SPILL CONTINGENCY PLAN

AGNICO-EAGLE MEADOWBANK PROJECT

EXPLORATION CAMP

LICENSE 2BE-MEA0507

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1. INTRODUCTION

1.1 PURPOSE & SCOPE OF THE SPILL CONTINGENCY PLAN

The overall purpose of establishing a spill contingency plan is to minimize the impacts of spills by the establishment of predetermined lines of response and plans of action. More specifically the objectives of this Spill Contingency Plan are to:

- identify roles, responsibilities, and reporting procedures;
- provide readily accessible emergency information to the cleanup crews, management, and government agencies;
- comply with federal and territorial regulations and guidelines pertaining to the preparation of contingency plans and notification requirements;
- promote the safe and effective recovery of spilled materials;
- minimize the environmental impacts of spills to water or land;
- provide site information on the facilities and contingencies in place,

in the event of an emergency or spill.

This plan covers the activities taking place at the Meadowbank Exploration Camp and has been prepared in accordance with the following reference documents:

- Indian and Northern Affairs Canada (INAC) 2007. *Guidelines for Spill Contingency Planning*.
- Government of Nunavut (GN) 2002, *Guideline General Management of Hazardous Wastes in Nunavut.*
- Northwest Territories Resources Wildlife and Economic Development Environmental Protection Service. 1988. *Spill Contingency Planning and Reporting Regulations.*

1.2 CORPORATE STRUCTURE

In early July 2007, Cumberland Resources became a 100% wholly-owned subsidiary of Agnico-Eagle Mines Limited (AEM). Through a series of steps, AEM amalgamated with Cumberland and Meadowbank Mining Corporation (a wholly-owned subsidiary of Cumberland) on August 1, 2007. As a result of this amalgamation, all of the rights, title, interests, liabilities and obligations of Cumberland and AEM are automatically, by law, transferred to and assumed by AEM. Therefore in all the Water License documents, the terms ‘Cumberland’, ‘Meadowbank’, ‘AEM’ and ‘AEM’ are to mean the same entity: ‘Agnico-Eagle Mines Limited.

Agnico-Eagle Mines (AEM) Limited has its head office in Toronto at the following address:

Agnico-Eagle Mines Limited
145 King Street East, Suite 400
Toronto, Ontario,
M5C 2Y7
Tel: 416-947-1212
Website: www.agnico-eagle.com

The Meadowbank project is managed out of the Vancouver office at the following address:

Agnico-Eagle Mines Limited
Suite 375, 555 Burrard Street, Box 209
Two Bentall Centre
Vancouver British Columbia, V7X 1M8
Tel: 604-608-2557

The exploration activities are managed out of the Vald'Or exploration office at the following address:

Agnico-Eagle Exploration Division
761 chemin de la mine Goldex
Val d'Or, Qc
J9P 4N9
Tel: 819-874-5980

The contact telephone numbers at the exploration camp are:
Tel: 604-677-0689
Email: dcontre@agnico-eagle.com
ddeterman@agnico-eagle.com

1.3 ENVIRONMENTAL POLICY

The present SCP has been prepared in accordance with the commitments made in Agnico-Eagle's environmental policy, which are to:

- Assess the potential environmental impacts of any new undertaking with an objective to minimise them.

- Design and operate our facilities to ensure that effective controls are in place to minimise risks to health, safety and the environment.

- Implement an emergency response plan to minimise the impacts of unforeseen events.

- Provide a professional environmental staff to plan and direct environmental compliance programs and to assist in training and education activities.

- Provide training and resources to develop environmentally responsible employees.

- Ensure that environmental factors are included in the purchase of equipment and materials.

- Ensure that contractors operate according to our environmental policy and procedures.

- Comply with all applicable environmental laws and regulations.

- Communicate with employees, the public, government agencies and other stakeholders on activities involving health, safety and the environment.

- Regularly verify environmental performance and implement any required corrective action.

- Minimise the generation of hazardous and non-hazardous waste and ensure proper disposal of all wastes.

- Implement measures to conserve natural resources such as energy and water.

- Rehabilitate sites in accordance with regulatory criteria and within the established time-frame.

2. MEADOWBANK CAMP DESCRIPTION

The Meadowbank project, operated by Agnico-Eagle Limited, is located approximately 70 kilometres north of the Hamlet of Baker Lake, Nunavut.

The exploration camp is located about 70 km north of the Hamlet of Baker Lake in Nunavut (see Figure 2-1). The project is located on Inuit Owned surface lands (IOL BL-14) and has the following coordinates:

- Latitude: 65°01'9.12"N
- Longitude: 96° 04'1.91"W

on NTS map sheet 66H/1.

The general layout of the camp is shown in Figure 2-2.

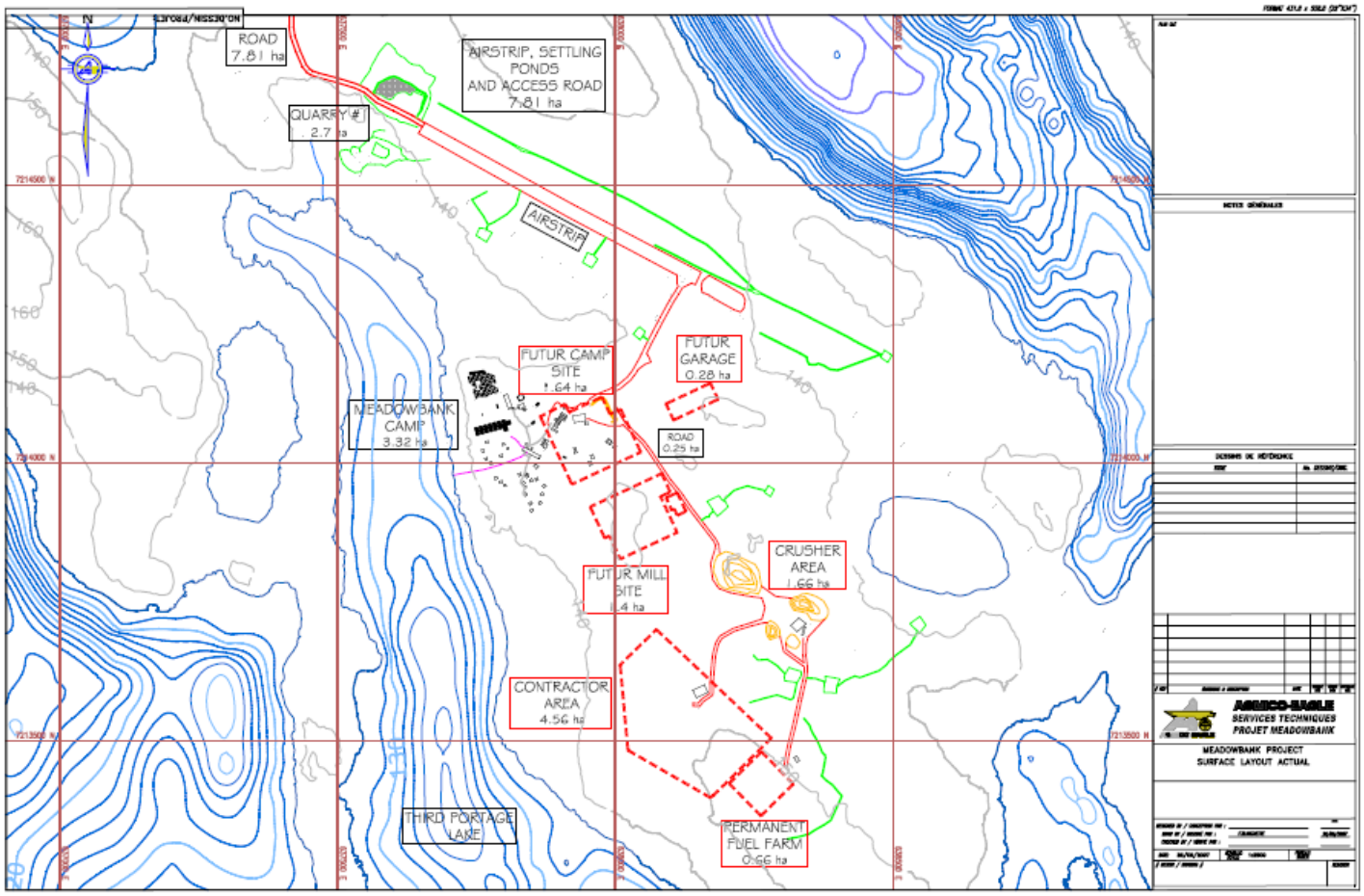
Buildings and Tents

The North Camp (currently under use) consists of the following structures:

- a stick built kitchen/dry structure,
- 4 :14’x16’ Weatherhaven sleeper tents,
- 19: 14’x16’ wooden framed canvas sleeper tents,
- 13: 12’x12’ Weatherhavean sleeper tents,
- a 16’x55’ Weatherhaven shower/toilet,
- a 24’x 84’ Weatherhaven core shack ,
- a 24’ x 32’ Weatherhaven office tent,
- a plywood generator shed and driller’s shop, and
- a 42’ x 70’ temporary Cover-all fabric building.

FIGURE 2.1: Location of the Meadowbank Project

Figure 2.2: General layout of camp



Fuel Storage

The following fuel storage equipment is used on site:

- 5 fuel tanks: 50 000 litres each, double-walled skid-mounted
  - Length 7.34 m (secondary tank)
  - Length 6.48 m (primary tank)
  - Diameter 3.2 m (outside secondary)
  - Maximum fill capacity 47 500 litres
  - Skid assembly – 8.48 m x 2.44 m
  - Used for diesel fuel storage, total capacity: 237 500 litres

- 4 fuel tanks: 75 000 litres double-walled skid-mounted
  - Length 11.71 m (secondary tank)
  - Length 10.59 m (primary tank)
  - Diameter 2.90 m (outside secondary)
  - Maximum fill capacity 71 250 litres
  - Skid assembly: 13.04 m x 2.90 m
  - 3 tanks used for diesel fuel storage, total capacity: 213 750 litres
  - 1 tank used for aviation fuel.

Both sizes of tanks are mounted on steel skids, which are supported by timbers resting on a bed of gravel and sand. All tanks are double-walled, with a secondary internal containment area and interstitial monitoring capability. Filling and pumping sites have additional spill containment capabilities and secondary containment is used under hose connections coming from the fuel tanks. The fuel storage monitoring program is included in Appendix A.

Other fuel supplies such as gasoline is stored in 205 litres metal drums, as the amount presently required at site does not justify the use of fuel tanks.

A 5.6 millions litres fuel tank will be constructed in the fall of 2007. It will be located within a bermed and lined facility (this tank should replace eight of the above mentioned double-walled fuel tanks). It has the following characteristics:

- Diameter 24.2 m
- Height 12.1 m high
- Nominal fill capacity of approximately 5 million litres
- Bermed lined enclosure : 74 m x 63.5 m (110% of tank volume)
- Dispensing unit located within its own bermed and lined area adjacent to the large tank pad, housing the pumps for filling the tank and dispensing fuel as required.

The 5.6 million litres tank will be filled with fuel transported from the Meadowbank Baker Lake Tank Farm when the AWPAR reaches the camp. When the large tank becomes operational the only other remaining fuel tank will be the 75 000 litres tank of aviation fuel.

Other Equipment

The following equipment is also on site:

- Tercon earthworks equipment: dozers, shovels, trucks, drill, pickup truck, etc.,
- 5 drills (one is in Baker Lake and should be brought up when the road is finished) belonging to the drilling company (Boart-Longyear),
- Snowmobiles and four wheelers,
- Two incinerators.

Explosive Storage Facility

A portable explosive storage facility is located on site for use by the earthworks crew, at a distance as required by explosive storage regulations. ANFO is not stored on site, it is fabricated on site with ammonium nitrate and fuel oil. The ammonium nitrate is flown in from Baker Lake on an as needed basis in the form of 2 tonnes bags.

3. HAZARDOUS MATERIALS STORED ON SITE

The hazardous materials stored on site consist of the following substances:

- P-50 Diesel
- Jet A and/or Jet B turbo fuel
- Hydraulic Oil
- Lube Oil
- Waste Oil
- Propane
- Explosives (used in quarries)
- Other materials hazardous to the safety of personnel and the environment

The Material Safety Data Sheets (MSDS) for the hazardous materials stored at the exploration camp can be found in Appendix I.

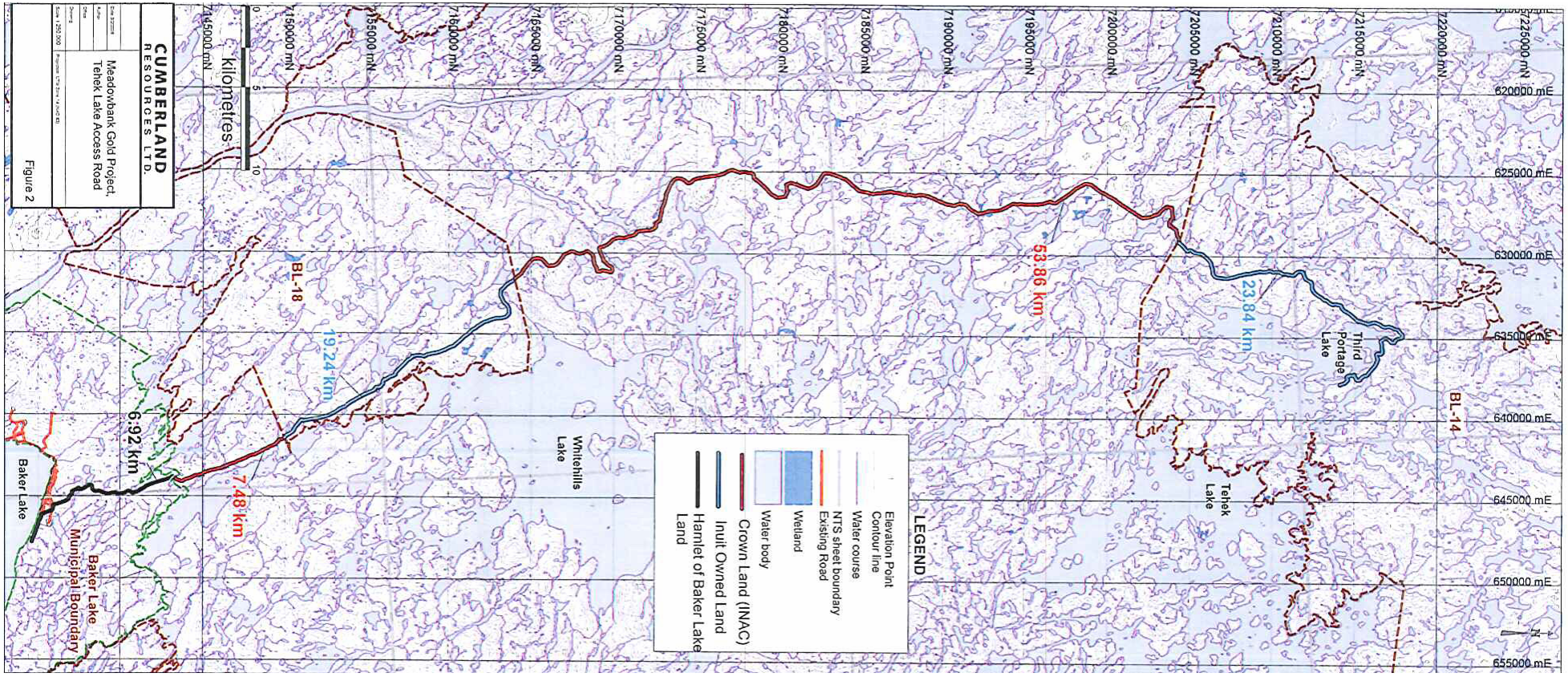
Until now, the transportation of fuel from Baker Lake to the site was accomplished over a winter road. The All Weather Private Access Road (AWPAR) from Baker Lake to the Meadowbank camp is expected to reach the Meadowbank site in late November, early December 2007. This road will be 108 km long and will be used to supply the camp site with fuel and other material as required (see Figure 3-1). A winter road may still be used, if for unforeseen reasons, the AWPAR cannot be completed as planned. The winter road was used by Cumberland for eleven years with negligible environmental impacts.

Inventory of Fuel at the camp site

The inventory of petroleum products, provided below, indicates the amounts stored at the Meadowbank site as of October 24, 2007. It should be noted that as soon as the road is ready, the inventory will be controlled by the filling of the 5.6 million litres fuel tank:

Diesel Fuel: 88 000 litres (double-walled fuel vaults)
Jet-A: 1000 litres (205 litre drums)
Gazoline: 1000 litres Engine Oil : 13 (20 litres pails)

Figure 3.1 All Weather Private Access Road



4. DEFINITIONS

4.1. WHAT IS A SPILL?

For the purposes of this plan, a spill is defined as an accidental release of product into the environment that has the potential for adverse impact. The emergency response team must be notified immediately of any spill or emergency.

4.2. MATERIALS & REPORTABLE SPILLS ON SITE

The GN Department of Environment is responsible for ensuring that spill contingency planning and reporting regulations are enforced as outlined in the *Environmental Protection Act*. According to the Consolidation of Spill Contingency Planning and Reporting Regulations of the *Environmental Protection Act (*1990), where there is a reasonable likelihood of a spill in an amount equal to or greater than the amounts set out in Table 4.1, the spill must be reported to the NT-NU 24-HOUR SPILL REPORT LINE at 867.920.8130.

As a precaution, if there is any doubt as to whether the quantity spilled meets the minimum reportable thresholds listed in Table 4.1, the spill incident shall be reported. Furthermore, AEM will maintain a detailed log of all spills of hazardous materials, including non-reportable spills. As part of AEM's overall environmental management system and in the spirit of a continuous improvement of environmental performance, procedures will be implemented to encourage all employees to communicate non-reportable spill incidents.

To ensure compliance with Section 36(3) of the *Fisheries Act* and Section 35 of the *Migratory Bird Regulations* all spills of fuel or hazardous materials, regardless of quantity, shall be reported immediately to the NT-NU 24-HOUR SPILL REPORT LINE (at 867.920.8130) where the release:

- is near or into a water body (including frozen)
- is near or into designed sensitive wildlife habitat
- is a threat to a listed species at risk or its critical habitat.

Table 4.1:
Spill Quantities that must be Reported to the NT-NU 24-HOUR SPILL REPORT LINE

Transportation Class	***Type of Substance***	***Compulsory Reporting Amount***
1	Explosives	Any amount
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity exceeding 100 L
2.2	Compressed gas (non-corrosive, non-flammable)	Any amount from containers with a capacity exceeding 100 L
2.3	Compressed gas	Any amount
2.4	Compressed gas (corrosive)	Any amount
3.1, 3.2, 3.3	Flammable liquid	100 L
4.1	Flammable solid	25 kg
4.2	Spontaneously combustible solid	25 kg
4.3	Water reactant solids	25 kg
5.1	Oxidizing substances	50 L or 50 kg
5.2	Organic peroxides	1 L or 1 kg
6.1	Poisonous substances	5 L or 5 kg
7	Radioactive substances	Any amount
8	Corrosive substances	5 L or 5 kg
9.1 (in part)	Miscellaneous substances	50 L or 50 kg
9.2	Environmentally hazardous	1 L or 1 kg
9.3	Dangerous wastes	5L or 5 kg
9.1 (in part)	PCB mixtures of 5 ppm or more	0.5 L or 0.5 kg
None	Other contaminants	100 L or 100 kg

Note: L = litre; kg = kilogram; PCB = polychlorinated biphenyls; ppm = parts per million.

4.3. SPILL PREVENTION MEASURES

General

The first step in spill response is to take actions to prevent the spill from occurring. Regular worksite inspections will be conducted to identify measures to minimize the risk of chemical spills. All personnel will be trained to be aware of the potential hazards associated with the fuel/chemicals with which they are assigned to work. AEM will support the following general principles for spill prevention:

- provide up to date and accessible Material Safety Data Sheets (MSDS) for all hazardous materials
- regularly inspect fuel/chemical storage areas
- train workers in the use of safe work procedures for hazardous materials, and procedures to clean up spills
- encourage workers to take reasonable measures to prevent spills
- keep drums/containers sealed or closed,
- place drums/containers within a suitable form of secondary or spill containment

- keep storage areas secure from unauthorized access
- segregate incompatible materials
- ensure chemical storage areas are adequately protected from weather and physical damage
- provide adequate spill response materials at storage areas

5. RESPONSIBILITES DURING FUEL AND HAZARDOUS MATERIAL TRANSPORTATION TO SITE

The following are the due diligence responsibilities for fuel and other hazardous goods transportation to the site.

- Shipper:
    - Ensures proper loading and containment and documentation, which complies with TDG guidelines
    - Ensures that goods are classified and labelled appropriately. Provide placards if required.
    - Ensures safety at all times.
    - Ensures proper communication with carrier

- Carrier:
    - Supervises and ensures proper loading and containment and documentation which comply with all TDG regulations
    - Ensures correct volumes for transport, attach placards if necessary, maintains or replaces safety marks
    - Checks and delivers TDG manifest to receiver
    - Ensures safety of all personnel and equipment

- Receiver:
    - Supervises unloading procedures
    - Complies with TDG guidelines.
    - Ensures safety of containment facilities.
    - Ensures maintenance of all pumps and loading/unloading equipment on site.
    - Provides on-site emergency communications (telephone, radio).
    - Completes regular site inspections of storages facilities.
    - Records all shipment manifests.
    - Keeps on-site inventory of all dangerous goods
    - Maintains safety procedures at all times.

- On-Site Coordinator:
    - Supervises and organises spill containment equipment and personnel
    - Reports to internal and external resources
    - Ensures proper safety equipment is available
    - Notifies all personnel of current hazards
    - Maintains proper safety procedures at all times
    - Must be compliant with all TDG guidelines.

6. ACTION PLAN

6.1. INITIAL ACTION

Initial actions for spills include ensuring personnel and site safety, identifying and containing spill materials, reporting the spills to the on-site coordinator, alerting AEM personnel and ERT, notifying government agencies, and recording the incident.

This section provides information on the general procedures for reacting to a spill. The response sequence is illustrated in Figure 6.1 and 6.2. Additional information regarding roles and responsibilities of each party is provided in Section 7.

Spills may be the result of any of the following occurrences:

- tanks, drums or containers may develop leaks or rupture
- failure of equipment such as valves, piping or containment structures
- overfilling
- improper storage
- spills during transfer of fuel, chemicals or waste products
- spills resulting from accidents during transportation

In all cases the initial action, by the first responder to the site, will be to ensure the safety of all people at the site. If necessary, people will be immediately evacuated from the area affected by the spill. The second activity will be to notify the On-Scene Coordinator of the occurrence and to provide an initial assessment of the problem. The first responder should not attempt to deal with a spill that represents a potential immediate danger to human health, property or environment.

6.1.1. ENSURING SAFETY

Ensuring personnel and site safety is the responsibility of all parties, particularly the first responder who has the most knowledge of the spill. In the event of a spill, the following general precautions and steps will be taken to ensure site and personnel safety:

• be alert – ensure safety of yourself and others by notifying them of the incident
• assess the hazard to persons in the vicinity of the spill by assessing the dangers of exposure to the spill material
• shut off ignition sources such as vehicles and unplug electrical equipment – NO SMOKING;
• shut off operating equipment
• establish exhaust ventilation
• attend to the injured (refer to the MSDS in Appendix I)
• contact the On-Scene Coordinator, identify the location and request assistance as required
• do not contain compounds (e.g. gasoline, aviation fuel) if vapours might ignite – allow them to evaporate
• keep people away from the spill site using barrier tape and pylons, closing doors and placing warning signage, and limiting access by positioning vehicles to restrict traffic.

The primary form of ensuring safety is by using preventative measures. All personnel who deal with chemicals must have training in first aid and safe materials handling, including the Workplace Hazardous Materials Information System (WHMIS). In addition, regular training updates and site-specific exercises / drills are integral to preventing incidents.

6.1.2. IDENTIFYING, CONTAINING & REPORTING THE SPILL

Identifying the spill material is essential for both ensuring safety and containing the spill. The material properties must be known in order to:

(a) assess first aid measures to injured personnel and potential dangers, and
(b) assess the appropriate containment measure for the spill material.

If necessary, consult the appropriate MSDS at the nearest WHMIS station (see also Appendix I) and determine the principal types of health and safety hazards associated with the product or material.

In the event of a spill, the following steps should be taken to properly contain the spilled material:

- assess the severity of the spill;
- assess whether the spill, leak, or system failure can be readily stopped or brought under control;
- stop product flow or leak if possible and IF IT IS SAFE TO DO SO
- wear appropriate PPE such as impervious clothing, goggles, and gloves when containing the spill
- approach spill from upwind IF IT IS SAFE TO DO SO
- depending on the type of compound spilled and if it is safe to do so, consider the following general spill response procedures:

Solids

- prevent it from contacting water in order to avoid it from further mobilizing or reacting
- protect it from snow, rain or wind by covering the spill area with an appropriate tarp
- evaluate if absorbent materials or earth should be used to create dikes, or whether ditches should be constructed to protect the spill area from surface water runoff

Liquids

- if the spill has occurred on land: use appropriate adsorbent materials, earthen dikes or trenches to prevent it from flowing out of the spill area or towards sewers, surface
- if the spill has occurred on water and the compound is immiscible in water: use floating booms to contain and skimmers to recover.
- IF IT IS SAFE TO DO SO, recover the spill as soon as possible and dispose of it.

Initial responsibilities for spill identification, containment, and reporting are outlined in Figure 6.1. The spill reporting procedure is depicted in Figure 6.2.

6.1.3. CLEANING UP MINOR SPILL

It is acceptable for a first responder to cleanup a spill if it is assessed to be a “minor” or “simple” spill.

A minor spill is defined as any hazardous chemical spill that does not involve highly toxic, highly reactive, or explosive chemicals in a situation that is not life threatening. Furthermore, this type of spill presents a manageable physical or health hazard to personnel who, when wearing proper personal protective equipment, will not be exposed to any chemical at a level that exceeds any recognized action level or permissible exposure limit. Minor or simple spills are still to be reported to the On-Scene Coordinator and the Environmental Advisor but they are not expected to involve emergency responders.

Before cleaning up a minor spill, the first responder will ensure that it can be done safely. The first responder will also wear the right personal protective equipment, including, at a minimum, appropriate eye protection, protective gloves, and protective clothes. Additional protective equipment may be required for spills that present special hazards (such as corrosive or reactive spills or spills that have a splash potential). As a rule of thumb, if a respirator is required, outside assistance will be sought because the spill is no longer a minor spill. Similar response procedures are required to clean up minor or simple spills as are required for those involving the ERT as described in Section 6. Consult the MSDS for specific requirements (see Appendix I)

6.2. INVESTIGATION AND RECOMMENDATIONS

To minimise the probability of reoccurrence, the Environmental Advisor or the Emergency Response and Safety coordinator might decide that for a particular spill, the initial action plan should be followed by an investigation.

In such a case, the General Mine Manager will appoint an investigation team comprised of :

- a senior level manager as team leader
- employees with the relevant expertise to the particular situation
- one employee independent of the operation
- representatives from the environmental and safety departments.

The investigation report, including recommended course of action, should be forwarded to the General Mine Manager within 20 days of the investigation team establishment.

Figure 6.1: AEM Action Plan

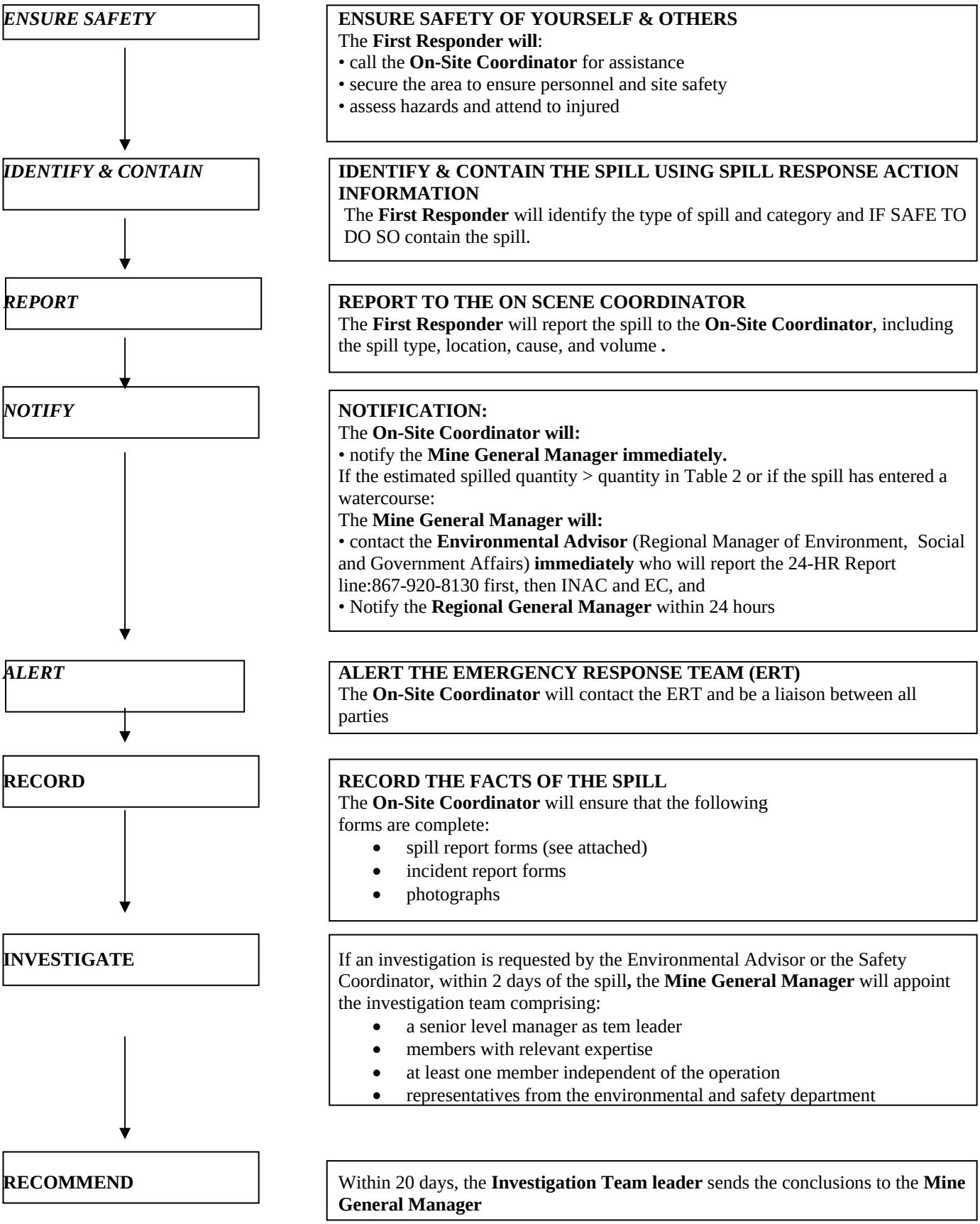
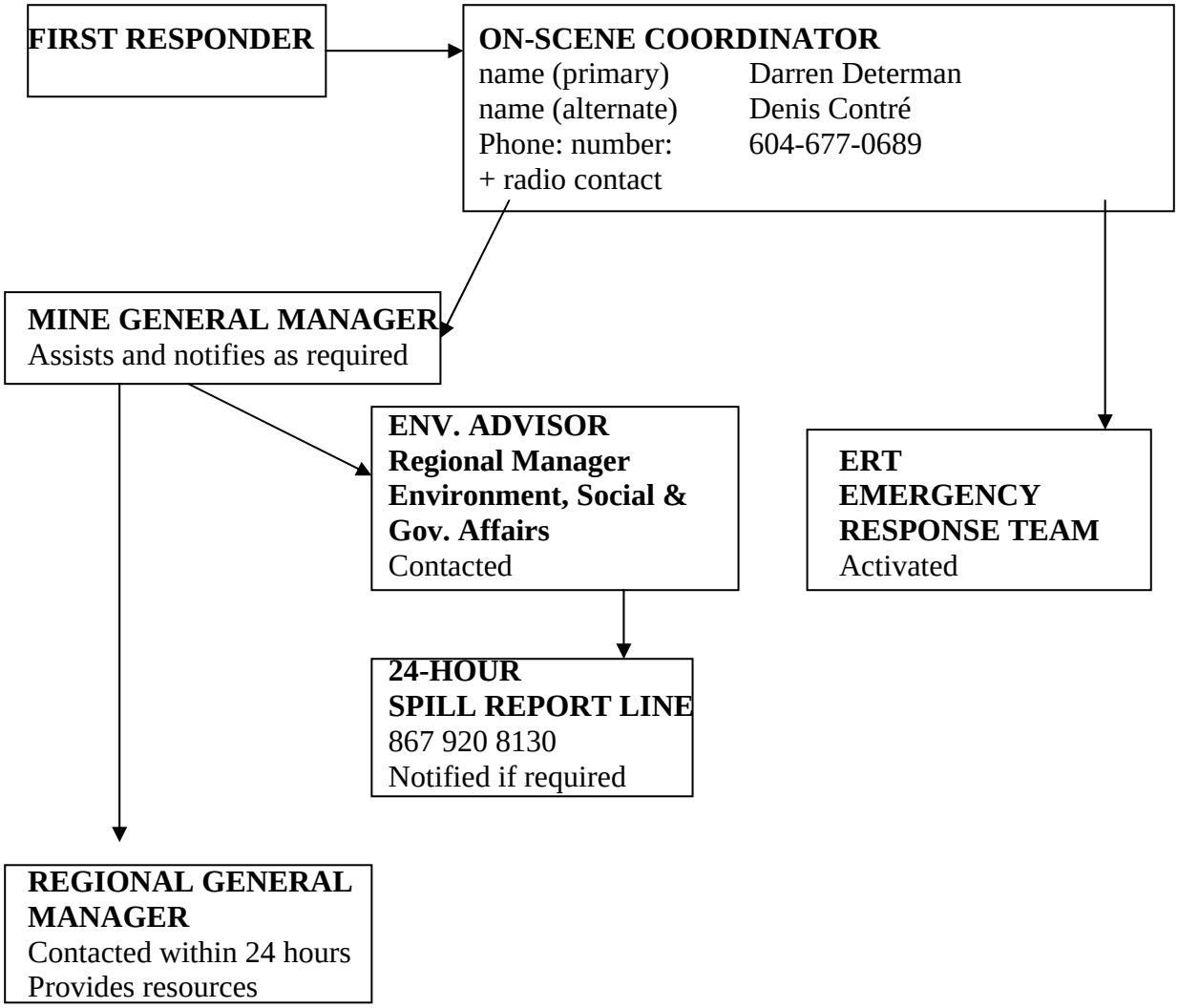


Figure 6.2
Spill Reporting Procedure



7. RESPONSE ORGANIZATION

In accordance with the action plan described in Section 5, the response organization details the roles and responsibilities of each party involved in the spill response. In the event that it is not safe to attempt a cleanup effort internally, the On-Scene Coordinator will contact the Environmental Advisor and General Mine Manager, who will in turn contact the NT-NU 24-HOUR SPILL REPORT LINE to coordinate cleanup using external resources.

7.1. FIRST RESPONDER

The person who has caused a spill or is the first to observe the spill is the first responder. The responsibilities of the first responder are as follows:

- ensure site and personnel safety
- assess the preliminary severity and source of the spill
- identify and contain the spill, IF SAFE TO DO SO
- immediately report to and work with the On-Scene Coordinator
- participate in spill response as a member of the clean up crew.

7.2. ON-SCENE COORDINATOR

The On-Scene Coordinator must be knowledgeable with regard to the exploration camp operations, initial response actions, and spill response equipment and facilities.

Responsibilities of the On-Scene Coordinator are as follows:

- assume complete authority over cleanup personnel and the spill scene, as well as assume responsibility for all mitigation efforts
- evaluate the initial situation and assess the magnitude of the problem
- activate the initial response plan
- alert and assemble key personnel in the response team, as deemed appropriate, to handle the situation
- in consultation with the General Mine Manager develop the overall plan of action for containment and cleanup of the specific incident, as well as direct and implement the plan
- ensure assigned responsibilities are carried out and the activities of team members are coordinated
- assess the requirements for people, equipment, materials, and tools to contain the spill in light of what resources are immediately available; urgency will depend on the nature of the spill
- in consultation with the General Mine Manager mobilize any additional resources that may be required and arrange for the transportation of necessary personnel and/or materials to the site
- with aid of the Emergency Response Team Coordinator, ensuring that the ERT is provided with proper personal protective equipment (PPE)

7.3. EMERGENCY RESPONSE TEAM (ERT)

AEM will have an Emergency Response Team (ERT) that will be trained and responsible for controlling and clean-up of spills, and assisting with medical and other emergencies that may occur at the exploration camp. These team members will attend regular training sessions.

7.4. EMERGENCY RESPONSE TEAM COORDINATOR (ERTC)

The responsibilities of the Emergency Response Team Coordinator (ERTC) are as follows:

- ensure on-site resources for spill response and cleanup are available
- mobilize all ERT personnel, equipment, personal protective equipment and supplies as required to the site of the spill
- assist On-Scene Coordinator in obtaining any additional resources not available on site
- ensure that appropriate PPE is worn properly
- conduct cleanup of spills under the direction of the on-scene coordinator
- liaise with On-Scene Coordinator and keep him/her informed of cleanup activities
- assist in developing and implementing emergency response training programs and exercises
- ensure that all spill response personnel receive adequate training to fulfil their responsibilities as part of the ERT.

7.5. ENVIRONMENTAL ADVISOR

The Environmental Advisor will be part of the AEM organisation and will be responsible for the following:

- liaise with the On-Scene Coordinator
- provide technical advice on the anticipated environmental impacts of the spill
- advise on the effectiveness of various containment, recoveries, and disposal options, and suggest the most appropriate approach
- report the spill to the NT-NU 24-HOUR SPILL REPORT LINE at 867.920.8130 as soon as possible, as required (see table 4.1)
- assist the General Mine Manager with regulatory and licensing reporting requirements, including gathering relevant information and submitting any formal reports (within the required time frame) to the applicable regulatory agencies and AEM management detailing the occurrence of a spill; this includes submitting an incident reporting form (see forms in Appendix J)
- recommend an investigation into the spill, if deemed necessary,
- if authorized by the General Mine Manager, act as a spokesperson with the public, media, and government agencies, as required
- within the context of the exploration camp water management plan, implement a sampling protocol for the collection and analysis of samples to identify and monitor possible contaminant levels resulting from the spill
- monitor the effectiveness of the cleanup operation and recommend further work, if necessary

- complete and fax (867.873.6924) or email (spills@gov.nt.ca) a NT-NU Spill Report Form to the NT-NU 24-HOUR SPILL REPORT LINE.

7.6. GENERAL MINE MANAGER

The General Mine Manager is responsible for implementing and maintaining the SCP. In addition, the General Mine Manager's responsibilities in the case of a spill are to:

- contact the Environmental Advisor to see if official reporting is necessary
- act as a spokesperson on behalf of AEM with the public, media, and government agencies, as required
- prepare and submit any formal reports (within the required time frame) to regulators and AEM management detailing the occurrence of a spill; this includes submitting an incident reporting form
- contact the Regional General Manager within 24 hours for a reportable spill.
- ensure that enough resources are available for all spill response personnel to receive adequate training to fulfil their responsibilities as part of the ERT
- establish an investigation team at the request of the environmental advisor or the safety coordinator..

7.7. PROJECT CONSTRUCTION MANAGER

The Project Construction Manager is potentially required to inform team members of the detailed nature of the operations to be performed in the event of a facility malfunction causing a spill during the construction phase. The responsibilities of the project construction manager are as follows:

- liaise with AEM personnel resources and keep them informed of cleanup activities
- assist the On-Scene Coordinator and ERT as needed, particularly in obtaining any additional resources not available onsite for spill response and cleanup.

7.8. HUMAN RESOURCES SUPERINTENDENT

The following are the responsibilities of the Human Resources (HR) Superintendent:

- maintain emergency and health and safety records
- assist in conducting emergency spill response exercises
- track all emergency and health and safety training that on-site staff have received, and when retraining will be required
- notify the On-Scene Coordinator when retraining is required
- ensure that employees are retrained in appropriate emergency response skills, Workplace Hazardous Materials Information System (WHMIS) training, Hazard Communication (HAZCOM), Occupational Health and Safety Administration (OHSA) training, first aid, and respirator fit-testing prior to expiry of existing training certification
- consult with appropriate organizations regarding retraining requirements and schedules.

7.9. HEALTH PROFESSIONAL

Health Professionals are responsible for the following:

- providing on-site first aid and other medical support
- providing additional training for ERT members

In addition to the health professional on site, the Baker Lake Hamlet health professionals will be first called on the scene. .

8. SPILL RESPONSE TEAM CONTACT INFORMATION

Emergency spill response personnel, their duties, location, and phone numbers are listed in Table 8.1 Important external contacts such as regulatory agencies, health organizations and transportation companies providing evacuation support are listed in Table 8.2. External spill response contractor contact information is listed in Table 8.3. AEM will identify off-site contractors with expertise in spill response. AEM will periodically review their qualifications, response time and equipment.

Table 8.1: Spill Response Team Contact Information Chart

Position	Name/Location	24 hours contact
Nunavut Territorial Government	NT-NU 24-HOUR SPILL REPORT LINE	Ph 867.920.8130
On-Site Coordinator	Darren Determan Denis Contré	
Emergency Response and Safety Coordinator	Jeannot Harvie	Ph: 867-793-4610
Emergency Response Team	Laurier Roy Denis Cormier Marlon Coakley Nuna	Ph: 867-793-4610
General Mine Manager	Martin Bergeron	Ph:604-608-2557 Fax:604-608-2559 Cell:604-613-7773
Construction Manager	Germain Cardinal	Ph:867-793-4610 Ph: 604-608-2557 Cell: 514-910-1909
Health Professional	Paramedic at camp site Baker Lake Nurse	Ph. 604-677-0689 Ph: 867.793.2813
Environmental Advisor (Regional Manager Environment, Social and Government Affairs)	Larry Connell	Ph: 604-608-2557 Fax: 604-608-2559 Home:604-638-6719
Regional General Manager	Daniel Kivari	Ph:604-608-2557 Fax:604-608-2559 Cell:604-760-7733

The hiring of key personnel is still ongoing. This table will be expanded as the information becomes available.

Table 8.2: Other Important Emergency Phone Numbers

Organisation/Authority	Telephone No.	Fax No.
NT-NU 24-HOUR SPILL REPORT LINE	867.920.8130	867.873.6924
Nunavut Water Board	867.360.6338	867.360.6369
Environment Canada, Environmental Protection Branch	867.669.4700	867.873.8185
Environment Canada 24 hours emergency pager monitored by Emergency and Enforcement	867.920.5131	
Manager Pollution Control & Air Quality Environmental Protection, Government of Nunavut	867.975.5907	867.975.5981
Indian and Northern Affairs Canada (INAC) – Manager Nunavut Regional Office	867.975.4550	867.975.4585
Indian and Northern Affairs Canada (INAC) – Land Administration Department – Nunavut Regional Office	867.975.4280	867.975.4286
Indian and Northern Affairs Canada (INAC)– General Enquiries	867.975.4275	
Kivalliq Inuit Association – Reporting Line	867.645.2810 867.646.2800	
Department of Fisheries and Ocean (DFO) – Nunavut Regional Office	867.979.8000	867.979.8039
Keewatin Health Services – Baker Lake (Health Centre) (Donna Brown, Head Nurse)	 867.793.2816 867.793.2813	
Baffin Regional Hospital (Iqaluit)	867.979.7300	
Royal Canadian Mounted Police (RCMP) Baker Lake – emergency number Cambridge Bay RCMP	867.793.0123 867.793.1111 867.983.2111	
Baker Lake Hamlet Office	867.793.2874	
Baker Lake Fire Emergency	867.793.2900	
Baker Lake Fire Marshall Office	867.873.7944	
Baker Lake Radio Station	867.793.2962	
Baker Lake Airport	867.793.2564	
Department of Environment Health	867.983.7328	
Poison Control Centre	867.920.4111	
CANUTEC (Spill Support Information)	613.996.6666	
Charter Aircraft/Helicopter Companies		
Air Tindi	867.669.8200	
First Air	867.873.4464	
Arctic Sun West	867.873.3306	
Ookpik Aviation	867.793.2234	
Kivalliq Air	1.877.855.1500	
Calm Air	867.793.2873	
Nunasi Helicopters	867.873.3306	
Canadian Helicopters	867.669.9604	
Great Slave Helicopters	867.873.2081	
Adlair Aviation	867.983.2569	

Table 8.3: Spill Response Contractor Phone Numbers

Company Name and Contact	Mobilisation Location/Estimated Time	Phone Number	Area of expertise
Local			
Sanavik Co-operative Association (representative of NTCL)		**867.793.2801**	
Baker Lake Contracting & Supplies		**867.793.2831**	**General Contracting and repairs**
Peter's Expediting		**867.793.2703**	**Transportation**
S.K. Construction Ltd		**867.793.2965**	**General Contracting and repairs**
T.& M. Enterprise		**867.793.2319**	**General Contracting and repairs**
NWT Ltd (Arctic Fuel)		**867.793.2311**	**General Contracting and repairs**
Tuuapak		**867.793.2965**	**General Contracting and repairs**
ZDYB Services		**867.793.2918**	**General Contracting and repairs**
External			
Northern Transportation Company Limited	**Halifax Within 24 hours**	**902.482.6825 Emergency: 902.225.2951 902.832.1582**	**Emergency response involving barge or fuel transfer from barge**
NTCL	**7 to 10 days to Baker Lake**		**Ice breaker vessel**

9. ACTION PLANS FOR SPECIFIC MATERIALS AT THE EXPLORATION CAMP

This SCP is designed to introduce the basic requirements for the efficient and safe cleanup of the materials that may be spilled during the operation of the Exploration Camp.

The main hazardous materials found at the exploration camp are:

- Explosives (ANFO)
- Compressed gas (propane, welding tanks, etc.)
- Flammable and combustible liquids (diesel fuel, Jet- A or B fuel, engine oil)

Actions plans for these types of hazardous materials are detailed here.

In the event that small amounts of other hazardous substances are used from time to time for equipment cleaning, welding or other usage, they also included in the action plans.

Copies of the MSDS for these hazardous are provided in Appendix I.

9.1. EXPLOSIVE MATERIALS

Explosive materials that is used at the site is ANFO. Small quantities are used. It is supplied in 1 tonne bags.

Initial actions regarding ANFO explosives spill include the removal of personnel from the immediate area and the elimination of ignition sources and combustible material if possible to ensure site and personnel safety. Personnel handling explosive materials will be fully trained on a regular basis. Untrained personnel must not attempt to contain or remove spills. The Environmental Advisor and the On-Scene Coordinator will contact and coordinate the appropriate measures for explosives cleanup.

Fires involving large quantities of ANFO should not be fought. General action plans for spills of ANFO explosives and explosive materials are outlined in Appendix B. AEM will review this information prior to mine operations to assess the requirement for further site specific details.

9.2. COMPRESSED GASES

Compressed gases such as acetylene are not expected to be stored in large quantities. However, they are flammable gases and can ignite and explode, if exposed to an ignition source. Vapours cannot be contained when released, and it is important that personnel withdraw immediately from any such release. If tanks are damaged, the gas should be allowed to disperse, with no attempt at recovery.

Compressed gas spills/leaks can generally be divided into two categories.

- The first are those leaks which occur away from the gas cylinder in lines, tubing, or apparatus. These types of leaks can generally be stopped by closing the main cylinder valve, if it is otherwise safe to do so.

- The second category of leak occurs at the cylinder itself, and cannot be stopped by closing the cylinder valve.

In some cases it may not be possible to close a cylinder valve due to age or poor condition, and as such, this situation falls into the second category of gas leak. **All leaking gas cylinders are considered an emergency if the leak cannot be stopped by closing the cylinder valve.**

Leaks of oxygen or flammable gas are especially dangerous.

General action plans for spills of compressed gases are outlined in Appendix C. AEM will review this information prior to operations to assess the requirement for chemical-specific spill response plans for compressed gasses. According to the *Environmental Emergency Regulations* (federal) a specific spill response plan for acetylene gas is required if it will be stored in quantities in excess of 4.5 tonnes. AEM will verify expected quantities prior to operations.

9.3. FLAMMABLE AND COMBUSTIBLE LIQUIDS

Flammable liquids have **flash points below 37.8oC**, evaporate quickly, and within a short period of time can reach high vapour concentrations in air. Flammable liquids that will be stored and used at the site. This includes but is not limited to aviation fuel, possibly gasoline and solvents.

Spills of flammable liquids represent an extreme fire and explosion hazard if vapour concentrations exceed the lower explosion limit (LEL). They are generally harmful if inhaled and can also be absorbed through the skin.

Combustible liquids such as diesel fuel have a **flash point above 37.8oC but below 93.3 oC** and are not fire hazards at room temperature. The principal hazard from non-flammable, volatile liquid spills is exposure to the vapour by inhalation or skin absorption.
The most common flammable and combustible materials stored and handled on site are liquids such as aviation fuel, diesel fuel, solvents and waste oils. For the purposes of spill response actions, lubricants and motor oil have been included with the flammable and combustible compounds given their petroleum hydrocarbon based nature. Action plans for spills of flammable and combustible liquids are outlined in Appendix D. AEM will review this information prior to operations to assess the requirement for chemical-specific spill response plans for flammable and combustible liquids.

9.4. OXIDIZING SUBSTANCES

Oxidizing compounds tend to promote combustion and can ignite organic solvents and combustible materials. They may also be harmful if inhaled or absorbed through the skin. Where an oxidizing substance such as ammonium nitrate, sodium nitrate or hydrogen peroxide is spilled, general safety measures include avoiding inhalation (e.g., by using a dust mask or half faced respirator), ingestion, and eye contact. In addition, ignition sources and combustible materials should be removed from the spill area. Spills on land will be contained by diking or barrier using non-combustible materials. Ammonium nitrate in particular mixes with water. Spills near or in water will therefore be dammed or diverted.

Action plans for spills of oxidizing substances are outlined in Appendix E. AEM will review this information prior to operations to assess the requirement for chemical-specific spill response plans for the oxidizing substances that will be used for the Meadowbank Project. According to the *Environmental Emergency Regulations* (federal) a specific spill response plan for hydrogen peroxide is required if it will be stored in quantities in excess of 3.4 tonnes. AEM will verify expected quantities prior to operations.

9.5. POISONOUS & TOXIC SUBSTANCES

Highly toxic chemicals include those with high acute systemic toxicity, and substances with chronic toxic effects such as carcinogens, reproductive or developmental (embryotoxins, teratogens) toxins, and mutagens. Also included in this category are compounds that can easily produce toxic products such as sodium cyanide which reacts with acids, water and weak alkalies to form lethal hydrogen cyanide (HCN) gas. Poisoning can result from breathing cyanide gas, dust or solution; absorption through the skin; and from ingestion. Because of the toxicity of sodium cyanide, all persons working with it must be completely familiar with, and observe the established safety practises.

The Meadowbank Project will use very dilute solutions of sodium cyanide, typically in the range of 0.01% to 0.05% cyanide (100 to 500 ppm) for ore extraction and flotation. Cyanide oxidizes and decomposes when exposed to air or other oxidants, and does not persist in the environment. As such, it does not give rise to chronic health or environmental problems when maintained at low concentrations. The concentration of HCN in water varies with pH. To suppress HCN formation in sodium cyanide make-up solutions, a minimum pH of 12 should normally be used.

The general action plan for spills of sodium cyanide as presented in Appendix F. AEM will review this action plan prior to mine operations to assess the requirement for further site specific details.

9.6. INFECTIOUS SUBSTANCES

Infectious substances are biological wastes from sewage. The Camp sewage is eliminated in the incinerators (some camps use electrical toilets which burn the waste immediately). No infectious substance contamination is expected at the camp site.

9.7. CORROSIVE SUBSTANCES

Corrosive substances include acids, bases and alkali compounds. Some corrosive substances could be used at the camp site in very small quantities for metal cleaning purposes. Dilute acid solutions irritate the skin, while concentrated solutions can result in burns and also react violently with water.

Many acids give off toxic fumes and are harmful if inhaled. Some acids are also flammable or oxidizers and can start a fire if in contact with organic matter. The resulting fire may produce irritating or poisonous gas.

Hydrofluoric acid can penetrate deeply and damage underlying tissue. Like acids, the principal concern with basic or alkali compounds is their corrosive effects. Dilute solutions irritate the skin, while concentrated solutions can result in burns. Concentrated alkali compounds can penetrate deeply and damage underlying tissue. Most bases do not wash off the skin and eyes with cold water. Consequently warm water must be used to wash the effected areas, often for prolonged periods of time up to several hours. They may be in solid form and cause airborne dust which is harmful if inhaled. Fires may produce irritating or poisonous gas.

Personnel dealing with these substances will be limited to selectively trained staff. Personnel will be trained regularly in prevention, storage, and handling and will be drilled regularly with spill exercises. In the event of a spill, safety measures will be implemented immediately. Personnel will be removed from the area of the spill until appropriate spill containment is acquired and protective gear is donned. Before handling corrosive materials, personnel must review safety, storage, and handling measures. The general method of dealing with acid or base/alkali spills is to apply a neutralizing agent that reacts with the original material to form a much less hazardous, often benign neutralized product.

Action plans for spills of corrosive substances are outlined in Appendix G. AEM will review this information prior to operations to assess the requirement for chemical-specific spill response plans for the corrosive substances that will be used at the Meadowbank Project. According to the *Environmental Emergency Regulations* (federal) a specific spill response plan for hydrochloric acid and nitric acid are required if they are stored in quantities in excess of 6.8 tonnes, for sulphuric acid if it is stored in quantities in excess of 4.5 tonnes, and for hydrofluoric acid if it is stored in quantities in excess of 0.45 tonnes. AEM will verify expected quantities prior to operations.

9.8. DISPOSAL METHODS

The wastes produced from response to spills depend on the nature of the spill and the method for responding. In some cases, particularly for solid spills, much of the spilled material can be recovered and re-used for its intended purpose.

In the case of acid or base spills, neutralizing agents may render the recovered liquids suitable for disposal back into the ore extraction process and/or to the sanitary sewer system on site.

In the case of spills of flammable and combustible materials, the recovered wastes may be suitable for on-site incineration (as is currently being proposed for used oil), or for landfarming at a licensed facility. The feasibility of an on-site landfarm facility will be evaluated during the mine design and engineering phase of the Meadowbank Gold Project.

Deteriorated or damaged ANFO should be destroyed or disposed of. Appropriate method of disposal or destruction and subsequent course of action will be determined by authorized personnel or the explosive supplier.

Some materials will not be suitable for reuse, treatment or disposal on site, and they will have to be packaged and sent off-site for recycling, treatment or disposal. AEM intends to use only approved methods, transporters and waste facilities for residual materials resulting from spill cleanup. Each case will have to be assessed on its own merits.

As part of its waste management plan for the Meadowbank Gold Project, AEM will establish acceptable disposal procedures and options for known and anticipated wastes.

9.9. CONTAMINATED SOILS AND WATER

It is possible that some spill events will result in significant, longer-term environmental impact to soil, groundwater or surface water. Each spill incident will be assessed by the On-Scene Coordinator and the Environmental Advisor for additional sampling and testing required to complete cleanup in accordance with the Water Quality and Flow Monitoring Plan, or to assess potential impacts to the environment and allow for additional remediation beyond the initial spill response. If required, the assessment and remediation of contaminated soil will be carried out in accordance with the *Environmental Guideline for Contaminated Site Remediation,* the *Canadian Council for Ministers of Environment - Canadian Environmental Quality Guidelines*, and other relevant environmental quality guidelines.

10. RESPONSE EQUIPMENT

10.1. GENERAL EQUIPMENT

AEM's spill response resource inventory for the Exploration camp is listed in Table 10.1. Fire extinguishers are provided at the tank farm, in all the buildings, at the helicopter pad and in any other area where flammable substances are stored and/or handled. Spill kits will be located at the tank farm, fuelling stations, airstrip, and other locations where spills of hazardous substances could occur.

A checklist of the required items for each spill response kit or equipment storage area will be provided. Spill response supplies will be checked against the lists on a quarterly basis and any deficiencies remedied immediately. The checklists will be reviewed whenever new chemicals are added to on-site activities to ensure that relevant spill cleanup supplies are present. MSDS for all the chemicals present in the vicinity of the spill kit will be kept near the kits, and will be updated as necessary to ensure that all MSDS data are up to date. The expiry dates of the MSDS will be tracked for every chemical present on site to help identify and replace those that are about to expire. MSDS are provided by the chemical suppliers. (See Appendix I for sample MSDS).

Table 10.1
Exploration Camp Spill Response Resource Inventory

24 hour response equipment	Number
Hydraulic Excavator	1
Single Axle truck	1
Front-end Loader	
Tractor dozers/snow plough	1
Spill Equipment Availability	
Fuel detention boom	x
Absorbent booms	x
Absorbent material	x
Portable oil skimmer	x
Portable pumps and hoses	x
Shop vacuum	x
Used drumss (210 L capacity)	x
Ice Auger	x
Tiger torch	x
Chain saw	x
Hand tools (shovels, rakes)	x

Note: This list will be updated as the mine construction activities are proceeding.

10.2. SPILL KITS

The locations and types of spill kits available at the camp site is listed in Table 10.2. The size and contents of the variously spill kits is listed in Tables 10.3 and 10.4.

Table 10.2: Types of Spill Kits at Each Location

Facility	Location	Kit
Tank Farm	Near the fuelling station	5 x 210 L kit Absorbent sheets
Weather Haven Garage		1 shovel Absorbent sheets
Explosive Storage		1 explosives cleanup kit per storage building

Note: L = litre.

Table 10.3: 210 L Spill Kit Contents

Number	Size	Description
5 piece	3'' x 4'	Oil selective boom
50 pieces	18'' x 18''	Universal pads
1piece	36'' x 48''	Polyethylene disposable bag
1pair		Chemical resistant gloves
1		Shovel
1 each	210 L	Metal container drum

Note: L = litre.

Table 10.4: Ammonium Nitrate Storage Spill Kit Contents

Number	Size	Description
2 boxes		Chemical resistant gloves
2 pairs		Uvex safety goggles
2 pairs		Tyvek coveralls
2 pairs		Half mask respirators with organic filters and National Institute for Occupational Safety and Health (NIOSH)/Occupational Safety & Health Association Approved dust respirator
3 each	205 L	Metal container drums
2 each		Shovels
1 box		Plastic garbage bags

Note: L = litre.

10.3. MOBILE ENVIRONMENTAL RESPONSE UNIT

Spill contingency planning for possible incidents during the transportation of fuel from Baker Lake to the Meadowbank site is coordinated by NWT Ltd (Artic Fuel) who operates the overland transportation equipment and is responsible for the operations.

1. Stop the equipment
2. Alert AEM and NWT Ltd (Artic Fuel) (see numbers on Tables 8.1 and 8.3)
3. Contain spill and initiate clean-up (see action plan for appropriate substance)
4. Report as outlined in Figure 6-1 as required.

11. TRAINING & EMERGENCY / SPILL EXERCISE

11.1. EFFECTIVENESS OF THE PLAN

To ensure the effectiveness of the SCP, the General Mine Manager will be responsible for:

- evaluating what training is required by all staff, and ensuring that all staff are given appropriate training and are retrained as needed
- completing an annual detailed review and update of the plan, with particular stress on the objectives and methods of the plan
- ensuring that this SCP remains up-to-date, and that updated versions are distributed to the personnel on site, and external agencies, organizations and selected qualified external responders
- ensuring that updates to new emergency communications information (new phone numbers, changes in reporting structure, etc.) are distributed as soon as the new information becomes available
- keeping a formal record of distribution and amendments to the SCP
- ensuring that emergency spill response exercises and inspections are conducted at least semiannually
- ensuring that the results of the regular inspections are used to improve spill response practices, and improve relevant plans accordingly
- completing annual internal audits of the EMS, including SCP, and arranging for external audits of the system every three years by independent specialists.

11.2. TRAINING

11.2.1. On-Site Personnel

A designated ERT consisting of on-site personnel will be established. AEM will ensure that the ERT is trained and present at all times. All members of the team will be trained and familiar with emergency and spill response resources, including their location and access, the SCP, and appropriate emergency spill response methodologies. ERT training will be conducted annually to ensure that sufficient team members are present and to ensure that training is up to date.

The following training will be included:

- a review of the spill response plan and responsibilities of the ERT members
- the nature, status, and location of fuel and chemical storage facilities
- the on-site and off-site spill response equipment, and how to use it
- emergency contact lists
- desktop exercises of “worst case” scenarios
- the likely causes and possible effects of spills.

All instructors will be highly qualified in spill response and prevention methods. All personnel and contractors at the project site will be familiar with spill reporting requirements. This will be ensured by conducting an orientation and training program on initial spill response procedures for all contractors and new personnel. Attendance will be tracked on site and re-training will be completed annually.

Fuel-handling crews will be fully trained in the safe operation of the facilities, spill prevention techniques, and initial spill response. Similarly, staff involved with the process, tailings, and wastewater systems will be trained in the safe operation of these systems. These crews will be re-trained annually; retraining schedules will be tracked on site.

Training programs will include regular WHMIS and Transportation of Dangerous Goods (TDG) training for all employees who use or are responsible for chemicals on site. A qualified trainer will provide WHMIS and TDG training. Additional safe chemical handling training will be conducted for employees handling or working in the vicinity of dangerous chemicals such as caustic soda, hydrochloric acid, explosives, and fuels. Completion dates of this training will be tracked and retraining done annually.

Re-training for TDG will be completed every three years. Employee TDG training status will be tracked by on-site personnel so that re-training can be completed before expiry of previous TDG training. All new staff handling or responsible for chemical use will receive Occupational Safety and Health Association (OSHA) training and annual refresher courses. Dates of course attendance will be tracked so that refresher courses can be offered prior to expiry of the previous course. Qualified trainers will provide the OSHA training.

Other specialist training will be considered for key Emergency Response Personnel including:

- Incident Command System National Training
- First Aid (Red Cross or similar)
- CPR (Red Cross or similar)
- Wildlife response (several types of classes available)
- Watercraft Safety - 241 FW 1 or (Coast Guard or equivalent)
- Natural Resource Damage Assessment
- Spill Response
- Media Relations

AEM will create a training matrix, which will identify specific spill and health and safety related training for generic classes of personnel on the ERT. The HR Representative, together with the General Mine Manager, will ensure that records of current training are retained, employee training expiry dates are tracked, and re-training is completed in a timely manner.

11.2.2. Contractors

Where pertinent, contractors will be required to have WHMIS, TDG and OSHA training as well as undergo site-specific health and safety training. Specialist responders will be expected to have technical environmental, health and safety training specific to their role as a qualified external contractor. AEM will request proof of qualifications for the areas external contractors are intended to support. All contractors working on site will be expected to complete site-specific training to ensure they are familiar with the risk and processes at the site.

11.3. EMERGENCY/SPILL EXERCISE

AEM will conduct semi-annual emergency/spill exercises to test the response of the ERT to system failures, emergencies, or spills. The type of drill/exercise will be varied between tests. The On-Scene Coordinator will document and prepare a report for the General Mine Manager noting the response time, personnel involved, and any problems or deficiencies encountered. This report will be used to evaluate the ability of personnel to respond to spills and to determine areas requiring improvement. The results of this report will be used in subsequent training exercises in order to continually improve the training program. The results of actual spill events and the success of the associated response will also be evaluated. Any deficiencies in the actual response will be investigated as to route cause and used to design new exercises and to test new procedures resulting from the corrective actions. The SCP will be revised and updated accordingly

12. LIST OF ACRONYMS

ANFO Ammonium Nitrate Fuel Oil
CCME Canadian Council of Ministers of the Environment
DFO Fisheries and Oceans Canada
EMS Environmental Management System
ERP Emergency Response Plan
ERT Emergency Response Team
ERTC Emergency Response Team Coordinator
FS Fuel Storage Area
GN Government of Nunavut
HAV Hepatitis A Virus
HCN Hydrogen Cyanide
HM Hazardous Materials Storage Area
HMMP Hazardous Materials Management Plan
HR Human Resources
HW Hazardous Waste Storage Area
INAC Indian and Northern Affairs Canada
LEL Lower Explosion Limit
AEM Meadowbank Mining Corporation (Cumberland)
MSDS Materials Safety Data Sheets
NIOSH National Institute for Occupational Safety and Health
OHSP Occupational Health & Safety Plan
PCB Polychlorinated Biphenyls
PPE Personal Protective Equipment
SCP Spill Contingency Plan
TDG Transportation of Dangerous Goods
WHMIS Workplace Hazardous Materials Information System

APPENDIX A
FUEL STORAGE MONITORING PLAN

The fuel storage monitoring plan at the Meadowbank exploration camp will consist of the following daily and weekly inspections conducted by AEM personnel that have been trained in the use of fuel pumping equipment and fuel spill response.

The following inspections will be conducted and recorded on a daily basis:

1. All tanks, lines, pumps, hoses, valves and fittings will be inspected for leaks or damage.
2. Ensure proper fuel only is dispensed into the correct tanks and barrels for use in the camp and associated exploration work sites.
3. Ensure that the 'No Smoking' signs posted in the area of the fuel tanks are always clearly visible.
4. Ensure that all personnel on site abide by the 'No Smoking' rule within the distances outlined in the regulations for fuel tanks.
5. Ensure that all fuel pumping and spill response equipment is clearly visible and easily accessed.

The following inspections will be conducted on a weekly basis:

1. Fuel levels in all primary tanks checked and compared against the fuel dispensed from each primary tank for each week.
2. Outer tanks checked for fuel leakage from the primary tank.
3. Spill response equipment checked.
4. Pumping equipment checked.

APPENDIX B
General Response Procedures for Spilled Chemical Substances Explosives

Ammonium Nitrate B.1
Ammonium Nitrate Fuel Oil (ANFO) B.2

Appendix B.1
Ammonium Nitrate

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank camp.

The first step against prevention of potential spills and association hazards is the application of proper storage procedures for bulk Ammonium Nitrate, including the following

- Good house keeping of the storage facility will prevent spilling and or contamination of materials.
- Ammonium nitrate should be stored away from combustible materials and fuels, as well as other blasting accessories (i.e. boosters, delays, detonating cords and detonators).
- The storage facility should be well ventilated.
- Proper signage restricting the use/exposure of ammonium nitrate to ignition sources should be posted (e.g. no hot work, smoking or vehicle maintenance).
- The storage facility should be locked at all times with only authorized personnel allowed access.

The following is a general spill response procedure for ammonium nitrate. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required. AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For an **ammonium nitrate spill (solid)**:
1) Isolate and evacuate the spill area.

2) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

3) Put on appropriate personal protective equipment. For an ammonium nitrate spill this includes:
a. Gloves **as recommended by the MSDS or glove manufacturer**
b. Protective eyeglasses or chemical safety goggles or face shield **as recommended by the MSDS**
c. Lab coat, coveralls or TyvekTM coveralls **as recommended by the MSDS**
d. Half mask air-purifying respirator with cartridges and/filters **as recommended by the MSDS or respirator manufacturer**

4) Ventilate (open windows/doors to outdoors) closed spaces before entering.

5) Remove all sources of heat and ignition (no smoking, flares, sparks or flames in immediate area) and remove uncontaminated combustible materials and organic compounds (wood, paper, oil, etc.,) from spill area.

6) For spills to land, protect the spill area from storm water runoff by constructing a ditch or dike using suitable absorbent materials, soil or other appropriate barrier.

7) Vacuum or sweep the spill residue using non-metal, non-sparking tools and place the residue in a labelled, plastic, container (plastic pail with lid or double heavy duty plastic bags) for re-use or off-site disposal at a licensed disposal facility.

Note: Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and **clearly label the container per WHMIS Guidelines**. Note: Minimize dust generation during the operation.

8) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash potential skin contact locations after handling.

Appendix B.2
Ammonium Nitrate Fuel Oil (ANFO)

Currently no ANFO is stored at the site. ANFO is fabricated as required, with ammonium nitrate and fuel oil. In the event that ANFO would be stored at the camp, AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp site. Proper handling and disposal of ANFO is an important first step in mitigating against spills and associated hazards.

The proper storage procedures are as follows:

- ANFO should only be used under the supervision of authorized trained personnel.
- ANFO should be kept away from heat, sparks, and flames, as well as initiating explosives, oxidizing agents, combustibles, and other sources of heat.
- Containers should be protected from physical damage and in dry, well ventilated conditions.
- Transportation to the Mine site will be in accordance with Section 14 of the *Mines Act* and Regulations and the *Transportation of Dangerous Goods Act*. Transport vehicles will be in sound mechanical condition and equipped with proper safety equipment. Loaded vehicles will not be left unattended and only authorized personnel will be responsible for the security of the explosives under their control.
- Explosives that have been identified as deteriorated or damaged will need to be disposed of or destroyed. The appropriate method of disposal or destruction and subsequent course of action will be determined by authorized personnel or the explosive supplier.

The following is a general spill response procedure for ammonium nitrate fuel oil – ANFO. The following procedure does not apply to emulsions or other explosives. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required. AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For an **ANFO spill (solid)**:
1) Isolate and evacuate the spill area.

2) Immediately extinguish any open flames and remove ignition sources (no smoking, flares,sparks in immediate area) IF SAFE TO DO SO. **Fires involving large quantities of ANFO should not be fought.**

3) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

4) Put on appropriate personal protective equipment. For an ANFO spill this includes:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Protective eyeglasses or chemical safety goggles or face shield **as recommended by the MSDS.**
c. Lab coat, coveralls or TyvekTM coveralls **as recommended by the MSDS.**
d. Shoe covers or rubber boots.

e. Half mask air-purifying respirator with cartridges and/filters **as recommended by the MSDS or respirator manufacturer.**

5) If the spill has occurred outdoors, stay upwind and avoid low lying areas. Ventilate (open windows/doors to outdoors) closed spaces before entering. Ensure adequate explosion proof ventilation for clean-up.

6) Remove all sources of heat and ignition (no smoking, flares, sparks or flames in immediate area) and remove uncontaminated combustible materials and organic compounds (wood, paper, oil, etc.,) from spill area.

7) Do not operate radio transmitters within 100 m of electric detonators.

8) For spill on land, protect the spill area from storm water runoff by constructing a ditch or dike using suitable absorbent materials, soil or other appropriate barrier. For spill to water, utilize damming, and/or water diversion to minimize the spread of contamination.

9) Collect, sweep or shovel spilled material and the other contaminated material/soil using non-metallic, spark-proof tools and place residue into a labelled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags) for off-site disposal at a licensed disposal facility.

Note: Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and **clearly label the container per WHMIS Guidelines.**

Note: The drums/containers/residues are to be stored in ventilated areas away from incompatible materials for eventual off-site disposal at a licensed disposal facility.

10) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.

APPENDIX C
General Response Procedures for Spilled Chemical Substances

Compressed Gases C.1
AEM commits to review, modify and approve as required to establish this procedure as appropriate for Meadowbank exploration camp.

The following is a general spill response procedure for compressed gases. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required. AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **compressed (inert and flammable) gas leak:**

1) IF SAFE TO DO SO and it will stop the gas leak, turn off cylinder valve.

2) If the leak cannot be stopped by closing the cylinder valve, and it is **an inert atmospheric gas** (e.g. nitrogen, carbon dioxide, etc) isolate and evacuate the affected area. If the leak is a **flammable gas** and the leak is outside of a ventilated building enclosure that will contain the gas, immediately activate the fire alarm system and evacuate the area/building.

3) Contact the On-Scene Coordinator who will assemble spill response team members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

4) If possible and safety permits, adjust leaking cylinder so that gas escapes rather than liquid.

5) If possible and safety permits, eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area) and turn off electrical equipment.

6) If the spilled has occurred outdoors, stay upwind and avoid low lying areas. If the spill has occurred inside a building, prevent spread of vapour throughout the building by closing doors to other rooms and hallways. If the room's air exchange system distributes air throughout the building, then it may also be necessary to have it shut-down. Allow vapours to ventilate outdoors by opening windows and doors to the exterior.

7) Isolate area until gas has dispersed. On-Scene Coordinator to verify safe conditions.

APPENDIX D
General Response Procedures for Spilled Chemical Substances

Flammable and Combustible Liquids D.1

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp. The following is a general spill response procedure for flammable or combustible liquids, particularly petroleum hydrocarbon products. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **spill of flammable or combustible petroleum hydrocarbon product (liquid):**

1) Isolate and evacuate the spill area.

2) Immediately extinguish any open flames and remove ignition sources (no smoking, flares, sparks in immediate area) IF SAFE TO DO SO.

3) Stop leak and contain spill (**see Step 9**) IF SAFE TO DO SO.

4) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

5) Put on appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Splash goggles or face shield.
c. Shoe covers or rubber boots.
d. Lab coat or TyvekTM coveralls.
e. Half mask air-purifying respirator with **organic vapour or combination** cartridges, or **as otherwise recommended by the MSDS or respirator manufacturer**.

6) If the spilled has occurred outdoors, stay upwind and avoid low lying areas. If the spill has occurred inside a building, prevent spread of vapour throughout the building by closing doors to other rooms and hallways. If the room's air exchange system distributes air throughout the building, then it may also be necessary to have it shut-down.

7) Ventilate (open windows/doors to outdoors) closed spaces before entering. Ensure adequate explosion-proof ventilation for clean-up. A vapour suppressing foam or water spray may be used to reduce vapours.

8) Remove all sources of ignition (no smoking, flares, sparks or flames in immediate area) and combustible materials (wood, paper, oil, etc.) within the spilled area.

9) Contain spill by using spill absorbent, spill pads or pillows, soil or snow to construct a dike that limits flow and prevents entry to sewer, waterways or onto ice. For spills to land, excavation of trenches/pits to capture spill flow may also be appropriate. If possible, compact soil or snow dikes, and place plastic tarps over the dike and at its foot to allow the product to pool on the plastic for easy recovery.

Note: Do not use paper towels to absorb spill as this increases the rate of evaporation and vapour concentration in the air.
Note: Do not flush with water into drainage areas or ditches as this will spread spill.
Note: Snow works well as a natural absorbent to collect and contain spilled petroleum hydrocarbons. However, its use in containing a spill will result in a water-contaminant mixture that may be more difficult to manage. It is important to scrape up the contaminated snow and ice as soon as possible.

10) Carefully cover the spill area with spill absorbent, spill pads, soil or snow, starting at the outside and working inward. Do not touch or walk through spilled material.

11) Sweep up or shovel the residue using non-metallic, spark-proof tools and place the residue into a labelled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). For larger spills to land, excavate impacted absorbent material and soil, place in lined and bermed temporary storage area or directly into sealed drums/containers.

Note: The Territorial Government may give permission to burn off pools of recovered fuel or product. Environmental Advisor to confirm by contacting the NT-NU 24-HOUR SPILL REPORT LINE. Inert or non-combustible absorbents (vermiculite, sand, snow) are not suitable for incineration.
Note: The drums/containers/residues are to be stored in ventilated areas away from incompatible materials for eventual treatment at on-site landfarm (if present) or off-site disposal at a licensed disposal facility. Electrically ground all containers and transporting equipment.
Note: If appropriate, product may be recovered from absorbent pads for re-use by squeezing to release absorbed fuel into empty drums. Larger pools of product may be pumped into empty storage tanks or drums.

12) If spill is indoors, mop the affected area using detergent and water. Dispose of this water to drums for eventual off-site disposal at a licensed disposal facility. Spills to land may require further excavation or remediation of contaminated soil until acceptable soil quality is achieved. The On-Scene Coordinator and/or Environmental Advisor will assess this requirement.

13) For spills to water, immediately limit the area of the spill on water using absorbent pads and booms and similar materials to capture small spills on water. Deploy and slowly draw in absorbent booms to encircle and absorb the spilled product. Recover larger spills on water with floating skimmers and pumps, as required, and discharge recovered product to drums or tanks.

Note: Petroleum hydrocarbons are generally hydrophobic, and as such, do not readily dissolve in water. They typically tend to float on the water's surface. Absorbent booms are often relied on to recover hydrocarbons that escape land containment and enter water.

Note: Antifreeze sinks and mixes with water. If released to water, attempt to isolate/confine the spill by damming or diverting the spill. Pump contaminated water to tanks or drums.

14) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated leather articles, (including shoes) that cannot be decontaminated.

APPENDIX E
General Response Procedures for Spilled Chemical Substances

Oxidizing Substances - Liquids E.1
Oxidizing Substances - Solids E.2

Appendix E.1
Oxidizing Substances - Liquids

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp. The following is a general spill response procedure for liquid oxidizer compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **liquid oxidizer spill**:

1) Isolate and evacuate the spill area.

2) Stop leak and contain spill (**see Step 8**) IF SAFE TO DO SO.

3) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

4) Put on the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Splash goggles or face shield.
c. Shoe covers or rubber boots.
d. Lab coat, coveralls or TyvekTM coveralls **as recommended by the MSDS.**
e. Half mask air-purifying respirator with cartridges and/or filters **as recommended by the MSDS or respirator manufacturer**.

5) Ventilate closed spaces before entering. Ensure adequate explosion-proof ventilation for clean-up.

6) Remove and/or moisten with water any combustible material (wood, paper, oil, etc.) affected by the spill.

7) Use water spray to reduce vapours or divert vapour cloud drift, if required.

8) Contain spill by using non-combustible spill absorbent, soil or snow to construct a dike that limits flow and prevents entry to sewer, waterways or onto ice. For spills to land, excavation of trenches/pits to capture spill flow may also be appropriate.

Note: Flushing area with flooding quantities of water may also be appropriate assuming this does not make clean up and waste management more difficult– **refer to the MSDS**.

9) Carefully cover the spill area with spill absorbent, soil or snow, starting at the outside and working inward. Use non-combustible absorbent. Do not touch or walk though spilled material.

10) Sweep up or shovel the spill residue using non-metal, non-sparking tools and place the residue into a labelled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags) for off-site disposal at a licensed disposal facility.

11) For indoor spills, mop the affected area using detergent and water. Flushing area with flooding quantities of water may also be appropriate – **refer to the MSDS**. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate. Spills to land may require further excavation or remediation of contaminated soil until acceptable soil quality is achieved. The On-Scene Coordinator and/or Environmental Advisor will assess this requirement.

12) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

Appendix E.2
Oxidizing Substances - Solids

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp.

The following is a general spill response procedure for solid oxidizer compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **solid oxidizer spill:**

1) Isolate and evacuate the spill area.

2) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

3) Put on the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Safety glasses or goggles.
c. Lab coat.
d. Half mask air-purifying respirator with **N95 or greater protection** particulate filter or **as recommended by the MSDS or respirator manufacturer**.

4) Remove all sources of heat and ignition (no smoking, flares, sparks or flames in immediate area) and remove uncontaminated combustible materials and organic compounds (wood, paper, oil, etc.,) from spill area.

5) For spills to land, protect the spill area from storm water runoff by constructing a ditch or dike using suitable non-combustible absorbent materials, soil or other appropriate barrier. For spill to water, utilize damming, and/or water diversion to minimize the spread of contamination.

6) Vacuum, sweep or shovel the spill residue using non-metal, non-sparking tools and place the residue into a labelled, plastic, container (plastic pail with lid or double heavy duty plastic bags) for re-use or off-site disposal at a licensed disposal facility.

Note: Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and **clearly label the container per WHMIS Guidelines**.

Note: Minimize dust generation.

7) If there is still oxidizer residue left in the spill area, neutralize with appropriate agent **as recommended by the MSDS**, or for spills to land continue to excavate until no visible spilled solid remains. Use non-combustible spill absorbent or soil to absorb the neutralized residue. Place in suitable drums/containers for disposal to a licensed facility.

8) For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.

9) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

APPENDIX F
General Response Procedures for Spilled Chemical Substances

Poisonous and Toxic Substances (Sodium Cyanide) F.1

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp.

The following is a general spill response procedure for solid Sodium Cyanide.
AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **Sodium Cyanide (solid) spill:**

1) Isolate and evacuate the spill area.

2) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

3) Put on the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
e. Gloves **as recommended by the MSDS or glove manufacturer.**
f. Safety glasses or goggles.
g. Lab coat.
h. Half mask air-purifying respirator **as recommended by the MSDS or respirator manufacturer**.

Note: For worker safety, maintain readily accessible supply of cyanide antidote kits on site.

4) Ventilate area of spill or leak.

5) Avoid exposure to acids, water or weak alkalies which can react to form toxic hydrogen cyanide (HCN) gas.

6) Contain spill to prevent release to sewer, waterway or onto ice. For spills to land, protect the spill area from storm water runoff by constructing a ditch or dike using absorbent materials, soil or other appropriate barrier. If raining, cover spill area with tarp or plastic to minimize contact with water and prevent subsequent runoff. For spill to water, utilize damming, and/or water diversion to minimize the spread of contamination.

7) Shovel the spilled material into labelled drums, containers or plastic bags for re-use or off-site disposal at a licensed disposal facility.

Note: Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and **clearly label the container per WHMIS Guidelines**.

Note: Minimize dust generation.

8) If there is still spilled sodium cyanide residue left in the spill area, neutralize with appropriate agent **as recommended by the MSDS** (sodium or calcium hypochlorite solution), or for spills to land continue to excavate until no visible spilled solid remains. Use suitable spill absorbent or soil to absorb the neutralized residue. Place in suitable drums/containers for disposal to a licensed facility. Collect material and place in a closed container for recovery or disposal.

9) For indoor spills, mop the affected area using detergent and water. Dispose of this water to waste drums/containers for disposal to a licensed facility.

10) Remove and bag personal protective equipment for disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

APPENDIX G
General Response Procedures for Spilled Chemical Substances

Corrosive Substances
Acids, Liquids G.1
Acids, Solids G.2
Bases/Alkali, Liquids G.3
Bases/Alkali, Solids G.4

Appendix G.1
Corrosive Substances – Acids, Liquids

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp.
The following is a general spill response procedure for liquid acid compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required. AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **liquid acid spill**:

1) Isolate & evacuate the spill area.

2) Stop leak and contain spill (**see Step 8 below**) IF SAFE TO DO SO.

3) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

4) Put on appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Splash goggles or face shield.
c. Shoe covers or rubber boots.
d. Lab coat or TyvekTM coveralls.
e. Half mask air-purifying respirator with **acid gas or combination** cartridges, or **as otherwise recommended by the MSDS or respirator manufacturer**.

5) If the spill has occurred outdoors, stay upwind and stay out of low areas. If the spill has occurred inside a building, prevent spread of vapour throughout the building by closing doors to other rooms and hallways. If the room's air exchange system distributes air throughout the building, then it may also be necessary to have it shut-down.

6) Ventilate (open windows/doors to outdoors) closed spaces before entering.

7) Remove all sources of ignition (no smoking, flares, sparks or flames in immediate area).

8) Contain spill by using spill absorbent, spill pads or pillows, or dry soil to construct a dike that limits flow and prevents entry to sewer, waterways or onto ice. For spills to land, excavation of trenches/pits to capture spill flow may also be appropriate. Ideally, use spill absorbent that contains a mild neutralizing agent **as recommended by the MSDS**.

Note: Many acids, particularly concentrated acids react violently in the presence of water. Do not flush spill area with water unless the **MSDS** indicates acceptable.

Note: Nitric Acid reacts violently and explosively with organic chemicals and organic material such as wood, cotton and paper; therefore, do not use organic absorbent material on Nitric acid.

Note: Hydrofluoric acid will fume during neutralization. Provide adequate ventilation and approach from upwind. Neutralize carefully with sodium bicarbonate, soda ash or lime. Use water spray to disperse the gas/vapour if required. Remove all sources of ignition.

9) Carefully cover the spill area with spill absorbent, spill pads or dry soil, starting at the outside and working inward. If practical, neutralize spill using **MSDS-recommended** or commercially available neutralizers. Use pH indicator paper to determine if spill is neutralized (pH 7).

Note: Use caution as neutralization reactions generate heat.

10) Sweep or shovel the neutralized spill residue using non-metal, non-sparking tools and place the residue into a labelled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags) for off-site disposal at a licensed disposal facility.

11) Check the pH of the spill area. If it is less than pH 6, then further neutralize with a dilute solution of a suitable reagent **as identified on the MSDS** or for spill to land continue to excavate contaminated soil.

12) For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.

13) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

14) After the spill has been cleaned up, the area should be free of vapours. However, if personnel note odours or irritation, isolate the spill area, re-clean the area as per **Steps 11 and 12** or wait at least **1 hour** before re-entering or until considered safe by the On-Scene Coordinator or Environmental Advisor.

Appendix G.2
Corrosive Substances – Acids, Solids

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use on the Meadowbank exploration camp.

The following is a general spill response procedure for solid acid compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **solid acid spill**;

1) Isolate and evacuate the spill area.

2) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

3) Put on the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Safety glasses or goggles.
c. Lab coat.
d. Half mask air-purifying respirator with **N95 or greater protection** particulate filter, or **as otherwise recommended by the MSDS or respirator manufacturer**.

4) Contain spill to prevent release to sewer, waterway or onto ice. For spills to land, protect the spill area from storm water runoff by constructing a ditch or dike using absorbent materials, dry soil or other appropriate barrier. If raining, cover spill area with tarp or plastic to minimize contact with water and prevent reaction and/or subsequent runoff. For spill to water, utilize damming, and/or water diversion to minimize the spread of contamination.

5) If necessary to minimize dust production, slightly moisten the solid. Use water, or if the material is water reactive, another inert liquid **as recommended by the MSDS**.

6) Sweep up or shovel the residue using non-metallic, spark-proof tools and place the residue into a labelled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags) for reuse or off-site disposal at a licensed disposal facility

Note: Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and **clearly label the container per WHMIS Guidelines**.

7) Remaining solid acid residue may be neutralized using a dilute solution of appropriate agent **as recommended by the MSDS** (e.g. sodium bicarbonate - baking soda), or for spills to land continue to excavate until no visible spilled solid remains. Check the pH of the spill area;

the final pH should be between pH 6 and 10. Use spill absorbent, spill pads or dry soil to absorb the neutralized residue.

Note: Use caution as neutralization reactions generate heat.

8) For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.

9) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

Appendix G.3
Corrosive Substances – Bases/Alkali, Liquids

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp.

The following is a general spill response procedure for liquid alkali or base compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **liquid alkali or base spill**:

1) Isolate & evacuate the spill area.

2) Stop leak and contain spill (**see Step 8**) IF SAFE TO DO SO.

3) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

4) Put on the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Splash goggles or face shield.
c. Shoe covers or rubber boots.
d. Lab coat or TyvekTM coveralls.
e. Half mask air-purifying respirator with cartridges/filters **as recommended by the MSDS or respirator manufacturer**.

5) If the spill has occurred outdoors, stay upwind and stay out of low areas. If the spill has occurred inside a building, prevent spread of vapour throughout the building by closing doors to other rooms and hallways. If the room's air exchange system distributes air throughout the building, then it may also be necessary to have it shut-down.

6) Ventilate (open/windows to outdoors) closed spaces before entering.

7) Remove all sources of ignition (no smoking, flares, sparks or flames in immediate area) and combustible materials (wood, paper, oil, etc.).

8) Contain spill by using spill absorbent, spill pads or pillows, or dry soil to construct a dike that limits flow and prevents entry to sewer, waterways or onto ice. For spills to land, excavation of trenches/pits to capture spill flow may also be appropriate. Ideally, use spill absorbent that contains a mild neutralizing agent **as recommended by MSDS**.

Note: Use caution as neutralization reactions generate heat.

9) Carefully cover the spill area with spill absorbent, spill pads or dry soil, starting at the outside and working inward. If practical, neutralize spill using MSDS-recommended or commercially available neutralizers. Use pH indicator paper to determine if spill is neutralized (pH 7).

Note: Use caution as neutralization reactions generate heat.

10) Sweep or shovel the neutralized spill residue using non-metal, non-sparking tools and place the residue into a labelled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags) for off-site disposal at a licensed disposal facility.

11) Check the pH of the spill area. If it is greater than pH 10, then further neutralize with a dilute solution of a suitable reagent **as identified on the MSDS**, or for spill to land continue to excavate contaminated soil.

12) For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.

13) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

14) After the spill has been cleaned up, the area should be free of vapours. However, if personnel note odours or irritation, isolate the spill area, re-clean as per **Steps 11 and 12** or wait at least **1 hour** before re-entering or until it is considered to be safe by the On-Scene Coordinator or Environmental Advisor.

Appendix G.4
Corrosive Substances – Bases/Alkali, Solids

AEM commits to review, modify and approve as required to establish this procedure as appropriate for use at the Meadowbank exploration camp.

The following is a general spill response procedure for solid alkali or base compounds. Consult the MSDS for the specific spilled compound to determine whether deviations from the general guidance are required.

AEM commits to review and test, and if necessary, modify and update thus spill response procedure on an annual basis.

For a **solid alkali or base spill**;
1) Isolate and evacuate the spill area.

2) Contact the On-Scene Coordinator who will assemble ERT members and the appropriate spill response materials outside the spill area. **Obtain and read the MSDS** for the substance to determine the chemical-specific hazards and to identify any special precautions that must be taken.

3) Put on the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
a. Gloves **as recommended by the MSDS or glove manufacturer.**
b. Safety glasses or goggles.
c. Lab coat.
d. Half mask air-purifying respirator with **N95 or greater protection** particulate filter or **as recommended by the MSDS or respirator manufacturer**.

4) Contain spill to prevent release to sewer, waterway or onto ice. For spills to land, protect the spill area from storm water runoff by constructing a ditch or dike using absorbent materials, dry soil or other appropriate barrier. If raining, cover spill area with tarp or plastic to minimize contact with water and prevent reaction and/or subsequent runoff. For spill to water, utilize damming, and/or water diversion to minimize the spread of contamination.

5) If necessary to minimize dust production, slightly moisten the solid. Use water, or if the material is water reactive, another inert liquid **as recommended by the MSDS**.

Note: Do not use water to flush bases in powdered form, such as calcium oxide (lime), as this material is not very soluble.

6) Sweep or shovel the residue using non-metallic, spark-proof tools and place the residue into a labelled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags) for offsite disposal at a licensed disposal facility.

Note: Recovered solid, if generally free from impurities, may be suitable for its intended use. In this case, place solid in suitable container with lid, and **clearly label the container per WHMIS Guidelines**.

7) Remaining solid alkali or base residue may be neutralized using a dilute solution of appropriate acid. Check the pH of the spill area; the final pH should be between pH 6 and 10. Use spill absorbent, spill pads or dry soil to absorb the neutralized residue.

8) For indoor spills, mop the affected area using detergent and water. Dispose of this water to the sanitary sewer, process stream or waste drums as appropriate.

9) Remove and bag personal protective equipment for cleaning, informing laundry personnel of contaminant hazards, or disposal at a licensed disposal facility. Thoroughly wash with soap potential skin contact locations after handling. Properly dispose of contaminated clothing that cannot be decontaminated.

APPENDIX H

TRANSPORTATION LOAD MANIFEST

Agnico-Eagle Mines Limited **Meadowbank Division**	**Date:**

VEHICLE TYPE: **ESTIMATED DEPARTURE:** **ESTIMATED ARRIVAL:**	**OWNER:** **FROM:** **TO:**

SUPPLY LIST

FUEL	**TYPE**	**VOLUMES**
	P-50	
	GASOLINE	
	JET – B/A	
	PROPANE	
	ACETYLENE	
	VOLUMES OR WEIGHT	
SALT		
CORE/BOXES		
CORE RACKS		
GRAVEL		
LUMBER		
DRILL SUPPLIES		
OTHER		
	TOTAL WEIGHT:	
DRIVER/ASSISTANT		

APPENDIX I

MSDS DATA SHEETS

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Personal Protective Equipment
	**WHMIS CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).**	

Section 1. Product and Company Identification

Product Name / Trade name	Varsol	**Associated Product's Item Code**	13-374HD
Synonym	Petroleum Distillate	**CAS #**	64742-88-7
Chemical Family	Aliphatic hydrocarbon (Solvent.)	**Validation Date**	June 26 2006
Chemical Formula	Not applicable. (mixture of hydrocarbons)	**Print Date**	June 26 2006
Manufacturer	Recochem Inc. 850 Montee de Liesse Montreal, Quebec 514-341-3550	**In Case of Emergency**	Recochem Inc. Communications and Regulatory Affairs Department (905) 791-1788
Material Uses	Consumer products: Various.		

Section 2. Hazardous Ingredients

Name	CAS #	% by Weight	Exposure Limits	
			Canadian Values (ACGIH)	U.S. Values (OSHA)
Petroleum distillate	64742-88-7	100	**ACGIH (Canada, 2003).** TWA: 100 ppm 8 hour(s). TWA: 525 mg/m^3 8 hour(s).	Petroleum distillate **OSHA (United States, 2003).** TWA: 500 ppm 8 hour(s). TWA: 2900 mg/m^3 8 hour(s).

Section 3. Hazard Identification

Emergency Overview	CAUTION! Combustible liquid. HARMFUL OR FATAL IF SWALLOWED. Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Keep out of reach of children.
Potential Acute Health Effects	**See Section #11: "Toxicological Information" for further human health effects.** This product may cause mild irritatation to eyes and skin upon contact. Prolonged and repeated contact with skin can cause drying of the skin resulting in irritation and dermatitis. Inflammation of the eye is characterized by mild redness, watering, and itching. Skin inflammation is characterized by mild itching, scaling, reddening. Ingestion can cause burning sensation, vomiting, drowsiness and in severe cases pulmonary edema. Inhalation of excessive amounts may result in impairment, such as drowsiness, lack of coordination, headache and nausea.
Note to Physician	Aspiration hazard if swallowed- can enter lungs and cause damage. Small amounts of liquid aspirated into the respiratory system during ingestion or from vomiting may cause mild to severe pulmonary injury and possible death.

Continued on Next Page

Section 4. First Aid Measures

Eye Contact	Rinse with water for a few minutes. If irritation persists, seek medical attention.
Skin Contact	Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. If irritation persists, get medical attention. Wash contaminated clothing before reusing.
Inhalation	Allow the victim to rest in a well ventilated area. Seek medical attention.
Ingestion	DO NOT induce vomiting. Allow the victim to rest in a well-ventilated area. Seek medical attention.

Section 5. Fire Fighting Measures

Products of Combustion	Carbon oxides (CO, CO_2), smoke, fumes.
Fire Fighting Media and Instructions	Combustible liquid, insoluble in water. SMALL FIRE: Use DRY chemicals, CO_2, alcohol foam or water spray. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Fire Hazards	Container explosion may occur under fire conditions or when heated. Vapour may travel considerable distance to source of ignition and flash back. Vigourously supports combustion. Combustible when exposed to heat or flame.
Explosion Hazards	Vapours may travel along ground and flashback along vapour trail.

Section 6. Accidental Release Measures

Small Spill and Leak	Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Large Spill and Leak	Combustible liquid, insoluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Prevent entry into sewers and surface waterways. Absorb with DRY earth, sand or other non-combustible material. Place in appropriate container and dispose of in accordance with regional regulations.

Section 7. Handling and Storage

Handling	Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.
Storage	**See Section #10 for applicable incompatible materials.** Combustible materials should be stored away from extreme heat and away from strong oxidizing agents. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed in a cool, well-ventilated place. Keep out of reach of children.

Section 8. Exposure Controls, Personal Protection

Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	
Eyes	Safety glasses.
Body	No special protective clothing is required.
Respiratory	Wear appropriate respirator when ventilation is inadequate. Be sure to use an approved/certified respirator or equivalent.
Hands	Gloves (impervious materials such as Viton®, Neoprene® or butyl rubber).

Continued on Next Page

Section 9. Physical and Chemical Properties

Physical State and Appearance	Liquid.	**Odour**	Petroleum distillates
Molecular Weight	Not applicable.	**Taste**	Not available.
pH	Not applicable.	**Colour**	Colourless.
Boiling/Condensation Point	150 to 210°C (302 to 410°F)	**Volatility**	100% (v/v). 100% (w/w).
Melting/Freezing Point	-58°C (-72.4°F)	**Evaporation Rate**	0.1 compared to Butyl acetate.
Specific Gravity	0.79 (Water = 1)	**Odour Threshold**	Not available.
Vapour Pressure	2.2 mm of Hg (@ 20°C)	**Viscosity**	Kinetic: 1.14 cS
Vapour Density	4.8 (Air = 1)	**Solubility**	Easily soluble in diethyl ether, n-octanol. Insoluble in water.
VOC Content	790 (g/l).	**Other Properties**	Not available.

The Product is:	Combustible.
Auto-ignition Temperature	229°C (444.2°F)
Flash Point	Closed cup: 42°C (107.6°F). (Tagliabue. (ASTM D56))
Flammable Limits	LOWER: 1% UPPER: 13.3%
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks and static discharge. This product is combustible if exposed to heat or when in involved in a fire and in contact with combustible materials which may act as a wick.

Section 10. Stability and Reactivity

Stability	The product is stable.
Conditions of Instability	No additional remark.
Incompatibility with Various Substances	Reactive with oxidizing agents.

Section 11. Toxicological Information

Routes of Entry	Eye contact. Inhalation. Ingestion.
Toxicity to Animals	Acute oral toxicity (LD50): >5000 mg/kg [Rat].
Acute Effects on Humans	
Eyes	May cause mild eye irritation.
Skin	May cause mild skin irritation.
Inhalation	Slightly hazardous in case of inhalation. Exposure to very high concentrations can cause dizziness, lightheadness, headache, nausea, and blurred vision. Higher levels may cause unconsciousness.
Ingestion	This product is of very low acute toxicity. Aspiration hazard if swallowed- can enter lungs and cause damage.

Continued on Next Page

Chronic Effects on Humans	**CARCINOGENIC EFFECTS**: Not available. **MUTAGENIC EFFECTS**: Not available. **TERATOGENIC EFFECTS**: Not available. **DEVELOPMENTAL TOXICITY**: Not available. Prolonged and repeated contact with skin can cause drying of the skin resulting in irritation and dermatitis. Effect of chronic exposure include soporific or intoxicating effect if prolonged and in sufficient concentration. Avoid breathing vapour or mist.

Section 12. Ecological Information

Ecotoxicity	**For accidential discharges into environment, see Section #6: "Accidential Release Measures" for suggested instructions.** No additional remark.

Section 13. Disposal Considerations

Waste Information	Waste must be disposed of in accordance with federal, state or provincial and local environmental control regulations.

Section 14. Transport Information

Canada Transportation of Dangerous Goods (TDG) Information	
Primary Class	Class 3: Flammable liquid.
Subsidiary Class (if applicable)	-
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.
Hazard Identification Number	UN 1268
Packing Group	III
Special Provisions	In containers of 450L or less this product is not classified as a Dangerous Goods according to TDG exemption 1.33

International Maritime Dangerous Goods (IMDG) Transportation Information	
Primary Class	Class 3: Flammable liquid.
Subsidiary Class (if applicable)	-
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.
Hazard Identification Number	UN 1268
Packing Group	III
Marine Pollutant	Not pollutant.
Special Provisions	In containers of 5 L (5Kg) capacity or less this product is classified as a "Consumer Commodity" under IMDG regulations.

United States Department of Transportation (DOT) Information	
Primary Class	Class 3: Flammable liquid.
Subsidiary class (if applicable)	-
Proper shipping name	PETROLEUM DISTILLATES, N.O.S.

Continued on Next Page

Hazard Identification Number	UN 1268
Packing Group	III
Special Provisions	In containers of 454L or less this product is not classified as a Gangerous Good according to exception 173.150 f(1-2)
International Air Transport Association (IATA)	For air shipment classification and associated regulations, please refer to the latest edition of IATA Dangerous Goods Regulations.

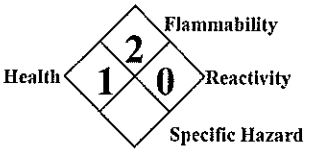
Section 15. Other Regulatory Information and Pictograms

WHMIS Classification (Canada)	WHMIS CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Canada Domestic Substances List (DSL) Status	This product and/ or all of its components are on the DSL.
HCS Classification (U.S.A.)	Combustible liquid
U.S.A. Regulatory Lists	This product and/ or all of its components are on the TSCA inventory list.

Hazardous Material Information System (U.S.A.)

Health	1
Flammability	2
Reactivity	0
Personal Protection	G

National Fire Protection Association (U.S.A.)



Section 16. Other Information

Validated and verified by Compliance and Technical Information Manager on June 26 2006 | **Printed** June 26 2006

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.

MSDS are available at www.recochem.com

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Preparation/Revision Date:
03/19/07

Distributor:
Teledyne Isco, Inc.
P.O. Box 82531
Lincoln, NE 68501-2531

Phone Number: (402) 464-0231

Hours: Mon.-Fri. 8:00a.m.-4:30p.m. CST

Product Name: RediSep® - Normal Phase, Reverse Phase C-18, Amine, Cyano, Diol, SAX, SCX

Solid Sample Cartridges – 5g, 25g, 65g, 270g

Silica Gel

Product Content: Amorphous Silicon Dioxide
or
Derivatized Amorphous Silicon Dioxide

2. COMPOSITION / INFORMATION ON INGREDIENTS

Component: Amorphous Silicon Dioxide, chemically prepared **CAS #**: 7631-86-9

Additional Information: See section 8 for exposure limits.

3. HAZARDS IDENTIFICATION

NFPA ratings (scale 0 – 4)

Health = 1
Fire = 0
Reactivity = 0

HIMS – ratings (scale 0 – 4)

Health	1
Fire	0
Reactivity	0

The statements contained herein are offered for informational purposes only and are based upon technical data that Teledyne Isco, Inc. believes to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make NO WARRANTY, EXPRESS OR IMPLIED, OR MERCHANTABILITY, FITNESS OR OTHERWISE.

4. FIRST AID MEASURES

Emergency First Aid:
GET MEDICAL ASSISTANCE IF ANY ADVERSE EFFECTS SHOULD DEVELOP.

Skin: Immediately rinse with water. Generally the product does not irritate the skin.

Eyes: Immediately rinse under running water for at least 15 minutes, lifting upper and lower eyelids occasionally.
Inhalation: Supply fresh air.

Ingestion: If large amounts are swallowed, wash mouth out with water.

5. FIRE FIGHTING MEASURES

Suitable extinguishing agents:
CO_2, extinguishing powder or water spray. Fight larger fire with alcohol resistant foam.

Fire Fighting Procedures: Use fire fighting measures that suit the environment.

Protective equipment: Wear protective equipment.

Fire & Explosion Hazards: Not an explosion hazard

Flammability: Not flammable

Flash Point (°F): Not applicable

Auto Igniting: Not self igniting

Additional Information:
Dispose of fire debris and contaminated water in accordance with official regulations.

6. ACCIDENTAL RELEASE MEASURES

Person-related safety precautions: Avoid formation of dust. Wear protective clothing.

Measures for cleaning/collecting: Vacuuming or wet sweeping may be used to avoid dust dispersal.

Measures for environmental protection: Containerize for reclamation or disposal.

Additional information: See section 7 for 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: Prevent formation of dust.

Information about protection against explosions and fires:
The product is not flammable. When pouring into a container of flammable liquid, ground both containers electrically to prevent a static electric spark.

Storage:

Information about storage conditions: Keep container tightly sealed.

Information about storage in one common storage facility: None required.

Class according to regulation on flammable liquids: None Applicable

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component: Amorphous Silicon Dioxide, chemically prepared **CAS #**: 7631-86-9

Exposure Limits: **NIOSH short term value – IDLH:** 3000mg/m^3
OSHA TWA – PEL: 80/(%SiO_2) mg/m^3
NIOSH TWA – REL: 6mg/m^3
ACGIH TWA – TLV: 10mg/m^3 Total Dust
5mg/m^3 Respirable fraction

Personal Protective Equipment:

General protection and hygienic measures:
The usual precautionary measures for handling chemicals should be followed.

Breathing equipment:
If exposure limit is exceeded, a suitable respiratory protective device is recommended.

Eye protection: Safety glasses.

Protection of hands: The glove material has to be impermeable to the product/ the substance/ the preparation.

Body protection: Protective work clothing.

9. PHYSICAL AND CHEMCIAL PROPERTIES

Physical State: RediSep® - Solid, (50mm Average particle size) powder
Solid Sample Cartridge 5g, 25g – Solid, 40-63µm powder
Solid Sample Cartridge 65g, 270g – Solid, 75-150µm powder

Color: White to off-white
Odor: None
pH at 20°C (68°F): 6.0-8.0 (5% slurry)
Melting Point (°C): Undetermined
Density: Not determined
Bulk Density (lb/ft^3): 25-35
Solubility in Water (%): Insoluble

10. STABILITY AND REACTIVITY

Thermal decomposition/conditions to be avoided:
No decomposition if used according to specifications.

Dangerous Reactions: Reacts with Hydrogen Fluoride.

Dangerous products of decomposition: No dangerous decomposition products known.

11. TOXICOLOGICAL INFORMATION

Component: Amorphous Silicon Dioxide, chemically prepared **CAS #**: 7631-86-9

Acute toxicity:
Oral – LD50: 10000 mg/kg (rat)
Dermal – LD50: >5000 mg/kg (rabbit) OECD 402
Inhalative – LC50: >0.139 mg/l/14h (rat)

Primary irritant effect:

On the skin: May cause irritation with dryness and abrasion.

In the eye: May cause abrasion, redness and pain.

Sensitization: No sensitizing effects known.

Subacute to chronic toxicity:
Amorphous silicon dioxide, chemically prepared:
No negative effects were determined during tests for chronic oral toxicity, carcinogenicity, teratogenicity and fertility. No irreversible changes and no symptoms of silicosis were determined during tests for chronic inhalative toxicity.

Additional toxicological information:
When used and handled according to specifications, the product does not have any harmful effects based on the experience and information provided to us by the manufacturer.

12. ECOLOGY INFORMATION

Component: Amorphous Silicon Dioxide, chemically prepared **CAS #**: 7631-86-9

Aquatic toxicity: Fish – LC50 (96 h): >10000 mg/l (Brachydanio rerio) OECD 202
Water Flea – EC50 (24 h): >1000 mg/l (Daphnia magna) OECD 202

General Note: Generally not hazardous for water.

13. DISPOSAL CONSIDERATIONS

EPA Waste Numbers: None

Dispose of in accordance with all federal, state, provincial and local regulations.

14. TRANSPORT INFORMATION

Not regulated as hazardous goods by DOT, ADR, IMO or IATA.

15. REGULATORY INFORMATION

None of the ingredients are listed under the following:

SARA section 313 and 355	TLV-ACGIH
Proposition 65	NIOSH-Ca
EPA	OSHA-Ca
IARC	Canadian NDSL
NTP	

All ingredients are listed with the following:
TSCA
MAK
Canadian DSL
Japan ENCS
Korea ECL
Philippines: PICCS
Australia: AICS
European EINECS

16. OTHER INFORMATION

The statements contained herein are offered for informational purposes only and are based upon technical data that Teledyne Isco, Inc. believes to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make NO WARRANTY, EXPRESS OR IMPLIED, OR MERCHANTABILITY, FITNESS OR OTHERWISE.

LAFARGE NORTH AMERICA

MSDS

Revised February 15, 2005

Material Safety Data Sheet

PRODUCT NAME: PORTLAND CEMENT

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

Supplier

Name: Lafarge North America Inc.
Address: 12950 Worldgate Drive, Suite 500
Herndon, VA 20170
Telephone: 703-480-3600

Product Identifier

Hydraulic Cement, Oil Well Cement, White Cement, Portland Cement Type I, IA, II, IIA, II L.A., III, IIIA, IV, IVA, V, VA, 10, 20, 30, 40, 50, OWH, OWG Cement, OW Class G HSR

Note: This MSDS covers many products. Individual composition of hazardous constituents will vary.

WHMIS Classification: D2A, E

Emergency Telephone Numbers

Health & Transportation: CHEMTREC 1-800-424-9300 or 703-527-3887

2. INFORMATION ON COMPONENTS

Component Name	%	CAS No.
Tri-Calcium Silicate	20 - 70	12168-85-3
Di-Calcium Silicate	10 - 60	10034-77-2
Tetra-Calcium- Alumino-Ferrite	5 - 15	12068-35-8
Calcium Sulfate	2 - 10	Various
Tri-Calcium Aluminate	1 - 15	12042-78-3
Calcium Carbonate	0 - 5	1317-65-3
Magnesium Oxide	0 - 4	1309-48-4
Calcium Oxide	0 - 0.2	1305-78-8
Crystalline Silica	0 - 0.2	14808-60-7
Chromates	0 - 0.005	Various

Component Name	EXPOSURE LIMITS OSHA PEL TWA	ACGIH TLV TWA
Portland Cement (CAS 65997-15-1)*		
(Respirable Dust)	5 mg/m^3	
(Total Dust)	15 mg/m^3	10 mg/m^3
Calcium Sulfate		
(Respirable Dust)	5 mg/m^3	
(Total Dust)	15 mg/m^3	10 mg/m^3
Calcium Carbonate		
(Respirable dust)	5 mg/ m^3	
(Total Dust)	15 mg/m^3	10 mg/m^3
Magnesium Oxide	15 mg/m^3	10 mg/m^3
Calcium Oxide	5 mg/m^3	2 mg/m^3
Crystalline Silica Quartz		0.05 mg/m^3
Quartz (Respirable)	10 mg/ m^3/ (%SiO_2+2)	
Quartz (Total Dust)	30 mg/ m^3/ (%SiO_2+2)	
Chromates	0.1 mg(CrO_3)/ m^3	0.05 mg(Cr)/m^3
Nuisance Dust		
(Respirable)	5 mg/m^3	3 mg/m^3
(Total / Inhalable)	15 mg/m^3	10 mg/m^3

*This value is for particulate matter containing no asbestos and < 1% crystalline silica.

3. HAZARD IDENTIFICATION

Emergency Overview

Solid; grey powder; odorless.

Potential Health Effects

INHALATION (acute): Breathing dust may cause nose, throat or lung irritation and choking. The described effect depends on the degree of exposure.

INHALATION (chronic): Prolonged or repeated exposure may cause lung injury including silicosis. This product may contain crystalline silica. Crystalline silica has been classified by IARC as a known human carcinogen. Some human studies indicate potential for lung cancer from crystalline silica exposure. Risk of injury depends on duration and level of exposure. Long term exposures which result in silicosis may result in additional health effects.

EYE CONTACT (acute/chronic): May cause eye irritation, severe burns and damage to cornea.

SKIN CONTACT (acute/chronic): May cause dry skin, redness, discomfort, irritation or severe burns. May produce allergic reaction potentially associated with hexavalent chromium. Thickening of the skin (scleroderma) may be associated with exposure to high levels of crystalline silica.

INGESTION (acute/chronic): Ingestion of large amounts may cause intestinal distress.

4. FIRST AID MEASURES

INHALATION: Move person to fresh air. Seek medical attention for discomfort.

EYE CONTACT: Rinse thoroughly with water. Seek medical attention for abrasions.

SKIN CONTACT: Wash with soap and water. Use moisturizing creams for irritated skin. Seek medical attention for burns.

INGESTION: Do not induce vomiting, but drink plenty of water. Seek medical attention for discomfort.

5. FIREFIGHTING MEASURES

Flashpoint and Method: None.
Flammable Limits: Not combustible.
Autoignition Temperature: None.
General Hazard: Avoid breathing dust.
Firefighting Instructions: Treat adjacent material.
Firefighting Equipment: This product is not a fire hazard. Self contained breathing apparatus is recommended to limit exposures to smoke from any combustion source.
Hazardous Combustion Products: None.

6. ACCIDENTAL RELEASE MEASURES

General: Wind blown dust may cause the hazards identified in Section 3. Remove spilled material to limit potential harm.
Land Spill Clean up spilled material.
Water Spill: Clean up spilled material.

7. HANDLING AND STORAGE

General: Avoid accidental release. Store dry and away from water.
Storage Temperature: Unlimited.
Storage Pressure: Unlimited.
Empty Containers: Dispose of containers in an approved landfill or incinerator.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Engineering Controls
Use exhaust ventilation to maintain dust levels below exposure limits in workplaces with poor ventilation and dusty conditions.
Personal Protection
RESPIRATORY PROTECTION: Under ordinary conditions no respiratory protection is required. Wear a NIOSH approved respirator when exposed to dust above exposure limits.
EYE PROTECTION: Wear glasses or safety goggles to prevent contact with eyes. Wearing contact lenses when using this product under dusty conditions is not recommended.
SKIN PROTECITON: Wear impervious gloves, shoes and protective clothing to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

Vapor Pressure:	Not measurable
Vapor Density:	Not measurable
Specific Gravity:	3.2
Solubility in Water:	Slight (0.1 - 1.0%)
Evaporation Rate:	Not measurable
pH (in water):	12 - 13
Boiling Point:	>1000° C
Freezing Point:	None, solid
Viscosity:	None, solid

10. STABILITY AND REACTIVITY

General: Product is stable but must be kept dry. Reacts with water forming polymerized silicates and calcium oxide.
Incompatible Materials and Conditions to Avoid: Must be kept dry. Dissolves in hydrofluoric acid producing corrosive silicon tetrafluoride gas. Silicates react with powerful oxidizers such as fluorine, chlorine trifluoride and oxygen difluoride.
Hazardous Decomposition: None, powdered solid.

11. MSDS PREPARATION AND TOXICOLOGICAL INFORMATION

For detailed toxicological information contact:
Environment, Health & Safety and Public Affairs
Lafarge North America
12950 Worldgate Drive, Suite 500
Herndon, VA 20170
(703) 480-3600

12. ECOLOGICAL INFORMATION

For detailed ecological information: See Section 11 above.

13. DISPOSAL CONSIDERATIONS

Dispose in landfill in accordance with all applicable regulations. Any disposal practice must be in compliance with local, provincial, state and federal laws and regulations. Contact local environmental agency for specific rules.

14. REQUIRED TRANSPORT INFORMATION

Not a hazardous material for DOT or TDG shipping.

15. REGULATORY INFORMATION

This product has been classified ni accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

OSHA Hazard Communication Rule, 29 CFR 1910.1200:
This product is considered by OSHA to be a hazardous chemical and should be included in the employer's hazard communication program.

CERCLA/SUPERFUND, 40 CFR 117,302: Not listed.

SARA TITLE III, Sections 311-312 Hazard Category:
This product has been reviewed according to the EPA Hazard Categories promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 and is considered a hazardous chemical and a delayed health hazard.

SARA Section 313 Information:
This product contains NONE of the substances 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.

Toxic Substance Control Act (TSCA):
Some constituents identified in this product are listed on the TSCA Inventory.

California Proposition 65:
CHRYSTALLINE SILICA (CAS - 14808-60-7) is considered to be a carcinogen by the state of California.

WHMIS Information
This product contains substances considered to be hazardous by Health Canada and is a controlled product. Consult local authorities for acceptable exposure limits. WHMIS Information – 613-957-2342

16. OTHER INFORMATION

Abbreviations:

CAS No	Chemical Abstract Service number
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
ACGIH	American Conference of Governmental Industrial Hygienists
TLV	Threshold Limit Value
TWA	Time Weighted Average (8 hour)
CL	Ceiling Limit
mg/m^3	milligrams per cubic meter
IARC	International Agency for Research on Cancer
NIOSH	National Institute for Occupational Safety and Health
pH	negative log of hydrogen ion
>	greater than
DOT	U.S. Department of Transportation
TDG	Transportation of Dangerous Goods
CFR	Code for Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
SARA	Superfund Amendments and Reauthorization Act
WHMIS	Workplace Hazardous Materials Information System

Information in this MSDS is believed to be current and accurate at the time provided. It is the user's obligation to determine the conditions of safe use of this product.

Material Safety Data Sheet

PETRO-CANADA SUPREME 5W-30, 10W-30, 10W-40, 20W-50 MOTOR OIL

PETRO-CANADA

1. Product and company identification

Common name	: PETRO-CANADA SUPREME 5W-30, 10W-30, 10W-40, 20W-50 MOTOR OIL
Code	: 410-344, MOSP53; 410-341, MOSP13; 410-342, MOSP14; 410-343, MOSP25
Material uses	: Supreme is designed for the lubrication of all gasoline, propane and CNG engines where the manufacturer recommends the use of API SM quality oils. SAE 5W-30 and 10W-30 grades also meet the requirements of ILSAC GF-4.
Manufacturer	: PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3
In case of emergency	: **Petro-Canada: 403-296-3000** **Canutec Transportation:** **613-996-6666** **Poison Control Centre: Consult local telephone directory for emergency number(s).**

2. Hazards identification

Odour	: Mild petroleum oil like.
OSHA/HCS status	: While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
Emergency overview	: No specific hazard.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects	
Eyes	: Slightly irritating to the eyes.
Skin	: Slightly irritating to the skin.
Inhalation	: No known significant effects or critical hazards.
Ingestion	: No known significant effects or critical hazards.
Medical conditions aggravated by over-exposure	: Repeated skin exposure can produce local skin destruction or dermatitis. Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation.

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	Mixture	-

The base oil may be a mixture of the following CAS#s: 8042-47-5, 64742-46-7, 64742-52-5, 64742-54-7, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1, 178603-64-0, 178603-65-1, 178603-66-2, 445411-73-4

4. First-aid measures

Eye contact	: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Skin contact	: Wash skin thoroughly with soap and water or use recognised skin cleanser. Get medical attention if irritation occurs. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Inhalation	: If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Ingestion	: Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training.

5 . Fire-fighting measures

Flammability of the product	:	May be combustible at high temperature.
Products of combustion	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), phosphorus oxides (POx), calcium oxides (CaOx), zinc oxides (ZnOx), molybdenum oxides (MoOx), boron oxides, smoke and irritating vapours as products of incomplete combustion.
Extinguishing media		
Suitable	:	Use an extinguishing agent suitable for the surrounding fire.
Not suitable	:	None known.
Special exposure hazards	:	No specific hazard.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
Special remarks on fire hazards	:	Low fire hazard. This material must be heated before ignition will occur.
Special remarks on explosion hazards	:	Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

Personal precautions	:	Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.
Environmental precautions	:	Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.
Methods for cleaning up	:	If emergency personnel are unavailable, contain spilt material. For small spills, add absorbent (soil may be used in the absence of other suitable materials), scoop up material and place in a sealable, liquid-proof container for disposal. For large spills, dyke spilt material or otherwise contain material to ensure runoff does not reach a waterway. Place spilt material in an appropriate container for disposal.

7 . Handling and storage

Handling	:	Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk. Evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapour/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidising agents, acids.
Storage	:	Keep container tightly closed. Store away from incompatible materials (see section 10). Keep container in a cool, well-ventilated area.

8 . Exposure controls/personal protection

Product name	Exposure limits
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	**ACGIH TLV (United States). Notes: (oil mist)** TWA: 5 mg/m^3 8 hour/hours. STEL: 10 mg/m^3 15 minute/minutes.

Consult local authorities for acceptable exposure limits.

Engineering measures	:	No special ventilation requirements. Good general ventilation should be sufficient to control airborne levels. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
Personal protection		
Eyes	:	Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.
Skin	:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

8 . Exposure controls/personal protection

Respiratory	:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour filter
Hands	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton.
Hygiene measures	:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

9 . Physical and chemical properties

Physical state	:	Viscous liquid.
Flash point	:	Open cup:≥227°C (440.6°F) (Cleveland.).
Auto-ignition temperature	:	Not available.
Flammable limits	:	Not available.
Colour	:	Light amber.
Odour	:	Mild petroleum oil like.
pH	:	Not applicable.
Boiling/condensation point	:	Not available.
Pour Point	:	**5W-30**: -45°C (-49°F) **10W-30**: -36°C (-33°F) **10W-40**: -36°C (-33°F) **20W-50**: -24°C (-11°F)
Melting/freezing point	:	Not available.
Relative density	:	0.856 to 0.8784 kg/L @ 15°C (59°F)
Vapour pressure	:	Not available.
Vapour density	:	Not available.
Volatility	:	Not available
Odour threshold	:	Not available.
Evaporation rate	:	Not available.
Viscosity	:	**5W-30**: 61.8 cSt @ 40°C (104°F), 10.4 cSt @ 100°C (212°F), VI=159; **10W-30**: 66.0 cSt @ 40°C (104°F), 10.2 cSt @ 100°C (212°F), VI=141; **10W-40**: 94.9 cSt @ 40°C (104°F), 13.9 cSt @ 100°C (212°F), VI=149; **20W-50**: 170.8 cSt @ 40°C (104°F), 18.9 cSt @ 100°C (212°F), VI=125
Solubility	:	Insoluble in water.
$LogK_{ow}$	:	Not available.
Softening Point	:	Not available.
Dropping Point	:	Not available.
Penetration	:	Not available.
Physical/chemical properties comments	:	Not available.

10 . Stability and reactivity

Stability and reactivity	:	The product is stable.
Conditions of instability	:	Not available.
Incompatibility with various substances	:	Reactive with oxidising agents and acids.
Hazardous decomposition products	:	May release COx, H2S, alkyl mercaptans, methacrylate monomers, smoke and irritating vapours when heated to decomposition.
Hazardous polymerisation	:	Will not occur.

11 . Toxicological information

Toxicity data

Product/ingredient name	Test	Result	Route	Species
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	LD50	>5000 mg/kg	Oral	Rat
	LD50	>2000 mg/kg	Dermal	Rabbit
	LC50	>2500 mg/m^3 (4 hour/hours)	Inhalation	Rat

Specific effects

Carcinogenic effects : Not listed as carcinogenic by OSHA, NTP or IARC.

Mutagenic effects : No known significant effects or critical hazards.

Teratogenicity / Reproductive toxicity : No known significant effects or critical hazards.

Sensitisation

Ingestion : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Eyes : Slightly irritating to the eyes.

Skin : Slightly irritating to the skin.

Synergistic products : Not available.

12 . Ecological information

Ecotoxicity data

Product/ingredient name	Species	Period	Result

Environmental precautions : No known significant effects or critical hazards.

Bioconcentration factor Not available.

BOD and COD Not available.

Biodegradable/OECD Not available.

Mobility Not available.

Special remarks on the products of biodegradation Not available.

13 . Disposal considerations

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Not regulated.

U.S. Federal regulations : Not available.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

EU regulations

Risk phrases : This product is not classified according to EU legislation.

International regulations

International lists

CANADA INVENTORY (DSL) : Not determined.

EC INVENTORY (EINECS/ELINCS) : Listed

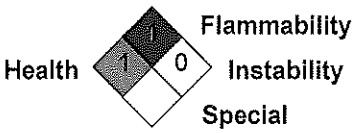
TSCA 8(b) inventory : Listed

16 . Other information

Hazardous Material Information System (U.S.A.) :

Health	1
Fire hazard	1
Reactivity	0
Personal protection	B

National Fire Protection Association (U.S.A.) :



References : Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Date of printing : **7/28/2006.**

Date of issue : **7/24/2006.**

Date of previous issue : **No previous validation.**

Responsible name : **Product Safety - JDW**

Version : **1**

For Copy of (M)SDS : The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

16 . Other information

Internet: www.petro-canada.ca/msds

Lubricants:
Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564
Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285

For Product Safety Information: (905) 804-4752

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.

PETRO-CANADA

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	B-2, D-2A, D-2B		

Section 1. Chemical Product and Company Identification

Product Name	**JET B AVIATION TURBINE FUEL**	**Code**	W219 SAP: 150, 151, 152
Synonym	Jet B; Jet B DI; JP-4; Jet F-40; NATO F-40; Turbine Fuel, Aviation, Wide Cut Type (CAN/CGSB-3.22).	**Validated on**	**2/8/2005.**
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	**In case of Emergency**	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Used as aviation turbine fuel. May contain a fuel system icing inhibitor.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	CAS #	% (W/W)	TLV-TWA(8 h)	STEL	CEILING
Complex mixture of petroleum hydrocarbons (C6-C14).	64741-41-9	>99	Not established	Not established	Not established
Benzene	71-43-2	<0.5	0.5 ppm	2.5 ppm	Not established
Fuel System Icing Inhibitor (FSII) (if added*): Diethylene Glycol Monomethyl Ether	111-77-3	≤0.15	Not established	Not established	Not established
Anti-static, antioxidant, corrosion inhibitor and metal deactivator additives. * Please note that Jet B DI, JP-4, Jet F-40 and NATO F-40 all contain Fuel System Icing Inhibitor (FSII).corrosion inhibitor	Not applicable	<0.1	Not applicable	Not applicable	Not applicable

Manufacturer Recommendation	Not applicable
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.

Section 3. Hazards Identification.

Potential Health Effects	Flammable liquid. Exercise caution when handling this material. Skin and eye contact can cause irritation. Inhalation of vapours can cause irritation of the respiratory tract and CNS depression with symptoms of nausea, headaches, vomiting, dizziness, fatigue, light-headedness, reduced coordination, unconciousness and possibly death. Aspiration into the lungs may produce potentially fatal chemical pneumonitis (fluid in the lungs), severe lung damage, or respiratory failure. May cause cancer. May cause teratogenicity/embryotoxicity. For more information refer to Section 11 of this MSDS.

Section 4. First Aid Measures

Eye Contact	Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 5 minutes or until chemical is removed.
Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of contamination or move victim to fresh air. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. Immediately transport victim to an emergency care facility.

Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	**Flammable Limits**	LOWER: 1.3% UPPER: 8% (NFPA)
Flash Points	CLOSED CUP: -31°C (-24°F) (NFPA)	**Auto-Ignition Temperature**	240°C (464°F) (NFPA)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite. May accumulate in confined spaces.	**Explosion Hazards in Presence of Various Substances**	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire.
Products of Combustion	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.		
Fire Fighting Media and Instructions	NAERG96, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. SMALL FIRES: Dry chemical, CO2, water spray or regular foam. LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discolouration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.		

Section 6. Accidental Release Measures

Material Release or Spill	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Evacuate non-essential personnel. Extinguish all ignition sources. Ventilate area. Stop leak if safe to do so. Avoid contact with spilled material. Do not allow spilled material to enter sewer systems as vapours may accumulate and may cause an explosion/fire hazard. If spilled in a confined space, ensure appropriate confined space entry protocols are followed. Ensure clean-up personnel wear appropriate personal protective equipment. Use appropriate inert absorbent material to absorb spilled product. Do not use paper or other flammable materials to absorb product. Collect used absorbent for later disposal. Avoid breathing vapours or mists of material. Notify appropriate authorities immediately.

Section 7. Handling and Storage

Handling	FLAMMABLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Wear proper personal protective equipment (See Section 8). Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Avoid inhalation of product vapours or mists. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product.
Storage	Store away from heat and sources of ignition. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded. Keep container tightly closed. Store in dry, cool, well-ventilated area.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection - ***The selection of personal protective equipment varies, depending upon conditions of use.***	
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come into contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information).
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister with a dust, fume of mist filter (R, or P series) may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): neoprene, polyvinyl alcohol (PVA), and fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Clear liquid.	**Viscosity**	Not available (similar to gasoline)
Colour	Clear and colourless.	**Pour Point**	Freezing Point: <-51°C (<-60°F) for Jet B/Jet B DI; <-58°C (<-72°F) for Jet Fuel F-40.
Odour	Gasoline like.	**Softening Point**	Not applicable.
Odour Threshold	Not available	**Dropping Point**	Not applicable.
Boiling Point	50 to 270°C (122 to 518°F)	**Penetration**	Not applicable.
Density	0.75 to 0.80 kg/L @ 15°C (59°F).	**Oil / Water Dist. Coefficient**	Not available
Vapour Density	3.5 (Air = 1)	**Ionicity (in water)**	Not available
Vapour Pressure	21 kPa (158 mmHg) @ 37.8°C (100°F).	**Dispersion Properties**	Not available
Volatility	Volatile.	**Solubility**	Insoluble in water. Partially miscible in some alcohols. Miscible in other petroleum solvents.

Section 10. Stability and Reactivity

Corrosivity	Not available		
Stability	The product is stable under normal handling and storage conditions.	**Hazardous Polymerization**	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Can react with strong oxidizing agents, uranium hexafluoride, diborane. Incompatible with halogens and halogen compounds.	**Decomposition Products**	May release COx, NOx, SOx, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	Acute toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below:

Based on toxicity of similar product.
Acute oral toxicity (LD50): >5000 mg/kg (rat).
Acute dermal toxicity (LD50): >5000 mg/kg (rabbit).
Acute inhalation toxicity (LC50): >5000 mg/m³/4h (rat).

	Benzene Acute oral toxicity (LD50): 930 mg/kg (rat). Acute dermal toxicity (LD50): >9400 mg/kg (rabbit). Acute inhalation toxicity (LC50): 13200 ppm/4h (rat). **Diethylene Glycol Monomethyl Ether** Acute oral toxicity (LD50): 4140-5180 mg/kg (rat). Acute dermal toxicity (LD50): >2000 mg/kg (rabbit). Acute inhalation toxicity (LC50): >50000 mg/m³/4h (rat).
Chronic or Other Toxic Effects	
Dermal Route:	Skin contact can cause irritation. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may lead to aspiration of the liquid, especially if vomiting occurs. This may result in chemical pneumonitis (inflammation of the lungs) and/or pulmonary edema (an accumulation of fluid in the lungs).
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	Benzene is tumorigenic by RTECS criteria.
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product contains a component(s) at >= 0.1% that has been shown to cause teratogenicity and/or embryotoxicity in laboratory tests. Therefore, this product is considered to be a teratogen/embryotoxin [Diethylene Glycol Monomethyl Ether].
Carcinogenicity (ACGIH):	ACGIH A1: confirmed human carcinogen. [Benzene]
Carcinogenicity (IARC):	IARC Group 1: carcinogenic to Humans. [Benzene]
Carcinogenicity (NTP):	NTP Group 1: known to be a carcinogen. [Benzene]
Carcinogenicity (IRIS):	EPA/IRIS Class A: human carcinogen.
Carcinogenicity (OSHA):	Benzene is an OSHA known carcinogen.
Other Considerations	No additional remark.

Section 12. Ecological Information

Environmental Fate	Not available	**Persistance/ Bioaccumulation Potential**	Not available
BOD5 and COD	Not available	**Products of Biodegradation**	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification	FUEL, AVIATION, TURBINE ENGINE, 3, UN1863, PGII (CL-TDG)	**Special Provisions for Transport**	See Transportation of Dangerous Goods Regulations.

Section 15. Regulatory Information

Other Regulations

This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

Please contact Product Safety for more information.

DSD/DPD (Europe) Not evaluated.

HCS (U.S.A.)

CLASS: Contains material which may cause cancer.
CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F).
CLASS: Toxic.
CLASS: Irritating substance.
CLASS: Target organ effects.

ADR (Europe) (Pictograms) NOT EVALUATED FOR EUROPEAN TRANSPORT

NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.

DOT (U.S.A) (Pictograms)

HMIS (U.S.A.)

Health Hazard	2*
Fire Hazard	3
Reactivity	0
Personal Protection	H

NFPA (U.S.A.)

Rating
0 Insignificant
1 Slight
2 Moderate
3 High
4 Extreme

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous goods by Road (Europe)
ASTM - American Society for Testing and Materials
BOD5 - Biological Oxygen Demand in 5 days
CAN/CGA B149.2 Propane Installation Code
CAS - Chemical Abstract Services
CEPA - Canadian Environmental Protection Act
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CFR - Code of Federal Regulations
CHIP - Chemicals Hazard Information and Packaging Approved Supply List
CNS - Central Nervous System
COD5 - Chemical Oxygen Demand in 5 days
CPR - Controlled Products Regulations
DOT - Department of Transport
DSCL - Dangerous Substances Classification and Labeling (Europe)
DSD/DPD - Dangerous Substances or Dangerous Preparations Directives (Europe)
DSL - Domestic Substance List
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPA - Environmental Protection Agency
EPCRA - Emergency Planning and Community Right to Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide and Rodenticide Act
HCS - Hazard Communication Standard
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer
IRIS - Integrated Risk Information System
LD50/LC50 - Lethal Dose/Concentration kill 50%
LDLo/LCLo - Lowest Published Lethal Dose/Concentration
NAERG'96 - North American Emergency Response Guide Book (1996)
NFPA - National Fire Prevention Association
NIOSH - National Institute for Occupational Safety & Health
NPRI - National Pollutant Release Inventory
NSNR - New Substances Notification Regulations (Canada)
NTP - National Toxicology Program
OSHA - Occupational Safety & Health Administration
PEL - Permissible Exposure Limit
RCRA - Resource Conservation and Recovery Act
RTECS - Registry of Toxic Effects of Chemical Substances
SARA - Superfund Amendments and Reorganization Act
SD - Single Dose
STEL - Short Term Exposure Limit (15 minutes)
TDG - Transportation Dangerous Goods (Canada)
TDLo/TCLo - Lowest Published Toxic Dose/Concentration
TLm - Median Tolerance Limit
TLV-TWA - Threshold Limit Value-Time Weighted Average
TSCA - Toxic Substances Control Act
USEPA - United States Environmental Protection Agency
USP - United States Pharmacopoeia
WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS

Prepared by Product Safety - JDW on 2/8/2005.

Internet: www.petro-canada.ca/msds Fuels & Solvents: Western Canada, Ontario & Central Canada, telephone: 1-800-668-0220; fax: 1-800-837-1228 Quebec & Eastern Canada, telephone: 514-640-8308; fax: 514-640-8385 For Product Safety Information: (905) 804-4752	Data entry by Product Safety - JDW.

PETRO-CANADA

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	B-2, D-2A, D-2B		

Section 1. Chemical Product and Company Identification

Product Name	**GASOLINE, UNLEADED**	**Code**	W102E
Synonym	Regular, Unleaded Gasoline (US Grade), Mid-Grade, Plus, Super, WinterGas, SummerGas, Supreme, SuperClean WinterGas, RegularClean, PlusClean, Premium, marked or dyed gasoline, Super Premium (94 RO), TQRUL, transitional quality regular unleaded, BOB, Blendstock for Oxygenate Blending	**Validated on**	**7/4/2005.**
Manufacturer	PETRO-CANADA P.O. Box 2844 Calgary, Alberta T2P 3E3	**In case of Emergency**	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Unleaded gasoline is used in spark ignition engines including motor vehicles, inboard and outboard boat engines, small engines such as chain saws and lawn mowers, and recreational vehicles.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	**CAS #**	**% (W/W)**	**TLV-TWA(8 h)**	**STEL**	**CEILING**
Gasoline	8006-61-9	85-100	300 ppm	500 ppm	Not established
Methyl tert-butyl ether	1634-04-4	0-15	50 ppm	Not established	Not established
Benzene	71-43-2	<1.5	0.5 ppm	2.5 ppm	Not established
Note: Petro-Canada does not use MTBE in the manufacturing of its gasoline, however MTBE can be introduced from time to time through the use of external gasoline blendstocks.					

Manufacturer Recommendation	Not applicable
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.

Section 3. Hazards Identification.

Potential Health Effects	Flammable liquid. Exercise caution when handling this material. May cause cancer. May cause heritable genetic effects (mutagenicity). This product contains an ingredient or ingredients, which have been shown to cause chronic toxic effects. Contact with this product may cause skin and eye irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.

Section 4. First Aid Measures

Eye Contact	Avoid direct contact. Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Avoid direct contact. Wear chemical resistant protective clothing if necessary. Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 15-20 minutes or until chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g., watch bands, belts, etc.). Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.

Continued on Next Page

Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Quickly transport victim to an emergency care facility.
Note to Physician	Not available

Section 5. Fire-fighting Measures

Flammability	Flammable liquid (NFPA).	**Flammable Limits**	Lower: 1.3%; Upper: 7.6% (NFPA).
Flash Points	Closed Cup: -50 to -38°C (-58 to -36°F), ASTM D56 Standard Test Method for Flash Point by Tag Closed Tester.	**Auto-Ignition Temperature**	257°C (495°F) (NFPA).
Fire Hazards in Presence of Various Substances	Extremely flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapour may generate static charge causing ignition. May accumulate in confined spaces.	**Explosion Hazards in Presence of Various Substances**	Do not cut, weld, heat, drill or pressurize empty container. Containers may explode in heat of fire. Vapours may form explosive mixtures with air.
Products of Combustion	Carbon oxides (CO, CO2), nitrogen oxides (NOx), polynuclear aromatic hydrocarbons, phenols, smoke and irritating vapours as products of incomplete combustion. See Section 11 (Other Considerations) for information regarding the toxicity of the combustion products.		
Fire Fighting Media and Instructions	NAERG2004 GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a very low flash point: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. SMALL FIRES: Dry chemical, CO2, water spray or regular foam. LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discolouration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.		

Section 6. Accidental Release Measures

Material Release or Spill	IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. Extinguish all ignition sources. Stop leak if safe to do so. Evacuate non-essential personnel. Ventilate area. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ensure clean-up personnel wear appropriate personal protective equipment. Avoid contact with spilled material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Avoid breathing vapours or mists of material. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Notify appropriate authorities immediately.

Section 7. Handling and Storage

Handling	FLAMMABLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Ensure all equipment is grounded/bonded. Avoid confined spaces and areas with poor ventilation. Do not ingest this product.
Storage	Store as flammable material. Store away from incompatible and reactive materials (See section 5 and 10). Store away from heat and sources of ignition. Store in dry, cool, well-ventilated area. Keep container tightly closed. Ensure the storage containers are grounded/bonded. Avoid direct sunlight.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	- ***The selection of personal protective equipment varies, depending upon conditions of use.***
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): polyvinyl alcohol (PVA), fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Clear liquid.	**Viscosity**	Not available.
Colour	Clear to slightly yellow, undyed liquid. May be dyed red for taxation purposes.	**Pour Point**	Not applicable.
Odour	Gasoline. MTBE has a terpene-like odour.	**Softening Point**	Not applicable.
Odour Threshold	Less than 1 ppm.	**Dropping Point**	Not applicable.
Boiling Point	25 to 220°C (77 to 428°F) Initial boiling point by ASTM D86 Standard Test Method.	**Penetration**	Not applicable.
Density	0.685 - 0.80 kg/L @ 15°C (59°F).	**Oil / Water Dist. Coefficient**	Not available
Vapour Density	3 to 4 (Air = 1) (NFPA).	**Ionicity (in water)**	Not available
Vapour Pressure	<107 kPa @ 37.8°C (100°F)	**Dispersion Properties**	Not available
Volatility	Volatile.	**Solubility**	Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform, and benzene. Dissolves fats, oils and natural resins.

Section 10. Stability and Reactivity

Corrosivity	Non corrosive.		
Stability	The product is stable under normal handling and storage conditions.	**Hazardous Polymerization**	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents, acids, interhalogens and uranium hexafluoride.	**Decomposition Products**	May release COx, NOx, phenols, polynuclear aromatic hydrocarbons, acrid smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation, and ingestion.
Acute Lethality	Gasoline (8006-61-9): Acute Oral toxicity (LD50): 13600 mg/kg (rat) Acute Dermal toxicity (LD50): >5000 mg/kg (rabbit) MTBE (1634-04-4): Acute Oral toxicity (LD50): 2963 mg/kg (rat) Acute Dermal toxicity (LD50): >6800 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 23576 ppm/4h (rat) Benzene (71-43-2):

	Acute Oral toxicity (LD50): 930 mg/kg (rat) Acute Dermal toxicity (LD50): >9400 mg/kg (rabbit) Acute Inhalation toxicity (LC50): 13229 ppm/4h (rat)
Chronic or Other Toxic Effects	
Dermal Route:	Contact may cause skin irritation. Prolonged or repeated contact may defat and dry skin, and cause dermatitis.
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Eye Irritation/Inflammation:	Contact may cause eye irritation.
Immunotoxicity:	Not available
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product contains a component(s) at >= 0.1% that has been shown to cause mutagenicity in laboratory tests. Therefore, this product is considered to be a mutagen. (Benzene)
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be A1 by the ACGIH. Benzene (71-43-2)] [Considered to be A3 by the ACGIH. Gasoline (8006-61-9), MTBE (1634-04-4)]
Carcinogenicity (IARC):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be carcinogenic to humans (group 1) by IARC. Benzene (71-43-2)] [Considered to be carcinogenic to humans (group 2B) by IARC. Gasoline (8006-61-9)]
Carcinogenicity (NTP):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Known to be a human carcinogen according to NTP. Benzene (71-43-2)]
Carcinogenicity (IRIS):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be carcinogenic by IRIS. Benzene (71-43-2)]
Carcinogenicity (OSHA):	This product contains the following chemical(s) at >=0.1% that are listed as carcinogenic compounds. Therefore this product is considered to be carcinogenic. [Considered to be carcinogenic by OSHA. Benzene (71-43-2)]
Other Considerations	Gasoline engine exhaust is possibly carcinogenic to humans (IARC Group 2B).

Section 12. Ecological Information

Environmental Fate	Not available	**Persistance/ Bioaccumulation Potential**	Not available
BOD5 and COD	Not available	**Products of Biodegradation**	Not available
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification	GASOLINE, 3, UN1203, PGII (CL-TDG)	**Special Provisions for Transport**	See Transportation of Dangerous Goods Regulations.

Section 15. Regulatory Information

Other Regulations This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

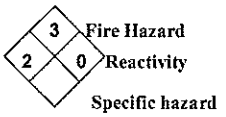
Please contact Product Safety for more information.

DSD/DPD (Europe)	Not evaluated.	**HCS (U.S.A.)**	CLASS: Contains material which may cause cancer. CLASS: Flammable liquid having a flash point lower than 37.8°C (100°F). CLASS: Irritating substance. CLASS: Target organ effects.
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	**DOT (U.S.A) (Pictograms)**	Not evaluated for transport Non évalué pour le transport

HMIS (U.S.A.)

Health Hazard	2*
Fire Hazard	3
Reactivity	0
Personal Protection	H

NFPA (U.S.A.)



Rating
0 Insignificant
1 Slight
2 Moderate
3 High
4 Extreme

Section 16. Other Information

References Available upon request.
* Marque de commerce de Petro-Canada - Trademark

Glossary

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NFPA - National Fire Prevention Association
NIOSH - National Institute for Occupational Safety & Health
NPRI - National Pollutant Release Inventory
NSNR - New Substances Notification Regulations (Canada)
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TLV-TWA - Threshold Limit Value-Time Weighted Average
TLm - Median Tolerance Limit
TSCA - Toxic Substances Control Act
USEPA - United States Environmental Protection Agency
USP - United States Pharmacopoeia
WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS

Prepared by Product Safety - JDW on 7/4/2005.

Internet: www.petro-canada.ca/msds **Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228** **For Product Safety Information: (905) 804-4752**	**Data entry by Product Safety - JDW.**

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.

Material Safety Data Sheet
Ethylene glycol

ACC# 09400

Section 1 - Chemical Product and Company Identification

MSDS Name: Ethylene glycol
Catalog Numbers: AC146750000, AC146750010, AC146750025, AC146750250, AC295530000, AC295530010, AC295530025, AC295530051, AC410010000, AC410010010, AC410010040, AC410010200, S79007, S80005, S800051, S93233, BP230-1, BP230-4, E177-20, E177-4, E178-1, E178-200, E178-4, E178-500, E178J-4, E184-4, S800052, ZZE1785C15
Synonyms: 1,2-Dihydroxyethane; 1,2-Ethanediol; Ethylene alcohol; Glycol.
Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
107-21-1	Ethylene glycol	>95	203-473-3

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: viscous liquid.
Warning! Causes eye irritation. May be harmful if swallowed. May cause kidney damage. May cause central nervous system effects. Hygroscopic (absorbs moisture from the air).
Target Organs: Kidneys, central nervous system, respiratory system, eyes.

Potential Health Effects
Eye: May cause moderate eye irritation.
Skin: Low hazard for usual industrial handling. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.
Ingestion: The lethal dose in adult humans for ethylene glycol is about 100 ml (1/3 cup). Swallowing may cause nausea, vomiting or diarrhea. Excessive exposure may cause CNS effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Toxicity follows 3-stage progression. (1) involves central nervous system effects including paralysis of eye muscles, convulsions, and coma. Metabolic acidosis and cerebral swelling may also occur. (2) involves cardiopulmonary system with symptoms of hypertension, rapid heart beat, and possible cardiac failure. (3) involves severe kidney abnormalities including possible renal failure.
Inhalation: If ethylene glycol is heated or misted in work areas that are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and

nausea. Material has a very low vapor pressure at room temperature, so inhalation exposures are not expected unless material is heated or misted.
Chronic: May cause kidney injury. Repeated excessive exposure to ethylene glycol may cause irritation of the upper respiratory tract. In humans, effects have been reported on the central nervous system, including nystagmus (involuntary, rapid, rhythmic movement of the eyeball).

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for a t least 15 minutes. Get medical aid.
Skin: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.
Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.
Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.
Flash Point: 111 deg C (231.80 deg F)
Autoignition Temperature: 398 deg C (748.40 deg F)
Explosion Limits, Lower:3.20 vol %
Upper: 15.30 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 1; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid breathing spray or mist.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Store protected from moisture.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Ethylene glycol	100 mg/m3 Ceiling (aerosol only)	none listed	none listed

OSHA Vacated PELs: Ethylene glycol: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Glove protection is not normally required.

Clothing: Protective garments not normally required.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless - syrupy - viscous

Odor: sweetish odor

pH: Not available.

Vapor Pressure: 0.05 mm Hg @ 20 deg C

Vapor Density: 2.14 (air=1)

Evaporation Rate: Not available.

Viscosity: 21cP @ 20 deg C

Boiling Point: 197 deg C @ 760 mmHg

Freezing/Melting Point:-13 deg C

Decomposition Temperature: Not available.

Solubility: Soluble.

Specific Gravity/Density:1.113 g/ml

Molecular Formula:C2H6O2

Molecular Weight:62.06

Section 10 - Stability and Reactivity

Chemical Stability: Stable at room temperature in closed containers under normal storage and handling conditions. Hygroscopic: absorbs moisture or water from the air.

Conditions to Avoid: Moisture, excess heat.

Incompatibilities with Other Materials: Strong oxidizing agents, strong acids, isocyanates, aliphatic amines, caustics.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 107-21-1: KW2975000
LD50/LC50:
CAS# 107-21-1:
Draize test, rabbit, eye: 500 mg/24H Mild;
Draize test, rabbit, eye: 100 mg/1H Mild;
Draize test, rabbit, eye: 0.012 ppm/3D;
Draize test, rabbit, eye: 1440 mg/6H Moderate;
Oral, mouse: LD50 = 5500 mg/kg;
Oral, rat: LD50 = 4700 mg/kg;
Skin, rabbit: LD50 = 9530 uL/kg;

Ethylene glycol is more acutely toxic for humans than for laboratory animals by ingestion. The single oral lethal dose for humans has been estimated at 1.4 ml/kg (1.56 g/kg) or about 100 ml (111 g) for an adult.
Carcinogenicity:
CAS# 107-21-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: An expert panel convened by the NTP's Center for the Evaluation of Risks to Human Reproduction concluded 2/13/03 that developmental and reproductive risks stemming from exposure to the chemicals propylene glycol and ethylene glycol are negligible.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: No data available.
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 41000 mg/L; 96 Hr.; Unspecified
Fish: Bluegill/Sunfish: LC50 = 27500-41000 mg/L; 96 Hr.; Unspecified
Fish: Goldfish: LC50 = 27500-41000 mg/L; 96 Hr.; Unspecified
Water flea Phytobacterium phosphoreum: LC50 = 46300 mg/L; 48 Hr.; Unspecified

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	Not regulated	Not Regulated
Hazard Class:		
UN Number:		
Packing Group:		

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 107-21-1 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
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.
CERCLA Hazardous Substances and corresponding RQs
CAS# 107-21-1: 5000 lb final RQ; 2270 kg final RQ
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 107-21-1: immediate, delayed.
Section 313
This material contains Ethylene glycol (CAS# 107-21-1, >95%),which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act:
CAS# 107-21-1 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 107-21-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives
Hazard Symbols:
XN
Risk Phrases:
R 22 Harmful if swallowed.

Safety Phrases:

WGK (Water Danger/Protection)
CAS# 107-21-1: 0
Canada - DSL/NDSL
CAS# 107-21-1 is listed on Canada's DSL List.
Canada - WHMIS
This product has a WHMIS classification of D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.
Canadian Ingredient Disclosure List
CAS# 107-21-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 5/12/1999
Revision #8 Date: 7/24/2006

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

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CANUTEC (CANADA) 613-996-6666

MSDS # 1030
Date 03/31/06

Supercedes
MSDS # 1030 01/24/05

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): DYNO® AP, DYNO® AP PLUS, DYNO® AP PLUS LD
DYNO® MC, DYNO® MC PLUS
DYNO® SL, DYNO® SL PLUS
DYNO® XTRA
IRECOAL® E-5 / DYNO® E5
IREMITE® TX / DYNO® TX
POWERMITE®
POWERMITE® AP, POWERMITE® SL, POWERMITE® PLUS
POWERMITE® SL PLUS
POWERMITE® LD, POWERMITE® LD PLUS
POWERMITE® Canadian
POWERMITE® RAISE BOMB™
DX 1004
DYNOSPLIT® AP

Product Class: Packaged Emulsion Explosives

Product Appearance & Odor: White or pink opaque semi-solid, which will appear gray if product contains aluminum. Little or no odor. Typically paper or plastic chub packaging.

DOT Hazard Shipping Description: Explosive, Blasting, Type E 1.1D UN0241 II

NFPA Hazard Classification: Not Available (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS#	% (Range)	ACGIH TLV-TWA
Ammonium Nitrate	6484-52-2	60-80	No Value Established
Sodium Nitrate[1]	7631-99-4	10-18	No Value Established
Aluminum	7429-90-5	0-10	10 mg/m^3
Mineral Oil (mist)	64742-35-4	0-3	5 mg/m^3

[1] Our source of Sodium Nitrate (Chilean) may contain perchlorate ion, which occurs naturally. Although Dyno Nobel does not analyze for the presence of perchlorate anion, based on published studies, the products listed above may contain between 50 and 350 ppm perchlorate.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

Material Safety Data Sheet

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable

Vapor Pressure: Not Applicable

Vapor Density: (Air = 1) Not Applicable

Density: 0.95-1.25 g/cc

Percent Volatile by Volume: <20 (water)

Solubility in Water: Product partially dissolves very slowly in water.

Evaporation Rate (Butyl Acetate = 1): <1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >100°C

Flammable Limits: Not Applicable

Extinguishing Media: (See Special Fire Fighting Procedures section.)

Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation, redness and tearing.

Skin: Prolonged contact may cause irritation.

Ingestion: Large amounts may be harmful if swallowed.

Inhalation: Not a likely route of exposure.

Systemic or Other Effects: *Perchlorate*: Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone. The National Academy of Sciences (NAS) has reviewed the toxicity of perchlorate and has concluded that even the most sensitive populations could ingest up to 0.7 microgram perchlorate per kilogram of body weight per day without adversely affecting health. The USEPA must establish a maximum contaminant level (MCL) for perchlorate in drinking water by 2007, and this study by NAS may result in a recommendation of about 20 ppb for the MCL.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists seek medical attention.

Skin: Remove contaminated clothing. Wash with soap and water.

Ingestion: Seek medical attention.

Inhalation: If irritation occurs, remove to fresh air.

Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantity.

Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.

Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).

Hazardous Decomposition Products: Nitrogen Oxides (NO_X), Carbon Monoxide (CO)

Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements.
Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Not required for normal handling.
Respiratory Protection: None normally required.
Protective Clothing: Gloves and work clothing that reduce skin contact are suggested.
Eye Protection: Safety glasses are recommended.
Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flame, ignition sources and strong shock.
Precautions to be taken during use: Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

SECTION X - SPECIAL INFORMATION

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listing of the previously referenced regulation should be reviewed.

Disclaimer

Material Safety Data Sheet

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CANUTEC (CANADA) 613-996-6666

MSDS # 1019
Date 01/24/05

Supercedes
MSDS # 1019 09/09/04

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):

D-GEL™ 1000
DYNOSPLIT®: D1, D3/4, D 7/8
EXTRA GELATIN: 40%, 75%
GELAPRIME® F
UNIGEL®
UNIMAX®
VIBROGEL®: 1,3
Z POWDER™
DYNOMAX PRO™
Oil Well Explosive 80%
Oil Well Explosive 100%
STONECUTTER™
REDH®A
RED H® B
POWERGEL D
60% Hi-Pressure Gelatin
IRESPLIT® D
IP: 724, 738

Product Class: Packaged Dynamites and Blasting Gelatins
Product Appearance & Odor: Powdery to gelatinous solid, light tan to dark brown color. Faint, waxy odor.
DOT Hazard Shipping Description: Explosive, blasting, type A 1.1D UN0081 II
NFPA Hazard Classification: Not Available (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	% (Range)	ACGIH TLV-TWA
Nitroglycerin (NG)	55-63-0	1-20	0.05 ppm
Ethylene Glycol Dinitrate (EGDN)	628-96-6	8-76	0.05 ppm
Nitrocellulose	9004-70-0	0-6	No Value Established
Ammonium Nitrate	6484-52-2	0-75	No Value Established
Sodium Nitrate[1]	7631-99-4	0-50	No Value Established
Sulfur[2]	7704-34-9	0-4	No Value Established

[1] Our source of Sodium Nitrate (Chilean) may contain perchlorate ion, which occurs naturally. Although Dyno Nobel does not analyze for the presence of perchlorate anion, based on published studies, the products listed above may contain between 0 and 1,000 ppm perchlorate.

[2] This ingredient is not found in most of the products listed above.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Vapor Pressure: Not Applicable
Density: 0.8-1.48 g/cc

Percent Volatile by Volume: Not Applicable

Evaporation Rate (Butyl Acetate = 1): Not Applicable

Solubility in Water: Ammonium and sodium nitrates are completely soluble. NG and EGDN are very slightly soluble.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Extinguishing Media: (See Special Fire Fighting Procedures section.)

Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation, redness and tearing.

Skin: Contact may result in headache, nausea and blood vessel dilation.

Ingestion: May result in headache, nausea, intestinal upset and blood vessel dilation.

Inhalation: May result in headache, nausea and blood vessel dilation.

Systemic or Other Effects: *Perchlorate*: Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone. The National Academy of Sciences (NAS) has reviewed the toxicity of perchlorate and has concluded that even the most sensitive populations could ingest up to 0.7 microgram perchlorate per kilogram of body weight per day without adversely affecting health. The USEPA must establish a maximum contaminant level (MCL) for perchlorate in drinking water by 2007, and this study by NAS may result in a recommendation of about 20 ppb for the MCL.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

Skin: Remove contaminated clothing. Wash with soap and water.

Ingestion: Seek medical attention.

Inhalation: Remove to fresh air. If irritation persists, seek medical attention.

Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions. May explode when subjected to fire, supersonic shock, or high-energy projectile impact, especially when confined or in large quantities.

Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.

Materials to Avoid (Incompatibility): Corrosives (mineral acids, bases, strong acids).

Hazardous Decomposition Products: Carbon Monoxide (CO), Hydrogen Sulfide (H_2S), Nitrous Oxides (NO_X), and Sulfur Oxides (SO_X).

Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged

and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements. Contact of this product with water may result in a reportable release.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Forced ventilation may be necessary where natural ventilation is limited. Magazines containing NG and/or EGDN based explosives must be ventilated before entry.
Respiratory Protection: None normally required.
Protective Clothing: Chemical resistant (nitrile) gloves are suggested.
Eye Protection: Safety glasses are recommended.
Other Precautions Required: Inhalation and skin contact should be minimized to avoid headaches, nausea, and blood vessel dilation. Protective clothing should be changed daily, more often if contaminated.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources, and strong shock.
Precautions to be taken during use: Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

SECTION X - SPECIAL INFORMATION

Chemical Name	CAS Number	% By Weight
Nitroglycerin	55-63-0	1-20

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listing of the previously referenced regulation should be reviewed.

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CANUTEC (CANADA) 613-996-6666

MSDS # 1049
Date 02/07/05

Supercedes
MSDS # 1049 01/24/03

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): N-36
N-37
N-39
N-40
N-52

Product Class: Emulsifier

Product Appearance & Odor: Dark, viscous liquid with a slightly pungent hydrocarbon odor.

DOT Hazard Shipping Description: Combustible liquid, n.o.s. (Alkanolamine), NA 1993 III
Shipped in drums or bulk tanker.

NFPA Hazard Classification: Health (Blue) = 2
Flammability (Red) = 1
Reactivity (Yellow) = 0

SECTION II - HAZARDOUS INGREDIENTS

			Occupational Exposure Limits	
Ingredients:	**CAS#**	**% (Range)**	**ACGIH TLV-TWA**	**OSHA PEL-TWA**
Alkanolamine	100-37-8	1-6	10 mg/m^3	50 mg/m^3
Mineral Oil (Mist)	64742-35-4	5-70	5 mg/m^3	None

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: >150°C (302°F)
Vapor Density: >1
Percent Volatile by Volume: <5
Evaporation Rate (Butyl Acetate = 1): <1

Vapor Pressure: <1 mm Hg at 20°C
Density: 0.87-0.92 g/cc
Solubility in Water: Insoluble

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: 79°C (174°F) **Flammable Limits:** Not Determined
Extinguishing Media: Use carbon dioxide or dry chemical on small fires. Use foam (alcohol, polymer or ordinary) and water spray for large fires.
Special Fire Fighting Procedures: Self contained breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards: None known.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation, redness and tearing.
Skin: Prolonged contact may cause irritation.
Ingestion: Large amounts may be harmful if swallowed.
Inhalation: May cause dizziness, nausea, intestinal upset.
Systemic or Other Effects: None known.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Remove contaminated clothing. Wash with soap and water.
Ingestion: Seek medical attention.
Inhalation: Remove to fresh air. If irritation persists, seek medical attention.
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions.
Conditions to Avoid: See Below
Materials to Avoid (Incompatibility): Strong oxidizing material can cause a reaction.
Hazardous Decomposition Products: Thermal decomposition or burning may produce Carbon Monoxide (CO) and/or Nitrogen Oxides (NO_x).
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Use appropriate safety equipment. Use absorbent material to collect and contain for disposal. Contain large spills and pump into a suitable tank. Wash area with suitable detergent and thoroughly rinse. Follow applicable Federal, State and local reporting requirements.
Waste Disposal Method: Disposal must comply with Federal, State and local regulations.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Ventilation must be adequate to prevent exposure to high concentrations of vapors. Mechanical ventilation is recommended for enclosed areas and/or when product is at elevated temperatures.

Respiratory Protection: Do not breath vapors. A suitable respirator is strongly recommended when ventilation is marginal or the product is being handled at elevated temperatures.
Protective Clothing: Body-covering clothing and rubber gloves are recommended. Remove contaminated clothing to prevent prolonged skin contact.
Eye Protection: Safety glasses are recommended.
Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in compliance with all Federal, State, and local regulations.
Other Precautions: Store only in well-ventilated areas at temperatures below the flash point. Keep all containers tightly sealed, including empty containers. Do not breathe vapors when opening containers.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are 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.

Chemical Name	CAS Number	% By Weight
None		

Disclaimer

PETRO-CANADA

Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Protective Clothing	TDG (pictograms)
	B-3, D-2B		

Section 1. Chemical Product and Company Identification

Product Name	**DIESEL FUEL**	**Code**	W104, W293; SAP: 120, 121, 122, 287
Synonym	Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, P50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel	**Validated on**	**2/5/2007.**
Manufacturer	PETRO-CANADA P.O. Box 2844 150 – 6th Avenue South-West Calgary, Alberta T2P 3E3	**In case of Emergency**	Petro-Canada: 403-296-3000 Canutec Transportation: 613-996-6666 Poison Control Centre: Consult local telephone directory for emergency number(s).
Material Uses	Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining Diesel has a higher flash point requirement, for safe use in underground mines.		

Section 2. Composition and Information on Ingredients

			Exposure Limits (ACGIH)		
Name	**CAS #**	**% (V/V)**	**TLV-TWA(8 h)**	**STEL**	**CEILING**
Distillates (petroleum), hydrodesulfurized middle	64742-80-9	100	Not established	Not established	Not established
Kerosine (petroleum), hydrodesulfurized	64742-81-0		200 mg/m³	Not established	Not established
Fuels, diesel	68334-30-5		100 mg/m³	Not established	Not established
Fuel oil no. 2	68476-30-2		100 mg/m³	Not established	Not established

Manufacturer Recommendation	Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.
Other Exposure Limits	Consult local, state, provincial or territory authorities for acceptable exposure limits.

Section 3. Hazards Identification.

Potential Health Effects	Combustible liquid. Exercise caution when handling this material. Contact with this product may cause skin and eye irritation. Prolonged or repeated contact may cause skin irritation, defatting, drying and dermatitis. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death. Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. For more information refer to Section 11 of this MSDS.

Section 4. First Aid Measures

Eye Contact	Avoid direct contact. Quickly and gently blot or brush away chemical. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes or until the chemical is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately.
Skin Contact	Avoid direct contact. Wear chemical resistant protective clothing if necessary. Quickly and gently, blot or brush away excess chemical. Wash gently and thoroughly with warm water and non-abrasive soap for 15-20 minutes or until chemical is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g., watch bands, belts, etc.). Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
Inhalation	Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Immediately transport victim to an emergency care facility.

Ingestion	NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 240 to 300 mL (8 to 10 oz) of water to dilute material in stomach. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Repeat administration of water. If breathing has stopped, trained personnel should begin artificial respiration (AR) or, if the heart has stopped, cardiopulmonary resuscitation (CPR) immediately. Quickly transport victim to an emergency care facility.
Note to Physician	Not available.

Section 5. Fire-fighting Measures

Flammability	Combustible liquid.	**Flammable Limits**	Lower: 0.7% Upper: 6%
Flash Points	Diesel Fuel: Closed Cup: ≥45°C (113°F) Marine Diesel Fuel: Closed Cup: ≥64°C (147°F) Mining Diesel: Closed Cup: ≥52°C (126°F)	**Auto-Ignition Temperature**	225°C (437°F)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.	**Explosion Hazards in Presence of Various Substances**	Containers may explode in heat of fire. Do not cut, weld, heat, drill or pressurize empty container. Runoff to sewer may create fire or explosion hazard.
Products of Combustion	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), sulphur compounds (H2S), smoke and irritating vapours as products of incomplete combustion. See Section 11 (Other Considerations) for information regarding the toxicity of the combustion products.		
Fire Fighting Media and Instructions	NAERG2004, GUIDE 128, Flammable liquids (Non-polar/Water-immiscible). CAUTION: This product has a moderate flash point above 40°C: Use of water spray when fighting fire may be inefficient. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. SMALL FIRES: Dry chemical, CO2, water spray or regular foam. LARGE FIRES: Water spray, fog or regular foam. Do not use straight streams. Move containers from fire area if you can do it without risk. Fires Involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting devices or any discolouration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.		

Section 6. Accidental Release Measures

Material Release or Spill	Consult current National Emergency Response Guide Book (NAERG) for appropriate spill measures if necessary. IN THE EVENT OF A LARGE SPILL CONSIDER THE FOLLOWING CONTROL MEASURES: Extinguish all ignition sources. Evacuate non-essential personnel. Ventilate area. Stop leak if safe to do so. Dike spilled material. Use appropriate inert absorbent material to absorb spilled product. Collect used absorbent for later disposal. Ground and bond all equipment used to clean up the spilled material, as it may be a static accumulator. Avoid contact with spilled material. Avoid breathing vapours or mists of material. Avoid contaminating sewers, streams, rivers and other water courses with spilled material. Notify appropriate authorities immediately. Ensure clean-up personnel wear appropriate personal protective equipment.

Section 7. Handling and Storage

Handling	COMBUSTIBLE MATERIAL. Handle with care. Avoid contact with any sources of ignition, flames, heat, and sparks. Ensure all equipment is grounded/bonded. Avoid skin contact. Avoid eye contact. Avoid inhalation of product vapours or mists. Wear proper personal protective equipment (See Section 8). Avoid confined spaces and areas with poor ventilation. Empty containers may contain product residue. Do not pressurize, cut, heat, or weld empty containers. Do not reuse containers without commercial cleaning and/or reconditioning. Personnel who handle this material should practice good personal hygiene during and after handling to help prevent accidental ingestion of this product. Properly dispose of contaminated leather articles including shoes that cannot be decontaminated.
Storage	Store away from heat and sources of ignition. Store in dry, cool, well-ventilated area. Store away from incompatible and reactive materials (See section 5 and 10). Ensure the storage containers are grounded/bonded.

Section 8. Exposure Controls/Personal Protection

Engineering Controls	For normal application, special ventilation is not necessary. If user's operations generate vapours or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make-up air should always be supplied to balance air removed by exhaust ventilation. Ensure that eyewash station and safety shower are close to work-station.
Personal Protection	- ***The selection of personal protective equipment varies, depending upon conditions of use.***
Eyes	As a minimum, safety glasses with side shields should be worn when handling this material. If product is used in an application where splashing may occur, the use of safety goggles and/or a face shield should be considered.
Body	If this material may come in contact with the body during handling and use, we recommend wearing appropriate protective clothing to prevent contact with the skin. (Contact your PPE provider for more information.)
Respiratory	A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.
Hands	If this material may come in contact with the hands during handling and use, we recommend wearing gloves of the following material(s): nitrile, neoprene, polyvinyl alcohol (PVA), fluoro-elastomer. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
Feet	Wear appropriate footwear to prevent product from coming in contact with feet and skin.

Section 9. Physical and Chemical Properties

Physical State and Appearance	Bright oily liquid.	**Viscosity**	1.3 - 4.4 cSt @ 40°C (104°F)
Colour	Clear to yellow / brown (may be dyed for taxation purposes).	**Pour Point**	Not available.
Odour	Mild petroleum oil like.	**Softening Point**	Not available.
Odour Threshold	Not available.	**Dropping Point**	Not available.
Boiling Point	150 to 371°C (302 to 699.8°F)	**Penetration**	Not available.
Density	0.8 to 0.88 kg/L @ 15°C (59°F)	**Oil / Water Dist. Coefficient**	Not available.
Vapour Density	4.5 [Air = 1]	**Ionicity (in water)**	Not available.
Vapour Pressure	1 kPa (7.5 mm Hg) @ 20°C (68°F)	**Dispersion Properties**	Not available.
Volatility	Semivolatile to volatile.	**Solubility**	Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

Section 10. Stability and Reactivity

Corrosivity	Not available.		
Stability	The product is stable under normal handling and storage conditions.	**Hazardous Polymerization**	Will not occur under normal working conditions.
Incompatible Substances / Conditions to Avoid	Reactive with oxidizing agents and acids.	**Decomposition Products**	May release COx, NOx, SOx, H2S, smoke and irritating vapours when heated to decomposition.

Section 11. Toxicological Information

Routes of Entry	Skin contact, eye contact, inhalation and ingestion.
Acute Lethality	Acute toxicity information is not available for the product as a whole, therefore, data for some of the ingredients is provided below: **Distillates (petroleum), hydrodesulfurized middle (64742-80-9):** Acute Inhalation toxicity (LC50): 4600 mg/m³/4h (rat) **Kerosine (petroleum), hydrosulfurized (64742-81-0):** Acute Oral toxicity (LD50): >5000 mg/kg (rat) Acute Dermal toxicity (LD50): >2000 mg/kg (rabbit) Acute Inhalation toxicity (LC50): >5000 mg/m³/4h (rat) **Fuels, diesel (68334-30-5):** Acute Oral toxicity (LD50): 7500 mg/kg (rat) Acute Dermal toxicity (LD50): 24500 mg/kg (mouse)

	Fuel oil no. 2 (68476-30-2): Acute Oral toxicity (LD50): 12000 mg/kg (rat)
Chronic or Other Toxic Effects	
Dermal Route:	This product contains a component (at >= 1%) that can cause skin irritation. Therefore, this product is considered to be a skin irritant. Prolonged or repeated contact may defat and dry skin, and cause dermatitis. (See Other Considerations)
Inhalation Route:	Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Oral Route:	Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
Eye Irritation/Inflammation:	Short-term exposure is expected to cause only slight irritation, if any.
Immunotoxicity:	Not available.
Skin Sensitization:	Contact with this product is not expected to cause skin sensitization, based upon the available data and the known hazards of the components.
Respiratory Tract Sensitization:	Contact with this product is not expected to cause respiratory tract sensitization, based upon the available data and the known hazards of the components.
Mutagenic:	This product is not known to contain any components at >= 0.1% that have been shown to cause mutagenicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a mutagen.
Reproductive Toxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause reproductive toxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a reproductive toxin.
Teratogenicity/Embryotoxicity:	This product is not known to contain any components at >= 0.1% that have been shown to cause teratogenicity and/or embryotoxicity. Therefore, based upon the available data and the known hazards of the components, this product is not expected to be a teratogen/embryotoxin.
Carcinogenicity (ACGIH):	Considered to be A3 by the ACGIH (Kerosine (petroleum), hydrodesulfurized; Fuels, diesel; Fuel oil no. 2) (See Other Considerations)
Carcinogenicity (IARC):	This product is not known to contain any chemicals at reportable quantities that are listed as group 1, 2A or 2B carcinogens by IARC.
Carcinogenicity (NTP):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by NTP.
Carcinogenicity (IRIS):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by IRIS.
Carcinogenicity (OSHA):	This product is not known to contain any chemicals at reportable quantities that are listed as carcinogens by OSHA.
Other Considerations	Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer. Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

Section 12. Ecological Information

Environmental Fate	Not available.	**Persistance/ Bioaccumulation Potential**	Not available.
BOD5 and COD	Not available.	**Products of Biodegradation**	Not available.
Additional Remarks	No additional remark.		

Section 13. Disposal Considerations

Waste Disposal	Spent/ used/ waste product may meet the requirements of a hazardous waste. Consult your local or regional authorities. Ensure that waste management processes are in compliance with government requirements and local disposal regulations.

Section 14. Transport Information

TDG Classification	DIESEL FUEL, 3, UN1202, PGIII (CL-TDG)	**Special Provisions for Transport**	See Transportation of Dangerous Goods Regulations.

Section 15. Regulatory Information

Other Regulations

This product is acceptable for use under the provisions of WHMIS-CPR. All components of this formulation are listed on the CEPA-DSL (Domestic Substances List).

All components of this formulation are listed on the US EPA-TSCA Inventory.

All components of this product are on the European Inventory of Existing Commercial Chemical Substances (EINECS).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

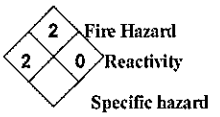
Please contact Product Safety for more information.

DSD/DPD (Europe)	Not evaluated.	**HCS (U.S.A.)**	CLASS: Irritating substance. CLASS: Target organ effects. CLASS: Combustible liquid having a flash point between 37.8°C (100°F) and 93.3°C (200°F).
ADR (Europe) (Pictograms)	NOT EVALUATED FOR EUROPEAN TRANSPORT NON ÉVALUÉ POUR LE TRANSPORT EUROPÉEN.	**DOT (U.S.A) (Pictograms)**	Not evaluated for transport Non évalué pour le transport

HMIS (U.S.A.)

Health Hazard	2*
Fire Hazard	2
Reactivity	0
Personal Protection	H

NFPA (U.S.A.)



Rating
0 Insignificant
1 Slight
2 Moderate
3 High
4 Extreme

Section 16. Other Information

References Available upon request.

* Marque de commerce de Petro-Canada - Trademark

Glossary

ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous goods by Road (Europe)
ASTM - American Society for Testing and Materials
BOD5 - Biological Oxygen Demand in 5 days
CAS - Chemical Abstract Services
CEPA - Canadian Environmental Protection Act
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CFR - Code of Federal Regulations
CHIP - Chemical Hazard Information and Packaging Approved Supply List
COD - Chemical Oxygen Demand
CPR - Controlled Products Regulations
DOT - Department of Transportation (U.S.A.)
DSCL - Dangerous Substances Classification and Labeling (Europe)
DSD/DPD - Dangerous Substance or Dangerous Preparations Directives (Europe)
DSL - Domestic Substance List (Canada)
EEC/EU - European Economic Community/European Union
EINECS - European Inventory of Existing Commercial Chemical Substances
EPCRA - Emergency Planning And Community Right-To-Know Act
FDA - Food and Drug Administration
FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act
HCS - Hazardous Communication System
HMIS - Hazardous Material Information System
IARC - International Agency for Research on Cancer
IRIS - Integrated Risk Information System
LD50/LC50 - Lethal Dose/Concentration kill 50%
LDLo/LCLo - Lowest Published Lethal Dose/Concentration
NFPA - National Fire Prevention Association
NIOSH - National Institute for Occupational Safety & Health
NPRI - National Pollutant Release Inventory
NSNR - New Substances Notification Regulations (Canada)
NTP - National Toxicology Program
OSHA - Occupational Safety & Health Administration
PEL - Permissible Exposure Limit
RCRA - Resource Conservation and Recovery Act
SARA - Superfund Amendments and Reorganization Act
STEL - Short Term Exposure Limit (15 minutes)
TDG - Transportation Dangerous Goods (Canada)
TDLo/TCLo - Lowest Published Toxic Dose/Concentration
TLV-TWA - Threshold Limit Value-Time Weighted Average
TLm - Median Tolerance Limit
TSCA - Toxic Substances Control Act
USEPA - United States Environmental Protection Agency
USP - United States Pharmacopoeia
WHMIS - Workplace Hazardous Material Information System

For Copy of MSDS

Prepared by Product Safety - JDW on 2/5/2007.

Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Data entry by Product Safety - JDW.

Material Safety Data Sheet

Dyno Nobel Inc.
2650 Decker Lake Boulevard, Suite 300
Salt Lake City, Utah 84119
Phone: 801-364-4800 Fax: 801-321-6703
E-Mail: dnna.hse@am.dynonobel.com
FOR 24 HOUR EMERGENCY, CALL CHEMTREC (USA) 800-424-9300
CANUTEC (CANADA) 613-996-6666

MSDS # 1076
Date 01/24/05

Supercedes
MSDS # 1076 01/22/03

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): ELECTRIC SUPER™ COAL
ELECTRIC SUPER™ LP
ELECTRIC SUPER™ SP
ELECTRIC SUPER™ SEISMIC
ELECTRIC SUPER™ INSTANT

Product Class: Commercial Electric Detonators and Accessory Products

Product Appearance & Odor: Metal cylinder with varying length of attached plastic coated wires.

DOT Hazard Shipping Description: Detonators, Electric 1.1B UN0030 II
Or
Detonators, Electric 1.4B UN0255 II
Or
Detonators, Electric 1.4S UN0456 II

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

		EXPOSURE LIMITS	
Ingredients	**CAS#**	**OSHA PEL-TWA**	**ACGIH TLV-TWA**
Tungsten	7440-33-7	None[1]	5 mg/m^3 (TWA) 10 mg/m^3 (STEL)
Barium Chromate	10294-40-3	1 mg (CrO_3)/10m^3 (ceiling) 0.5 mg (Ba)/m^3	0.01 mg (Cr)/m^3 0.5 mg (Ba)/m^3
Lead Compounds	----------	0.5 mg (Pb)/m^3	0.5 mg (Pb)/m^3
Pentaerythritol Tetranitrate (PETN)	78-11-5	None[1]	None[2]
Boron	7440-42-8	No Value Established	No Value Established
Potassium Perchlorate[3]	7778-74-7	None[1]	None[2]
Diazodinitrophenol (DDNP)	4682-03-5	No Value Established	No Value Established
Nitrocellulose	9004-70-0	No Value Established	No Value Established

[1] Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m^3 ; respirable fraction, 5 mg/m^3 .
[2] Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m^3 ; respirable part., 3 mg/m^3 .
[3] Not all delay periods contain perchlorate. Those that do contain between from about 4 to a maximum of about 25 mg perchlorate per detonator.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: Not Applicable
Percent Volatile by Volume: Not Applicable
Vapor Pressure: Not Applicable
Density: Not Applicable
Solubility in Water: Not Applicable

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable
Flammable Limits: Not Applicable
Extinguishing Media: None
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.
Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

This is a packaged product that will not result in exposure to the explosive material under normal conditions of use. Exposure concerns are primarily with post-detonation reaction products, particularly heavy metal compounds.

Eyes: No exposure to chemical hazards anticipated with normal handling procedures. Particulates in the eye may cause irritation, redness and tearing.
Skin: No exposure to chemical hazards anticipated with normal handling procedures.
Ingestion: No exposure to chemical hazards anticipated with normal handling procedures.
Inhalation: Not a likely route of exposure.
Systemic or Other Effects: None anticipated with normal handling procedures. Repeated inhalation or ingestion of post-detonation reaction products may lead to systemic effects such as respiratory tract irritation, ringing of the ears, dizziness, elevated blood pressure, blurred vision and tremors. Heavy metal (lead) poisoning can occur.
Carcinogenicity: ACGIH classifies Lead as a "Suspected Human Carcinogen" and insoluble Chromium VI as "Confirmed Human Carcinogen". NTP, OSHA, and IARC consider components contained in this detonator carcinogenic.
Perchlorate: Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone. The National Academy of Sciences (NAS) has reviewed the toxicity of perchlorate and has concluded that even the most sensitive populations could ingest up to 0.7 microgram perchlorate per kilogram of body weight per day without adversely affecting health. The USEPA must establish a maximum contaminant level (MCL) for perchlorate in drinking water by 2007, and this study by NAS may result in a recommendation of about 20 ppb for the MCL.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Wash with soap and water.
Ingestion: Seek medical attention.
Inhalation: Not applicable.
Special Considerations: None

Material Safety Data Sheet

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.
Conditions to Avoid: Keep away from heat, flame, ignition sources, strong shock and electrical impulse. Do not attempt to disassemble.
Materials to Avoid (Incompatibility): Corrosives (acids and bases)
Hazardous Decomposition Products: Carbon Monoxide (CO), Nitrous Oxides (NO_x), Lead (Pb) and various oxides and complex oxides of metals.
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State, and local spill reporting requirements.
Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Not required for normal handling.
Respiratory Protection: None normally required.
Protective Clothing: Cotton clothing is suggested.
Eye Protection: Safety glasses are recommended.
Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources, strong shock, and electrical impulses.
Precautions to be taken during use: Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are 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.

Chemical Name	CAS Number (Use Toxic Chemical Category Code)	% By Weight
Barium Compounds	N040	1.2
Lead Compounds	N420	0 – 0.59
Chromium Compounds	N090	1.2

Amount of Lead in Detonator Product Line *				
Product	Pb compounds in detonator [grams]	Pb compounds in detonator [Wt.%]	Pb in detonator [grams]	Pb in detonator [Wt. %]
Electric Super SP	0.0412	0.588%	0.0357	0.5093%
Electric Super LP	0.0412	0.588%	0.0357	0.5093%
Electric Super Coal	0.0412	0.588%	0.0357	0.5093%
Electric Super Seismic	0.0000	0.0000%	0.0000	0.0000%
Electric Super Instant	0.0000	0.0000%	0.0000	0.0000%

*Applies to only the detonator (source of lead). Do not use case weight or weight of any other component.

Disclaimer

Material Safety Data Sheet

Orica Canada Inc.
Maple Street
Brownsburg, PQ
For MSDS Requests: 450-533-4201

Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137
For MSDS Requests: 303-268-5000

EMERGENCY CONTACTS

FOR CHEMICAL EMERGENCIES(24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: IN CANADA CALL THE ORICA CANADA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT 1-877-561-3636; IN THE U.S. CALL CHEMTREC (800) 424-9300. IN THE U.S. FOR LOST, STOLEN OR MISPLACED EXPLOSIVES CALL: BATF (800) 424-9555.

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **Pentex Boosters**
MSDS Number: 60000 **Date Issued:** 11-07-05
Manufactured By: Orica Brazil Inc.
Product Use: Booster used in blasting systems

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENT(S)	% (w/w)	ACGIH TWA	CAS NO.
Trinitrotoluene (TNT)	30-50	0.1 mg/M^3(skin)	118-96-7
Pentaerythritol Tetranitrate (PETN)	50-70	Not Listed	78-11-5

Ingredients that are not listed above, that are used in the product are not hazardous as defined under current legislation.

SECTION 3 - HAZARD IDENTIFICATION

Emergency Overview: Risk of explosion by shock, friction, fire or other sources of ignition. Very toxic if swallowed. Irritating to eyes, respiratory system and skin. May cause methemoglobinemia. May cause sensitization by skin contact. Read the entire MSDS for a more thorough evaluation of the hazards.

SECTION 4 - FIRST AID MEASURES

Inhalation: If detonation fumes are inhaled, remove to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. If breathing is difficult, give oxygen and contact a physician. Note: Oxygen should only be administered by a person trained in its use.
Skin Contact: Wash skin with soap and water
Eye Contact: Flush eyes with clean water for 15 minutes, then seek medical attention
Ingestion: If victim is alert and not convulsing, rinse mouth out and give 200-300 mL (1 cup) of water to dilute material. DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY.
Note to Physicians: Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10 cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%. Symptomatic. Do not give vasopressor drugs (e.g. epinephrine, adrenalin, ephedrine, etc.) as there may be danger of producing cardiac arrhythmia. Medical conditions that may be aggravated by exposure to this product include hypotension and skin disorders.

SECTION 5 - FIRE-FIGHTING MEASURES

Flash Point: This product does not flash.
Flammable Limits (Lower): Not Applicable
Flammable Limits (Upper): Not applicable
Auto Ignition Temperature: Not available
Decomposition Temperature: Not available
Rate of Burning: Not available
Explosive Power: Not available
Sensitivity to Mechanical Impact: Not available

Sensitivity to Static Discharge: Not available
Hazardous Reactions: Will detonate if suitably primed by heat, flame or **significant** impact. Hazardous gases produced in fire are Nitrogen Oxides and Carbon monoxide.
Fire and Explosion Hazards:
Extinguishing Media: None
Fire Fighting Procedures: DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Note: Division 1.1 explosives: Evacuate to 5000 feet (1 Mile). Consult the *North American Emergency Response Guide* number 112 for more details
Fire Fighting Protective Equipment: Not applicable.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills, Leaks, or Releases: Review fire and explosion hazards before proceeding with clean up. Remove and protect ignition sources. Wear protective equipment during clean up. Mop up with water using non sparking tools. It is suggested that only personnel trained in emergency response should respond. Verify complete account of the product (s). Notify authorities and follow applicable spill reporting requirements.
Deactivating Chemicals: Not Applicable.

SECTION 7 - HANDLING AND STORAGE

Storage Requirements: Store in compliance with applicable regulatory requirements. Keep away from ignition sources, strong shock, flames and heat. Store in a cool, dry location designed for explosives storage.
Storage Temperature: Store in accordance with the requirements of local legislation respecting explosive storage.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

PREVENTIVE MEASURES:

Engineering Controls: General ventilation should be appropriate under conditions of use.
PERSONAL PROTECTIVE EQUIPMENT:
Eye Protection: Chemical/Safety goggles are recommended.
Skin Protection: Cotton or leather gloves, clothing to protect exposed skin such as flameproof coveralls and conductive boots.
Respiratory Protection: Wear NIOSH approved respirator if concentrations are above acceptable limits.
EXPOSURE GUIDELINES:
PRODUCT: None established for product

HAZARDOUS INGREDIENT(S):

Trinitrotoluene (TNT)	ACGIH TLV – 0.1 mg/M^3 (skin)

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Alternate Name(s): Pentex CD 3 * 90, Pentex CD 5.5 * 150, Pentex CD 8 * 227, Pentex CD 12 * 340, Pentex CD 16 * 454, Pentex SB 8, Pentex SB 20, Pentex SB 60, Pentex SL 8 * 227, Pentex SL 12 * 340, Pentex SL 16 * 454
Chemical Name: Not applicable
Chemical Family: Booster explosives
Molecular Formula: Not applicable
Appearance: Tan to brown solid
Odour: No noticeable odour
pH: Not applicable
Vapour Pressure (mm Hg at 20°C/68°F): Not applicable
Vapour Density (Air=1): Not applicable
Boiling Point: Not applicable
Melting Point: 176°F
Solubility (Water): Insoluble
Solubility (Other): Not available
Specific Gravity: 1.5 - 1.65
Evaporation Rate: Not applicable
Additional Properties: None

SECTION 10 - STABILITY AND REACTIVITY

Hazardous Decomposition Products: Oxides of Nitrogen and Carbon.
Chemical Stability: Stable under normal conditions.
Conditions to Avoid: Ignition sources, strong shock, heat and flame.
Incompatibility with other Substances: Not compatible with strong acids such as nitric acid.
Hazardous Polymerization: Will not polymerize.

SECTION 11 - TOXICOLOGICAL INFORMATION

Summary: Detonation may cause severe injury and death. All explosives are dangerous and must be handled carefully using approved safety procedures under the direction of competent, experienced personnel. Inhalation of explosive powders may cause nervous system irregularities including headache and dizziness. Nitrogen and Carbon Oxides generated during detonation are skin, eye and respiratory irritants.
TOXICOLOGICAL DATA:
PRODUCT: None established for product

INGREDIENTS:

Trinitrotoluene (TNT)	Oral LD50 (mouse) 25500 mg/kg
Pentaerythritol Tetranitrate (PETN)	Oral LD50 (rat) 795 mg/kg

POTENTIAL HEALTH EFFECTS:
Inhalation: High concentrations of the material may be irritating to the respiratory tract. May cause dizziness and nausea.
Skin Contact: May cause skin irritation. Repeated or prolonged contact may cause dermatitis. Can be absorbed through the skin. Evidence has indicated that an ingredient in this product may cause skin sensitization.
Eye Contact: Moderate irritant causing moderate initial pain.
Ingestion: Harmful if swallowed. May cause headache, weakness, anemia or liver injury.
Subchronic Effects: None known
Chronic Effects: None known
Carcinogenicity: Ingredients of this product are not listed as carcinogens by the National Toxicology Program (NTP), International Agency for Research for Cancer (IARC) or the Occupational Safety and Health Administration (OSHA)
Reproductive Effects: The ingredients of this product are not reproductive toxicants.
Teratogenicity and Fetotoxicity: None known
Synergistic Materials: None known.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicological Information: Harmful to aquatic life at low concentrations. (1.5 mg/L of TNT is toxic to fish)
Environmental Effects: Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds or rivers.

SECTION 13 - DISPOSAL CONSIDERATIONS

Burn under the supervision of an expert at an approved explosive burning ground or destroy by detonation in boreholes. Call upon the services of an Orica Canada Inc./Orica USA Inc. technical representative for assistance.

SECTION 14 - TRANSPORT INFORMATION

TDG Name: Boosters
TDG Class/Division: 1.1D
Product Indentification Number (PIN): UN0042
Packing Group: II
Transportation Emergency Telephone Number: IN CANADA CALL 1-877-561-3636. IN THE US CALL CHEMTREC (800) 424-9300.
Proper Shipping Name: Boosters, without detonators
DOT Label : EXPLOSIVE 1.1D
DOT Placard: EXPLOSIVES 1.1

SECTION 15 - REGULATORY INFORMATION

CANADIAN CLASSIFICATION:

Controlled Products Regulations (WHMIS) Classification: This product is an explosive and is not regulated by WHMIS.
CEPA / Canadian Domestic Substances List (DSL): All ingredients in this product are on the Canadian Domestic Substances List
IARC Classification: Not listed
USA CLASSIFICATION:
OSHA Classification:
Physical: Explosive
Health: Skin Sensitizer, Irritant.

Target Organ: Eye, skin, liver, urinary tract, gastrointestinal tract, cardiovascular system, immune system
SARA Regulations Sections 313 and 40 CFR 372: This product does not contain substances subject to reporting requirements.
Ozone Protection and 40 CFR 42: This product does not contain, nor is it manufactured with ozone depleting substances.
Other Regulations/Legislation which apply to this product: Massachusetts Right to Know, Pennsylvania Right to Know, New Jersey Right to Know.

SECTION 16 - OTHER INFORMATION

Prepared by: Orica Inc. Technical Personnel.

The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica Canada Inc./Orica USA Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

Material Safety Data Sheet

PETRO-CANADA ARCTIC 0W30 MOTOR OIL

PETRO-CANADA

1 . Product and company identification

Common name	:	PETRO-CANADA ARCTIC 0W30 MOTOR OIL
Synonym	:	Not available
Code	:	MAXSP03, 410-338
Material uses	:	A high performance synthetic motor oil designed to provide excellent performance in gasoline, propane and CNG engines where the manufacturer recommends an oil of ILSAC GF-4, API SM or API CF quality.
Manufacturer	:	PETRO-CANADA P.O. Box 2844 150 – 6th Avenue South-West Calgary, Alberta T2P 3E3
In case of emergency	:	**Petro-Canada: 403-296-3000** **Canutec Transportation:** **613-996-6666** **Poison Control Centre: Consult local telephone directory for emergency number(s).**

2 . Hazards identification

Physical state	:	Viscous liquid.
Odour	:	Mild petroleum oil like.
OSHA/HCS status	:	While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
Emergency overview	:	No specific hazard.
Routes of entry	:	Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects		
Eyes	:	Slightly irritating to the eyes.
Skin	:	Slightly irritating to the skin.
Inhalation	:	No known significant effects or critical hazards.
Ingestion	:	No known significant effects or critical hazards.
Medical conditions aggravated by over-exposure	:	Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	Mixture.	-

4 . First-aid measures

Eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Skin contact	:	Wash skin thoroughly with soap and water or use recognised skin cleanser. Get medical attention if irritation occurs. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Inhalation	:	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

4 . First-aid measures

Ingestion	:	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.
Protection of first-aiders	:	No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

5 . Fire-fighting measures

Flammability of the product	:	May be combustible at high temperature.
Products of combustion	:	Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), phosphorus oxides (POx), zinc oxides (ZnOx), calcium oxides (CaOx), molybdenum oxides (MoOx), boron oxides (BOx), smoke and irritating vapours as products of incomplete combustion.
Extinguishing media		
Suitable	:	Use an extinguishing agent suitable for the surrounding fire.
Not suitable	:	None known.
Special exposure hazards	:	In a fire or if heated, a pressure increase will occur and the container may burst. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	:	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
Special remarks on fire hazards	:	Low fire hazard. This material must be heated before ignition will occur.
Special remarks on explosion hazards	:	Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

Personal precautions	:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
Environmental precautions	:	Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Methods for cleaning up	:	Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling	:	Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk. Evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapour/spray. Wear suitable protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles.
Storage	:	Keep container tightly closed. Store away from incompatible materials (see section 10). Keep container in a cool, well-ventilated area.

8 . Exposure controls/personal protection

Product name	Exposure limits
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	**ACGIH TLV (United States). Notes: (oil mist)** TWA: 5 mg/m³ 8 hour(s). STEL: 10 mg/m³ 15 minute(s).

Consult local authorities for acceptable exposure limits.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Recommended: organic vapour filter

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

9 . Physical and chemical properties

Physical state	: Viscous liquid.
Flash point	: Open cup: 233°C (451.4°F) [Cleveland.]
Auto-ignition temperature	: Not available.
Flammable limits	: Not available.
Colour	: Amber.
Odour	: Mild petroleum oil like.
pH	: Not available.
Boiling/condensation point	: Not available.
Pour Point	: -45°C (-49°F)
Melting/freezing point	: Not available.
Relative density	: 0.8435 kg/L @ 15°C (59°F)
Vapour pressure	: Not available.
Vapour density	: Not available.
Volatility	: Not available.
Odour threshold	: Not available.
Evaporation rate	: Not available.
Viscosity	: 58.5 cSt @ 40°C (104°F), 10.6 cSt @ 100°C (212°F), VI=172
Solubility	: Insoluble in water.
$LogK_{ow}$	: Not available.
Softening Point	: Not available.

9 . Physical and chemical properties

Dropping Point	:	Not available.
Penetration	:	Not available.
Physical/chemical properties comments	:	Not available.

10 . Stability and reactivity

Stability and reactivity	:	The product is stable.
Conditions of instability	:	Not available.
Incompatibility with various substances	:	Reactive with acids and oxidising agents .
Hazardous decomposition products	:	May release COx, H2S, methacrylate monomers, alkyl mercaptans, smoke and irritating vapours when heated to decomposition.
Hazardous polymerisation	:	Will not occur.

11 . Toxicological information

Toxicity data

Product/ingredient name	Test	Result	Route	Species
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	LD50	>5000 mg/kg	Oral	Rat
	LD50	>2000 mg/kg	Dermal	Rabbit
	LC50	>2500 mg/m³ (4 hours)	Inhalation	Rat

Specific effects

Carcinogenic effects	:	Not listed as carcinogenic by OSHA, NTP or IARC.
Mutagenic effects	:	No known significant effects or critical hazards.
Teratogenicity / Reproductive toxicity	:	No known significant effects or critical hazards.

Sensitisation

Ingestion	:	No known significant effects or critical hazards.
Inhalation	:	No known significant effects or critical hazards.
Eyes	:	Slightly irritating to the eyes.
Skin	:	Slightly irritating to the skin.
Synergistic products	:	Not available.

12 . Ecological information

Ecotoxicity data

Product/ingredient name	Species	Period	Result

Environmental precautions	:	No known significant effects or critical hazards.
Bioconcentration factor		Not available.
BOD and COD		Not available.
Biodegradable/OECD		Not available.
Mobility		Not available.
Special remarks on the products of biodegradation		Not available.

13 . Disposal considerations

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Class	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Not regulated.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

EU regulations

Risk phrases : This product is not classified according to EU legislation.

International regulations

International lists

Canada Inventory status : Not determined.

EC INVENTORY (EINECS/ELINCS) : Listed

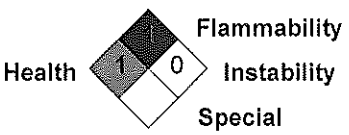
TSCA 8(b) inventory : Listed

16 . Other information

Hazardous Material Information System (U.S.A.) :

Health	1
Fire hazard	1
Reactivity	0
Personal protection	B

National Fire Protection Association (U.S.A.) :



16 . Other information

References	:	Available upon request. * Marque de commerce de Petro-Canada - Trademark
Date of printing	:	**2/13/2007.**
Date of issue	:	**2/13/2007.**
Date of previous issue	:	**No previous validation.**
Responsible name	:	**Product Safety - RS**
Version	:	**1**
For Copy of (M)SDS	:	The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact: Internet: www.petro-canada.ca/msds Lubricants: Western Canada, telephone: 1-800-661-1199; fax: (780) 464-9564 Ontario & Central Canada, telephone: 1-800-268-5850 and (905) 822-4222; fax: 1-800-201-6285 Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285 For Product Safety Information: (905) 804-4752

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.

ORICA

Material Safety Data Sheet

Orica Canada Inc.
Maple Street
Brownsburg, PQ
For MSDS Requests: 450-533-4201

Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137
For MSDS Requests: 303-268-5000

EMERGENCY CONTACTS
FOR EMERGENCIES INVOLVING CHEMICAL SPILL OR RELEASE:
IN CANADA 1-877-561-3636 OR IN USA CHEMTREC AT 1-800-424-9300.

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: AMEX, AMEX HD, ANFO **MATS Index:** 59531
MSDS Number: 20100 **Date Issued:** 06/16/04
Alternate Name(s): Ammonium Nitrate Fuel Oil.

Product Use: A booster-sensitive blasting agent.

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENT(S)	% (w/w)	ACGIH TWA	CAS NO.
Ammonium Nitrate	90-95	Not Listed.	6484-52-2
Diesel Fuel Oil No. 2	5-10	Not Listed.	68476-34-6

SECTION 3 - HAZARD IDENTIFICATION

Emergency Overview: Risk of explosion when burning. Irritating to eyes. May cause methemoglobinemia. May cause central nervous system (CNS) depression. Read the entire MSDS for a more thorough evaluation of the hazards.

SECTION 4 - FIRST AID MEASURES

General: If you feel unwell seek medical advice (show the label where possible).
Inhalation: Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.
Skin Contact: Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, obtain medical advice.
Eye Contact: Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing and obtain medical advice.
Ingestion: If victim is alert and not convulsing, rinse mouth out and give 200-300 mL (1 cup) of water to dilute material. DO NOT induce vomiting. Never give anything by mouth to an unconscious person. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY.

Note to Physicians: Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, consider administering 10 cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

SECTION 5 - FIRE-FIGHTING MEASURES

Flash Point: 52oC (125.6oF) (Diesel Fuel Oil No. 2)
Flammable Limits (Lower): Not applicable.
Flammable Limits (Upper): 4.7% (Diesel Fuel Oil No. 2)
Auto Ignition Temperature: 230-265oC (446-509oF)
Decomposition Temperature: Ammonium nitrate will spontaneously decompose at approximately 210oC (410oF)
Rate of Burning: Does not sustain burning at atmospheric pressure.
Explosive Power: 350 - 400 kJ/100 g.
Sensitivity to Mechanical Impact: 250 cm (USBM Report 7840). Not sensitive.
Sensitivity to Static Discharge: Not sensitive.
Hazardous Reactions: See 'Fire and Explosion Hazards'.
Fire and Explosion Hazards: Explodes on overheating when contained and, thus, fires involving large quantities of the material should not be fought. This product is an explosive with a mass detonation hazard. This product is classified as a flammable solid and may detonate under fire conditions.
Extinguishing Media: Water may be used on small fire. Do not attempt to fight large fires.
Fire Fighting Procedures: DO NOT FIGHT FIRES INVOLVING BLASTING AGENTS OR EXPLOSIVE MATERIALS. Immediately evacuate all personnel from the area.
Fire Fighting Protective Equipment: Use self-contained breathing apparatus and special protective clothing.
NOTE: Also see "Section 10 - Stability and Reactivity".

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spills, Leaks, or Releases: Collect product for re-use or disposal. For release to land, contain storm water runoff by dyking with earth or other barrier, for release to water, utilize damming, and/or water diversion to minimize the spread of contamination. Collect contaminated soil and water for disposal. Notify applicable government authority if release is reportable or could adversely affect the environment.
Deactivating Chemicals: None known.

SECTION 7 - HANDLING AND STORAGE

Handling: This product is an explosive and should only be used under the supervision of trained personnel. Locate safety shower and eyewash station close to chemical handling area. Use normal good industrial hygiene and housekeeping practices.
Storage Requirements: Store under moderate temperatures recommended by technical service representative. Store under dry conditions in a well ventilated

magazine that has been approved for either blasting agent storage or explosive storage.
Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, sparks and flames. Keep containers closed. Blasting agents should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Keep away from incompatibles.
Storage Temperature: Ideal storage temperature is 10-27oC (50-80.6oF).

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

PREVENTIVE MEASURES:
Recommendations listed in this section indicate the type of equipment that will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.
Engineering Controls: Full handling precautions should be taken at all times. General ventilation is recommended. Provide adequate ventilation where operational procedures demand it.
PERSONAL PROTECTIVE EQUIPMENT:
Eye Protection: Use chemical safety goggles when there is potential for eye contact.
Skin Protection: Gloves and protective clothing made from rubber should be impervious under conditions of use. User should verify impermeability under normal conditions of use prior to general use.
Respiratory Protection: A NIOSH/MSHA-approved respirator, if required.
EXPOSURE GUIDELINES:
PRODUCT:
None established for product.
HAZARDOUS INGREDIENT(S):
Ammonium Nitrate:
Internal Guideline 5 mg/m3 (internal TWA)

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name: Not applicable.
Chemical Family: Explosive.
Molecular Formula: Not applicable.
Appearance: Off-white prills.
Odour: Smell of fuel oil.
pH: Not available.
Vapour Pressure (mm Hg at 20°C/68°F): 0.4 (Diesel Fuel Oil No. 2)
Vapour Density (Air=1): Not available.
Boiling Point: 176oC (Diesel Fuel Oil No. 2) to 370oC (Diesel Fuel Oil No. 2) (348.8 to 698oF)
Melting Point: 170oC (338oF)
Solubility (Water): Will dissolve slowly with prolonged exposure to water.
Solubility (Other): Not available.

Specific Gravity: (Similar to water).
Evaporation Rate: Not available.
Additional Properties: Bulk density: 0.8 - 0.88 (poured); 0.92 - 1.10 (pneum. loaded).

SECTION 10 - STABILITY AND REACTIVITY

Hazardous Decomposition Products: Thermal decomposition products are toxic and may include hydrocarbons, oxides of carbon and nitrogen. Toxic gases and vapours (oxides of nitrogen) will be released by thermal decomposition (about 210oC). At higher temperatures, decomposition may be explosive, especially if confined.
Chemical Stability: Stable at room temperature.
Conditions to Avoid: Keep away from heat, impact, and friction. High temperatures, sparks, open flames and all other sources of ignition.
Incompatibility with other Substances: Avoid oxidizable materials, metal powder, bronze & other copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorates, sulphur, charcoal, coke and other finely divided combustibles. Reducing agents.
Hazardous Polymerization: Will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

Summary: May cause irritation. May cause central nervous system (CNS) depression. May cause methemoglobinemia.
TOXICOLOGICAL DATA:
PRODUCT:
None established for product.
INGREDIENTS:
Ammonium Nitrate:
Oral LD50 (rat) = 2217 mg/kg
Dermal LD50 (rabbit) = 3000 mg/kg
Diesel Fuel Oil No. 2:
LD50 (oral, rat) = >5 g/kg
LD50 (dermal, rabbit) = >5 g/kg
POTENTIAL HEALTH EFFECTS:
Inhalation: Inhalation is not a likely route of exposure at normally encountered temperatures and is thus not applicable.
Skin Contact: May cause skin irritation. Repeated and/or prolonged contact may cause dermatitis.
Eye Contact: Moderate irritant causing moderate initial pain.
Ingestion: Highly unlikely under normal industrial use. Ingestion may cause irritation of the gastrointestinal tract.
Subchronic Effects: Ingestion may cause methemoglobinemia. initial manifestation of methemoglobinemia is cyanosis, characterized by navy blue lips, tongue and mucous membranes, with skin colour being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be

reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and, possibly, shock. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure.
Chronic Effects: None known.
Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and health Administration) and not listed as carcinogens by NTP (National Toxicology Program).
Mutagenicity: There is no evidence of mutagenic potential.
Reproductive Effects: No information is available and no adverse reproductive effects are anticipated.
Teratogenicity and Fetotoxicity: No information is available and no adverse teratogenic/embryotoxic effects are anticipated.
Synergistic Materials: None known.

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicological Information: Harmful to aquatic life at low concentrations.
Environmental Effects: Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

SECTION 13 - DISPOSAL CONSIDERATIONS

Burn under supervision of an expert at an approved explosive burning ground or destroy, by detonation in boreholes, in accordance with applicable local, state or provincial, and federal regulations. Call upon the services of an Orica Technical Representative if needed.

SECTION 14 - TRANSPORT INFORMATION

TDG Name: Explosive, Blasting, Type B
TDG Class/Division: 1.5D
Product Identification Number (PIN): UN0331
Packing Group: II
Transportation Emergency Telephone Number: 1-877-561-3636.
DOT Class: Explosive, Blasting, Type B

SECTION 15 - REGULATORY INFORMATION

CANADIAN CLASSIFICATION:
This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.
Controlled Products Regulations (WHMIS) Classification: This product is an explosive and is not regulated by WHMIS.

CEPA / Canadian Domestic Substances List (DSL): The substance(s) in this product is/are on the Canadian Domestic Substances List (CEPA DSL).
IARC Classification: None of the components of this product are listed on IARC.
USA CLASSIFICATION:
Physical: Explosive. Oxidizer.
Health: Irritant.
Target Organ: Eye. Skin. Respiratory tract. Central nervous system. Blood/hematopoietic system.
SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements: 94% Ammonium Nitrate (6484-52-2).
Ozone Protection and 40 CFR 42: This product does not contain nor is it manufactured with ozone depleting substances.
Other Regulations/Legislation that apply to this product: Massachusetts Right-to-Know, Pennsylvania Right-to-Know, New Jersey Right-to-Know.

SECTION 16 - OTHER INFORMATION

MATS Index: 59531
Label Text: Danger! Explosive! Strong Oxidizer! May be harmful if ingested. Avoid contact with skin and eyes.
REFERENCES:
RTECS-Registry of Toxic Effects of Chemical Substances, CCINFOdisc, Canadian Centre for Occupational Health and Safety RTECS database, National Institute for Occupational Safety and Health, U.S. Dept. of Health and Human Services, Cincinnati, 1998.
Supplier's Material Safety Data Sheets.
"CHEMINFO", through "CCINFOdisc" Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada
Sax, N. Irving, Dangerous Properties of Industrial Materials, 7th ed., Van Nostrand Reinhold Co., New York, 1989.

Prepared by: Safety, Health and Environment (303) 268-5000.

Panasonic®

BATTERY SALES GROUP

MATERIAL SAFETY DATA SHEET

LC SEALED LEAD ACID BATTERY SERIES

Section I: Chemical Product and Company Identification

Product Identity: Sealed Lead Acid Battery

Trade Name: Panasonic LC Valve Regulated Lead Acid Battery Series

Distributor:
Panasonic Industrial Company - Battery Sales Group
Two Panasonic Way/7A-1, Secaucus, New Jersey 07094

Manufacturer:
Matsushita Battery Industrial
Osaka, 570, Japan

For Chemical Emergency
Spill, Leak, Fire, Exposure or Accident
Call CHEMTREC - Day or Night - 24 hours
1-800-424-9300
Outside the USA: 1-703-527-3887 (collect)

Telephone Number for General Information
Toll Free 1-800-793-3772
Internet: www.panasonic.com/batteries

Section II: Hazardous Ingredients / Identity Information

Component	Common Name	Chemical Name	Approximate % by wt. or vol.	OSHA PEL	ACGIH TLV	CAS#
Lead	(Negative Electrode and Grid)	Pb	48~53 wt%	0.05 mg/m^3	0.15 mg/m^3	7439-92-1
Lead Oxide	(Positive Electrode)	PbO_2	23~26%	0.05 mg/m^3	0.15 mg/m^3	1309-60-0
Lead Sulfate	(Positive and Negative Electrode)	$PbSO_4$	< 1. wt%	0.05 mg/m^3	0.15 mg/m^3	7446-14-2
Sulfuric Acid	(Electrolyte)	H_2SO_4	7~10 wt%	1.0 mg/m^3	1.0 mg/m^3	7664-93-9

Percentages of components are dependant both on the model of the battery and state of charge/discharge of the battery. Sulfuric Acid is reportable under Sections 302, 311, 312 and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). Reportable Quantity: 500 lbs for sulfuric acid and 10,000 lbs for lead. See Section XII, Page 3 for more information.

Overall Chemical Reaction: $PbO2 + Pb + 2H_2SO_4 \rightleftharpoons 2PbSO_4 + 2H_2O$

Note: Panasonic Sealed Lead Acid batteries are a sealed, non-spillable design. Under normal use and handling the customer has no contact with the internal components of the battery or the chemical hazards. Under normal use and handling these batteries do not emit regulated or hazardous substances. Warning: Battery terminals/posts and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands thoroughly after working with batteries and before eating, drinking or smoking.

Section III: Physical / Chemical Characteristics

Boiling Point:	Electrolyte 110°C - 112°C
Vapor Pressure:	Electrolyte 11.7 mm Hg. at 20°C
Vapor Density (AIR = 1):	Electrolyte 3.4
Solubility in Water:	Lead, Lead Oxide and Lead Sulfate are insoluble in water. Sulfuric Acid is 100% soluble in water.
Appearance and Odor:	The entire battery is a solid article consisting of an opaque plastic case with two protruding lead terminals. The battery is odorless. Sulfuric Acid is a liquid.
Specific Gravity (H2O = 1)	Electrolyte 1.300

<u>Health Hazard Information (Acute and Chronic) - Sulfuric Acid only.</u>
The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category I carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within the battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may however result in the generation of sulfuric acid mist.

Routes of Entry:	By inhalation (mist), skin and eyes, ingestion.
Acute:	Tissue destruction on contact. May cause 2nd and 3rd degree burns or blindness. Ingestion will cause corrosive burns on contact. May be fatal if swallowed.
Chronic:	Inhalation of mists may cause upper respiratory irritation.
Signs and Symptoms:	Irritation and burning of exposed tissues.
Medical Conditions:	Respiratory disorders may be aggravated by prolonged inhalation of mists.

Section IV: Emergency and First Aid Procedures

Battery Electrolyte

Inhalation:	Remove to fresh air. Give oxygen or artificial respiration if needed. **Get immediate medical attention.**
Eye Contact:	Flush with plenty of water for at least 15 minutes. **Get immediate medical attention.**
Skin Contact:	Remove contaminated clothing and flush affected areas with plenty of water for at least 15 minutes.
Ingestion:	Do not induce vomiting. Dilute by giving large quantities of water. If available give several glasses of milk. Do not give anything by mouth to an unconscious person. **Give CPR if breathing has stopped. Get immediate medical attention.**

Section V: Fire and Explosion Hazard Data

Flash Point:	Not Applicable
Flammable Limits:	Lower 4.10% (Hydrogen gas) Upper 74.20%
Extinguishing Media:	Dry chemical, foam, halon or CO_2.

Special Fire Fighting Procedures:
If batteries are on charge, turn off power. Use positive pressure, self-contained breathing apparatus in fighting fire. Water applied to electrolyte generates heat and causes it to splatter. Wear acid resistant clothing. Ventilate area well.
Unusual Fire and Explosion Hazards:
Hydrogen and oxygen gases are generated in cells during normal battery operation or when on charge. (Hydrogen is flammable and oxygen supports combustion). These gases enter the air through the vent caps during battery overcharging. To avoid risk of fire or explosion, keep sparks and other sources of ignition away from the battery. Do not allow metal objects to simultaneously contact both positive and negative terminal of batteries. Ventilate area well.

Section VI: Reactivity Data

Stability:	Stable under normal conditions.
Conditions to Avoid:	Sparks and other sources of ignition. Prolonged overcharge. Fire or explosion hazard due to possible hydrogen gas generation.

Incompatibility:
Combination of sulfuric acid with combustibles and organic materials may cause fire and explosion. Avoid strong reducing agents, most metals, carbides, chlorates, nitrates, picrate.
Hazardous Decomposition Products: Hydrogen gas may be generated in an overcharged condition, in fire or at very high temperatures. CO, CO_2 and sulfur oxides may emit in fire.
Hazardous polymerization will not occur.

Section VII: Precautions for Safe Handling and Use

Steps to be Taken in Case of Broken Battery Case or Electrolyte Leakage:
Neutralize any electrolyte or exposed internal battery parts with soda ash (sodium bicarbonate) until fizzing stops. Keep untrained personnel away from electrolyte and broken battery. Place broken battery and clean-up materials in a plastic bag or non-metallic container. Dispose of clean-up materials as a hazardous waste. Ventilate area as hydrogen gas may be given off during neutralization.
Waste Disposal Method:
Federal and State laws prohibit the improper disposal of all lead acid batteries. The battery end users (owners) are responsible for their batteries from the date of purchase through their ultimate disposal. The only legally acceptable method of disposal of lead acid batteries is to recycle them at a Resource Conservation and Recovery Act (RCRA) approved secondary lead smelter. The Panasonic SAV-LEAD Recycling Program allows for the recycling of lead-acid batteries in an environmentally sound manner. For more information on the SAV-LEAD Recycling Program call toll-free, 1-800-SAV-LEAD (1800-728-5323). These batteries are chemically identical to common automotive starter batteries and can be recycled with automotive lead-acid batteries.
HAZARDOUS WASTE CODES: D002, D008.
Precautions to be Taken in Handling, Storing and Transportation:
Store in cool, dry area away from combustible materials. Do not store in sealed, unventilated areas. Avoid overheating and overcharging.
Other Precautions:
Do not charge in unventilated areas. Do not use organic solvents or other than recommended chemical cleaners on battery.

Section VIII: Control Measures / Personal Protection

General:
Normal room ventilation is sufficient during normal use and handling. Recommend 2 to 3 room air changes per hour to prevent buildup of hydrogen gas.
Personal Protective Equipment (In the Event of Battery Case Breakage):
Always wear safety glasses with side shields or full face shield.
Use rubber or neoprene gloves.
Wear acid resistant boots, apron or clothing.
Work/Hygienic Practices:
Remove jewelry, rings, watches and any other metallic objects while working on batteries. All tools should be adequately insulated to avoid the possibility of shorting connections. DO NOT lay tools on top of battery. Be sure to discharge static electricity from tools and individual person by touching a grounded surface in the vicinity of the batteries, but away from cells. Batteries are heavy. Serious injury can result from improper lifting or installation. DO NOT lift, carry, install or remove cells by lifting or pulling the terminal posts for safety reasons and because terminal posts and post seals may be damaged. DO NOT wear nylon clothes or overalls as they can create static electricity. DO KEEP a fire extinguisher and emergency communications device in the work area.
IMPORTANT:
Wash hands thoroughly after working with batteries and before eating, drinking or smoking.

Section IX: Regulatory Information

NFPA Hazard Rating for Sulfuric Acid:
Flammability (Red) = 0 Health (Blue) = 3 Reactivity (Yellow) = 2

Section X: Transportation Information

Identification and Proper Shipping Name:
Batteries – Wet, Non-Spillable, Electric Storage, UN 2800.
DOT - Unregulated, meets the requirements of 49 CFR 173, 159 (d).
IATA/ICAO - Unregulated, meets the requirements of Special Provision A67.
IMO - Unregulated.
***For all modes of transportation, each battery and outer package must be labeled: "Non-Spillable" or "Non-Spillable Battery." This label must be visible during transportation. * Batteries must be securely packed to prevent short-circuiting.**

Section XI: California Proposition 65 Information

The State of California has determined that certain battery terminals contain lead and lead compounds, *and handling this product may also expose you to sulfuric acid mist*, chemicals known to the State of California to cause cancer and reproductive harm. IMPORTANT: WASH HANDS THOROUGHLY AFTER WORKING WITH BATTERIES AND BEFORE EATING, DRINKING OR SMOKING.

Section XII: Other Information - Notice to Readers

General Product Description – LC VRLA Batteries
Panasonic LC Batteries are **sealed** (valve regulated) non-spillable lead-acid batteries with pasted lead-calcium plates. The electrolyte is held captive in an Absorbed Glass Mat (AGM) separator between plates that immobilize the electrolyte in the cell. AGM separator material is a highly porous, absorbent micro fiberglass mat mixed with polymer fibers. There is no "free" electrolyte to leak out if the cell is tipped over (cell case and cover are sealed together) or if the cell is punctured. The AGM separator material immobilizes the electrolyte and creates a situation where the spill of electrolyte is highly unlikely. Typical accidents where a battery case is punctured results in a slight drip or a slow ooze of material out of the cell that cannot be characterized as a spill.

Panasonic LC VRLA batteries are also different from conventional **unsealed** (wet/flooded) cells because they contain only a minimum amount of electrolyte. VRLA battery electrolyte is a dilute mixture of sulfuric acid in water, which typically has a specific gravity between 1.270 and 1.3. Specific Gravity is a measure of the density of a liquid as compared to that of water, which has a specific gravity of 1.000. Pure sulfuric acid has a specific gravity of 1.835.

NOTE: Panasonic LC batteries do not contain a gel electrolyte.

General Product Description - LC VRLA Batteries (continued)

During normal battery installation, operation and maintenance, the user has NO contact with the internal components of the battery or its internal hazardous chemicals.

Panasonic LC batteries are UL recognized under the file number: Matsushita Electric Industrial Co. Ltd., Matsushita Electric Corp. of America, File #MH13723, 1 Panasonic Way, Secaucus, NJ 07094.

MSDS Preparation Date: 9/2005 Supersedes: 5/2001
Preparer: Charles P. Monahan Director, Regulatory Compliance 201-392-6464
Printed in the U.S.A.

Supplemental Information on Panasonic Valve-Regulated Lead Acid Batteries

Transportation

All Panasonic valve-regulated lead acid batteries are considered "non-spillable" for purposes of transportation by the U.S. Department of Transportation (DOT), International Civil Aviation Administration (ICAO), the International Air Transport Association (IATA) and the International Maritime Dangerous Goods regulations (IMDG). They are considered "non-spillable" by DOT by passing the Vibration Test and Pressure Differential Test as required in 49 CFR 173.159(d). They are also considered to be "non-spillable" by both ICAO and IATA by exceeding the requirements of Special Provisions "A67" as defined in their 1998 Handbooks.

Our batteries are authorized for transportation on deck or under deck storage on either a passenger or cargo vessel by passing the Vibration and Pressure Differential Tests as described in the International Maritime Dangerous Goods Regulations (IMDG).

To transport these batteries as "non-spillable" they must be shipped in a condition that would protect them from short-circuits and be securely packaged so as to withstand conditions normal to transportation. For transportation by a consumer, in or out of a device, they are unregulated thus requiring no additional special handling or packaging.

All of our lead acid batteries and their outside packaging, manufactured after September 30, 1995 are labeled "NON-SPILLABLE" per 49 CFR 173.159(d). If you repackage our batteries either as batteries or as a component of another product you must label the outer package "NON-SPILLABLE" per 49 CFR 173.159(d).

Assure Proper Recycling!

Valve-Regulated Lead Acid batteries destined for recycling can be managed under the federal *Universal Waste Rule* codified at 40 CFR Part 273.

In the event of disposal, dispose only in accordance with federal, state and local regulation. Batteries generated as a waste are subject to the Resource Conservation and Recovery Act (RCRA) as a D008 (lead) hazardous waste.

Panasonic VRLA Recycling Program

The Panasonic 1-800-SAV-LEAD Recycling Program for the collection and recycling of valve-regulated lead acid batteries (VRLA) covers all Panasonic Valve-Regulated Lead Acid Batteries. The proper disposal of spent VRLA batteries is becoming more of a critical issue, both from the viewpoint of environmental stewardship and from compliance with federal and state environmental regulations. Panasonic recognizes the burdens and responsibilities that have been placed on our customers to properly dispose of spent VRLA batteries and is proud to offer this voluntary nationwide battery recycling program.

Federal and State Requirements for Proper Disposal

Federal and State laws prohibit the improper disposal of all lead acid batteries. The battery end users (owners) are responsible for their batteries from the date of purchase through their ultimate disposal. The only legally acceptable method of disposal of lead acid batteries is to recycle them at Resource Conservation and Recovery Act (RCRA) approved secondary lead smelter. This Panasonic 1-800-SAV-LEAD Recycling Program will allow for you to arrange for the recycling of your VRLA batteries from anywhere in the United States. The Program will accept Panasonic and other VRLA batteries regardless of manufacturer. Panasonic will handle all VRLA batteries returned in an environmentally sound manner designed to comply with all applicable Federal and State laws and regulations. Panasonic will send batteries only to fully-permitted secondary lead smelters that we believe meet the highest environmental standards. Once the VRLA batteries are received by Panasonic, the cost to transport the batteries to the secondary lead smelter and the actual recycling costs will be borne by Panasonic.

See the next page for How the 1-800-SAV-LEAD Recycling Program Works

Supplemental Information on Panasonic Valve-Regulated Lead Acid Batteries (Cont.)

How the 1-800-SAV-LEAD Recycling Program Works

1) We encourage all of our customers to serve as VRLA collection centers for your customers, thereby establishing a reverse distribution network between the end user and the secondary lead recycling facility.
2) All shipments to our national consolidation facility must be prepaid. No freight collect shipments will be accepted. All freight collect and non-VRLA batteries will be returned to the shipper.
3) Panasonic will maintain on file all necessary documentation for EPA reference. A copy will be provided upon request.
4) All batteries must be shipped, prepaid to Ebco Battery Company that serves as our national consolidation facility. (See *exception* below).

SHIPPING ADDRESS:
Ebco Battery Company
4017 Warm Springs Road
Columbus, Georgia 31909

5) Only VRLA batteries that meet the U.S. Department of Transportation (DOT) "NON-SPILLABLE" (49 CFR 173.159d) requirements will be accepted by this program.
6) Panasonic reserves the right to alter or discontinue this program at any time.

Packaging Requirements

1) All VRLA batteries must be fully discharged and packaged in a manner as to insure safe handling and conform to all applicable DOT regulations. (49 CFR 173.159d). A dab of silicon caulking or non-conductive tape on each terminal will ensure that no direct shorts occur during shipment.
2) VRLA battery shipments should be made in pallet quantities whenever possible.
3) Palletized shipments should be secured with metal bands or poly-wrapped with stack height limited to four (4) feet.
4) VRLA batteries shipped on pallets should be of uniform size or be stacked with the larger batteries on the bottom.
5) VRLA batteries should be stacked upright in a head-to-base arrangement. Each layer should be separated by cardboard to prevent accidental shorting.
6) Smaller quantities of VRLA batteries may be shipped via standard UPS. Be sure that each box does not exceed the UPS weight limit of 70 lbs. A dab of silicon caulking or non-conductive tape on each terminal will ensure that no shorts occur during shipment.
7) The outside of every pallet and individual box must be labeled "NON-SPILLABLE" as required by DOT regulations. This label must be visible during transportation.

Exception:

Full-Truck-Loads – All full-truck-load shipments of VRLA batteries must be scheduled 48 hours in advance. To schedule shipments to our consolidation site, please be sure to fax a scheduling request (including contact name and phone number) to Ebco Battery Company at fax: (706) 569-6774.

Consumer Users of Panasonic VRLA Batteries

All Panasonic VRLA batteries are chemically identical to common automotive starter batteries and can be returned to any site that accepts automotive lead acid batteries for recycling. Examples include retailers of automotive batteries, automotive service centers, scrap metal dealers, etc...

For additional information on this program or information on how to recycle other Panasonic batteries please call your local Panasonic Battery Sales Group sales office.

Panasonic Batteries
Panasonic Industrial Company
A Division of Panasonic Corporation of North America
Two Panasonic Way
Secaucus, NJ 07094
Toll Free: 877-726-2228
Fax: 847-468-5750
e-mail: oembatteries@us.panasonic.com
Internet: www.panasonic.com/batteries

Material Safety Data Sheet

Printing date 08/11/2006 Version 1 Reviewed on 08/11/2006

1 Identification of substance

· **Product details**

· **Trade name: Acetylene**

· **Article number:** 030-01-0003BOC

· **Creation date:** 08/09/2006

· **Manufacturer/Supplier:**
BOC Canada Limited
5860 Chedworth Way
Mississauga, Ontario L5R 0A2
www.bocgases.ca

TELEPHONE NUMBER: (905) 501-1700
24-HOUR EMERGENCY TELEPHONE NUMBER: (905) 501-0802
EMERGENCY RESPONSE PLAN NO: 2-0101

Please ensure that this MSDS is received by the appropriate person

· **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

· **Chemical characterization:**
· **CAS No. Description**
74-86-2 Acetylene
· **Identification number(s)**
· **EINECS Number:** 200-816-9
· **EU Number:** 601-015-00-0

3 Hazards identification

· **Hazard description:**

Extremely flammable

· **WHMIS-symbols:**
A - Compressed gas
B1 - Flammable gas

· **HMIS-ratings (scale 0 - 4)**

Health = 0
Fire = 4
Reactivity = 3

(Contd. on page 2)

Material Safety Data Sheet

Printing date 08/11/2006 Version 1 Reviewed on 08/11/2006

Trade name: Acetylene

(Contd. of page 1)

· **NFPA ratings (scale 0 - 4)**

Health = 0
Fire = 4
Reactivity = 3

· **Information pertaining to particular dangers for man and environment:**
Heating may cause an explosion.
Explosive with or without contact with air.
Extremely flammable.
· **Classification system:**
The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

*

4 First aid measures

· **After inhalation:**
Supply fresh air. If required, provide artificial respiration and consult doctor. Keep patient warm.
· **After skin contact:** Generally the product does not irritate the skin.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Not applicable

*

5 Fire fighting measures

· **Suitable extinguishing agents:**
Use fire fighting measures that suit the environment.
In the case of fires caused by ignited acetylene leaks:
- DO NOT extinguish unless it is possible (without risk) to shut-off gas flow; explosive vapours could form and re-ignition may occur.
Evacuate area as soon as possible.
· **Protective equipment:** Wear self-contained respiratory protective device.

*

6 Accidental release measures

· **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventillation.
· **Measures for environmental protection:** Prevent seepage into sewage system, workpits and cellars.
· **Measures for cleaning/collecting:** Ensure adequate ventillation.

7 Handling and storage

· **Handling:** Do not mix with air or oxygen above atmospheric pressure.
· **Information for safe handling:** Open and handle cylinder with care.
· **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect from heat.

(Contd. on page 3)

Material Safety Data Sheet

Printing date 08/11/2006 Version 1 Reviewed on 08/11/2006

Trade name: Acetylene

(Contd. of page 2)

Protect against electrostatic charges.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
Prevent impact and friction.

· **Storage:**
· **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Do not expose cylinder to temperatures higher than 50°C (122 °F)
· **Information about storage in one common storage facility:** Store away from oxidizing agents.
· **Further information about storage conditions:**
Keep cylinder valve tightly closed.
Store in cool, dry conditions in well sealed receptacles.
Protect from heat and direct sunlight.
Store cylinder in a well ventilated area.
Store in accordance with local fire code and/or building code or any pertaining regulations.

*

8 Exposure controls and personal protection

· **Additional information about design of technical systems:** Adequate local ventillation.

· **Components with limit values that require monitoring at the workplace:**	
74-86-2 Acetylene (50-100%)	
EL	Simple asphyxiant

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Personal protective equipment:**
· **General protective and hygienic measures:** Wash hands before breaks and at the end of work.
· **Breathing equipment:**
Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator in case of insufficient ventilation.
· **Protection of hands:** Protective gloves
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Eye protection:**

Tightly sealed goggles

*

9 Physical and chemical properties

· **General Information**	
Form:	Gaseous.
Color:	Colorless
Odor:	Ether-like

(Contd. on page 4)

Material Safety Data Sheet

Printing date 08/11/2006 Version 1 Reviewed on 08/11/2006

Trade name: Acetylene

(Contd. of page 3)

· **Change in condition**	
Melting point/Melting range:	-80.8°C
Boiling point/Boiling range:	-83°C
· **Flash point:**	< 0°C
· **Ignition temperature:**	325°C
· **Danger of explosion:**	Explosive with or without contact with air.
· **Explosion limits:**	
Lower:	2.3 Vol %
Upper:	78 Vol %
· **Solubility in / Miscibility with**	
Water at 20°C:	1.185 g/l

*

10 Stability and reactivity

· **Thermal decomposition / conditions to be avoided:** To avoid thermal decomposition do not overheat.
· **Dangerous reactions** Forms explosive gas mixture with air.
· **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** No irritating effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.

12 Ecological information

· **General notes:** Generally not hazardous for water

13 Disposal considerations

· **Product:**
· **Recommendation:**
Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.

· **Uncleaned packagings:**
· **Recommendation:**
Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.

(Contd. on page 5)

Material Safety Data Sheet

Printing date 08/11/2006 Version 1 Reviewed on 08/11/2006

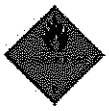
Trade name: Acetylene

(Contd. of page 4)

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

14 Transport information

· **TDG and DOT regulations:**



· **Hazard class:** 2
· **Identification number:** UN1001
· **Packing group:** -
· **Proper shipping name (technical name):** ACETYLENE, DISSOLVED
· **Label** 2.1
· **Packaging group:** -

· **Maritime transport IMDG:**

· **IMDG Class:** 2.1
· **UN Number:** 1001
· **Label** 2.1
· **Packaging group:** -
· **EMS Number:** F-D,S-U
· **Marine pollutant:** No
· **Propper shipping name:** ACETYLENE, DISSOLVED

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

· **ICAO/IATA Class:** 2
· **UN/ID Number:** 1001
· **Label** 2.1
· **Packaging group:** -
· **Propper shipping name:** ACETYLENE, DISSOLVED

15 Regulations

· **Sara**

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

(Contd. on page 6)

Material Safety Data Sheet

Printing date 08/11/2006 Version 1 Reviewed on 08/11/2006

Trade name: Acetylene

(Contd. of page 5)

· **Section 313 (Specific toxic chemical listings):**
Substance is not listed.

· **TSCA (Toxic Substances Control Act):**
Substance is listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**
Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**
Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**
Substance is not listed.

· **Chemicals known to cause developmental toxicity:**
Substance is not listed.

· **Cancerogenity categories**

· **EPA (Environmental Protection Agency)**
Substance is not listed.

· **NTP (National Toxicology Program)**
Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**
Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
Substance is not listed.

· **Canadian substance listings:**

· **Canadian Domestic Substances List (DSL)**
Substance is listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**
Substance is not listed.

· **Canadian Ingredient Disclosure list (limit 1%)**
Substance is not listed.

· **Product related hazard informations:**
The product has been classified and marked in accordance with directives on hazardous materials.

· **Hazard symbols:**
Extremely flammable

· **Risk phrases:**
Heating may cause an explosion.
Explosive with or without contact with air.
Extremely flammable.

· **Safety phrases:**
Keep out of the reach of children.

(Contd. on page 7)

Material Safety Data Sheet

Printing date 08/11/2006 Version 1 Reviewed on 08/11/2006

Trade name: Acetylene

(Contd. of page 6)

Keep container in a well-ventilated place.
Keep away from sources of ignition - No smoking.
Take precautionary measures against static discharges.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349
· **Contact:** Canada Technical Services: 1-866-385-5349

APPENDIX J

SPILL REPORTING FORMS

External Spill Reporting Form

Internal Spill Reporting Form

AEM	Meadowbank Project	Spill report
Date and time of spill :		
Location of spill :		
First responder name :		
Person on the contact list contacted :		
Nature of contaminant :		
Volume/quantity of the container / tank		
Quantity spilled :		
Cause of the spill :		
Contaminant collected by :		
Follow-up done by : :		
Actions taken :		
Incident investigation recommended : YES ☐ NO ☐		
Report completed by:	Date :	
Government agency notified :	YES ☐ NO ☐	
Date of notification to government agency :		
Date of report : _____	Signature of environmental personnel : _____	

Spill Logbook Entry Form

Date of Spill	Date of Spill Report completion	Description (type, approximate quantity, location of spill)	Clean-up action taken	Logged by:
