if necessary. Please check the Review Date on Page 1 for most current version. Please request a new MSDS from LidoChem, Inc. if the date is older than 3 years.

NOTICE: OSHA STANDARD 29 CFR 1910.1200 requires that information be provided to employees regarding the hazards of chemicals by means of a Hazard Communication Program including training, labeling, Material Safety Data Sheets, and access to written records. We request that you, and it is your legal duty, make all information in this Material Safety Data Sheet available to your employees.

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 06/14/2004 Reviewed on 05/21/2004

1 Identification of substance:

- **Product details:**
- **Product name: Sodium nitrite**
- **Stock number:** 14244
- **Manufacturer/Supplier:**
  Alfa Aesar, A Johnson Matthey Company
  Johnson Matthey Catalog Company, Inc.
  30 Bond Street
  Ward Hill, MA 01835-8099
  Emergency Phone: (978) 521-6300
  CHEMTREC: (800) 424-9300
  Web Site: www.alfa.com
- **Information Department:** Health, Safety and Environmental Department
- **Emergency information:**
  During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

- **Chemical characterization:**
  Description: (CAS#)
  sodium nitrite (CAS# 7632-00-0); 100%
- **Identification number(s):**
- **EINECS Number:** 231-555-9
- **EU Number:** 007-010-00-4

3 Hazards identification

- **Hazard description:**
  T Toxic
  O Oxidizing
  N Dangerous for the environment
- **Information pertaining to particular dangers for man and environment**
  R 8 Contact with combustible material may cause fire.
  R 25 Toxic if swallowed.
  R 50 Very toxic to aquatic organisms.
- **Classification system**

- **HMIS ratings (scale 0-4)**

  (Hazardous Materials Identification System)
  Health (acute effects) = 2
  Flammability = 0
  Reactivity = 1

4 First aid measures

- **General information**
  Immediately remove any clothing soiled by the product.
  In case of irregular breathing or respiratory arrest provide artificial respiration.

- **After inhalation**
  Supply fresh air. If required, provide artificial respiration. Keep patient warm.
  Seek immediate medical advice.

- **After skin contact**
  Immediately wash with water and soap and rinse thoroughly.
  Seek immediate medical advice.

- **After eye contact**
  Rinse opened eye for several minutes under running water. Then consult a doctor.

- **After swallowing**
  Do not induce vomiting; immediately call for medical help.
  Seek immediate medical advice.

5 Fire fighting measures

- **Suitable extinguishing agents**
  Product is not flammable. Use fire fighting measures that suit the surrounding fire.

- **Protective equipment:**
  Wear self-contained respirator.
  Wear fully protective impervious suit.

6 Accidental release measures

- **Person-related safety precautions:**
  Wear protective equipment. Keep unprotected persons away.
  Ensure adequate ventilation

- **Measures for environmental protection:**
  Do not allow material to be released to the environment without proper governmental permits.

- **Measures for cleaning/collecting:**
  Dispose contaminated material as waste according to item 13.

- **Additional information:**
  See Section 7 for information on safe handling
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.

7 Handling and storage

- **Handling**

- **Information for safe handling:**
  Keep container tightly sealed.
  Store in cool, dry place in tightly closed containers.
  Ensure good ventilation at the workplace.

- **Information about protection against explosions and fires:**
  Substance/product can reduce the ignition temperature of flammable substances.
  This substance is an oxidizer and its heat of reaction with reducing agents or combustibles may cause ignition.

- **Storage**

- **Requirements to be met by storerooms and receptacles:**
  No special requirements.

- **Information about storage in one common storage facility:**
  Store away from flammable substances.
  Store away from reducing agents.

- **Further information about storage conditions:**
  Keep container tightly sealed.
  Store in cool, dry conditions in well sealed containers.
  Store under lock and key and with access restricted to technical experts or their assistants only.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**
  Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

  Components with limit values that require monitoring at the workplace:
  Not required.

- **Additional information:** No data

- **Personal protective equipment**

- **General protective and hygienic measures**
  The usual precautionary measures for handling chemicals should be followed.
  Keep away from foodstuffs, beverages and feed.
  Remove all soiled and contaminated clothing immediately.
  Wash hands before breaks and at the end of work.

- **Breathing equipment:**
  Use suitable respirator when high concentrations are present.

- **Protection of hands:** Impervious gloves

- **Eye protection:** Safety glasses

- **Body protection:** Protective work clothing.

9 Physical and chemical properties:

- **General Information**

- **Form:** Crystalline

- **Color:** White

- **Odor:** Odorless

	Value/Range	Unit	Method
Change in condition			
Melting point/Melting range:	271	° C	
Boiling point/Boiling range:	320	° C	
Sublimation temperature / start:	Not determined		
Flash point:	Not applicable		
Flammability (solid, gaseous) Contact with combustible material may cause fire.			
Ignition temperature:	Not determined		
Decomposition temperature:	Not determined		
Explosion limits:			
Lower:	Not determined		
Upper:	Not determined		
Vapor pressure:	Not determined		
Density: at	20	° C	2.168 g/cm³
Solubility in / Miscibility with			
Water: at	20	° C	82 g/l

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** Decomposition will not occur if used and stored according to specifications.

- **Materials to be avoided:** Reducing agents, easily oxidized materials

- **Dangerous reactions** Reacts with reducing agents

Reacts with flammable substances

- **Dangerous products of decomposition:**
  Nitrogen oxides
  Metal oxide fume

11 Toxicological information

- **Acute toxicity:**
  LD/LC50 values that are relevant for classification:
  Oral: LD50: 175 mg/kg (mus)
  LD50: 180 mg/kg (rat)
  LD50: 186 mg/kg (rbt)
  LDLo: 22 mg/kg (chd)
  LDLo: 71 mg/kg (hmn)
  LDLo: 321 mg/kg (man)
  Inhalative: LC50/4H: 5.5 mg/m3/4H (rat)
  Irritation of eyes: mild: 500 mg/24H (rbt)

- **Primary irritant effect:**

- **on the skin:** Irritant to skin and mucous membranes.

- **on the eye:** Irritating effect.

- **Sensitization:** No sensitizing effects known.

- **Other information (about experimental toxicology):**
  Reproductive effects have been observed on tests with laboratory animals.
  Mutagenic effects have been observed on tests with bacteria.
  Mutagenic effects have been observed on tests with laboratory animals.

- **Subacute to chronic toxicity:**
  The toxicity of sodium compounds is generally due to the anion.

- **Subacute to chronic toxicity:**
  Exposure to nitrites may cause nausea, vomiting, cyanosis, and collapse into a coma. Small doses cause a fall in blood pressure, rapid pulse, muscle weakness, headache and visual disturbances.

- **Additional toxicological information:**
  To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
  The Registry of Toxic Effects of Chemical Substances (RTECS) contains tumorigenic and/or carcinogenic and/or neoplastic data for components in this product.
  No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

12 Ecological information:

- **Ecotoxical effects:**

- **Remark:** Very toxic for fish

- **General notes:**
  Also poisonous for fish and plankton in water bodies.
  Do not allow material to be released to the environment without proper governmental permits.
  Very toxic for aquatic organisms

13 Disposal considerations

- **Product:**
- **Recommendation**
  Consult state, local or national regulations to ensure proper disposal.
- **Uncleaned packagings:**
- **Recommendation:**
  Disposal must be made according to official regulations.

14 Transport information

- **DOT regulations:**
- **Hazard class:** 5.1
- **Identification number:** UN1500
- **Packing group:** III
- **Hazardous substance:** 100 lbs, 45.4 kg
- **Proper shipping name (technical name):**
  Sodium nitrite
- **Land transport ADR/RID (cross-border)**
- **ADR/RID class:** 5.1 Oxidizing substances
- **Item:** 23c
- **Danger code (Kemler):** 50
- **UN-Number:** 1500
- **Description of goods:** Sodium nitrite
- **Maritime transport IMDG:**
- **IMDG Class:** 5.1
- **Page:** 5077
- **UN Number:** 1500
- **Packaging group:** III
- **EMS Number:** F-A,S-Q
- **MFAG:** 235

- **Proper shipping name:** Sodium nitrite

- **Air transport ICAO-TI and IATA-DGR:**

- **ICAO/IATA Class:** 5.1

- **UN/ID Number:** 1500

- **Packaging group:** III

- **Proper shipping name:** Sodium nitrite

15 Regulations

- **Product related hazard informations:**

- **Hazard symbols:**
  T Toxic O Oxidizing N Dangerous for the environment

- **Risk phrases:**
  8 Contact with combustible material may cause fire.
  25 Toxic if swallowed.
  50 Very toxic to aquatic organisms.

- **Safety phrases:**
  45 In case of accident or if you feel unwell, seek medical advice immediately.
  61 Avoid release to the environment. Refer to special instructions/Safety data sheets

- **National regulations**
  All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

- **Information about limitation of use:**
  For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

- **Department issuing MSDS:** Health, Safety and Environmental Department.

- **Contact:** Darrell R. Sanders

EXXON CHEMICAL AMERICAS -- VARSOL 18 SOLVENT - DRY CLEANING SOLVENT
MATERIAL SAFETY DATA SHEET
NSN: 6850002649038
Manufacturer's CAGE: 72190
Part No. Indicator: B
Part Number/Trade Name: VARSOL 18 SOLVENT

General Information

Item Name: DRY CLEANING SOLVENT
Company's Name: EXXON CHEMICAL AMERICAS
Company's P. O. Box: 3272
Company's City: HOUSTON
Company's State: TX
Company's Country: US
Company's Zip Code: 77001
Company's Emerg Ph #: 800-726-2015/800-424-9300(CHEMTREC)
Company's Info Ph #: 713-870-6885
Distributor/Vendor # 1: CSD, INC (713-923-6641)
Distributor/Vendor # 1 Cage: 4N760
Safety Data Action Code: A
Record No. For Safety Entry: 018
Tot Safety Entries This Stk#: 028
Status: FE
Date MSDS Prepared: 18OCT94
Safety Data Review Date: 23APR98
Supply Item Manager: CX
MSDS Preparer's Name: UNKNOWN
MSDS Serial Number: CGMFW
Specification Number: P-D-680B
Spec Type, Grade, Class: TYPE I
Hazard Characteristic Code: F4
Unit Of Issue: CN
Unit Of Issue Container Qty: 5 GAL
Type Of Container: CAN
Net Unit Weight: 32.9 LBS
NRC/State License Number: NOT RELEVANT

Ingredients/Identity Information

Proprietary: NO
Ingredient: PETROLEUM HYDROCARBONS
Ingredient Sequence Number: 01
Percent: UNKNOWN
Ingredient Action Code: A
NIOSH (RTECS) Number: 1000099PH
OSHA PEL: 5 MG/M3 (OIL MIST)
ACGIH TLV: 5 MG/M3 (OIL MIST)

Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: 1,2,4-TRIMETHYLBENZENE (SARA 313)
Ingredient Sequence Number: 02
Percent: 2.0
Ingredient Action Code: A
NIOSH (RTECS) Number: DC3325000
CAS Number: 95-63-6
OSHA PEL: 25 PPM
ACGIH TLV: 25 PPM; 9596
Other Recommended Limit: NONE RECOMMENDED

Proprietary: NO
Ingredient: STODDARD SOLVENT
Ingredient Sequence Number: 03
Percent: UNKNOWN
Ingredient Action Code: A
NIOSH (RTECS) Number: WJ8925000
CAS Number: 8052-41-3
OSHA PEL: 500 PPM
ACGIH TLV: 100 PPM; 9596
Other Recommended Limit: NONE RECOMMENDED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, COLORLESS LIQUID - HYDROCARBON ODOR
Boiling Point: 315F - 397F
Melting Point: -4F,-20C
Vapor Pressure (MM Hg/70 F): 6 @ 68F
Vapor Density (Air=1): 3.90
Specific Gravity: 0.79
Decomposition Temperature: UNKNOWN
Evaporation Rate And Ref: <0.1 (N-BUTYL ACETATE=1)
Solubility In Water: <0.01% @ 77F
Viscosity: UNKNOWN
Radioactivity: NOT RELEVANT
Corrosion Rate (IPY): UNKNOWN
Autoignition Temperature: 490F

Fire and Explosion Hazard Data

Flash Point: 104F,40C
Flash Point Method: TCC
Lower Explosive Limit: 2.3
Upper Explosive Limit: 14.4
Extinguishing Media: USE CARBON DIOXIDE, SAND, WATER SPRAY, FOAM/DRY CHEMICAL. WATER SPRAY MAY BE USED TO KEEP FIRE EXPOSED CONTAINERS COOL.

Special Fire Fighting Proc: WEAR PROTECTIVE CLOTHING AND NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.
Unusual Fire And Expl Hazrds: VAPOR IS HEAVIER THAN AIR AND CAN TRAVEL CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK. CONTAINERS MAY RUPTURE DUE TO VAPOR PRESSURE BUILDUP.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HEAT, OPEN FLAMES
Materials To Avoid: STRONG OXIDIZING AGENTS, MOLTEN SULFUR, HALOGENS
Hazardous Decomp Products: CARBON MONOXIDE, CARBON DIOXIDE MAY BE FORMED.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: TLV 100 PPM FOR STODDARD SOLVENT
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: NO
Health Haz Acute And Chronic: TARGET ORGANS:EYE, SKIN, CNS, RESPIRATORY & GI TRACTS. ACUTE- EYE:MAY CAUSE MILD IRRITATION. SKIN:REPEATED/PROLONGED CONTACT MAY CAUSE DRYING. INHALE:IRRITATION, CNS EFFECTS. ORAL:MINIMAL TOXICITY, BUT ASPIRATION HAZARD DURING INGESTION OR VOMITING. CHRONIC-UNKNOWN
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION, TEARING, REDNESS, DRYING AND CRACKING OF SKIN, NAUSEA, VOMITING, COUGHING, HEADACHE, DIZZINESS, DROWSINESS, WEAKNESS, FATIGUE, UNCONSCIOUSNESS
Med Cond Aggravated By Exp: PERSONS WITH PRE-EXISTING SKIN DISORDERS, EYE PROBLEMS, OR IMPAIRED CNS OR RESPIRATORY FUNCTION MAY BE MORE SUSCEPTIBLE TO THE EFFECTS OF THIS PRODUCT.
MOVE TO FRESH AIR. PROVIDE CPR/OXYGEN IF NEEDED. EYES:FLUSH WITH WATER FOR 15 MINUTES. HOLD EYELIDS OPEN. SKIN:WASH WITH SOAP & WATER. ORAL:DO NOT INDUCE VOMITING. IF PERSON IS DROWSY/UNCONSCIOUS, PLACE ON LEFT SIDE WITH HEAD DOWN. GET MEDICAL ATTENTION. IF POSSIBLE, DO NOT LEAVE INDIVIDUAL UNATTENDED.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE IGNITION SOURCES. VENTILATE AREA. ABSORB SPILL WITH NON-FLAMMABLE MATERIAL SUCH AS VERMICULITE OR SAND. PLACE IN A CONTAINER FOR CHEMICAL WASTE. CLEAN SURFACE THOROUGHLY TO REMOVE

RESIDUAL CONTAMINATION. DO NOT FLUSH TO SEWERS OR WATERWAYS.
Neutralizing Agent: NOT RELEVANT
Waste Disposal Method: DISCHARGE, TREATMENT OR DISPOSAL IS SUBJECT TO FEDERAL, STATE OR LOCAL REGULATIONS. REUSING OR INCINERATION IS RECOMMENDED.
Precautions-Handling/Storing: STORE IN COOL, VENTILATED AREA, AWAY FROM IGNITION SOURCES & INCOMPATIBLES. KEEP CONTAINER TIGHTLY CLOSED.
Other Precautions: WARNING! FLAMMABLE. KEEP OUT OF REACH OF CHILDREN. AVOID EYE CONTACT. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. EMPTY CONTAINER RETAINS RESIDUE. FOLLOW LABEL INSTRUCTIONS. AVOID REPEATED SKIN CONTACT.

Control Measures

Respiratory Protection: IF ENGINEERING CONTROLS ARE INADEQUATE, A NIOSH-APPROVED AIR-SUPPLIED RESPIRATOR SHOULD BE WORN.
Ventilation: MECHANICAL (GENERAL AND/OR LOCAL EXHAUST, EXPLOSION-PROOF) VENTILATION TO MAINTAIN EXPOSURE BELOW TLV(S).
Protective Gloves: RUBBER
Eye Protection: SAFETY GLASSES WITH SIDE SHIELD/GOGGLES
Other Protective Equipment: EYE BATH, WASHING FACILITIES, SAFETY SHOWER
Work Hygienic Practices: OBSERVE GOOD INDUSTRIAL HYGIENE PRACTICES AND RECOMMENDED PROCEDURES. WASH AFTER HANDLING AND BEFORE EATING OR DRINKING.
Suppl. Safety & Health Data: FORMULA CHANGED. FOR PREVIOUS FORMULATION, SEE PNI A, SAME NSN.

Transportation Data

Transportation Action Code: A
Trans Data Review Date: 98113
DOT PSN Code: LKZ
DOT Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S. OR PETROLEUM PRODUCTS, N.O.S.
DOT Class: 3
DOT ID Number: UN1268
DOT Pack Group: III
DOT Label: FLAMMABLE LIQUID
DOT/DoD Exemption Number: NOT RELEVANT
IMO PSN Code: LMH
IMO Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S. o
IMO Regulations Page Number: 3375
IMO UN Number: 1268
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: TJB
IATA UN ID Number: 1268
IATA Proper Shipping Name: PETROLEUM DISTILLATES, N.O.S.
IATA UN Class: 3

IATA Label: FLAMMABLE LIQUID
AFI PSN Code: TJB
AFI Prop. Shipping Name: PETROLEUM DISTILLATES, N.O.S.
AFI Class: 3
AFI ID Number: UN1268
AFI Pack Group: III
AFI Special Prov: P5
AFI Basic Pac Ref: A7.3
N.O.S. Shipping Name: STODDARD SOLVENT
Additional Trans Data: PROPER SHIPPING NAME, HAZARD CLASS PER CTDF. UP TO 220 LITERS ARE ALLOWED BY AIR CARGO.

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Disposal Data

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Label Data

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Label Required: YES
Technical Review Date: 23APR98
Label Date: 18OCT94
MFR Label Number: UNKNOWN
Label Status: M
Common Name: VARSOL 18 SOLVENT
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-Moderate: X
Reactivity Hazard-None: X
Special Hazard Precautions: TARGET ORGANS:EYE, SKIN, CNS, RESPIRATORY & GI TRACTS. ACUTE- EYE:MAY CAUSE MILD IRRITATION. SKIN:REPEATED/PROLONGED CONTACT MAY CAUSE DRYING. INHALE:IRRITATION, CNS DEPRESSION. ORAL:LARGE AMOUNTS MAY INJURE. ASPIRATION HAZARD. CHRONIC- UNKNOWN. STORE IN VENTILATED AREA, AWAY FROM FLAMES & INCOMPATIBLES. ABSORB SPILL WITH NON-FLAMMABLE MATERIAL. PLACE IN A CONTAINER FOR DISPOSAL. FIRST AID- CALL PHYSICIAN IF SYMPTOMS PERSIST. INHALED:MOVE TO FRESH AIR. PROVIDE CPR/ OXYGEN IF NEEDED. EYES:FLUSH WITH WATER FOR 15 MINUTES. HOLD EYELIDS OPEN. SKIN:WASH WITH SOAP & WATER. ORAL:DO NOT INDUCE VOMITING. GET MEDICAL ATTENTION.
Protect Eye: Y
Label Name: EXXON CHEMICAL AMERICAS
Label P.O. Box: 3272
Label City: HOUSTON
Label State: TX
Label Zip Code: 77001
Label Country: US
Label Emergency Number: 800-726-2015/800-424-9300(CHEMTREC)
Year Procured: 1998

APPENDIX 2.2

TOXICOLOGICAL PROPERTIES OF MAJOR AND MINOR CHEMICALS STORED AT JERICHO

TOXICOLOGICAL PROPERTIES OF MAJOR CHEMICALS

Powdered Ammonium Nitrate

Physicochemical Properties

Appearance:
Colorless crystals.

Odor:
Odorless.
Solubility:
118g/100g water @ 0C (32F).
Specific Gravity:
1.73 @ 23C (77F)
Ph:
5.4
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
210C (410F) Decomposes.
Melting Point:
170C (338F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.
Stability:
Stable under ordinary conditions of use and storage. Hygroscopic.
Hazardous Decomposition Products:
Emits nitrous oxides when heated to decomposition. Liberates ammonia in reaction with strong alkalis.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Aluminum, antimony, chromium, copper, iron, lead, magnesium, manganese, nickel, zinc, brass, oil, charcoal, organic material, acetic acid, ammonium chloride, bismuth, cadmium, chlorides, cobalt, phosphorus, potassium and ammonium sulfate, sodium, sodium hypochlorite, sodium perchlorate, sodium-potassium alloy, and sulphur.
Conditions to Avoid:
Heat, flame, ignition sources, dusting and incompatibles. Moisture and combustible materials. Shock sensitive.
Toxicological Properties

Oral rat LD50: 2217 mg/kg.
NTP Carcinogen

Ingredient	Known	Anticipated	IARC Category
Ammonium Nitrate (6484-52-2)	No	No	None

Magnafrac™

Physicochemical Properties

Appearance And Odor:
Creamy white, pink, orange or green free-flowing solid; slight fuel oil odor.
Specific Gravity:
0.8-1.1
Stability:
No
Cond To Avoid (Stability):
None specified by manufacturer.
Materials To Avoid:
Incompatible w/acids, alkalies, oxidants.
Hazardous Decomp Products:
Decomposes w/heat, shock, or by rxn w/acids, alkalies, oxidants. Haz gases prdcd are nitrogen oxides.
Hazardous Poly Occur:
No
Conditions To Avoid (Poly):
Not relevant

Toxicological Properties

LD50-LC50 Mixture:
See ingredients.
Route Of Entry – Inhalation:
Yes
Route Of Entry – Skin:
No
Route Of Entry – Ingestion:
Yes
Health Haz Acute And Chronic:
Ing 1:skin & eye irrit. Tox efts in animals from acute expos by ingest incl neuro efts & nonspec efts such as wt loss & irrit. Human hlth efts from overexp by skin/eye cont/ingest may initially incl skin irrit w/discomfort or rash & eye irrit w/discomfort, tearing/ blurring of vision. Ing 2:skin irrit. (efts of overexp)
Carcinogenicity – NTP:
No
Carcinogenicity – IARC:
No
Carcinogenicity – OSHA:
No
Explanation Carcinogenicity:
Not relevant
Signs/Symptoms Of Overexp:
Hlth haz:tox efts described in animals from expos by inhal incl liver & kidney efts. Human hlth efts from overexp by inhal, ingest/skin or eye cont may initially incl skin irrit w/discomfort or rash & eye irrit w/discomfort, tearing/blurred vision. Ing 3:tox efts described in animals from short expos by inhal (supdat)
Med Cond Aggravated By Exp:
Individuals w/pre-existing diseases of lungs may have increased susceptibility to toxicity of excessive exposures.

Diesel (Fuel Oil)

Physicochemical Properties

Appearance And Odor:
Clear to yellow, typical hydrocarbon odor.
Boiling Point:
360-572F
Melting Point: NA
Vapor Pressure (MM Hg/70 F):
0.1
Vapor Density (Air=1): NA
Specific Gravity:
0.81-0.86
Decomposition Temperature: NA
Evaporation Rate And Ref: NA
Solubility In Water:
Trace
Percent Volatiles By Volume:
100
Ph: NA
Corrosion Rate (IPY): NA
Flash Point:
100F,38C
Flash Point Method:
PMCC
Lower Explosive Limit:
1 %
Upper Explosive Limit:
5 %
Stability:
Yes
Cond To Avoid (Stability):
Under normal conditions, the material is stable.

Materials To Avoid:
Strong oxidants such as liquid chlorine, concentrated oxygen, sodium hypochlorite or calcium hypochlorite.
Hazardous Decomp Products:
Fumes, smoke, carbon monoxide, aldehydes and other decomposition products.
Hazardous Poly Occur:
No
Conditions To Avoid (Poly):
Material is not known to □ulphuric□.

Toxicological Properties

LD50-LC50 Mixture:
Oral LD50 (rat) is = 5-15 g/kg
Route Of Entry – Inhalation: Yes
Route Of Entry – Skin: Yes
Route Of Entry – Ingestion: Yes
Health Haz Acute And Chronic:
Acute:

Central nervous system depression with extreme exposure; effects may include anaesthesia, coma, respiratory arrest, and irregular heart rate. Oxygen deprivation is possible if working in a confined area.

Chronic:

No known major cumulative or latent effects have been reported.

Carcinogenicity – NTP: No

Carcinogenicity – IARC: No

Carcinogenicity – OSHA: No

Explanation Carcinogenicity:

Not carcinogenic.

Signs/Symptoms Of Overexp:

Inhalation-irritation of the upper respiratory tract, depression, dizziness, headache, uncoordination, anaesthesia, coma & respiratory arrest. Skin-defatting, irritation & burning sensation & swelling of lids. Eye-severe burning sensation. Ingestion- irritation of throat, esophagus & stomach, vomiting.

Med Cond Aggravated By Exp:

None specified by manufacturer.

Ferrosilicon

Physicochemical Properties

Not a hazardous substance.

Appearance And Odor:
Silver metallic, powder, □ulphuric
Boiling Point: N/A
Melting Point:
2192 – 2282F
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity:
2-5
Evaporation Rate And Ref:
Not applicable
Solubility In Water:
Insoluble/negligible
Percent Volatiles By Volume: N/A
Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Stability:
Yes
Cond To Avoid (Stability):
Not applicable
Materials To Avoid:
Acids, strong oxidizers, strong bases.
Hazardous Decomp Products:
None.
Hazardous Poly Occur:
No
Conditions To Avoid (Poly):
Not relevant.
Toxicological Properties

LD50-LC50 Mixture:
None specified by manufacturer.
Route Of Entry – Inhalation: Yes
Route Of Entry – Skin: No
Route Of Entry – Ingestion: No
Health Haz Acute And Chronic:
Acute:
Effects associated w/overexposure to metal dusts may include respiratory irritation, conjunctivitis, pneumoconiosis, etc.
Carcinogenicity – NTP: No
Carcinogenicity – IARC: No
Carcinogenicity – OSHA: No
Explanation Carcinogenicity:
Not relevant.

Slaked Lime (Calcium Hydroxide)

Physicochemical Properties

Appearance And Odor:
Odorless soft white powder
Boiling Point: N/A
Melting Point:
580C
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity:
2.24 @ 68F
Evaporation Rate And Ref: N/A
Solubility In Water:
No data
Percent Volatiles By Volume: N/A
Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Stability:
Yes
Cond To Avoid (Stability):
Not applicable
Materials To Avoid:
Acids, fluorine, maleic anhydride, organic materials, phosphorus
Hazardous Decomp Products:
No data.
Hazardous Poly Occur:
No data
Conditions To Avoid (Poly):
No data

Toxicological Properties

No data

Ethylene Glycol

Physicochemical Properties

Appearance:
Clear oily liquid.
Odor:
Odorless.
Solubility:
Miscible in water.
Specific Gravity:
1.1
Ph @20C/4C**:**
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
197.6C (388F)
Melting Point:
-13C (9F)
Vapor Density (Air=1):
2.14
Vapor Pressure (mm Hg):
0.06 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.
Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition. May produce acrid smoke and irritating fumes when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents. Reacts violently with chlorosulfonic acid, oleum, □ulphuric acid, perchloric acid. Causes ignition at room temperature with chromium trioxide, potassium permanganate and sodium peroxide; causes ignition at 212F(100C) with ammonium dichromate, silver chlorate, sodium chloride and uranyl nitrate.
Conditions to Avoid:
Heat, flames, ignition sources, water (absorbs readily) and incompatibles.

Toxicological Properties

Oral rat LD50: 4700 mg/kg; skin rabbit LD50: 9530 mg/kg.
Irritation – skin rabbit: 555mg(open), mild; eye rabbit: 500mg/24H, mild.
Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown teratogenic effects in laboratory animals.

Ingredient	NTP Carcinogen		
	Known	Anticipated	IARC Category
Ethylene Glycol (107-21-1)	No	No	None

TOXICOLOGICAL AND PHYSICOCHEMICAL PROPERTIES OF MINOR CHEMICALS HANDLED

Magnifloc 156 Flocculent

Physicochemical Properties

Odour and Appearance:
Off-white coloured solid.
Bulk Density:
0.75 g/cm^3.
Vapour Density:
Not available.
Boiling Point:
Not available.
Ph Value:
6.5 1% soln.
Vapour Pressure:
Not available.
Solubility (in water):
Soluble.
Odour Threshold:
Not available.
Evaporation Rate:
Not available.
Freezing Point:
Not available.
Coeff. of water/oil Dist.:
Soluble in water.
Specific Gravity:
0.75
Conditions of Flammability:
Very low risk.
Flash Point (method of determination):
None exhibited.
LEL, UEL: NA
Auto-ignition Temperature:
Not available.

Flammability Classification: NA
Hazardous Combustion Products:
None known.
Explosion Data:
As with most organic powders, flammable dust clouds may be formed in air. Avoid creating dust. Keep away from sources of ignition.

Toxicological Properties

Nature of Hazard:
May cause mild irritation to the eyes which should cease upon removal of the product. May cause mild irritation of the skin with repeated or prolonged use. The product is non-volatile but inhalation of dust may cause irritation.
WHMIS Classification:
Not a controlled product.

Primary Routes of Entry:
Ingestion, inhalation, eye and skin contact.

Effects of Acute Exposure:

Contact with the eye may produce irritation and redness. Inhalation of dust may cause irritation to the respiratory system.

Effects of Chronic Exposure:

None known.

Exposure Limit: (8-hour TWA, total inhalable dust):

ACGIH: 10 mg/m^3 OSHA PEL: 10 mg/m^3 MFRS Recommendation: 10 mg/m^3.

Carcinogenicity Determination by NTP, IARC, OSHA:

None.

Varsol

Physicochemical Properties

Appearance And Odor:
Clear, colorless liquid – hydrocarbon odor
Boiling Point:
315F – 397F
Melting Point:
-4F,-20C
Vapor Pressure (MM Hg/70 F):
6 @ 68F
Vapor Density (Air=1):
3.90
Specific Gravity:
0.79
Decomposition Temperature:
Unknown
Evaporation Rate And Ref:
<0.1 (n-butyl acetate=1)
Solubility In Water:
<0.01% @ 77F
Viscosity:
Unknown
Radioactivity:
Not relevant
Corrosion Rate (IPY):
Unknown
Autoignition Temperature:
490F
Flash Point:
104F,40C
Flash Point Method:
TCC
Lower Explosive Limit:
2.3
Upper Explosive Limit:
14.4
Stability:
Yes
Cond To Avoid (Stability):
Heat, open flames
Materials To Avoid:
Strong oxidizing agents, molten sulphur, halogens
Hazardous Decomp Products:
Carbon monoxide, carbon dioxide may be formed.
Hazardous Poly Occur:
No
Conditions To Avoid (Poly):
Not relevant

Toxicological Properties

LD50-LC50 Mixture:
TLV 100 PPM for □ulphuri solvent
Route Of Entry – Inhalation:

Yes

Route Of Entry – Skin:

No

Route Of Entry – Ingestion:

No

Health Haz Acute And Chronic:

Target organs:eye, skin, cns, respiratory & gi tracts. Acute- eye:may cause mild irritation. Skin:repeated/prolonged contact may cause drying. Inhale:irritation, cns effects. Oral:minimal toxicity, but aspiration hazard during ingestion or vomiting. Chronic- unknown

Carcinogenicity – NTP:

No

Carcinogenicity – IARC:

No

Carcinogenicity – OSHA:

No

Explanation Carcinogenicity:

None

Signs/Symptoms Of Overexp:

Irritation, tearing, redness, drying and cracking of skin, nausea, vomiting, coughing, headache, dizziness, drowsiness, weakness, fatigue, unconsciousness

Med Cond Aggravated By Exp:

Persons with pre-existing skin disorders, eye problems, or impaired cns or respiratory function may be more susceptible to the effects of this product.

Hydraulic/Motor Oil

Physicochemical Properties

Appearance And Odor:
Dark oily with mineral oil odor
Specific Gravity:
0.890
Decomposition Temperature:
Unknown
Solubility In Water:
Negligible,<0.1%
Corrosion Rate (IPY):
Unknown
Flash Point: >90F,>32C
Flash Point Method: COC
Stability:
Yes
Cond To Avoid (Stability):
Open flames
Materials To Avoid:
Strong oxidizers such as hydrogen peroxide, bromine, and chromic acid.
Hazardous Decomp Products:
Carbon monoxide, carbon dioxide, oxides of phosphorous, sulphur, and possibly hydrogen sulphide.
Hazardous Poly Occur:
No
Conditions To Avoid (Poly):
Not applicable.

Toxicological Properties

LD50-LC50 Mixture:
Unknown
Route Of Entry – Inhalation: No
Route Of Entry – Skin: Yes
Route Of Entry – Ingestion: No
Health Haz Acute And Chronic:
Acute-
Inhalation of mist may cause irritation. Ingestion:no ill effects expected. Minute amounts aspirated into lungs may cause pulmonary injury. Eye: irritation. Skin: not normally expected to cause ill effects.

Chronic-
Prolonged/repeated skin contact may cause irritation.
Carcinogenicity – NTP: No
Carcinogenicity – IARC: No
Carcinogenicity – OSHA: No
Explanation Carcinogenicity: none of the compounds in this product is listed by IARC, NTP, or OSHA as a carcinogen.
Signs/Symptoms Of Overexp:
Skin and eye irritation.
Med Cond Aggravated By Exp:
None specified by manufacturer.

Jet Fuel

Physicochemical Properties

Appearance And Odor:
Colorless liquid, fuel oil odor
Boiling Point:
250-549f
Melting Point:
Not given
Vapor Pressure (MM Hg/70 F):
2-3 PSI
Vapor Density (Air=1):
Not given
Specific Gravity:
0.75 –0.8
Decomposition Temperature:
Unknown
Evaporation Rate And Ref:
Not given
Solubility In Water:
Negligible
Corrosion Rate (IPY):
Unknown
Autoignition Temperature:
468F
Flash Point:
-10F,-23C
Flash Point Method:
CC
Lower Explosive Limit:
1.3 %
Upper Explosive Limit:
8 %
Extinguishing Media:
Agents approved for class B hazards (dry chemical, carbon dioxide, halogenated agents, foam, steam) and water fog.
Special Fire Fighting Proc:
Fire fighters should use NIOSH approved SCBA & full protective equipment when fighting chemical fire. Use water spray to cool nearby containers exposed to fire.
Unusual Fire And Expl Hazrds:
Do not use direct stream of water on fire. Toxic gases are released during combustion. Vapor may explode if ignited in enclosed area.
Stability:
Yes
Cond To Avoid (Stability):
Heat, open flame, sparks
Materials To Avoid:
Strong oxidizing agents
Hazardous Decomp Products:
Carbon monoxide, carbon dioxide, unidentified organic compounds.
Hazardous Poly Occur:
No
Conditions To Avoid (Poly):
None. Will not occur.

Toxicological Properties

LD50-LC50 Mixture:
Not given for product as a whole
Route Of Entry – Inhalation:
Yes
Route Of Entry – Skin:
Yes
Route Of Entry – Ingestion:
No
Health Haz Acute And Chronic:
May be mildly irritating to the eyes. Prolonged or repeated contact may cause dermatitis. Vapors may irritate the nose, throat and upper respiratory tract and cause central nervous system depression. Aspiration hazard.
Carcinogenicity – NTP:
Yes
Carcinogenicity – IARC:
Yes
Carcinogenicity – OSHA:
Yes
Explanation Carcinogenicity:
Contains Benzene [71-43-2] which is listed by NTP and IARC and regulated by OSHA as a carcinogen.
Signs/Symptoms Of Overexp:
Eye irritation, skin irritation, dermatitis, upper respiratory tract irritation, nausea, vomiting, diarrhea, headaches, dizziness, drowsiness.
Med Cond Aggravated By Exp:
Pre-existing skin and/or respiratory disorders may be aggravated by exposure to this product.

Gasoline

Physicochemical Properties

Appearance And Odor:
Clear liquid with gasoline odor.
Boiling Point:
>70F,>21C
Melting Point:
-36F,-38C
Vapor Pressure (MM Hg/70 F):
400
Vapor Density (Air=1):
5
Specific Gravity:
0.74
Decomposition Temperature:
Unknown
Evaporation Rate And Ref:
10.5(N-Butyl Acetate=1)
Solubility In Water:
Negligible
Percent Volatiles By Volume:
100
Viscosity:
Unknown
Ph:
7
Corrosion Rate (IPY):
Unknown
Flash Point:
-36F,-38C
Flash Point Method:
TCC
Lower Explosive Limit:
1.4 %
Upper Explosive Limit:
7.6 %
Extinguishing Media:
Use water fog, carbon dioxide, foam, or dry chemical.
Special Fire Fighting Proc:
Water may be ineffective on flames, but should be used to keep fire-exposed containers cool. Large fires, such as tank fires, should be fought with caution.
Unusual Fire And Expl Hazrds:
Highly volatile material. Flowing gasoline can be ignited by self-generated static electricity. Vapors may travel along the ground to a remote ignition source.
Stability:
Yes
Cond To Avoid (Stability):
High heat, open flames and other sources of ignition
Materials To Avoid:
Strong oxidizing agents
Hazardous Decomp Products:
Burning or excessive heating may produce carbon monoxide and other harmful gases/vapors.
Hazardous Poly Occur:

No
Conditions To Avoid (Poly):
Not applicable

Toxicological Properties

LD50-LC50 Mixture:
Oral LD50 (Rat) is >5G/KG
Route Of Entry – Inhalation:
Yes
Route Of Entry – Skin:
Yes
Route Of Entry – Ingestion:
No
Health Haz Acute And Chronic:
Inhalation: moderate risk of vapor defatting with drying and cracking can lead to dermatitis and secondary infection. Eye: irritant. Ingestion: burning of mouth and upper gi tract, vomiting and diarrhea. Prolonged or repeated contact: dermatitis.
Carcinogenicity – NTP:
Yes
Carcinogenicity – IARC:
Yes
Carcinogenicity – OSHA:
Yes
Explanation Carcinogenicity:
Contains Benzene [71-43-2] which is listed by NTP and IARC and regulated by OSHA as a carcinogen.
Signs/Symptoms Of Overexp:
Inhalation may cause euphoria, lung irritation and edema, headache, dizziness, drowsiness, convulsions, coma, cyanosis, generalized depression. Ingestion may cause general depression, sedation, respiratory depression, coma.
Med Cond Aggravated By Exp:
May aggravate pre-existing dermatitis, respiratory illness, or other conditions which have the same symptoms or effects as stated above.

Sulphuric Acid

Physicochemical Properties

Appearance And Odor:
Colorless, □ulphuric liquid.
Boiling Point:
230F,110C
Specific Gravity:
1.24 @80F
Solubility In Water:
100%
Lower Explosive Limit:
None
Upper Explosive Limit:
None
Extinguishing Media:
Water, carbon dioxide, dry chemical. Sulphuric acid not combustible.
Special Fire Fighting Proc:
Sulphuric acid not combustible. Use water, carbon dioxide, or dry chemical on fires.
Unusual Fire And Expl Hazrds:
None specified by manufacturer.
Stability:
Yes
Cond To Avoid (Stability):
Avoid shorting. Use only approved charging methods. Do not puncture battery case.
Materials To Avoid:
None specified by manufacturer.
Hazardous Decomp Products:
None specified by manufacturer.
Conditions To Avoid (Poly):
Not applicable

Toxicological Properties

LD50-LC50 Mixture:
Unknown
Route Of Entry – Inhalation:
No
Route Of Entry – Skin:
No
Route Of Entry – Ingestion:
No
Health Haz Acute And Chronic:
Not applicable for finished product used in normal conditions. When battery case broken/leaking electrolyte severe burns to all tissue may occur.
Carcinogenicity – NTP:
No
Carcinogenicity – IARC:
No
Carcinogenicity – OSHA:
No
Signs/Symptoms Of Overexp:
Severe burns to all tissues from sulphuric acid.
Med Cond Aggravated By Exp:
None specified by manufacturer.

Hydrofluoric Acid

Physicochemical Properties

Appearance:
Colorless, fuming liquid.
Odor:
Acrid odor. Do not breathe fumes.
Solubility:
Infinitely soluble.
Specific Gravity:
1.15 –1.18
Ph:
1.0 (0.1M solution)
% Volatiles by volume @ 21C (70F):
100 (as water and acid)
Boiling Point:
108C (226F)
Melting Point:
< -36C (< -33F)
Vapor Density (Air=1):
1.97
Vapor Pressure (mm Hg):
25 @ 20C (68F)
Evaporation Rate (BuAc=1):
No information found.
Stability:
Stable at room temperature (68F) when stored and used under proper conditions.
Hazardous Decomposition Products:
On contact with metals, liberates hydrogen gas. On heating to decomposition, could yield toxic fumes of fluorides. Attacks glass and other silicon containing compounds. Reacts with silica to produce silicon tetrafluoride, a hazardous colorless gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Hydrofluoric acid is incompatible with arsenic trioxide, phosphorus pentoxide, ammonia, calcium oxide, sodium hydroxide, sulphuric acid, vinyl acetate, ethylenediamine, acetic anhydride, alkalis, organic materials, most common metals, rubber, leather, water, strong bases, carbonates, sulphides, cyanides, oxides of silicon, especially glass, concrete, silica, fluorine. Will also react with steam or water to produce toxic fumes.
Conditions to Avoid:
Moisture and incompatibles.

Toxicological Properties

Hydrofluoric acid: Inhalation rat LC50: 1276 ppm/1H; Investigated as a mutagen, reproductive effector.

Ingredient	NTP Carcinogen		
	Known	Anticipated	IARC Category
Hydrogen fluoride (7664-39-3)	No	No	None
Water (7732-18-5)	No	No	None

Hydrochloric Acid

Physicochemical Properties

Appearance:
Colorless, fuming liquid.
Odor:
Pungent odor of hydrogen chloride.
Solubility:
Infinite in water with slight evolution of heat.
Density:
1.18
Ph:
For HCL solutions: 0.1 (1.0 N), 1.1 (0.1 N), 2.02 (0.01 N)
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
53C (127F) Azeotrope (20.2%) boils at 109C (228F)
Melting Point:
-74C (-101F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
190 @ 25C (77F)
Evaporation Rate (BuAc=1):
No information found.
Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
When heated to decomposition, emits toxic hydrogen chloride fumes and will react with water or steam to produce heat and toxic and corrosive fumes. Thermal oxidative decomposition produces toxic chlorine fumes and explosive hydrogen gas.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
A strong mineral acid, concentrated hydrochloric acid is incompatible with many substances and highly reactive with strong bases, metals, metal oxides, hydroxides, amines, carbonates and other alkaline materials. Incompatible with materials such as cyanides, sulphides, sulphites, and formaldehyde.
Conditions to Avoid:
Heat, direct sunlight.

Toxicological Properties

Inhalation rat LC50: 3124 ppm/1H; oral rabbit LD50: 900 mg/kg (Hydrochloric acid concentrated); investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	NTP Carcinogen		
	Known	Anticipated	IARC Category
Hydrogen chloride (7647-01-0)	No	No	3
Water (7732-18-5)	No	No	None

Acetone

Physicochemical Properties

Appearance:
Clear, colorless, volatile liquid.
Odor:
Fragrant, mint-like
Solubility:
Miscible in all proportions in water.
Specific Gravity:
0.79 @ 20C/4C
Ph:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
56.5C (133F) @ 760 mm Hg
Melting Point:
-95C (-139F)
Vapor Density (Air=1):
2.0
Vapor Pressure (mm Hg):
400 @ 39.5C (104F)
Evaporation Rate (BuAc=1):
ca. 7.7
Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Concentrated nitric and sulphuric acid mixtures, oxidizing materials, chloroform, alkalis, chlorine compounds, acids, potassium t-butoxide.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

Toxicological Properties

Oral rat LD50: 5800 mg/kg; Inhalation rat LC50: 50,100mg/m^3; Irritation eye rabbit, Standard Draize, 20 mg severe; investigated as a tumorigen, mutagen, reproductive effector.

Ingredient	NTP Carcinogen		
	Known	Anticipated	IARC Category
Acetone (67-64-1)	No	No	None

APPENDIX 4.1

EMERGENCY SPECIFIC PROCEDURES

Company: Tahera Diamond Corporation

Site: Jericho Diamond Mine

Emergency Procedures

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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred.
Personal Respirators (NIOSH-Approved)	For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection	Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection	Use chemical safety goggles and/or a full face shield where splashing is possible.

2.0 HEALTH HAZARD DATA

Airborne Exposure Limits	OSHA PEL 1000 ppm (TWA); ACGIH TLV 500 ppm (TWA), 750 ppm (STEL)
Acute Effects of Overexposure	Eye: Vapours are irritating to the eyes. Splashes may cause severe irritation, with stinging, tearing, redness and pain.
	Skin: Irritating due to defatting actin on skin. Causes redness, pain, drying and cracking of the skin.
	Inhalation: Inhalation of vapours irritates the respiratory tract. May cause coughing, dizziness, dullness, and headache. Higher concentrations can produce central nervous system depression, narcosis, and unconsciousness.
	Ingestion: Swallowing small amounts is not likely to produce harmful effects. Ingestion of larger amounts may produce abdominal pain, nausea and vomiting. Aspiration into lungs can produce severe lung damage and is a medical emergency.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion	Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact	Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact	Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.

4.0 FIRE AND EXPLOSION DATA

Flash Point (Method Used)	-4F, -20C (CC)
Flammable Limits	LEL: 2.5%; UEL: 12.8%. Extremely flammable liquid and vapour. Vapour may cause flash fire.
Explosion	Above flash point, vapour-air mixtures are explosive within flammable limits noted above. Vapours can flow along surfaces to distant ignition source and flash back. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. This material may produce a floating fire hazard. Sensitive to static discharge.
Fire Extinguishing Media	Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapours.
Special Information	In the event of a fire, wear full protective clothing and NIOSH-approved SCBA with full facepiece operated in the pressure demand or other positive pressure mode.

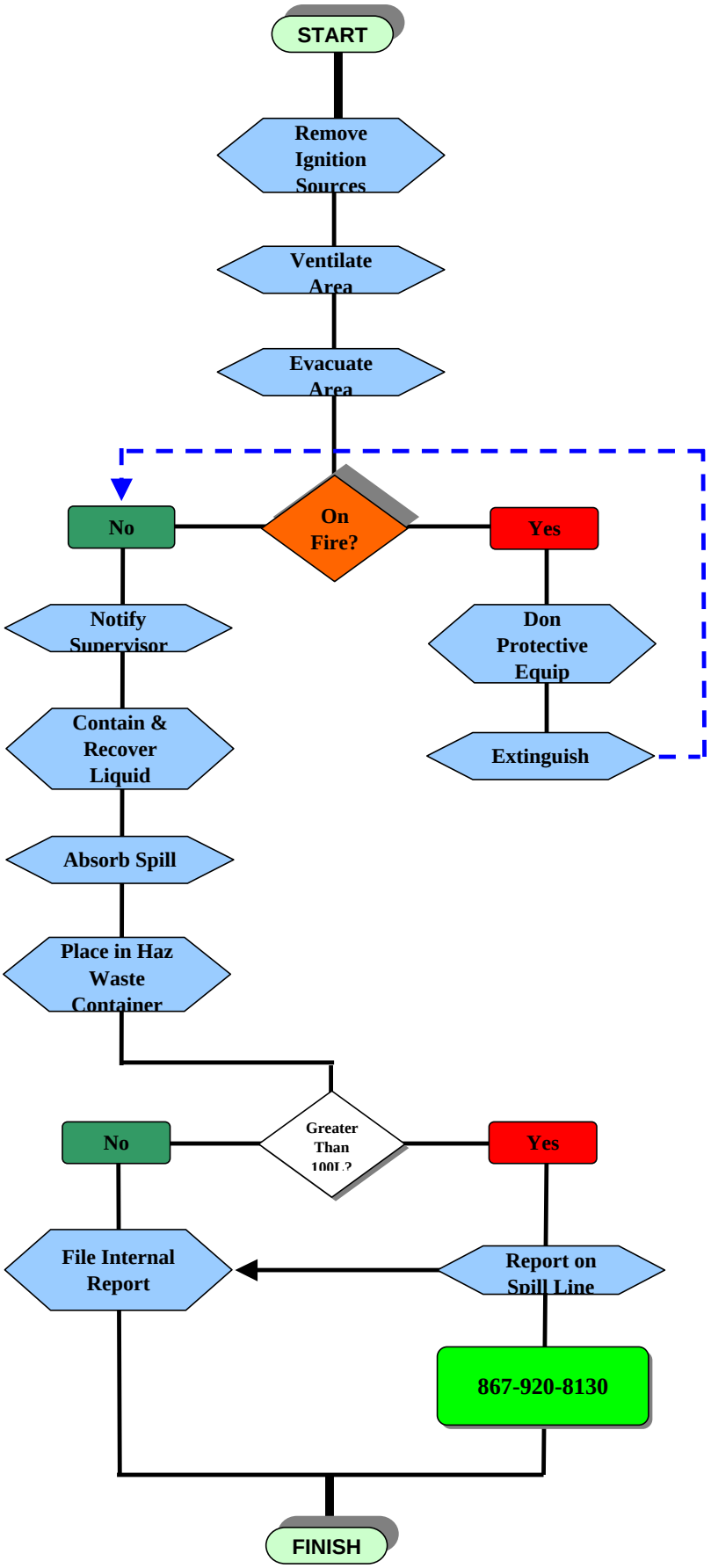
5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry

sand, earth), and place in a chemical waste container. Do not use combustible materials such as saw dust.

Do not flush to sewer. If a leak or spill has not ignited, use water spray to disperse the vapours, to protect personnel attempting to stop leak, and to flush spills away from exposures.

ACETONE SPILL RESPONSE



Company: Tahera Diamond Corporation

Site: Jericho Diamond Mine

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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	A system of local and/or general exhaust is recommended to keep employee exposures as low as possible.
Personal Respirators (NIOSH Approved)	For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection	Wear protective gloves and clean body-covering clothing
Eye Protection	Use chemical safety goggles. Maintain eye wash fountain and quick-drench facilities in work area.

2.0 HEALTH HAZARD DATA

Airborne Exposure Limits	None established
Acute Effects of Overexposure	Eye: Causes irritation, redness and pain.
	Skin: Causes irritation to skin. Symptoms include redness, itching, and pain.
	Inhalation: May cause irritation to the respiratory tract; symptoms may include coughing, sore throat, and shortness of breath. At high temperatures, exposure to toxic nitrogen oxides decomposition products can quickly cause acute respiratory problems, Inhalation of large amounts causes systemic acidosis and abnormal hemoglobin
	Ingestion: Large oral doses of nitrates may cause dizziness, abdominal pain, vomiting, bloody diarrhea, weakness, convulsions, and collapse. Harmful if swallowed. May cause methemoglobinemia resulting in cyanosis.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion	If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact	Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Eye Contact	Wash thoroughly with running water. Get medical advice if irritation develops.

4.0 FIRE AND EXPLOSION DATA

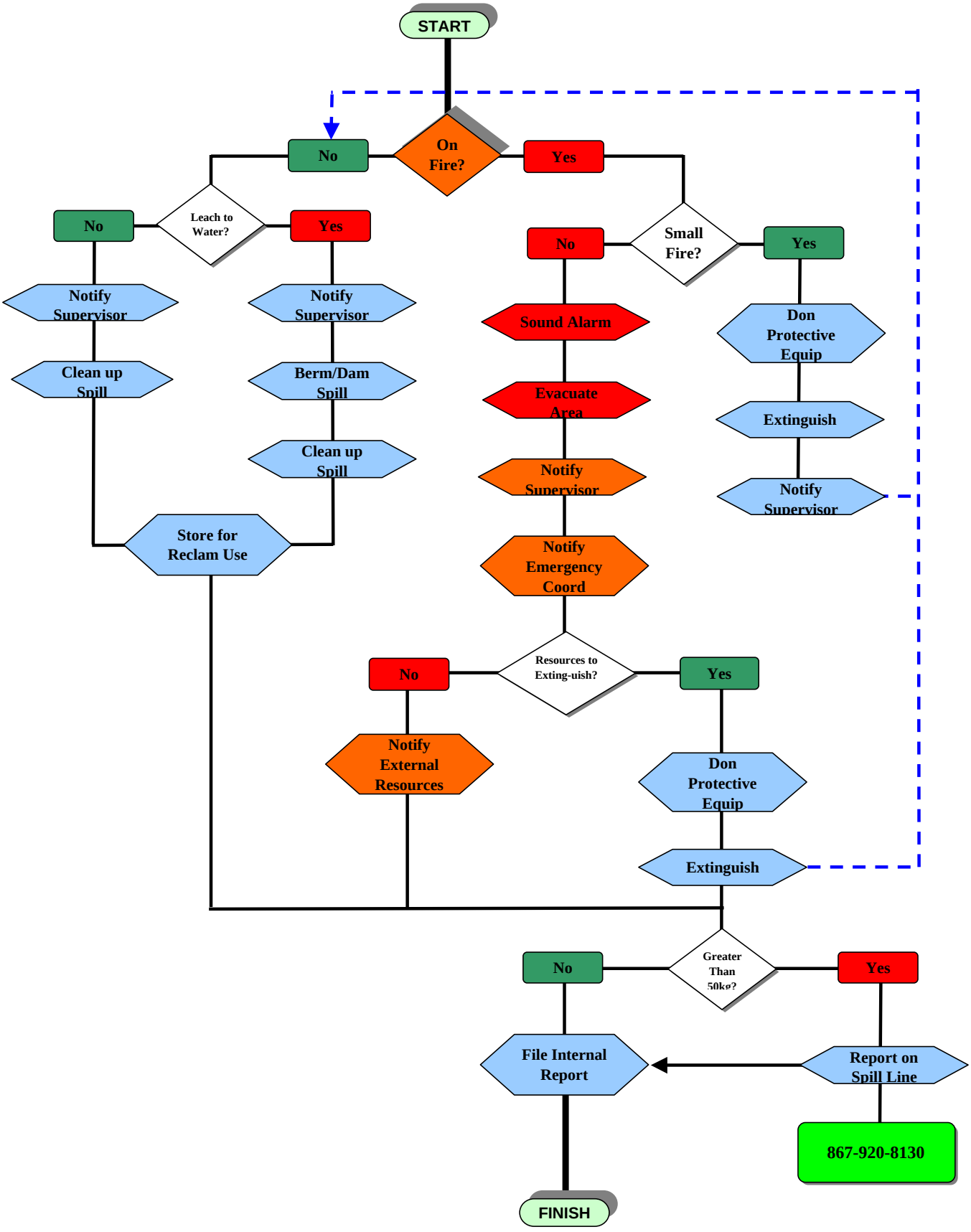
Flash Point (Method Used)	Not given
Flammable Limits	Not combustible, but substance is a strong oxidizer and its heat reaction with reducing agents or combustibles may cause ignition. May support combustion in an existing fire.
Explosion	Contact with oxidizable substances may cause extremely violent combustion. Sealed containers may rupture when heated. Sensitive to mechanical impact.
Fire Extinguishing Media	Use flooding amounts of water in early stages of fire involving ammonium nitrate. Use any means suitable for extinguishing surrounding fire.
Special Fire Fighting Procedures	In the event of fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Remove sources of heat and ignition. Collected waste may be transferred to a closed, preferably metal, container and sent off site to an approved hazardous waste disposal facility. Small and moderate amounts of ammonium nitrate may be retained on site for use as nitrogen fertilizer. Do not allow to leach into fish-bearing waters.

Alternately, sweep spill into noncombustible container and dissolve in a large amount of water. Add soda ash. Mix and neutralize with 6M-HCl. Neutralized sludge may be sent off site to an approved hazardous waste disposal facility.

AMMONIUM NITRATE SPILL RESPONSE



Company: Tahera Diamond Corporation

Site: Jericho Diamond Mine

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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	Not applicable for finished product.
Personal Respirators (NIOSH-Approved)	Not applicable for finished product.
Skin Protection	Wear acid-resistant gloves
Eye Protection	Wear Safety glasses

2.0 HEALTH HAZARD DATA

Airborne Exposure Limit	Not available.
Acute Effects of Overexposure	Eyes: Corrosive. May cause permanent eye damage.
	Skin: Corrosive. May cause severe burns.
	Inhalation: Corrosive. May cause irritation of respiratory tract.
	Ingestion: Corrosive. May cause burns to gastrointestinal tract.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Remove to fresh air. Get medical attention for any breathing difficulty
Ingestion	If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medial attention immediately.
Skin Contact	Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Eye Contact	Wash thoroughly with running water. Get medical advice if irritation develops.

4.0 FIRE AND EXPLOSION DATA

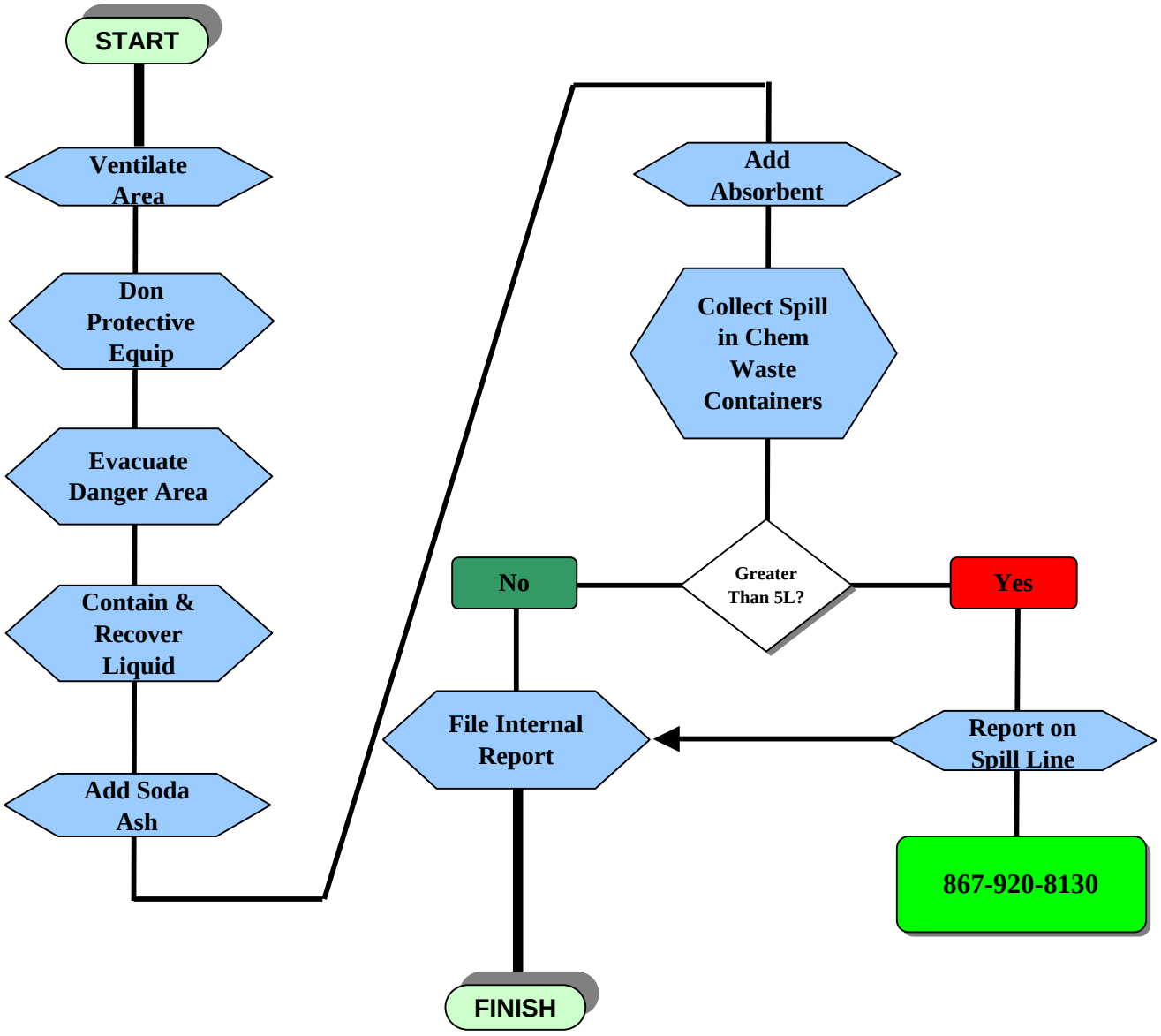
Flash Point (Method Used)	Not give.
Flammable Limits	None.
Explosion	Not explosive.
Fire Extinguishing Media	Product is not combustible. Use water, carbon dioxide, or dry chemical on fires.
Special Fire Fighting Procedures	None specified by manufacturer.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Wear safety glasses, acid-resistant gloves and full coverage acid resistant clothing. Use soda ash to neutralize. Flush with large amounts of water.

Place in acid resistant containers. Dispose of in accordance with federal and territorial regulations. Do not incinerate.

BATTERT ACID SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation	Use adequate ventilation
Respiratory Protection	Not generally required unless needed to prevent respiratory irritation. In case of spill or leak resulting in unknown concentration, use NIOSH/MSHA approved supplied air respirator.
Eye Protection	For splash protection, use chemical goggles and face shield.
Skin Protection	Use gloves resistant to the material being used, i.e., neoprene or Nitrile rubber. Use protective garments to prevent excessive skin contact.

2.0 HEALTH HAZARD DATA

Recommended Exposure Limits	Not established
Acute Effects of Overexposure	Eye: May cause mild irritation, with stinging and redness of eyes
	Skin: May cause severe irritation. Repeated or prolonged contact may cause defatting of the skin, resulting in dermatitis. Dermal LD50 for diesel fuel is >5 ml/kg (rabbit)
	Inhalation: May cause irrigation to nose, throat or lungs. Headache, nausea, dizziness, unconsciousness may occur
	Ingestion: May cause irritation to intestines. May cause headache, nausea, unconsciousness. If swallowed, may be aspirated resulting in inflammation and possible fluid accumulation in the lungs. Oral LD50 for diesel fuel is 9 ml/kg (rat)

3.0 FIRST AID AND EMERGENCY PROCEDURES

Eye	Flush eyes with running water for at least 15 minutes. If irritation or adverse symptoms develop, seek medical attention
Skin	Immediately wash skin with soap and water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention
Inhalation	Remove from exposure. If breathing is difficult, give oxygen. If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention.
Ingestion	Do not induce vomiting. Seek immediate medical attention.

4.0 FIRE AND EXPLOSION DATA

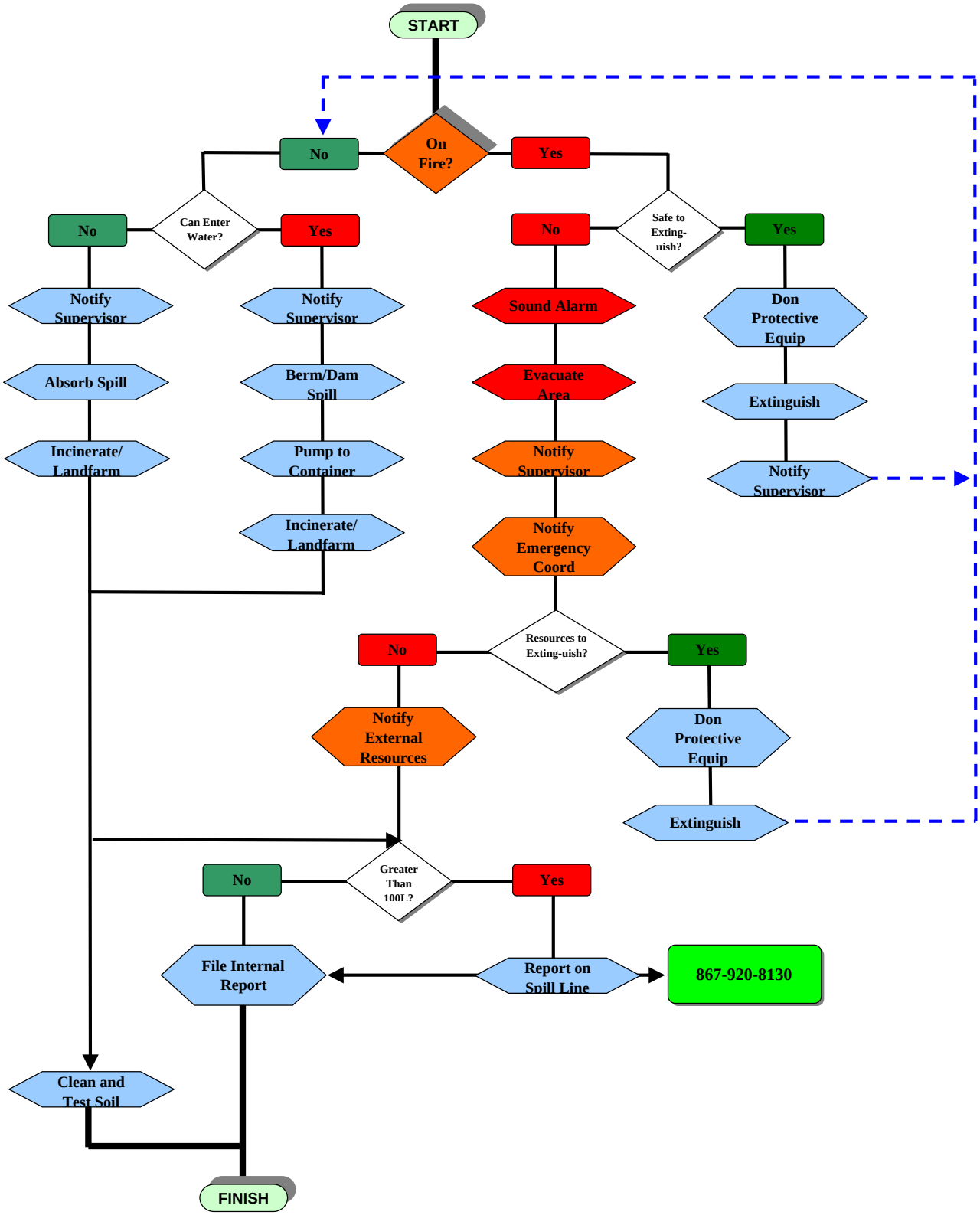
Flash Point (Method Used)	>130F (>54C) (Estimated)
Flammable Limits (% by Volume in Air)	LEL: Not Established UEL: Not Established
Fire Extinguishing Media	Dry chemical, foam or carbon dioxide
Special Fire Fighting Procedures	Evacuate area of all unnecessary personnel. Shut off source, if possible. Use NIOSH/MSHA approved self-contained breathing apparatus and other protective equipment and/or garments described in Section 1.0 if conditions warrant. Water fog or spray may be used to cool exposed containers and equipment. Do not spray water directly on fire – product will float and coud be reignited on surface of water.
Fire and Explosion Hazards	Carbon and sulphur oxides and various hydrocarbons formed when burned.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Evacuate the area of all unnecessary personnel. Wear protective equipment and/or garments described in Section 1.0 if exposure conditions warrant. Shut off source, if possible and contain the spill. Protect from ignition. Keep out of water sources and sewers. Absorb in dry, inert material (sand, clay, etc.) Transfer to disposal drums using non-sparking equipment.

Waste disposal: Incinerate or place in land farm for soil remediation. Check with your supervisor.

DIESEL FUEL SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.
Personal Respirators (NIOSH-Approved)	For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection	Wear protective gloves and clean body-covering clothing.
Eye Protection	Use chemical safety goggles.

2.0 HEALTH HAZARD DATA

Airborne Exposure Limits	OSHA PEL 50 ppm Ceiling; ACGIH TLV 50 ppm Ceiling (vapour)
Acute Effects of Overexposure	Eyes: Splashes may cause irritation, pain, eye damage.
	Skin: Minor skin irritation and penetration may occur.
	Inhalation: Vapour inhalation is generally not a problem unless heated or misted. Exposure to vapours over an extended time period has caused throat irritation and headache. May cause nausea, vomiting, dizziness and drowsiness. Pulmonary edema and central nervous system depression may also develop. When heated or misted, has produced rapid, involuntary eye movement and coma.
	Ingestion: Initial symptoms in massive dosage parallel alcohol intoxication, progressing to central nervous system depression, vomiting, headache, rapid respiratory and heart rate, lowered blood pressure, stupor, collapse, and unconsciousness with convulsions. Death from respiratory arrest or cardiovascular collapse may follow. Lethal dose in humans is 100 ml (3 – 4 ounces).

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion	Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention
Skin Contact	Remove any contaminated clothing. Wash skin with soap and water for at least 15 minutes. Get medical attention if irritation develops or persists.
Eye Contact	Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4.0 FIRE AND EXPLOSION DATA

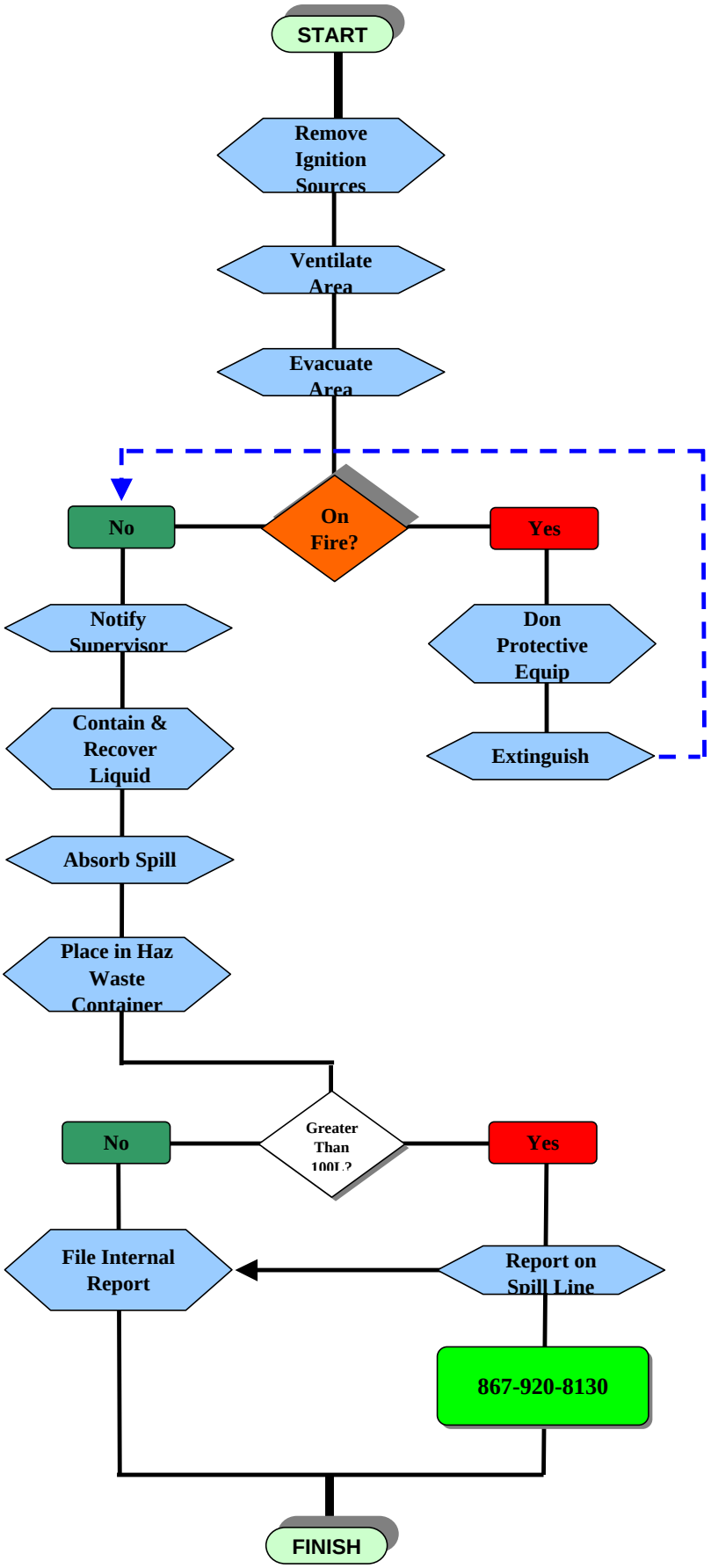
Flash Point (Method Used)	232F, 111C (CC)
Flammable Limits	LEL: 3.2%; UEL: 15.3%
Explosion	Above flash point, vapour-air mixtures are explosives within flammable limits noted above. Containers may explode when involved in a fire.
Fire Extinguishing Media	Dry chemical, foam or carbon dioxide. Water or foam may cause frothing. Water spray may be used to extinguish surrounding fire and cool exposed containers. Water spray will also reduce fume and irritant gases.
Special Fire Fighting Procedures	In the event of a fire, wear full protective clothing and NIOSH-approved self-co0ntained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Toxic gases and vapours may be released if involved in a fire.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer.

Dispose of in accordance with federal and territorial regulations.

ETHYLENE GLYCOL SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation	Use adequate ventilation.
Respiratory Protection	Use SCBA with minimal ventilation. In well-ventilated, open areas, the use of a respirator equipped with combination organic vapour/acid gas, HEPA cartridges and dust/ mist prefilter is required.
Skin Protection	Use protective gloves resistant to material being used.
Eye Protection	Wear safety goggles.
Work Hygienic Practices	Avoid contamination of work clothing.

2.0 HEALTH HAZARD DATA

Recommended Exposure Limit	Not established
Acute Effects of Overexposure	High concentrations of dust will cause some irritation to eyes, nose and throat.
	Inhalation may cause benign pneumoconiosis, mottling of the lungs.
	Inhalation/ingestion: manganese poisoning. Irritation. Central nervous system disorders, apathy, drowsiness, sleep disturbance, muscular twitching, spastic gait and emotion control problems.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Remove to fresh air. Support. Flush with water for 15 minutes. Obtain medical attention in all cases.

4.0 FIRE AND EXPLOSION DATA

Lower Explosive Limit	800
Extinguishing Media	Dry powder, dry sand, CO_2
Special Fire Fighting Procedures	Isolate fire and allow to burn out
Fire and Explosion Hazards	Dust can be ignited when suspend in air. Will propagate flame but isn't expected to generate sufficient pressure to explode.

5.0 SPILL AND DISPOSAL PROCEDURES

Use appropriate protective equipment. Avoid the use of compressed air to manoeuvre spilled material. Fine material should be swept up/vacuumed using explosion proof equipment. Keep dry and wet material separated.

Avoid repacking wet material in sealed containers.

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SEE JET FUEL SPILL RESPONSE, PROCEDURE NUMBER 005

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1.0 PERSONAL PROTECTION INFORMATION

Ventilation	None
Respiratory Protection	None required under normal use. If mist is being generated or vapours are being produced at high temperatures, use NIOSH approved organic vapour mask.
Skin Protection	None
Eye Protection	Safety goggles with optional face shield

2.0 HEALTH HAZARD DATA

Symptoms of Overexposure	Skin and eye irritation

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Inhalation of mist may cause irrigation.
Ingestion	No ill effects expected. Minute amounts aspirated into lungs may cause pulmonary injury.
Skin Contact	Not normally expected to cause ill effects. Chronic-prolonged/repeated skin contact may cause irritation.
Eye Contact	Irritation.

4.0 FIRE AND EXPLOSION DATA

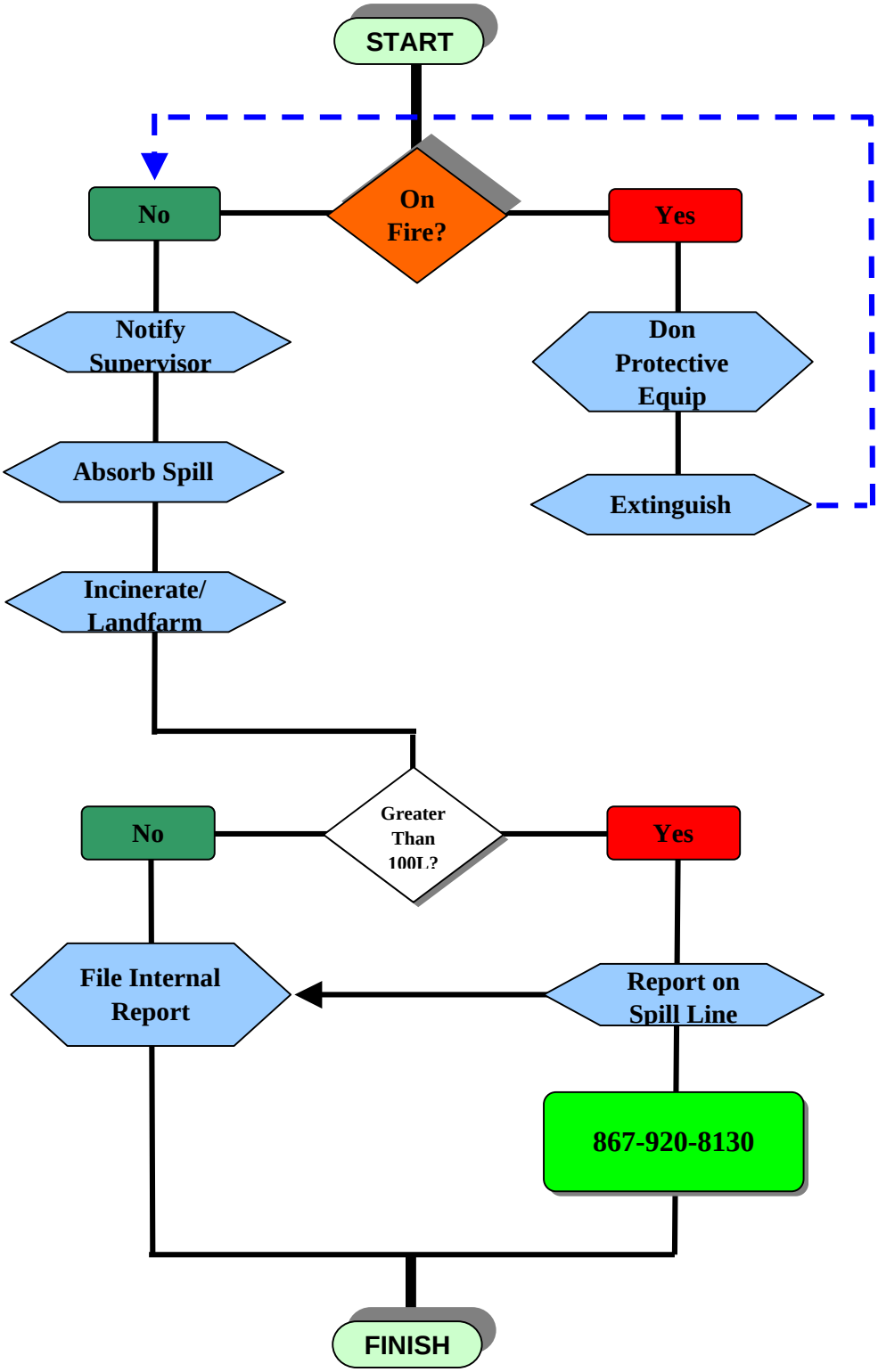
Flash Point (Method Used)	>90F, >32C (COC)
Flammable Limits	Not given
Explosion	Not given
Fire Extinguishing Media	Use water fog, carbon dioxide, foam, dry chemical, earth or sand.
Special Fire Fighting Procedures	Wear fire fighting protective equipment and full faced self contained breathing apparatus. Cool fire exposed containers with water spray. Contain runoff.
Unusual Fire Hazards	Dense smoke.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Recover bulk of mixture into another container. Absorb residue with an inert material such as earth, sand, or vermiculite. Sweep up and dispose as solid waste.

Disposal should be made in accordance with all applicable federal and territorial laws and regulations.

HYDRAULIC OIL SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.
Personal Respirators (NIOSH Approved)	For emergencies or instances where the exposure levels are not known, us a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection	Rubber or neoprene gloves and additional protection including impervious boots, apron, or coveralls, as needed in areas of unusual exposure to prevent skin contact.
Eye Protection	Use chemical safety goggles and/or a full face shield where splashing is possible.

2.0 HEALTH HAZARD DATA

Airborne Exposure Limits	OSHA PEL 5 ppm Ceiling; ACGIH TLV 5 ppm Ceiling
Acute Effects of Overexposure	Eye: Corrosive. Vapours are irritating and may cause damage to the eyes. Contact may cause severe burns and permanent eye damage.
	Skin: Corrosive. Can cause redness, pain, and severe skin burns. Concentrated solutions cause deep ulcers and discolour skin.
	Inhalation: Corrosive. Inhalation of vapours can cause coughing, choking, inflammation of the nose, throat, and upper respiratory tract, and in severe cases, pulmonary edema, circulatory failure and death.
	Ingestion: Corrosive. Swallowing hydrochloric acid can cause immediate pain and burns of the mouth, throat, esophagus and gastrointestinal tract. May cause nausea, vomiting, and diarrhea. Swallowing may be fatal.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	DO NOT INDUCE VOMITING. Give large quantities of water or milk if available. Never give any thing by mount to an unconscious person. Get medical attention immediately.
Skin Contact	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.
Eye Contact	Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4.0 FIRE AND EXPLOSION DATA

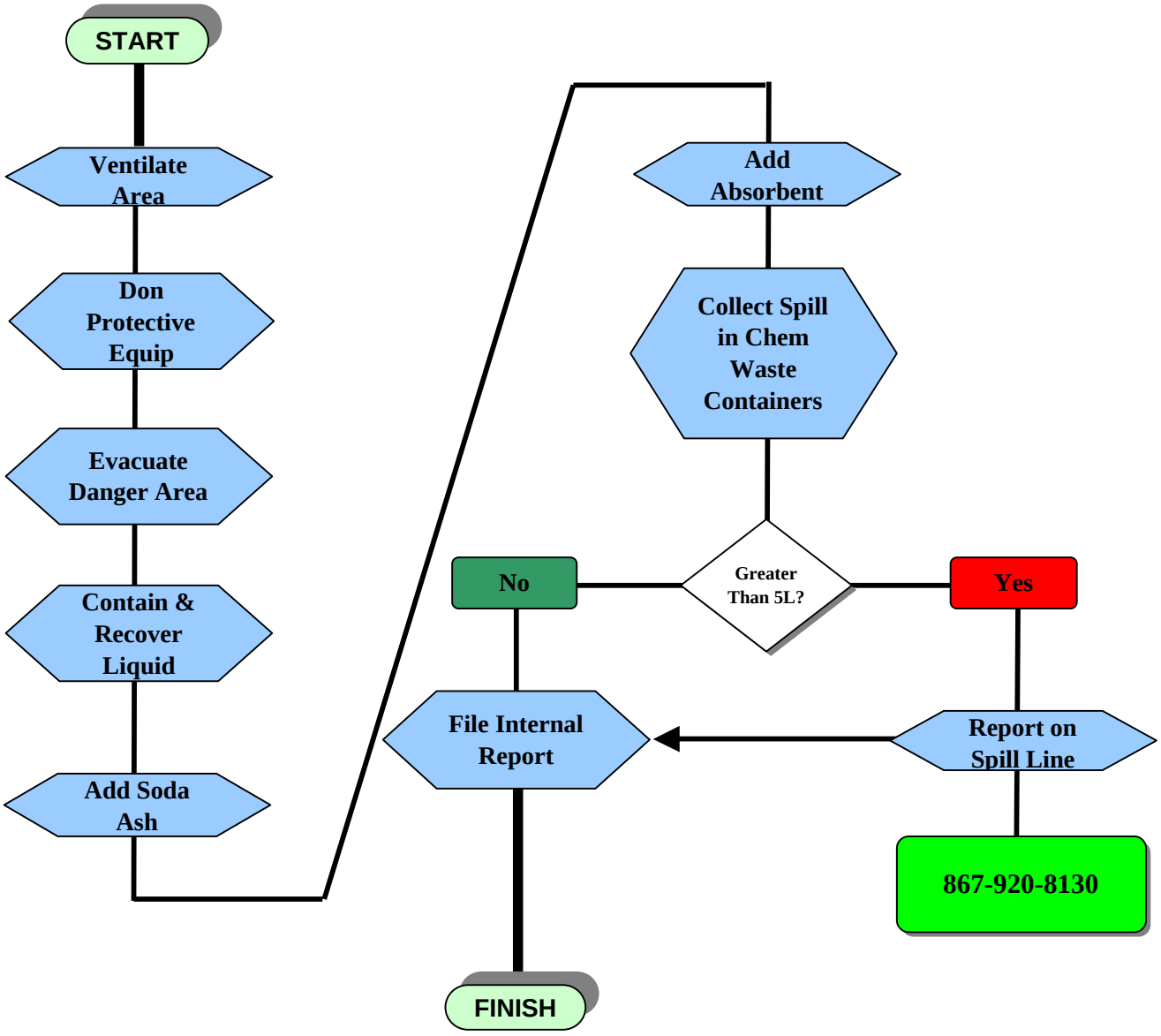
Flash Point (Method Used)	Not given.
Flammable Limits	Not flammable
Explosion	Not considered to be an explosion hazard
Fire Extinguishing Media	If involved in a fire, use water spray. Neutralize with soda ash or slaked lime.
Special Fire Fighting Procedures	In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Structural firefighter's protective clothing is ineffective for fires involving hydrochloric acid. Stay away from end of tanks. Cool tanks with water spray until well after fire is out.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Ventilate area of leak or spill. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust.

Do not flush to sewer.

HYDROCHLORIC ACID SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area.
Personal Respirators (NIOSH-approved)	For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection	Wear protective clothing, including boots or safety shoes with polyvinyl chloride (PVC) or neoprene. Use chemical goggles and/or a full face shield. Wear coveralls with long sleeves, gauntlets and gloves of PVC or neoprene.
Eye Protection	Use chemical safety goggles and/or full-face shield where splashing is possible.

2.0 HEALTH HAZARD DATA

Airborne Exposure Limits	IDLH: 30 ppm; OSHA PEL 3 ppm (TWA); ACGIH TLV 3 ppm Ceiling as F.
Acute Effects of Overexposure	Eye: Corrosive to the eyes. Symptoms of redness, pain, blurred vision, and permanent eye damage may occur.
	Skin: Corrosive to skin. Skin contact causes serious skin burns which may not be immediately apparent or painful. Symptoms may be delayed 8 hours or longer. The fluoride ion readily penetrates the skin causing destruction of deep tissue layers and even bone.
	Inhalation: Severely corrosive to respiratory tract. May cause sore throat, coughing, laboured breathing and lung congestion/ inflammation.
	Ingestion: Corrosive. May cause sore throat, abdominal pain, diarrhea, vomiting, severe burns of the digestive tract, and kidney dysfunction.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Get medical help immediately. If patient is unconscious, give artificial respiration or use inhalator. Keep patient warm and resting, and send to hospital after first aid is complete.
Ingestion	If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact	Remove the victim from the contaminated area and immediately place him under a safety shower or wash him with a water hose, whichever is available. Remove all contaminated clothing. Keep washing with large amounts of water for a minimum of 15 to 20 minutes. Have someone make arrangements for medical attention while you continue flushing the affected area with water. SEE MSDS FOR FURTHER FIRST AID INFORMATION.
Eye Contact	Irrigate eyes for at least 30 minutes with copious quantities of water, keeping the eyelids apart and away from eyeballs during irrigation. Get competent medical attention immediately, preferably an eye specialist. If a physician is not immediately available, apply one or two drops of 0.5% Pontocaine Hydrochloride solution. Do not use oily drops or ointment. Place ice pack on eyes until reaching emergency room

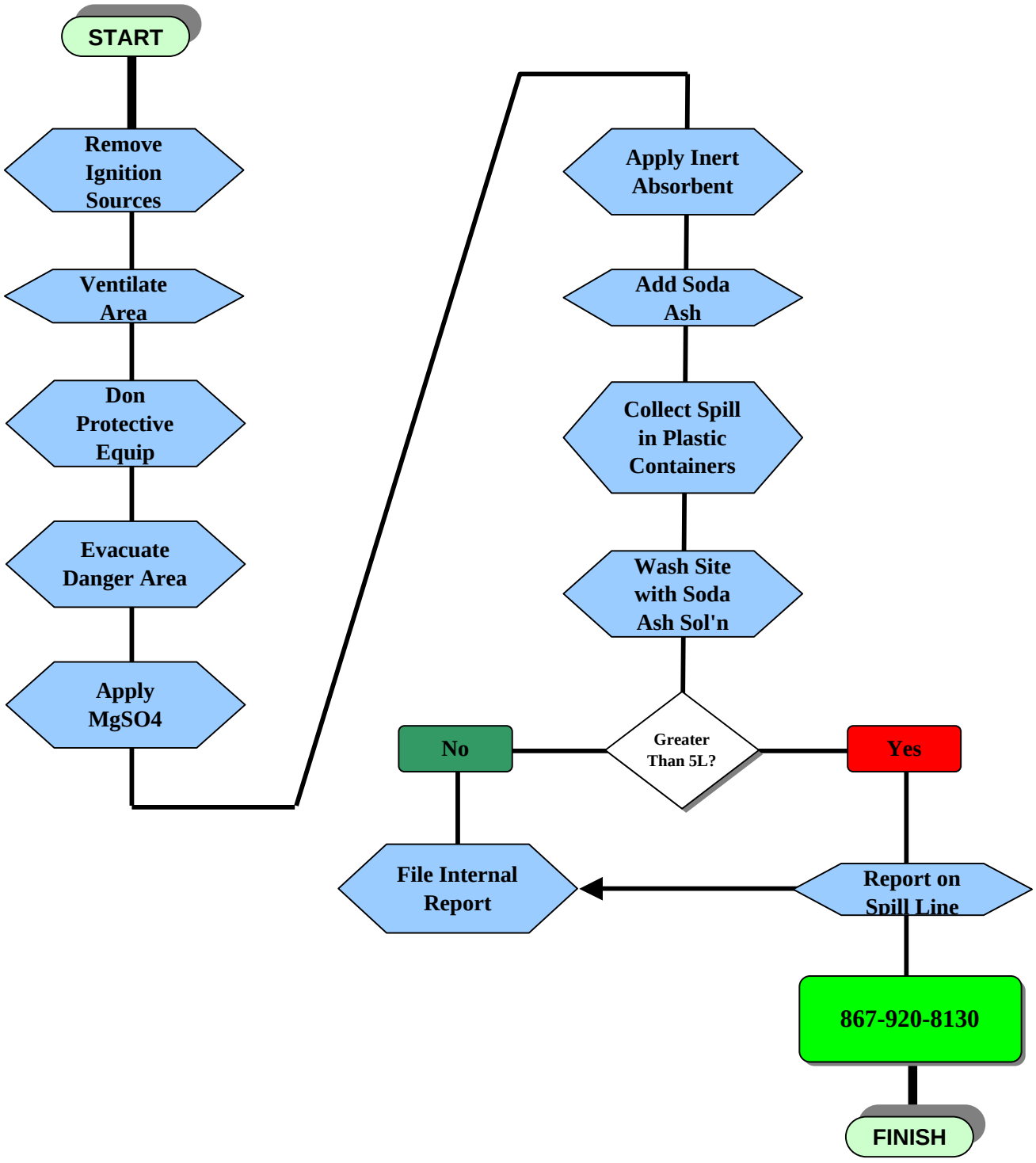
4.0 FIRE AND EXPLOSION DATA

Flash Point (Method Used)	Not applicable
Flammable Limits	Not flammable
Explosion	Violent exothermic reaction occurs with water. Sufficient heat may be produced to ignite combustible materials. Reacts with metals forming flammable hydrogen gas.
Fire Extinguishing Media	Keep upwind of fire. Use water or carbon dioxide on fires in which hydrofluoric acid is involved. Halon or foam may also be used. In case of fire, the sealed containers can be kept cool by spraying with water.
Special Fire Fighting Procedures	In the event of a fire, wear full protective clothing and a NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Avoid getting water in tanks or drums; water can cause generation of heat and spattering. In contact with air, the acid gives off corrosive fumes which are heavier than air.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Provide adequate ventilation and remove ignition sources since hydrogen may be generated by reactions with metals. Wear appropriate personal protective equipment. Evacuate the danger area. Apply magnesium sulphate (dry) to the spill area. Follow up with inert absorbent and add soda ash or magnesium oxide and slaked lime. Collect in appropriate plastic containers and save for disposal. Wash spill site with soda ash solution. NOTE: Porous materials (concrete, wood, plastic, etc.) will absorb HF and become a hazard for an indefinite time. Such spills should be cleaned and neutralized immediately.

HYDROFLUORIC ACID SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation	Local exhaust and mechanical (general) ventilation to maintain exposure levels.
Respiratory Protection	Avoid breathing vapour and/or mist. Use with adequate ventilation. If ventilation is inadequate, use NIOSH/MSHA certified respirator which will protect against organic vapour/mist.
Skin Protection	Impervious protective gloves
Eye Protection	Safety glasses or goggles
Other Protective Equipment	Protective clothing as required to avoid skin contact. An emergency eye wash station and shower should be available.
Work Hygienic Practices	Wash with soap and water after handling product and before eating, drinking or smoking

2.0 HEALTH HAZARD DATA

Acute Effects of Overexposure	May be mildly irritating to eyes. Prolonged or repeated contact may cause dermatitis. Vapours may irritate the nose, throat and upper respiratory tract and cause central nervous system depression. Aspiration Hazard.
Signs/ Symptoms of Overexposure	Eye irritation, skin irritation, dermatitis, upper respiratory tract irritation, nausea, vomiting, diarrhea, headaches, dizziness, drowsiness.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Remove to fresh air. Restore breathing. Get medical attention.
Ingestion	Do not induce vomiting. Get medical attention.
Skin Contact	Remove contaminated clothing. Wash with soap and water. If irritation persists, get medical attention.
Eye Contact	Flush with water for 15 minutes while holding eyelids open. Get medical attention.

4.0 FIRE AND EXPLOSION DATA

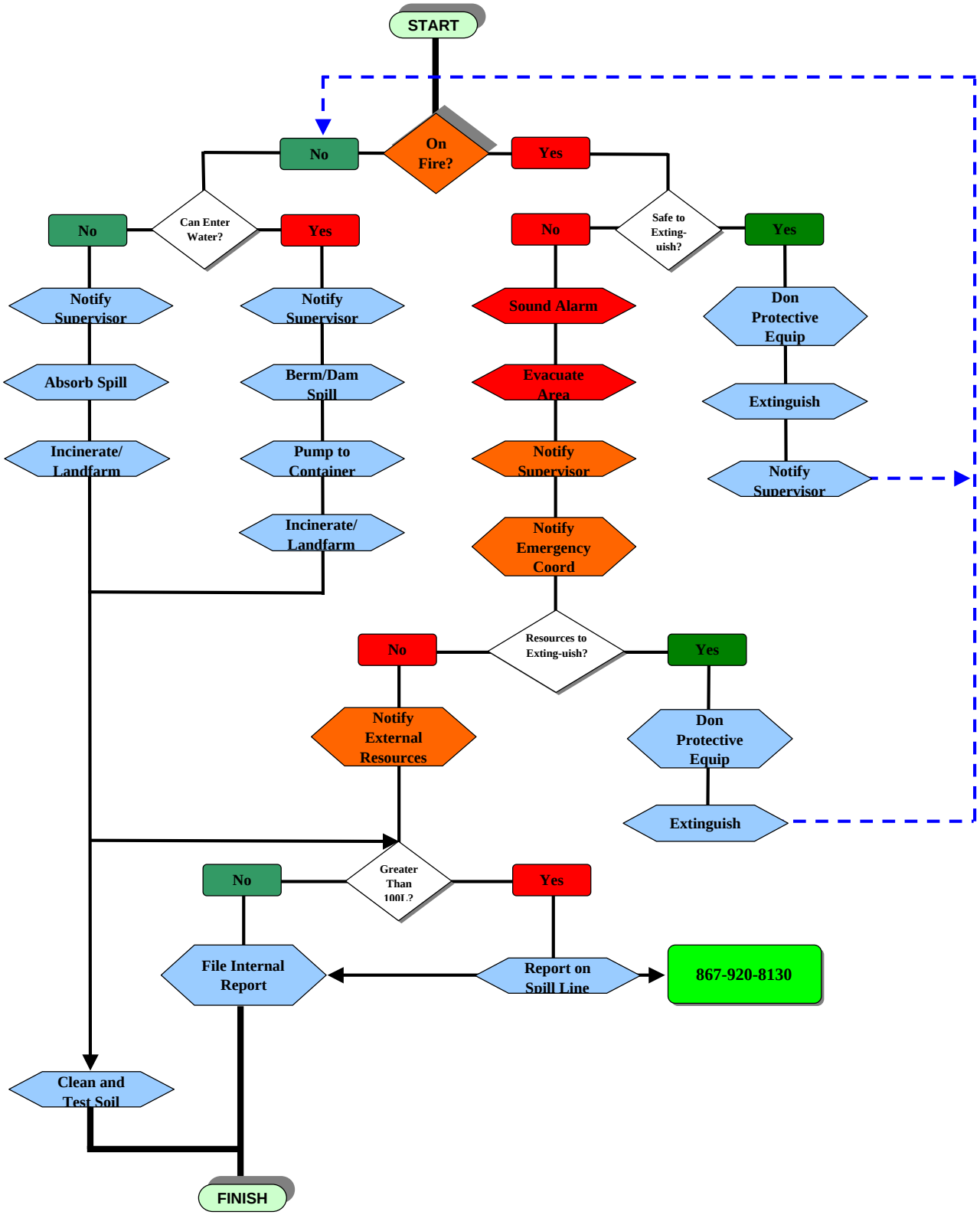
Flash Point (Method)	-10F, -23C (CC)
Explosion	LEL: 1.3% UEL: 8%
Fire Extinguishing Media	Agents approved for Class B hazards (dry chemical, carbon dioxide, halogenated agents, foam, steam) and water fog.
Special Fire Fighting Procedures	Fire fighters should use NIOSH approved SCBA and full protective equipment when fighting chemical fire. Use water spray to cool nearby containers exposed to fire.
Unusual Fire and Explosion Hazards	Do not use direct stream of water on fire. Toxic gases are released during combustion. Vapour may explode if ignited in enclosed area.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

If material released/spilled, eliminate sources of ignition. Evacuate area. Wear proper personal protective equipment. Contain spill. Stop leak. If can be done without risk, absorb liquid with suitable absorbent material. Collect for disposal.

Discard any product, residue, disposal container or liner in accordance with all federal and territorial regulations.

JET FUEL SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	Provide adequate ventilation to minimize dust inhalation
Personal Respirators (NIOSH-Approved)	Use dust mask if handling in bulk to prevent inhalation of airborne particles.
Skin Protection	Use gloves, if needed, to avoid prolonged or repeated skin contact.
Eye Protection	Use splash goggles when eye contact may occur.

2.0 HEALTH HAZARD DATA

Airborne Exposure Limits	OSHA PEL 10 mg/m^3; ACGIH TLV 10 mg/m^3; MFRS Recommendation 10 mg/m^3.
Acute Effects of Overexposure	Eye: may produce irritation and redness.
	Skin: None provided.
	Inhalation: dust may cause irrigation to the respiratory system.
	Ingestion: None provided.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	None provided.
Ingestion	If ingested, do not induce vomiting; remove product from mouth and call a physician.
Skin Contact	In case of skin contact, remove contaminated clothing and wash skin thoroughly with soap and water.
Eye Contact	If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

4.0 FIRE AND EXPLOSION DATA

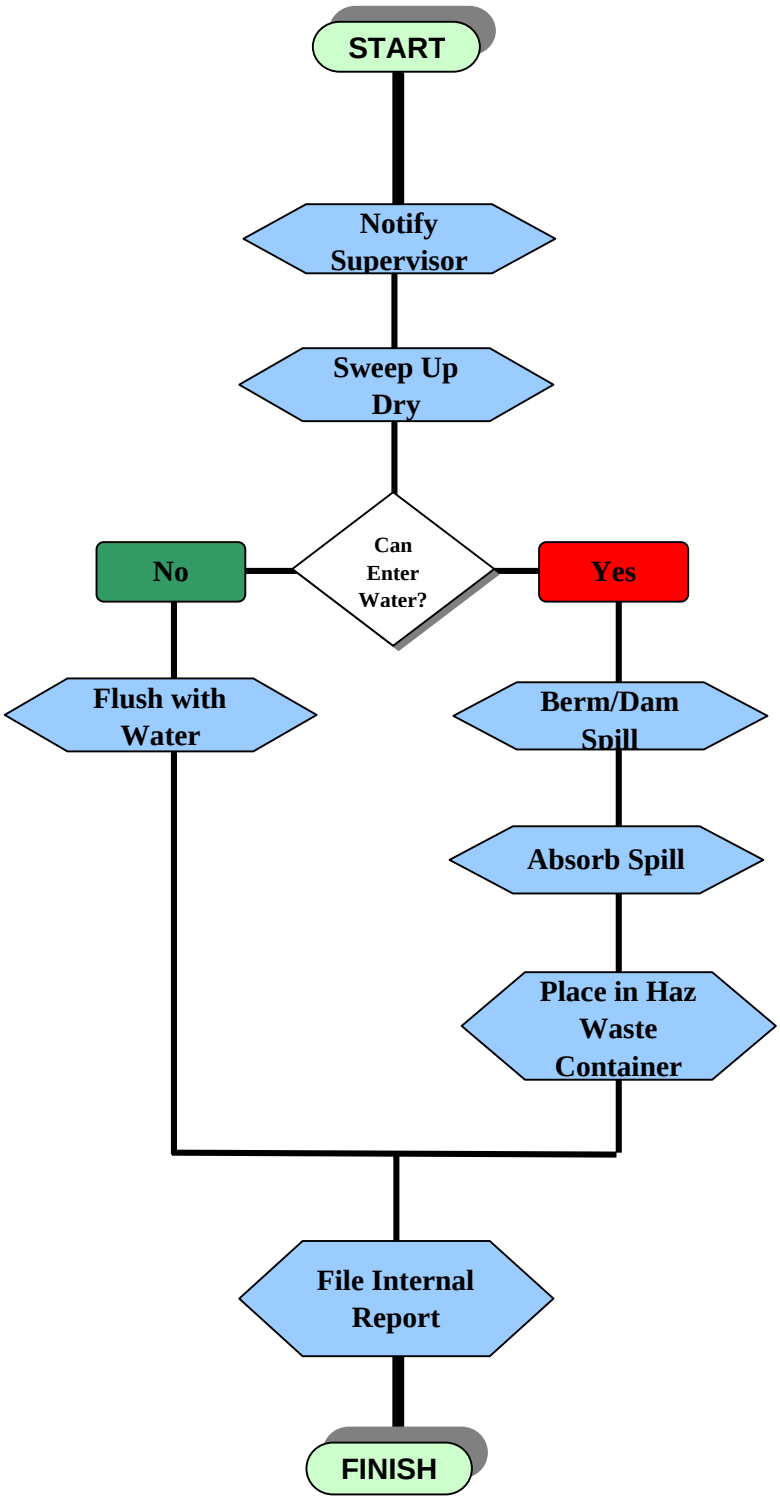
Flash Point (Method Used)	None exhibited.
Flammable Limits	Not flammable
Explosion	As with most organic powders, flammable dust clouds may be formed in air. Avoid creating dust. Keep away from sources of ignition.
Fire Extinguishing Media	Carbon dioxide, dry chemical, foam, in preference to a water spray.
Special Fire fighting Procedures	None given.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Sweep up dry and flush spill area with water. Spills of dilute solutions may be flushed with copious amounts of water, or alternately, they may be absorbed with an inert material such as earth or speedi-dry and contained for disposal. The product or its solutions should not be allowed to enter waterways without treatment.

Product should be disposed of in accordance with applicable federal and territorial regulations. Spilled solutions can create a hazard because of their slippery nature.

MAGNAFLOC 156 SPILL RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation	None
Respiratory Protection	None required; however use of adequate ventilation is good industrial practice.
Skin Protection	Impervious gloves
Eye Protection	Chemical workers goggles (FP D)
Other Protective Equipment	Protective clothing

2.0 HEALTH HAZARD DATA

Eyes/Inhalation/ Ingestion	No significant health hazards identified.
Skin	None expected for single short-term exposures. Prolonged/repeated contact may produce some irritation.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	If adverse effects occur, remove to uncontaminated area.
Ingestion	If large amount swallowed, induce vomiting; get medical attention.
Skin Contact	None required for unused motor oil. Contact with used motor oil, wash area thoroughly with soap and water or use waterless hand cleaners. Do not use gasoline, thinners or solvents.
Eye Contact	Flush with plenty of water for at least 15 minutes.

4.0 FIRE AND EXPLOSION DATA

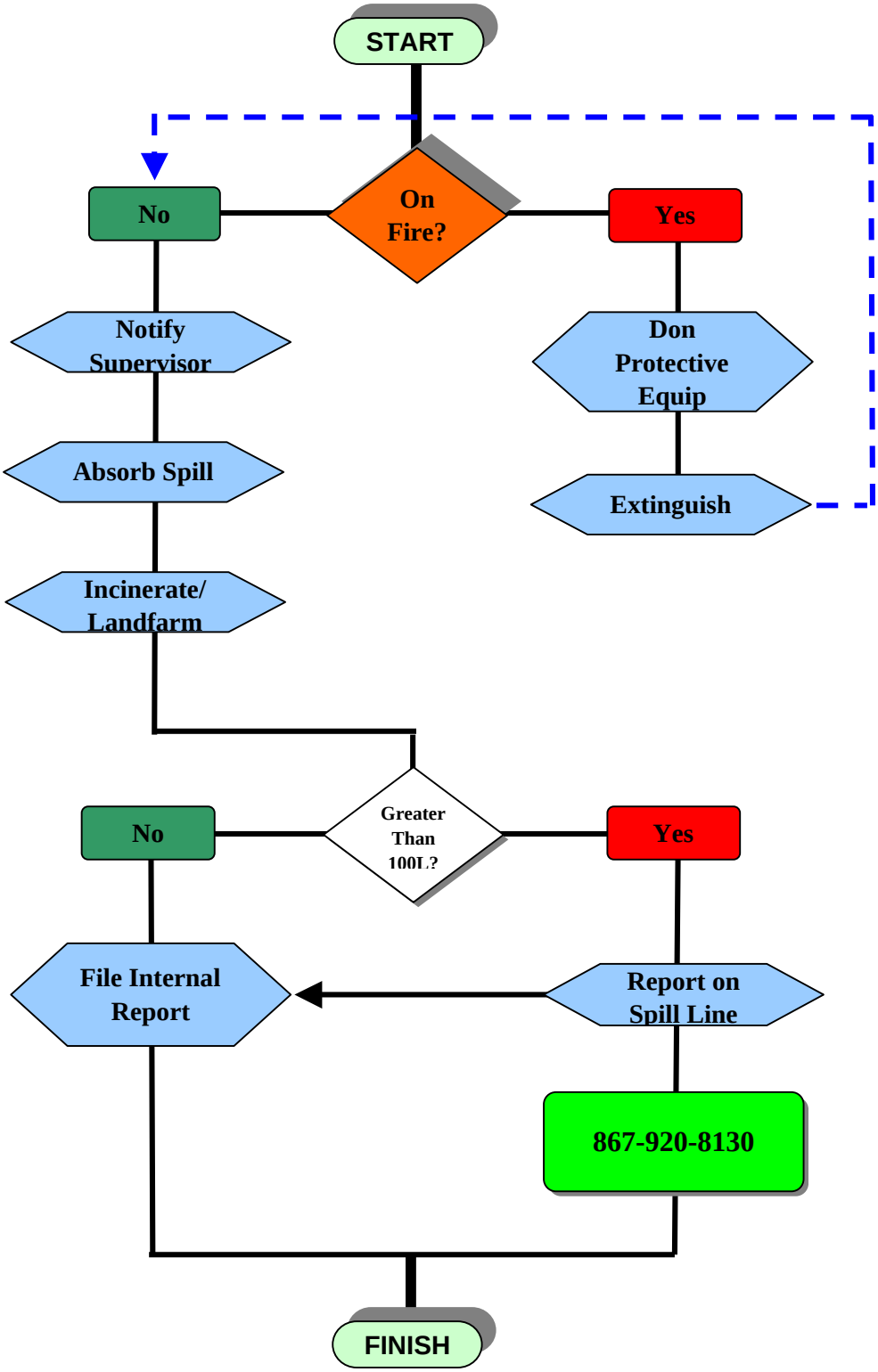
Flash Point (Method Used)	401F, 205C (COC)
Flammable Limits	Not given
Explosion	Not given
Fire Extinguishing Media	Agents approved for Class B hazards (e.g. dry chemical, carbon dioxide, halogenated agents, foam, steam) or water fog.
Special Fire Fighting Procedures	Wear NIOSH/MSHA approved SCBA and full protective equipment.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Contain on absorbent material (e.g. sand, sawdust, dirt, clay). Keep out of sewers and waterways.

Disposal must be in accordance with applicable federal and territorial regulations. Enclosed-controlled incineration is recommended unless prohibited by law.

MOTOR OIL SPILL RESPONSE



Company: Tahera Diamond Corporation

Site: Jericho Diamond Mine

Emergency Procedures

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and should call document control for revision level status.

Approved by: _____

Approved Date _____

1.0 PERSONAL PROTECTION INFORMATION

Unless authorized, remain a minimum of 5 m away from a damaged density meter, or until the meter's radioactive source has been determined to be safely shielded.

2.0 HEALTH HAZARD DATA

Radiation from meters is normally shielded and must be below 2.5 μSiverts/h outside the shield (instrument).

3.0 FIRST AID AND EMERGENCY PROCEDURES

There are no special first aid procedures as injury should not occur except for high radiation exposure. If high radiation exposure is suspected (above the health hazard limit) seek immediate medical attention.

In the case of emergency that may have damaged the meters containing the radioactive sources, the following steps must be taken:

- Cease work immediately.
- If the gauge has been partially damaged or destroyed, keep people at least 5 m away until the source is replaced or shielded, or until radiation levels are known to be safe.
- If possible, shutters on the sources in the density meters must be closed and the meters removed from danger of fire exposure if time permits. These procedures must be carried out by personnel trained in the safe use of radioactive prescribed substances.
- Have leak test performed after any incident that may result in source damage.
- In case of an accident or fire, do not use the gauge until any danger from or damage to the source is assessed.
- In the case of damage to meters, notify the Atomic Energy Control Board within 24 hours and file a report in accordance with licence conditions. The report, if required, will be prepared by the Plant Manager or designate.

4.0 FIRE AND EXPLOSION DATA

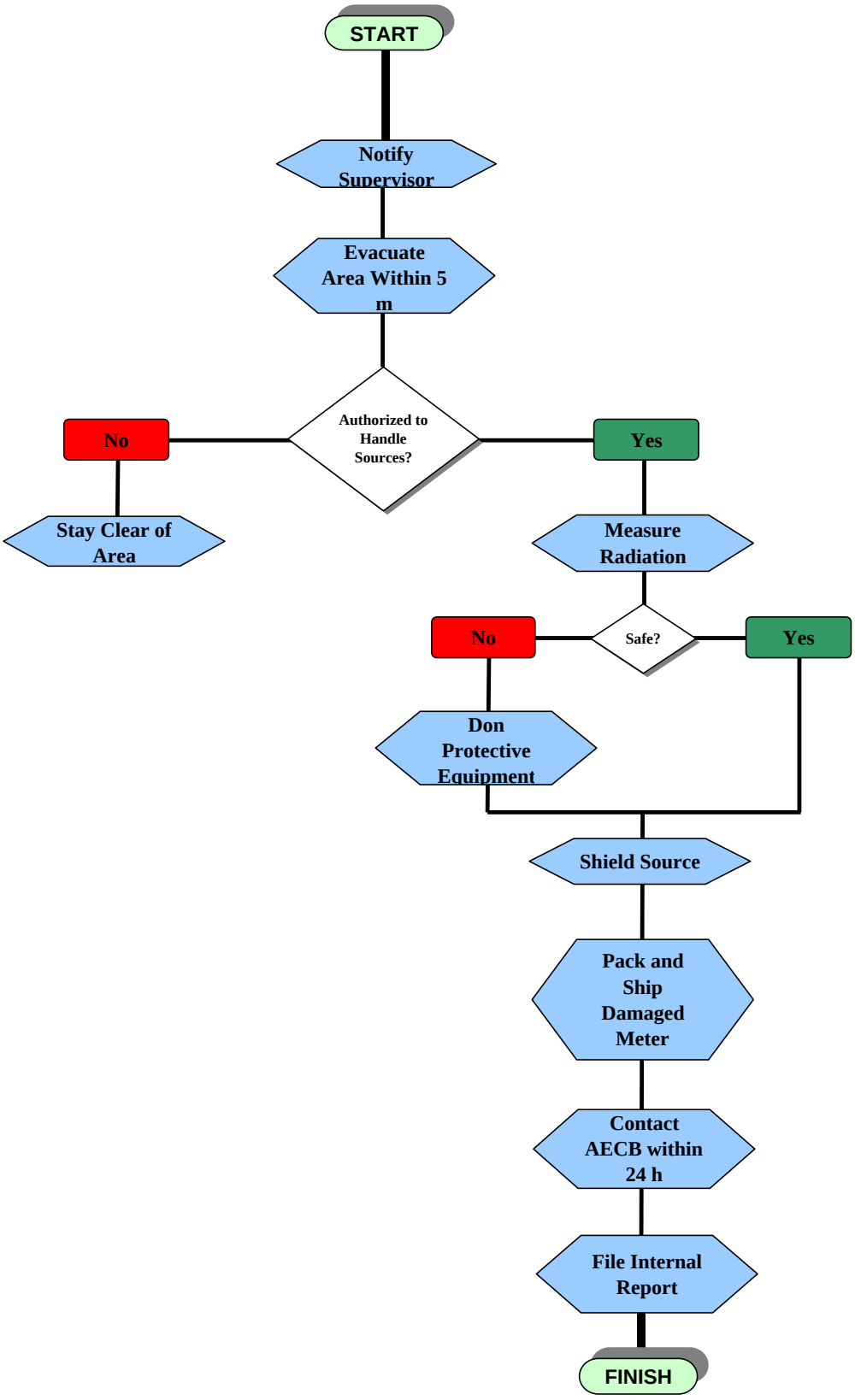
Meters and sources are non-flammable and will not explode. If meters are exposed to fire, they must be assumed to be leaking radiation until tested.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Meters and radioactive sources are not liquid and cannot spill or leak in that sense. Defective meters must be returned to the supplier, sent to the Atomic

Energy Control Board of Canada or an approved waste handling facility following Transportation of Dangerous Goods Regulations for radioactive substances. Radioactive sources must be effectively sealed prior to shipment. The consignee of meters must be notified prior to shipment. Label the package to indicate its contents and affix a radiation warning sign. If in doubt, contact AECB.

RADIOACTIVE SOURCE LEAK RESPONSE



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1.0 PERSONAL PROTECTION INFORMATION

Ventilation	Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLVs
Respiratory Protection	If overexposure has been determined or documented, a NIOSH/MSHA approved dust/mist and fume respirator is advised in the absence of proper environmental control.
Skin Protection	Wear resistant gloves such as: natural rubber, neoprene, nitrile rubber. To prevent skin contact, wear impervious clothing and boots
Eye Protection	Chemical splash goggles and fish shield in compliance with WCB regulations are advised; other types of safety glasses may be used.

2.0 HEALTH HAZARD DATA

Recommended Exposure Limits	OSHA PEL 5 mg/m^3, TWA; ACGIH TLV 5 mg/m^3, TWA
Acute Effects of Overexposure	Eye: Can cause permanent eye injury. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure the cornea and cause blindness.
	Skin: Can cause permanent skin damage. Symptoms include redness, burning, and swelling of skin, burns, and other skin damage.
	Inhalation: Breathing this material may be harmful or fatal. Symptoms may include severe irritation and burns to the nose, throat, and respiratory tract. Prolonged or repeated breathing may result in chronic bronchitis. Symptoms usually occur at air concentrations higher than the recommended exposure limit.
	Ingestion: Ingestion may be harmful or fatal. Symptoms may include severe stomach and intestinal irritation (nausea, vomiting, diarrhea), abdominal pain, and vomiting of blood. Swallowing may cause burns and destroy tissue in the mouth, throat, and digestive tract. Low blood pressure and shock may occur as a result of severe tissue injury.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Eye	Immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart. If symptoms develop as a result of vapor exposure, immediately move individual away from exposure and into fresh air before flushing as recommended. Seek immediate medical attention.
Skin	Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash clothing before reuse and discard contaminated shoes.
Inhalation	If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.
Ingestion	Seek immediate medical attention. Do not induce vomiting. Vomiting will cause further damage to the mouth an throat. If indivi8dual is conscious and alter, immediately rinse mouth with water and give milk or water to drink. If possible, do not leave individual unattended.

4.0 FIRE AND EXPLOSION DATA

Flash Point (Method Used)	Not applicable
Flammable Limits	No applicable.
Fire Extinguishing Media	Use an extinguishing medium appropriate for surrounding fire.
Special Fire Fighting Procedures	Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment.
Fire and Explosion Hazards	No special fire hazards are know to be associated with this product.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Small Spill

Sweep up material for disposal or recovery.

Large Spill

Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Shovel material into containers. Thoroughly sweep area of spill to clean up any residual material.

Company: Tahera Diamond Corporation

Site: Jericho Diamond Mine

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1.0 PERSONAL PROTECTION INFORMATION

Ventilation System	Mechanical (general and/or local exhaust, explosion-proof)
Respiratory Protection	If engineering controls are inadequate, a NIOSH-approved air-supplied respirator should be worn
Skin Protection	Rubber gloves
Eye Protection	Safety glasses with side shield/goggles

2.0 HEALTH HAZARD DATA

Acute Effects of Overexposure	Eyes: Irritation, tearing, redness.
	Skin: Drying and cracking of skin.
	Ingestion: Nausea, vomiting, coughing, headache, dizziness, drowsiness, weakness, fatigue, unconsciousness.

3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Move to fresh air, provide CPR if needed.
Ingestion	Do not induce vomiting. If person is drowsy/unconscious, place on left side with head down. Get medical attention. If possible, do not leave individual unattended.
Skin Contact	Wash with soap and water.
Eye Contact	Flush with water for 15 minutes. Hold eyelids open.

4.0 FIRE AND EXPLOSION DATA

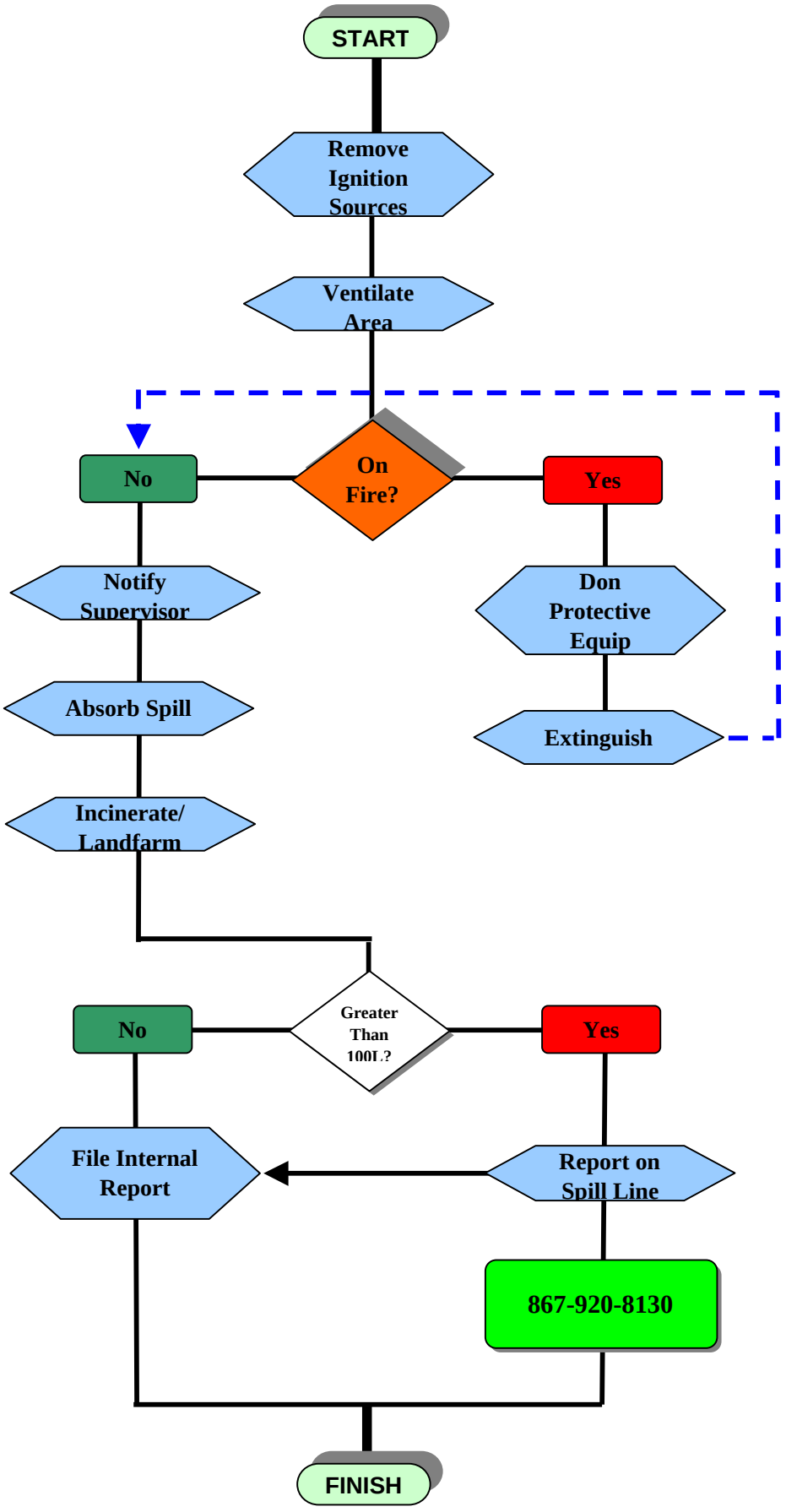
Flash Point (Method Used)	104F, 40C (TCC)
Flammable Limits	LEL: 2.3%; UEL: 14.4%
Explosion	.Not given.
Fire Extinguishing Media	Use CO_2, sand, water spray, foam/dry chemical. Water spray may be used to keep fire exposed containers cool.
Special Fire Fighting Procedures	Wear protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in positive pressure mode.
Unusual Fire and Explosion Hazards	Vapour is heavier than air and can travel considerable distance to a source of ignition and flash back. Containers may rupture due to vapour pressure buildup.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

Remove ignition sources. Ventilate area. Absorb spill with non-flammable material such as vermiculite or sand. Place in a container for chemical waste. Clean surface thoroughly to remove residual contamination.

Do not flush to sewers or waterways. Discharge, treatment or disposal is subject to federal and territorial regulations. Reusing or incineration is recommended.

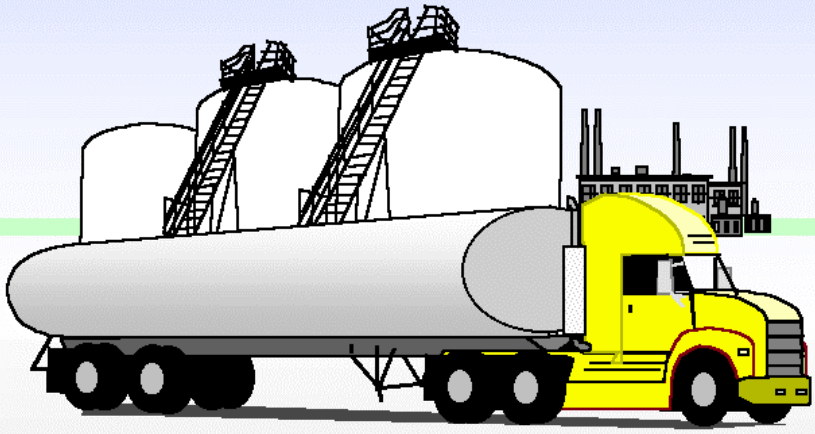
VARSOL/SOLVENT SPILL RESPONSE



APPENDIX 2.3

INDUSTRIAL EMERGENCY RESPONSE PLANNING GUIDE

Industrial Emergency Response Planning Guide



MANITOBA

Manitoba Industrial Accidents Council

SEPTEMBER 1996

CONTENTS

This planning guideline has been developed by a partnership of experts from business, industry and government. MIAC Task Group 1 is made up of the following individuals:

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Barrie Simoneau - Mine Accident Prevention Association of Manitoba
Doug Caldwell - Imperial Oil
Dennis Nikkel - Manitoba Labour and Immigration
Stephen Reid - Corporate Environment, Health and Safety
Tab Dudley - Simplot Canada

The Manitoba Industrial Accidents Council is not responsible for any loss, damage or injury of any nature whatsoever and however caused to the property or persons of any organization using or relying upon the material in this guidebook.

If you have any comments or questions about this document please let us know:

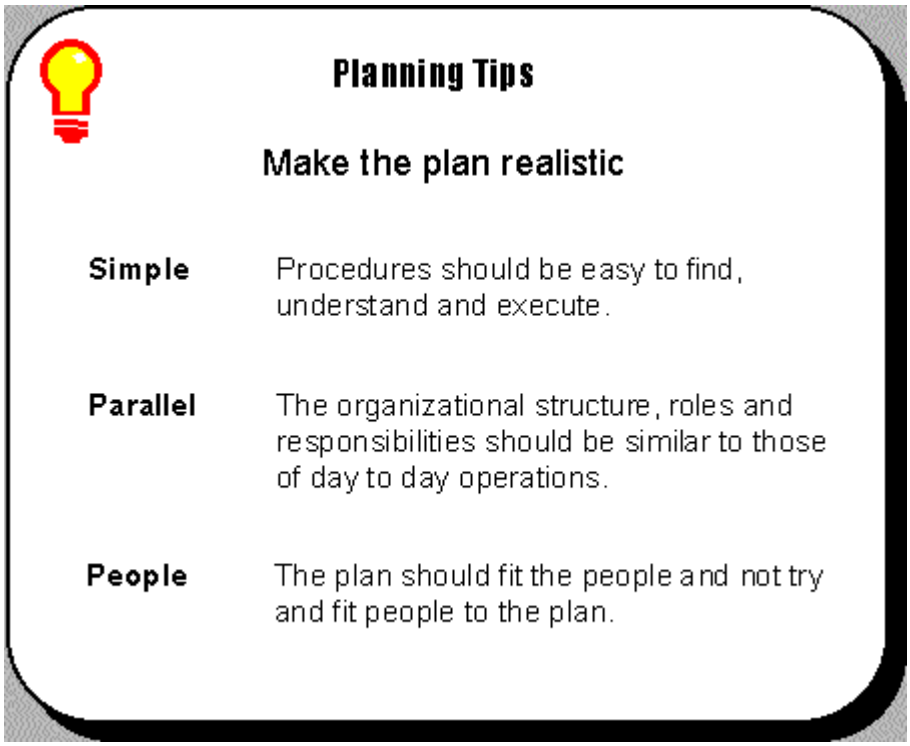
INTRODUCTION

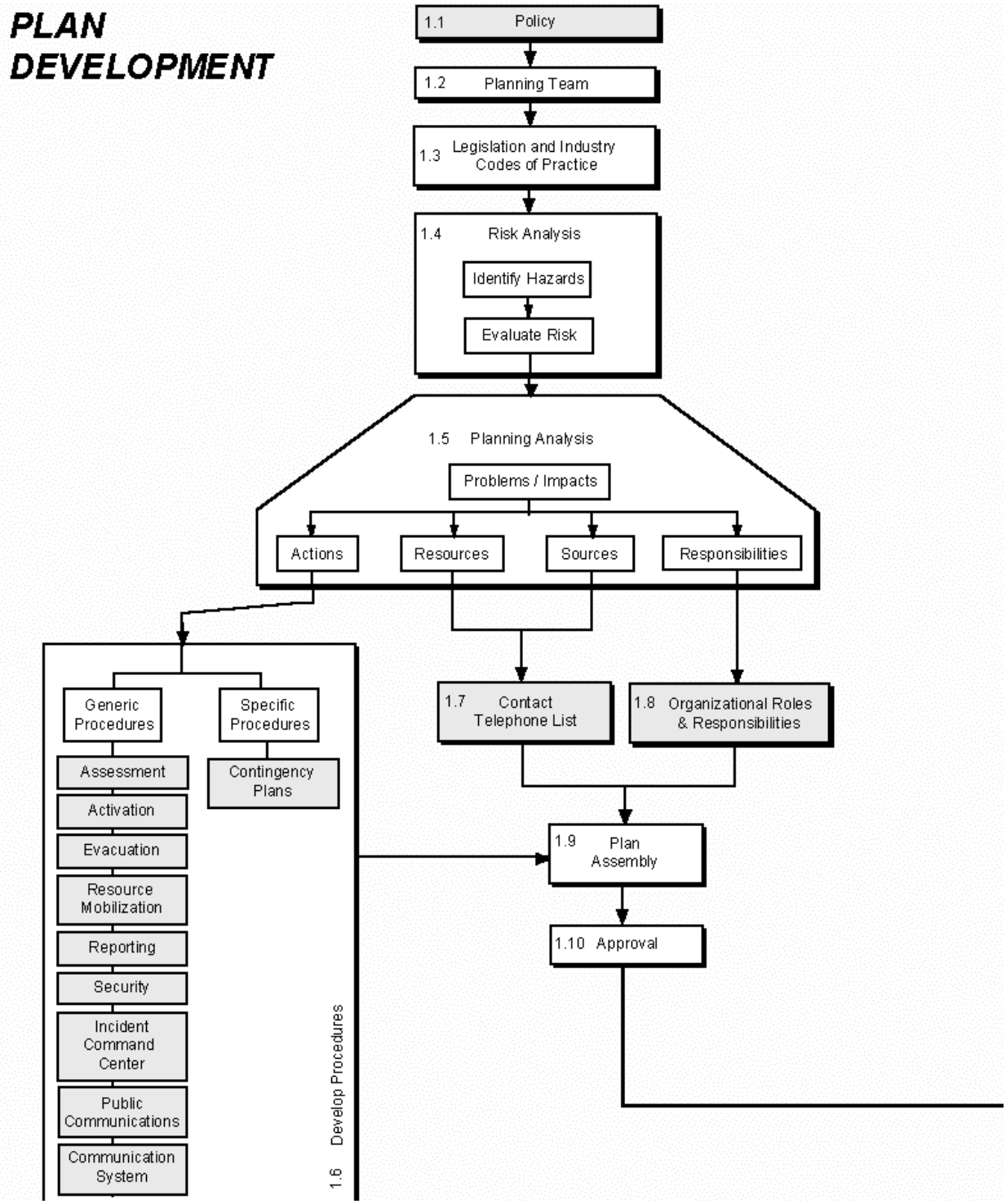
It is a reasonable assumption that every business or industry will, at some point, experience some type of crisis or emergency. Emergency preparedness and planning activities will help to minimize human, property, and economic losses due to any hazardous event.

The province of Manitoba recognizes this fact and as a result, all businesses that handle, transport, store or otherwise use significant quantities of dangerous goods are required, by provincial legislation, to have an emergency plan.

'Industrial Emergency Response Planning Guide' is designed for small to medium size Manitoba businesses with little or no experience emergency planning. It has been designed to be user friendly and proceeds step by step through a process for developing an appropriate emergency plan. Worksheets and other aids are used where possible to help simplify the process where possible.

All businesses are different and some may require more involved methods and information at certain times during plan development. References are included at the rear of the document to guide the user to more rigorous processes or methods whenever necessary.




PLAN DEVELOPMENT
1.1 Policy
1.2 Planning Team
1.3 Legislation and Industry Codes of Practice
1.4 Risk Analysis
Identify Hazards
Evaluate Risk
1.5 Planning Analysis
Problems / Impacts
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Sources
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Public Communications
Communication System
Contingency Plans
1.6 Develop Procedures
1.7 Contact Telephone List
1.8 Organizational Roles & Responsibilities
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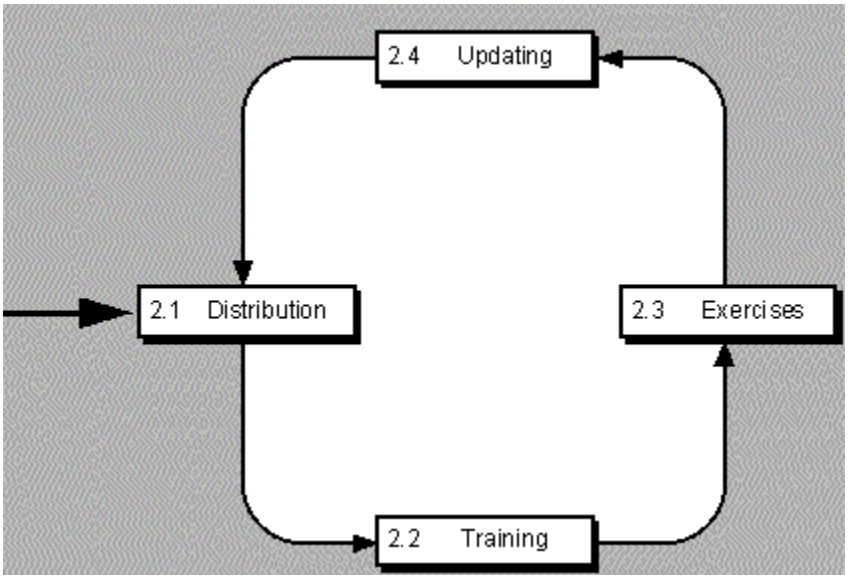
PLAN
ADMINISTRATION



1. PLAN DEVELOPMENT

1.1 POLICY

OVERVIEW

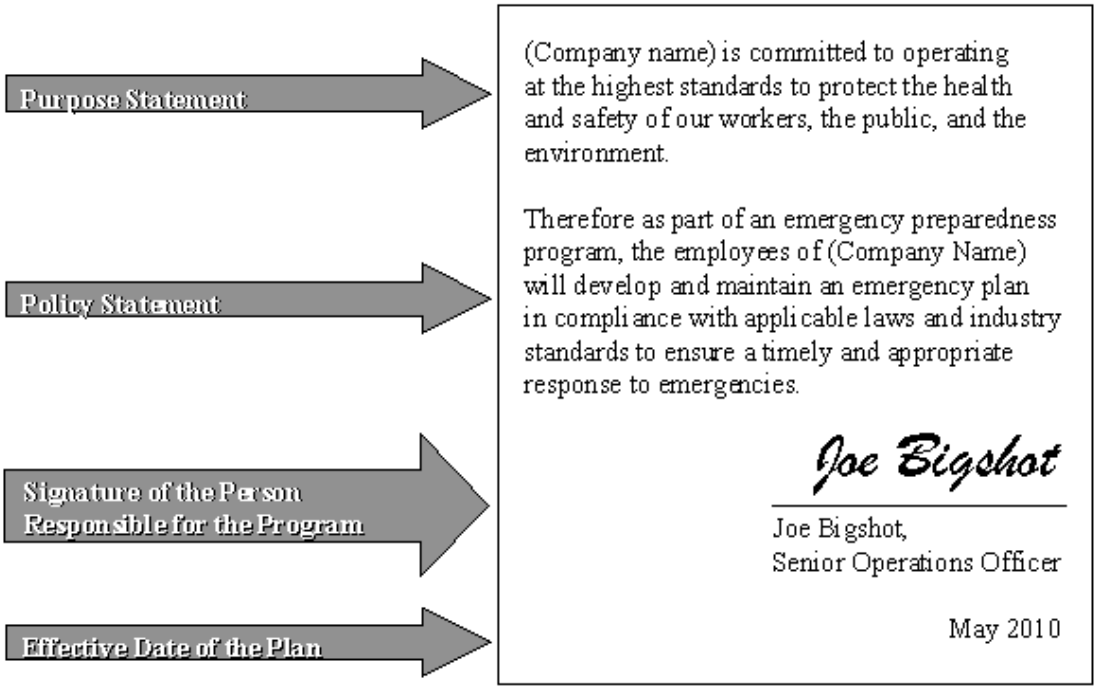
Every organization should have a policy reflecting its commitment to emergency response planning. The policy is usually signed by the senior most person within the organization.

The policy becomes part of the plan (see section 1.9).

ACTION REQUIRED

Senior Management	Develop an appropriate emergency preparedness / planning policy for your organization

EXAMPLE



1.2 EMERGENCY PLANNING TEAM

OVERVIEW

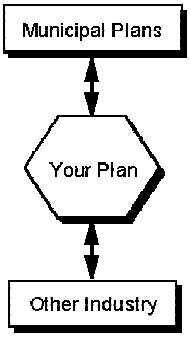
The Emergency Planning Team is responsible for the development and administration of the emergency response plan. The team is made up of the following:

1) Emergency Planning Coordinator

Responsible for overseeing the development and maintenance of the plan and;

2) **Emergency Planning Committee**

In larger and more complex organizations a committee of persons with expertise act as a resource to the emergency planning coordinator to ensure that the plan accurately reflects the needs of the organization. It is advisable to bring in outside expertise (fire, police, utilities, etc...) to work with the planning committee.



ACTION REQUIRED

Senior Management	▪ Select and appoint an appropriate position / person within the organization to be the Emergency Planning Coordinator.
Emergency Planning Coordinator	▪ Decide whether an emergency Planning Committee is required. If so, identify the types of expertise available within the organization that will be useful on the committee and assign appropriate individuals to the committee. ▪ Invite outside agencies to participate on the committee. ▪ Integrate the organizations emergency response plan with other emergency response plans.

ADDITIONAL INFORMATION

CSA Z731- Emergency Planning for Industry
MIAC-C's Principals for Joint Emergency Preparedness

OVERVIEW

The planning team should identify all federal, provincial and municipal regulations which apply to their operation and contact regulatory agencies to identify requirements and obtain advice.

In addition, some types of industries are required to follow procedures recommended in codes of practice. These industry associations must be contacted to identify appropriate codes.

ACTION REQUIRED

Emergency Planning Team	▪ Identify all pertinent legal authority in the way of local, provincial, and federal acts and regulations. ▪ Consult with regulatory agencies as necessary. ▪ Identify and implement industry codes of practice.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry

1.4 RISK ASSESSMENT

OVERVIEW

The risk assessment is the basis for the emergency plan although this information is not physically part of the plan. Keep the results of this process on file.

The next few pages outline a simple risk analysis process. Higher risk facilities will require more sophisticated risk analysis techniques.

ACTION REQUIRED

Emergency Planning Team	▪ Undertake a risk assessment. ▪ Consider methods to eliminate or reduce risk.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry
- MIAC-C Risk Assessment Guidelines

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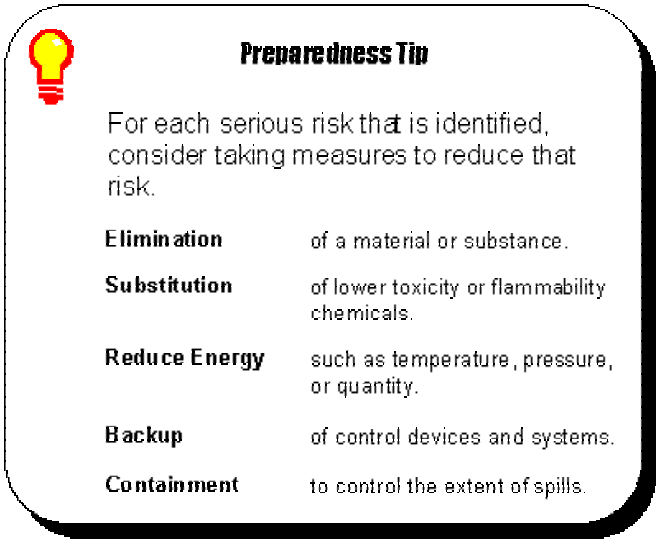


Step 1 - Identify the Hazards

The risk assessment begins by creating a list of all of the hazards that could possibly impact the site of operations. This process should include both natural hazards as well as human made hazards both internal to the company and those represented by any adjacent industries.

ACTION REQUIRED

Emergency Planning Team	▪ Complete worksheet A. Remember to include other hazards as appropriate.

Worksheet A - Hazard Identification

☐ Check all that apply

NATURAL	HUMAN CAUSED
☐ Tornado / Plough Wind	**Fire**
☐ Severe Hail	☐ Minor ☐ Major ☐ Structural Fire
☐ Heavy Rain/Flash Flood	
☐ Flood (River)	**Explosion**
☐ Extreme/Prolonged Heat ☐ Extreme/Prolonged Cold	☐ Minor ☐ Major
☐ Blizzard/Major Snow Storm	**Chemical Release**
☐ Freezing Rain/Ice Storm	☐ Chemical 1 _____ ☐ Chemical 2 _____ ☐ Chemical 3 _____
☐ Dust Storm	☐ Sabotage ☐ Bomb Threat
☐ Other _____	☐ Civil Unrest
☐ Other _____	☐ Plane Crash
☐ Other _____	☐ Dam Break
☐ Other _____	☐ Epidemic
☐ Other _____	☐ Financial Collapse ☐ Utility Shortage/Outage ☐ Gas Main Break ☐ Water Main Break ☐ Radiation Fallout
	☐ Other _____
	☐ Other _____

Step 2 Evaluate Risks

The second step is to evaluate the degree of risk represented by each hazard. Risk is a function of the frequency (probability) and consequences (severity) of a hazards occurrence.

ACTION REQUIRED

Emergency Planning Team	■ Take the list of hazards from the previous step (Worksheet A). ■ For each hazard identified: ■ Select the appropriate frequency category from Table 1 ■ Select the appropriate consequence category from Table 2. ■ Take the frequency and consequence categories that you have selected and locate the risk level in table 3. Record this result in the appropriate box on Worksheet B.

Table 1 - Frequency Categories

	Category	
A	Highly Likely	The hazard is very probable (100% chance) within the next year.
B	Likely	The hazard is probable (10%-100%) within the next year or; has at least one chance of occurring in the next 10 years.
C	Possible	The hazard is possible (1%-10%) within the next year or; has a one chance of occurrence in a hundred years.
D	Unlikely	The hazard is likely to occur less than once in a 100 years.

Consequences

Evaluate the consequences (severity) resulting from the hazard by selecting the category which best describes the effects of a worst credible mishap on personnel, public, environment, economy.

Note: The hazard is placed in the highest category for which it meets one or more criteria.(i.e.: death or fatal injury is always catastrophic even if all other consequences are negligible.

Table 2 - Consequence Categories

Category Impact Type	a Catastrophic	b Critical	c Marginal	d Negligible
Personnel	• Death or fatal injury	• Permanent disability, severe injury or illness	• Injury or illness not resulting in disability, major quality of life loss or perceived illness.	• Treatable first aid injury.
Public	• Death or fatalities due to direct exposure	• Permanent disability, severe injury or illness	• Injury or illness not resulting in disability, major quality of life loss or perceived illness.	• Minor quality of life loss.
Environment	• A major hazardous spill that is uncontained. • Regional or total species / subspecies loss.	• A minor hazardous chemical spill that is uncontained. • Local or species / subspecies damage.	• A major hazardous materials spill which is contained. • Portion of local organisms negatively impacted.	• A minor hazardous chemical spill which is contained • No measurable impact to the environment.
Economic Impact	• Total loss of financial base, incapacitating the community. • Funding not available within one week to initiate urgent recovery procedures.	• Partial loss of financial base, temporarily incapacitating the community. • Funding not available within four days to initiate recovery procedures.	• Minor loss to financial base, temporarily incapacitating the community. • Funding not available within 24 hours to initiate recovery procedures.	• Minor loss to the financial base. • Funding not available within 12 hours to initiate recovery procedures.
Facility Impact	• Complete shutdown of facilities and critical services for more than a month.	• Complete shutdown of facilities and critical services for more than two weeks	• Complete shutdown of facilities and critical services for more than a week.	• Complete shutdown of facilities and services for more than 24 hours
Property	• More than 50% of property located in the proximity of the impact is severely damaged.	• More than 25% of property located in the proximity of the mishap is severely damaged.	• More than 10 of property located in the proximity of the mishap is severely damaged.	• No more than 1% of property in the proximity of the mishap is severely damaged.

Risk

Risk is the combination of probability and consequences (severity).

Based on your answers from the probability table and the consequences table select the corresponding risk category.

Frequency Category / Severity Category	A Highly Likely	B Likely	C Possible	D Unlikely
a) Catastrophic	**aA**	**aB**	**aC**	**aD**
b) Critical	**bA**	**bD**	**bC**	**bD**
c) Marginal	**cA**	**cB**	**cC**	**cD**
d) Negligible	**dA**	**dB**	**dC**	**dD**

	High	· Receive top planning priority.
	Medium	· Receive planning priority.
	Low	· Do not plan for these.
	Very Low	· Do not plan for these.

Worksheet B - Risk Evaluation Summary

HIGH RISK	MODERATE RISK

LOW RISK	VERY LOW RISK

1.5 PLANNING ANALYSIS

OVERVIEW

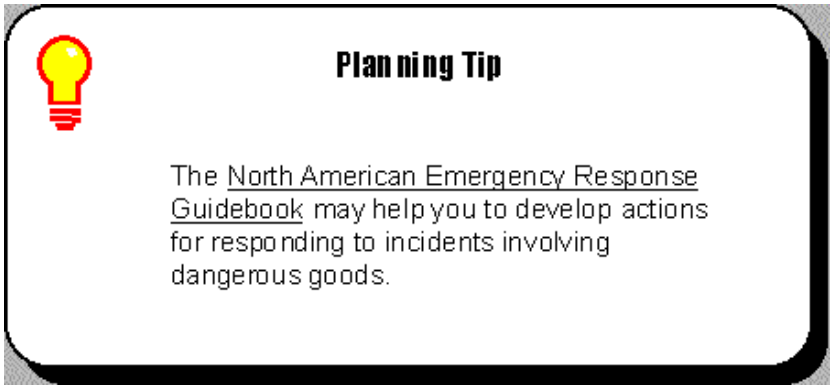
The risk assessment (Section 1.4) has demonstrated which hazards represent the most serious risks and should therefore receive planning priority.

The next step is to systematically review each hazard (beginning with the highest risk) to assemble the information that will become the emergency response plan.

ACTION REQUIRED

	◻ Photocopy Worksheet C (Copy in appendix).
Emergency Planning Team	◻ Using Worksheet C evaluate for each of the high and medium ranked hazards on Worksheet B. ◻ Identify the impacts or problems that are likely to occur due to the hazard (be detailed). ◻ The actions that will be necessary to reduce or eliminate the impact of the hazard (be detailed). ◻ The resources that will be necessary to undertake that action. ◻ The position (individual) or agency that is responsible for seeing that the action is done. ◻ Where these resources can be obtained company, mutual aid community, provincial government, federal government or other

ADDITIONAL INFORMATION



WORKSHEET E - PLANNING ANALYSIS

HAZARD **MAJOR RIVER FLOOD**

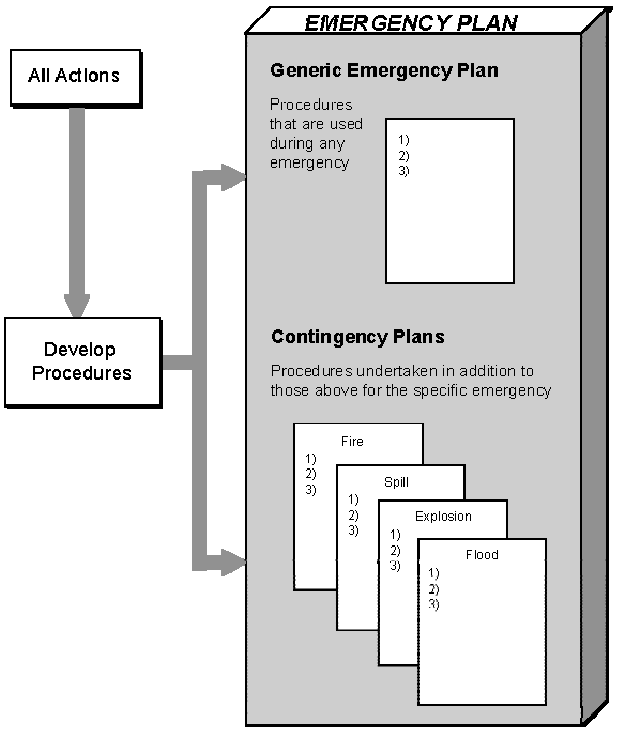
IMPACT	EMERGENCY RESPONSE / ACTIONS REQUIRED	RESOURCES REQUIRED	RESOURCE SOURCES / RESPONSIBILITY
Release of Chemical X due to containment tank floating.	*Anchor tank* *Drain tank and relocate contents*	*Professional to evaluate engineering demands.* *Hauling company*	*XYZ Engineering 555-1257* *ABC Chemical Transport*
Damage to machine A	*Remove / Relocate* *Sandbag/Dyke equipment*	*Approx 1200 sandbags* *Approx 30 yards³ sand* *12 people* *1 Water Pump (400 gph)*	*Arco Sandbags (staff to pickup)* *Terra Conglomerates (will deliver)* *Staff* *Chunks power equipment*

1.6 DEVELOP PROCEDURES

OVERVIEW

The completed planning analysis (Section 1.5) provides a complete listing of all the actions necessary for any emergency - essentially a number of hazard-specific emergency plans.

This information is key to the emergency plan but needs to be further structured and refined into a more useful product.



This refinement is a two stage process:

1) Developing procedures for each action

2) Separating procedures into those that pertain to all emergencies (Generic emergency plan) and those that apply to specific hazards (Contingency plans).

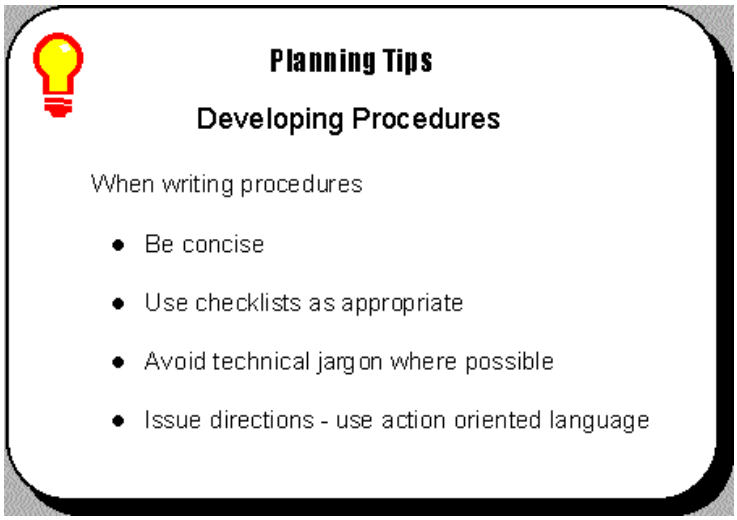
The majority of this section (1.6.1 to 1.6.9) describes many of the procedures that are to be found in the generic emergency plan. The contingency plans that you will develop will depend on the hazards in your area of operations.

1.6.1 Assessment	1.6.4 Mobilization	1.6.7 Incident Command Center
1.6.2 Activation	1.6.5 Reporting	1.6.8 Public Communication
1.6.3 Evacuation	1.6.6 Security	1.6.9 Communication System

ACTION REQUIRED

Emergency Planning Team	◻ Develop procedures for each action (Section 1.5)
	◻ Develop an emergency plan and contingency plans for specific emergencies.
	◻ Take all procedures
	  ◻ Determine which are applicable to all or most emergencies.
	  ◻ List these as a generic emergency plan
	  ◻ Assign all remaining procedures as separate contingency plans.

ADDITIONAL INFORMATION



1.6.1 EMERGENCY PLAN : ASSESSMENT PROCEDURES

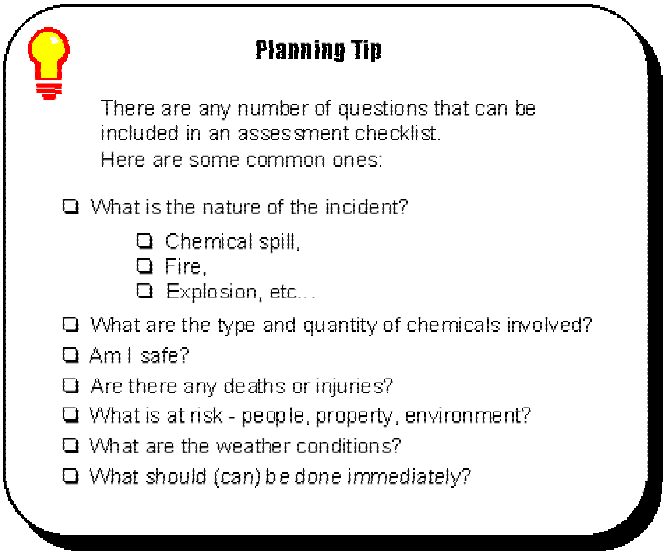
OVERVIEW

A rapid yet thorough situation assessment is essential to ensure that appropriate and sufficient resources are brought to bear on the emergency.

ACTION REQUIRED

Emergency Planning Team	□	Develop procedures for evaluating an emergency situation to ensure that critical issues are addressed and that an appropriate response develops.

ADDITIONAL INFORMATION



1.6.2 EMERGENCY PLAN - ACTIVATION

OVERVIEW

An emergency may be reported from any source (employee at the facility, outside agency, general public...) and, depending on the nature of the business, may occur at a location other than a fixed facility. This section of the plan describes procedures for:

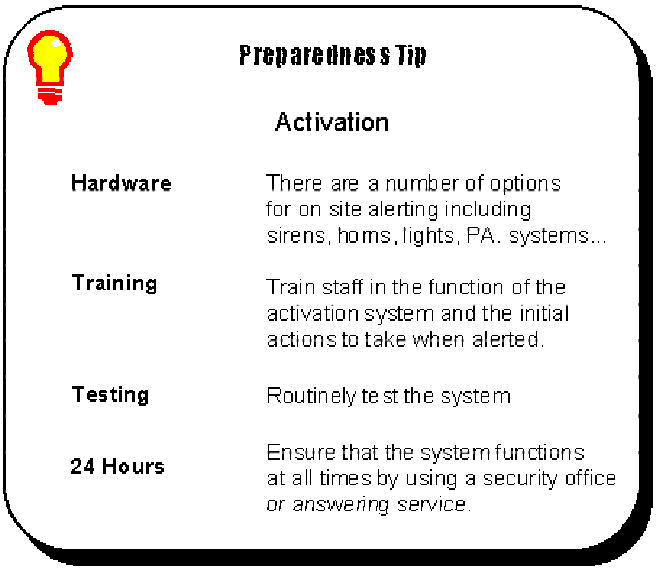
- Processing emergency calls.
- Notifying key personnel.
- Activating the Emergency Plan.

Regardless of the location of the emergency, the procedure should indicate where to call in an emergency and who is responsible for receiving the information. In most situation this will require access to a 24 hour telephone number or radio location.

ACTION REQUIRED

Emergency Planning Team	☐ Develop a procedure for alerting on-site personnel to the emergency. ☐ Develop or designate a system for receiving internal and external emergency calls on a 24 hour basis. ☐ Develop a procedure for notifying key personnel, indicating who is to make the notification and how contact is to be made.

ADDITIONAL INFORMATION



1.6.3 EMERGENCY PLAN - EVACUATION PROCEDURES

OVERVIEW

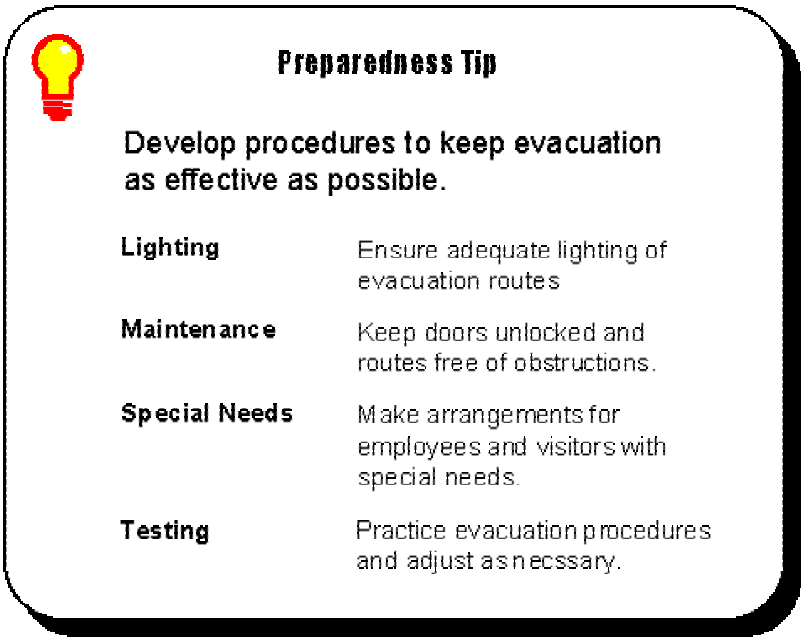
The safety of employees and visitors at the site is of critical importance. A safe and rapid evacuation is necessary to ensure that casualties are avoided during an emergency.

Evacuation routes and procedures should be established in the plan and implemented through signage and training around the workplace.

ACTION REQUIRED

Emergency Planning Team	◻ Develop an evacuation plan including routes and procedures. ◻ Implement the evacuation plan by posting signage and training and drilling staff in evacuation procedures. ◻ Review and change evacuation plans whenever physical changes are made to the work environment.

ADDITIONAL INFORMATION



1.6.4 EMERGENCY PLAN - RESOURCE MOBILIZATION

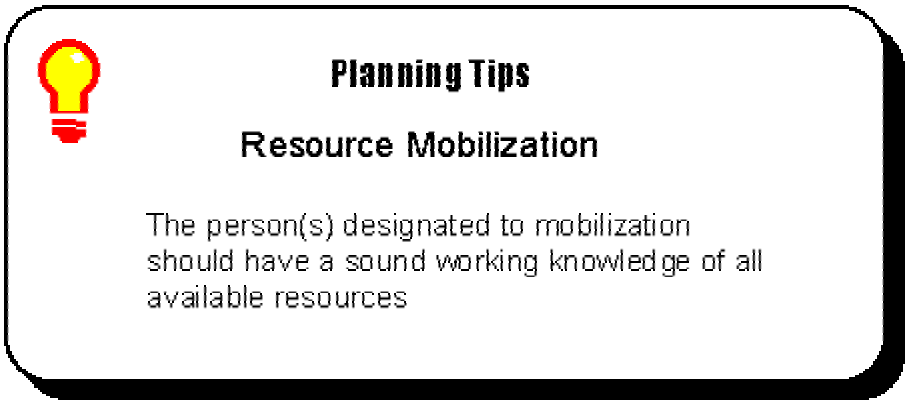
OVERVIEW

After an initial assessment of the need for personnel and equipment have been made and key personnel have been alerted, resources need to be assembled in a coordinated manner.

ACTION REQUIRED

Emergency Planning Team	◻ Designate a person or position who will be responsible for mobilizing personnel, equipment and other technical resources from within the organization. For facilities with a number of distinct sections, it may be appropriate to designate a separate contact for each section. ◻ Identify specific procedures to be used for arranging resources and assistance from outside organizations and designate a person or position to be responsible for initiating these procedures.

ADDITIONAL INFORMATION



1.6.5 EMERGENCY PLAN - REPORTING

OVERVIEW

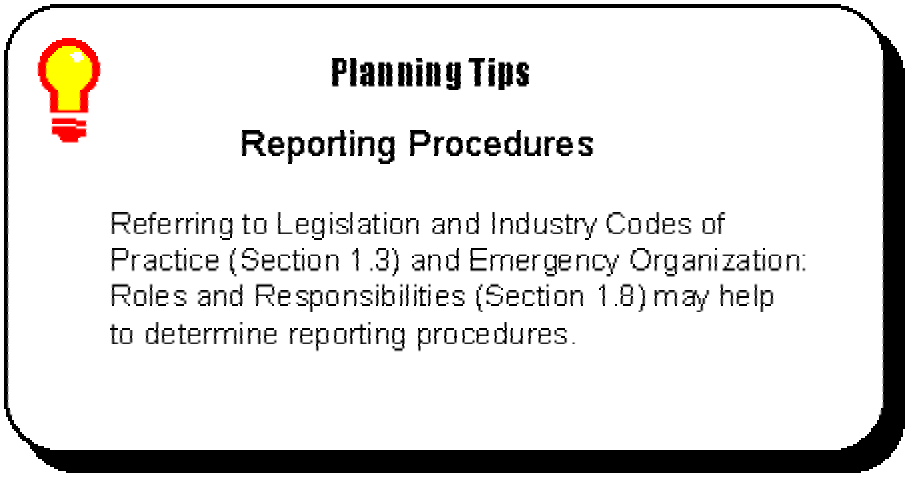
During a typical emergency response, reports will have to be made to both internal and external parties to aid in the response operation or, as in some cases, are a legislated requirement.

ACTION REQUIRED

Emergency Planning Team	☐ Develop a list of the reports that will have to be made during an emergency response. Include the following: ☐ Who is responsible for making the report ☐ To whom the reports are to be made ☐ When reports are to be made ☐ The form of each report (verbal, written)

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry



1.6.6 EMERGENCY PLAN - SECURITY

OVERVIEW

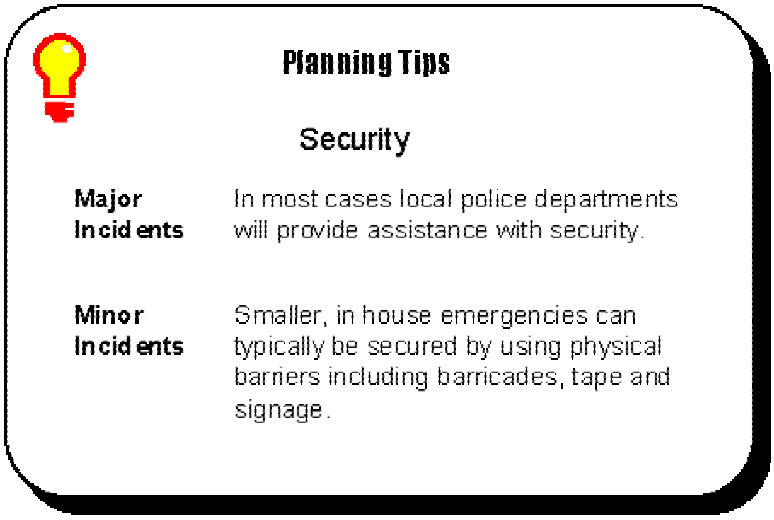
During an emergency situation proper security measures will be required to limit the movement of unauthorized personnel into the incident site including the public, media, and facility staff not involved in the response.

ACTION REQUIRED

Emergency Planning Team	☐ Determine the need for security during an emergency. ☐ Where security is required identify how this is to be done and who is responsible for initiating security measures.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry



1.6.7 EMERGENCY PLAN - INCIDENT COMMAND CENTER

OVERVIEW

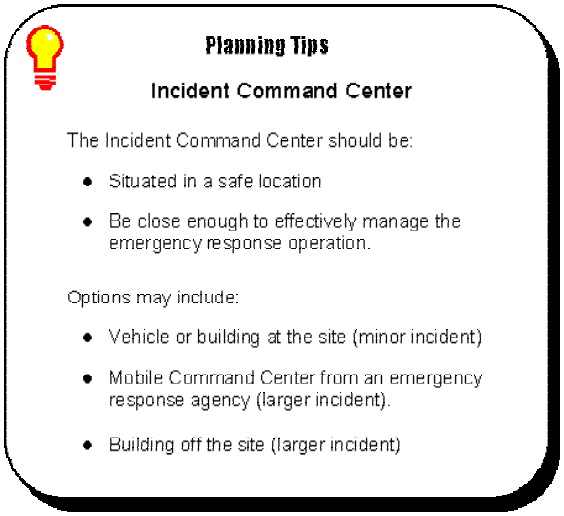
In order to coordinate an emergency response operation, a suitable work area, the Incident Command Center, is required.

ACTION REQUIRED

Emergency Planning Team	☐ Designate one or more locations which could be used as an Incident Command Center. ☐ Identify the specific items that will have to be available at the Incident Command Center.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry



1.6.8 EMERGENCY PLAN - COMMUNICATION WITH THE PUBLIC

OVERVIEW

The public has an inherent right to be informed of risks to which it might be exposed and to be warned and advised in case of an accident. It is to industry's advantage to accurately and completely inform the public regularly with respect to it's operations and facilities. Community awareness will develop trust and lead to improved citizen involvement in the event of an emergency.

ACTION REQUIRED

Emergency Planning Team	□ Identify the following in the plan: □ The population that might be affected. □ Adequate methods to inform citizens and the media. □ Procedures for rapid and efficient communications if an accident occurs. □ Warning systems that will be used during an emergency. □ Appropriate actions to be taken during and after an emergency. □ A spokesperson.

ADDITIONAL INFORMATION

1.6.9 EMERGENCY PLAN - COMMUNICATION SYSTEM

OVERVIEW

One of the keys to an effective emergency response is an effective communications system that is able to relay accurate information quickly. To do this reliable communications equipment must be used, procedures developed and personnel trained.

When planning for an emergency consider the conventional communication systems may be unavailable communications systems may be required to operate for extended periods in adverse conditions or communications may be necessary with a central control area.

ACTION REQUIRED

Emergency Planning Team

- ☐ Develop an effective emergency communications system for the company: This should include the following:
  - ☐ Equipment
    - ☐ Use backup power sources and batteries.
    - ☐ Plan for a secondary communications system.
    - ☐ Develop a routine maintenance program.
  - ☐ Procedures
    - ☐ Develop communications operating procedures. These should conform to standardized procedures and those of other agencies that may be involved with the emergency response.
    - ☐ Develop a communications schedule to allow emergency responders to keep management informed.
  - ☐ Training
    - ☐ Develop a training program to be made available to all users of the system.

ADDITIONAL INFORMATION

1.6.10 EMERGENCY PLAN - CONTINGENCY PLANS

OVERVIEW

The generic emergency response plan consists of procedures that apply to all or most emergencies.

Contingency plans are sets of procedures and information specific to individual hazards (ie floods - sandbagging).

ACTION REQUIRED

Emergency Planning Team	☐ Group procedures that are specific to individual hazards into contingency plans for those hazards.

ADDITIONAL INFORMATION

1.7 RESOURCES - PERSONNEL & EQUIPMENT

OVERVIEW

The planning analysis (Section 1.5) provides a listing of the people, equipment and supplies will be required to undertake emergency actions (Section 1.6).

The imaginative use of available resources, including external response groups, may reduce or eliminate the duplication of effort and the loss of time and/or money. Routine maintenance should be addressed to ensure that all resources are in a state of readiness.

Knowledge of the capabilities of various external response groups, such as fire, medical, police and environmental agencies should be determined.

ACTION REQUIRED

Emergency Planning Committee

- Develop a listing of all internal and external resources (personnel and equipment) that will be required to respond to any emergency.
- Compile information from site drawings or knowledgeable personnel on the following:
  - The locations of isolation points of sources of energy or product (electrical, gas ...).
  - The locations of emergency protective equipment (fire hydrants, monitors, fire pumps...)
  - The locations, quantities, accessibility and operability of equipment and supplies.
- Verify the response capabilities of all contracted sources
- Write clearly defined procedures to mobilize the various resources as needed during the emergency.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry

1.7.1 MUTUAL AID AGREEMENTS

OVERVIEW

Organizations may choose to enter into mutual assistance agreements with other industries and government agencies to provide help with one another in emergencies that they would be unable to contend with alone. Such agreements allow for the sharing of personnel and equipment which enhances response capabilities. This is particularly useful for example when one organization lacks special resources needed to counteract a particular emergency and these resources are available through others.

Mutual assistance agreements are especially beneficial where a number of industries operate in the same area allowing a common pool of resources thus minimizing costs and avoiding unnecessary duplication of materials and equipment.

ACTION REQUIRED

Emergency Planning Team	□ Assess the following options □ Dovetailing plans with current municipal or industrial agreements □ Consider formalizing links with a qualified third party by way of retainer contract to ensure that capable hands on first responders can be activated and attend at the incident scene. □ Any formal agreements should be reproduced or referenced in the plan along with standard procedures to be used by staff to activate mutual assistance.

ADDITIONAL INFORMATION

- MIAC-Cs Guiding Principles for Joint Municipal and Industrial Emergency Preparedness
- CSA - Z731 - Emergency Planning for Industry

1.7.2 CONTACT TELEPHONE LIST

OVERVIEW

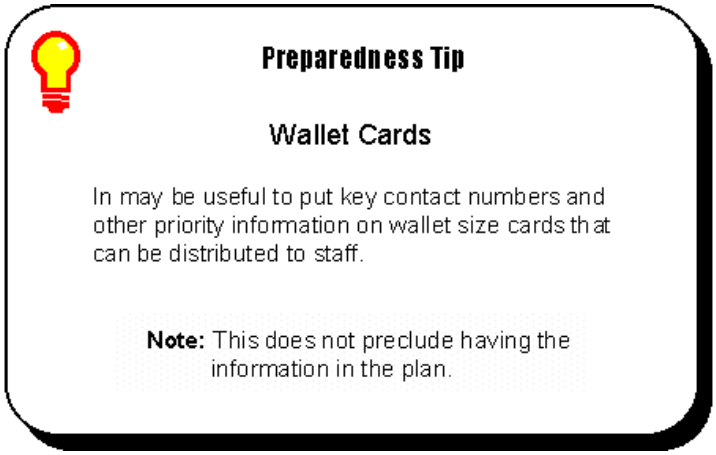
A list of telephone numbers of the external and internal resources that can assist during an emergency is essential for the rapid activation of an appropriate emergency response.

ACTION REQUIRED

Planning Team

- Compile and maintain a list of contacts. Include:
  - A brief description of the resources;
  - A key contact name and secondary contact;
  - A means of activation:
    - Work phone number;
    - Home phone number;
    - Mobile telephone or cellular numbers;
    - Pagers;
    - Fax, etc.
- All contacts included in the list should be aware that they are on the list and know is expected of them (Section 1.2).
- Develop a procedure to update the list regularly (Section 2.3).

ADDITIONAL INFORMATION



1.8 EMERGENCY ORGANIZATION : ROLES & RESPONSIBILITIES

OVERVIEW

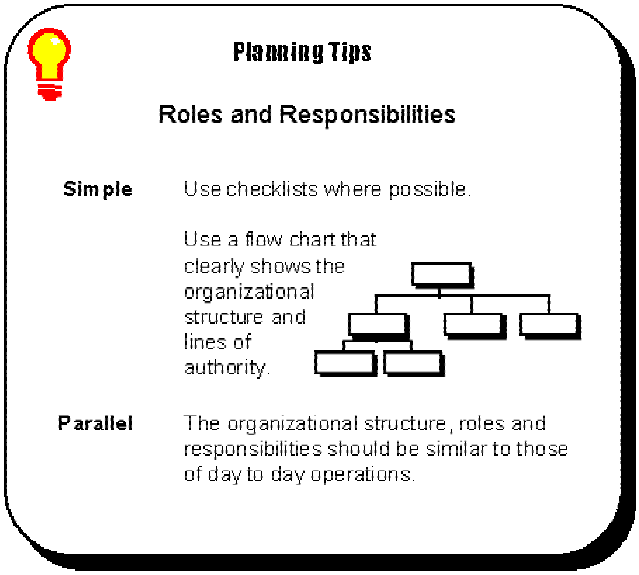
The emergency plan should identify the organizational structure for the emergency response and the roles and responsibilities of all individuals or groups identified in the plan.. This should include clearly defined roles and responsibilities including authority and accountability for all staff as well as those external agencies listed in the plan.

ACTION REQUIRED

Emergency Planning Team	□	Identify and / or develop specific roles and responsibilities for all key individuals, groups or agencies (both internal and external) that are listed in the plan.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry



1.9 PLAN ASSEMBLY

OVERVIEW

The final step in developing the plan is to combine the elements of the plan into a usable product.

ACTION REQUIRED

Content

Title / Cover Page	Title (Emergency Plan) Name of Company / Facility Location of Facility Address of Facility (if different from location) Phone Number Type of facility - what is done here General Manager - Name & Telephone Number Date of Plan
Policy	(Section 1.1)
Distribution List	
Table of Contents	
Generic Plan	(Section 1.6)
Contingency Plans	(Section 1.6)
Resource / Callout Lists	(Section 1.7)
Organizational Chart	(Section 1.8)
Additional information	Site Plan - floor plans Access Routes Hazards and Equipment for first responders Maps & Other Attachments

Assembly

Paper Print the plan on good quality white paper for durability.

Tabs Are recommended to help locate information in a hurry.

Binder The plan should be put in binders to protect them and so that changes can be made easily.

Binders should be a readily identifiable color (red is common) and labeled so that they are easily located.

1.10 APPROVAL

OVERVIEW

The emergency plan will need to be approved by management and should conform to company policy, industry codes of practice and industrial emergency planning standards.

ACTIONS REQUIRED

Planning Committee	□ Refer to Sections 1.1 and 1.3 to determine if the plan meets all of the criteria outlined in that section.
Management	□ Approves the plan.

2. PLAN ADMINISTRATION

2.1 DISTRIBUTION

OVERVIEW

Emergency plans should be distributed to all appropriate individuals or agencies and records kept of their locations.

ACTIONS REQUIRED

Emergency Planning Coordinator	◻ Number each copy of the plan.
	◻ Distribute copies of the plan to:
	  ◻ All members or departments having roles in the plan
	  ◻ Other external agencies that have a role in the plan
	◻ Maintain a list of to whom plans have been distributed.

Preparedness Tip

Protect your ERP

Ensure that some copies of the plan are kept off site so that they are not made unavailable by the emergency.

2.2 TRAINING

OVERVIEW

An emergency is an abnormal situation and an individual's ability to cope largely depends on the amount of emergency response training that they have.

A training program should include the following:

- ☐ Fundamental knowledge.
- ☐ Roles and responsibilities within the plan.
- ☐ Familiarity with policy and procedures.
- ☐ Hands on response training including use of equipment and protective devices.

Whenever possible this training should conform to recognized standards (i.e. NFPA, OSHA)

ACTIONS REQUIRED

Emergency Planning Team	☐ Design and implement a training program to ensure that staff have the skills and knowledge to enable them to respond to an emergency in a safe and effective manner.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry
- Emergency response training is available in Manitoba. Contact MIAC-Mb for more information.

2.3 UPDATING

OVERVIEW

Some types of information found in emergency plans is subject to change (i.e.: Telephone #s). The emergency plan should be reviewed on a regular basis and amended as required.

It is advisable to periodically recall all plans and replace with new versions to ensure that all plan amendments are kept up to date.

ACTIONS REQUIRED

Emergency Planning Coordinator	□ Ensure that information in all copies of the emergency plan are kept up to date.

2.4 PLAN TESTING

OVERVIEW

An emergency plan is more effective when it is tested since it gives personnel to practice their roles and allows for the detection and correction of any inadequacies.

An initial test of the plan should occur as part of the development process. In addition it should be tested as often as is practically feasible even if it is only a partial test (i.e.: conducting an emergency callout to test the speed of notification and mobilization of resources).

ACTIONS REQUIRED

Emergency Planning Coordinator	□ Regularly design and implement emergency exercises. □ Use the results of the exercise to update and improve the plan.

ADDITIONAL INFORMATION

- CSA Z731 - Emergency Planning for Industry
- Training courses in exercise design are available in Manitoba. Contact MIAC-Mb for more information.

3. APPENDIX

References

The following were used to help create this document. You may find them useful when developing your emergency response plan.

Canadian Manufacturers Association (1989)
A Simplified Guide to Emergency Planning

Major Industrial Accidents Council of Canada
CSA Z731 Emergency Planning for Industry

Major Industrial Accidents Council of Canada
Guiding Principles for Joint Municipal and Industrial Emergency Preparedness

Holloway, Lynne D (1996)
Emergency Response: It's All in the Plan
Occupational Health and Safety Canada - 1996 Buyers Guide

Transport Canada, US Department of Transportation,
Secretariate of Transport and Communications (1996)
1996 North American Emergency Response Guidebook

WORKSHEET E - PLANNING ANALYSIS

HAZARD

IMPACT	EMERGENCY RESPONSE / ACTIONS REQUIRED	RESOURCES REQUIRED	RESOURCE SOURCES / RESPONSIBILITY

APPENDIX 4.2

USED CHEMICAL CONTAINERS HANDLING AND DISPOSAL PROCEDURE

PROCEDURE FOR HANDLING AND DISPOSAL OF EMPTY CHEMICAL CONTAINERS

1. PURPOSE

1.1. To ensure that chemical containers are properly handled so that they do not impact the environment or injure employees.

1.2. To encourage the reuse and recycling of empty chemical containers.

2. SCOPE

2.1. This procedure covers any empty container (or one with residue) that housed a chemical that might have an impact on the environment or human health.

2.2. This procedure covers all types of hazardous chemicals or fuels whether they are in the liquid, solid, or gaseous/vapor state.

3. RESPONSIBILITIES

3.1. It is the responsibility of the chemical user to ensure that the chemical container has been properly cleaned.

3.2. The environmental department will audit the container cleaning operation to ensure that the procedure is being followed.

3.3. The procurement department will arrange contracts with chemical suppliers to reuse as many containers as possible.

4. PROCEDURE

Since most empty chemical containers may still have some residue, they must be handled properly to minimize injury and impact to the environment (see MSDS for the particular chemical). In many cases, the residues in the containers result in a hazardous waste classification.

4.1. Training

Responsible employees will be trained concerning this procedure and personal protective equipment (PPE) provided when this training is carried out. If the employees don't understand or appreciate what they are doing, there will be containers going out in the trash with residual chemicals. This may result in heavy fines and possible environmental damage.

4.2. Complete Use

It is very important to remove as much of the chemical as possible. This may require inversion for a period of time or scraping or chipping. Drain racks are commonly used for this phase of the process.

4.3. Handling of Residual

The residue will be used in the plant operation, if possible. If this cannot occur, then the residue will probably have to be treated as hazardous waste and should not be placed in the common landfill. If liners are present, they are also usually treated as hazardous waste.

4.4. Container Cleaning/Washing

Depending on the residual, it may be possible to wash out the container and cap. This washing is usually done three times (triple rinse). The wash solution may have to be treated as hazardous waste.

4.5. Testing

The container will be tested after the washing. For example, if an acid or base was in the container before, then pH paper could be used. pH meters are another option to ensure adequate washing has occurred.

4.6. Inversion

After washing the container, it should be inverted. A drain rack will allow all residual fluid to exit the container.

4.7. Return of Container

If possible, the container should then be returned to the chemical supplier, broker, or recycler. This is preferable to land disposal in terms of the environment and associated liabilities.

APPENDIX 10.1

CHEMICAL TRACKING PROCEDURE

PROCEDURE FOR TRACKING OF CHEMICALS

Tracking of chemicals is an essential component of a comprehensive environmental management system. Being aware of chemicals that are planned, purchased, stored, and used, and that become hazardous wastes is the essence of the system. Key components of the tracking system include an inventory, important information about the chemical, and a mass balance.

1. PURPOSE

1.1. To make sure all chemicals are identified and accounted for in all phases of the operation.

1.2. To reduce the volume and/or toxicity of chemicals on-site.

1.3. To detect early any significant leak or spill of chemicals.

2. SCOPE

2.1. This procedure covers chemicals used in mining, processing, catering/janitorial, and all other aspects of the operation.

3. RESPONSIBILITIES

3.1. The purchaser of the chemical is responsible for notifying the environmental department when a new chemical is introduced into the operation. The purchaser is also responsible for tracking of chemical quantities and reporting this to the environmental department.

3.2. The environmental department is responsible for keeping facility-wide inventories of chemicals by type and quantity. The environmental department must also compare this data to emissions and discharges to determine if leaks have occurred.

4. PROCEDURE

4.1. Identify Responsible Individual

A person who is responsible for all chemical tracking at the site will be identified. Many people may be involved; however, one individual should coordinate the overall effort for the entire organization.

4.2. Inventory

Inventory the chemicals planned and on-site and enter this information into a software system. For example, it should be indicated whether the chemical is planned or on-site. The quantity of the chemical in use, in storage, and being discharged needs to be recorded on an ongoing basis. The discharged amount would be in accordance with permits and regulations and include that to sewers, water bodies, air, and landfill. The amounts presently being recycled, reused, or sold should also be added into the inventory and so designated.

4.3. Other Information

Additional information should be entered into the software system, however, this may require some research into material safety data sheets or calls to the manufacturer. For example, the composition of the chemical along with Chemical Abstract System (CAS) numbers should be added. Hazard rating information should also be added.

4.4. Ongoing Review and Entry of Information

There will be on-going review of invoices, shipping documents, manifests, plans, and other information, which is added to the software system. The system should track, balance and account for, all chemicals. This helps to ensure that some have not leaked or been spilled from their containers.

4.5. Enforcement of Chemical Purchase Procedures

As all the numbers are obtained, there may be cases where it is found some individuals are not following the chemical purchase procedures. When this happens they will be reminded of the procedure.

4.6. When the Numbers Don’t Add Up

If the mass balance shows that there are significant volumes of chemicals unaccounted for some additional research will be needed. If it is not just an error in calculation, it might be a leaking storage tank or a spill.

APPENDIX

APPENDIX B FUEL INSPECTION FORM

TAHERA DIAMOND CORPORATION - JERICHO DIAMOND MINE			
New and Used Fuel Lubricants Date: _____			
	Location	Condition	Action / Comment
Fuel Tanks: (Quarterly)			
• TDG and WHMIS regulations posted • Spill kits and containment • Transfer pumps and hoses condition • Drum condition			
Diesel Generator Facilities: (Monthly)			
• TDG and WHMIS regulation posted • Spill kits and containment • Tank / drum conditions • Transfer pump and hose condition			
Other Fuelling Sites: (Weekly)			
• Other site features • Spill containment			
Spill Kits: (Quarterly)			
•			
•			
Hazardous Materials Storage: (Monthly)			
•			
•			

Inspected by: _____

APPENDIX

APPENDIX C LANDFILL THERMAL ANALYSIS

APPENDIX C

LANDFILL THERMAL ANALYSIS

1.0 INTRODUCTION

Thermal analyses were carried out to estimate the required waste rock cover thickness to maintain the long-term frozen condition of the Jericho Landfill. This following summarizes the input data and results of the thermal analyses.

The landfill at the Jericho Diamond Mine site is operated as a dry waste landfill with food wastes removed from the waste stream. The landfill has been used since 2006 and will remain active until the end of the mine life (projected to be 2012). Final closure of the landfill will be undertaken when the mine closes as part of mine closure activities. The landfill will be capped and closed during the mine closure stage. The landfill closure plan is to cover the landfill waste with a thick layer of mine waste rock to promote the permafrost development within the landfill waste.

2.0 LANDFILL SITE CONDITIONS

The landfill is located within the Waste Rock Dump No. 2 (EBA, 2007). The surficial geological mapping presented in SRK (2003a) indicates that the original ground at the Waste Rock Dump No. 2 primarily consist of bedrock. The bedrock at the mine site is mostly granite. Regional permafrost maps and site-specific measured ground temperature data indicate that the mine site lies in a region of continuous permafrost (SRK, 2003b). Permafrost is everywhere except areas beneath or near large lakes. It is expected that permafrost exists beneath the landfill area.

The Waste Rock Dump No. 2 has been developed to accept overburden and waste rock. Based on information from the mine operation, the till material from pit overburden excavation was initially placed over the original ground at the landfill area in winter 2005. The thickness of the winter-placed till material was approximately 2 m. Additional till material of approximately 6 m was placed over the winter-placed till in summer 2005. It is understood that the landfill waste has been placed into the landfill area over the placed till material since 2006. Additional landfill waste will be placed in the landfill through the life of the mine. The landfill waste will be contained by perimeter berms constructed with till and waste rock fill. The planned total height of the landfill waste is approximately 10 m. A landfill cover will be placed over the landfill waste during the mine closure stage.

As described in EBA (2007), the landfill waste consists of scrap metal, rubble, wood products, rubber products, construction debris, glass, fabrics, and lines, etc. The landfill waste will be dumped in the landfill area, crushed with a dozer, track packed, and then buried regularly with waste rock as the dump elevations increase.

There are no measured ground temperature data for either the original ground prior to the till placement or the placed till material in the landfill area; however there have been ground

temperature cables installed in the Jericho adjacent to the waste rock pile and landfill site. The ground temperatures were between -5 and -6 °C at depth prior to pit development. These temperatures are similar to other areas of the site including the dam sites for the PKCA area.

3.0 CLIMATIC DATA FOR THERMAL EVALUATIONS

3.1 MEAN CLIMATIC CONDITIONS

Climatic data required for the thermal analyses includes monthly air temperature, wind speed, solar radiation, and snow cover. There has been no meteorological station at the Jericho Diamond Mine site. The closest meteorological station is at Lupin/Contwoyto Lake, which is approximately 30 km south of the mine site. The climatic data for air temperature, snow cover, and wind speed were obtained from Environment Canada's meteorological station at Lupin/Contwoyto Lake, which has been operating since 1959. Mean monthly air temperatures for the thermal analyses were based on the 1971 to 2000 climatic normals at Lupin/Contwoyto Lake (data from Environment Canada's webpage). Monthly wind speed data were based on the 1951-1981 climatic normals at Contwoyto Lake (Environment Canada, 1982a). Month end snow cover data were based on the 1961-1991 climatic normals at Contwoyto Lake (Environment Canada, 1993). The solar radiation data were obtained from the meteorological station at Norman Wells, which is at a similar latitude as that for the Jericho mine site. The solar radiation data were based on the 1951 to 1980 climatic normals at Norman Wells (Environment Canada, 1982b). Table C1 summarizes the climatic conditions used for the thermal analyses.

TABLE C1: SUMMARY OF CLIMATIC DATA USED IN THERMAL ANALYSIS

Month	Monthly Air Temperature (°C)		Monthly Wind Speed (km/h)	Month-End Snow Cover (m)	Daily Solar Radiation (W/m²)
	Mean (1971 to 2000)	1 in 100 Warm			
January	-30.4	-25.2	20.2	0.44	5.4
February	-28.5	-23.6	13.3	0.52	31.6
March	-24.9	-20.6	13.8	0.60	97.3
April	-15.9	-13.2	14.3	0.65	179.2
May	-5.7	-4.7	16.5	0.30	233.1
June	6.5	9.2	14.6	0	267.2
July	11.5	16.3	16.8	0	234.5
August	8.8	12.5	18.8	0	166.8
September	1.8	2.5	23.0	0.02	93.9

TABLE C1: SUMMARY OF CLIMATIC DATA USED IN THERMAL ANALYSIS					
Month	Monthly Air Temperature (°C)		Monthly Wind Speed (km/h)	Month-End Snow Cover (m)	Daily Solar Radiation (W/m²)
	Mean (1971 to 2000)	1 in 100 Warm			
October	-8.6	-7.1	19.8	0.15	32.5
November	-20.7	-17.1	16.9	0.28	9.6
December	-26.8	-22.2	16.3	0.37	2.0

3.2 1 IN 100 WARM YEAR AIR TEMPERATURES

A probabilistic analysis was carried out to determine the mean monthly temperatures representative of a 1 in 100 warm year. The freezing index and thawing index for each year at Lupin/Contwoyto Lake from 1959 to 2004 were calculated. The freezing index for each winter was ranked in ascending order and plotted on probability paper. A "best-fit" line was drawn through the set of points to estimate the 1 in 100 warm year freezing index. A similar procedure was repeated for the summer temperatures to obtain the 1 in 100 warm year thawing index. Mean winter air temperatures were multiplied by the ratio of the 1 in 100 year freezing index to the mean freezing index to estimate the monthly winter air temperatures of a 1 in 100 warm year. Similarly, mean summer air temperatures were multiplied by the ratio of the 1 in 100 year thawing index to the mean thawing index to estimate the monthly summer air temperatures of a 1 in 100 warm year.

Monthly air temperatures for a 1 in 100 warm year are also listed in Table C1. As shown in Table C1, the 1 in 100 warm year annual air temperature is approximately 3.3oC warmer than the mean annual air temperature for the period of 1971 to 2000.

3.3 AIR TEMPERATURES CONSIDERING GLOBAL WARMING TRENDS

According to Environment Canada's "Climate Trends and Variations Bulletin" (http://www.msc-smc.ec.gc.ca/ccrm/bulletin/national_e.cfm), seven of the ten warmest years on record in northern Canada have occurred since 1994. There is an international scientific consensus that most of the warming observed over the last 50 years is attributable to human activities, namely in the emissions of greenhouse gases through the burning of fossil fuels (ACIA, 2004).

Global Circulation Models, or GCMs, are mathematical representation of the atmosphere, land surfaces, and oceans that have been developed to predict future climate behaviour in response to changes in the composition of the atmosphere. Several scenarios have been developed to estimate the likely range of future emissions that may affect climate (IPCC, 2000). Different GCMs have been developed, resulting in different degrees of projected global warming. In this study, using results from the Canadian Climate Impact Scenario project (http://www.cics.uvic.ca/scenarios/index.cgi), seasonal temperature changes for the Jericho Mine site area were estimated for the "B21 scenario" from four GCMs: a)

CGCM2 (Canadian Centre for Climate Modelling and Analysis, Canada); b) GFDL-R30 (Geophysical Fluid Dynamics Laboratory, United States); c) ECHAM4 (Max-Planck Institute of Meteorology, Germany), and d) HadCM3 (Hadley Centre for Climate Prediction and Research, United Kingdom).

The average seasonal changes in temperatures over 110 years estimated from the four GCMc for the mine site area are 5.9°C, 4.1°C, 3.6°C, and 4.2°C during winter, spring, summer, and fall, respectively.

Table C2 compares the estimated/predicted mean annual air temperatures and freezing/thawing indexes for mean, 1 in 100 warm year, and long-term global warming (GCMs) climatic conditions.

TABLE C2: SUMMARY OF AIR TEMPERATURE CONDITIONS

Climate Scenario	Mean Annual Air Temperature (°C)	Freezing Index (°C-days)	Thawing Index (°C-days)
Mean (1971 to 2000)	-11.1	4,884	878
1 in 100 Warm Year (based on air temperature data from 1959 to 2004)	-7.8	4,044	1,243
Predicted 2013 (average of GCM's warming trend)	-10.0	4,593	993
Predicted 2113 (average of GCM's warming trend)	-5.9	3,535	1,408

4.0 THERMAL EVALUATION OF LANDFILL

4.1 THERMAL ANALYSIS METHODOLOGY

Analyses were carried out using EBA's proprietary two-dimensional finite element computer model, GEOTHERM. The model simulates transient, two-dimensional heat conduction with change of phase for a variety of boundary conditions. The heat exchange at the ground surface is modelled with an energy balance equation considering air temperature, wind velocity, snow depth, and solar radiation. The model facilitates the inclusion of temperature phase change relationships for saline soils, such that any freezing depression and unfrozen water content variations can be explicitly modelled. The model has been verified by comparing its results with closed-form analytical solutions and many different field observations. The model has formed the basis for thermal evaluations and designs of a substantial number of projects in the arctic and sub-arctic regions, including dams, ground freezing systems, foundations, pipelines, utilidor systems, and landfills.

One-dimensional thermal analyses were firstly carried out to predict the temperatures of the original ground prior to the till placement and the temperatures of the placed till material and landfill waste with time based on mean climatic conditions. One-dimensional thermal analyses were then conducted to estimate the landfill cover thickness required to maintain the long-term frozen conditions of the landfill waste for mean, 1 in 100 warm year, and long-term global warming climatic conditions.

The thermal model was calibrated to the measured ground temperatures at both BH-03-08 and BH-03-10 during previous thermal evaluations for the designs of West and East Dams at the Jericho mine site. Good agreements were obtained between the measured and predicted ground temperatures. Calibration thermal analysis was not conducted for this study since no measured temperature data are available at the landfill site.

4.2 SOIL INDEX AND THERMAL PROPERTIES

The soil index properties for the materials in the thermal analysis were estimated based on the past experience for similar materials. Thermal properties of the materials were determined indirectly from well-established correlations with soil index properties or based on past experience. Table C3 summarizes the material properties used in the thermal analyses.

TABLE C3: MATERIAL PROPERTIES USED IN THERMAL ANALYSES

Material	Water Content (%)	Bulk Density (Mg/m^3)	Thermal Conductivity (W/m-K)		Specific Heat (kJ/kg^oC)		Latent Heat (MJ/m^3)
			Frozen	Unfrozen	Frozen	Unfrozen	
Waste Rock Cover Fill	2	2.14	1.45	1.67	0.76	0.80	14
Landfill Waste	3	1.96	1.50	1.50	0.77	0.83	19
Till Fill	13	2.26	2.77	1.94	0.89	1.13	87
Bedrock	1	2.53	3.00	3.00	0.75	0.77	8

4.3 RESULTS, DISCUSSIONS, AND RECOMMENDATIONS

Thermal analysis results indicate that the ground temperature at depth for the original ground (bedrock) prior to the till placement is estimated to be -5.2°C under mean climatic conditions. It is predicted that the till material placed in summer 2005 will be frozen back about two years after its placement. The temperatures in the original ground are estimated to be 1 to 3°C warmer after the placement of the till fill and landfill waste.

Parametric thermal analyses were carried out to determine the minimum required fill cover thickness under mean, 1 in 100 warm year, and long-term global warming climatic

conditions. The predicted active layer thicknesses (or maximum thaw penetration) in the landfill cover for the analyzed climatic conditions are summarized in Table C4.

TABLE C4: SUMMARY OF PREDICTED MAXIMUM DEPTH OF THAW PENETRATION INTO LANDFILL COVER	
Air Temperature Conditions	Predicted Active Layer Thickness (m)
After five consecutive mean years	3.2
After one 1 in 100 warm year following five mean years	3.6
After five consecutive 1 in 100 warm years following five mean years	3.9
After 100 years of global warming, average of four GCMs	4.6

Table C4 suggests that the predicted maximum depth of thaw penetration ranges from 3.2 to 4.6 m for various climatic conditions. The required landfill cover thickness is a function of the climatic conditions selected as the design criteria for the landfill. Additional factors of safety can also be applied to account for uncertainties in the geothermal model, soil input parameters, and climate input parameters.

Given these uncertainties, it is recommended that the landfill at the Jericho Mine site be designed for 100 years of long-term climate warming (average of four GCMs) to maintain the landfill waste in long-term permafrost condition. Therefore, the recommended minimum landfill cover thickness is 4.6 m.

It is expected that the required cover thickness would be less when till material is used instead of mine waste rock. However, further thermal evaluations are required to verify and estimate the required cover thickness should till material be used.

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