



JERICO DIAMOND PROJECT

SPILL PREVENTION AND EMERGENCY RESPONSE PLAN

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TAHERA DIAMOND CORPORATION

JERICHO DIAMOND MINE
SPILL PREVENTION AND EMERGENCY RESPONSE PLAN

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PREAMBLE

The Spill Prevention and Emergency Response 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 following formal distribution has been made of this Plan:

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Gjoa Haven, NT, X0E 1J0

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

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1.0 INTRODUCTION

This plan is written to meet Tahera Diamond Corporation's (Tahera's) requirements for a spill prevention and emergency response 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 as required when mine contractors have been engaged. This document was prepared to support Tahera's application for a water licence from the Nunavut Water Board. 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*.

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.

1.2 PURPOSE AND SCOPE OF THE PLAN

The purpose of this plan is twofold:

- 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; and
- to set out procedures and processes to be followed in the event of an emergency at the mine.

Since the mine detailed engineering has not been completed at the time of writing of this report, it presents conceptual approaches to emergency response and lays the framework for a comprehensive emergency response plan, to be completed prior to mine construction and operation. Completion of the plan will require consultation with Tahera Diamond Corporation's major contractors who will provide mining, catering and transportation/supply services. This consultation will take place when contracts are signed and prior to construction.

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. 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 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 8.0).

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.

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 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*.

1.6 METHODS FOR INTERNAL EVALUATION OF THE PLAN

The mine and plant health and safety committee will be responsible for evaluation of the plan with direction from the senior mine management 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 health and safety committee who will provide verbal and written reports on the schedule detailed in Section 1.7.

All emergency incidents will be reviewed by site management and the 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, Department of Sustainable Development 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 and LZ 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
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

TABLE 2.1			
HAZARDOUS SUBSTANCES INVENTORY - JERICHO MINE SITE			
Substance	Estimates of On Hand Quantities	Risk of Spill	Comments
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 - Percol E-10, 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
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
Magnafrac™	Powder; explosive; fumes toxic resulting from oxidation of lung tissue; fire extinguishing by flooding with water
Acetic Acid	Colourless liquid; pungent, makes eyes water; flash point 40°C; completely miscible in

TABLE 2.2
PHYSICOCHEMICAL PROPERTIES OF MAJOR HAZARDOUS SUBSTANCES
TO BE USED AT THE JERICHO MINE

Substance	Properties
	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 waqter.
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
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 construction.

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 extinguishers, fire alarms, hose station, dry or CO ₂ extinguisher (kitchen)
Plant	Fire extinguishers, fire alarms, hydrant/hose station
Power House	Dry or CO ₂ extinguisher system, fire extinguishers
Truck Shop	Fire extinguishers, Fire hose station

TABLE 2.3
POSSIBLE FIRE LOCATIONS AT JERICHO

Location	Precautions
Fuel Farm	Fire extinguishers, fire hose connected to water supply, monitor, foam system
Explosives Storage	Fire extinguishers
Vehicles	Fire extinguishers
Exploration Camp	Fire extinguishers
Sewage Treatment Plant	Fire extinguishers
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 basis to check personnel preparedness. Locations of fire alarms and evacuation routes (if not obvious, e.g. only one door) will be posted in the accommodations facility and 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 and on the tailings line thickener underflow. Plant personnel will be trained and a certified nuclear safety officer (NSO) will be designated prior to operation.

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;
- 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. Until the Jericho Mine has operated for some time (minimum of one year) the site-specific risk from accidents cannot be determined. However, an approximation can be obtained from mining industry lost-time injury records. Statistics for Alberta for the mid 90s indicate the following:

- lost time accidents: 1.6% of the mine workforce;
- fatal accidents: 150 per million workers.

Medical evacuations will be accomplished by means of fixed wing medivac to Yellowknife. Trained personnel 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 8.0 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 will 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 DIAND 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 regularly by Tahera site personnel and annually by a qualified geotechnical engineer as part of Water Licence requirements. Any 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.

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 the mine plan. Quantities listed are estimates at this time. 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 or a silled concrete containment area. 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 and covered at the storage site on the gravel pad or on pallets in a bermed area or within a covered storage building. Spills (from torn bags) will be cleaned up immediately and reported to the mine contractor Operating Supervisor. Cleaned up ammonium nitrate will be rebagged. If not salvageable for explosives use, the ammonium nitrate will be used as fertilizer for the reclamation program.

Caps and stick powder (likely Magnafrac™) 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.

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). Table 2.4 lists the results of this analysis (see the MIAC reference for the basis of the categories chosen).

TABLE 2.4 RISK ANALYSIS WORKSHEET						
Risk	Frequency	Consequences			Result (F x C)	
		Pers	Env	Fac		
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	
Power House	C	b	d	b	Cb	
Truck Shop	C	c	d	c	Cc	
Fuel Farm	C	a	b	b	Ca	

TABLE 2.4 RISK ANALYSIS WORKSHEET						
Risk	Frequency	Consequences			Result (F x C)	
		Pers	Env	Fac		
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						
Likely						
Possible						
Unlikely						
Category (personnel, environment, facility)						
Catastrophic						
Critical						
Marginal						
Negligible						

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

TABLE 2.5
SPILL REPORTING QUANTITIES

Substance	TDGA Class	Reportable Amount
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 construction. 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.

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
JERICO MINE SITE EMERGENCY RESPONSE ORGANIZATION

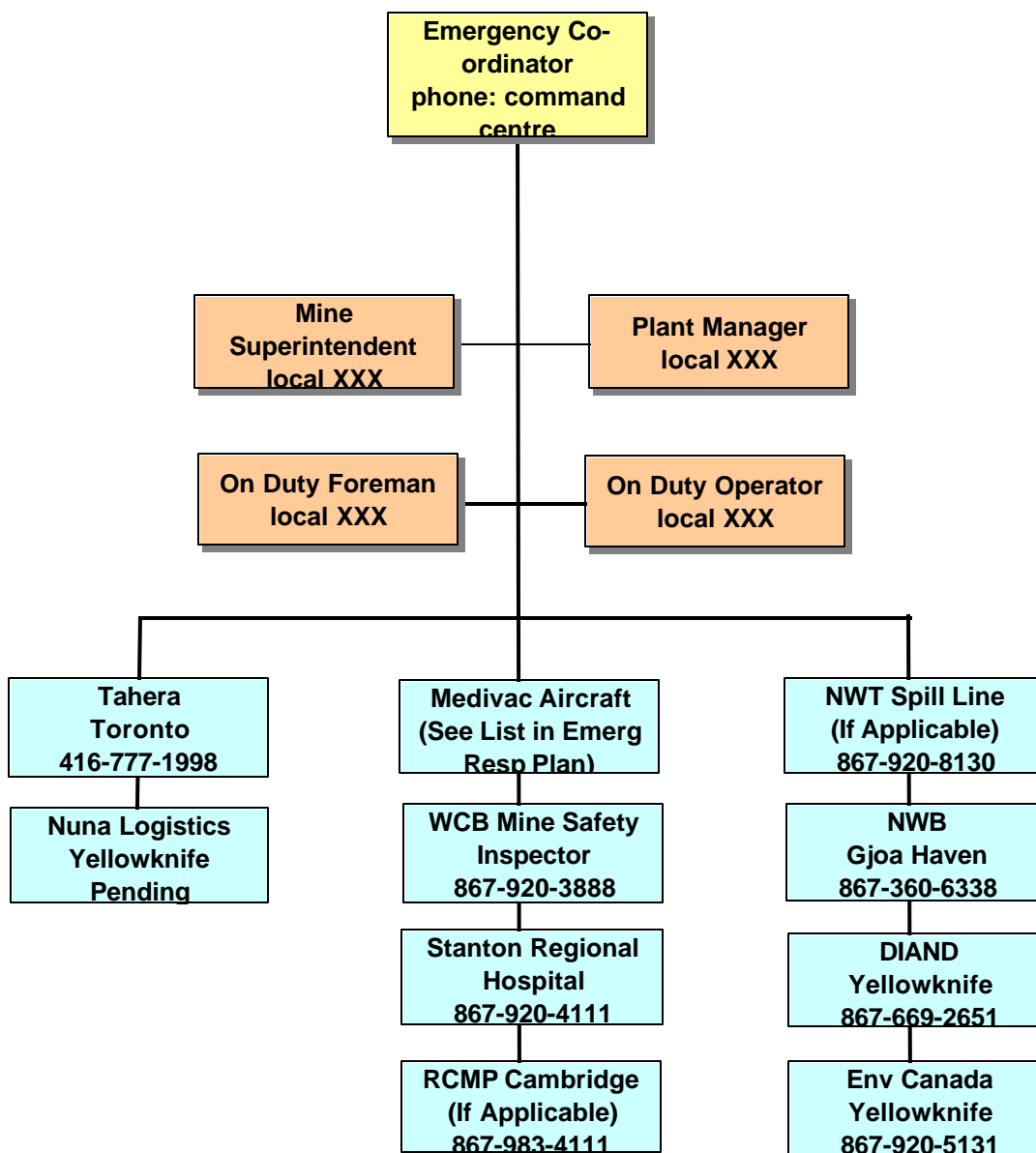


Table 3.1: Emergency Assessment

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 involved Fish 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.

4.2 EMERGENCY RESPONSE

Emergency response contact telephone numbers are listed in Section 8.0 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 manager or mine superintendent, external communications providing information on Jericho Mine emergencies will be handled by the plant manager or mine superintendent exclusively.

4.4 PERSONAL PROTECTION EQUIPMENT

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 construction. Conceptually, the equipment could include that listed in Table 4.2.

TABLE 4.2 JERICHO MINE SITE PERSONAL PROTECTIVE EQUIPMENT INVENTORY			
Equipment	Mine Site	Plant	Accommodation
slickers/coveralls	X	X	
goggles	X	X	
gloves	X	X	
respirators	X	X	X
self-contained breathing apparatus	X	X	
first aid kit	X	X	X
fire extinguisher	X	X	X

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.

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.

¹ use of chemical dispersants along shorelines requires government permission.

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

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 occur 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

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 (RTL Trucking Spill Plan, Appendix 5.1). 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. Repackaged ammonium nitrate will be placed inside the ammonium nitrate storage area. Explosives handlers will decide whether the ammonium nitrate is useable for manufacturer of ANFO. If not, the ammonium nitrate will be used as fertilizer, or backhauled on the winter resupply for disposal. Further information is provided in the Ammonium Nitrate and Explosives Management Plan.

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.

4.9 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 UTILITIES

During an emergency it may be necessary to shut down services. The plant manager and mine superintendent 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 conceptual building inspection form for monthly (or more frequent) inspections is provided in Schedule 2. 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 contractor Operating Supervisor 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 SAFE DISTANCES AND PLACES OF REFUGE

5.1 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 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 5.1 provide minimum safe distances.

TABLE 5.1 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
Weather Emergency			Not applicable
Dam Break			Evacuate any area downslope of the affected dam

5.2 REFUGES

Refuges will be established after detailed engineering (including development of detailed site arrangement plans) and prior to construction. 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 should fire or other disaster make the accommodation complex temporarily unusable.

6.0 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 manager 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 5.0). 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.

7.0 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 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 Health and Safety Committee and/or the mine superintendent or plant manager. 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 Coordinator will establish headquarters at the exploration camp and direct emergency operations from that location, if appropriate. Mine contractor and 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 manager and mine superintendent, or their designate, and would require aircraft support from Yellowknife or Cambridge Bay where air charter companies are headquartered. Mine contractor and 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.

8.0 REPORTING PROCEDURE

8.1 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 contractor Operating Supervisor 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):

Stanton Regional Hospital	920-4111
Yellowknife RCMP	669-1111
Cambridge Bay RCMP	983-2111
GNWT Pollution Control Division, Yellowknife	873-7654
Department of Indian Affairs and Northern Development, Yellowknife	669-2500
DIAND, Water Resource Division, Yellowknife	669-2651
Environment Canada, Environmental Protection Branch, Yellowknife	920-5131
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

8.2 OTHER 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

8.3 SPILL REPORT

1. An NWT Spill Report Form will be completed. A copy of the form is shown in Figure 8.1.
2. A copy of the NWT 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 8.1



N.W.T. SPILL REPORT

(Oil, Gas, Hazardous Chemicals or other Materials)

ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ (ᑭᓄᓐᑎᑦᑎᑦ, ᑭᓄᓐᑎᑦᑎᑦ, ᑭᓄᓐᑎᑦᑎᑦ)

24-Hour Report Line
24-ᓄᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ

Phone/ᑭᓄᓐᑎᑦᑎᑦ (403) 920-8130

Fax/ᑭᓄᓐᑎᑦᑎᑦ (403) 873-6924

A Report date and time ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ		B Date and time of spill (if known) ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ		C <input type="checkbox"/> Original report ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ <input type="checkbox"/> Update no. _____ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ		Spill number ᑭᓄᓐᑎᑦᑎᑦ	
D Location and map coordinates (if known) and direction (if moving) ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ							
E Party responsible for spill ᑭᓄᓐᑎᑦᑎᑦ							
F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible) ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ							
G Cause of spill ᑭᓄᓐᑎᑦᑎᑦ							
H Is spill terminated? ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ <input type="checkbox"/> yes/ᑭᓄᓐᑎᑦᑎᑦ <input type="checkbox"/> no/ᑭᓄᓐᑎᑦᑎᑦ		I If spill is continuing, give estimated rate ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ		J Is further spillage possible? ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ <input type="checkbox"/> yes/ᑭᓄᓐᑎᑦᑎᑦ <input type="checkbox"/> no/ᑭᓄᓐᑎᑦᑎᑦ		K Extent of contaminated area (in square metres if possible) ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ	
L Factors affecting spill or recovery (weather conditions, terrain, snow cover, etc.) ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ				M Containment (natural depression, dykes, etc.) ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ			
N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ							
O Do you require assistance? ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ <input type="checkbox"/> no ᑭᓄᓐᑎᑦᑎᑦ <input type="checkbox"/> yes, describe: ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ				P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ			
Q Comments and/or recommendations ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ						FOR SPILL LINE USE ONLY ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ	
						Lead Agency ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ	
						Spill significance ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ	
						Lead Agency contact and time ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ	
						Is this file now closed? ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ	
Reported by ᑭᓄᓐᑎᑦᑎᑦ		Position, Employer, Location ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ				Telephone ᑭᓄᓐᑎᑦᑎᑦ	
Reported to ᑭᓄᓐᑎᑦᑎᑦ		Position, Employer, Location ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ ᑭᓄᓐᑎᑦᑎᑦ				Telephone ᑭᓄᓐᑎᑦᑎᑦ	

NWT 1752/0593

9.0 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 appropriate fire fighting systems (wet or dry). The mine camp will meet current fire protection regulations including required sensors, fire water systems, and separation halls and doors.

9.1 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 8.0. A finalized site arrangement together with specific locations of fire extinguishers, spill kits and other emergency response equipment will be attached to the plan prior to mine construction.

Hazardous substances will be stored in the locations listed in Table 9.1 (refer to Drawing 1CT004.06-G12); on-hand quantities are listed in Table 2.1:

TABLE 9.1: 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	West Dam road	Ammonium nitrate, sodium nitrite, emulsions
Caps magazine	Explosives road	Blasting caps
Powder magazine	Explosives road	Stick powder
Explosives truck wash	West Dam 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

9.2 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.

10.0 RESOURCE INVENTORY

10.1 EMERGENCY EQUIPMENT LOCATIONS

Tahera's spill response resource inventory is listed in Table 10.1. 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 10.1 JERICO 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	X
Sorbent booms	
Sorbent pillows	X
Sorbent material	X
Portable oil skimmer	
Portable pumps and hoses	X
Shop vac	X
Used oil cubes (1600 litre capacity)	X
Ice auger	X
Tiger torch	X
Chain saw	X
Hand tools (shovels, rakes)	X

10.2 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.

11.0 CONTAMINANT AND DEBRIS DISPOSAL

11.1 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 adjacent to the landfill. The area will be fenced and signed and will be on impermeable ground. Any runoff from the site will be directed to the waste rock dump sedimentation pond. 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.

11.2 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.

11.3 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. A report to NWB, DIAND and DSD will be filed.

11.4 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 polishing pond. If of sufficient volume water from the polishing pond and possibly the west pond 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 polishing pond, given the basin nature of the PKCA. If slimes overtopped the polishing pond dam they would travel some distance down Stream C3 toward Lake C3, but are unlikely to escape in sufficient volume to reach the Lake. 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.

12.0 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 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 construction.

13.0 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 (as appropriate).

14.0 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.

REFERENCES

- Baecher, G.B. 1998. Geotechnical Reliability. Geoinstitute of the American Society of Civil Engineers.
- Canadian Council of Ministers of the Environment (CCME). 2003. Canadian Soil Quality Guidelines.
- National Institute for Occupational Safety and Health. 1995. NIOSH Pocket Guide to Chemical Hazards.
- Manitoba Industrial Accidents Council (MIAC). 1996. Industrial Emergency Response Planning Guide.
- SRK. 2001. Risk Assessment for Mine Waste Disposal. www.srk.co.uk

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 aiseways 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.	

APPENDICES

APPENDIX 2.1

MSDS

NOTE: list of hazardous substances

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

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Fire and Explosion Hazard Data

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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

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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.

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Health Hazard Data

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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 MEDICAL ATTENTION. 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 MEDICAL ATTENTION. SKIN-WASH WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHES & FOOTWEAR. 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

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 combustible 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 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993		

International Chemical Safety Cards

AMMONIUM NITRATE

ICSC: 0216

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: ODOURLESS, HYGROSCOPIC, COLOURLESS TO WHITE SOLID IN VARIOUS FORMS.		ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol.	
	PHYSICAL DANGERS:		INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.	
	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.		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.	
	OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV not established.		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

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IMPORTANT LEGAL NOTICE:

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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

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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: 10001070I

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

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Physical/Chemical Characteristics

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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

=====

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)

MATERIAL SAFETY DATA SHEET

For Emergency Assistance
Involving Chemicals Call CHEMTREC
(800) 424-9300

WHMIS (Classification)
WHMIS CLASS C: Oxidizing material.
WHMIS CLASS D-1B: Material causing
immediate and serious toxic effects
(TOXIC).
WHMIS CLASS D-2B: Material causing
other toxic effects (TOXIC).

Section I. Chemical Product Identification

Distributed by:
Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC
V6X 1W5

Product Name	Sodium Nitrite FCC	Code	LA3167
		CAS#	007632000
Synonym	Nitrous acid, Sodium salt.	DSL	On the DSL list.
Chemical Name	Sodium Nitrite	CI#	Not available.
Chemical Family	Not available.		
Chemical Formula	NNAO2		
Material Uses	Not available.		

Section II. Composition and Information on Ingredients

Name	CAS #	% by Weight	LC50/LD50
Sodium Nitrite FCC	007632000	>95	ORAL (LD50): Acute: 175 mg/kg [Mouse]. 180 mg/kg [Rat]. 186 mg/kg [Rabbit].

Section III. Hazards Identification

Potential Acute Health Effects Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Prolonged exposure may result in skin burns and ulcerations. Over-exposure by inhalation may cause respiratory irritation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

Potential CARCINOGENIC EFFECTS: Not available.
Chronic Health MUTAGENIC EFFECTS: Not available.
Effects TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
Repeated exposure to an highly toxic material may produce
general deterioration of health by an accumulation in one
or many human organs.

****Section IV. First Aid Measures****

Eye Contact Check for and remove any contact lenses. IMMEDIATELY flush
eyes with running water for at least 15 minutes, keeping
eyelids open. COLD water may be used. DO NOT use an eye
ointment. Seek medical attention.

Skin Contact After contact with skin, wash immediately with plenty of
water. Gently and thoroughly wash the contaminated skin
with running water and non-abrasive soap. Be particularly
careful to clean folds, crevices, creases and groin. COLD
water may be used. Cover the irritated skin with an
emollient. If irritation persists, seek medical attention.
Wash contaminated clothing before reusing.

Hazardous Skin Wash with a disinfectant soap and cover the contaminated
Contact skin with an anti-bacterial cream. Seek immediate medical
attention.

Inhalation Allow the victim to rest in a well-ventilated area. Seek
immediate medical attention.

Hazardous Evacuate the victim to a safe area as soon as possible.
Inhalation Loosen tight clothing such as a collar, tie, belt or
waistband. If breathing is difficult, administer oxygen.
If the victim is not breathing, perform mouth-to-mouth
resuscitation. WARNING: It may be hazardous to the person
providing aid to give mouth-to-mouth resuscitation when the
inhaled material is toxic, infectious or corrosive. Seek
immediate medical attention.

Ingestion Have conscious person drink several glasses of water or
milk. INDUCE VOMITING by sticking finger in throat.
Examine the lips and mouth to ascertain whether the tissues
are damaged, a possible indication that the toxic material
was ingested; the absence of such signs, however, is not
conclusive. Loosen tight clothing such as a collar, tie,
belt or waistband. If the victim is not breathing, perform
mouth-to-mouth resuscitation. Seek immediate medical
attention.

Hazardous No additional information.
Ingestion

****Section V. Fire and Explosion Data****

The Product is: May be combustible at high temperature.

Auto-Ignition 538°C (1000.4°F)
Temperature

Flash Points Not available.

Flammable Limits Not available.

Products of Combustion Not available.

Fire Hazards in Presence of Various Substances No specific information is available in our database regarding the flammability of this product in presence of various materials.

Explosion Hazards in Presence of Various Substances Risks of explosion of the product in presence of static discharge: Not available.
Explosive in presence of shocks.
Slightly explosive to explosive in presence of heat.

Fire Fighting Media and Instructions Oxidizing material.
DO NOT use water jet. Use flooding quantities of water.
Avoid contact with organic materials.

Special Remarks on Fire Hazards No additional remark.

Special Remarks on Explosion Hazards Reported to explode when heated over 537 C. As oxidizing oxidizing agent, it will accelerate the combustion of organic or other combustible material.

Section VI. Accidental Release Measures

Small Spill Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill Oxidizing material.
Stop leak if without risk. Avoid contact with a combustible material (wood, paper, oil, clothing...). Keep substance damp using water spray. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all sources of ignition. Call for assistance on disposal.

Section VII. Handling and Storage

Precautions Keep locked up. Keep away from heat. Keep away from sources of ignition. Keep away from combustible materials. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. DO NOT ingest. DO NOT breathe dust. Take precautionary measures against electrostatic discharges. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as reducing agents, acids.

Storage Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool and well-ventilated area. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section VIII. Exposure Controls/Personal Protection

Engineering Use process enclosures, local exhaust ventilation, or other

Controls	engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Personal Protection	Splash goggles. Lab coat. Dust respirator. Be sure to use a MSHA/NIOSH approved respirator or equivalent. Gloves.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
Exposure Limits	Not available.

****Section IX. Physical and Chemical Properties****

Physical State and Appearance	Solid.	Odor	Odorless.
		Taste	Not available.
Molecular Weight	69 g/mole		
pH (1% soln/water)	9 [Basic.]	Color	White to yellowish.
Boiling Point	320°C (608°F)		
Melting Point	271°C (519.8°F)		
Critical Temperature	Not available.		
Specific Gravity	2.17 (Water = 1)		
Vapor Pressure	0 mm of Hg (@ 20°C)		
Vapor Density	Not available.		
Volatility	Not available.		
Odor Threshold	Not available.		
Evaporation rate	Not available.		
Viscosity	Not available.		
Water/Oil Dist. Coeff.	Not available.		
Ionicity (in Water)	Not available.		
Dispersion Properties	See solubility in water, methanol.		
Solubility	Soluble in cold water. Partially soluble in methanol. Very slightly soluble in diethyl ether.		

****Section X. Stability and Reactivity Data****

Stability	The product is stable.
Instability Temperature	Not available.
Conditions of Instability	Temperatures above 320 C cause decomposition. Prolonged exposure to air will slowly oxidize the nitrite to nitrate. Avoid particulary cyanides, thiocyanates and thiosulfates cause hazardous reactions. Also certain combustibles and orgaics.
Incompatibility with various substances	Reactive with reducing agents, acids.
Corrosivity	No specific information is available in our database regarding the corrosivity of this product in presence of various materials.
Special Remarks on Reactivity	Hazardous Decomposition Products: Oxides of nitrogen which are toxic as well as oxidizers. The residue is caustic.
Special Remarks on Corrosivity	No additional remark.
Hazardous Polymerization	No.

****Section XI. Toxicological Information****

Routes of Entry	Eye contact. Inhalation. Ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): 175 mg/kg [Mouse].
Chronic Effects on Humans	CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.
Other Toxic Effects on Humans	Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant), of inhalation. Prolonged exposure may result in skin burns and ulcerations. Over-exposure by inhalation may cause respiratory irritation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.
Special Remarks on Toxicity to Animals	No additional remark.
Special Remarks on Chronic Effects on Humans	Passes through the placental barrier in animal.
Special Remarks	No additional remark.

on
Other Toxic
Effects on Humans

****Section XII. Ecological Information****

Ecotoxicity Not available.

BOD5 and COD Not available.

Products of Possibly hazardous short term degradation products are not
Biodegradation likely. However, long term degradation products may arise.

Toxicity of the The products of degradation are less toxic than the
Products product itself.
of
Biodegradation

Special Remarks No additional remark.
on the Products
of
Biodegradation

****Section XIII. Disposal Considerations****

Waste Disposal Recycle to process, if possible. Consult your local or
regional authorities.

****Section XIV. Transport Information****

TDG TDG CLASS 5.1: Oxidizing substance.
Classification TDG CLASS 6.1: Toxic.

Shipping name Sodium Nitrite

PIN UN1500

Packing Group III

Special No additional remark.
Provisions for
Transport

****Section XV. Other Regulatory Information****

Other Regulations OSHA: Hazardous by definition of Hazard Communication
Standard (29 CFR 1910.1200).

****Section XVI. Other Information****

References Not available.

Other Special No additional remark.
Considerations

Validated on March 8 2002

Tel. number for non-emergency questions concerning MSDS: 1-866-686-4827

Notice to Reader

To the best of our knowledge, the information contained herein is accurate.

However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Univar Canada Ltd. expressly disclaims all expressed or implied warranties of merchantability and fitness for a particular purpose with respect to the product provided.**

===== END OF MSDS =====



Product Fact Sheet

Magnafrac™

Magnafrac* packaged, detonator-sensitive emulsion explosive, is an ideal underground product for cartridge loading in narrow-vein mining or in areas where bulk explosives loading is not economical. **Magnafrac** gives high shock energy for rock breaking and minimum throw for less mixing of ore grades. It is a good primer in small-diameter holes pneumatically loaded with **Amex*** blasting agent.

Features

Packaged Magnafrac emulsion explosive is:

- An emulsion formulation - highly efficient explosive reaction;
- Sticky - ideal for cartridge loading applications;
- Specifically formulated for underground use;
- Packaged in easy to tamp plastic film for excellent borehole coupling;
- A high shock energy explosive;
- Made to tight diameter control specifications;
- Highly water resistant - minimal leaching;
- Free of nitroglycerin - no headaches.

Benefits

Magnafrac emulsion explosive in film cartridges:

- Reduces potential for sulphide dust ignitions;
- Loads with up to 95% compaction in up-holes up to 115 mm (4½ in) diameter with minimum fall out;
- Reduces post-blast fumes and improves turnaround time;
- Has the potential to expand drill pattern;
- Gives excellent fragmentation with minimum throw; good priming for **Amex** in small-diameter pneumatically loaded holes;
- Maximizes cartridge loader performance;
- Reduces environmental concerns;
- Improves labor efficiency.



ALWAYS

Lock up explosive materials and keep them from children

Magnafrac

Film Packaged, Detonator-Sensitive Emulsion Explosive

Properties

Magnafrac	32 x 400 mm (1¼ x 16 in)	
Cartridge Density (g/cc)	1.11	
Velocity of Detonation [†]	5 000 m/s (16,400 ft/s)	
Water Resistance	Excellent	
Relative Effective Energy (REE) [§]	Relative Weight Strength (RWS)	91
	Relative Bulk Strength (RBS)	120
Fume Class	1	

[†] unconfined at 5°C (41°F)

[§] The "Relative Effective Energy" (REE) of an explosive is the energy calculated to be available to do effective blasting work. All energy values are calculated using the **IDeX*** computer code owned by Orica for the exclusive use of its companies. Energy values are based on standard ANFO with a density of 0.84 g/cc and a cut-off pressure of 100 MPa. Other computer codes may give different values.

Priming

When the internal temperature is higher than -15°C (5°F), initiate with a high-strength detonator. At temperatures below -15°C (5°F), a Stinger booster or a **Pentex*** booster are recommended.

Note: Detonating cord may adversely affect the performance of **Magnafrac** and could result in misfires. Consult an Orica representative before attempting to use with detonating cord.

Shelf Life

One year from time of manufacture.

Packaging

Magnafrac packed in PMP plastic is tampable, offers good coupling in the borehole and is ideal for cartridge loading.

Standard Sizes

Size		Cartridge Count [^]	Packaging
25 x 300 mm	(1 x 12 in)	156-166	PMP
25 x 400 mm	(1 x 16 in)	118-124	PMP
32 x 400 mm	(1¼ x 16 in)	77-82	PMP
90 x 200 mm	(3 ½ x 8 in)	18	Valeron

Other sizes may be available by special arrangement.

[^] 25 kg (55 lb) case

Storage

Detonator-sensitive **Magnafrac** is best stored at temperatures above -15°C (5°F). This is especially important in cold weather "load-and-shoot" worksites where there is insufficient in-hole warm-up time.

Before it can be used with a pneumatic cartridge-loading machine, the internal temperature of detonator-sensitive **Magnafrac** should be 0°C (32°F) or higher.

Avoid sudden and extreme changes in temperature.

Hazardous Materials Shipping Description

Explosive, Blasting, Type E,
Class and Division 1.1D,
UN 0241, PG II

EX 9808193 (50mm and below)

EX 9808195 (greater than 50mm)

Orica Canada Inc.

90 Sheppard Ave East
North York, ON
M2N 6Y1

Tel: 416-229-7000 • Fax 416-229-8438

* Trademarks of companies within Orica World Group

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EXPLOSIVES TECHNOLOGIES INTL -- INSTANTANEOUS ELECTRIC BLASTING CAPS

MATERIAL SAFETY DATA SHEET

NSN: 137500N027264

Manufacturer's CAGE: 0E5W7

Part No. Indicator: A

Part Number/Trade Name: INSTANTANEOUS ELECTRIC BLASTING CAPS

=====
General Information=====
Company's Name: EXPLOSIVES TECHNOLOGIES INTL

Company's Street: 501 CARR RD ROCKWOOD OFFICE PARK BLDG 1

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: 01MAR89

Safety Data Review Date: 27FEB92

MSDS Preparer's Name: TECHNICAL MANAGER

Preparer's Company: SAME

MSDS Serial Number: BNLRR

Hazard Characteristic Code: E1

=====
Ingredients/Identity Information=====
Proprietary: NO

Ingredient: PENTAERYTHRITOL, TETRANITRATE

Ingredient Sequence Number: 01

NIOSH (RTECS) Number: RZ2620000

CAS Number: 78-11-5

OSHA PEL: NOT APPLICABLE

ACGIH TLV: NOT APPLICABLE

Proprietary: NO

Ingredient: LEAD AZIDE

Ingredient Sequence Number: 02

NIOSH (RTECS) Number: OF8650000

CAS Number: 13424-46-9

OSHA PEL: 0.05 MG/M3 AS PB

ACGIH TLV: 0.15 MG/M3 AS PB

Proprietary: NO

Ingredient: ALUMINUM

Ingredient Sequence Number: 03

NIOSH (RTECS) Number: BD0330000

CAS Number: 7429-90-5

OSHA PEL: 15MG/M3 TDUST,5 FUME

ACGIH TLV: 10MG/M3 DUST, 5 FUME

Proprietary: NO

Ingredient: COMMERCIAL BRONZE

Ingredient Sequence Number: 04

NIOSH (RTECS) Number: 1006318CB

OSHA PEL: NOT APPLICABLE

ACGIH TLV: NOT APPLICABLE

Proprietary: NO

Ingredient: LEAD

Ingredient Sequence Number: 05

NIOSH (RTECS) Number: OF7525000

CAS Number: 7439-92-1

OSHA PEL: 0.05 MG/M3

ACGIH TLV: 0.15MG/M3DUST & FUME

Other Recommended Limit: 50UG/100G BLOOD(MFR)

=====

Physical/Chemical Characteristics

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Appearance And Odor: ALUMINUM OR BRONZE SHELLS WITH ATTACHED INSULATED
COPPER OR IRON LEG WIRES.

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Fire and Explosion Hazard Data

=====

Extinguishing Media: NONE.

Special Fire Fighting Proc: DO NOT FIGHT FIRE. ISOLATE AREA. EVACUATE
PERSONNEL TO A SAFE AREA. GUARD AGAINST INTRUDERS.

Unusual Fire And Expl Hazrds: WILL DETONATE WHEN EXPOSED TO HEAT OR FLAME.

=====

Reactivity Data

=====

Stability: NO

Cond To Avoid (Stability): DETONATES WITH FRICTION, IMPACT, HEAT, LOW
LEVEL ELECTRICAL CURRENT, ELECTROSTATIC OR RF ENERGY.

Materials To Avoid: INCOMPATIBLE WITH ACIDS, ALKALIES.

Hazardous Decomp Products: PRODUCES SHRAPNEL ON DETONATING. HAZ GASES
PRODUCED MAY INCLUDE LEAD FUMES, SILICA, CARBON MONOXIDE & NITROGEN OXIDES.

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: ETI DELAY ELECTRIC BLASTING CAPS & THEIR COMPONENTS DO NOT PRESENT HLTH HAZ IN NORMAL HANDLING & USE. HOWEVER, THEY ARE CLASS A/CLASS C EXPLOSIVES & DETONATION MAY CAUSE SEV PHYSICAL INJURY, INCLUDING DEATH. OVEREXP TO LEAD MAY CAUSE ADVERSE EFTS TO BLOOD-FORMING, NERVOUS, URINARY, REPRODUCTIVE SYS, (EFTS OF OVEREXP)

Carcinogenicity - NTP: NO

Carcinogenicity - IARC: YES

Carcinogenicity - OSHA: NO

Explanation Carcinogenicity: LEAD AND LEAD CPDS (INORGANIC): GROUP 2B (IARC)

Signs/Symptoms Of Overexp: HLTH HAZ:INCLUDING EMBROYOTOXIC EFTS. SYMPS MAY INCLUDE LOSS OF APPETITE, ANEMIA, DISTURBANCE OF SLEEP & FATIGUE. FOR ADDITIONAL INFO, SEE OSHA STANDARD 29 CFR, 1910.1025. NITROGEN OXIDES GENERATED DURING USE ARE SKIN, EYE & RESP SYS IRRITANTS. SYSTEMIC TOX RESULTING FROM OXIDATION OF LUNG TISS INCLUDES (SUPP DATA)

Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.

Emergency/First Aid Proc: INHAL/SKIN/EYE/INGEST:NOT A LIKELY ROUTE OF IF DETONATION FUMES ARE INHALED, REMOVE TO FRESH AIR. IF NOT BRTHG, GIVE IMMED FLUSH W/POTABLE WATER FOR AT LEAST 15 MIN, SEEK ASSIST FROM MD (FP N) . SKIN:FLUSH W/COPIOUS AMTS OF WATER. CALL MD (SUPP DATA)

=====

Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: REVIEW FIRE & EXPLO HAZ & SAFETY PRECS. USE APPROP PERS EQUIP. CONTROL ACCESS TO AREA & REMOVE SOURCES OF FRICTION/IMPACT/HEAT/LOW LEVEL ELEC CURRENT/ELECTROSTATIC/RF ENERGY. REFER TO MFR'S "ALWAYS" AND NEVER'S" INSTRUCTIONS & WARNINGS (SUPP DATA)

Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.

Waste Disposal Method: CONSULT AN EXPLOSIVES MFR FOR RECOMMENDED METHODS OF DESTROYING EXPLOSIVE MATERIALS. COMPLY WITH APPLICABLE FEDERAL, STATE & LOCAL REGULATIONS UNDER THE AUTHORITY OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) 40 CFR PARTS 269-271.

Precautions-Handling/Storing: STORE IN COOL, WELL VENTILATED AREA. DO NOT STORE WITH OTHER EXPLOSIVES. STORE I/A/W NFPA & W/FEDERAL REGULATIONS.

Other Precautions: STORE IN AN APPROVED TYPE MAGAZINE. AVOID BREATHING FUMES FROM DETONATION. REFER TO MFR'S "ALWAY'S & NEVER'S" INSTRUCTIONS AND WARNINGS SUPPLIED WITH EACH PRODUCT SHIPMENT.

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Control Measures

=====

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

Ventilation: NONE SPECIFIED BY MANUFACTURER.

Protective Gloves: IMPERVIOUS GLOVES (FP N).

Eye Protection: CHEMICAL WORKERS GOGGLES (FP N).

Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.

Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.

Suppl. Safety & Health Data: HLTH HAZ:EMPHYSEMA, BRONCHITIS & BRONCHOPNEUMONIA. ACUTE EXPOS CAN LEAD TO DEATH FROM ASPHYXIA/PULM EDEMA. IN ANIMALS, NITROGEN OXIDES CAUSED METHEMOGLOBINEMIA, WERE NOT CARCIN, BUT SHOWED EMBRYOTOXIC ACTIVITY & REPRO EFTS. SPILL PROC:SUPPLIED W/EACH PROD SHIPMENT. FIRST AID PROD:(FP N). INGEST:CALL MD IMMED (FP N).

=====

Transportation Data

=====

Trans Data Review Date: 92223

DOT PSN Code: EGT

DOT Proper Shipping Name: DETONATORS, ELECTRIC

DOT Class: 1.1B

DOT ID Number: UN0030

DOT Pack Group: II

DOT Label: EXPLOSIVE 1.1B

IMO PSN Code: FBH

IMO Proper Shipping Name: DETONATORS,ELECTRIC

IMO Regulations Page Number: 1257

IMO UN Number: 0030

IMO UN Class: 1.1 B

IMO Subsidiary Risk Label: -

IATA PSN Code: IFG

IATA UN ID Number: 0030

IATA UN Class: 1.1B

AFI PSN Code: IFG

AFI Symbols: T

AFI Prop. Shipping Name: DETONATORS, ELECTRIC

AFI Class: 1.1B

AFI ID Number: UN0030

AFI Pack Group: II

AFI Basic Pac Ref: 5-45

=====

Disposal Data

=====

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Label Data

=====

Label Required: YES

Technical Review Date: 27FEB92

Label Status: G

Common Name: INSTANTANEOUS ELECTRIC BLASTING CAPS

Chronic Hazard: YES

Signal Word: DANGER!

Acute Health Hazard-Moderate: X

Contact Hazard-Slight: X

Fire Hazard-None: X

Reactivity Hazard-Severe: X

Special Hazard Precautions: DOT CLASS A/C EXPLOSIVE! AVOID FRICTION, IMPACT, HEAT, LOW LEVEL ELEC CURRENT, ELECTROSTATIC/RF ENERGY. ACUTE: DETONATION MAY CAUSE SEV PHYSICAL INJURY INCLUDING DEATH. INHAL OF DETONATION FUMES MAY CAUSE SYSTEMIC TOX FROM OXIDATION OF LUNG TISS INCLUDING EMPHYSEMA, BRONCH & BRONCHOPNEUMONIA. ACUTE EXPOS MAY LEAD TO DEATH FROM ASPHYXIA/PULM EDEMA. NITROGEN OXIDES MAY IRRIT SKIN, EYES & RESP SYS. OVEREXP TO LEAD MAY CAUSE LOSS OF APPETITE, ANEMIA, SLEEP DISTURBANCE, FATG, & ADVERSE EFTS TO BLOOD-FORMING, NERV, URINARY, AND REPRO SYS. CHRONIC: CANCER HAZ. LEAD & LEAD COMPOUNDS, ARE LISTED CARCINOGENS. LEAD APPEARS ON NAVY REPRO HAZ LIST (FP N).

Protect Eye: Y

Protect Skin: Y

Protect Respiratory: Y

Label Name: EXPLOSIVES TECHNOLOGIES INTL

Label Street: 501 CARR RD ROCKWOOD OFFICE PARK BLDG 1

Label City: WILMINGTON

Label State: DE

Label Zip Code: 19809

Label Country: US

Label Emergency Number: 800-424-9300 (CHEMTREC)



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.

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.

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.

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.

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.

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.

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.

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.

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.

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:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

ETHYLENE GLYCOL

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

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 02/03/2000

Reviewed on 01/13/2000

• 1 Identification of substance:

○ Product details:

○ Trade name: Acetic acid-d4, glacial

○ Stock number: 36469

○ 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#)

Acetic acid-d4 (CAS# 1186-52-3), 100%

○ Identification number(s):

○ EINECS Number: 2146934

○ EU Number: 607-002-00-6

• 3 Hazards identification

○ Hazard description: C Corrosive

○ Information pertaining to particular dangers for man and
environment

R 10 Flammable.

R 35 Causes severe burns.

• 4 First aid measures

○ General information

Immediately remove any clothing soiled by the product.

- **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** Seek immediate medical advice.

- **5 Fire fighting measures**

- **Suitable extinguishing agents**

Carbon dioxide

Fire-extinguishing powder

Foam

- **Special hazards caused by the material, its products of combustion or**

resulting gases:

In case of fire, the following can be released:

Carbon monoxide (CO)

- **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

Keep away from ignition sources

- **Measures for environmental protection:**

Do not allow material to be released to the environment without proper governmental permits.

- **Measures for cleaning/collecting:**

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Use neutralizing agent.

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

Keep away from ignition sources.

- **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.
 - Prevent formation of aerosols.
- **Information about protection against explosions and fires:**
 - Keep ignition sources away.
 - Protect against electrostatic charges.
 - Fumes can combine with air to form an explosive mixture.
- **Storage**
- **Requirements to be met by storerooms and receptacles:**
 - No special requirements.
- **Information about storage in one common storage facility:**
 - Do not store together with oxidizing and acidic materials.
 - Do not store together with alkalies (caustic solutions).
- **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:

Acetic acid	
	ppm
ACGIH TLV	15-Ceiling
Belgium TWA	15-STEL
France TWA	10-STEL
Germany TWA	10
Netherlands TWA	10
Switzerland TWA	10; 20-STEL
United Kingdom TWA	15-STEL
Russia	10-STEL
Denmark	10-STEL
Finland	10-STEL
Hungary	10 mg/m ³ -STEL
Poland TWA	5 mg/m ³
Sweden	10-STEL
USA PEL	10-Ceiling

- **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.
 Avoid contact with the eyes and skin.
- **Breathing equipment:**
 Use suitable respirator when high concentrations are present.
- **Protection of hands:** Impervious gloves
- **Eye protection:**
 Safety glasses
 Tightly sealed goggles
 Full face protection
- **Body protection:** Protective work clothing.

• **9 Physical and chemical properties:**

- **Form:** Liquid
- **Color:** Colorless
- **Odor:** Pungent, makes eyes water
-

Value/Range	Unit	Method
-------------	------	--------

- **Change in condition**
- **Melting point/Melting range:** 17 ° C
- **Boiling point/Boiling range:** 118 ° C
- **Sublimation temperature / start:** Not determined
- **Flash point:** 40 ° C
- **Ignition temperature:** 426.6 ° C
- **Decomposition temperature:** Not determined
- **Danger of explosion:**
 Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
- **Explosion limits:**
- **Lower:** 5.4 Vol %
- **Upper:** 16.0 Vol %
- **Vapor pressure:** Not determined
- **Density:** at 20 ° C 1.12 g/cm³
- **Solubility in / Miscibility with**

o **Water:**

Fully miscible

• **10 Stability and reactivity**

o **Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

o **Materials to be avoided:**

Acids

Bases

Oxidizing agents

Amines

Alcohols

Metal powders

Water/moisture

o **Dangerous reactions** No dangerous reactions known

o **Dangerous products of decomposition:** Carbon monoxide and carbon dioxide

• **11 Toxicological information**

o **Acute toxicity:**

o **Primary irritant effect:**

o **on the skin:**

Corrosive effect on skin and mucous membranes.

Irritant to skin and mucous membranes.

o **on the eye:**

Strong corrosive effect.

Irritating effect.

o **Sensitization:** No sensitizing effects known.

o **Other information (about experimental toxicology):**

Mutagenic effects have been observed on tests with laboratory animals.

Reproductive effects have been observed on tests with laboratory animals.

o **Subacute to chronic toxicity:**

Acetic acid is corrosive and causes burns, lachrymation and conjunctivitis. It may cause skin ulcers and dermatitis.

Inhalation causes damage to the lining of the nose, throat and lungs. Ingestion may cause severe injury leading to death.

Severity of symptoms is a function of concentration.

o **Additional toxicological information:**

Swallowing will lead to a strong corrosive effect on mouth and throat and to the danger of perforation of esophagus and stomach.

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.

• **12 Ecological information:**

- **General notes:**

Do not allow material to be released to the environment without proper governmental permits.

- **13 Disposal considerations**

- **Product:**

- **Recommendation**

Consult state, local or national regulations for proper disposal.

- **Uncleaned packagings:**

- **Recommendation:**

Disposal must be made according to official regulations.

- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

- **14 Transport information**

- **DOT regulations:**

- **Hazard class:** 8

- **Identification number:** UN2789

- **Packing group:** II

- **Proper shipping name (technical name):**
Acetic acid, glacial

- **Land transport ADR/RID (cross-border)**

- **ADR/RID class:** 8 Corrosive substances

- **Item:** 32b2

- **Danger code (Kemler):** 83

- **UN-Number:** 2789

- **Description of goods:** Acetic acid, glacial

- **Maritime transport IMDG:**

- **IMDG Class:** 8

- **UN Number:** 2789

- **Packaging group:** II

- **Proper shipping name:** Acetic acid, glacial

- **Air transport ICAO-TI and IATA-DGR:**

- **ICAO/IATA Class:** 8

- **UN/ID Number:** 2789

- **Packaging group:** II

- **Proper shipping name:** Acetic acid, glacial

- **15 Regulations**

- **Product related hazard informations:**
- **Hazard symbols:** C Corrosive
- **Risk phrases:**
 - 10 Flammable.
 - 35 Causes severe burns.
- **Safety phrases:**
 - 23 Do not breathe gas/fumes/vapour/spray.
 - 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 - 45 In case of accident or if you feel unwell, seek medical advice immediately.
- **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

GFS CHEMICALS, INC.

P.O. Box 245 Powell, OH 43065
740-881-5501(Tel.) 740-881-5989(Fax)
1-800-424-9300(Chemtrec 24Hr. Info.)

MATERIAL SAFETY DATA SHEET

63

NITRIC ACID**CHEMICAL NAME & SYNONYMS**

Nitric Acid, concentrated nitric acid, aqua fortis

DOT CLASS

8/II

SARA TITLE 313Yes - HNO₃**TSCA listed** - Yes**FORMULA**HNO₃ < 70%H₂O > 30%**REPORTABLE QUANTITY**

454 kg

N/A

F.W.

63.01

18.02

CAS#

7697-37-2

7732-18-5

PHYSICAL DATA

Boiling point 121°C. Specific gravity 1.408. Completely miscible with water. This is a constant-boiling acid (minimum vapor pressure, maximum boiling point).

APPEARANCE & ODOR

Clear, colorless liquid. Pungent odor. May discolor on storage.

REACTIVITY & CONDITIONS TO AVOID

Stable, no spontaneous self-reaction. Incompatible with alcohol, charcoal, most organics and reducing agents.

FIRE HAZARDS

May cause fire or explosion with combustibles, flammables or reducing agents. Avoid breathing smoke or fumes. Firefighters wear SCBA. NFPA # 3-0-3.

EXTINGUISHER

Water.

FLASHPOINT

N/A

LEL

N/A

UEL

N/A

HEALTH HAZARDS

Very corrosive to skin, eyes and mucous membranes. Fumes are choking when inhaled. Ingestion causes burning of mouth and esophagus, will cause irritation shock or death. Continued exposure to vapors will cause bronchitis or pneumonitis. LD_{Lo} (oral-human) 430 mg/kg. OSHA PEL/ACGIH TLV: TWA 2 ppm. ACGIH STEL 4 ppm. Not considered carcinogenic.

SPECIAL PRECAUTIONS

Use only with proper ventilation. Wear goggles or face shield, resistant gloves while handling. Must have eye wash and water supply close.

FIRST AID

Inhalation, remove to fresh air. If breathing is difficult, give oxygen. If breathing stops administer artificial respiration. Get medical attention. Wash contact area well with water. For eyes, wash with water and get medical attention. Internal, give water (do not use soda), do not induce vomiting, give demulcent. Get medical attention.

SPILLS & LEAKS

Wash up immediately with water and soda or lime to neutralize. Provide ventilation for work crew. Do not use sawdust, rags or the like as absorbent. Disposal of neutralized solution to sanitary drain for small spills, large spills to appropriate disposal facility.

CATALOG #

63

PREPARED BY

MDM

DATE

November 7, 2001

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

General Information

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: FERGUSON 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

Ingredients/Identity Information

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. GET MEDICAL ATTENTION. SKIN: REMOVE EXCESS WITH CLOTH OR PAPER. WASH THOROUGHLY 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 ANOTHER 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

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.

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Control Measures
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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.

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Transportation Data
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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

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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)

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

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Physical/Chemical Characteristics

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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

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Fire and Explosion Hazard Data

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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.

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Reactivity Data

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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.

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Health Hazard Data

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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.

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.

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Precautions for Safe Handling and Use

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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.

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Control Measures

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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
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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
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=====
 Label Data
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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



Material Safety Data Sheet

115/145 AVIATION GASOLINE

March 31, 1993

PHONE NUMBERS

PHILLIPS CHEMICAL COMPANY

Emergency: (918) 661-8118

A Division of Phillips Petroleum Company

Technical Services: (918) 661-9091

Bartlesville, Oklahoma 74004

For Additional MSDSs: (918) 661-7297

A. Product Identification

Synonyms: 115/145 AVGAS;
Aviation Check Fuel 115/145;

Aviation Fuel

Chemical Name: Mixture

Chemical Family: Hydrocarbon

Chemical Formula: Mixture

CAS Reg. No.: Mixture

Product No.: MF2100

Product and/or Components Entered on
EPA's TSCA Inventory: YES

This product is in U.S. commerce, and is listed in the Toxic Substances Control Act (TSCA) Inventory of Chemicals; hence, it may be subject to applicable TSCA provisions and restrictions.

B. Components

			CAS
%	OSHA	ACGIH	
	Ingredients		Number
By Wt.	PEL	TLV	
Tetraethyl lead			78-00-2
<4.6 ml/gal	0.075 mg/m ³ *	0.1 mg/m ³ *	
Light alkylate naphtha			64741-66-8
40	NE	NE	
Heavy reformat naphtha			64741-68-0

11	NE	NE	
	may include, Benzene		71-43-2
< 1	10 ppm**	10 ppm	
	Toluene		108-88-3
NE	100 ppm	100 ppm	
	Isooctane		26635-64-3
25	NE	NE	
	C7-C8 Isoparaffins		70024-92-9
11	NE	NE	
	Isopentane		78-78-4
10	NE	NE	
	n-Butane		106-97-8
3	800 ppm	800 ppm	

* As lead, skin notation.

** Areas covered by the Benzene Standard, 29 CFR 1910.1028, will have a 1 ppm 8 hour TWA and 5 ppm STEL.

C. Personal Protection Information

Ventilation: Use adequate ventilation to control exposure below recommended levels.

Respiratory Protection: For concentrations exceeding the recommended exposure

level, use NIOSH/MSHA approved air purifying respirator.

When entry into or exit from concentrations of unknown exposure, use NIOSH/MSHA approved self-contained breathing apparatus (SCBA).

Eye Protection: Use safety glasses with side shields and face shield for splash protection.

Skin Protection: Use gloves resistant to the materials being used (Viton, nitrile, neoprene). Use full-body, long sleeved garments to prevent skin contact.

NOTE: Personal protection information shown in Section C is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

D. Handling and Storage Precautions

Do not get in eyes, on skin or on clothing. Do not breathe vapors, mist, fume or dust. Do not swallow. May be aspirated into lungs. Wear protective equipment and/or garments described in Section C if exposure conditions warrant. Wash thoroughly after handling. Use only with adequate ventilation. Launder contaminated clothing before reuse.

Keep away from heat, sparks, and flames. Store in a well-ventilated area.

Store in tightly closed container. Bond and ground during transfer.

E. Reactivity Data

Stability:

Stable

Conditions to Avoid:

Not Applicable

Incompatibility (Materials to Avoid):

Oxygen and strong oxidizing agents

Hazardous Polymerization:

Will Not Occur

Conditions to Avoid:

Not Applicable

Hazardous Decomposition Products:

Carbon oxides, lead fumes and

various hydrocarbons when burned.

F. Health Hazard Data

Recommended Exposure Limits:

See Section B.

Acute Effects of Overexposure:

Eye: May cause mild irritation, with stinging and redness of the eyes.

Skin: Minimize skin contact. Skin absorption of hazardous material may cause slight to moderate irritation. Repeated or prolonged contact

may cause defatting of the skin, resulting in dermatitis. The dermal

LD50 for aviation gasoline in rabbits is greater than 2 g/kg.

Inhalation: May cause headache, nausea, weakness, sedation, and unconsciousness.

The inhalation LC50 for aviation gasoline in rats is greater than

89.67 mg/liter.

Ingestion: May cause irritation to intestines. If swallowed, may be aspirated

resulting in inflammation and possible fluid accumulation in the lungs. The oral LD50 for aviation gasoline is greater than 5 g/kg.

Subchronic and Chronic Effects of Overexposure:

Unleaded gasoline has produced kidney cancer in male rats only. No comparable kidney disease is known to occur in humans.

Gasolines generally contain benzene which has been designated a carcinogen

by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), and the Occupational Safety and Health Administration (OSHA). Benzene may produce blood changes which include reduced platelets, red blood cells, and white blood cells. Also, aplastic anemia, and acute nonlymphotic leukemia. Benzene has produced fetal death in laboratory animals and caused chromosome changes in humans and mutation changes in cells of other organisms.

Isopentane did not produce kidney damage in a subchronic oral laboratory study or in a subchronic inhalation exposure to 4500 ppm and 1000 ppm of a 50/50 mixture of isobutane and isopentane.

Exposure of pregnant rats during gestation to toluene at levels 250 ppm

and higher produced some maternal toxicity and embryo/fetotoxicity. A lifetime inhalation study in rats did not show any toxic effects even at the high dose of 300 ppm.

Behavioural signs of hearing loss were observed in rats exposed to toluene subchronically at levels of 1000 ppm or more. Comparable effects have not been reported in humans.

Other Health Effects:

Combustion, a normal use of gasoline, results in an exhaust that has been associated with skin cancer in laboratory animals. Skin cancer was observed in these animals when exhaust was concentrated and repeatedly applied to the skin. It is unknown if this route of exposure is relevant to human exposure.

Combustion (burning) of most carbon-containing material forms carbon monoxide. Carbon monoxide inhalation may cause carboxyhemoglobinemia.

Chronic exposure to carbon monoxide causes fatigue, poor memory, loss of sensation in fingers, visual disturbances and insomnia.

Carboxyhemoglobinemia is frequently misdiagnosed as flu.

Sensitive sub-populations to the inhalation of carbon monoxide exist.

Carbon monoxide displaces oxygen in the bloodstream and therefore, can adversely effect people with pre-existing heart disease, pregnant women and smokers.

Fuels containing lead anti-knock compounds should be handled in such a way to minimize contact with the body. Lead can accumulate in the body

with overexposure and cause illness due to effects on the blood, nerves, kidneys and the reproductive system.

A Toxicity Study Summary for Aviation Gasoline is available upon request.

Health Hazard Categories:

	Animal	Human	
Animal	Human		
Known Carcinogen	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Toxic
<input type="checkbox"/> Suspect Carcinogen	<input type="checkbox"/>	<input type="checkbox"/>	
Corrosive		<input type="checkbox"/>	
<input type="checkbox"/> Mutagen	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Irritant		<input type="checkbox"/>	
<input type="checkbox"/> Teratogen	<input type="checkbox"/>	<input type="checkbox"/>	Target
Organ Toxin	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Allergic Sensitizer _____
Specify - Blood Toxin; Reproductive
Highly Toxic _____
Toxin-Embryo/Fetotoxin; _____

Lung-Aspiration Hazard

First Aid and Emergency Procedures:

Eye: Flush eyes with running water for at least fifteen minutes. If irritation or adverse symptoms develop, seek medical attention.

Skin: 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.

Note to Physician: Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. Physical Data

Appearance:

Purple liquid

Odor:

Mild

Boiling Point:

95-338F (35-170C)

Vapor Pressure:

5.5 - 7.0 psia @ 100F (38C)

Vapor Density (Air = 1):

3-4

Solubility in Water:

Negligible

Specific Gravity (H2O = 1):

0.70 - 0.71 @ 60/60F (16/16C)

Percent Volatile by Volume:

100

Evaporation Rate (Butyl Acetate = 1): >
1

Viscosity:

Not Established

H. Fire and Explosion Data

Flash Point (Method Used):

<-35F (-37C) (Estimated)

Flammable Limits (% by Volume in Air):

LEL - 1.5

UEL - 7.6

Fire Extinguishing Media:

Dry chemical, foam or carbon

dioxide (CO2)

Special Fire Fighting Procedures:

Evacuate area of all unnecessary

personnel. Wear appropriate safety equipment for fire conditions including NIOSH/MSHA self-contained breathing apparatus (SCBA). Shut off source, if possible. Water fog or spray may be used to cool exposed containers and equipment. Do not spray water directly on fire - product will float and could be reignited on surface of water.

Fire and Explosion Hazards:
Carbon oxides and various hydrocarbons
formed when burned. Gasolines
containing

Tetraethyl Lead will form lead fumes

when

burning. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along ground away

from handling site. Flashback along vapor trail may occur.

I. Spill, Leak and Disposal Procedures

Precautions Required if Material is Released or Spilled:

Evacuate area of all unnecessary personnel. Wear protective equipment and/or

garments described in Section C if exposure conditions warrant. Shut off source, if possible and contain spill. Protect from ignition. Keep out of

water sources and sewers. Absorb in dry, inert material. Transfer to disposal drums using non-sparking equipment.

Waste Disposal (Insure Conformity with all Applicable Disposal Regulations):
Incinerate or otherwise manage in a RCRA permitted waste management facility.

J. DOT Transportation

Shipping Name:	Gasoline
Hazard Class:	3
(Flammable liquid)	
ID Number:	UN 1203
Packing Group:	II
Marking:	Gasoline,
UN 1203, Marine Pollutant	
(Gasoline, leaded)*	
Label:	Flammable
liquid	
Placard:	

Flammable/1203

Hazardous Substance/RQ: Not applicable

Shipping Description: Gasoline, 3 (Flammable liquid), UN 1203, PG II, Marine Pollutant (Gasoline, leaded)*

Packaging References: 49 CFR 173.150, 173.202, 173.242

* Marine pollutant mark and shipping paper notation required for all bulk domestic shipments and for non-bulk shipments by water.

K. RCRA Classification - Unadulterated Product as a Waste

Ignitable (D001)

Prior to disposal, consult your environmental contact to determine if TCLP (Toxicity Characteristic Leaching Procedure, EPA Test Method 1311) is required. Reference 40

L. Protection Required for Work on Contaminated Equipment

Contact immediate supervisor for specific instructions before work is initiated. Wear protective equipment and/or garments described in Section C if exposure conditions warrant.

M. Hazard Classification

 X This product meets the following hazard definition(s) as defined by the Occupational Safety and Health Hazard Communication Standard (29 CFR Section 1910.1200):

- | | |
|----------------------------------|-------------------------|
| <u> </u> Combustible Liquid | <u> </u> Flammable |
| <u> </u> Aerosol | <u> </u> Oxidizer |
| <u> </u> Compressed Gas | <u> </u> Explosive |

☐ Pyrophoric
☐ Flammable Gas ☒ Health
Hazard (Section F) ☐ Unstable
☒ Flammable Liquid ☐ Organic
Peroxide ☐ Water Reactive
☐ Flammable Solid

☐ Based on information presently
available, this product does not meet
any of the hazard definitions of 29
CFR Section 1910.1200.

N. Additional Comments

SARA 313

This product contains the following
chemical or chemicals subject
to the reporting requirements of
Section 313 of Title III of the
Superfund Amendments and
Reauthorization Act of 1986 and 40 CFR
Part 372. (See Section B).

Benzene

Toluene

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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

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Physical/Chemical Characteristics

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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

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Fire and Explosion Hazard Data

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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

ADVANTAGE BATTERY -- ADVANTAGE BATTERY - BATTERY,STORAGE,LEAD ACID,WET CHARGED,MAINTENANCE FREE

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
=====

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: IMMEDIATE APPLICATION OF A LARGE QUANTITY OF RUNNING WATER.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: WEAR SAFETY GLASSES, ACID-RESISTANT GLOVES & FULL COVERAGE 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

=====

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: IMMEDIATE 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

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

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Fire and Explosion Hazard Data

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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.

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Reactivity Data

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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.

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Health Hazard Data

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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

SHIELDALLOY METALLURGICAL -- FERROSILICON

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)



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)

HYDROFLUORIC ACID

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.

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

HYDROFLUORIC ACID

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 physical 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. Brown, 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

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.

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.

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.

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.

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.

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:

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

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\-----

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\-----

Ingredient	-SARA 302-	-SARA 313-		
	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\-----

-RCRA- -TSCA-

Ingredient	CERCLA	261.33	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.

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

HYDROFLUORIC ACID

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:

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

Prepared by: Strategic Services Division

Phone Number: (314) 539-1600 (U.S.A.)



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.

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.

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.

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.

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.

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.

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.

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.

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\-----			
---NTP Carcinogen---			
Ingredient	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

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.

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

FISHER SCIENTIFIC -- SODIUM HYDROXIDE, PURUM PELLETS, S318 5

MSDS Safety Information

MSDS Date: 12/12/1997
 MSDS Num: CJGBC
 Product ID: SODIUM HYDROXIDE, PURUM PELLETS, S318 5
 MFN: 02
 Responsible Party
 Cage: 1B464
 Name: FISHER SCIENTIFIC
 Address: 1 REAGENT LANE
 City: FAIR LAWN NJ 07410
 Info Phone Number: 201-796-7100
 Emergency Phone Number: 201-796-7100
 Resp. Party Other MSDS No.: 21300
 Chemtrec IND/Phone: (800)424-9300
 Review Ind: Y
 Published: Y

Contractor Summary

Cage: 1B464
 Name: FISHER SCIENTIFIC CO. CHEMICAL MFG DIV
 Address: 1 REAGENT LANE
 City: FAIRLAWN NJ 07410-2802
 Phone: 201-796-7100
 Cage: SO010
 Name: NAVY ENVIRONMENTAL HEALTH CENTER
 Address: 2510 WALMER AVENUE
 City: NORFOLK VA 23513-2617
 Phone: 804-444-4657, DSN 564-4657 X 272

Toxicological Information

Toxicological Information: CARCINOGENICITY: SODIUM HYDROXIDE - NOT LISTED BY ACGIH, IARC, NIOSH, NTP OR OSHA. EPIDEMIOLOGY: NO INFO REPORTED.
 TERATOGENICITY: NO INFO REPORTED. REPRODUCTIVE EFTS: NO INFO REPORTED.
 NEUROTOXICITY: NO INFO REPORTED. MUTAGENICITY: MUTATION DATA REPORTED. OTHER STUDIES: NO INFO REPORTED.

Ecological Information

Ecological: ECOTOXICITY: TLM, MOSQUITO FISH, 125 PPM/96HR (FRESH WATER); TLM, BLUEGILL, 88 MG/48HR (TAP WATER). ENVIRONMENTAL FATE: THIS CHEM IS NOT MOBILE IN SOLID FORM, ALTHOUGH IT ABSORBS MOISTURE VERY EASILY. ONCE LIQUID, SODIUM HYDROXIDE LEACHES RAPIDLY INTO THE SOIL, POSSIBLY CONTAMINATING WATER SOURCES. PHYSICAL/CHEMICAL: NO INFO FOUND. OTHER: NO INFO FOUND.

MSDS Transport Information

Transport Information: US DOT - SHIPPING NAME: SODIUM HYDROXIDE, SOLID. HAZ CLASS: 8. UN NUMBER: UN1823. PACKING GROUP: II. IMO - SHIPPING NAME: SODIUM HYDROXIDE, SOLID. HAZ CLASS: 8. UN NUMBER: 1823. PACKING GROUP: 2. IATA - SHIPPING NAME: SODIUM HYDROXIDE, SOLID. HAZ CLASS: 8. UN NUMBER: 1823. PACKING GROUP: 2. RID/ADR - SHIPPING NAME: SODIUM HYDROXIDE, SOLID. DANGEROUS GOODS CODE: 8(41B). UN NUMBER: 1823.

Regulatory Information

Sara Title III Information: SECTION 302 (RQ) CAS #1310-73-2: FINAL RQ = 1000 LBS (454 KG). SECTION 302 (TPQ) NONE OF CHEMS IN PROD HAVE TPQ. SARA CODES CAS #1310-73-2: ACUTE, REACTIVE. SECTION 313 NO CHEMS ARE REPORTABLE UNDER SECTION 313. CLEAN AIR ACT: THIS MATL DOES NOT CNTN ANY HAZ AIR POLLUTANTS. THIS MATL DOES NOT CNTN ANY CLASS 1 OZONE DEPLETORS. THIS MATL DOES NOT CNTN ANY CLASS 2 OZONE DEPLETORS. CLEAR WATER ACT: C AS #1310-73-2 IS LISTED AS HAZ SUBSTANCE UNDER CWA. NONE OF CHEMS IN PROD ARE LISTED AS PRIORITY POLLUTANTS UNDER CWA. NONE OF CHEMS IN PROD ARE LISTED AS TOX POLLUTANTS UNDER CWA.

OSHA: NONE OF CHEMS IN PROD CONSIDERED HIGHLY HAZ BY OSHA.

Federal Regulatory Information: TSCA CAS #1310-73-2 IS LISTED ON THE TSCA INVENTORY. HEALTH & SAFETY REPORTING LIST: NONE OF THE CHEMICALS IN THIS PRODUCT ARE UNDER A CHEMICAL TEST RULE. SECTION 12B: NONE OF THE CHEMICALS ARE LISTED UNDER TSCA SECTION 12B. TSCA SIGNIFICANT NEW USE RULE: NONE OF THE CHEMICALS IN THIS MATERIAL HAVE A SNUR UNDER TSCA.

State Regulatory Information: SODIUM HYDROXIDE CAN BE FOUND ON THE FOLLOWING STATE RIGHT TO KNOW LISTS: CALIFORNIA, NEW JERSEY, FLORIDA, PENNSYLVANIA, MINNESOTA, MASSACHUSETTS. CALIFORNIA NO SIGNIFICANT RISK LEVEL: NONE OF THE CHEMICALS IN THIS PRODUCT ARE LISTED.

=====

Other Information

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=====

HAZCOM Label

=====

Product ID: SODIUM HYDROXIDE, PURUM PELLETS, S318 5

Cage: 1B464

Company Name: FISHER SCIENTIFIC CO. CHEMICAL MFG DIV

Street: 1 REAGENT LANE

City: FAIRLAWN NJ

Zipcode: 07410-2802

Health Emergency Phone: 201-796-7100

Label Required IND: Y

Date Of Label Review: 05/27/1999

Status Code: A

Origination Code: F

Chronic Hazard IND: Y

Eye Protection: YES

Skin Protection IND: YES

Signal Word: DANGER

Respiratory Protection: YES

Health Hazard: Moderate

Contact Hazard: Severe

Fire Hazard: None

Reactivity Hazard: Slight

Hazard And Precautions: GENERATES LARGE AMOUNTS OF HEAT WHEN IN CONTACT WITH WATER. ACUTE: EYE: CAUSES SEVERE EYE BURNS. SKIN: CAUSES SKIN BURNS. MAY CAUSE DEEP, PENETRATING ULCERS OF THE SKIN. INGESTION: HARMFUL IF SWALLOWED. CAUSES GASTROINTESTINAL TRACT BURNS. CAUSES SEVERE PAIN, NAUSEA, VOMITING, DIARRHEA AND SHOCK. INHALATION: IRRITATION MAY LEAD TO CHEMICAL PNEUMONITIS AND PULMONARY EDEMA. CAUSES SEVERE IRRITATION OF UPPER RESPIRATORY TRACT WITH COUGHING, BURNS, BREATHING DIFFICULTY AND POSSIBLE COMA. CHRONIC: PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DERMATITIS. TARGET ORGANS: NONE.

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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.

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.

5. Fire Fighting Measures

Fire:

Flash point: -20C (-4F) CC

Autoignition temperature: 465C (869F)

Flammable limits in air % by volume:

lcl: 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.

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

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.

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.

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.)

Ciba Specialty Chemicals Corporation
USA

2301 Wilroy Rd.
P. O. Box 820
Suffolk, VA 23434

8am to 5pm Phone: (757) 538-3700
24-Hour Health/Environmental Emergency Phone: (800) 873-1138



Value beyond chemistry

Effective Date: 10/14/02

Material Safety Data Sheet

MSDS No: 16296

SECTION 1. PRODUCT IDENTIFICATION

Trade Name: PERCOL 155

Chemical Family: Copolymer of sodium acrylate and acrylamide.

Health	0
Flammability	1
Reactivity	0
Protective Equipment	X

HMIS RATING

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

O S H A	CAS No.	CHEMICAL IDENTITY	EXPOSURE LIMITS					CARCINOGEN STATUS		
			ACGIH		OSHA		MFR.	IARC	NTP	OSHA
			TWA	STEL	PEL	STEL				
	25085-02-3	COPOLYMER OF ACRYLAMIDE:SODIUM ACRYLATE	NE	NE	NE	NE	NE	NR	NR	NR

NE = Not Established NR = Not Reviewed

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview:

Description: White, free flowing powder with little or no odor.

Statement of Hazards: NA (not a health hazard as defined by OSHA)

Precautionary Measures: Do not get in eyes, on skin, on clothing. Wash thoroughly after handling. Avoid prolonged or repeated inhalation of dust or skin contact. Slip hazard when wet.

Effective Date: 10/14/02

Primary Route(s) of Entry: Inhalation.

Signs and Symptoms of Exposure: Eye contact may produce slight irritation and/or redness. Inhaled dust may cause some respiratory irritation.

Carcinogenicity: Not listed as a carcinogen by IARC, NTP, OSHA or ACGIH

Medical Conditions Aggravated by Exposure: Existing respiratory conditions.

Target Organ(s): NA

SECTION 4. FIRST AID MEASURES

Ingestion: Do not give an emetic unless directed by a physician. Never give anything by mouth to an unconscious person.

Skin: Remove contaminated clothing and launder before reuse. Wash effected area with soap and water.

Inhalation: Remove to fresh air.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

SECTION 5. FIRE FIGHTING MEASURES

Flash Point:	Not Applicable
Autoignition:	Not Evaluated

Sensitivity to Mechanical Impact: None

Sensitivity to Static Discharge: Dust in sufficient concentration may result in an explosive mixture in air.

Fire Fighting Extinguishing Media: Carbon dioxide, dry chemical or foam.

Fire Fighting Equipment: No special procedures. However, wetted product presents a slip hazard. Pedestrian and vehicular traffic must proceed with caution where wet product may exist.

Fire and Explosion Hazards: Dust in sufficient concentration can result in an explosive mixture in air. Handle to minimize dusting, and eliminate open flame and other sources of ignition.

Extinguishing Media to Avoid: Water may create a slip hazard with product.

Hazardous Combustion Products: Oxides of carbon and nitrogen.

Dust Explosivity: Dust in sufficient concentration may result in an explosive mixture in air.

Emergency Response Guidebook Information: No ERG # indicated. Handle as combustible material.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Effective Date: 10/14/02

Accidental Release Measures: Product becomes slippery and difficult to handle when wet; spills are best handled while still dry. Sweep up and collect dry product. Absorb wet product with vermiculite or other inert material. Then water wash area to waste treatment to eliminate slip hazard.

SECTION 7. HANDLING AND STORAGE

Precautions: Good personal hygiene practices can reduce potential exposure. Wash with soap and water following any contact with this product, as well as before breaks and meals. Shower and change clothing at end of work shift. If clothing becomes contaminated, remove and launder or dry-clean before reuse.

Storage Information: Store in cool dry location.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Skin Protection: Not normally required.

Respiratory Protection: Use NIOSH approved dust respirator as required to control exposure. Follow ANSI Z88.2.

Eye Protection: Goggles (ANSI Z87.1 std; safety glasses alone do not protect from dust).

Engineering Controls: Provide mechanical ventilation to prevent dust concentrations, and to reduce potential exposure.

Additional Information: Provide eyewash station(s). Select additional protective equipment (eg apron, face shield, etc.), depending on conditions of use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form:	Granular Powder
Color:	White
Odor:	Little or No
Odor Threshold:	Not applicable
Physical State:	Solid
Solubility in Water:	Soluble, solubility limited by viscosity
Vapor Pressure:	Not Applicable
Specific Gravity:	~ 0.75
Boiling Point:	Not Applicable
Melting Point:	Not Applicable
Freezing Point:	Not Applicable
Decomposition Temperature:	Not Evaluated
Evaporation Rate:	Not Applicable
Vapor Density:	Not Applicable
VOC:	Not Evaluated
pH:	~ 6 For 1 % solution.
Coefficient of water/oil:	Not Evaluated

Percent Volatile:
None expected above trace levels.

SECTION 10. STABILITY AND REACTIVITY

Effective Date: 10/14/02

Conditions to Avoid: Avoid wet and humid conditions.

Stability: Stable.

Hazardous Polymerization: Will not occur..

Hazardous Decomposition Products: Thermal decomposition or combustion may produce oxides of carbon and nitrogen, various hydrocarbons, and/or ammonia which may be irritating or harmful.

Incompatibility: Strong oxidants such as liquid chlorine, enriched gaseous or liquid oxygen, and sodium or calcium hypochlorite.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Oral Toxicity:

Low oral toxicity. By analogy to similar materials, the acute LD50 (rat) is expected to be > 2000 mg/kg.

Carcinogenicity:

Not listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

Reproductive Toxicity:

No data for product. No effects anticipated.

Teratogenicity:

No data for product. No effects anticipated.

Mutagenicity:

No data for product. No effects anticipated.

Skin Irritation:

57-13-6 UREA

Mild irritant (human).

Intravenous LD 50:

57-13-6 UREA

LD50(Rat): 5300 mg/kg.

LD50(Mice): 4600 mg/kg.

LD50(Rabbit): 4800 mg/kg.

Toxicologically Synergistic Products:

None known.

Additional Information:

57-13-6 UREA

LD50(Rat): 8200 mg/kg (Subcutaneous).

LD50(Mice): 8200 mg/kg (Subcutaneous).

SECTION 12. ECOLOGICAL INFORMATION

Ecological Information:

Product not considered toxic to aquatic organisms.

Effective Date: 10/14/02

SECTION 13. DISPOSAL CONSIDERATIONS

RCRA Hazard Class: This product, when unadulterated, is not a RCRA regulated hazardous waste.

Waste Disposal Method: Disposal must be arranged in accordance with local, state and federal regulations. Care must be taken to prevent environmental contamination from the disposal of material, residues and containers.

SECTION 14. TRANSPORT INFORMATION**DOT:****Proper Shipping Name:**

NOT A DOT/IMO HAZARDOUS MATERIAL

Harmonized Tarrif 3906.90.5000**SECTION 15. REGULATORY INFORMATION****US Federal Regulations:**

Chemical Weapons Convention (CWC): This product does not contain any chemicals listed under the Chemical Weapons Convention Schedules of Chemicals.

Clean Air Act -Hazardous Air Pollutants (HAP): The following chemical(s) are listed as hazardous air pollutants (HAP) under the U.S. Clean Air Act Section 12 (40 CFR 61):

Chemical Name: ACRYLIC ACID (Impurity)

CASRN: 79-10-7

Percent in Composition: < 0.5 % by wt

Chemical Name: 2-Propenamide (Impurity)

Common Name: Acrylamide

CASRN: 79-06-1

Percent in Composition: < 0.1 % by wt

Clean Air Act - Ozone Depleting Substances (ODS): This product neither contains, nor was manufactured with, a Class I or Class II ozone depleting substance (ODS), as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App. A+B).

Clean Water Act - Priority Pollutants (PP): This product does not contain any priority pollutants listed under the U.S. Clean Water Act Section 307 (2)(1) Priority Pollutant List (40 CFR 401.15).

Occupational Safety and Health Act (OSHA): This product is not considered to be a hazardous chemical under the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Resource Conservation and Recovery Act (RCRA): This product is not considered to be a P or U listed hazardous waste under RCRA (40 CFR 261).

SARA Title III: Section 302 - Extremely Hazardous Substances (EHS): This product contains the following chemicals regulated under Section 302 (40 CFR 355) as extremely hazardous substances:

Chemical Name: ACRYLAMIDE

CASRN: 79-06-1

Effective Date: 10/14/02

Percent in Composition: <0.1 % by wt

SARA Title III: Section 304 - CERCLA: This product contains the following chemicals regulated under Section 304 (40 CFR 302) as hazardous substance(s) for emergency release notification ("CERCLA" List):

Chemical Name: ACRYLIC ACID (Impurity)

CASRN: 79-10-7

Percent in Composition: < 0.5 % by wt

Component RQ: 5000

Chemical Name: 2-Propenamide (Impurity)

Common Name: Acrylamide

CASRN: 79-06-1

Percent in Composition: < 0.1 % by wt

Component RQ: 5000

SARA Title III: Section 311/312 - Hazard Communication Standard (HCS): This product is not regulated under Section 311-312 (40 CFR 370).

SARA Title III: Section 313 Toxic Chemical List (TCL): This product does not contain any chemicals for routine annual toxic chemical release reporting under Section 313 (40 CFR 372).

TSCA Section 5(e) - Consent Order / SNUR: This product is not subject to a Section 5(e) Consent Order or Significant New Use Rule (SNUR).

TSCA Section 8(b) - Inventory Status: All chemical(s) comprising this product are either exempt or listed on the TSCA inventory.

TSCA Section 12(b) - Export Notification: This product contains the following chemical(s) that are subject to a Section 12(b) export notification:

Chemical Name: ACRYLIC ACID (Impurity)

CASRN: 79-10-7

State Regulations:

California Proposition 65: The following is required composition information. This product contains the following chemical(s) which are currently listed on the California list of Known Carcinogens and Reproductive Toxins:

Chemical Name: ACRYLAMIDE

CASRN: 79-06-1

Percent in Composition: <0.1% by wt

Massachusetts Right-to-Know: The following is required composition information:

Chemical Name: 2-Propenamide (Impurity)

Common Name: Acrylamide

CASRN: 79-06-1

Percent in Composition: < 0.1 % by wt

Chemical Name: ACRYLIC ACID (Impurity)

CASRN: 79-10-7

Percent in Composition: < 0.5 % by wt

Effective Date: 10/14/02**New Jersey Right-to-Know:** The following is required composition information:

Chemical Name: COPOLYMER OF ACRYLAMIDE:SODIUM ACRYLATE
CASRN: 25085-02-3

Chemical Name: WATER
CASRN: 7732-18-5

Chemical Name: UREA
CASRN: 57-13-6

Pennsylvania Right-to-Know: The following is required composition information:

Chemical Name: COPOLYMER OF ACRYLAMIDE:SODIUM ACRYLATE
CASRN: 25085-02-3

Comment: Not on Pennsylvania Hazardous Substance List

Chemical Name: WATER
CASRN: 7732-18-5
Comment: Not on Pennsylvania Hazardous Substance List

SECTION 16. OTHER INFORMATION

MSDS No:	16296
Reason Issued:	New format
Prepared By:	Leon Knight
Approved By:	
Supersedes Date:	11/30/01

Sections Modified: Section 14. Section 16.

Disclaimer: The following supercedes Buyer's documents. SELLER MAKES NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. No statements herein are to be construed as inducements to infringe any relevant patent. Under no circumstances shall Seller be liable for incidental, consequential or indirect damages for alleged negligence, breach of warranty, strict liability, tort or contract arising in connection with the product(s). Buyer's sole remedy and Seller's sole liability for any claims shall be Buyer's purchase price. Data and results are based on controlled or lab work and must be confirmed by Buyer by testing for its intended conditions of use. The product(s) has not been tested for, and is therefore not recommended for, uses for which prolonged contact with mucous membranes, abraded skin, or blood is intended; or for uses for which implantation within the human body is intended.

FDA Status Has been cleared for use as Acrylamide-acrylic acid resins complying with 21 CFR 176.110 and 176.170(a)(4) as an adjuvant in the manufacture of paper and paperboard at a use level not to exceed 2% by weight of the paper or paperboard and also complies with 21 CFR 176.180(b)(2). Also has been cleared for use as Adjuvants for pesticide chemicals complying with 21 CFR 182.99 added to pesticide use dilutions prior to application to the raw agricultural commodity, exempt from tolerances requirement.



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 Calcium hydroxide	Chemical Family Alkaline earth hydroxide	Chemical Formula Complex mixture - mostly Ca(OH)₂
Molecular Weight Ca(OH)₂ = 74.096	Trade Name and Synonyms High Calcium Hydrated Lime, Lime, Slaked lime, Lime Putty, Lime Slurry, Milk of Lime, Calcium Hydroxide	Material Use 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 (TWA) 8/40h	ACGIH TLV (TWA) 8/40h	RQMT OEL (TWA) 8/40h	NIOSH REL (TWA) 10/40h	NIOSH IDLH
(Complex Mixture)							
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 <input type="checkbox"/> Liquid <input type="checkbox"/> Solid <input checked="" type="checkbox"/>	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 <input type="checkbox"/> No <input checked="" type="checkbox"/> which conditions:			
Extinguishing Media <p style="text-align: center;">Calcium Hydroxide does not burn. Use extinguishing media appropriate to surrounding fire conditions.</p>			
Special Fire Fighting Procedures <p style="text-align: center;">Not applicable</p>			
Flash point (°C) and Method Not applicable	Upper flammable limit (% by volume) Not applicable	Lower flammable limit (% by volume) Not applicable	
Auto Ignition Temperature (°C) Not applicable	TDG Flammability Classification Non-flammable	Hazardous Combustion Products None	
Dangerous Combustion Products None			
EXPLOSION DATA			
Sensitivity to Chemical Impact Not applicable	Rate of Burning Not applicable	Explosive Power Not applicable	Sensitivity to Static Discharge 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**LD₅₀ of Product (Specify Species and Route)
(Food grade Ca(OH)₂: 7340mg/kg)
(Rats, ingestion)Irritancy of Product
Severe to moist tissuesExposure limits of Product
UnavailableLC₅₀ of Product (Specify Species)
UnavailableSensitization to Product
NoneSynergistic 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 cristobalite 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) Gauntlets Cuff style	Respiratory (Specify) NIOSH approved filtering anti-dust mask	Eyes (Specify) Tight fitting goggles with side shields	Footwear (Specify) Resistant to caustics
Clothing (Specify) Fully covering skin		Other (Specify) 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	National Fire Protection Association (U.S.)	<div> <div>Health Hazard</div> <div> <div>0</div> <div>1 1</div> </div> <div>Fire hazard</div> <div>Reactivity</div> <div>Specific hazard</div> </div>
	Flammability ②		
	Reactivity ①		
	Personal Protection ⑤		
WHMIS Classification: "E" Corrosive Materials.		WHMIS Classification: "D2A" Materials causing other toxic effects.	
Symbol: 		Symbol: 	
Additional Information/Comments: <p>The technical data contained herein is given as information only and is believed to be reliable.</p> <p>GRAYMONT makes no guarantee of results and assumes no obligation or liability in connection therewith.</p>			
Sources Used: <p>NFPA, NLA, TDG, CSST, (LSRO-FASEB), Hazardous Products Act, Environment Canada, Enviroguide, OSHA, ACGIH, IARC, NIOSH, CFR, NTP.</p>			
Prepared by: Technical Services GRAYMONT (QC) INC. GRAYMONT (WESTERN US) INC		Telephone number (450) 449-2262 (801) 264-6879	Date July 2001

EAGLE-PICHER INDUSTRIES -- FLOOR DRY, CELATOM

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

General Information

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

Ingredients/Identity Information

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

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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

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=====

Disposal Data

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Label Data

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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

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 react with sulphuric acid.

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, sulphuric

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

TOXICOLOGICAL AND PHYSICOCHEMICAL PROPERTIES OF MINOR CHEMICALS HANDLED

Percol E-10 Flocculent*Physicochemical Properties***Odour and Appearance:**

Off-white coloured solid.

Bulk Density:

0.75 g/cm³.

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/m³ OSHA PEL: 10 mg/m³ MFRS Recommendation: 10 mg/m³.

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 sulphur 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 (IP Y):

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, sulphuric 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.

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, sulphuric 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

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/m³; 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 Corporation

Site: Jericho Diamond Mine

Emergency Procedures

*This is a "controlled" document.
Routine distribution is restricted to the approved
distribution at **Jericho Mine**. All other persons
in possession of this document have uncontrolled copies
and should call document control for revision level status.*

Approved by: _____

Approved Date _____

Confidential

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 action 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

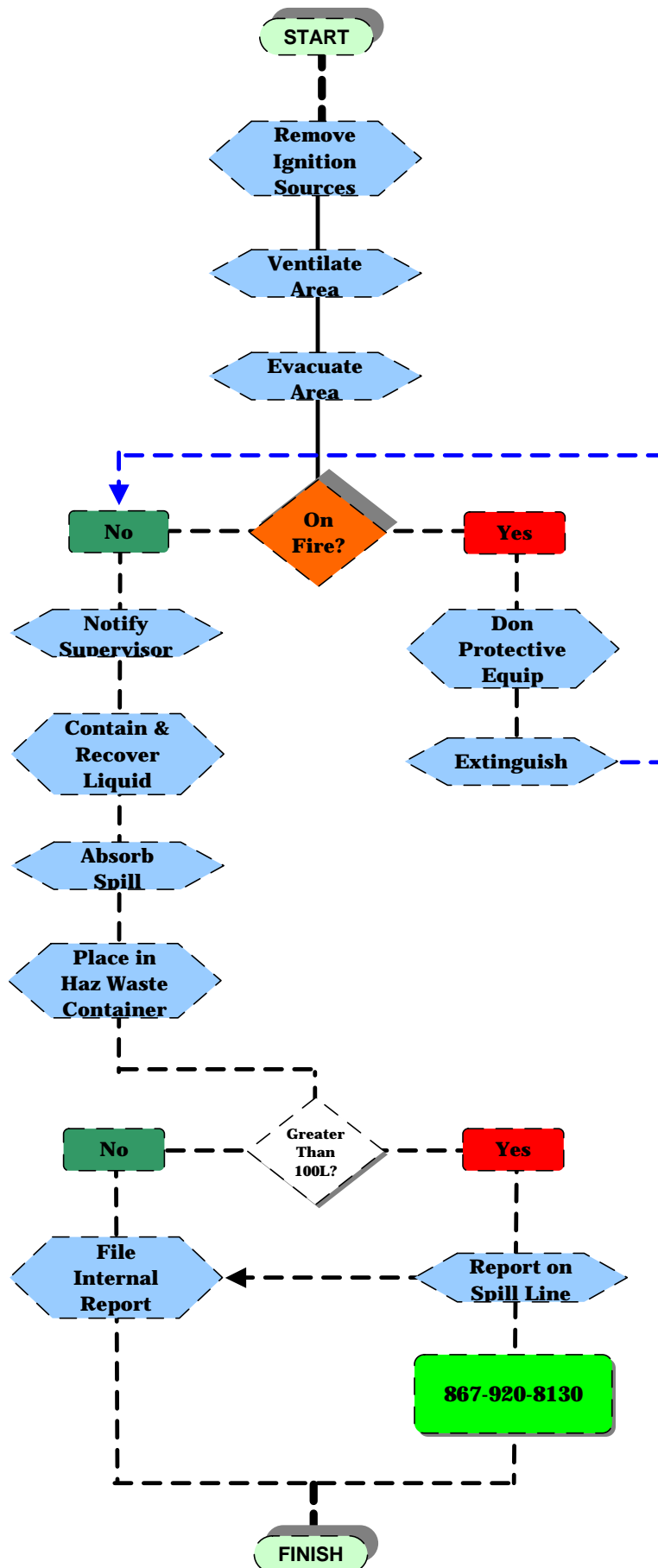
See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general procedures.

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.

ETHYLENE GLYCOL SPILL RESPONSE





Company: Tahera 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.

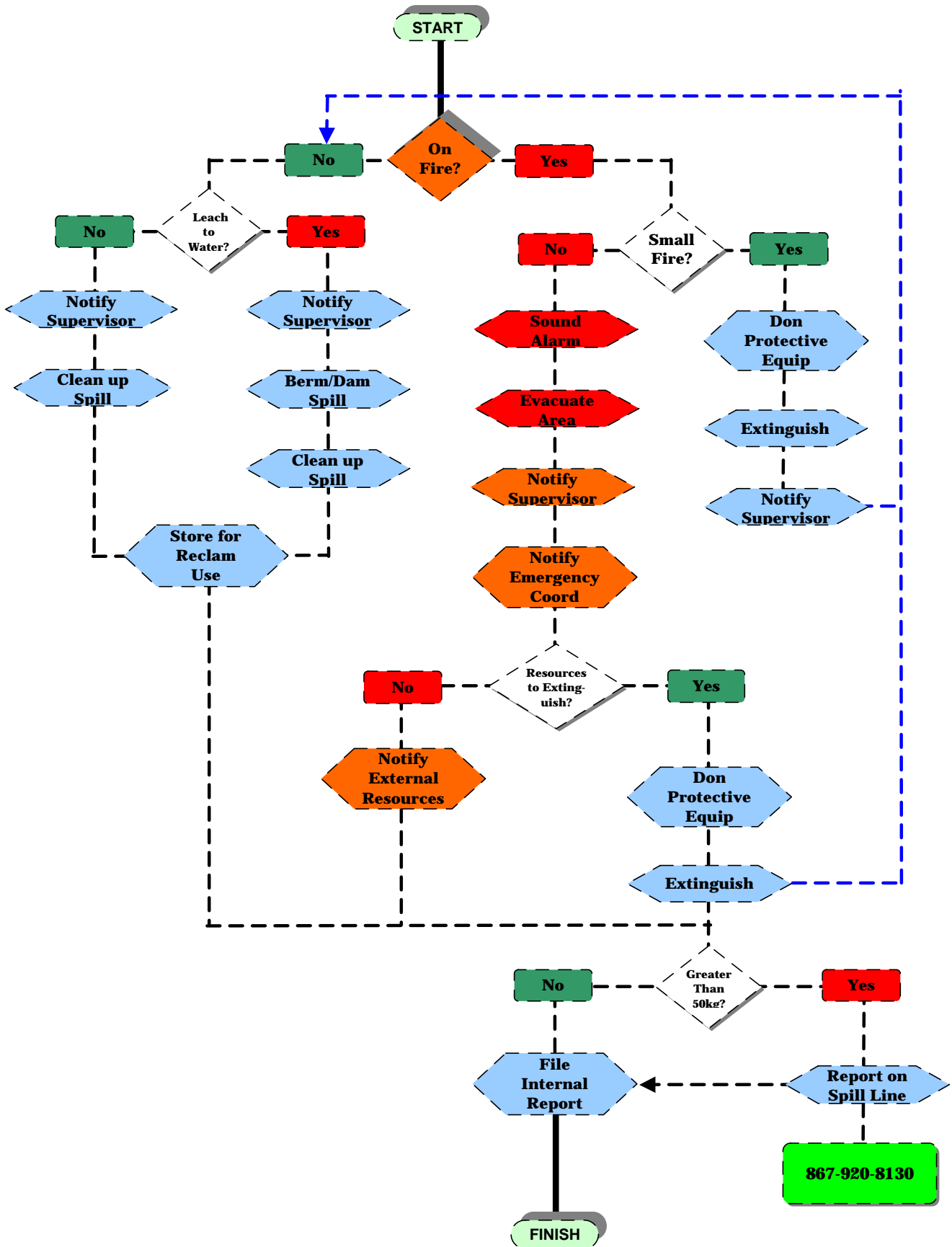
5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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 Name: Tahera Corporation

Date: March 1, 2001

Rev. 0



Company: Tahera 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 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 give.
Flammable Limits	None.
Explosion	Not explosive.
Fire Extinguishing Media	Product is not combustibile. Use water, carbon dioxide, or dry chemical on fires.
Special Fire Fighting Procedures	None specified by manufacturer.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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.



Company: Tahera Corporation

Site: Jericho Diamond Mine

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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 irritation 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 could be reignited on surface of water.
Fire and Explosion Hazards	Carbon and sulphur oxides and various hydrocarbons formed when burned.

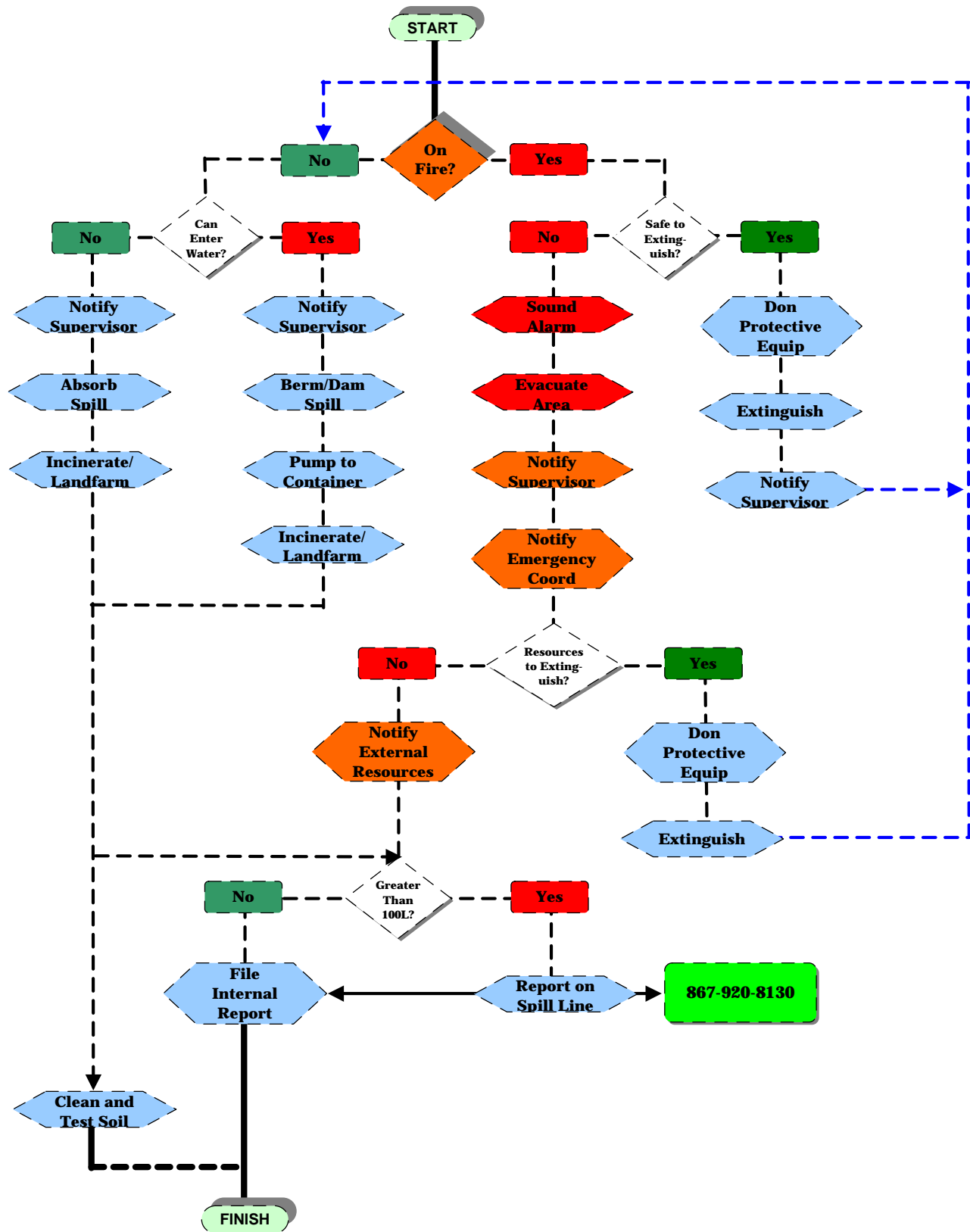
5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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



Company Name: Tahera Corporation

Date: March 1, 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

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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, head ache, 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-contained 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

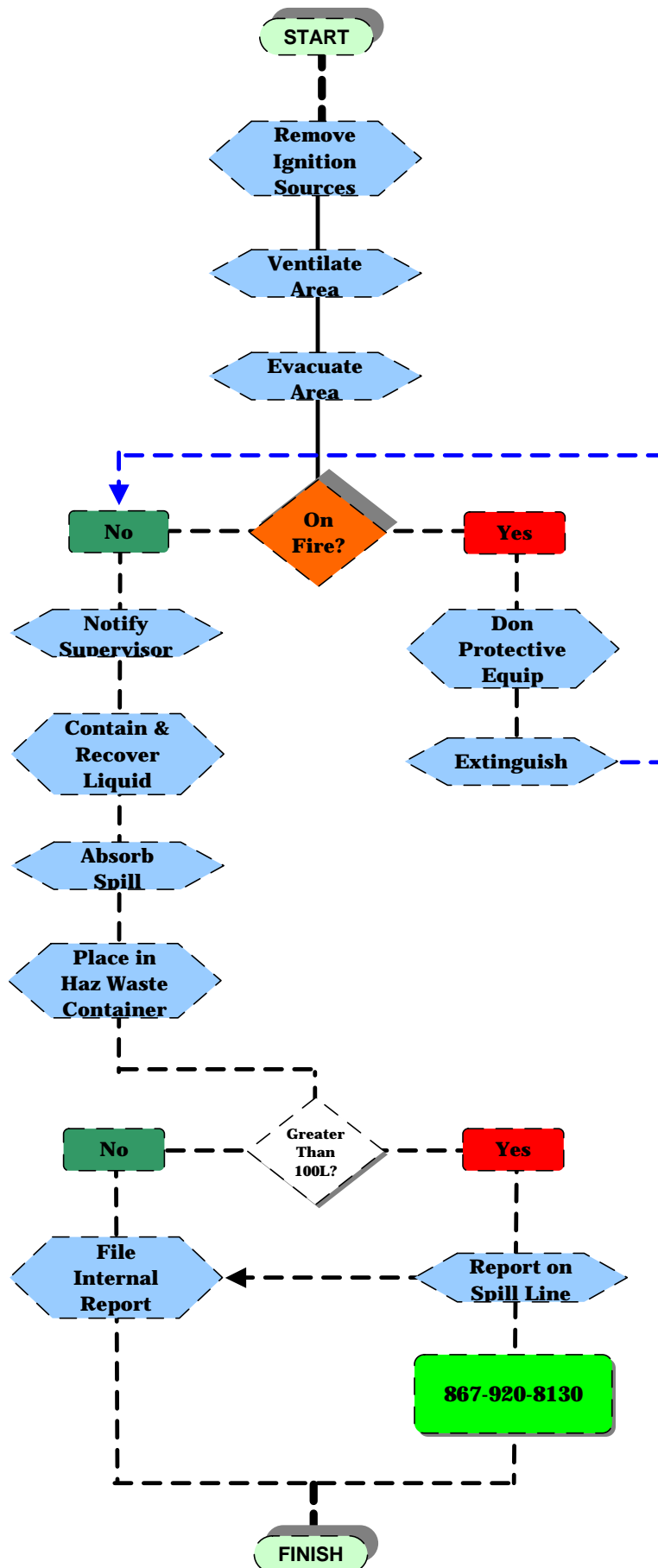
See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general procedures.

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



Company Name: Tahera Corporation

Date: 1 March 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

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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.
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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

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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.

Company Name: Tahera Corporation Date: March 1, 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

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SEE JET FUEL SPILL RESPONSE, PROCEDURE NUMBER 005



Company: Tahera Corporation

Site: Jericho Diamond Mine

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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
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3.0 FIRST AID AND EMERGENCY PROCEDURES

Inhalation	Inhalation of mist may cause irritation.
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.

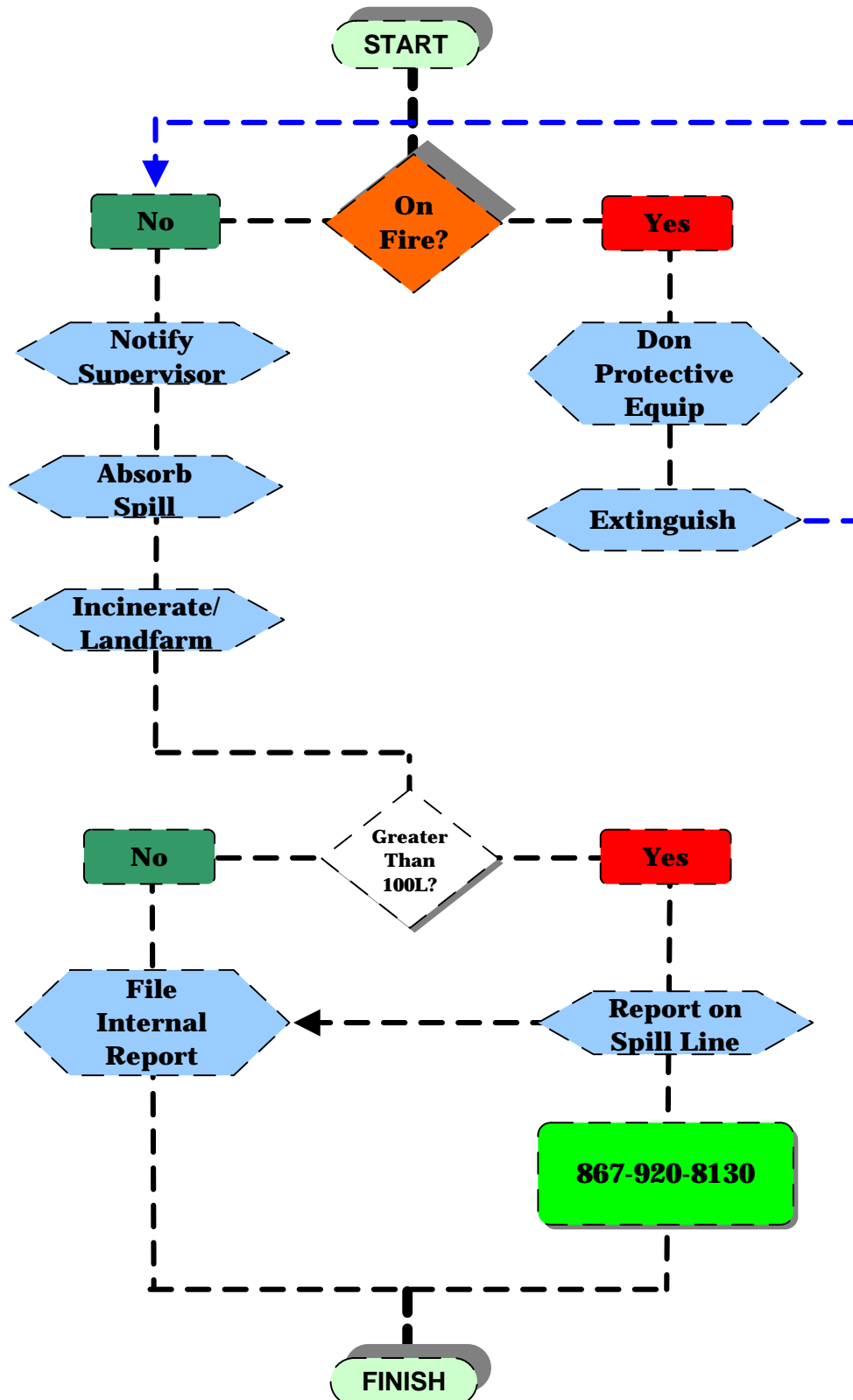
5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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



Company Name: Tahera Corporation

Date: 1 March 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

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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

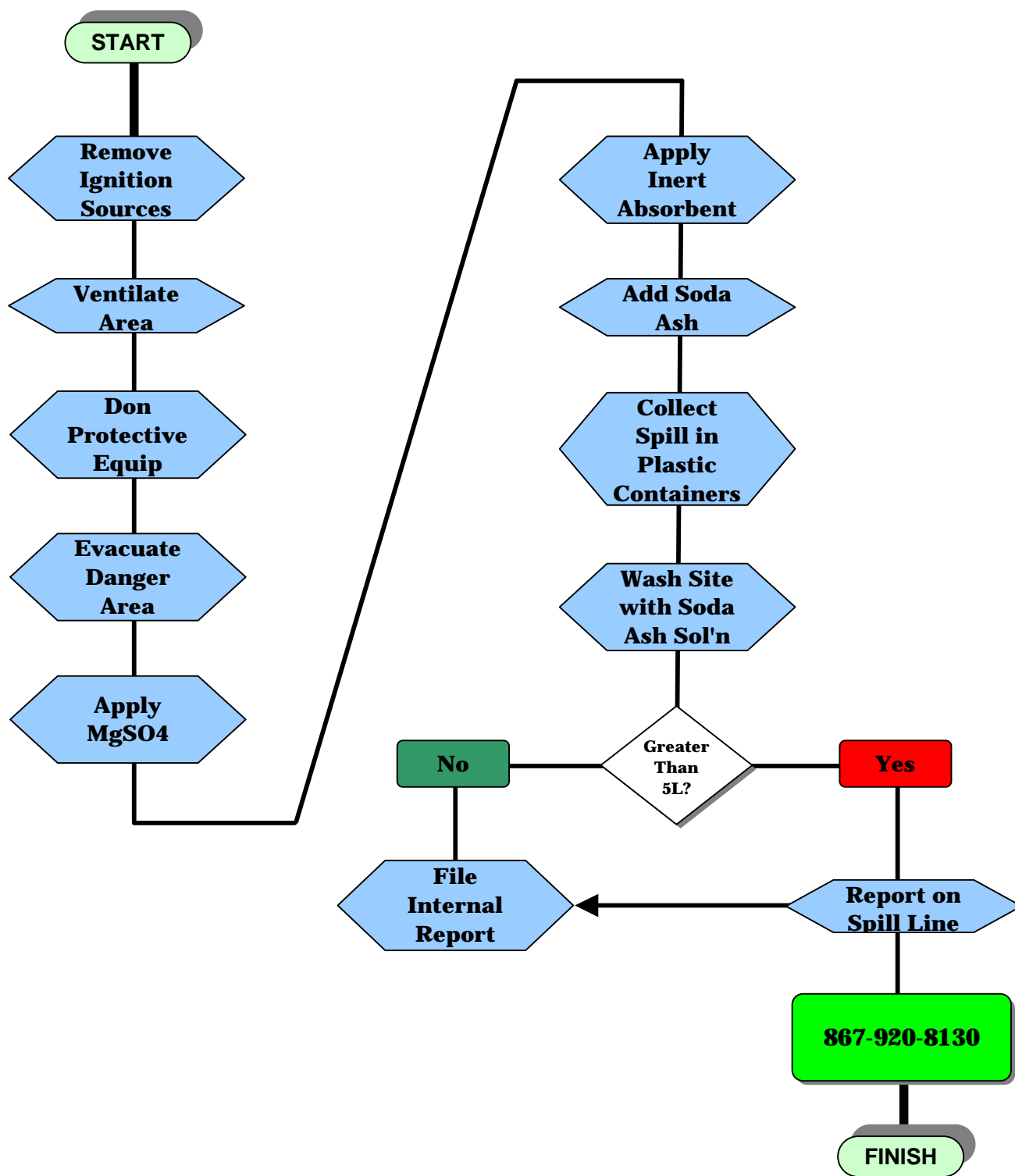
Flash Point (Method Used)	Not applicable
Flammable Limits	Not flammable
Explosion	Violent exothermic reaction occurs with water. Sufficient heat may be produced to ignite combustible materials. Reacts with metals forming flammable hydrogen gas.
Fire Extinguishing Media	Keep upwind of fire. Use water 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

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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



Company Name: Tahera Corporation Date: March 1, 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

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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.

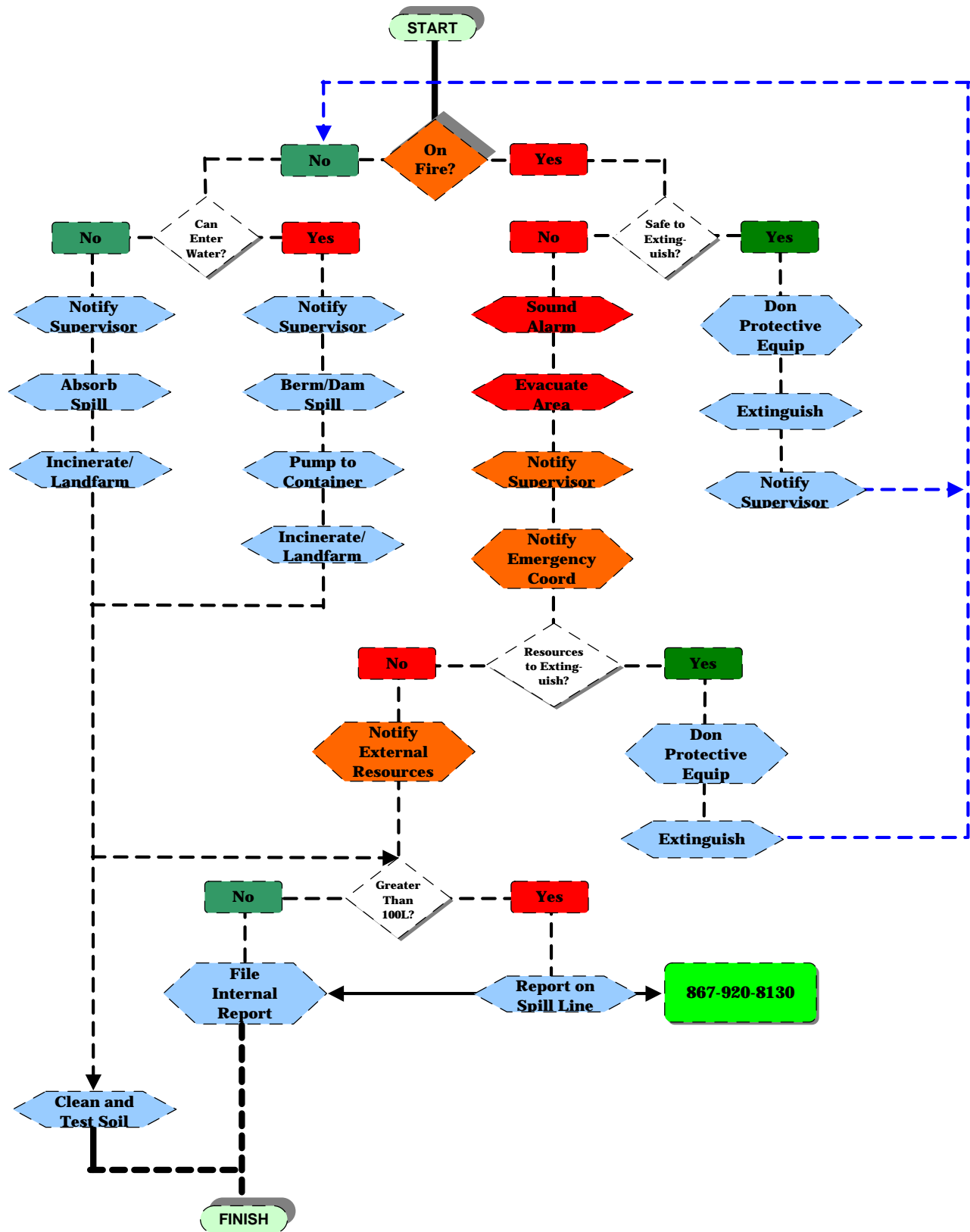
5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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



Company Name: Tahera Corporation Date: March 1, 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

Emergency Procedures

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Approved by: _____

Approved Date _____

Confidential

Magnafrac spills are to be handled **ONLY** by qualified personnel with blasting certificates. Spills of this material should be reported **IMMEDIATELY** to the explosives contractor who will notify the mine superintendent.

Note: Under Nunavut spill reporting regulations, any amount of explosives spilled must be reported to the spill line:

867-920-8130

Company Name: Tahera Corporation Date: March 1, 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

Emergency Procedures

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Company Name: Tahera Corporation Date: March 1, 2001

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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.

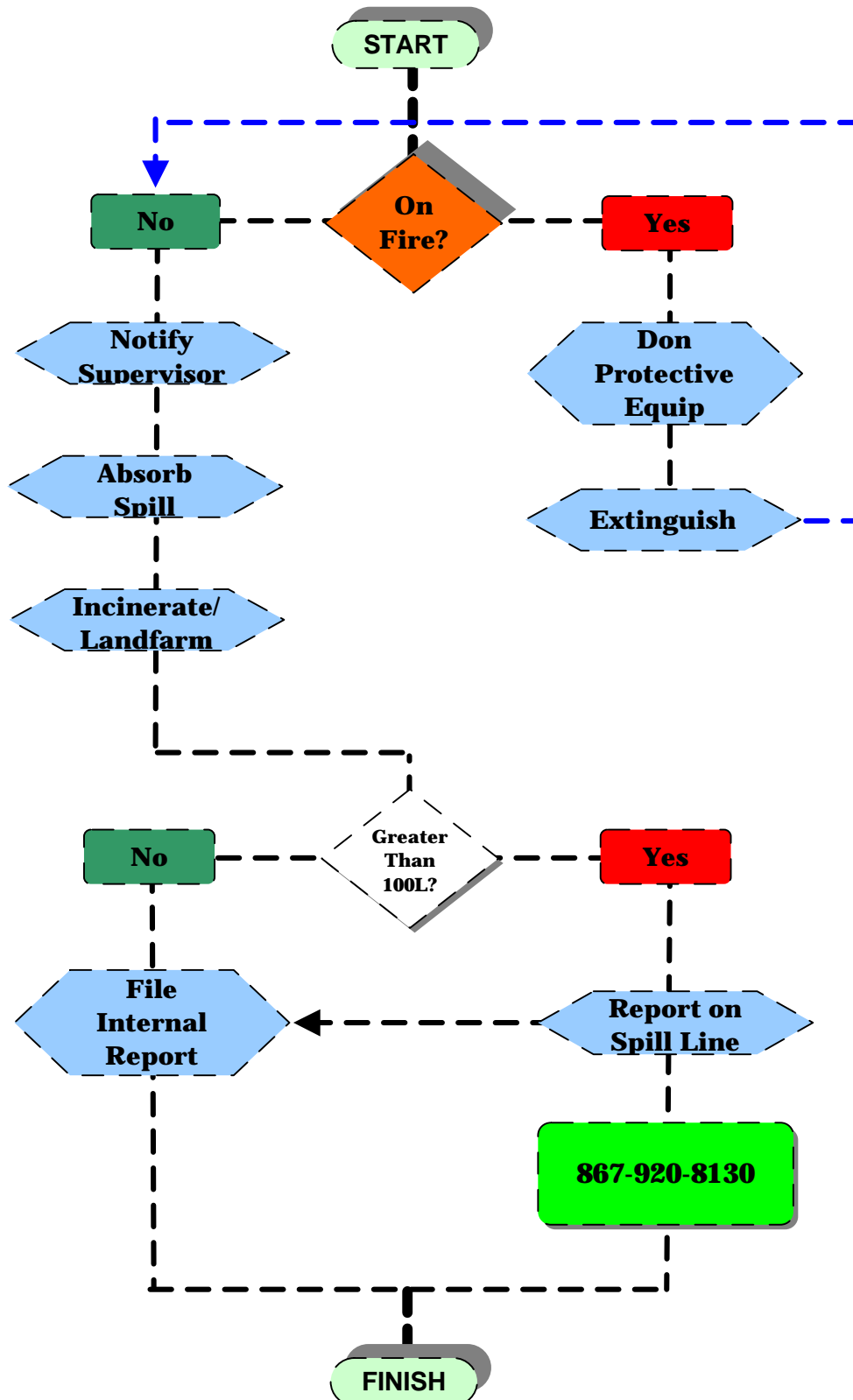
5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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 Name: Tahera Corporation

Date: March 1, 2001

Rev. 0



Company: Tahera Corporation

Site: Jericho Diamond Mine

Emergency Procedures

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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 irritation 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

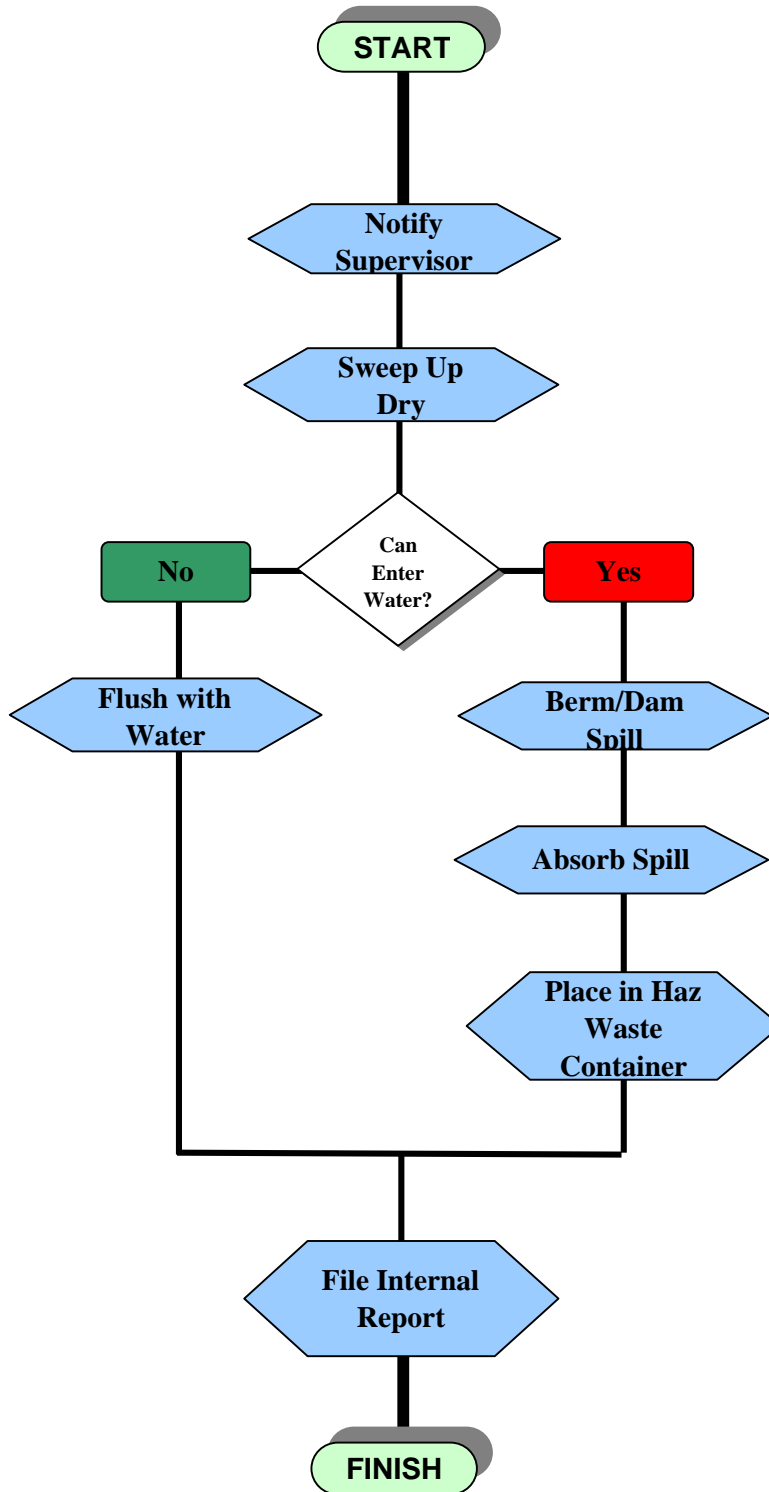
Flash Point (Method Used)	None exhibited.
Flammable Limits	Not flammable
Explosion	As with most organic powders, flammable dust clouds may be formed in air. Avoid creating dust. Keep away from sources of ignition.
Fire Extinguishing Media	Carbon dioxide, dry chemical, foam, in preference to a water spray.
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





Company: Tahera Corporation

Site: Jericho Diamond Mine

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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 μ Siverts/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

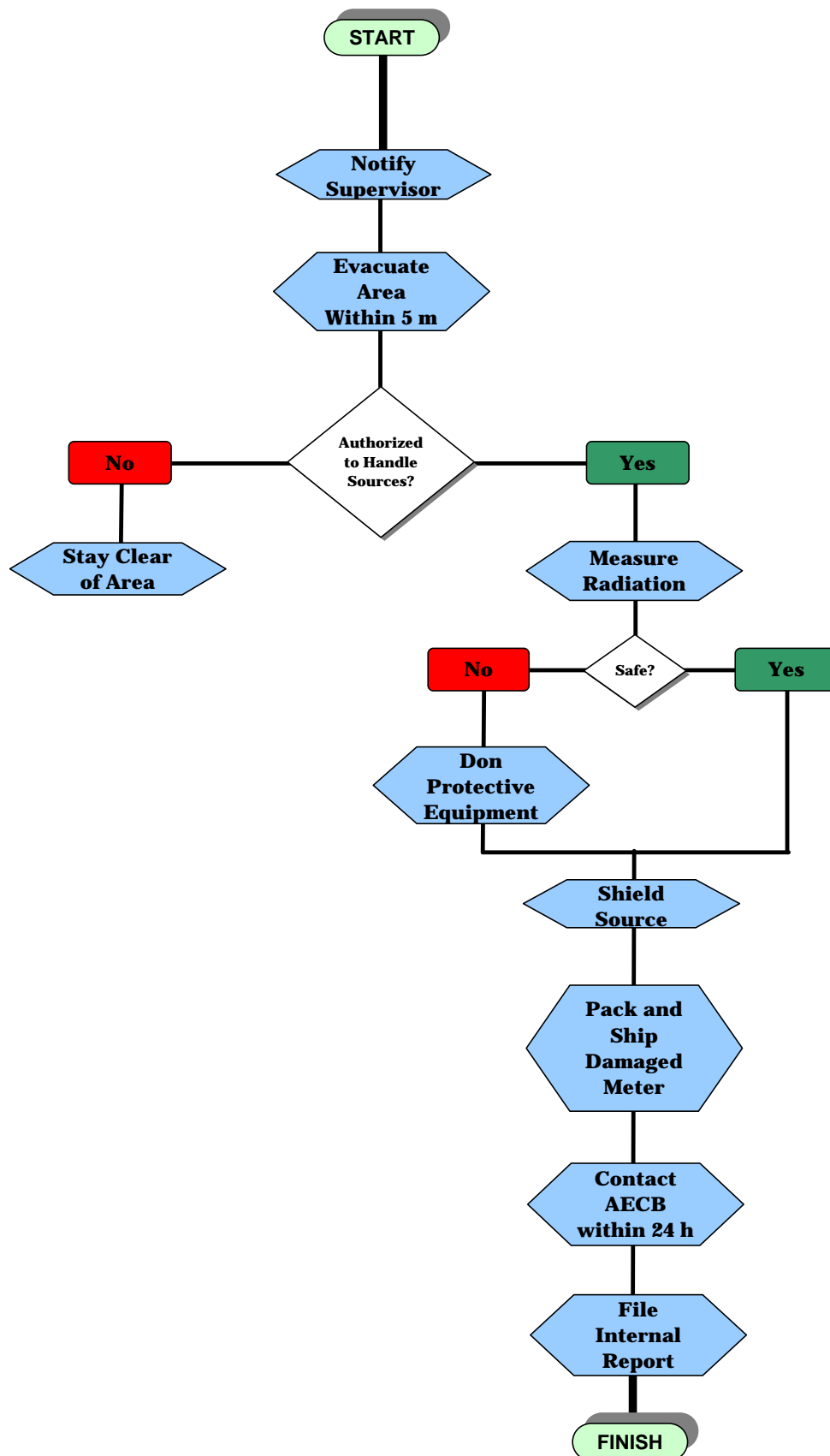
Meters and sources are non-flammable and will not explode. If meters are exposed to fire, they must be assumed to be leaking radiation until tested.

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 AECSB.

RADIOACTIVE SOURCE LEAK RESPONSE





Company: Tahera Corporation

Site: Jericho Diamond Mine

Emergency Procedures

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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 and throat. If individual is conscious and alert, 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 known to be associated with this product.

5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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 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.

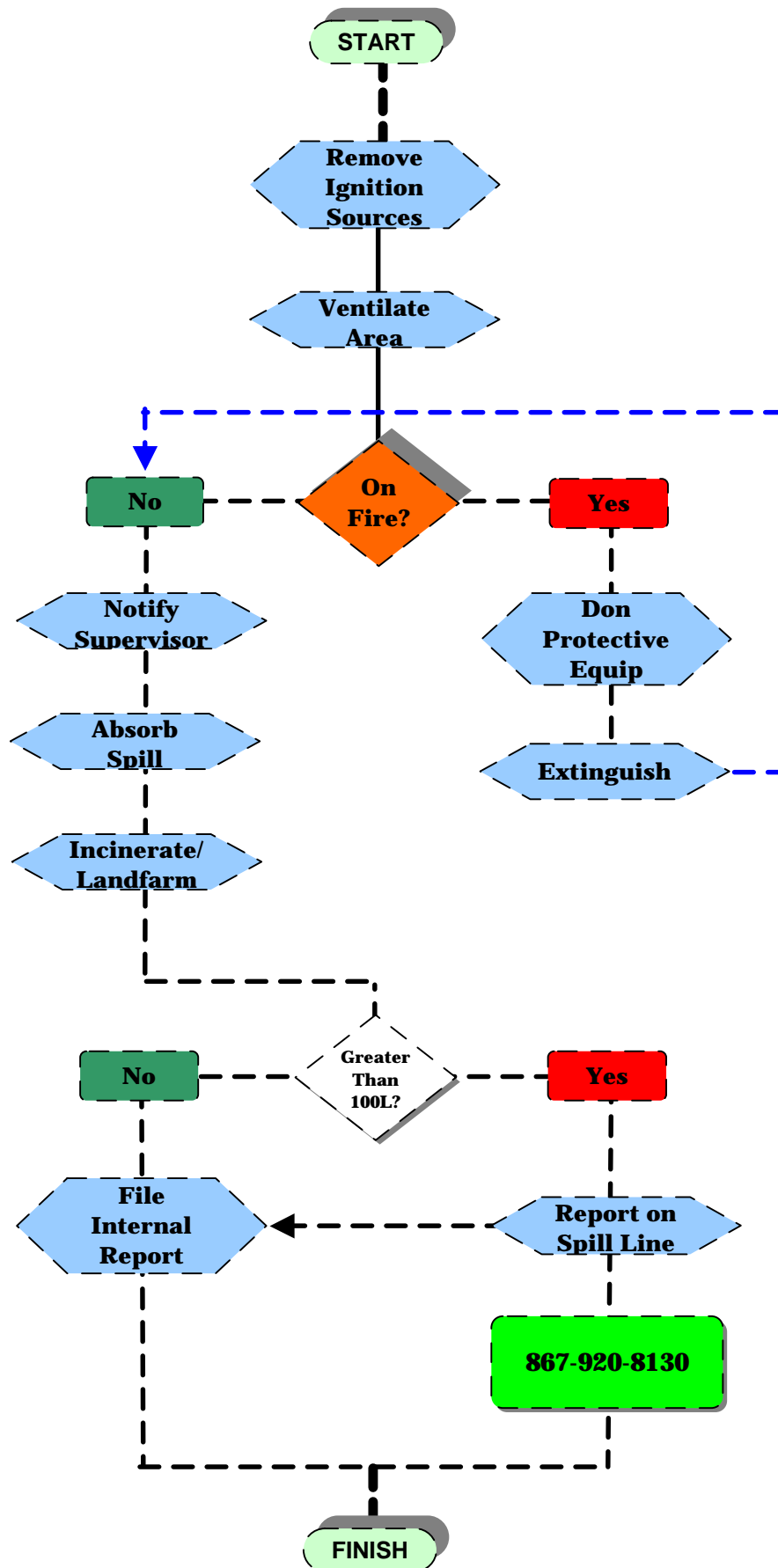
5.0 SPILL, LEAK AND DISPOSAL PROCEDURES

See Jericho Diamond Mine Emergency Response Plan, Section 8.0 or Jericho Project Spill Prevention, Countermeasures and Control Plan, Section 6.0 for general 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.

VAR SOL/SOLVENT SPILL RESPONSE



APPENDIX 5.1
Oil and Hazardous Materials Spills Contingency Plan
For Winter Road Transportation Use

Provided by RTL Trucking Enterprises

OIL AND HAZARDOUS MATERIAL SPILLS CONTINGENCY PLAN



RTL - Robinson Enterprises Ltd.

RTL ROBINSON ENTERPRISES LTD.

**HEAD OFFICE:
LOT #350 OLD AIRPORT ROAD
POST OFFICE BOX 1807
YELLOWKNIFE, NT X1A 2P4**

**DIVISIONAL OFFICE
10821 - 209th STREET
EDMONTON, AB
T5S 1Z7**

24hr PHONE 867-873-6271

24hr PHONE 780-447-3300

RTL ROBINSON ENTERPRISES LTD. OIL AND HAZARDOUS MATERIAL SPILLS CONTINGENCY PLAN

CONFIDENTIAL

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EXPRESS WRITTEN PERMISSION GIVEN BY
RTL ROBINSON ENTERPRISES LTD.***

AMENDMENTS

[illegible]

**EMERGENCY SPILL REPORTING
(24 HOURS)
867-920-8130**

**DANGEROUS GOODS
COMPLIANCE CENTRE
ALBERTA 1-780-422-9600**

**RTL ROBINSON ENTERPRISES LTD.
867-873-6271**

ERP2 - 0448

RTL ROBINSON ENTERPRISES LTD. OIL AND HAZARDOUS MATERIAL CONTINGENCY PLAN

COMPANY POLICY

It is the policy of RTL Robinson Enterprises Ltd. to prevent spills through safe road design, strict operating procedures and through employee training and orientation. In the event of a spill, every effort will be made to contain and clean up the spill. All employees involved in winter road operations must be familiar with this plan. This plan will be reviewed annually and changed if required.

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1.0 INTRODUCTION

RTL Robinson Enterprises Ltd. handles and transports many types of dangerous goods during the winter road phase of its operation. To a lesser degree some of the same materials are transported by highway during other times of the year.

Accidents happen and occasionally hazardous materials are involved. In order to lessen any adverse environmental impact the company has initiated an Emergency Rapid-response Spill Recovery Team. The team consists of trained personnel, both management and labour, who have specific duties and areas of responsibility. A combination of expertise and equipment is utilized to ensure rapid spill recovery clean-up in order to minimize environmental impact caused by spilled materials.

Due to RTL Robinson Enterprises Ltd.'s experience and expertise in the Dangerous Occurrence recovery field, the company has, in the past, and can expect in the future to be called upon by various agencies and transportation companies to recover spills and equipment at various locations within its operating area.

This contingency plan is designed specifically to satisfy the requirements of RTL Robinson Enterprises Ltd., and to comply with Federal Dangerous Goods legislation passed in March 1985. The plan has the potential of wide application as its design allows modification for different commodities and conditions.

Should it be required, there is, nation-wide, a large resource of equipment and personnel; for example, vacuum trucks, large cranes, etc., as well as chemical and petroleum industry Emergency Response Teams.

Because of logistical times involved, RTL Robinson Enterprises Ltd. decided not to include any of the above resources in this contingency plan. Instead, RTL Robinson Enterprises Ltd. has chosen to base the plan on resources that are directly available to it and can be mobilized within a short time period, say, not in excess of six hours.

Core and supervisory personnel receive training in spill prevention, control and recovery through in-service programs. Advanced and additional training is available to company staff through a variety of agencies nation-wide and is continuous. Personnel listed are permanent employees who have been employed by RTL Robinson Enterprises Ltd. for a number of years.

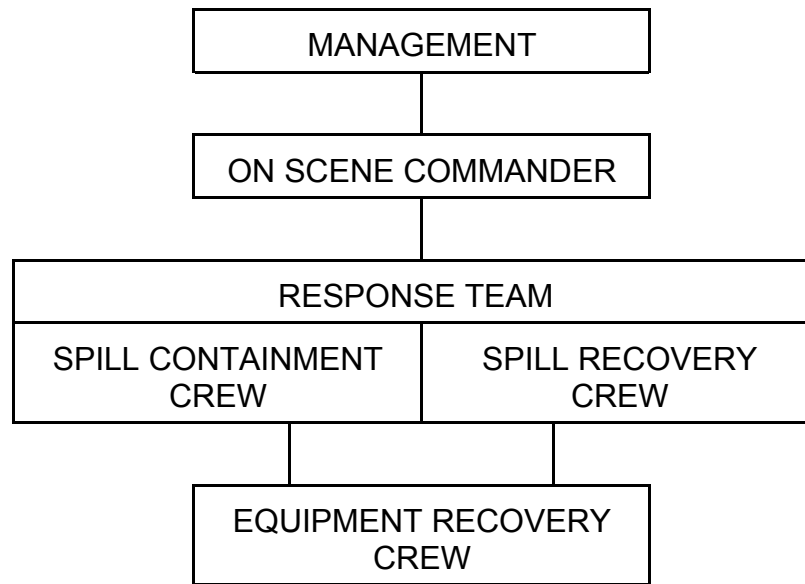
As is required by the new legislation, all of our drivers receive basic dangerous goods training when or shortly after they are hired. RTL Robinson Enterprises Ltd., as a matter of principle, does not accept training provided to employees by former employers, but prefers to initiate its own training programs.

RTL Robinson Enterprises Ltd. takes pride in presenting this contingency plan. The company feels the plan directly reflects our emergency response capabilities and provides the reader with an indication of our commitment towards an environmentally safe operation.

Marvin Robinson
President

January 19, 2004

2.0 SPILL RESPONSE TEAM ORGANIZATION AND DUTIES



2.1 RESPONSIBILITIES AS MEMBERS OF SPILL RESPONSE TEAM

Described in this section are the various areas of responsibility relating to the different components of the Spill Response Team.

2.1.1 MANAGEMENT

1. Ensures that transport equipment is in working order.
2. Ensures that where possible, the winter roads are designed properly to reduce hazards.
3. Ensures that the On Scene Commander has been properly trained.
4. Ensures that all involved employees and sub-contractors are trained.
5. Ensures that the spill response equipment is available and maintained.
6. Ensures that all spills are reported to the Spill Report Line.
7. Deals with the media.

2.1.2 ON SCENE COMMANDER

1. Receives the following training from Petroleum Industry Training Service:
 - "On Scene Spill Commander"
 - "Oil Spill Containment and Recovery"
 - "Transportation and Spill Response for Dangerous Goods"
2. Becomes familiar with Company library reference material related to Spill Response.
3. Trains employees and sub-contractors on spill prevention and initial response.
4. Trains response crew.
5. Maintains spill response equipment.
6. Acts as On Scene Commander in the event of a spill:
 - mobilizes Response Crew.
 - manages and directs all operations related to containment, clean up and disposal.
 - liaises with government agencies.
 - monitors site as required to ensure all spilled material is removed.

2.1.3 RESPONSE CREW

1. Must become familiar with techniques, materials and equipment used for spill response.
2. Must be familiar with Company policy on spill prevention and response.

2.1.4 EQUIPMENT OPERATORS

1. Must be familiar with the hazardous properties and characteristics of cargo hauled.
2. Must be familiar with Company procedures for spill containment.
3. Must ensure that basic spill response equipment is on the vehicle and Initial Response Action Card is in the vehicle.
4. Must radio the Company immediately in the event of a spill from his unit.
5. Must assist other operators in attempting to contain spill until Spill Response Team arrives.
6. Must keep a diary of his actions taken during spill.
7. Refers all media enquiries to Management.

2.2 SPILL RESPONSE TEAM PERSONNEL

MANAGEMENT

Mr. Marvin Robinson
Mr. Donnie Robinson

ON SCENE COMMANDER

Mr. Marvin Robinson or as required

RESPONSE TEAM

Mike Suchlandt - Containment Crew Leader
Bob Wheaton - Containment Crew Leader
Larry Wheaton - Containment Crew Leader
Dale Christensen - Tanker Crew Leader
Terry Shaw - Containment Crew Leader
Rickie Robinson – Containment Crew Leader

EQUIPMENT OPERATORS

Various Personnel

3.0 PREVENTION, TRAINING AND PRACTICE DRILLS

RTL Robinson Enterprises Ltd. wants to prevent spills of oil and hazardous materials. This helps to eliminate environmental damage and saves money in lost fuel, clean up costs and fines levied under various environmental protection acts.

The key to prevention is training and awareness. People are trained to do certain jobs in ways that make them safer and must be aware of things that can go wrong and what to do about them.

This section describes the ways the Company prevents spills and the training that various personnel have to prevent spills.

3.1 OPERATOR REQUIREMENTS

3.1.1 EQUIPMENT OPERATORS

1. Must have the proper operating licences for the equipment to be used.
2. Must be familiar with the Company's policy on hydrocarbon and hazardous material spills.
3. Must be familiar with the hazards and characteristics of the cargo that he is hauling or handling.
4. Must be familiar with the Company's Initial Response Procedures.
5. Must inspect the equipment prior to his trip and ensure that it is in proper operating condition.
6. Must ensure that the vehicle is equipped with a copy of the Initial Response Procedures and the fact sheet on hazardous materials, polyethylene, shovel, chains and flagging material.
7. Must be aware of Company imposed speed limits and road signs.
8. Must not use drugs or alcohol while operating equipment and be aware that use of these substances is cause for dismissal.

3.1.2 MANAGEMENT

1. Management will ensure that all equipment is in proper operating condition, and
2. Will ensure that winter roads are designed for travel by equipment used. This will include reviewing routes from year to year and making improvements to areas that are found hazardous.
3. Will ensure that personnel are properly trained, and
4. Will provide relevant educational material to their employees.

3.1.3 ON SCENE COMMANDER

1. Must participate in the following courses by Petroleum Industry Training Service:
 - On Scene Spill Commander
 - Oil Spill Containment and Recovery
 - Transportation and Spill Response for Dangerous Goods
2. Must become familiar with the following:
 - Clean Up Manual - Alberta Environment
 - Response to Inland Oil Spills
 - The Basics of Oil Spill Cleanup
 - Basics of Oil Spill Response
 - Oil Spill Containment and Recovery
3. Must provide in-house training to all employees and sub-contractors on prevention and initial response.

3.1.4 RESPONSE CREWS

1. Must attend training courses as directed by the Company.
2. Must become familiar with materials and equipment for on-site clean up of an oil spill.

3.1.5 ROAD SUPERVISION

1. Monitors road condition.
2. Ensures equipment is being operated in a safe manner.
3. For loads such as acid and cyanides: acts as pilot for convoys by driving ahead and checking hazardous areas - checks drivers to see that they have taken sleep breaks.
4. Has radio communication with base, trucks and company aircraft.

3.2 SPECIFIC TRAINING OF EMPLOYEES

ON SCENE COMMANDER COURSE - (PITS) 1984
Marvin Robinson

SPILL RESPONSE AND RECOVERY - Petroleum Industry Training Service. (PITS)
- Edmonton, Alberta 1984
Marvin Robinson
Donnie Robinson
Rick Robinson

EMERGENCY PLANNING COURSE - Calgary Fire Department - 1984
Marvin Robinson
Donnie Robinson

TANKER ROLLOVER COURSE - (PITS) 1985
Marvin Robinson

Donnie Robinson

DANGEROUS GOODS AWARENESS SEMINAR - Transport Canada/Emergency
Planning Canada - Arnprior, Ontario

Marvin Robinson
Donnie Robinson
Larry Wheaton

DANGEROUS GOODS INSTRUCTORS PROGRAM

Mike Suchlandt - NAIT Edmonton, Alberta - 1999
Terry Shaw – British Columbia Safety Council - 1994

PROFESSIONAL DRIVER IMPROVEMENT COURSE

Available to all drivers on an annual basis

ST. JOHN'S FIRST AID

Thirty staff members every two years

ATISA - (1997) Extended Length Instructors Course, Red Deer, Alberta

Marvin Robinson
Donnie Robinson
Rickie Robinson
Mike Suchlandt
Terry Shaw (2002)

LPG Emergency Response Training, Amcoc Oil Company – 1997

Marvin Robinson
Donnie Robinson
Larry Wheaton
Dale Christensen
Rickie Robinson

SAFETY SUPERVISORS

Mike Suchlandt - Yellowknife, NT
Terry Shaw - Edmonton, AB

MIKE SUCHLANDT – TRAINER

EDUCATION:

- 1974 Driver Examiner Training Program - Calgary, AB
- 1976 St. John's Ambulance Instructors Course - Standard and Emergency
Qualification Edmonton, AB
- 1976 Qualification for Alberta Driver Instructor's License, Edmonton, AB
- 1977 Antogogy Course, Keyano College, Fort McMurray, AB
- 1978 Pedagogy Course, Keyano Collage - Fort McMurray, AB
- 1980 District Trainer School, Dowell Schumberger, Kellyville, Oklahoma
Red Cross Industrial Multi-media Standard First Aid Instructors Program -
Kellyville, Oklahoma

- British Columbia Instructors Air Brake Course – Certificate #1252 Canadian Association of Fleet Supervisors
- 1983 St. John's Ambulance CPR Course - Red Deer, AB
Motor Fleet Supervisors Course - Alberta Safety Council
- 1984 Xerox Interpersonal Managing Skills - Dowell Schlumberger
Commentary Driver Instructor's Program, Dowell Schumberger, Kellyville, Oklahoma
Public Safety Services Dangerous Goods Control Course
- 1985 Air Brake Instructors Course for AB, SK and BC
Public Safety Services Dangerous Goods Control Course
- 1986 Driver Improvement Instructor Training Course, Driver Training Associates
- 1989 Alberta Transportation of Dangerous Goods Instructor's Course
- 1990 Workplace Hazardous Materials Information System Instructor Certification, Safety and Public Services Safety Division
- 1991 NWT Mines and Safety Division Surface Blasting Certificate
Oil Spill Containment and Recovery Course, Canadian Petroleum Products Institute
- 1992 Workers' Compensation Board, Work Place Hazardous Materials Information System
- 1993 Leadership for Safety Excellence, Alberta Construction Association
WHMIS Instructor Program, Alberta Construction Association
Transportation of Dangerous Goods Instructor Program, Alberta Construction Association
Flag Person Instructor Training Program, Alberta Construction Association
- 1994 Dangerous Goods Instructor's Renewal, NAIT
RTL Robinson Enterprises Ltd. Extended Length Program
Joint Safety and Health Committees, Workers' Compensation Board
Peer Health and Safety Auditor, Alberta Construction Association
Incident and Accident Investigations, Worker's Compensation Board
- 1995 Medic First Aid Instructors Course
Office Compliments - Guide to Employment Law
Office Compliments - Recruiting and Selecting Personnel Course
- 1996 Dupont Emergency Reporting
Mine Safety NWT Supervisor Certificate
Leadership in Safety Excellence
Emergency Response Explosives
Claims Management for Employers
- 1997 NWT Blasting Certificate
Instructor Extended Length Vehicle Combination Program
Explosives Handling Permit
Alta Certified Peer Auditor
LPG Emergency Response Training, Amoco Oil Company
Alcohol & Drug Supervisor Training - JJ Keller
- 1998 Supervisor Training on Company Alcohol and Drug Policy, Canadian Motor Carrier Consortium
Workplace Alcohol and Drug Training for Supervisors, Canadian Motor Carrier Consortium
Managerial and Negotiating Skills Workshop, Alberta Safety Council

- 1999 Dangerous Goods Instructor Renewal - NAIT
Oil Spill Containment and Recovery, Canadian Petroleum Products Institute
- 2000 Alberta Certified Auditor Re-certification, AB Construction Association
WHIMIS Train the Trainer Re-certification, AB Construction Association
Professional Driver Instructor Course Re-certification, AB Safety Council
Collision Investigation, Level II, Canadian Traffic Education Centre
Oil Spill Containment and Recovery, Canadian Traffic Education Centre
- 2001 St. John Ambulance First Aid/CPR Instructor Re-certification
Mine Safety Supervisor II Certificate Renewal
- 2002 Alberta Long Combination Vehicle Program Instructor
Alberta Air Brake Program Instructor
Transportation of Dangerous Goods Instructor - NAIT
Transportation of Dangerous Goods instructor – Alberta Construction Association
- 2003 Explosives Handling Permit Nunavut and Northwest Territories
Blasting Certificate Nunavut and Northwest Territories
Alberta Safety Council DDC and PDIC Instructor Re-certification

POSITIONS HELD:

1988 – Present

RTL – Robinson Enterprises Ltd., Yellowknife, NT

Safety and Personnel Manager

- Filling personnel requirements; truck drivers, operators, mechanics, cooks, pipe layers, and labourers
- Liaison with Highway Patrol, RCMP, Occupational Health and Safety Division, WCB, Safety Meetings, Safety Committee Meetings, Accident Investigations, Workers' Compensation Reporting, Labour Canada, GNWT and Federal Government Environment Officials.
- Administrator of Drug and Alcohol program
- All training, auditing, supervision of RTL's Branch Office Safety Coordinator
- Administrator of Quality Assurance

TERRY SHAW – TRAINER

- 1993 Air Brake Instructor – Province of British Columbia
- 1993 Hazard Avoidance Instructor – British Columbia Safety Council
- 1993 Air Brake Instructor – British Columbia Safety Council
- 1994 Transportation of Dangerous Goods Instructor, British Columbia Safety Council
- 1994 WHMIS Instructor, British Columbia Safety Council
- 1996 Driver Training Instructor Licence - ICBC
- 1996 First Responder Level III Program – Justice Institute of BC
- 1997 Live Fire Level I – Justice Institute of BC
- 1997 Emergency Vehicle Driver Training – Justice Institute of BC
- 1998 Oil Spill Containment and Recovery - CPPI
- 1999 Smart Driver Program For Heavy Vehicle Master Trainer Natural Resources Canada
- 1999 Instructor Alberta Air Brake Course – Alberta Transportation and Utilities

- 1999 Urine Drug Collection Procedures (US DOT CFR Part 40) Dynacare Kasper Medical Laboratories
- 1999 Instructor PDIC II - Atisa
- 2000 Breath Alcohol Technician – Canadian Occupational Health Resources Inc.
- 2002 AMTA – PDIC Instructor Re-certification
- ALTA – Long Combination Vehicle Program Instructor
- ALTA – Air Brake Program Instructor
- 2003 AMTA – PDIC Instructor Re-certification
- AMTA – Long Combination Vehicle Instructor Re-certification

3.3 PRACTICE DRILLS

The company will undertake yearly programs to carry out a spill exercise simulating various situations that might be encountered. A film of an exercise was produced in 1985, which will be used to train employees.

EXERCISES USED IN 1987 INCLUDE:

- Tomark Dangerous Goods Course held in June 1987
- Three RTL Rollover Exercises in 1987

EXERCISES USED IN 1997 INCLUDE:

- Amoco Rollover Course
- Yellowknife Mock Spill Disaster (Fire Dept, RCMP, Pollution Control, RTL)

EXERCISES USED IN 2000 INCLUDE:

- Accident recovery Feb 20th, 2000 - see below.

EXERCISES USED IN 2002 INCLUDE:

- Accident Recovery Aug 11/02 – RY- 02 -195
- Accident Recovery Jan 12/02 – RE – 02 - 08

EXERCISES USED IN 2003 INCLUDE:

- Accident Recovery Jan 3/03 – RY – 03 – 01
- Accident Recovery Feb 11/03 – RY – 03 – 27
- Accident Recovery Feb 17/03 – RY – 03 – 44

Response / Recovery Tracking Sheet

Date of Incident

AUGUST 11/02

Location

HWY #3 JOB # 01565

Brief Description

WATER TRUCK ROLLOVER,
UNIT 18007-50623.

Non-Company Hired Services

RTL equipment and personnel:

Date	Time Out	Name	Equipment mobilized	Equipment hauled	Time back
Aug 11	—	Donnie R	10-105	Supervisor.	1 HR
Aug 11	—	Fred Bernstein	63509-800402	ON SITE	1 HR
Aug 11	—	Lamy W	10-120	ON SITE	1 HR
Aug 11	—	ABE KOE	63507-400402	ON SITE.	1 HR

4 HRS

RESPONSE/RECOVERY SUMMARY
RE-02-08 Northwoods
MVA Mosquito Creek - January 12/02

		Hours
Jan 12/02	Equip.Operator w. P/up	5
	Winch Tractor w. trailer	3
	D 6 w. operator	5
	Safety Supervisor w. Safety Truck	5.5
Jan 13/02	Winch Tractor (#2) w. trailer	8.5
	250 loader	10
	D 6 w. operator	5
	Pilot vehicle w. operator	7
	Operator w. Pick-up	9
	Hwy Tractor (dry)	6
	Permit 47395 (mobe loader)	
	Permit 47393 (de-mobe loader)	
	Bag Absorbent	1
Jan 14/02	Crane with operator (transfer SN106)	2
	Picker truck w. operator (")	1
	Transport SN106 YKE - DGP (YKM0279139)	
Jan 17/02	Picker Truck w. operator (transfer cement bags)	5
	Laborer (" ")	5

TOTAL RECOVERY/RESPONSE

4.0 SPILL REPORTING

4.1 EQUIPMENT OPERATORS

All equipment operators will report immediately to the Company by radio, any spills of fuel or hazardous materials. This will include all spills, even though they may be by other users of the road. The spill will be flagged by that employee or operator. This report will include:

1. anyone injured
2. name of person reporting the spill
3. time of spill or time spill noticed
4. material spilled (type and quantity if possible)
5. where on route the spill occurred and whether on land, ice or water
6. weather conditions
7. cause of spill
8. initial action taken, ie: containment

4.2 MANAGEMENT

All spills will be reported to NWT 24-hour Spill Report Line:

Phone: 867-920-8130 Fax: 867-873-6924

Spill Line will send the spill report out to all government agencies involved. They designate lead agency for follow up.

RTL Robinson Enterprises Ltd. employees will complete an "Initial Report of An Accident" form (Example to follow this page).

INITIAL REPORT OF AN ACCIDENT

This form is to be completed upon receipt of the **FIRST CALL** regarding an accident.

ACCIDENT FILE#: _____

DRIVER'S NAME: _____ DATE: _____

CALL REC'D BY: _____ DATE: _____

ACCIDENT LOCATION: _____

CONTACT DRIVER AT: _____

TRUCK#: _____ TRAILER#: _____ PUP#: _____

LOADER: _____ EMPTY: _____ PRODUCTS: _____

ANYONE INJURED?: _____ IF YES, GIVE NAME: _____

NAME OF OTHER PARTY (IF ANY): _____

PHONE#: _____ GET APPRAISAL: _____

NAME OF WITNESS: _____

PHONE#: _____

RCMP NOTIFIED?: _____ WHICH DETACHMENT: _____

WHO REPORTED THE ACCIDENT?: _____ PHONE#: _____

INITIAL DRIVER'S STATEMENT: _____

DESCRIPTION OF DAMAGE: _____

TRACTOR: _____

LEAD TRAILER: _____

PUP TRAILER: _____

SIGNATURE: _____

DATE RETURNED TO SERVICE: _____

5.0 EQUIPMENT FOR SPILL RESPONSE

5.1 RESPONSE TRUCK

The truck is a four-wheel drive 3-Ton truck equipped with a V-plow and van. The truck will be used for the initial response to spills and will carry the following items:

- **Polyethylene:** To contain, gather or collect fuel in dykes or sumps to facilitate recovery.
- **Shovels:** To move snow or other materials, to build dykes or sumps to contain oil temporarily.
- **Absorbent Material:** Either manufactured material or hay bales to be used to absorb hydrocarbons spilled. This material will be deposited and burned, if possible at an approved disposal site.
- **Tiger Torches:** To heat and ignite residual hydrocarbons that cannot be pumped off into tanks or tankers.
- **Needle Bars and/or Chisels:** To make trenches in the ice or frozen ground to direct the flow of fuel oils so that it may be pumped off or burnt. Additional usage includes making holes in the ice so that any oil under the ice may be gathered and recovery attempted.
- **Ice Augers:** To drill holes in the ice to obtain water, if necessary or to recover hydrocarbons that may have gathered under the ice.
 - To check ice thickness so that required equipment can be spotted without danger.
- **Hatch Cone Covers:** To catch fuel oil that is leaking from a hatch cover and facilitate the opening of the hatch closure without unnecessary additional spills of fuel while hoses are attached during pumping operations.
- **Pumps with Hose:** To pump fuel, oil or other liquids.
- **Road Barricades:** To temporarily block a road, if necessary. This will keep the general public away from the accident providing safety for the Response Team in the case of flammable products and will also prevent tracking of material until a detour can be plowed.
 - To restrict access to the site by unauthorized personnel, thereby limiting the likelihood of a careless or unexpected ignition source. By closing the area to general access the problem of the spread of materials by tracking is reduced.
- **Recovery Porta Tank:** 1500 Gallon #3002
- **Hazmat Liner:** To pump spilt hydrocarbons into.
- **Bio Packs:** Self-contained breathing apparatus for use with products that impose a breathing hazard while recovery is undertaken.
- **Trailer:** A 38-foot trailer has been designated as an emergency response trailer. It has been well stocked with emergency response items. A tractor can hook on to this unit at any time for emergency purposes. As this unit is self-contained, emergency gear is easily accessible.
- **Miscellaneous Other Equipment:** As required.

5.2 ADDITIONAL EQUIPMENT

- **Dump Trucks:** To transport contaminated material from the accident to an approved dumpsite.
- **Vacuum Truck:** Form of pump truck that will remove the fuel and soil mixture.
- **Loader, Loader-Backhoe:** To make trenches to contain fuel or oil, to scrape ice or frozen ground, to clean up and load contaminated material.
- **Low Boy/High Boy Trailers:** To transport equipment to and from accident.
- **Grader and/or Plow Truck:** To make detours around spill sites and to grade or scrape contaminated material so it may be hauled to an approved dumpsite.
- **Additional Labour:** To be available if required.
- **Aircraft (with skis):** To patrol route and to transport crews if necessary.
- **40 Ton Crane:** To be used with or without other equipment to assist with recovery of any vehicles involved in an accident.
- **Truck with Overhead Crane/Winch:** To be used with or without other equipment to assist with recovery of any vehicle involved in an accident.
- **Warning Signs:** To warn public and equipment operators of a hazardous area on route.
- **Patch and Seal Materials:** To temporarily patch equipment such as tankers to restrict or prevent the flow of fuel/oil when possible.
- **Helicopter:** To patrol route and transport injured persons on a stretcher to hospital, if required.
- **3 Emergency Response Trailers** – converted to be pulled behind a pickup
 - One in Edmonton
 - One in Enterprise
 - One in Yellowknife, which is positioned along the Winter Road or at a particular mine Site.

6.0 ENVIRONMENTAL PROTECTION

RTL Robinson Enterprises Ltd. realizes that routes used by us during winter road operations traverse some environmentally sensitive areas. With this in mind, the Company has available at head office in Yellowknife a series of land use maps produced by DIAND. These maps show in detail sensitive areas and anticipated winter road routes. The information contained on these maps allows RTL Robinson Enterprises Ltd. to plan routes and maintain contingency plans so that in the event of a spill of environmentally hazardous material, damage to fisheries, migration routes, wildlife habitat or recreational areas may be minimized.

7.0 ACTION PLANS

7.1 PURPOSE

Action plans serve the following purposes:

1. They provide product data.
2. They describe the initial response action to be taken by the first person on the scene.
3. They warn that person of the dangers of the product
4. They indicate to the Response Team the best response for different types of spill situations.
5. They warn the Response Team of product hazards.
6. They warn the Response Team against inappropriate countermeasures.

7.2 HOW THIS SECTION IS SET UP

There are two main classes of materials hauled by the Company:

1. Hydrocarbons (gasoline, diesel, propane)
2. Chemicals (cyanides, acids, ethylene glycol, etc)

Since these two classes of materials have different characteristics, different clean up techniques must be used for each.

Hydrocarbons have similar hazards and countermeasures, and will be dealt with under one section, with special cautions for gasolines and propane.

The chemical commodities are all different, so each one has its own section.

Each section concerning a particular material contains the following:

- Initial response actions
- Product hazards and warnings
- Countermeasures
- Containment
- Clean up
- Disposal

The section on hydrocarbons deals with six typical situations (scenarios) that the Company feels could take place if a tanker truck is involved in an accident. For each scenario, measures to be taken are described.

7.3 HYDROCARBONS

INITIAL RESPONSE ACTION

PROPANE

1. Eliminate all ignition sources including engine
2. Notify Management
3. Avoid direct contact with liquid propane
4. Place highway warning devices (non-pyrotechnic type)
5. If no risk to personnel, try to stop leak
6. If leak cannot be stopped, evacuate the area to a minimum of 1000 metres.

GASOLINE AND DIESEL

1. Eliminate ignition sources including engine.
2. Avoid direct contact with spilled material
3. Set out warning markers (non-pyrotechnic type)
4. If possible, without personal risk, stop discharge of material
5. Notify Management
6. Contain spill if possible
7. Build a dyke around the spill area using snow or dirt
8. Prevent the spill from running into stream courses
9. Keep unauthorized persons back a minimum of 600 metres.

PROPANE
P.I.N. 1978
P.I.N. 1075 LIQUIFIED PETROLEUM GAS

PRODUCT HAZARDS AND WARNINGS

Of major concern with propane is the hazard of fire or explosion. Propane is highly flammable and containers may rupture violently if exposed to fire. The resulting explosion generates a large fireball and distributes debris over a wide area.

COUNTERMEASURES

EVACUATION

- Evacuate people within 1000 metres

FIRE

- Wear fire protective clothing and SCBA
- Approach only from up wind
- Vapours are heavier than air
- Flammable **VAPOURS** may spread away from spill to a source of ignition, flashing back to source of leak
- Small fires can be extinguished with dry chemical or CO₂
- For large fires use large quantities of water: spray, fog or foam
- Move containers from fire area if no danger to personnel
- Stay away from ends of tanks
- Cool containers with water from maximum distance using unmanned monitors until fire is out
- Let burn unless leak stopped immediately
- Withdraw immediately in case of **RIISING** sound from venting safety device or discoloration of tank material
- Keep internal combustion engines **OUT** of **SPILL** area

CONTAINMENT

- Vapour cannot be contained
- Use water spray to disperse vapours

RECOVERY

- Cannot be recovered from damaged tank - **MUST** be allowed to disperse

DIESEL

P.I.N. 1202 (P40, P50 DIESEL FUEL)

PRODUCT HAZARDS AND WARNINGS

Diesel fuel poses a hazard as a combustible liquid. It is also an environmental pollutant with the potential to destroy plant and aquatic life.

COUNTERMEASURES

FIRE

- Small fires may be extinguished with dry chemicals or foam
- Large fires require water: spray, fog or foam
- Since diesel floats on water, excessive water will spread the fire
- Use water spray to cool containers of diesel involved in a fire

CONTAINMENT - LAND

- Stop or reduce discharge if this can be done safely, (for example, close or repair valves)
- Plug or patch the leak if possible. Plug and dyke the leak if possible.
- Direct the leak to a catch area
- Punctures may be sealed using a number of plug devices which are in Company Response Truck - bolt/neoprene pad combinations, foam plugs
- Once sealed, the cargo should be transferred to an empty tanker
- Contain spill by means of snow or dirt dykes built by hand or heavy equipment
- If possible, line the dyke with polyethylene to ensure impermeability
- If water can be pumped from a lake, snow dykes can be coated with water to form ice. This will help to reduce the leakage through the dyke.
- Dig ditches to divert oil away from important water bodies

CONTAINMENT - ICE

- It is difficult to contain fuel under an ice surface as it spreads under the ice
- In lakes, drill holes in the ice until the limit of oil is found
- Ignite the oil in the bore holes
- If it is safe to do so, cut slots in the ice and burn the diesel floating there
- If the oil is in a river, a slot can be cut in the ice downstream where the oil can be trapped for burning
- In practice, containment of oil under ice in lakes and rivers is very difficult

RECOVERY

- Oil can be off-loaded from a leaking tank through the dispensing manifold or by

suction hose through the hatchcover

- If the tanker is upside down this is not possible and different techniques are required
- If the tanker is on its side, hatch cone covers may be installed allowing diesel to be pumped to another unit
- Alternatively, an explosion proof device can be used to make a hole through which a suction hose can be fed
- Sorbent materials can be used for small spills of diesel

DISPOSAL

- Where oil can not be recovered practically, it should be disposed of by burning
- Contact the Government Spill Representative for approval to burn oil
- Diesel can be ignited by a tiger torch
- Oil contaminated snow and burn residues will be picked up and disposed of at Government approved locations

GASOLINE (AV GAS)
P.I.N. 1203 (GASOLINE)
P.I.N. 1863 (AV GAS)

PRODUCT HAZARDS AND WARNINGS

Of major concern with gasoline is fire. Gasoline is highly flammable. Sealed containers in a fire situation are subject to explosion. Contact with gasoline may result in skin irritation and absorption through the skin. It produces slicks on water that can be hazardous to aquatic life.

COUNTERMEASURES

EVACUATION

- Evacuate the area within 600 metres

FIRE

- Wear fire protective clothing and SCBA
- Approach only from up wind
- If no danger smother small fires with sand or dirt
- Use foam or carbon dioxide extinguisher if available
- Small fire can be extinguished with dry chemical extinguisher
- Do not extinguish large fires until all spilled material is burned
- Gasoline vapour, which is heavier than air, hugs the ground. May spread over a large area and will travel with the wind. Intense heat accompanied by violent flash-back to liquid surface will occur if vapours contact a source of ignition.
- If there is no fire, guard against ignition hazards by:
 - Extinguishing all fires and cigarettes in the area
 - Keep internal combustion engines out of the vapour area
 - Try to stop leaks
 - Wooden plugs are good for punctures
 - Lead wool and epoxy or polyester resins and neoprene pads can be used for sealing

CONTAINMENT

- Follow the basic steps as for diesel containment, except be aware that **FIRE** is of major concern
- **Use extreme caution if attempting to ignite a gasoline spill as serious explosion hazard exists**

RECOVERY

- Gasoline should be offloaded from a leaking tanker if it can be done safely
- Follow the basic steps as for diesel, but be aware of the fire hazard
- Use sorbents to clean up spilled gasoline

DISPOSAL

- Dispose of sorbents and/or burnt residues at Government approved sites

TANKER ACCIDENTS

1. Truck through ice - Not leaking

2. Truck through ice - Leaking
3. Truck in ditch, upright - Not leaking
4. Truck upset on land or ice surface, on side - Not Leaking
5. Truck upset on land or ice surface, on side - Leaking
6. Truck upset on land or ice surface, upside down - Leaking/Not Leaking

STEPS TO TAKE IN EACH TYPE OF ACCIDENT

1. TRUCK THROUGH ICE - NOT LEAKING

- Do not approach with heavy equipment
- See that accessible hatches are secure
- Monitor tanker daily to ensure that no leak has developed
- When ice is safe, approach with empty tanker and transfer load
- Remove tanker and truck with equipment
 - NOTE: If it is late in the season, it may be necessary to approach the tanker on foot with a portable pump and transfer the load to a tanker on the shore.

2. TRUCK THROUGH ICE - LEAKING

- A tanker of fuel normally floats because it is lighter than the water it displaces
- If the tanker is leaking, it will eventually sink as water entering the tank will displace the fuel
- It is most important to get the fuel off as quickly as possible
- It is also important to try to support the tanker on the surface of the ice by means of timbers and cables (divers may be used if necessary)
- A heavy line should be attached to the tanker to secure it
- Equipment recovery as required

3. TRUCK IN DITCH UPRIGHT - NOT LEAKING

- If the tanker can be removed without upset, attempt immediate recovery
- Caution must be used: if in doubt, transfer the load
- The cargo should be offloaded partially or fully to an empty tanker
- Equipment recovery as required

4. TRUCK UPSET ON LAND OR ICE SURFACE, ON SIDE - NOT LEAKING

- If possible, use hatch cone covers and polyethylene
- Transfer load
- Remove all or as much fuel as possible before attempting to upright unit
- Equipment recovery as required

5. TRUCK UPSET ON LAND OR ICE SURFACE, ON SIDE - LEAKING

- Attempt to stop leak by tightening hatch or closing valve
- Make dykes to contain spilled fuel
- Build a catch basin around the tanker and line basin with polyethylene - place

suction hose of pump in basin and transfer to empty tanker

- Install hatch cone cover over hatch so fuel can be offloaded
- If tank has small puncture, attempt to plug using toggle-bolt, patch, or whatever is appropriate. Small holes can also be patched using plug and dyke.
- If leak can't be quickly stopped, attempt to contain leaking fuel
- Equipment recovery as required
- Clean up residues as required

6. TRUCK UPSET ON LAND OR ICE SURFACE, UPSIDE DOWN - LEAKING/NOT LEAKING

- Prepare a containment basin around the tanker, using snow or dirt dykes and polyethylene
- If it is leaking, attempt to stop the leak using toggle-bolt, patches, or whatever is available (sticks, rags, etc)
- If possible, turn the tanker on side and use the hatch cone covers to remove fuel
- If not possible to tip it on its side, use an explosion-proof tool to make a hole in the bottom of the tanker and transfer load to empty tanker
- Equipment recovery as required
- Clean up residues as required

7.4 CHEMICALS

SODIUM CYANIDE

P.I.N. 1689

WARNING

Sodium cyanide when mixed with acid, acid salts, or water forms a deadly gas. Unless you are wearing self-contained breathing apparatus (SCBA) and protective clothing, do not approach spill area if drums of sodium cyanide are broken open.

INITIAL RESPONSE

- If possible, stop spill at source. DO NOT approach if danger exists
- Do NOT go near spill area without SCBA
- Be aware that acid and cyanide together make a deadly gas - keep acid sources away from spill, for example broken batteries
- Isolate the area of the spill - keep people back 600 metres
- Approach only from upwind if necessary

PRODUCT HAZARDS AND WARNINGS

- Very toxic by ingestion, inhalation or prolonged skin contact (dust or gas)
- Corrosive to skin because of strong alkalinity
- Liberates highly toxic HCN gas if it comes into contact with acids or acid salts
- Contact with carbon dioxide produces toxic gas (HCN) in lesser quantities
- Contact with water may produce small amounts of HCN gas
- HCN gas can be absorbed through the skin

COUNTERMEASURES

FIRE

- Do not use carbon dioxide extinguishers to fight a fire involving sodium cyanide as this may produce toxic and flammable HCN gas
- Sodium cyanide itself is non-flammable and will not support combustion
- HCN gas **is** flammable
- If water is used to fight a fire involving sodium cyanide, treat runoff as if it were a cyanide spill: do not allow runoff to reach a stream

RECOVERY

- Test area for HCN gas prior to recovery operations. Spills of sodium cyanide on dry surfaces can be shovelled into containers. Crews should wear dust masks and protective clothing. If HCN is present use SCBA and full protective clothing
- Be aware that sodium cyanide can be absorbed through skin
- Sodium cyanide must not be permitted to enter lakes or streams. It is very soluble and once it enters water, virtually impossible to recover.

DISPOSAL

- The best place to dispose of spilled sodium cyanide is at a gold mine using the cyanidation process. Lupin Mine at Lupin; Miramar and Giant Mines at Yellowknife use cyanide in their process
- If the cyanide is not contaminated with soil it may be used in the mill at a mine
- If contaminated, it may be disposed of in the tailing ponds
 - NOTE: This will require approval of the Water Board. Water use and waste disposal at mines is licensed by the Water Board.
- Consult with government officials to ensure that everyone is informed of disposal procedures

PERSONAL HYGIENE

It is very important that anyone involved in a spill of sodium cyanide or in the clean-up operations bathe thoroughly as soon as practical after the incident. Contaminated clothing should be laundered or disposed of according to accepted practice. (See appendix for more information.)

SULFURIC ACID

P.I.N. 1832

INITIAL RESPONSE

- Keep unnecessary people away
- Stay upwind and out of low areas
- Do not touch spilled acid
- Stop leak if you can do so without personal risk
- Call Management

PRODUCT HAZARDS AND WARNINGS

- Poison
- Corrosive - contact will cause burns
- Vapour extremely irritating
- Violent reaction with water

COUNTERMEASURES

FIRE

- Do not get water inside tank
- Fight with dry chemical or CO₂
- Acid not flammable but will ignite paper, wood, oil

RECOVERY

- Use water spray to reduce vapours
- For small spills absorb with sand and then flush area with water
- The recommended method of dealing with acid is to dilute it with large amounts of water. Consult with appropriate government agency for advice on disposal.
- Keep personnel out of contaminated run-off
- Equipment recovery as required

CALCIUM HYPOCHLORITE (DRY)

P.I.N. 2880

INITIAL RESPONSE

- Keep unnecessary people away
- Keep upwind
- Eliminate ignition sources
- Do not touch spilled material
- Stop leak if without personal risk
- Call Management

PRODUCT HAZARDS AND WARNINGS

- Poisonous by inhalation
- Poisonous if swallowed
- Skin contact poisonous
- Contact may cause burns
- Fire may produce irritating and/or poisonous gases
- Reacts with water to produce chlorine

COUNTERMEASURES

FIRE

- Non combustible but gives off oxygen and chlorine at high temperatures
- Most extinguishing agents (preferable water spray) can be used on fires involving calcium hypochlorite

RECOVERY

- Dyke with snow or dirt
- Pick up spilled material, wearing SCBA
- If near water, dilute with large amounts of water if approved by government spill representative
- Personnel must bathe thoroughly after contact

LEAD NITRATE (SOLID)

P.I.N. 1469

INITIAL RESPONSE

- Keep unnecessary people away
- Keep upwind
- Eliminate ignition sources
- Do not touch spilled material
- Stop leak if without personal risk
- Call Management

PRODUCT HAZARDS AND WARNINGS

- Poisonous by inhalation
- Poisonous if swallowed
- Skin contact poisonous
- Contact may cause burns
- Fire may produce irritating and/or poisonous gas

COUNTERMEASURES

FIRE

- Non combustible but may ignite combustibles
- Most fire extinguishing agents can be used
- Can give off toxic lead oxide if heated
- Use SCBA and protective clothing

RECOVERY

- Recover spilled material and put in drums
- Wear protective clothing and dust masks
- Do NOT flush material into water course
- Bathe thoroughly after contact

FERROUS SULPHATE (SOLID)

N.A. 9125

INITIAL RESPONSE

- Keep unnecessary people away
- Isolate spill area
- Stop leak if without personal risk
- Call Management

PRODUCT HAZARDS AND WARNINGS

- Little health hazard
- May be harmful if dust breathed
- Fire may produce irritating gases

COUNTERMEASURES

FIRE

- Use dry chemical or CO₂ for small fires
- Use water, fog or foam for large fires

RECOVERY

- Pick up spilled material with shovels and put in drums
- Use normal caution (dust masks, gloves) for handling
- Normal personal hygiene recommended

HYDROGEN PEROXIDE

P.I.N. 2014 20-52% CONCENTRATION

P.I.N. 2015 53-70% CONCENTRATION

PRODUCT HAZARDS AND WARNINGS

The major hazard with Hydrogen Peroxide is that spontaneous combustion can occur if allowed to remain in contact with oxidizable materials. Drying of product on clothing or combustible materials may cause fire.

COUNTERMEASURES

EVACUATION

- Evacuate people within 1000 metres

FIRE

- Wear rubberized clothing including gloves and boots
- Wear SCBA
- Use only water to extinguish fires
- Cool down tanks
- Keep upwind
- Keep clear of ends of tanks

CONTAINMENT

- Heavy gases or fumes hug the ground. Use water to knock down vapours and dilute the peroxide
- Fire is major hazard

RECOVERY

- Hydrogen peroxide can be off-loaded from a leaking tanker if it can be done safely
- Require distilled water for hose connections and dedicated pump
- Ensure large quantities of water are available in case of fire

HYDRATED LIME (CALCIUM HYDROXIDE)

P.I.N. 9098

INITIAL RESPONSE

- Keep unnecessary people away
- Isolate area
- Stop Leak if without personal risk
- Do not touch spilled material
- Call Management

PRODUCT HAZARDS AND WARNINGS

- Corrosive - causes burning of skin and eyes
- Irritation of respiratory system on inhalation
- Toxic on ingestion

COUNTERMEASURES

FIRE

- Non combustible
- Any extinguishing agent can be used on fires involving hydrated lime

RECOVERY

- Pick up spilled material with shovels and put in drums
- Lime can be disposed of in a tailings pond or reused in the tailings treatment plant at a mine
- Bathe thoroughly after handling

ETHYLENE GLYCOL

INITIAL RESPONSE

- Keep unnecessary people away
- Isolate area
- Stop leak if without personal risk
- Extinguish all ignition sources
- Call Management

PRODUCT HAZARDS AND WARNINGS

- Flammable
- DO NOT inhale - use SCBA
- Moderately toxic by ingestion, contact and inhalation
- Normal hygiene recommended

COUNTERMEASURES

FIRE

- Use water fog, alcohol rated foam, CO₂ or dry chemical
- Flammable vapour may spread away from spill
- Closed containers may explode from heat

RECOVERY

- Dyke with snow or dirt and polyethylene
- Pump into spare tanker
- Flush spill site with large amounts of water to dilute if approved by government spill representative

SODA ASH (SODIUM CARBONATE)
NOT CONSIDERED A HAZARDOUS CHEMICAL

In a spill situation, take normal precautions in handling - dust mask, gloves, goggles.

EXPLOSIVES

Explosive shipping and handling will comply with Territorial Explosives Act.

HIGH EXPLOSIVES

CLASS 1.1 AND 1.5 INCLUDES FORCITES, POWERFRAC, LOGGERS SPECIAL, CILGEL, POWERMEX, HYDROMEX, WET PETN, MAGNAFRAC, TNT BOOSTER

PACKAGING

- Fibreboard boxes

HAZARDS

- Explosion
- Water pollution
- The grouping covers a wide range of high explosives, including nitoglycerinel based explosives, TNT, slurries, water gels and emulsion explosives
- By far the major concern is the potential of a major detonation, which could be caused by fire, impact, or lightening
- While water pollution could be a concern, any protection in this area should be left to people qualified to handle explosives. Also, should the explosives burn instead of detonating, the fumes given off are very toxic. However, the whole area should have been evacuated before fumes become a problem

INITIAL RESPONSE

- Notify Management immediately
- Keep all unauthorized personnel away from the area. If fire is involved, clear to a 1000 metre radius
- Eliminate sources of ignition. Shut off motor, stop or control spillage of gasoline and oil. **NO SMOKING.**

RECOVERY

- Wait for qualified help to handle explosives

AMMONIUM NITRATE PRILLS



PACKAGING

- Bulk or bags

HAZARDS

- Ammonium nitrate (AN) is an oxidizing agent hence will supply oxygen to support combustion of fuels. It can explode violently if overheated in a confined space, particularly if mixed with organic fuels.
- Will emit highly toxic (yellow, red or brown) fumes of nitrogen oxide (NO_x).
- While ammonium nitrate is a fertilizer, it is a toxic material which should not be allowed to enter water courses or wells. It can be harmful to aquatic life in concentration as low as 10-100 ppm.

INITIAL RESPONSE

- Notify Management immediately by quickest means
- Keep unauthorized personnel away from the area
- Eliminate all open sources of ignition. Shut off motor. Stop or control spillage of diesel, oil or gasoline. NO SMOKING.
- In case of fire, cool and extinguish with copious amounts of water. The run off should be contained. If possible, ventilate to reduce pressure build up. Since AN has excess oxygen smothering the fire is useless and could be very harmful. Fire fighters must stay out of NO_x fumes (upwind) or wear Self-Contained Breathing Apparatus. If the fire cannot be controlled, evacuate the area to ½ mile.
- Should anyone be exposed to NO_x fumes, take them to an uncontaminated area, have them lay down, and keep warm. Even if they feel fine they should be examined by a doctor who has been made aware that they have been exposed to NO_x fumes. Avoid exertion.
- Providing fire is not involved, stop the discharge of AN and contain surface run off by dyking around the spill with earth and covering the prills with a plastic sheet to prevent dissolving by rain water.

RECOVERY

- Wait for qualified help to handle explosives

EXPLOSIVES 1.1, 1.2, 1.3 OR 1.5

POTENTIAL HAZARDS:

- Fire, Explosions
- If subject to heat, shock or friction:
 - Explosives of division 1.1 or 1.5 will burn and may detonate EN MASSE at any time
 - Explosives of division 1.2 may burn or detonate with PROJECTION of fragments
 - Explosives of division 1.3 may burn VIOLENTLY
- Health - Fire may produce irritating, poisonous and/or corrosive gases

EMERGENCY ACTION

GENERAL

- Isolate hazard area, Keep unnecessary people away
- Keep upwind and use terrain and buildings for shielding
- Keep away from windows

EVACUATION

- If fire or heat threatens cargo area, consider initially the following minimum evacuation distances in all directions:

<u>Quantity</u>	<u>Division 1.1,1.2 or 1.5</u>	<u>Division 1.3</u>
1000 kg	150 m	70 m
5000 kg	400 m	150 m
20000 kg	700 m	200 m
50000 kg	900 m	300 m
100000 kg	1100 m	400 m

FIRE

- **CARGO** - do not fight fire involving explosives if cargo is subjected to heat. evacuate surrounding area. If possible and without risk, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area. DO NOT MOVE cargo that was exposed to heat except under supervision of a specialist.
- **VEHICLE AND EQUIPMENT** - Use dry chemical, sand or flooding quantities of water. If possible, remove tractor from cargo trailer. Pay special attention to entire fire as re-ignition may occur.

SPILL OR LEAK

- Eliminate all ignition sources
- Do not touch damaged containing vessels, packages or spilled material
- Do not operate radio transmitters within 100 metres of electric detonators
- Do not clean up or dispose except under supervision of a specialist

FIRST AID

- Obtain immediate medical care. Ensure that attending medical staff are aware identity of product (s) involved.

EXPLOSIVES 1.4

POTENTIAL HAZARDS:

- Fire
- Explosion
- If subjected to heat, shock, explosives of division 1.4, including 1.4S (in the same shipment), may burn vigorously with localized detonations and projection of fragments; risks are limited to the immediate vicinity.
- The effects of accidentally initiating packaged explosives of division 1.4S should be confined to the immediate vicinity of the package.
- Health: Fire may produce irritating gases

EMERGENCY ACTION:

GENERAL

- Isolate hazard area
- Keep upwind
- Keep unnecessary people away

EVACUATION

- If fire or heat threatens cargo area of explosives of division 1.4, consider initial evacuation for 100 metres in all directions

FIRE

- **CARGO** - For explosives of division 1.4, fight fire from maximum distance using unmanned hose holders or monitor nozzles. For explosives of division 1.4S, fight fire with normal precautions from reasonable distance to protect personnel. DO NOT MOVE cargo that was exposed to heat except under supervision of a specialist.
- **VEHICLE AND EQUIPMENT** - Use dry chemical, sand or flooding quantities of water. If possible, remove tractor from cargo trailer. Pay special attention to tire as re-ignition may occur.

SPILL OR LEAK

- Eliminate all ignition sources
- Do not touch damaged containing vessels, packages or spilled material
- Do not clean up or dispose except under supervision of a specialist

FIRST AID

- Obtain immediate medical care
- Ensure that attending medical staff are aware of identity of product(s) involved

8.0 REFERENCES

Manual of Spills for Hazardous Materials: Technical Services Branch.
Environmental Protection Service. Environment Canada March 1984.

North American Emergency Response Guide for Dangerous Goods: Transport
Canada. 2000

Cleanup Guidelines for Commonly Spilled Hazardous Materials in Alberta:
Alberta Environment. Environmental Protection Services. Edmonton 1983.

C.I.L. Explosives Emergency Response Manual.

APPENDIX A

PRODUCT DATA SHEETS (FROM EPS MANUAL FOR SPILLS OF HAZARDOUS MATERIALS 2000)

PROPANE

PROPANE

$\text{CH}_3\text{CH}_2\text{CH}_3$

UN No. 1978

IDENTIFICATION

COMMON SYNONYMS

- LPG (see also Butane)
- DIMETHYLMETHANE

OBSERVABLE CHARACTERISTICS

- Colourless gas
- Odourless when pure

MANUFACTURERS

- Superior Propane Ltd., Toronto ON
- Consumers Co-op Refineries Ltd., Regina SK
- Dome Petroleum Ltd., Calgary AB
- Goliad Oil Canada Ltd., Calgary AB
- Mobil Oil Canada Ltd., Calgary AB
- Pacific Petroleums Ltd., Calgary AB
- Home Oil Ltd., Calgary AB

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Liquid (compressed gas)
- **Classification:** Flammable gas
- **Inert Atmosphere:** No requirement
- **Venting:** Safety relief
- **Pump Type:** Rotary LPG
- **Label(s):** Red Label - FLAMMABLE GAS
- **Storage Temperature:** Ambient
- **Hose Type:** LPG type; reinforced high pressure
- **Grades or Purity:** Commercial, technical 97.5%
- **Containers and Materials:** Cylinders tank cars, tank trucks, steel

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical State** (20°C, 1 atm): gas
- **Solubility** (water): Slight, 0.012 g/100 mL (17.8°C)
- **Molecular Weight:** 44.1
- **Vapour Pressure:** 400 mm Hg (-56°C); 6 400 mm Hg (21°C)
- **Boiling Point:** -42.1°C
- **Floatability** (water): Liquefied propane floats and boils
- **Odour:** Odourless when pure, added mercaptans give 500 to 20 000 ppm, odour threshold, natural gas odour
- **Flash Point:** -104°C (c.c.)

- **Vapour Density:** 1.5 (20°C)
- **Specific Gravity** (liquid): 0.58 (-44°C)
- **Colour:** colourless
- **Explosive Limits:** 2.1 to 9.5%
- **Melting Point:** -187.7° to 189.9°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: asphyxiant; rapid irregular breathing, headache, fatigue, nausea and vomiting, convulsions loss of consciousness; Contact: skin and eyes - with propane liquified causes frostbite, burning sensation.
- **Toxicology:** An asphyxiant. Low toxicity.
 - TLV®- (inhalation) Asphyxiant
 - Short term Inhalation Limits - No information
 - LC₅₀ - Human: no effect 10 000 ppm brief exposures; slight dizziness in a few minutes at 100 000 ppm
 - Delayed toxicity - No information
 - LD₅₀ - No information

FIRE

- **Fire Extinguishing Agents:** Stop or reduce discharge if safe to do so. Do not attempt to extinguish fire until leak has been shut off. Use water spray to cool tanks exposed to fire.
- **Behaviour in Fire:** When exposed to heat and flame, containers may rupture. Flash back may occur along vapour trail.
- **Ignition Temperature:** 432°C
- **Burning Rate:** 8.2 mm/min.

REACTIVITY

- **With Water:** No reaction
- **With Common Materials:** Reacts vigorously with strong oxidizing agents. Reacts violently with chlorine dioxide.
- **Stability:** Stable

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Aquatic toxicity rating > 1000 ppm/96h/TLm/freshwater
- **Land-Air:** No information
- **Food Chain Concentration Potential:** None

EMERGENCY MEASURES

SPECIAL HAZARDS

- Flammable

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "FLAMMABLE". CALL FIRE DEPARTMENT. Eliminate all ignition sources. contact supplier or

manufacturer. Flash back may occur along vapour trail. Do not attempt to extinguish fire until leak has been shut off. Contact environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

In fire or confined spaces - Respiratory protection - self-contained breathing apparatus. Goggles - (mono), tight fitting should be worn, to protect from liquid propane, which could cause eye injury from frostbite burn.

FIRE AND EXPLOSION

Stop or reduce discharge if safe to do so. Do not attempt to extinguish fire until leak has been controlled. Let fire burn. Use water spray to cool fire-exposed containers.

FIRST AID

Move victim out of spill area to fresh air. Call for medical assistance, but start first aid at once. Inhalation: if breathing has stopped give artificial respiration; if laboured, give oxygen. Contact: eyes and skin-if exposed to liquid propane, immediately remove contaminated clothing, irrigate eyes and slush skin with water. Treat as for frostbite. Do not rub affected areas. If medical assistance is not immediately available, transport victim to hospital, doctor or clinic.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• WATER

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Notify environmental authorities to discuss disposal and cleanup of contaminated materials

• LAND-AIR

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Recover undamaged containers.
4. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.
- Burn or flare at spill site (under knowledgeable supervision).

DIESEL

OILS, FUEL
(distillates 1, 2 and 2D)
UN No. 1233 kerosene (fuel oil no. 1)
UN No. 1202 Diesel Fuel

IDENTIFICATION

COMMON SYNONYMS

- KEROSENE (Fuel Oil No. 1)
- FUEL OIL NO. 1, 2, 2-D
- DIESEL OIL LIGHT
- HOME HEATING OIL (Fuel Oil No. 2 and 2-1)
- DIESEL OIL MEDIUM

OBSERVABLE CHARACTERISTICS

- Oily liquids
- Light brown to brown colour
- Characteristic diesel fuel-like odour

MANUFACTURERS

- Universally available

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Liquid
- **Classification:** Flammable liquid (kerosene)
- **Inert Atmosphere:** No requirement
- **Venting:** Open (flame arrester)
- **Pump Type:** Gear or centrifugal. Steel or stainless steel.
- **Label(s):** Red label - FLAMMABLE LIQUID (kerosene)
- **Storage Temperature:** Ambient
- **Hose Type:** Neoprene, Viton, polyethylene
- **Grades of Purity:** Kerosene, diesel fuel 1-D, diesel fuel 2; diesel fuel 2-D
- **Containers and Materials:** Drums, tank cars, tank trucks, tankers; steel

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Liquid
- **Solubility** (water): Insoluble (about 30 ppm)
- **Molecular Weight:** Variable
- **Vapour Pressure:** <1 mm Hg (20°C)
- **Boiling Point:** 150 to 350°C
- **Floatability** (water): Float
- **Odour:** Characteristic diesel-like (about 0.1 ppm, odour threshold)
- **Flash Point:** (Fuel 1) 43 to 72°C; (Fuel 2) 52 to 96°
- **Vapour Density:** about 3 to 5
- **Specific Gravity:** 0.81 to 0.90 (20°C)
- **Colour:** Light brown to brown

- **Explosive Limits:** 0.7 to 5% (Fuel 1)
- **Melting Point:** -18 to -46°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: dizziness, headache. Ingestion: nausea and vomiting. Contact: skin - irritation; eyes - irritation. Pneumonitis. Dermatitis may result from prolonged and repeated skin exposure.
- **Toxicology:** Low toxicity by all routes.
 - TLV® (inhalation) 5 mg/m³ (mineral oil particulate mist)
 - Short-term Inhalation Limits - 10 mg/m³ for 15 min (oil particulate mineral mist)
 - LC₅₀ - No information
 - Delayed Toxicity - No information
 - LD₅₀ - Oral: rat = 28 g/kg
 - LD₅₀ - Oral: rabbit = 0.2 g/kg

FIRE

- **Fire Extinguishing Agents:** Foam, carbon dioxide or dry chemical. Water may be ineffective but should be used to cool fire-exposed containers.
- **Behaviour in Fire:** Flash back may occur along vapour trail
- **Ignition Temperature:** (Fuel 1) 210°C; (Fuel 2) 257°C
- **Burning Rate:** 4 mm/min

REACTIVITY

- **With Water:** No reaction
- **With Common Materials:** Reacts with oxidizing agents
- **Stability:** Stable

ENVIRONMENT

- **Water:** Prevent entry into water intakes or waterways. Fish toxicity: 10 ppm/96 h/rainbow trout/lethal/LD₅₀/freshwater; 95 to 135 ppm/96 h/bluegill/LC₅₀/freshwater (fuel oil no. 2); 2 ppm/96 h/grass shrimp/LC₅₀/saltwater; BOD: Not available.
- **Land-Air:** No information
- **Food Chain Concentration Potential:** None

EMERGENCY MEASURES

SPECIAL HAZARDS

- Flammable

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "FLAMMABLE". CALL FIRE DEPARTMENT. Eliminate all sources of ignition. Notify supplier. Stop or reduce discharge if this can be done without risk. Dyke to contain spill and prevent runoff. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Gloves and Boots - neoprene, butyl rubber. Appropriate goggles or face shield.

FIRE AND EXPLOSION

Use foam, carbon dioxide or dry chemical to extinguish. Water may be ineffective, but should be used to cool fire-exposed containers. Flash back may occur along vapour trail.

FIRST AID

Move victim out of spill site to fresh air. Call for medical assistance, but start first aid at once. Inhalation: give artificial respiration if necessary. Contact: skin - remove contaminated clothing follow by washing affected areas with soap and water; eyes - irrigate eyes with plenty of water. Ingestion: do not induce vomiting. If medical assistance is not immediately available, transport victim to hospital, doctor or clinic.

ENVIRONMENTAL PROTECTION MEASURES

RESPONSE

- **Water**
 1. Stop or reduce discharge if safe to do so
 2. Contact manufacturer or supplier for advice
 3. If possible, contain discharge by booming
 4. If floating, skim and remove
 5. Notify environmental authorities to discuss disposal and cleanup of contaminated materials
- **Land-Air**
 1. Stop or reduce discharge if safe to do so
 2. Contact manufacturer or supplier for advice
 3. Contain spill by dyking with earth or other barrier
 4. Remove material with pumps or vacuum equipment and place in appropriate containers
 5. Recover undamaged containers
 6. Absorb residual liquid on natural or synthetic sorbents
 7. Notify environmental authorities to discuss disposal and cleanup of contaminated materials

DISPOSAL

- Contact supplier for advice on disposal
- Contact environmental authorities for advice on disposal
- Incinerate (approval of environmental authorities required)
- Oil and slightly contaminated oil may be recycled in a refinery

GASOLINE

GASOLINE

UN No. 1203

IDENTIFICATION

COMMON SYNONYMS

- PETROL
- AUTOMOTIVE FUEL
- AV-GAS
- Leaded contains tetraethyl lead
- Lead-free may contain other compounds

OBSERVABLE CHARACTERISTICS

- Colourless (or dyed red, purple) liquid
- Typical gasoline odour

MANUFACTURERS

- Universally available

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Liquid
- **Classification:** Flammable liquid
- **Inert Atmosphere:** No requirement
- **Venting:** Open (flame arrester) or pressure vacuum
- **Pump Type:** Standard
- **Label(s):** Red and white label - FLAMMABLE LIQUID; Class 3, Group II
- **Storage Temperature:** Ambient
- **Hose Type:** Standard
- **Grades of Purity:** Various octane ratings or use ratings: Leaded or Lead-free
- **Containers and Materials:** Cans, drums, tank cars, tank trucks; steel

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Liquid
- **Solubility** (water): 1 to 100 ppm/100 mL water
- **Molecular Weight:** Mixture of materials
- **Vapour Pressure:** 300 to 600 mm Hg (20°C)
- **Boiling Point:** 40 to 200°C
- **Floatability** (water): Floats
- **Odour:** Gasoline (0.25 ppm, odour threshold)
- **Flash Point:** -43°C (c.c.) (up to 60 octane); -38°C (c.c.) up to 100 octane; -46°C (c.c.) aviation
- **Vapour Density:** 3 to 4
- **Specific Gravity:** 0.75 to 0.85 at 20°C
- **Colour:** Colourless to (dyed red or purple)
- **Explosive Limits:** 1.4 to 7.6%
- **Melting Point:** -90°C to -75°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: vapours cause rapid breathing, excitability, staggering, headache, fatigue, nausea and vomiting, dizziness, drowsiness, narcosis, convulsions, coma. Ingestion: gastrointestinal irritation, dizziness, fatigue, loss of consciousness, coma. Contact: skin - dryness, cracking, irritation; eyes - watering, stinging and inflammation.
- **Toxicology:** Moderately toxic by inhalation.
 - TLV® - 300 ppm; 900 mg/m³
 - Short-term Inhalation Limits - 1500 ppm; 1 500 mg/m³ (15 min)
 - LC₅₀ - No information
 - LC_{Lo} - Inhalation: man = 900 ppm/1 Hour
 - LD₅₀ - No information
 - Delayed Toxicity - No information

FIRE

- **Fire Extinguishing Agents:** Foam, carbon dioxide, dry chemical. Water may be ineffective and cause fire to spread, but may be used to cool fire-exposed containers.
- **Behaviour in Fire:** Flashback may occur along vapour trail
- **Ignition Temperature:** 280°C, up to 60 octane; 456°C, up to 100 octane; 440°C, 100 to 130 octane (aviation grade); 471°C, 115 to 145 octane (aviation grade).
- **Burning Rate:** 4 mm/min

REACTIVITY

- **With Water:** No reaction
- **With Common Materials:** Can react vigorously with oxidizing materials
- **Stability:** Stable

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Harmful to aquatic life. Fish toxicity: 90 ppm/4 h/juvenile American shad/TLm/freshwater; 91 mg/L/24 h/juvenile American shad/TLm/saltwater; 5 to 40 ppm/96 h/rainbow trout/TLm/freshwater; BOD: 8%, 5 days.
- **Land-Air:** No information
- **Food Chain Concentration Potential:** None

EMERGENCY MEASURES

SPECIAL HAZARDS

FLAMMABLE

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "FLAMMABLE". Call

Fire Department. Eliminate all sources of ignition. Notify manufacturer. Dyke to prevent runoff. Shut off leak, if safe to do so. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Protective clothing as required.

FIRE AND EXPLOSION

Use foam, dry chemical or carbon dioxide to extinguish. Water may be ineffective and cause fire to spread, but may be used to cool fire-exposed containers. Flashback may occur along vapour trail.

FIRST AID

Move victim out of spill area to fresh air. Call for medical assistance, but start first aid at once. Inhalation: if breathing has stopped give artificial respiration; if laboured, give oxygen. Ingestion: give water to conscious victim to drink; do not induce vomiting. Contact: skin - remove contaminated clothing and wash affected areas with plenty of warm water; eyes - irrigate with plenty of water. If medical assistance is not immediately available, transport victim to hospital, doctor or clinic.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. If possible, contain discharge by booming.
4. If floating, skim and remove.
5. Notify environmental authorities to discuss disposal and clean-up of contaminated materials.

• Land-Air

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Contain spill by dyking with earth or other barrier.
4. Remove material with pumps or vacuum equipment and place in appropriate containers.
5. Absorb residual liquid on natural or synthetic sorbents.
6. Remove contaminated soil for disposal.
7. Notify environmental authorities to discuss disposal and clean-up of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.
- Incinerate (approval of environmental authorities required).

SODIUM CYANIDE

SODIUM CYANIDE

NaCN

UN No. 1689

IDENTIFICATION

COMMON SYNONYMS

- CYANIDE OF SODIUM
- CYANOGRAN (Du Pont)
- CYANOIDS (Kraft)

OBSERVABLE CHARACTERISTICS

- White, crystalline solid, powder or granules
- Odourless when dry; when wet gives typical cyanide almond-like odour

MANUFACTURERS

- Canadian Supplier: Canadian Industries Ltd., Montreal PQ
- Originating from: ICI, United Kingdom

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** Poison
- **Inert Atmosphere:** No requirement
- **Venting:** Closed
- **Label(s):** White label - POISON; Class 6.1, Group I
- **Storage Temperature:** Ambient
- **Grades of Purity:** 97 to 99%
- **Containers and Materials:** Drums; steel

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Solid
- **Solubility** (water): 49 g/100 mL (10°C); 82 g/100 mL (35°C)
- **Molecular Weight:** 49.0
- **Vapour Pressure:** 1 mm Hg (817°C)
- **Boiling Point:** 1496°C
- **Floatability** (water): Sinks and mixes
- **Odour:** Odourless when dry; when wet, gives typical cyanide almond-like odour
- **Flash Point:** Not flammable
- **Vapour Density:** 0.93 as HCN (25°C)
- **Specific Gravity:** 1.6 (25°C)
- **Colour:** White
- **Explosive Limits:** Not flammable
- **Melting Point:** 560 to 564°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: headache, dizziness, nausea, rapid breathing, anguish, convulsions, foaming at mouth, prolonged coma, death. Ingestion: symptoms similar to inhalation. Contact: skin - absorbed with symptoms similar to inhalation; eyes - irritation, watering and symptoms similar to inhalation.
- **Toxicology:** Highly toxic by all routes
 - TLV® - (skin) 5 mg/m³ (as CN)
 - Short-term Inhalation Limits - No information
 - LC₅₀ - Inhalation: rat = 484 ppm/1 h(as HCN)
 - LCLo- Inhalation: human = 120 mg/m³/1 h
 - Delayed Toxicity - No information
 - LD₅₀ - Oral: rat = 0.0064 g/kg
 - LDLo - Oral: human = 0.0029 g/kg

FIRE

- **Fire Extinguishing Agents:** Not combustible; however, water may be used on fires involving sodium cyanide.
- **Behaviour in Fire:** Not combustible. In fires may evolve toxic fumes.
- **Ignition Temperature:** Not combustible.
- **Burning Rate:** Not combustible.

REACTIVITY

- **With Water:** Contact with water or moist air may produce HCN; soluble.
- **With Common Materials:** Contact with acids or weak alkalis produces poisonous and flammable HCN gas. Reacts violently with nitrates, nitrites and other oxidizing agents, and chlorates.
- **Stability:** Stable when dry.

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Fish toxicity: 0.15 ppm/96 h/bluegill/TLm/freshwater; 0.25 ppm/48 h/prawn/LC₅₀/saltwater; BOD: 6%, 7 days (theoretical).
- **Land-Air:** No information.
- **Food Chain Concentration Potential:** No information.

EMERGENCY MEASURES

SPECIAL HAZARDS

POISON. Contact with acids or weak alkalis liberates HCN.

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "POISON". Avoid contact and inhalation. Contact supplier or manufacturer for guidance. Stop or reduce discharge, if this can be done without risk. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Respiratory protection - Self-contained breathing apparatus and totally encapsulated suit. Gloves - rubber.

FIRE AND EXPLOSION

Not combustible. In fires involving sodium cyanide water may be used to extinguish; however, area should be dyked to prevent runoff.

FIRST AID

Move victim out of spill area to fresh air. Call for medical assistance, but start first aid at once. Inhalation: if breathing has stopped, give artificial respiration (not mouth-to-mouth method); if laboured, give oxygen. Contact: skin - remove contaminated clothing, and flush affected areas with plenty of water; eyes - irrigate with plenty of water. Ingestion: induce vomiting in conscious victim, and repeat until vomitus is clear. If medical assistance is not immediately available, transport victim to hospital, doctor or clinic.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. If possible, contain discharge by damming or water diversion.
4. If possible, dredge or vacuum pump to remove contaminants, liquids and contaminated bottom sediments.
5. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

• Land-Air

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Dyke to prevent runoff from rainwater or water application.
4. Remove material by manual or mechanical means. Avoid contact with material.
5. Recover undamaged containers.
6. Remove contaminated soil for disposal.
7. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.

SULFURIC ACID

SULFURIC ACID

H₂SO₄

UN No. 1832

IDENTIFICATION

COMMON SYNONYMS

- HYDROGEN SULPHATE
- FERTILIZER ACID
- BATTERY ACID
- DIPPING ACID
- (See Oleum for concentrated solutions)

OBSERVABLE CHARACTERISTICS

- Colourless to brown liquid
- Sharp, penetrating odour

MANUFACTURERS

- (CIL) Canadian Industries Ltd., Copper Cliff ON
- ESSO Chemicals Canada, Redwater AB
- Texasgulf Canada, Timmons ON
- Western Co-operative Fertilizers, Calgary AB

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Liquid
- **Classification:** Corrosive liquid
- **Inert Atmosphere:** No requirement
- **Venting:** Open
- **Pump Type:** Centrifugal; alloy 20 (for 70% and up)
- **Label(s):** White and black label - CORROSIVE; Class 8, Group II
- **Storage Temperature:** Ambient
- **Hose Type:** Chemiflex 951 (polypropylene), flexible stainless steel - rigid pipe and swivel joints
- **Grades of Purity:** Commercial, 52° Bé 65.1% H₂SO₄; 58° Bé 74.4% H₂SO₄; 60° Bé 77.7% H₂SO₄; 66° Bé 93.2% H₂SO₄
- **Containers and Materials:** Bottles, carboys, (lined) drums, tank trucks, tank cards; stainless steel

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Liquid
- **Solubility** (water): Soluble in all proportions
- **Molecular Weight:** 98.1 (pure)
- **Vapour Pressure:** ~1 mm Hg at 38°C for 66° Bé
- **Boiling Point:** (66° Bé), ~281°C
- **Floatability** (water): Sinks and mixes. May react vigorously.
- **Odour:** Sharp, penetrating (1 mg/m³ odour threshold)
- **Flash Point:** Not flammable

- **Vapour Density:** 2.8 (20°C)(SO₃)
- **Specific Gravity:** 52° Bé 1.56; 58° Bé 1.67; 60° Bé 1.71; 66° Bé 1.84
- **Colour:** Clear to dark brown
- **Explosive Limits:** Not flammable
- **Melting Point:** (66° Bé), -32°C; 100% 10.4°C; (52° Bé), -40°C; 58° Bé, -44°C; (60° Bé), -8°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Highly concentrated sulfuric acid is rapidly destructive to body tissues on contact. Contact: skin - dermatitis and burns; eyes - rapidly causes severe damage, and possible loss of sight. Inhalation: of concentrated vapour or mist will cause damage to the upper respiratory tract and lung tissue, sore throat, coughing, laboured breathing. Ingestion: sore throat, abdominal pain, nausea and vomiting.
- **Toxicology:**
 - TLV® - (inhalation) 1 mg/m³
 - Short-term Inhalation Limits - No information
 - LC₅₀ - Inhalation: guinea pig 18 mg/m³
 - Delayed Toxicity - None known
 - LD₅₀ - Oral: rat = 2.14 g/kg

FIRE

- **Fire Extinguishing Agents:** Not combustible. Use dry chemical to fight adjacent fires.
- **Behaviour in Fire:** Not combustible. In fires, toxic SO_x fumes may be released. May react with metals producing flammable H₂ gas.
- **Ignition Temperature:** Not combustible
- **Burning Rate:** Not combustible

REACTIVITY

- **With Water:** Soluble. Concentrated solutions may react violently producing toxic SO_x fumes.
- **With Common Materials:** Powerful oxidizer; concentrated solutions may ignite organic materials. Can react violently with acetic anhydride, acetonitrile, acrolein, acrylonitrile, allyl alcohol, allyl chloride, ammonium hydroxide, aniline, n-butyraldehyde, carbides, chlorates, chlorosulfonic acid, epichlorohydrin, ethylenediamine, ethylene glycol, hydrochloric acid, hydrofluoric acid, iron, isoprene, metals (powdered), perchlorates, phosphorus, potassium-t-butoxide, potassium permanganate, propylene oxide, pyridine, sodium, sodium carbonate, sodium chlorate, sodium hydroxide, steel, styrene monomer, vinyl acetate and zinc chlorate.
- **Stability:** Stable (within the limits of the foregoing)

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Harmful to aquatic life. Fish toxicity: 10 to 24.5 mg/L/24 h/bluegill/lethal/freshwater; 45.2 ppm/48

h/prawn/LC₅₀/saltwater; 138 ppm/4 h/goldfish/lethal/freshwater; 80 to 80 ppm/48 h/shrimp/LC₅₀/saltwater; BOD: None.

- **Land-Air:** No information
- **Food Chain Concentration Potential:** None

EMERGENCY MEASURES

SPECIAL HAZARDS

CORROSIVE. Reactive with water and other common materials.

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "CORROSIVE". Call Fire Department. Eliminate all ignition sources. Contact manufacturer for advice. Contain spill by dyking with earth or other material. Avoid inhalation and contact. Stop or reduce discharge if this can be done without risk. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Respiratory protection - self-contained breathing apparatus and totally encapsulated suit. Gloves - gauntlet type, rubber, vinyl. Boots - high, rubber or neoprene (pants worn outside boots).

FIRE AND EXPLOSION

Not combustible. Avoid use of water. Toxic SO_x fumes are released in fires.

FIRST AID

Move victim out of spill area to fresh air. Call for medical assistance, but start first aid at once. Inhalation: if breathing has stopped, give artificial respiration (not mouth-to-mouth method); if laboured, give oxygen. Contact: eyes - irrigate immediately with plenty of water; skin - flush with plenty of water, and remove contaminated clothing. Ingestion: give plenty of water to conscious victim to drink to reduce acid concentration. Do not induce vomiting. If medical assistance is not immediately available, transport victim to hospital, doctor or clinic.

ENVIRONMENTAL PROTECTION MEASURES

RESPONSE

• **Water**

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. If possible, contain discharge by damming or water diversion.
4. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

• **Land-Air**

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Contain spill by dyking with earth or other barrier.
4. Remove material with pumps or vacuum equipment

- and place in appropriate containers.
5. Remove material by manual or mechanical means.
 6. Remove contaminated soil for disposal or neutralize with lime.
 7. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.

CALCIUM HYPOCHLORITE

CALCIUM HYPOCHLORITE

Ca(OCl)₂ CaCl(OCl).4H₂O (hydrate)

UN No. 2880 hydrate

1748 dry > 38% Cl

2208 dry 10 to 39% Cl

IDENTIFICATION

COMMON SYNONYMS

- ANHYDROUS Ca(OCl)₂
- Calcium Oxychloride
- HYDRATE CaCl(OCl).4H₂O
- Chloride of Lime
- Bleaching Powder
- Lime Chloride

OBSERVABLE CHARACTERISTICS

- White powder or crystals
- Strong chlorine odour

MANUFACTURERS

Canadian Manufacturer:

- CIL Industries Ltd., Shawinigan PQ

Selected US Manufacturers:

- Olin Corporation, Stamford CT
- Pennwalt Corp., Indchem Division, Philadelphia PA

Canadian Suppliers:

- Industries Limited, General Chemicals Division, Toronto ON
- Pennwalt of Canada Ltd., Oakville ON
- Standard Chemical Ltd., Montreal PQ

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** Oxidizing material
- **Inert Atmosphere:** No requirement
- **Venting:** Open or closed
- **Label(s):** Yellow label - OXIDIZER; Class 5.2, Group III
- **Storage Temperature:** Ambient
- **Grades of Purity:** Anhydrous - Commercial 70%; high purity 99.2%; hydrate 35 to 37% active chlorine or technical
- **Containers and Materials:** Cans, drums; steel, plastic

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Solid
- **Solubility** (water): Decomposes
- **Molecular Weight**: 143 anhydrous; 199 hydrate (varies)
- **Vapour Pressure**: No information
- **Boiling Point**: Decomposes > 100°C
- **Floatability** (water): Sinks and decomposes
- **Odour**: Chlorine odour
- **Flash Point**: Not flammable
- **Vapour Density**: No information
- **Specific Gravity**: 2.35 (20°C)(anhydrous); hydrate is similar, but varies
- **Colour**: White
- **Explosive Limits**: Not flammable
- **Melting Point**: Decomposes > 100°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms**: Contact: skin - itching, burning, sensation, inflammation; eyes - tingling, watering, inflammation. Inhalation: irritation of nose and eyes, coughing, difficulty breathing, cyanosis. Ingestion: burning sensation in mouth and throat, stomach cramps, nausea, vomiting, weakness, shock, convulsion, coma.
- **Toxicology**: Highly toxic by ingestion and inhalation (as chlorine)
 - TLV® - 1 ppm; 3 mg/m³ (as chlorine)
 - Short-term Inhalation Limits - 3 ppm; 9 mg/m³ (as chlorine)(15 min)
 - LC₅₀ - No information
 - Delayed Toxicity - No information
 - LD₅₀ - Oral: rat = 0.85 g/kg (anhydrous)

FIRE

- **Fire Extinguishing Agents**: Not combustible. Most fire extinguishing agents (preferably water spray) may be used on fires involving calcium hypochlorite.
- **Behaviour in Fire**: Not combustible, but evolves O₂ and Cl₂ at high temperatures. Readily ignites organic materials when in contact.
- **Ignition Temperature**: Not combustible
- **Burning Rate**: Not combustible

REACTIVITY

- **With Water**: Reacts with water to produce chlorine
- **With Common Materials**: Readily oxidized combustible and organic substances. Reacts violently with carbon tetrachloride and amines.
- **Stability**: Stable when dry and not exposed to heat or organic materials.

ENVIRONMENT

- **Water**: Prevent entry into water intakes and waterways; harmful to aquatic life in

very low concentrations. Fish toxicity: 0.5 ppm/tns/trout/killed/freshwater; Aquatic toxicity rating = 1 to 10 ppm/96 h/TLm/freshwater; BOD: No information.

- **Land-Air:** No information
- **Food Chain Concentration Potential:** No information

EMERGENCY MEASURES

SPECIAL HAZARDS

OXIDIZER. Releases chlorine upon decomposition by heat or on contact with water.

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "OXIDIZER". Call fire Department. Avoid contact and inhalation. Contact supplier or manufacturer. Stop discharge, if this can be done without risk. Move undamaged containers out of spill or fire area if this can be done without risk. Dyke to prevent runoff. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Respiratory protection - in the case of a fire or in enclosed spaces, self-contained breathing apparatus. Otherwise, chemical goggles - (mono), tight fitting. Rubber gloves. Protective outerwear - suitable for the situation. If high rubber boots are worn, pants should be outside boots.

FIRE AND EXPLOSION

Not combustible. Most fire-extinguishing agents (preferable water spray) may be used on fires involving calcium hypochlorite.

FIRST AID

Move victim out of spill site to fresh air. Call for medical assistance, but start first aid at once. Contact: eyes - irrigate immediately with plenty of water for at least 15 minutes; skin - remove contaminated clothing and flood affected skin with water for at least 15 minutes. Inhalation: if breathing has stopped, give artificial respiration; if laboured, give oxygen. Ingestion: wash out mouth thoroughly with water. give conscious victim plenty of water to drink. If medical assistance is not immediately available, transport victim to hospital, doctor, or clinic.

ENVIRONMENTAL PROTECTION MEASURES

RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.

3. If possible, contain discharge by damming or water diversion.
4. Dredge or vacuum pump to remove contaminants, liquids and contaminated bottom sediments.
5. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

▪ **Land-Air**

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Contain spill by dyking with earth or other barrier.
4. Remove material by manual or mechanical means.
5. Recover undamaged containers.
6. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.

LEAD NITRATE

LEAD NITRATE



UN No. 1469

IDENTIFICATION

COMMON SYNONYMS

- NITRIC ACID
- LEAD II SALT

OBSERVABLE CHARACTERISTICS

- White crystals
- Odourless

MANUFACTURERS

- No Canadian manufacturers

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** Oxidizing material. Poison
- **Inert Atmosphere:** No requirement
- **Venting:** Open
- **Label(s):** Yellow label - OXIDIZER; Class 5.1, Group II; White label - POISON; Class 6.1, Group II
- **Storage Temperature:** Ambient
- **Grades of Purity:** Technical, 98+%
- **Containers and Materials:** Multiwall paper bags and drums

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Solid
- **Solubility** (water): 37.7 g/100 mL (0°C); 127 g/100 mL (100°C)
- **Molecular Weight:** 331.2
- **Vapour Pressure:** No information
- **Boiling Point:** Decomposes at 470°C
- **Floatability** (water): Sinks and mixes
- **Odour:** Odourless
- **Flash Point:** Not flammable
- **Vapour Density:** No information
- **Specific Gravity:** 4.53 (30°C)
- **Colour:** white
- **Explosive Limits:** Not flammable
- **Melting Point:** Decomposes at 470°C

HAZARD DATA

HUMAN HEALTH

• **Symptoms:** Inhalation: of dust, mist or fumes, irritation of nose and eyes, headache, stomach cramps and fatigue. Ingestion: metallic taste in mouth, constriction of throat, stomach pains, nausea, vomiting, diarrhea, convulsions, coma. Contact: skin - irritation, inflammation; eyes - inflammation.

- **Toxicology:** Highly toxic by ingestion
 - TLV® - (inhalation) 0.15 mg/m³ (as Pb)
 - Short-term Inhalation Limits - 0.45 mg/m³ (15 min)(as Pb)
 - LC₅₀ - No information
 - Delayed Toxicity - Cumulative poison
 - LD₅₀ - No information
 - LD_{Lo} - Oral: guinea pig = 0.5 g/kg

FIRE

- **Fire Extinguishing Agents:** Not combustible. Most fire extinguishing agents may be used. Use water sparingly.
- **Behaviour in Fire:** Not combustible. When heated to decomposition, can emit toxic nitrogen oxide and lead oxide fumes.
- **Ignition Temperature:** Not flammable
- **Burning Rate:** Not flammable

REACTIVITY

- **With Water:** No reaction; soluble
- **With Common Materials:** Strong oxidizer, can ignite organic materials. Reacts violently with ammonium thiocyanate, carbon and lead hypophosphite.
- **Stability:** Stable

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Fish toxicity: 240 ppm/48 h/mosquito fish/TLm/freshwater.
- **Land-Air:** No information
- **Food Chain Concentration Potential:** Fish and terrestrial animals are capable of concentrating lead.

EMERGENCY MEASURES

SPECIAL HAZARDS

OXIDIZER. POISON

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "OXIDIZER. POISON". Avoid contact and inhalation. Call Fire Department. Dyke to prevent runoff from rainwater or water application. Lightly wet down dry spillage to prevent

wind drift or dust. Notify manufacturer or supplier. Notify environmental authorities..

PROTECTIVE CLOTHING AND EQUIPMENT

In fire or enclosed spaces, Respiratory protection - self-contained breathing apparatus. Otherwise, dust respirators (with suitable filters) or metal fume respirators for normal situations. Gloves and boots - rubber. Frequent changes of clothing and footwear should be provided. Contaminated clothing and footwear should be washed immediately after contact.

FIRE AND EXPLOSION

Not combustible. Most fire extinguishing agents may be used. Use water sparingly.

FIRST AID

Move victim out of spill site to fresh air. Call for medical assistance, but start first aid at once. Inhalation: if breathing has stopped give artificial respiration (not mouth-to-mouth method); if laboured, give oxygen. Contact: skin - remove contaminated clothing, and flush affected areas with plenty of water; eyes - irrigate with plenty of water. Ingestion: give water to conscious victim to drink, and induce vomiting. If medical assistance is not immediately available, transport victim to doctor, clinic, or hospital.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. If possible, contain discharge by damming or water diversion.
4. Dredge or vacuum pump to remove contaminants, liquids, and contaminated bottom sediments.
5. Notify environmental authorities to discuss disposal and clean-up of contaminated materials.

• Land-Air

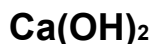
1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Dyke to prevent runoff from rainwater or water application.
4. Remove material by manual or mechanical means.
5. Broken and empty bags or containers should be handled carefully to avoid scattering of duct.
6. Remove contaminated soil for disposal.
7. Notify environmental authorities to discuss disposal and clean-up of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.

CALCIUM HYDROXIDE

CALCIUM HYDROXIDE



UN No. 9098

IDENTIFICATION

COMMON SYNONYMS

- LIME
- CALCIUM HYDRATE
- HYDRATED LIME
- SLAKED LIME
- CAUSTIC LIME
- AGRICULTURAL LIME

OBSERVABLE CHARACTERISTICS

- White or greyish-white powder or lumps

MANUFACTURERS

- Domtar Chemicals, Beachville ON
- Joliette PQ
- BeachviLime, Beachville ON
- Algoma Steel, Sault-Ste-Marie ON

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** None
- **Inert Atmosphere:** No requirement
- **Venting:** Open
- **Label(s):** None. Class 9.2, Group III
- **Storage Temperature:** Ambient
- **Grades of Purity:** Agricultural, 65 to 71%; industrial 70 to 73%; chemical, 71 to 73% (may contain magnesium hydroside, magnesium oxide, silicon dioxide and others in trace amounts).
- **Containers and Materials:** Multiwall paper bags; bulk by truck or tank; steel.

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Solid
- **Solubility** (water): 0.185 g/100 mL (0°C); 0.077 g/100 mL (100°C)
- **Molecular Weight:** 74.1
- **Vapour Pressure:** No information
- **Boiling Point:** Decomposes > 580°C
- **Floatability** (water): Sinks
- **Odour:** Odourless
- **Flash Point:** Not flammable
- **Vapour Density:** No information
- **Specific Gravity:** 2.08-2.34 (20°C)
- **Colour:** White or greyish-white

- **Explosive Limits:** Not flammable
- **Melting Point:** Decomposes 580°C (loses H₂O)

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Contact: skin - burning sensation and inflammation; eyes - pain and watering. Inhalation: irritation or respiratory tract, difficulty breathing, coughing, sneezing. Ingestion: burning sensation, pain, stomach cramps.
- **Toxicology:**
 - TLV® - (inhalation) 5 mg/m³ (dust)
 - Short-term Inhalation Limits - No information
 - LC₅₀ - No information
 - Delayed Toxicity - None known
 - LD₅₀ - Oral: rat = 7.34 g/kg

FIRE

- **Fire Extinguishing Agents:** Not combustible. Most fire extinguishing agents may be used on fires involving calcium hydroxide.
- **Behaviour in Fire:** Not combustible.
- **Ignition Temperature:** Not combustible.
- **Burning Rate:** Not combustible.

REACTIVITY

- **With Water:** No reaction
- **With Common Materials:** Reacts violently with phosphorus, maleic anhydride, nitromethane, nitroethane, nitropropane and nitroparaffins.
- **Stability:** Stable

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways, toxic to aquatic life. Fish toxicity: 92 ppm/7 h/trout/toxic/freshwater; Aquatic toxicity rating = 10 to 1000 ppm/96 h/TLm/freshwater; 240 ppm/24 h/mosquito fish/TLm/freshwater; 160 ppm/96 h/mosquito fish/TLm/freshwater; BOD: None
- **Land-Air:** Frequently used in agriculture to neutralize acidic soils.
- **Food Chain Concentration Potential:** No information

EMERGENCY MEASURES

SPECIAL HAZARDS

CORROSIVE

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning "CORROSIVE". Stop discharge, if possible. Exercise caution with water application. Notify manufacturer or supplier. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Dusty conditions, suitable dust mask. Gloves - work gloves with gauntlets.

Coveralls. Boots - safety or high rubber (pants worn outside boots).

FIRE AND EXPLOSION

Not combustible. Most fire extinguishing agents may be used on fires involving calcium oxide. If water is used, use flooding amounts.

FIRST AID

Move victim out of spill site to fresh air. Call for medical assistance, but start first aid at once. Inhalation: (dust) make victim blow nose. Contact: skin - remove contaminated clothing and slush affected areas with water; eyes - immediately flush with plenty of water. If medical assistance is not immediately available, transport victim to hospital, doctor or clinic.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

• Land-Air

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Contain spill by dyking with earth or other barrier.
4. Remove material by manual or mechanical means.
5. Recover undamaged containers.
6. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.
- Dump in a municipal landfill site (approval of environmental authorities required).

ETHYLENE GLYCOL

ETHYLENE GLYCOL

CH₂OHCH₂OH

IDENTIFICATION

COMMON SYNONYMS

- ANTIFREEZE
- GLYCOL
- MONOETHYLENE GLYCOL
- 1, 2-ETHANEDIOL
- ETHYLENE DIHYDRATE

OBSERVABLE CHARACTERISTICS

- Colourless liquid
- Slight odour

MANUFACTURERS

- Dow Chemical Canada Inc., Fort Saskatchewan AB, Sarnia ON
- Union Carbide, Montreal PQ

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Liquid
- **Classification:** None
- **Inert Atmosphere:** No requirement
- **Venting:** Open (flame arrester)
- **Pump Type:** Most types
- **Label(s):** Not regulated
- **Storage Temperature:** Ambient
- **Hose Type:** Most types
- **Grades of Purity:** Industrial
- **Containers and Materials:** Drums, tank cars, tank trucks; steel, stainless steel

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Liquid
- **Solubility** (water): Soluble in all proportions
- **Molecular Weight:** 62.1
- **Vapour Pressure:** 0.05 mm Hg (20°C); 0.2 mm Hg (30°C)
- **Boiling Point:** 196 to 198°C
- **Floatability** (water): Sinks and mixes
- **Odour:** Slight (0.08 to 25 ppm, odour threshold)
- **Flash Point:** 116°C (o.c.); 111°C (c.c.)
- **Vapour Density:** 2.1
- **Specific Gravity:** 1.11 (20°C)
- **Colour:** Colourless
- **Explosive Limits:** 3.2 to 15.3%
- **Melting Point:** -13°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: intoxication, headache; prolonged inhalation may cause throat irritation and nervous system disorder. Ingestion: intoxication, headache, vomiting, cyanosis, unconsciousness with convulsions. Contact: skin - absorbed causing intoxication; eyes - irritation.
- **Toxicology:** Moderately toxic by ingestion, contact and inhalation.
 - TLV® - 10 mg/m³ (particulate); 50 ppm; 125 mg/m³ (vapour)
 - Short-term Inhalation Limits - 20 mg/m³ (15 min)(particulate)
 - LC₅₀ - No information
 - Delayed Toxicity - Fatal kidney injury may result from ingestion
 - LD₅₀ - Oral: rat = 5.84 g/kg

FIRE

- **Fire Extinguishing Agents:** Use water fog, alcohol foam, carbon dioxide, or dry chemical. Water or foam may cause frothing
- **Behaviour in Fire:** No information
- **Ignition Temperature:** 398°C
- **Burning Rate:** 1.0 mm/min

REACTIVITY

- **With Water:** No reaction, soluble
- **With Common Materials:** Can react violently with chlorosulfonic acid, oleum and sulfuric acid. May react with strong oxidizing materials.
- **Stability:** Stable

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Fish toxicity: >100 ppm/48 h/shrimp/LC₅₀/saltwater; Aquatic toxicity rating = 100 to 1 000/96 h/TLm/freshwater;>5 000 mg/L/24 h/goldfish/LD₅₀/freshwater; 41 000 mg/L/96 h/rainbow trout/LC₅₀/freshwater; BOD: 16 to 68%, 5 days.
- **Land-Air:** No information
- **Food Chain Concentration Potential:** None

EMERGENCY MEASURES

SPECIAL HAZARDS

None listed

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Dyke to prevent runoff. Notify manufacturer for advice. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Protective outer clothing as required.

FIRE AND EXPLOSION

Use water fog, alcohol foam, carbon dioxide or dry chemical to extinguish. Water or

foam may cause frothing.

FIRST AID

Move victim out from spill site to fresh air. Call for medical assistance, but start first aid at once. Inhalation: if breathing has stopped give artificial respiration; if laboured, give oxygen. Contact: skin - remove contaminated clothing and wash affected areas with plenty of water; eyes - irrigate with water. Ingestion: give water to conscious victim to drink and induce vomiting. If medical assistance is not immediately available, transport victim to doctor, clinic or hospital.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

• Land-Air

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Contain spill by dyking with earth or other barrier.
4. Remove material with pumps or vacuum equipment and place in appropriate containers.
5. Recover undamaged containers.
6. Absorb residual liquid on natural or synthetic sorbents.
7. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.
- Incinerate (approval of environmental authorities required)

HYDROGEN PEROXIDE

HYDROGEN PEROXIDE

UN No. **2014**
 2015

IDENTIFICATION

COMMON SYNONYMS

- PEROXIDE
- HYDROGEN PEROXIDE

OBSERVABLE CHARACTERISTICS

- Clear, colourless gas with a slightly pungent odour

MANUFACTURERS

- Degussa Corporation

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Bulk liquid
- **Classification:** Primary Hazard - Oxidizer, Secondary Hazard - Corrosive
- **Venting:** Maintain adequate ventilation TLV
- **Label(s):** Yellow label "OXIDIZER" Class 5.1; White & Black label "CORROSIVE" Class 8
- **Containers and Materials:** IM 101 portable tanks

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Solubility** (water): complete
- **Percent volatile by volume %:** Approximately 100
- **Vapour Pressure:** (MMHG) 11-18
- **Boiling Point:** 237 to 257°F
- **Evaporation rate** (Butyl Acetate = 1): More than 1
- **Flash Point:** (closed cup): Non-flammable
- **Vapour Density:** (AIRFI) approximately 1.0
- **Specific Gravity:** (H₂O=1) 1.2 - 1.3
- **Colour:** Clear fluid
- **Decomposition Temperature:** not applicable

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: of vapour or mist may cause irritation or inflammation of upper air passages. Ingestion: if swallowed may cause sudden formation of oxygen which can cause injury. Contact: skin - whitening on contact. Longer exposure causes blisters or burns.
- **Toxicology:**
 - TLV® - 1 ppm
 - LC₅₀ - not applicable
 - LD₅₀ - not applicable

FIRE

- **Fire Extinguishing Agents:** DO NOT use any other fire fighting agents except WATER.
- **Behaviour in Fire:** Spontaneous combustion can occur if allowed to remain in contact with oxidizable materials

REACTIVITY

- **With Water:** No reaction soluble
- **With Common Materials:** Contamination from any source may cause rapid decomposition, generation of large quantities of oxygen gas and high pressure.
- **Stability:** Incompatible with following materials (avoid them): heavy metals, organic materials, dust, reducing agents, dirt, alkali, rust.

ENVIRONMENT

- **Water:** No reaction soluble
- **Land-Air:** Extreme fire hazard

EMERGENCY MEASURES

SPECIAL HAZARDS

OXIDIZER, CORROSIVE

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "OXIDIZER, CORROSIVE". Avoid contact and inhalation. Call Fire Department. Thoroughly flood area with water to prevent uncontrollable fire and to knock down vapours and dilute peroxide. Dyke with sand or earth. Keep area isolated. Notify manufacturer or supplier. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Respiratory protection - organic vapour/acid gas container - self-contained breathing apparatus during emergencies. Gloves, boots, hats, protective clothing - neoprene, butyl rubber. Eye protection - chemical safety goggles or face shield. Flush contaminated protective clothing & equipment with water.

FIRE AND EXPLOSION

Spontaneous combustion when in contact with oxidizable materials. Only use water as the fire fighting agent.

FIRST AID

Remove contaminated clothing at once and wash affected skin with water. Eyes - flush with water for 15 minutes. Stopped Breathing - use mouth to mouth resuscitation. Give patient milk or water if conscious, but do not induce vomiting. Transport to medical aid.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

1. Eliminate source of spill.
2. Flood with vast amounts of water.
3. Dyke with sand or earth.
4. Contact manufacturer or supplier for advise.
5. Notify environmental authorities to discuss disposal and cleanup.
6. Notify Fire Department

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advise on disposal.

SODIUM CARBONATE

SODIUM CARBONATE

Na₂CO₃ (anhydrous)

IDENTIFICATION

COMMON SYNONYMS

- CALCINED SODA
- SODA ASH
- SODA MONOHYDRATE
- CRYSTAL CARBONATE
- CARBONIC ACID, DISODIUM SALT

OBSERVABLE CHARACTERISTICS

- White to grey crystalline solid or powder
- Odourless

MANUFACTURERS

- Allied Chemical Limited, Amherstburg ON

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** None
- **Inert Atmosphere:** No requirement
- **Venting:** Open
- **Label(s):** Not regulated
- **Storage Temperature:** Ambient
- **Grades of Purity:** Dense (58%), light (58%), extra light, natural and refined
- **Containers and Materials:** Bags, barrels, drums and bulk by truck or train; steel

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Solid
- **Solubility** (water): 7.1 g/100 mL (0°C); 22 g/100 mL (20°C); 45.5 g/100 mL (100°C)
- **Molecular Weight:** 106.0
- **Vapour Pressure:** No information
- **Boiling Point:** Slowly begins to decompose at 400°C
- **Floatability** (water): Sinks and mixes
- **Odour:** Odourless
- **Flash Point:** Not flammable
- **Vapour Density:** No information
- **Specific Gravity:** 2.53 (20°C)
- **Colour:** White to grey
- **Explosive Limits:** Not flammable
- **Melting Point:** 851°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: irritation of respiratory tract, coughing, sneezing, difficulty breathing. Contact: with dust causes eye and skin irritation. Excessive contact can cause "soda ulcers" and perforation of nasal septum. Ingestion: of large amounts is corrosive to the gastrointestinal tract, causing cramps, vomiting, diarrhea and possible circulatory collapse.
- **Toxicology:** Moderately toxic by ingestion. Low toxicity by inhalation and contact.
 - TLV® - No information
 - Short-term Inhalation Limits - No information
 - LC₅₀ - No information
 - Delayed Toxicity - No information
 - LD₅₀ - Intraperitoneal: mouse = 0.117 g/kg
 - LD_{Lo} - Oral: rat = 4 g/kg

FIRE

- **Fire Extinguishing Agents:** Not combustible. Most fire extinguishing agents may be used on fires involving sodium carbonate.
- **Behaviour in Fire:** Not combustible. Begins to decompose at 400°C producing CO₂ gas.
- **Ignition Temperature:** Not combustible
- **Burning Rate:** Not combustible

REACTIVITY

- **With Water:** No reaction; moderately soluble.
- **With Common Materials:** Can react violently with aluminum phosphorus pentoxide and fluoride sulfuric acid.
- **Stability:** Stable.

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Fish toxicity: 265 mg/L/48 h/Daphnia magna/TLm/freshwater; BOD: No information.
- **Land-Air:** No information
- **Food Chain Concentration Potential:** None

EMERGENCY MEASURES

SPECIAL HAZARDS

None

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Avoid contact and inhalation of dust. Stop or reduce discharge, if this can be done without risk. Notify supplier. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

If dust is present wear dust respirator, industrial (tight fitting) goggles, gloves and coveralls.

FIRE AND EXPLOSION

Not combustible. Most fire extinguishing agents may be used on fires involving sodium carbonate.

FIRST AID

Move victim out of spill area to fresh air. Call for medical assistance, but start first aid at once. Inhalation: if breathing has stopped give artificial respiration; if laboured, give oxygen. Contact: skin - remove contaminated clothing and flush affected areas with plenty of water; eyes - irrigate with plenty of water. Ingestion: give warm water to conscious victim to drink. Do not induce vomiting. If medical attention is not immediately available, transport victim to hospital, clinic or doctor.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. If possible, contain discharge by damming or water diversion.
4. Dredge or vacuum pump to remove contaminants, liquids and contaminated bottom sediments.
5. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

• Land-Air

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Dyke to prevent runoff from rainwater or water application.
4. Remove material by manual or mechanical means.
5. Recover undamaged containers.
6. Notify environmental authorities to discuss cleanup and disposal of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.
- Contaminated materials may be buried in a secured landfill site (approval of environmental authorities required).

EXPLOSIVES

AMMONIUM NITRATE



UN No. 1942 <0.2% combustible substances
0222 ammonium nitrate
0223, 2068, 2069, 2070, 2071 fertilizers

IDENTIFICATION

COMMON SYNONYMS

- GERMAN SALTPETER
- NORWAY SALTPETER
- NITRAM

OBSERVABLE CHARACTERISTICS

- White to grey or brown
- Odourless

MANUFACTURERS

- Canadian Industries Ltd., Courtright ON; Nobel ON; Carsland AB; McMasterville PQ
- Cominco Limited, Calgary AB
- Cyanamid of Canada Ltd., Niagara Falls ON
- Esso Chemical Canada, Redwater AB
- Du Pont Canada, North Bay ON
- Agrium US Inc. Denver, Colorado

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** Oxidizing material
- **Inert Atmosphere:** No requirement
- **Venting:** Open
- **Label(s):** Yellow label - OXIDIZER; Class 5.1, Group III
- **Storage Temperature:** Ambient
- **Grades of Purity:** Reagent grade. Fertilizer and explosive grades
- **Containers and Materials:** Bags (poly); bulk, trucks, rail cars

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical state** (20°C, 1 atm): Solid
- **Solubility** (water): 118 g/100 mL (0°C); 192 g/100 mL (20°C)
- **Molecular Weight:** 80.1
- **Vapour Pressure:** No pressure
- **Boiling Point:** Decomposes >210°C
- **Floatability** (water): Sinks and mixes
- **Odour:** Odourless
- **Flash Point:** Detonates under certain circumstances

- **Vapour Density:** No information
- **Specific Gravity:** 1.7 (20°C)

- **Colour:** White to grey or brown
- **Explosive Limits:** Detonates under certain circumstances
- **Melting Point:** 170°C

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Contact: skin and eyes - irritation of eyes and mucous membranes.
Inhalation: sore throat, coughing, shortness of breath. Ingestion: large amounts cause dizziness, cramps and vomiting.
- **Toxicology:** Moderately toxic by contact and ingestion
 - TLV® - No information
 - Short-term Inhalation Limits No information
 - LC₅₀ - No information
 - Delayed Toxicity - No information
 - LD₅₀ - No information

FIRE

- **Fire Extinguishing Agents:** Use flooding amounts of water in early stages of fire. Exercise caution in application of water on molten material to stop spread of fire.
- **Behaviour in Fire:** In decomposition or burning, generates poisonous NO_x fumes. May explode if heated in container.
- **Ignition Temperature:** Detonates under certain circumstances.
- **Burning Rate:** No information.

REACTIVITY

- **With Water:** No reaction; soluble
- **With Common Materials:** Ammonium nitrate is an oxidizing material and can cause any organic materials to burn. Can react with powdered metals, chlorides, phosphorus, sodium and sulphur.
- **Stability:** Stable, within the limits of the foregoing.

ENVIRONMENT

- **Water:** Prevent entry into water intakes and waterways. Harmful to aquatic life. Aquatic toxicity rating = 10 to 100 ppm/96h/TLm/freshwater; Fish toxicity: 800 µg/L/3.9 h/bluegill/killed/tapwater; 4 545 µg/L/90 h/goldfish/killed/distilled water.
- **Land-Air:** Ammonium nitrate is widely used as a fertilizer. Livestock toxicity: 400 ppm (water).
- **Food Chain Concentration Potential:** None

EMERGENCY MEASURES

SPECIAL HAZARDS

OXIDIZER. Can detonate under certain circumstances.

IMMEDIATE RESPONSES

Keep non-involved people away from spill site. Issue warning: "OXIDIZER". Call Fire Department. Evacuate hazard area. Fight fires by water flooding. Notify manufacturer. Notify environmental authorities.

PROTECTIVE CLOTHING AND EQUIPMENT

Use self-contained breathing apparatus and gastight suit, if involved in a fire. Chemical goggles - (tight fitting). Gloves - rubber or plastic. Acid suit - (jacket and pants) or coveralls (if gastight suit not available). Boots - high, rubber (pants worn over boots). When not involved with fire - gloves, boots and coveralls.

FIRE AND EXPLOSION

Apply water immediately in as large a volume as possible. Cool any fire-exposed containers with water and continue after fire is out.

FIRST AID

Move victim out of spill area to fresh air. Call for medical assistance, but start first aid immediately. Inhalation: if breathing has stopped, give artificial respiration. If breathing is laboured, give oxygen. Contact: eyes - rinse eyes thoroughly with plenty of water; skin - remove contaminated clothing and wash affected areas thoroughly with water. Ingestion: give milk or water to conscious victim. If medical assistance is not immediately available, transport victim to hospital, doctor or clinic.

ENVIRONMENTAL PROTECTION MEASURES RESPONSE

• Water

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. If possible, contain discharge by damming or water diversion.
4. Dredge or vacuum pump to remove contaminants, liquids and contaminated bottom sediments.
5. Notify environmental authorities to discuss disposal and clean-up of contaminated materials.

• Land-Air

1. Stop or reduce discharge if safe to do so.
2. Contact manufacturer or supplier for advice.
3. Dyke to prevent runoff from rainwater or water application.
4. Remove material by manual or mechanical means.
5. Recover undamaged containers.
6. Notify environmental authorities to discuss disposal and cleanup of contaminated materials.

DISPOSAL

- Contact manufacturer or supplier for advice on disposal.
- Contact environmental authorities for advice on disposal.

NONEL, ANOLINE, CODLINE Delay Detonators

NONEL, ANOLINE, CODLINE Delay Detonators
INDEX: CXU 005/86C
PIN UN0360

IDENTIFICATION

MANUFACTURERS

- CXA Ltd., Maple Ave South, Brownsburg PQ

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** 1.1B, UN00360, Class II
- **Shipping Name:** Detonators assemblies, non-electric
- **Label(s):** 1.1B
- **Precautions:** This product is an explosive. Meet all legal requirement for shipping and magazinging.

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Description:** Ingredients are housed in an aluminum shell
- **Composition:** Pentaerythritol Tetranitrate (PETN), Lead Azide
- **Flash Point:** Not applicable
- **Autoignition Temperature:** PETN explodes at 205-215°C
- **Flammability Limits in Air (%):** Not available
- **Explosive Limits:** Shock, impact or heat may detonate the produce
- **Storage Temperature (°C):** Ambient Temperatures
- **Storage Requirements:** Product should be stored in a cool dry environment and not stored in close proximity to high explosive material
- **Environmental Effects:** None
- **Deactivating Chemicals:** Not applicable

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** This is a packaged product that will not result in exposure to the contents under normal conditions.
- **Toxicology:** This is a manufactured article and may release hazardous products during detonation. Detonation product include NO, NO₂, CO, SO₂.

Recommended Exposure Limits	OSHA PEL	AXGIH TLV(ppm)
Nitrogen Dioxide	5 ppm-ceiling	3 ppm
Nitric Oxide	25 ppm	25 ppm
Carbon Monoxide	50 ppm	50 ppm
Sulfur Dioxide	5 ppm	2 ppm

FIRE

- **Fire Extinguishing Media:** DO NOT fight fire
- **Fire Fighting Procedure:** Evacuate area promptly
- **Other Fire or Explosion Hazards:** High explosive with mass detonation hazards

REACTIVITY

- **Stability:** Under normal conditions; can explode on impact. Under fire conditions;

may detonate if heated. Hazardous Polymerization; will not occur.

- **With Common Materials:** Avoid oxidizing materials
- **Hazardous Decomposition or Combustion Products:** Vapours of NO_x, CO

EMERGENCY MEASURES

HANDLING PROCEDURES AND EQUIPMENT

All personnel should keep clear during detonation. Avoid inhalation of smoke and vapours.

ENVIRONMENTAL PROTECTION MEASURES

RESPONSE

- **Steps To Be Taken In The Event Of A Spill Or Leak:**

1. Pick up cautiously as per normal precautions taken in handling explosives.

DISPOSAL

- Return to CXA or contact CXA Technical Representative to arrange for destruction by detonation under CXA supervision.

FORCITE 40%

FORCITE 40%
INDEX: EXU 0019/86B
PIN UN0081

IDENTIFICATION
HAZARD SUMMARY

- 29 CFR 1910.1200: Explosive

HEALTH HAZARDS

- Toxic, Target Organs: Cardiovascular system and blood.

DISTRIBUTORS

- Explosives Ltd., Post Office Box 200, STN A, North York ON

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** 1.1D
- **Label(s):** Explosives, Blasting Type A, Group II
- **Storage Temperatures (°C):** Ambient temperature
- **Storage Requirements:** Dry, well ventilated, secure magazine
- **Other Precautions:** Meet all legal requirements for shipping and magazining.

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Chemical Name:** Not applicable
- **Chemical Family:** Ammonia gelatin high explosive
- **Synonyms:** Not applicable
- **CAS Number:** Not applicable
- **Molecular formula:** Not applicable

• COMPOSITION:	OSHA PEL	ACGIH TLV(ppm)
Ethylene Glycol Dinitrate (EGDN) 10-20%	0.2 ppm skin	.05 ppm skin
Nitroglycerin (NG) 5 - 10%	0.2 ppm skin	.05 ppm skin
Ammonium Nitrate 40-80%	none	not listed
Nitrocotton less than 1%	none	not listed

- **Evaporation Rate:** Not applicable
- **Percentage Volatile By Volume:** Not applicable
- **Bulk Density:** 1.55 - 1.56 g/cm³ (cartridged density)
- **Vapour Pressure:** Approximately 0.1 (30°C)
- **Boiling Point:** Not applicable
- **Solubility:** Nitrate salts readily dissolve in water
- **Odour:** Characteristic Nitroglycerin smell
- **PH:** Not applicable
- **Vapour Density:** Not applicable
- **Specific Gravity:** Not applicable
- **Colour:** Brownish-yellow semi-gelatin
- **Melting Point:** Not applicable

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: Not a likely route of exposure from intact product. If heated, product may give off vapours which may cause rapid pulse due to lowered blood pressure, throbbing headache, lightheadedness, palpitations, dizziness, flushing of skin followed by pallor. Severe exposures may lead to fainting, anemia, bluish skin due to methemoglobinemia, difficulty breathing, unconsciousness and death. Contact: skin - may be absorbed through the intact skin in toxic amounts. May cause lowered blood pressure and symptoms as described in "inhalation". May cause skin rash in susceptible individuals. Eyes - may cause irritation and redness. Ingestion: may cause headaches, dizziness, palpitations. Very high doses may cause symptoms as described in "inhalation". Other Health Effects: consumption of alcohol may increase the severity of poisoning. Individuals with prolonged or repeated exposure to Nitroglycerin or Ethylene Glycol Dinitrate may develop a tolerance to organic nitrates from compensation due to chronic dilation of the blood vessels. This tolerance disappears rapidly after a few days away from exposure and re-exposure may cause chest pain or possibly fatal heart attack.
- **Toxicology:** No recommended exposure limit for the mixture. See exposure limits for each component in Section 1. Exposure to package contents is unlikely during normal use, unless packages are damaged or broken. Over exposure to the contents may result in the health effects listed above.
 - Ethylene Glycol Dinitrate: LD₅₀ (oral): rat 616 mg/kg
 - Nitroglycerine: LD₅₀ (oral): rat 525 mg/kg
 - Ammonium Nitrate: LD₅₀ (oral): rat 4500 mg/kg

FIRE

- **Flash Point (method):** Not applicable
- **Flammability Limits in Air (%):** UEL: No data
- **Autoignition Temperature:** At 222°C liquid NG will explode in a few seconds
- **LEL:** No data
- **Fire Fighting Procedures:** Evacuate area promptly
- **Fire Extinguishing Media:** Do not fight fires
- **Other Fire or Explosion Hazards:** High explosives with mass detonation hazard

REACTIVITY

- **Stability:** Under normal conditions - stable; Under fire conditions - decomposes and burns; Hazardous Polymerization - will not occur
- **Conditions to Avoid:** High temperatures, impact, friction
- **Materials to Avoid:** Strong alkaline materials (NH₃ formed)
- **Hazardous Decomposition or Combustion Products:** NO, NO₂, CO

ENVIRONMENT

- **Water:** NG is practically water-insoluble therefore remains explosive. It eventually breaks down to Glycerol Mono (or Di) Nitrate, and similarly EGDN breaks down to EGMN, which is readily soluble in water.
- **Food Chain Concentration Potential:** The aquatic toxicity rating based on Ammonium Nitrate is 10-100 mg/L and Nitroglycerin is 1-2 mg/L.

PREVENTIVE MEASURES

ENGINEERING CONTROLS

General area ventilation required. (Good quality non-forced air ventilation in magazines)

RESPIRATORY PROTECTION

None normally required. A NIOSH/MSHA approved air-supplied respirator should be worn if exposure to contents is anticipated.

SKIN PROTECTION

Wear cotton or cotton-lined gloves when handling cartridges as some product residue may be on the surface. DO NOT use rubber gloves as Nitroglycerin, Ethylene Glycol, and Dinitrate may readily penetrate the material.

EYE PROTECTION

Safety glasses.

OTHER PERSONAL PROTECTIVE EQUIPMENT

Change contaminated clothing frequently. Launder clothing before reuse. Ventilation precautions required in laundry room.

HANDLING PROCEDURES AND EQUIPMENT

This product is an explosive and should only be used under the supervision of an experienced blaster.

FIRST AID

Inhalation: Remove from exposure. Give artificial respiration if not breathing. Oxygen may be administered by a person trained in its use. Obtain medical attention immediately. Contact: Skin - remove contaminated clothing IMMEDIATELY. wash affected areas thoroughly with soap and water. Obtain medical attention immediately. Eyes - rinse eyes with water for at least 20 minutes, holding eyelids open. Obtain medical attention. Ingestion: Unless unconscious or convulsing, give copious amounts of water to induce vomiting. Obtain medical attention immediately.

• NOTE TO PHYSICIAN: Treat hypotension initially with I.V. fluids and then with vasopressive agents if hypotension is unresponsive. In cases of severe poisoning and methemoglobinemia, concentration is suspected to be greater than 30%. Administer 1% solution of methylene blue in doses of 1 to 2 mg/kg (0.1 to 0.2 mg/kg of methylene blue) I.V. over 5 - 10 minutes to reverse the methemoglobinemia. Oxygen may be administered if breathing is difficult.

• Medical conditions that are aggravated by exposure include cardiovascular and neurovascular disease, hypertension and hypotension and anemia.

ENVIRONMENTAL PROTECTION MEASURES

• RESPONSE TO SPILL OR LEAK

1. Wear protective equipment and clothing.
2. Stop and contain spill.

3. Eliminate all open sources of ignition.
4. Clean up using non-sparking tools.
5. Absorb into sawdust or use NG destroyer for any remaining.
6. Do not allow material to enter waterways.

▪ **DEACTIVATING CHEMICALS**

- NG Destroyer (Na_2S or NaOH : CH_3OH : $(\text{CH}_3)_2\text{CO}$: H_2O)

▪ **DISPOSAL**

- On-Site spills are picked up and destroyed by detonation in the borehole.
- Off-Site spills are burnt under supervision of an expert at a government approved explosive burning ground in accordance with local, provincial, state and federal regulations.
- Call upon the services of a CIL Technical Representative.

CILGEL 70%

CILGEL 70%
INDEX: EXU 0022/86B
PIN UN0081

IDENTIFICATION
COMMON SYNONYMS

- BL-220

HEALTH HAZARDS

- Toxic, Target Organs: Cardiovascular system and blood.

DISTRIBUTORS

- Explosives Ltd., Post Office Box 200, STN A, North York ON

TRANSPORTATION AND STORAGE INFORMATION

- **Shipping State:** Solid
- **Classification:** 1.1D
- **Label(s):** Explosives, Blasting Type A, Group II
- **Storage Temperatures (°C):** Ambient temperature
- **Storage Requirements:** Dry, well ventilated, secure magazine
- **Other Precautions:** Meet all legal requirements for shipping and magazining.

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Chemical Name:** Not applicable
- **Chemical Family:** Semi-gelatin high explosive
- **CAS Number:** Not applicable
- **Molecular formula:** Not applicable

• COMPOSITION:	OSHA PEL	ACGIH TLV(ppm)
Ethylene Glycol Dinitrate (EGDN) 10-20%	0.2 ppm skin	.05 ppm skin
Nitroglycerin (NG) 5 - 10%	0.2 ppm skin	.05 ppm skin
Ammonium Nitrate 40-80%	none	not listed
Nitrocotton less than 1%	none	not listed

- **Evaporation Rate:** Not applicable
- **Percentage Volatile By Volume:** Not applicable
- **Bulk Density:** 1.21 - 1.30 g/cm³ (cartridged density)
- **Vapour Pressure:** Approximately 0.1 (30°C)
- **Boiling Point:** Not applicable
- **Solubility:** Nitrate salts readily dissolve in water
- **Odour:** Characteristic Nitroglycerin smell
- **PH:** Not applicable
- **Vapour Density:** Not applicable
- **Specific Gravity:** Not applicable
- **Colour:** Brownish-yellow semi-gelatin
- **Melting Point:** Not applicable

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: Not a likely route of exposure from intact product. If heated, product may give off vapours which may cause rapid pulse due to lowered blood pressure, throbbing headache, lightheadedness, palpitations, dizziness, flushing of skin followed by pallor. Severe exposures may lead to fainting, anemia, bluish skin due to methemoglobinemia, difficulty breathing, unconsciousness and death. Contact: skin - may be absorbed through the intact skin in toxic amounts. May cause lowered blood pressure and symptoms as described in "inhalation". May cause skin rash in susceptible individuals. Eyes - may cause irritation and redness. Ingestion: may cause headaches, dizziness, palpitations. Very high doses may cause symptoms as described in "inhalation". Other Health Effects: consumption of alcohol may increase the severity of poisoning. Individuals with prolonged or repeated exposure to Nitroglycerin or Ethylene Glycol Dinitrate may develop a tolerance to organic nitrates from compensation due to chronic dilation of the blood vessels. This tolerance disappears rapidly after a few days away from exposure and re-exposure may cause chest pain or possibly fatal heart attack.
- **Toxicology:** No recommended exposure limit for the mixture. See exposure limits for each component in Section 1. Exposure to package contents is unlikely during normal use, unless packages are damaged or broken. Over exposure to the contents may result in the health effects listed above.
 - Ethylene Glycol Dinitrate: LD₅₀ (oral): rat 8186 mg/kg
 - Nitroglycerine: LD₅₀ (oral): rat 525 mg/kg
 - Ammonium Nitrate: LD₅₀ (oral): rat 4500 mg/kg

FIRE

- **Flash Point (method):** Not applicable
- **Flammability Limits in Air (%):** UEL: No data
- **Autoignition Temperature:** At 222°C liquid NG will explode in a few seconds
- **LEL:** No data
- **Fire Fighting Procedures:** Evacuate area promptly
- **Fire Extinguishing Media:** Do not fight fires
- **Other Fire or Explosion Hazards:** High explosives with mass detonation hazard

REACTIVITY

- **Stability:** Under normal conditions - stable; Under fire conditions - decomposes and burns; Hazardous Polymerization - will not occur
- **Conditions to Avoid:** High temperatures, impact, friction
- **Materials to Avoid:** Strong alkaline materials (NH₃ formed)
- **Hazardous Decomposition or Combustion Products:** NO, NO₂, CO

ENVIRONMENT

- **Water:** NG is practically water-insoluble therefore remains explosive. It eventually breaks down to Glycerol Mono (or Di) Nitrate, and similarly EGDN breaks down to EGMN, which is readily soluble in water.
- **Food Chain Concentration Potential:** The aquatic toxicity rating based on Ammonium Nitrate is 10-100 mg/L and Nitroglycerin is 1-2 mg/L.

PREVENTIVE MEASURES

ENGINEERING CONTROLS

General area ventilation required. (Good quality non-forced air ventilation in magazines)

RESPIRATORY PROTECTION

None normally required. A NIOSH/MSHA approved air-supplied respirator should be worn if exposure to contents is anticipated.

SKIN PROTECTION

Wear cotton or cotton-lined gloves when handling cartridges as some product residue may be on the surface. DO NOT use rubber gloves as Nitroglycerin, Ethylene Glycol, and Dinitrate may readily penetrate the material.

EYE PROTECTION

Safety glasses.

OTHER PERSONAL PROTECTIVE EQUIPMENT

Change contaminated clothing frequently. Launder clothing before reuse. Ventilation precautions required in laundry room.

HANDLING PROCEDURES AND EQUIPMENT

This product is an explosive and should only be used under the supervision of an experienced blaster.

FIRST AID

Inhalation: Remove from exposure. Give artificial respiration if not breathing. Oxygen may be administered by a person trained in its use. Obtain medical attention immediately. Contact: Skin - remove contaminated clothing IMMEDIATELY. wash affected areas thoroughly with soap and water. Obtain medical attention immediately. Eyes - rinse eyes with water for at least 20 minutes, holding eyelids open. Obtain medical attention. Ingestion: Unless unconscious or convulsing, give copious amounts of water to induce vomiting. Obtain medical attention immediately.

- **NOTE TO PHYSICIAN:** Treat hypotension initially with I.V. fluids and then with vasopressive agents if hypotension is unresponsive. In cases of severe poisoning and methemoglobinemia, concentration is suspected to be greater than 30%. Administer 1% solution of methylene blue in doses of 1 to 2 mg/kg (0.1 to 0.2 mg/kg of methylene blue) I.V. over 6 - 10 minutes to reverse the methemoglobinemia. Oxygen may be administered if breathing is difficult.
- Medical conditions that are aggravated by exposure include cardiovascular and neurovascular disease, hypertension and hypotension and anemia.

ENVIRONMENTAL PROTECTION MEASURES

• RESPONSE TO SPILL OR LEAK

1. Wear protective equipment and clothing.

2. Stop and contain spill.
3. Eliminate all open sources of ignition.
4. Clean up using non-sparking tools.
5. Absorb into sawdust or use NG destroyer for any remaining.
6. Do not allow material to enter waterways.

▪ **DEACTIVATING CHEMICALS**

- NG Destroyer (Na_2S or NaOH : CH_3OH : $(\text{CH}_3)_2\text{CO}$: H_2O)

DISPOSAL

- On-Site spills are picked up and destroyed by detonation in the borehole.
- Off-Site spills are burnt under supervision of an expert at a government approved explosive burning ground in accordance with local, provincial, state and federal regulations.
- Call upon the services of a CIL Technical Representative.

AMEX II

AMEX II
NH₄NO₃
INDEX: EXU 0016/86B
PIN UN0331

IDENTIFICATION
COMMON SYNONYMS

- ANFO

SHIPPERS

- Explosives Ltd., Post Office Box 200, STN A, North York ON

TRANSPORTATION AND STORAGE INFORMATION

- **Storage Temperatures** (°C): Ambient temperature
- **Storage Requirements:** Dry, static-free environment
- **Procedures and Equipment:** this product is an explosive and should only be used under the supervision of an experienced blaster.
- **Other Precautions:** Meet all legal requirements for shipping and magazining.
- **Shipping State:** Solid
- **Classification:** 1.5D
- **Label(s):** Explosives, Blasting Type B AMEX II, Group II

PHYSICAL AND CHEMICAL CHARACTERISTICS

- **Physical Hazards:** Explosive
- **Health Hazards:** Irritant, Skin, and Eye
- **Chemical Name:** Not applicable
- **Chemical Family:** Explosive
- **CAS Number:** Ammonium Nitrate, 6484-52-2
- **Molecular formula:** HN₄NO₃ (for ammonium nitrate)
- **COMPOSITION:**

	OSHA PEL	ACGIH TLV(ppm)
Ammonium Nitrate (prills) 80-95%	none	not listed
Diesel or Fuel Oil 5-15%	none	not listed
Inert Coating less than 1.2%		
may contain: Kaolin Clay	none	10 mg/m ³ total
and/or Talo	20 mppof	2 mg/m ³ respirable dust
- **Evaporation Rate:** No data
- **Percentage Volatile By Volume:** varies with diesel oil
- **Bulk Density:** 1.55 - 1.56 g/cm³ (cartridged density)
- **Vapour Pressure:** varies with diesel oil
- **Boiling Point** (0°C): Not applicable
- **Solubility:** Ammonium Nitrates vary soluble in water - 200 g/100 g water at 20°C
- **Odour:** none
- **PH:** Not applicable
- **Vapour Density:** Not applicable

- **Specific Gravity:** Not applicable
- **Colour:** Off-white pellets commonly called prills
- **Melting Point:** (0°C): approximately 170°C (for ammonium Nitrate)
- **Bulk Density:** 0.80-0.88 (tapped): 0.92-1.10 (pneum-loaded)

HAZARD DATA

HUMAN HEALTH

- **Symptoms:** Inhalation: Irritation of the nose and throat, coughing. Contact: skin - irritation; prolonged or repeated contact may cause dermatitis. Eyes - dust may cause irritation. Ingestion: Nausea, vomiting and gastrointestinal irritation. Possible methemoglobinemia. Other Health Effects: If ingested nitrates may be reduced to nitrites by certain bacteria in the digestive tract. Signs and symptoms of nitrate poisoning include cyanosis, nausea, dizziness, increased heart rate due to methemoglobinemia formation.
- **Toxicology:** No recommended exposure limit established.
 - Ammonium Nitrate: LD₅₀ (oral): rat 4500 mg/kg

FIRE

- **Flash Point (method):** 63-66°C (diesel oil)
- **Flammability Limits in Air (%):** UEL: Not applicable
- **Autoignition Temperature:** Greater than 200°C
- **LEL:** Not applicable
- **Fire Fighting Procedures:** For large fires, evacuate area. Do not fight fires except small ones of unconfined material. Fire fighting personnel should wear self-contained breathing apparatus to protect against vapours.
- **Fire Extinguishing Media:** Copious quantities of water
- **Other Fire or Explosion Hazards:** Ammonium Nitrate can react violently with reducing agents. May detonate if heated while confined or contaminated.

REACTIVITY

- **Stability:** Under Normal Conditions - stable; Under Fire Conditions - may explode under confinement, at high temperature; Hazardous Polymerization - will not occur
- **Conditions to Avoid:** High temperatures, static
- **Materials to Avoid:** Ammonium Nitrate forms sensitive explosive compounds with copper, organic matter, chlorates, metal powders, acids or alkalis (NH₃ produced)
- **Hazardous Decomposition or Combustion Products:** NO, NO₂, CO

ENVIRONMENT

- **Food Chain Concentration Potential:** Ammonium Nitrate is harmful to aquatic life at low concentrations. Aquatic toxicity rating for Ammonium Nitrate is 10-100ppm.

PREVENTIVE MEASURES

ENGINEERING CONTROLS

Local exhaust ventilation preferred when handling dry ammonium nitrate.

RESPIRATORY PROTECTION

A NIOSH/MSHA approved air purifying respirator for dusts if needed.

SKIN PROTECTION

Impermeable gloves to protect against diesel oil

EYE PROTECTION

Safety glasses.

FIRST AID

Inhalation: Remove victim to fresh air. If not breathing, give artificial respiration. Obtain medical attention. Contact: Skin - Wash thoroughly with soap and water. If irritation persists obtain medical advice. Eyes - Flush eyes with running water for at least 20 minutes, holding eyelids open. Obtain medical advice immediately. Ingestion: Unless unconscious or convulsing, give copious amounts of water or milk to induce vomiting. Obtain medical attention.

• **NOTE TO PHYSICIAN:** Chronic lung conditions may be aggravated by heavy dust exposure.

ENVIRONMENTAL PROTECTION MEASURES

• RESPONSE TO SPILL OR LEAK

1. Wear protective equipment and clothing.
2. Stop and contain spill.
3. Clean up using non-sparking tools
4. Wash down affected area with water.
5. Do not allow material or washwater to enter waterways.
6. For significant spills, contact appropriate regulatory authorities.

• DEACTIVATING CHEMICALS

- Not applicable

DISPOSAL

- Burn under supervision of an expert at a government approved explosive burning ground in accordance with local, provincial, state and federal regulations.
- Call upon the services of a CIL Technical Representative.

APPENDIX B

TELEPHONE NUMBERS

TELEPHONE NUMBERS

RTL ROBINSON ENTERPRISES LTD. in YELLOWKNIFE, NT 867-873-6271

RTL ROBINSON ENTERPRISES LTD. in EDMONTON, AB (24Hr) 403-447-3300

Rickie Robinson (Residence) 403-963-3594

(Cell) 403-995-5310

Marvin Robinson (Residence) 867-873-8750

(Cell) 867-873-1775

Donnie Robinson (Residence) 867-873-6450

(Cell) 867-873-1773

SPILL REPORT LINE (24 Hours)

Phone: 867-920-8130

Fax: 867-873-6924

OTHER GOVERNMENT AGENCIES - D.I.A.N.D.
LOCALLY

DISTRICT MANAGER- ED HORNBY

867-669-2760

Ken Dahl

867-669-2757

Ken Dahl (Residence)

867-920-4809

Inspector – Clint Ambrose

867-669-2794

LAND USE ADMINISTRATOR – Charlene Coe

867-669-2762

LANDS CLERK – Jerry Mazer

867-669-2674

LAND USE FAX

867-669-2713

MANAGER OF LAND ADMINISTRATION

Brenda Becker

867-669-2671

LAND ADMINISTRATOR – Sandra Bradbury

867-669-2673

WATER RESOURCES

867-669-2657

WATER RESOURCE OIL AND GAS SPECIALIST

867-669-2574

Robert Jenkins (Residence)

867-766-2573

E.P.B. DISTRICT OFFICE in YELLOWKNIFE, NT

867-669-4700

Laura Johnson (Manager)	867-669-4725
Laura Johnson (Residence)	867-873-4876
Magnus Bourqe (Work)	867-669-4729
Magnus Bourqe (Residence)	867-873-2475
Dave Tilden (Work)	867-669-4728
Dave Tilden (Facsimile)	867-873-8185
Dave Tilden (Residence)	867-873-2509
 FISHERIES AND OCEANS	 867-669-4900
Ron Allen - Area Director NWT (Work)	867-669-4902
Ron Allen (Residence)	867-669-7357
Warren Parsons (Conservation & Protection Supervisor)	867-669-4921
Elaine Blais (Work)	867-669-4912
Dave Tyson (Area Habitat Biologist)	867-669-4919
Julie Dahl (Work) (Area Chief Fish Habitat)	867-669-4911
Resources, Wildlife & Economic Development	876-873-7654
Emergency Spill	867-920-8130
Ken Hall (Manager Environmental Protection) (Residence)	867-873-6476 867-873-3942
Harvey Gaukel (Hazardous Substance Specialist) (Residence)	867-873-7645 867-873-9856

CANUTEC - TRANSPORT CANADA EMERGENCY RESPONSE CENTRE	613-996-6666
DANGEROUS GOODS COMPLIANCE CENTRE – ALBERTA	780-422-9600
ALBERTA ENVIRONMENT (Phone)	780-422-4505
(Fax)	780-427-3178
Mike Watt (High-Level Area)	
(Cell)	780-926-5263
	780-926-7240
Byron Schram (Peace District)	
	780-836-3065
Kreg Alde (Grande Prairie Area)	
(Cell)	780-538-8049
	780-518-2126
BRENNTAG EMERGENCY ADMINISTRATION	514-861-1211
	514-636-9230
CALGARY EMERGENCY RESPONSE	403-255-7776
EXPLOSIVES LIMITED – YELLOWKNIFE	867-444-2111
Dave Price (Work)	867-444-2111

CHEMICAL MANUFACTURES AND SUPPLIERS

SODIUM CYANIDE: Dupont Canada Inc.

Product Information: 800-387-2122
Transportation Emergency Phone: 613-348-3616
Medical Emergency Phone: 613-348-3616

CALCIUM CYANIDE: Cyanamid Canada Inc.

Emergency Telephone Number: 905-356-8310

FUEL OIL/DIESEL FUEL: Petro-Canada Inc.

Gasoline, Ethylene Glycol, Antifreeze
Emergency Telephone Number: 403-296-3000
Switchboard: 403-296-8000
David Friendly: 403-296-4951

FUEL OIL/DIESEL FUEL: Esso Petroleum

Gasoline, Ethylene Glycol, Antifreeze
Emergency Telephone Number: 780-468-6120
Esso Contract Haul (Warren Laugheed) 780-465-8431
Cell: 780-915-1802

AGRUIM: North American Wholesale

24 HR Emergency Telephone Number – Transportation 1-800-792-8311
Medical: 1-888-670-8123

FUEL OIL/DIESEL FUEL: Shell Canada Products

Gasoline, Ethylene Glycol, Antifreeze
Emergency Telephone Number: 800-661-7378

Petro - Canada Products

Yellowknife: 867-873-4001

Brian Harrison (Home): 867-873-8653

Dalyn Chan (Home): 867-873-8853

LEAD NITRATE: Univar Canada Ltd.

Emergency Telephone Number: 780-452-6655

HYDROGEN PEROXIDE 50-70%: Degussa Canada Ltd.

Emergency Telephone Number CANUTEC: 613-996-6666

PROPANE: Superior Propane (Yellowknife)

Emergency Telephone Number: 867-873-5551

Ken Yoder (Manager) Number: 867-444-1327
867-873-4197

Taylor Gas Liquids 250-789-3727

Jerry Wozniak, Security Manager, Duke Energy : 250-789-6500

SUPPLIER OF PERSONAL PROTECTIVE EQUIPMENT

ACKLANDS GRAINGER: 867-873-4100

Trevor Roddick, Manager : 867-444-3321

CEDA:

Shaun Dovell, Manager Cert (Edmonton, AB): 780-472-6766

Jeff Grubbs, Safety Manager, CEDA: 780-472-6766

Ext 4334

**COMPANIES WITH EQUIPMENT AVAILABLE ON AN EMERGENCY BASIS
(UPON REQUEST)**

OSCAR UNITS - Hay River, NT and Yellowknife NT (Esso)

Emergency Edmonton, AB: 780-468-6120
Hay River, NT (Midnight petroleum Ltd): 867-874-2201
Mark Miltenberger (Midnight Petroleum, Home): 867-874-6230
Yellowknife, NT (IOC): 867-873-6214

David Hynes: 867-920-4107

Jamie Hynes (IOC, Home): 867-766-4638

ADDITIONAL TELEPHONE NUMBERS

Peace River	Tom Remple	780-625-8023 (cell) 780-624-3371 (home)
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Yellowknife Fire Department (Emer)	867-920-2222
CPPI Trailer	867-766-5500
(Ask for shift supervisor)	

APPENDIX C

SAMPLE SPILL REPORT

NWT 1752/1295

**RTL ROBINSON ENTERPRISES LTD.
SPILL / RECOVERY REPORT**

DATE:	TIME STARTED:	TIME FINISHED:
TIME REPORTED:	TOTAL TIME:	MILEAGE:
LOCATION:		
PRODUCT TYPE/PIN NO.:		
OWNER OF VEHICLE:		
ADDRESS:		
INSURED BY:		
ADDRESS:		
INVOICE TO:		
ADDRESS:		
DRIVER'S NAME:		
ADDRESS:		
TRACTOR UNIT#	TANK OR TRAILER#:	
DAMAGE TO TRACTOR:		
DAMAGER TO TRAILER:		
DAMAGE TO PROPERTY OF THIRD PARTY:		
ADDRESS:		
BRIEF DESCRIPTION OF INCIDENT:		
CLEAN UP PROCEDURES:		
TOTAL COST OF RECOVERY (\$)		

RECOVERY COSTS, ITEMS:

RECOVERY TRACTOR#	TYPE (Picker, Winch, Pump etc)	HOURS TRAC.	TLR	RATE PER HOUR	TOTAL

TOTAL TRACTOR COSTS \$: _____

RECOVERY TANK/TRAILER	TYPE: (Hiboy, B-Train etc)	HOURS TRAC.	TLR	RATE PER HOUR	TOTAL

TOTAL TRAILER COSTS \$: _____

OTHER HEAVY EQUIPMENT#	TYPE: (Crane, Cat, Loader etc)	HOURS TRAC.	TLR	RATE PER HOUR	TOTAL

TOTAL HEAVY EQUIPMENT COSTS \$: _____

OTHER MISC. EQUIP: (pumps, saws, hoses, boats, booms, augers, etc)	HOURS	RATE PER HOUR	TOTAL

TOTAL MISCELLANEOUS COSTS \$: _____

**EQUIPMENT USED
OTHER THAN RTL ROBINSON ENTERPRISES LTD.:**

COMPANY	UNIT#	TYPE	RATE(\$)	HOURS	RECOVERY TRAC. TLR		TOTAL(\$)

TOTAL COST OF OTHER EQUIPMENT \$: _____

INCIDENTALS: (poly, rope, chains, canvas, etc)	AMOUNT	COST \$	TOTAL (\$)

TOTAL COST OF INCIDENTALS \$: _____

PERSONNEL NAME	HOURS	RATE \$	TOTAL (\$)

TOTAL MAN HRS: _____ TOTAL COST \$: _____

PERSONNEL (Not RTL)	HOURS	RATE \$	TOTAL (\$)

TOTAL MAN HOURS: _____ TOTAL COST \$: _____

REMARKS:

RTL OFFICE USE ONLY

PRODUCT:

Product Total: _____

Product Recovered: _____

Product Lost: _____ (Litres)

_____ (¢per L)

A. Estimated Cost of Lost Product:

\$ _____

Tractors: \$ _____

Trailers: \$ _____

Misc. Heavy Equip: \$ _____

Misc. Small Equip: \$ _____

Other Equip (Not RTL): \$ _____

Incidentals: \$ _____

Wages: \$ _____

B. Cost of Recovery to RTL:

\$ _____

Other Related Costs:

Tractor Damage: \$ _____

Tank/Trailer Damage: \$ _____

Third Party Damage: \$ _____

C. Total Related Costs:

\$ _____

Estimated Cost of Incident (Total A, B & C):

\$ _____

Remarks: