Appendix G

Spill Contingency Plan

Indigenous and Northern Affairs Canada | Affaires autochtones et du Nord Canada

Spill Contingency Plan

PROJECT ID: Great Bear Lake Sites Phase II Remediation Project

DATE OF SUBMISSION: May 25, 2017

SUBMITTED BY: Carey Ogilvie - Indigenous and Northern Affairs Canada (INAC)

SUBMITTED TO: Sahtu Land and Water Board

Canada

YELLOWKN#883377 - v1
YELLOWKN#883377 - v2

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1 Introduction

Indigenous and Northern Affairs Canada (INAC) – Contaminants and Remediation Division (CARD) intends to implement the Great Bear Lake Sites Phase II Remediation Project (the Project). In support of these activities, INAC-CARD must obtain applicable regulatory authorizations, including a renewed Land Use Permit and Water Licence as issued by the Sahtu Land and Water Board (SLWB). As part of this renewal process, INAC-CARD has developed the Great Bear Lake Sites (GBL Sites) Phase II Remediation Project – Spill Contingency Plan (Plan). This Plan applies to the operations of INAC, through the Northern Contaminated Sites Program (CSP), and their contractors.

This current version of the Plan is conceptual in nature and a more comprehensive plan will be submitted by the successful Primary Remediation Contractor in advance of their mobilization to site. The updated plan will be tailored to the remedial approach selected. This current plan is considered as the minimum standard that submittals will be measured against.

1.1 Key Information

Table 1 presents key corporate information pertaining to CARD and the GBL Sites Phase II Remediation Project.

Table 1 Key Information Pertaining to CARD and the GBL Sites Remediation Project

<table>
<tr><td>Federal Department</td><td>Indigenous and Northern Affairs – Contaminants and Remediation Division</td></tr>
<tr><td>Contact Person</td><td>Candace Decoste
Project Manager
Telephone number: (867) 669-2461
Cellphone number: (867) 444-9783</td></tr>
<tr><td>Project Office Location</td><td>4923 52nd Street Yellowknife, NT, X1A 2R3</td></tr>
<tr><td>Site Coordinates</td><td>
<table>
<tr><th>Site</th><th>Latitude</th><th>Longitude</th></tr>
<tr><td>Silver Bear Mines - Terra</td><td>65° 36' 16.56" N</td><td>118° 7' 11.23" W</td></tr>
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1.2 Effective Date of Spill Contingency Plan

This Spill Contingency Plan is effective as of the date of submission and will be adhered to once approved by the SLWB. This Plan is considered to be a living document that will undergo review, at minimum, annually prior to the start of any site activities. Additional reviews will be implemented as warranted to reflect changes in operations, technology, chemicals/fuels, or as directed by the SLWB. Any revisions to the plan will be submitted to the SLWB for review and approval.

1.3 Revisions to the Spill Contingency Plan

Table 2 will be used to track reviews and revisions to the Spill Contingency Plan and to assist in confirming stakeholders have the most up to date copy of the plan.

Table 2 Revision History of the Spill Contingency Plan

Version #	Contractor Approval	Date	Crown Approval	Date	Sections Revised	Comments	Revision Distribution Date
v.1	n/a	n/a	Candace Decoste Project Manager	May 19, 2017	n/a	First Approval	n/a

1.4 Purpose and Scope

The purpose of CARD's Spill Contingency Plan is to provide a plan of action for unforeseeable spill events at the GBL Sites Phase II Remediation Project. The Plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to respond to a spill. It details spill response procedures that will minimize potential health and safety hazards, environmental damage and clean-up efforts. The Plan has been prepared to ensure quick access to information required in responding to a spill. This document is considered to be the minimum standard for spill response that CARD requires of itself and its contractors for the duration of the Project.

All personnel will be familiar with the Spill Contingency Plan and refreshed through separate or regularly scheduled safety meetings. A copy of the Plan will be available to all departments involved in the Project. Training sessions will be provided by the Contractor to ensure employees have an understanding of the steps to be undertaken in the event of a spill. All personnel will be shown where spill kits are stored, be familiarized with their contents, and be trained in using spill equipment and responding to spills. CARD is committed to keeping personnel up to date on the latest technologies and spill response methods.

The Primary Contractor will be required to submit a Site Specific Health and Safety Plan (SSHSP) to the CARD Departmental Representative for review. The Spill Contingency Plan is considered a component of

the SSHSP and is required to contain the following minimum information:

- A description of pre-emergency planning.
- Personnel roles, lines of authority and communication, emergency phone numbers.
- Emergency alerting and response procedures.
- Evacuation routes and procedures, safe distances and places of refuge.
- Directions/methods of getting to nearest medical facilities.
- Emergency decontamination procedures.
- Emergency medical treatment and First Aid.
- Emergency equipment and materials: Include and provide at minimum booms (sorbent and containment), sorbents for cleanup, fire extinguishers for A-B-C fires, overpacks for contaminated soils, pumps, hand shovels, picks and containment barriers, such as plastic sheeting.
- Emergency protective equipment: Include at minimum clothing, protective suits, respirators, etc. to comply with potential emergency conditions and in accordance with NIOSH guidelines.
- Procedures for reporting incidents.
- Spill response and containment plans for all materials that could potentially be spilled.
- Site specific spill contingency plans for all locations where refined petroleum products will be stored and used for refuelling including, but not limited to:
    - An inventory of response and clean-up equipment.
    - A site map with the location of storage facilities and the location of emergency equipment with spill response and clean-up equipment.
    - A cover page that clearly identifies the NWT 24-hour Spill Report Line and the name, job title and 24-hour telephone number for person(s) responsible for activating the Spill Contingency Plan.

1.5 Environment, Health and Safety Policy

INAC's Environment, Health and Safety (EHS) Policy provides direction in order to meet the requirements of the Canada Labour Code, applicable territorial and federal environmental regulations and policies, and related policies of the Treasury Board in the implementation of the Northern CSP. The policy serves as an integral component of INAC's CSP and applies to all individuals involved with contaminated sites. Within the Northern CSP, the health and safety of employees and the protection of the environment are an overriding priority. Management is committed to doing everything possible to prevent injuries and to maintain a healthy environment. To this end:

- Senior managers are responsible for ensuring that all the requirements of the Environmental, Health and Safety (EHS) Policy are fully implemented.
- All managers and supervisors are responsible for ensuring that their employees are trained in safe

work procedures, to undertake their assigned duties without accidents, injuries or harm to the environment, and for ensuring that employees follow safe work methods and all related regulations. This includes training on industry best practices, assessing and managing EHS risks, and the emergency spill response plan (outlined in the Spill Contingency Plan to be provided by the Primary Contractor).

- All personnel are required to support and comply with the EHS program, making safety, health and protection of the environment a part of their daily routine, and ensuring that they follow safe work methods and relevant regulations.
- All personnel will be held accountable for implementing, and adhering to, the requirements of the EHS program.
- All personnel are accountable for reporting to their immediate supervisor any unsafe practices or areas in need of improvement. Personnel are further accountable for bringing such reports to the attention of higher levels in the organization, without fear of reprisal, if the situation is not addressed appropriately.
- All relevant territorial and federal laws, regulations, policies, and industry best practices including the requirements of INAC's CSP Management Framework, are incorporated into our program as minimum standards.
- Pollution prevention practices and programs to achieve continuous improvement will be implemented as an ongoing requirement of the program, and will include recycling when possible.
- Where a conflict arises due to different standards or requirements between different regulations or standards, the more stringent of the two will apply.

CARD also considers environmental protection to be a priority in our activities and it is our policy to:

- Strive to comply with all applicable environmental laws, regulations and standards.
- Strive to conduct our activities and manage our operations in a manner that minimizes environmental impact by employing the best practices, control mechanisms, processes, and procedures that have been proven technically sound and economically feasible.
- Measure our environmental performance against standards taking into account that which is known to us or apparent to us about environmental consequences of our activities, and going beyond lawful requirements when we know it to be essential to protect the environment.
- Strive to train our employees in environmental matters and responsibilities relating to their particular assignments.
- Periodically examine and evaluate our environmental protection activities to ensure policy implementation, and that appropriate procedures, programs, and systems are being applied.
- Encourage, support and conduct research and development activities to find solutions to technological problems.
- Strive to ensure that ecological considerations are properly identified and evaluated in our projects and long-range planning processes.

- Strive to support all levels of government in the promulgation of cost effective, sound environmental laws, codes, rules, and regulations, based on scientific facts and need.

1.6 Site Description

The GBL Sites Phase II Remediation Project is to be completed at the following abandoned project sites: Silver Bear Mines (Terra, Northrim, Norex/Graham Vein and Smallwood mine sites), Contact Lake Mine, El Bonanza/Bonanza Mine and the Sawmill Bay Sites. All sites are located on the eastern and southeastern shores of Great Bear Lake, within the boundaries of the Sahtu Dene and Metis Comprehensive Land Claim Agreement. The Silver Bear Mines are also within the overlap area with the Tłı̨chǫ Mǫwhì Gogha Dè Nı̨ı̨łèè Boundary. The community of Déline is approximately 250 km west of the project area and Gamètì is 160 km to the south. Site coordinates are provided in Table 3 below.

Table 3 Great Bear Lake Sites - Coordinates

Site	Latitude	Longitude
Silver Bear Mines - Terra	65° 36' 16.56" N	118° 7' 11.23" W
Silver Bear Mines - Northrim	65° 35' 47.35" N	117° 58' 38.54" W
Silver Bear Mines – Smallwood	65° 34' 56.54" N	117° 56' 38.91" W
Silver Bear Mines – Norex and Graham Vein	65° 35' 22.13" N	117° 58' 0.12" W
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Sawmill Bay	65° 43' 8.54" N	118° 55' 57.77"W

There is currently no road access to any of the GBL Sites. The sites are reached by fixed wing (float based at all sites or unmaintained airstrips at Terra Mine and Sawmill Bay) or rotatory wing.

The former industrial properties operated many decades ago and have long since been abandoned by the original occupants. Silver Bear Mines is composed of one large site (Terra Mine) and four smaller satellite sites (Northrim, Smallwood, Norex and Graham Vein). These underground mining properties produced primarily silver, copper and bismuth and were in operation from 1969 to 1985. The Contact Lake Mine was significantly smaller in scale than Terra Mine and was originally an underground silver mine during the 1930s and was also mined for uranium in 1949/50. El Bonanza and Bonanza Mines are both located on the Dowdell Peninsula and were small scale silver mines operational 1934-1936, 1956-1957, and in 1965. The Sawmill Bay Site was established as a sawmill in the 1930's, after which it was used for barging and air transportation of uranium ore from Port Radium (1940's-1950). It was subsequently used for various military activities (1950s) and, later, as a fishing lodge (late 1950s to 1987). All GBL Sites fall under the custodial responsibility of INAC, and site remediation is coordinated by INAC-CARD.

Remedial activities at the project sites first commenced as the GBL Phase I Remediation Project in 2010/2011, with secondary activities conducted through to 2016. The scope of the remediation work at the project sites focused on activities which could be practically implemented by small camps without heavy equipment and

aimed to address immediate risks. A general summary of the remedial work completed to date is as follows:

- Drum/Product Consolidation: Conducted at all sites. Residual fuels and products were collected from drums and most tanks for testing, consolidation and shipment to off-site licensed management facilities. Drums were washed (if containing residual product), crushed and consolidated at Sawmill Bay. Additional empty drums requiring management are found at Contact Lake Mine, El Bonanza/Bonanza Mine and Silver Bear Mines.
- Debris Management: Conducted at Sawmill Bay, Contact Lake Mine and El Bonanza/Bonanza Mine. Surface debris which could be manually lifted was consolidated by category into burnable (untreated unpainted wood), non-hazardous debris and hazardous debris. Most hazardous debris has been shipped to off-site licensed management facilities. Non-hazardous debris piles remain at the respective sites and the combustible materials were burned (with an appropriate permit).
- Building Demolition: Conducted at Contact Lake Mine and El Bonanza/Bonanza Mine. The majority of buildings were stripped of materials which were then consolidated by category into burnable (untreated unpainted wood), non-hazardous debris and hazardous debris. Most of the hazardous debris has been shipped to off-site licensed management facilities. Non-hazardous debris piles remain at the respective sites and the combustible materials were burned (in piles or in-situ for timber frame structures).
- Contaminated Soil Excavation/Removal: A small volume of PCB contaminated soil was removed from El Bonanza/Bonanza. PHC contaminated soil from a recent spill at the Sawmill Bay airstrip was also excavated and the soil remains on site in closed overpacks for future removal.

The Phase I Remediation Project represented only a portion of the remediation requirements for the project sites. The remainder of the work will be completed as the GBL Sites Phase II Remediation Project, for which this Spill Contingency Plan has been designed.

1.7 Project Description

The primary objective of the GBL Sites Phase II Remediation Project is to reduce, and where possible, eliminate the risk to the environment and human health caused by legacy environmental concerns from the sites, to leave as minimal a presence in the area as possible, and to promote socio-economic benefits to Aboriginal people and other northerners.

The Project is expected to span approximately five years (not including monitoring post remediation). Project activities will primarily be limited to the open water season, with the exception of site mobilization and demobilization which may occur by ice road (to be determined by the Contractor).

A summary of the Project related activities for the current phase of the GBL Sites Phase II Remediation Project are provided in the Table 4 below.

Table 4 Project Related Activities for the Great Bear Lake Sites Remediation Project

Site	Activity
Silver Bear Mines	• Mine Openings: 17 Vertical openings (shafts and raises) will be closed using engineered caps; 12 Horizontal openings (portals and adits), 1 mined trench and 6 open stopes will be closed using engineered backfill. • Waste Rock: Depending on geochemistry: Reduce surface water interaction with waste rock by using drainage to divert water; enhance wetland to treat drainage; leave as is; or relocate to use as covers/backfill • Tailings: Depending on geochemistry: Cover; excavate (smelter waste); enhance wetlands and/or redirect water flow; or leave as is. • Buildings/Equipment: Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste for on-site landfill and ship hazardous waste to a licensed waste management facility. • Non-Hazardous Waste: Construct engineered non-hazardous landfill at Terra Mine to receive waste from all GBL Sites. • Hazardous Waste: Ship to licensed hazardous waste management facility, except asbestos containing materials (ACMs) to be double bagged for storage in separate area of Terra landfill. • Hydrocarbon Impacted Soil: Treat (i.e. landfarm) soils contaminated with light hydrocarbons (F1-F2); soils contaminated with heavy hydrocarbons (F3-F4) will be covered or used as intermediate fill in landfill. • Roads: Remove culverts, with consultation with the Department of Fisheries and Oceans and allow roads to naturally re-vegetate. • Airstrips: Smallwood airstrip left as is; Terra airstrip abandoned per Transport Canada. • Docks: Remove the three docks and excavate/treat hydrocarbon contaminated soils.
Contact Lake Mine	• Mine Opening: Vertical Openings (shaft and raise) will be capped, the adit backfilled and the open stope fenced. • Waste Rock: Cover where exceeding gamma radiation criteria and grade to reduce water infiltration. • Tailings: Cover where practical, excavate smelter waste and improve drainage to reduce surface water contact/runoff. • Buildings/Infrastructure: Only four buildings remain. Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste in pre-existing stockpiles, and consolidate hazardous waste. • Non-Hazardous Waste (scattered, disposal areas, buildings): Most non-hazardous waste has been consolidated into piles. Complete consolidation and transfer to Terra Mine non-hazardous landfill. • Hazardous Waste: Most hazardous waste was consolidated and removed from site. Complete consolidation and ship to licenced hazardous waste management facility, except ACMs to be double bagged for storage in separate area of Terra landfill. • East Arm Fuel Storage and Dock: Remove and containerize oily water in tank for off-site disposal. Dispose of the tank, dock materials, boiler and equipment at the non-hazardous Terra landfill. • Hydrocarbon Impacted Soils: Treat (i.e. landfarm) soils contaminated with light hydrocarbons (F1-F2); cover soils contaminated with heavy hydrocarbons (F3-F4). • Roads: Remove culverts and allow roads to naturally revegetate.
El Bonanza/Bonanza Mine	• Mine Openings: Backfill the adit entrance and Bear Portal with local waste rock. Concrete cap the easily accessible vertical openings (shafts). Cap the No. 1 Shaft in a safe manner. • Buildings/Infrastructure: Only four buildings remain. Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste in pre-existing stockpiles and consolidate hazardous waste. • Airstrip and Fuel Storage Tank Area: Remove any residual fuel products in tanks/drums,

Site	Activity
	crush drums, dismantle tanks and consolidate all with non-hazardous waste for management (or hazardous waste where lead paint exceeds criteria). • Non-Hazardous Waste: Most non-hazardous waste has been consolidated into piles. Complete consolidation and transfer to the Terra Mine non-hazardous landfill. • Hazardous Waste: Most hazardous waste was consolidated and removed from site. Complete consolidation and ship to a licensed hazardous waste management facility, with the exception of ACMs to be double bagged for storage in separate area of Terra Mine landfill. • Hydrocarbon Impacted Soils: Treat (i.e. landfarm) soils contaminated with light hydrocarbons (F1-F2); cover or reuse (as intermediate fill) soils contaminated with heavy hydrocarbons (F3-F4). • Roads/Culverts: Remove culverts and allow roads to naturally revegetate (including designed removal of culvert linking Mile Lake and Silver Lake, with DFO consultation).
Sawmill Bay	• Buildings and Infrastructure: Demolish, burn unpainted/untreated wood, consolidate non-hazardous waste for transfer to non-hazardous Terra Mine landfill and ship hazardous waste to a licensed waste management facility. • Machinery/Equipment: Consolidate and transport to the Terra Mine landfill (subject to leachable lead levels in any paint applications). • Non-Hazardous Waste: Most non-hazardous waste has been consolidated into piles. Complete consolidation and transfer to the Terra Mine non-hazardous landfill. • Hazardous Materials: Most hazardous waste was consolidated and removed from site. Complete consolidation and ship to a licensed hazardous waste management facility, except ACMs to be double bagged for storage in separate area of Terra Mine landfill. • Submerged Debris: Consolidate and transport to the Terra Mine landfill. • Roads/Airstrips: Remove culverts and allow roads/airstrips to naturally revegetate.

1.8 List of Hazardous Materials and Potential Contaminants

Table 5 presents a list of the hazardous materials and potential contaminant streams that are anticipated to be required in support of the remedial activities. These are preliminary estimates and the Contractor will be required to provide a detailed list of all hazardous materials on-site, including the types and numbers of storage containers, storage location and Material Safety Data Sheets (MSDS) for each material.

Table 5 Anticipated On-site Hazardous or Potentially Hazardous Materials

Fuels	**Number of Containers ***	**Capacity of Containers**	**Location** (provided by Contractor and subject to approval by INAC and SLWB)	**Use**
Diesel	TBD – Estimate <5000 at any time	Bulk and/or drummed (205 L)	Designated storage area, location TBD and subject to approval. Minimum 100 m from waterbody (where possible).	Remediation equipment, camp generators, etc.
Gasoline	TBD - Estimate <900 at any time	Bulk and/or drummed (205 L)	Designated storage area, location TBD and subject to approval. Minimum 100 m from waterbody (where possible).	Light trucks, ATVs, hand tools, etc.
Aviation Fuel	TBD – Estimate <100 at any time	Drummed (205 L)	Designated storage area, location TBD and subject to approval. At airstrips and float docks (with secondary containment).	Fixed or rotary aircraft
Propane	Estimate <30 at	100 lb tanks	Designated/secure gas storage area,	Camp kitchen

Fuels	Number of Containers *	Capacity of Containers	**Location** (provided by Contractor and subject to approval by INAC and SLWB)	Use
	any time		location TBD.	
Compressed Oxygen	Estimate <20 at any time	154 cu. ft. Cylinders	Designated/secure gas storage area, location TBD.	Welding
Acetylene	Estimate <20 at any time	145 cu. ft. Cylinders	Designated/secure gas storage area, location TBD.	Welding
Other Vehicle Fluids (hydraulic oil, coolant, etc.)	Estimate <50 at any time	4 L plastic containers	Shop facility, location TBD	Vehicle maintenance and operation
Cleaning Products (household, degreaser, etc.)	Estimate <50 at any time	1 L plastic containers	Camp and shop facilities, location TBD	Cleaning of camp facilities, vehicle maintenance, remedial activities, etc.
Process Water	Generated on site	N/A	Sumps, equipment decontamination, etc.	Dewatering and industrial water use may result in process water exceeding applicable criteria
Camp Wastewater	Generated on site	N/A	Site sewage treatment plant (location TBD) and adjacent to work areas	Production of wastewater from camp and work activities

1.9 Preventative Measures

In addition to the response actions detailed within this plan, the Contractor must ensure that suitable preventative measures are in place to reduce the likelihood of incidents. General and practical approaches are presented below, to be refined by the Contractor:

- Once on site, handling of hazardous material will be supervised by the Contractor and/or the Departmental Representative.
- Anyone handling hazardous material on-site will be required to wear all necessary personal protective equipment and have appropriate training.
- Material Safety Data Sheets (MSDS, also called SDS), must be readily available for all workers at site.
- Due to the volumes of fuel required, the Contractor will be required to provide a Fuel Management Plan, including proposed storage locations.
- Drums containing fuel and/or hazardous materials will be stored either on their side with bungs facing 9 and 3 o'clock position, or on pallets, upright, and banded.
- All drums of product will be labelled with INAC and/or the Contractor.
- All hazardous materials transported to site will have industry standard labels.
- Designated hazardous material storage and transfer areas will be established within previously disturbed areas of the sites. Although common practice is to also establish these areas ≥ 100 m from any local high water mark, at select sites a reduced distance may be required in an effort to

remain on disturbed areas and to minimize transport risks (e.g. at plane docking locations). The Contractor will be required to identify locations for hazardous material storage prior to initiating use.

- According to Workplace Hazardous Materials Information System (WHMIS) and/or Transportation of Dangerous Goods (TDG) standards, signs will be posted at all designated hazardous material storage and transfer areas with the product name, TDG placard and signs warning of danger.
- Designated hazardous material storage and transfer areas will have secondary containment (*i.e.*, berms or doubled-walled tanks), or in the case of small volumes (e.g. < 5 L) will be equipped with drip trays, spill pads and/or mats. Holding capacity of berms will be a minimum of 110% capacity of the largest storage container.
- Designated hazardous material transfer areas will be equipped with spill kits for emergency use and additional supplies for preventative use. This may include spill pads and drip trays at refueling areas which may be used as routine practice to prevent accidental release.
- Portable drip trays are to be used when refueling ATVs or other mobile equipment away from designated refueling areas, to avoid any leaks/drips onto the land.
- Regular maintenance and oil checks of all motorized equipment will also be undertaken to avoid preventable leaks.
- The site foreman or designate will conduct visual inspections to check for leaks and damage to the fuel storage containers and transfer equipment, as well as check for stained or discoloured soils around storage areas and motorized equipment. The visual inspections will be included in the foreman's weekly checks. For example, lids and caps will be checked for tight seals.
- Following any near miss or incident, lessons learned and corrective measures will be identified to prevent further similar events.

Fuel transfer and storage for the proposed activities of the GBL Remediation Program will be conducted by the Contractor in accordance to the following regulations, under the supervision of the Departmental Representative:

- National Fire Code of Canada (2010)
- Transportation of Dangerous Goods Act (1992)
- Transportation of Dangerous Goods Regulations
- CEPA Petroleum and Allied Petroleum Products Storage Tanks Regulations

1.10 Additional Copies of the Spill Contingency Plan

Copies of the Plan (most current version) will be available on-site at all times. Copies are also held at the CARD office in Yellowknife, as well as with the Contractor, Departmental Representative and the SLWB.

2 Responding to Spills

2.1 Response Organization

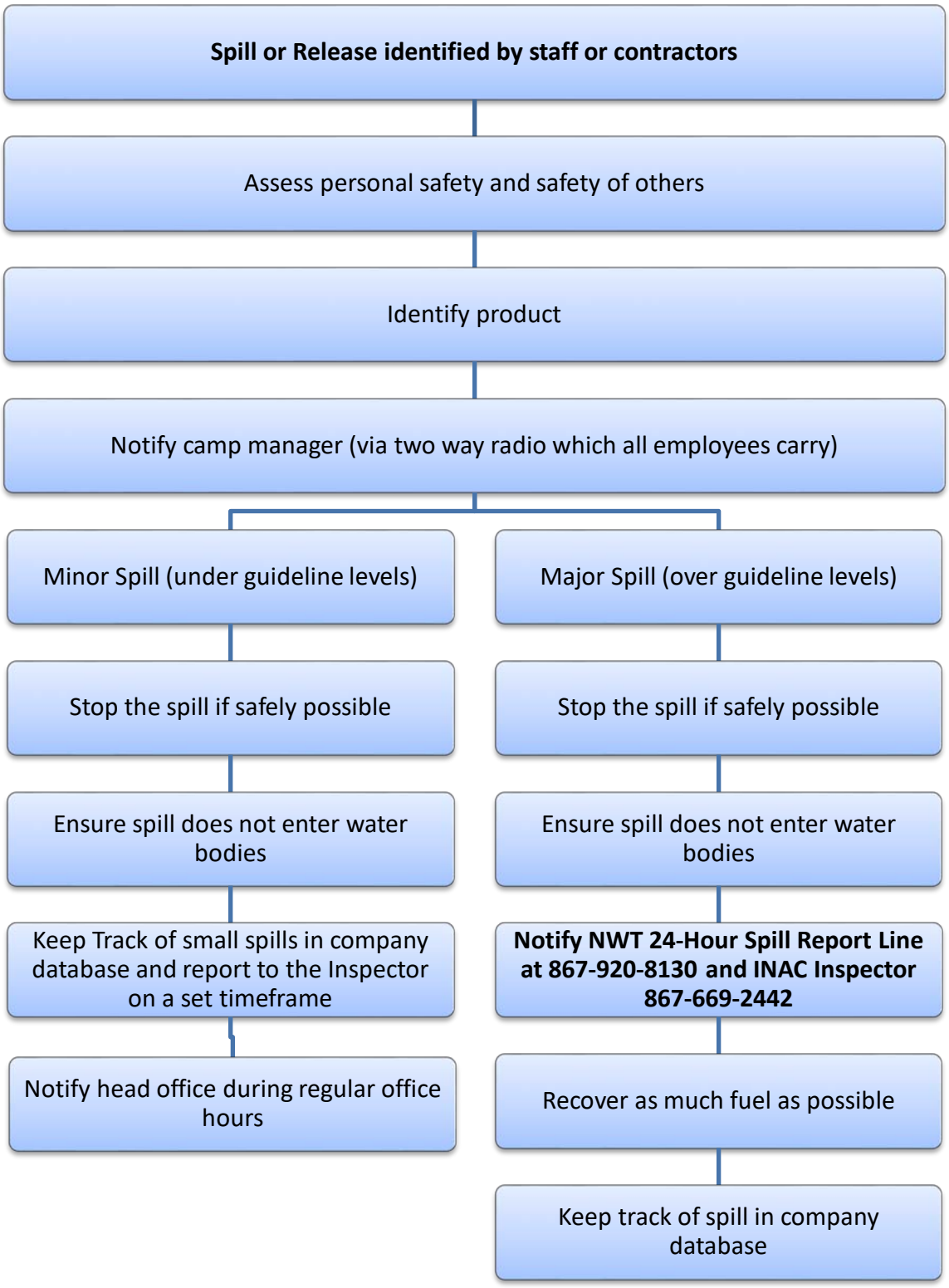
This section is intended to identify response personnel, their duties, on or off-site work locations and contact information, including 24-hour telephone numbers for those responsible for activating the plan. The Primary Contractor will supplement this information with a flowchart depicting lines of communication and the response duties of each member of the response team.

Figure 1.0 shows the proposed organizational chart for spill response. Details of each step will be provided in the procedures for initial actions under Section 3. General duties include:

- ENSURING SAFETY of all persons in the vicinity - if necessary, remove staff from the area affected by the spill immediately
- Making every effort to IDENTIFY the spilled product
- Consulting appropriate MSDS and determine principal types of health and safety hazards associated with this product or material
- Wearing appropriate PPE when working on or near the spill
- If safe to do so, STOPPING THE LEAK
- If safe to do so, CONTAINING THE SPILL
- DOCUMENTING AND REPORTING internally and to Spill Report Line if necessary
- CLEANING UP SPILLED MATERIALS
- DISPOSING of materials in approved manner
- AT ALL TIMES: CONSIDER YOUR PERSONAL SAFETY AND THOSE OF YOUR CO-WORKERS BEFORE PROCEEDING WITH ANY ACTION

An immediately reportable spill is defined as a release of a substance that is likely to be an imminent environmental or human health hazard or meets or exceeds the volumes outlined in Appendix C. It must be reported immediately to the NWT 24-Hour Spill Report Line at 867-920-8130. Any spills less than these quantities do not need to be reported to the spill reporting line. Rather, these minor spills will be tracked and documented by the Contractor and submitted to the appropriate authority either immediately upon request or at a pre-determined reporting interval. The site foreman will also inform the Yellowknife CARD office for inclusion in the spill tracking database and notify the Project Manager in the event of media inquiries. If there is any doubt that the quantity spilled exceeds reportable levels, the spill will be reported to the NWT 24-Hour Spill Report Line.

Figure 1.0 Flow chart of response organization



An emergency satellite phone will be located on site and used to report spills. In the event of a spill involving danger to human life, this phone will also be used to contact emergency response personnel in Yellowknife. Employees and contractors will have a communication device (i.e., two-way radios) for communication with the foreman and other staff on site.

3 Action Plan

This section outlines the procedures and steps that would occur in the event of a spill or unauthorized discharge. As a component of the Final Spill Contingency Plan, the Contractor is required to provide detailed procedures and steps that would occur in the event of a spill or unauthorized discharge for the hazardous materials. The Contractor will also be required to list all hazardous materials, potential discharge events, potential discharge volumes (with worst case scenario) and direction of potential discharge.

In all cases, environmental monitoring is a vital aspect of any spill or unauthorized discharge. It ensures that the emergency response team has acted correctly and that the action plan has been effective. Sampling of liquid, soil and vegetation within a spill area may be required to determine contaminant levels, if any. Once a spill is terminated and or contained, the area may be monitored on a regular basis until results conclude that levels are below prescribed limits or additional cleanup is required. The Contractor must prepare both the initial spill report (immediately), followed by the Detailed Spill Report within 30 days of the spill, documenting the incident, response, monitoring and current conditions.

3.1 Potential Spill Size and Sources for Each Hazardous Material On Site

Table 6 lists the expected hazardous materials mobilized to site, potential discharge events, potential discharge volumes (worst case scenario in brackets) and direction of potential discharge.

Table 6 Potential Spill Sources, Causes, Volumes and Direction

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
Diesel Fuel (fuel storage, refueling stations, vehicles, generators)	1.) Over pumping during refueling 2.) Leaking of hose or fittings 3.) Leaking from vehicles and equipment 4.) Leaking of fuel drum(s) in/outside fuel storage area	Likely under 205 L/ 1 drum (likely max 820 L/4 drums per pallet)	To ground from equipment operation, fuel transfer, camp or fuel storage area(s), potential for underground seepage or overland flow.
Gasoline (pumps, power tools, vehicles)	1.) Over pumping during refueling 2.) Leaking of hose or fittings 3.) Leaking from vehicles and equipment 4.) Leaking of fuel drum(s) in/outside fuel storage area	Likely under 205 L/1 drum (likely max 820 L/4 drums per pallet)	To ground from equipment operation, fuel transfer, camp or fuel storage area(s), potential for underground seepage or overland flow.

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
Aviation Fuel (float plane, helicopter)	1.) Overfilling aircraft 2.) Leaking of hose or fittings 3.) Leaking of fuel drum (s) in/outside fuel storage area	Likely under 205 L/ 1 drum (likely max 820 L/4 drums per pallet)	To ground from fuel leak from drums and/or fueling equipment. To waterbody if hose/nozzle failure when refueling float plane.
Propane (kitchen, stove, fridge)	1.) Leaking of hose or fittings 2.) Leaking of cylinder	Likely under 100 lbs/1 cylinder (single cylinder)	Volatile, release into atmosphere. Managing human health/fire risks paramount.
Acetylene	1.) Leaking of hose or fittings 2.) Leaking of cylinder	Likely under 145 cu. ft (single cylinder)	Volatile, release into atmosphere. Managing human health/fire risks paramount.
Oxygen	1.) Leaking of hose or fittings 2.) Leaking of cylinder	Likely under 154 cu. ft. (single tank)	Volatile, release into atmosphere. Managing human health/fire risks paramount.
Other Vehicle Fluids	1.) Leaking from vehicles and equipment 2.) Leaking of container in/outside storage area	Likely under 4 L (max 20L)	To ground from equipment or storage area(s). Unlikely to reach groundwater due to limited volumes.
Cleaning Products	1.) Leaking from maintenance area 2.) Leaking from camp facilities	Likely under 1 L (max 5L)	To ground during vehicle maintenance activities or camp operation. Could be seepage into groundwater; however, unlikely due to small volumes.
Process Water	1.) Discharge of untreated water 2.) Leak while treating water	Dependent on activities Estimated < 100 L (maximum 500 L)	Process water may seep into groundwater system or flow overland to waterbodies.
Grey Water /Black Water	1.) Leak from sewage treatment plant 2.) Failure to meet criteria 3.) Spill during handling	Dependent on Contractor approach to STP. Estimated 50 L (maximum 1,000 L)	Grey water/black water may seep into groundwater system or flow overland to waterbodies.

3.2 Potential Environmental Impacts of Spill

The following section outlines the general environmental conditions of the primary hazardous materials to be managed on-site.

Diesel Fuel

Environmental Impacts: Diesel may be harmful to wildlife and aquatic life. Diesel burns slowly and thus risk to the environment is reduced during recovery as a burn can be more readily contained compared with volatile fuels. Runoff into water bodies must be avoided.

Worst Case Scenario: All were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Gasoline

Environmental Impacts: Gasoline may be harmful to wildlife and aquatic life. It is not readily biodegradable though is quick to volatize. Runoff into water bodies must be avoided.

Worst Case Scenario: All fuel drums were punctured or released simultaneously and contents seeped into surrounding soil and or flowed to water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Aviation Fuel (Jet fuel)

Environmental Impacts: Aviation fuel (i.e. Jet Fuel) is similar in chemical nature to diesel fuel and may be harmful to wildlife and aquatic life. While slower to volatilize than gasoline, aviation fuel will volatilize to the atmosphere and is biodegradable. Due to known aquatic affects, runoff to water bodies must be avoided.

Worst Case Scenario: All fuel drums were punctured or open simultaneously and contents seeped into surrounding soil and water bodies. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Propane

Environmental Impacts: Propane may be harmful to wildlife and the surrounding environment and has the potential to accumulate. Propane is extremely volatile and is the most flammable material stored on-site, thus immediate impacts to the surrounding environment are a concern.

Worst Case Scenario: All cylinders were punctured or failed simultaneously, leaked into the surrounding environment and ignited leading to an explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to a propane spill is of the utmost concern.

Compressed Oxygen

Environmental Impacts: While oxygen at normal concentrations (23%) is not toxic, in concentrations greater than 80% health effects may occur. More importantly, oxygen may significantly increase combustion rates and is an extreme fire hazard.

Worst Case Scenario: All cylinders were punctured or failed simultaneously, contents leaked into the surrounding environment and ignited leading to an explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to an excess of oxygen or ignition is of utmost concern.

Acetylene

Environmental Impacts: Acetylene may be harmful to wildlife, the surrounding environment and workers. Acetylene is an asphyxiant (replacing oxygen) and is extremely flammable in the presence of flames, sparks and heat. Inhalation of acetylene may result in health effects.

Worst Case Scenario: All cylinders were punctured or failed simultaneously, contents leaked into the surrounding environment and ignited leading to an explosion. This could cause serious environmental impacts in the immediate surroundings. Safety during emergency response to an acetylene leak is of the utmost concern.

Other Vehicle Fluids and Cleaning Products
Environmental Impacts: The environmental toxicity of these products are highly variable, even within each specific class of materials (e.g. ethylene glycol vs propylene glycol). The potential effects of each product must be evaluated when managing spills and providing response.

Worst Case Scenario: Release of multiple containers or mixture of reactive products. This could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.

Process Water
Environmental Impacts: Processing water may be contaminated with hydrocarbons or cleaning products depending on the scope decontamination activities. While dilute relative to the original source, these constituents may be mobile to land and water systems when released as process water. Concentrations are unlikely to result in significant ecological effects, though may be a regulatory infraction and contribute to contaminant loadings.

Worst Case Scenario: Significant failure of processing water system resulting in release of large volume of water to land systems.

Greywater / Blackwater
Environmental Impacts: Biohazards associated with blackwater must be mitigated for human and animal receptors. The pH during the sewage treatment process may be low, resulting in a release of acidic waters. Water may contain dilute non-organic constituents (residual cleaning products, soap, etc.) which may impact aquatic plants and other organisms.

Worst Case Scenario: Failure and release of sewage treatment plant contents (either above or below ground). While unlikely to cause significant adverse effects, impacts to aquatic life may occur where rapid overland flow occurs to waterbodies (i.e. no groundwater attenuation).

3.3 General Procedures

The following general response procedures have been outlined to facilitate spill response.

3.3.1 Procedures for Initial Actions

- Ensure safety of all personnel.
- Assess spill hazards and risks.

- Remove all sources of ignition.
- Stop the spill if safe to do so (e.g. shut of pump, replace cap, tip drum upward, patch leaking hole). Use the contents of the nearest spill kit to aid in stopping the spill. Tyvek suits and chemical master gloves will be located in the spill kit and should be worn immediately if there is any risk of chemical contact.
- No matter what the volume is, notify site foreman via two-way radio (all employees carry these, as well as on-site contractors if they are not accompanied by an employee).
- Contain the spill – use contents of spill kits to place sorbent materials on the spill, or use shovel to dig dike to contain spill. Methods will vary depending on the nature of the spill. See section 3.3.3 for more details.

3.3.2 Spill Reporting Procedures

Report spill immediately to site superintendent, who will determine if spill is to be reported to the NWT 24-Hour Spill Line at 867-920-8130.

Each spill kit, as well as the site foreman, will have copies of the NWT Spill Report form to be filled out (see Appendix B). Fill out the Spill Report to send to the staff of the NWT 24-Hour Spill Line and report it to the CARD office in Yellowknife.

3.3.3 Procedures for Containing and Controlling the Spill

- Initiate spill containment by first determining what will be affected by the spill.
- Assess speed and direction of spill and cause of movement (water, wind and slope).
- Determine best location for containing spill, avoiding any water bodies.
- Have a contingency plan ready in case spill worsens beyond control or if the weather or topography impedes containment.

3.3.3.1 Specific Spill Containment Methods for Land and Water

1) Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. Generally spills on land occur during the late spring, summer or fall when snow cover is at a minimum. It is important that all measures be undertaken to avoid spills reaching open water bodies.

Silt Screens

Should a release of sediment enriched water occur on land, silt fencing may be used where flow rates are slow enough to be mitigated with surface measures. A silt fence is a sediment control device which assists in retaining sediments in place to prevent migration to waterbodies.

Sorbents

Where migration is slow and product volumes are minimal, the use of sorbent materials may be sufficient to contain a spill on land. Sorbent materials recover liquid through absorption or adsorption and fall into three general categories: organic (e.g. peat moss, sawdust), inorganic sorbents (e.g. clay, sand) and synthetic sorbents (materials designed specifically to take up oil or specific chemicals). Spill kits will contain sorbents for use in small spills. Used sorbent materials must be managed per hazardous materials (as appropriate).

Dykes

Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled product. A dyke needs to be built to a size that will ensure containment of the maximum quantity of fuel that may reach it. A plastic tarp can be placed on and at the base of the dyke such that fuel can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags.

Trenches

Trenches can be dug out to contain spills as long as the top layer of soil is unfrozen. Shovels, pick axes or a loader can be used depending on the size of trench required. It is recommended that the trench be dug to the bedrock or permafrost, which will then provide containment layer for the spilled fuel. Fuel may then be recovered using a pump or sorbent materials.

2) Containment of Spills on Water

Spills on water may negatively impact water quality and aquatic life and may migrate easily. All measures must be undertaken to taken to prevent and contain spills on open water.

Silt Curtains

Where the release of sediment laden water occurs, the use of silt curtains may be employed. Silt curtains are floating barriers which prevent the migration of water with elevated suspended solids. Floating nets and debris booms may also be used to contain larger solids or debris.

Booms

Booms are commonly used to recover fuel or other light non-aqueous phase liquids floating on the surface of lakes or slow moving streams. They are commonly released from the shore of a waterbody to create a circle around the spill. If the spill is offshore, a boat may be required. More than one boom may be used at once, providing a secondary means of containment. Booms may be also be used in streams and should be set out at an angle to the current. Booms are designed to float and have sorbent materials built into them to absorb fuels. Fuel contained within the circle of the boom will need to be recovered using sorbent materials or pumps and placed into barrels for disposal.

Weirs

Weirs can be used to contain spills in streams and to prevent further migration downstream. Plywood or

other materials found on site can be placed into and across the width of the stream, such that water can still flow under the weir. Spilled fuel will float on the water surface and be contained at the foot of the weir. It can then be removed using sorbents, booms or pumps and placed into barrels or plastic bags.

Barriers
In some situations barriers made of netting or fence material can be installed across a stream, and sorbent materials placed at the base to absorb spilled fuel. Sorbents will need to be replaced as soon as they are saturated. Water will be allowed to flow through. This is very similar to the weir option discussed above.

Note that in some cases, it may be appropriate to burn fuel or to let volatile fuels such as gasoline evaporate after containment on the water surface. This should only be undertaken after approval from the INAC Inspector.

3.3.4 Procedures for Transferring, Storing and Managing Spill Related Wastes

In most cases, spill cleanups are initiated at the far end of the spill and contained moving toward the center of the spill. Sorbent socks and pads are generally used for small spill cleanup. A pump with an attached fuel transfer hose can suction spills from leaking containers or large accumulations on land/ice, for containerization into empty drums. Hand tools such as cans, shovels, and rakes are also very effective for small spills or hard to reach areas.

Used sorbent materials are to be placed in plastic bags temporarily for future disposal. All materials mentioned in this section will be available in spill kits to be located at the fuel storage areas, in trucks, the mechanic shop and in camps. Following clean-up, any tools or equipment used will be properly washed and decontaminated, or replaced if this is not possible.

Spilled petroleum products and materials used for containment will be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

3.3.5 Procedures for Restoring Affected Areas

Once a spill of reportable size has been contained, CARD will consult with the INAC or Lead Agency Inspector assigned to the file to determine the level of cleanup required. The Inspector may require a site-specific study to ensure appropriate clean up levels are met. Measures that may be considered include natural biodegradation of oil, replacement of soil and revegetation.

3.4 Specific Procedures

As part of the Contractor's Spill Contingency Plan, specific spill response approaches will be presented for the primary products used at site. Below are **examples** of procedures outlined for a diesel fuel spill, gasoline spill, lubricating or hydraulic oil spill and a sewage spill.

A. Diesel Fuel Spill

i. *Initial Response*: The Sites Superintendent, or their designate, shall be advised of the incident and a response initiated. **ELIMINATE** ignition sources and any open flame. **STOP** the flow of product. **CONTAIN** the flow of diesel fuel by dyking with earth or other barrier, blocking any entry to waterways, construction of an oil interceptor trench or underflow dam, etc. If any spill has reached natural waters, deploy a containment boom and apply oil absorbent materials. The spill report will be filed with the 24 hour Spill Line by the Sites Superintendent or his designate.

ii. *Recovery:* Recover as much free product as possible by pumping into drums or portable tanks. Excavate any contaminated soils/snow and dispose of at an approved sites. Diesel fuel spilled on water can be recovered by using skimmers or absorbent booms.

iii. *Fire Response:* Use CO_2, dry chemical, foam or water spray (fog). Use water to cool tanks. Divert the fuel to a secure area for controlled burning. If diesel fuel is escaping, get it contained as soon as possible.

iv. *Properties*: Chemical composition hydrocarbon C_9 to C_{16}. Clear to yellow with hydrocarbon odour. Diesel fuel will float on water. Flash point of diesel fuel is >52ºC.

v. *Environmental Concerns:* Diesel fuel is toxic to fish and other aquatic organisms and harmful to waterfowl.

vi. *Containers:* Diesel fuel may be found in drums or tanks.

vii. *Personal Protection:* Wear impervious chemical resistant clothing, gloves, footwear and goggles. For confined spaces SCBA may be required. Avoid contact with strong oxidizers such as sulphuric acid and peroxides.

B. Gasoline Spill

i. *Initial Response:* The Sites Superintendent, or their designate, shall be advised of the incident and response initiated. **ELIMINATE** ignition sources and any open flame. **REMOVE** all personnel not involved with the incident from the area. **STOP** the flow of product. **CONTAIN** the flow of gasoline by dyking with earth or other barrier, blocking any entry to waterways, construction of an oil interceptor trench or underflow dam, etc. If spill has reached natural waters, deploy a containment boom and apply oil absorbent materials or leave to evaporate.

Gasoline contains benzene a suspected carcinogen. Avoid breathing vapours, and if necessary, obtain an organic vapour cartridge full-face piece respirator or wear SCBA. The Spill Report will be filed with the 24 hour Spill Line by the Sites Superintendent or his designate.

ii. *Recovery:* Conduct regular explosive atmosphere monitoring with an intrinsically safe instrument. Recover as much free product as possible by pumping into drums or portable tanks. Free product recovery operation should utilize an explosion proof pump and all equipment involved in the transfer must be properly grounded. Excavate any contaminated soils/snow and dispose of at an approved site. Gasoline spilled on water can be recovered by using skimmers or absorbent booms or left to evaporate. When excavating gasoline-contaminated soils/snow, consider using a layer of compression foam to reduce the potential of explosion arising from sparks caused during excavating.

iii. *Fire Response*: Use CO_2, dry chemical, foam, or water spray (fog). Use water to cool tanks. Divert the gasoline to a secure area for controlled burning (upon approval). If gasoline is escaping, get it contained as soon as possible.

iv. *Properties:* Chemical composition hydrocarbon C_4 to C_{12} range. Light green, clear, amber colour liquid with hydrocarbon odour. Gasoline floats on water. Gasoline has a Flash Point of -40ºC. Vapours and product are highly flammable and explosive. Vapours are heavier than air.

v. *Environmental Concerns:* Gasoline is toxic to fish and other aquatic organisms and harmful to waterfowl.

vi. *Containers:* Will be transported to the site in drums.

vii. *Personal Protection:* Wear impervious chemical resistant clothing, gloves, footwear and goggles. For confined spaces SCBA may be required. Eliminate all sources of ignition. Restrict access and work upwind from spilled product. Avoid contact with strong oxidizers such as sulphuric acid and peroxides.

C. Lubricating or Hydraulic Oil Spill

i. *Initial Response:* The Sites Superintendent, or their designate, shall be advised of the incident and response initiated. **ELIMINATE** ignition sources and any open flame. **STOP** the flow of product. **CONTAIN** the flow of oil by dyking with earth or other barrier, blocking any entry to waterways, construction of an oil interceptor trench or underflow dam, etc. If spill has reached natural waters, deploy a containment boom and apply oil absorbent materials. The spill report will be filed with the 24 hour Spill Line by the Sites Superintendent or his designate.

ii. *Recovery:* Recover as much free product as possible by pumping into drums or portable

tanks. Excavate any contaminated soils/snow and dispose of at an approved site. Lubricating and hydraulic oils spilled on water can be recovered by using skimmers or absorbent booms. Use absorbent pads or granular absorbents for minor spills.

iii. *Fire Response:* Use CO_2 dry chemical, foam or water spray (fog). Water may spread fire. Use cool water to cool containers. Divert the oil to a secure area and allow to burn under control. If oils are escaping, get it contained as soon as possible. Wear SCBA and eye protection.

iv. *Properties:* Chemical composition mixture of hydrocarbons and conventional industrial oil additives C_{22} to C_{61} range. Light and dark amber colours with hydrocarbon odour.
Floats on water. Flash Point 190ºC to 215ºC.

v. *Environmental Concerns:* Lubricants and hydraulic oil are toxic to fish and other aquatic organisms, harmful to waterfowl. Lubricants and hydraulic oil will foul riverbanks, shorelines, etc.

vi. *Containers:* Transported to the sites by drums and tanker trucks and transferred to various storage locations at the sites. Products stored in various size containers up to 205 Litre drums.

vii. *Personal Protection:* Wear impervious chemical resistant clothing, gloves, footwear and goggles. The use of an organic cartridge respirator will not likely be required. Avoid contact with strong oxidizers such as sulphuric acid, bleaches and peroxides.

D. Sewage Spill

i. *Initial Response:* The Sites Superintendent, or their designate, shall be advised and a response initiated. Initiate shut down procedures to **STOP** the flow of sewage and commence repairs. **CONTAIN** the sewage sludge by dyking with earth, sand bags, snow or other barrier, blocking any entry to waterways. Construct an interceptor trench or direct flow towards a low area away from water. If the spill has reached natural waters, try to prevent additional material from entering the water. Construct a berm if required. Use earth-moving equipment to complete repairs to containment dam. Secure the sites and prevent non-authorized entry. The spill report will be filed with the 24 hour Spill Line by the Sites Superintendent or his designate.

ii. *Recovery*: Sewage recovered with a vacuum truck or other means of recovery, may be placed in the sewage treatment plant. Contaminated soil or snow excavated may be placed in the approved sewage lagoon or sewage treatment plant. The contaminated area is to be covered with lime to neutralize the affected area.

iii. *Fire Response:* Use dry chemical, foam or water spray (fog). Use water to cool tanks.

iv. *Properties:* Sewage is a mixture of human waste and wash water. Fecal coliforms are present.

v. *Environmental Concerns:* Human health concerns related to the presence of disease causing organisms potentially contained in the sewage.

vi. *Containers:* Sewage will be contained in holding tanks for treatment/management.

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

4 Spill Resource Inventory

This section is intended to describe all resources available for responding to spills. This includes personnel and an inventory of clean up materials, tools and equipment. The Primary Contractor will include, at minimum, comprehensive details on the categories below within the Spill Contingency Plan.

4.1 On-Site Resources

On-site resources may include spill kits, booms, sorbent materials, earth moving equipment, etc. The Contractor will be required to provide a list of the spill resources on site as well as a map showing the location of resources.

The contents of a typical spill kit are listed below. Spill kit contents may vary from those listed below; however, industry standards must be maintained.

Standard Contents of Conventional Spill Kits

- Tyvek splash suits
- pairs of chemical master gloves
- 10 large bags with ties for temporary use
- 2 oil only booms (5” x 10’)
- 50 oil only mats (16” x 20”)
- sorbent socks
- 10 sorbent pads
- 2 large tarps and rolls of polyethylene sheeting
- 1 roll duct tape
- 1 utility knife
- 1 field notebook and pencil
- 1 rake

- 1 pick axe
- 1 Shovel
- 1 instruction binder
- Empty drums (or overpack)
- Hatch removal sock

In addition to the contents of the spill kit, the following materials/equipment will be on site and readily available in case of spills at any location in the camp or worksites:

- Containment booms
- Skimmers
- Empty drums and/or portable tanks for spill recovery
- CO_2, dry chemical, foam or water spray for fire response
- Impervious chemical resistant clothing, gloves, footwear and goggles
- Organic vapour cartridge full-face piece respirator and/or SCBA.
- Atmosphere monitoring instrument
- Explosion-proof pump for free product recovery operation
- Compressive foam for gasoline recovery
- Vacuum tank or suitable pump for sewage spill recovery
- Lime
- Rubber boots, full slicker suit, rubber gloves and a full-face shield
- Earth-moving equipment required for construction of berms and dykes

4.2 Off-Site Resources

In the event of a spill, site staff may require off-site resources and detailed instructions on how to obtain assistance. This includes contact numbers for deploying off-site resources and an estimate of how long it will take to deploy them. If spill response is primarily reliant on an off-site contractor, a written contract, mutual aid agreement or memorandum of understanding is strong advised to ensure timely access to clean-up equipment.

All the contacts listed below could reach the site in three hours at a minimum. However, realistically government officials would not be able to reach the site until the next business day, depending on the severity of the spill.

- NWT 24-Hour spill line: (867) 920-8130
- Indigenous and Northern Affairs Canada Inspector: (867) 669-2442
- GNWT Department of Environment and Natural Resources: (867)-920-8130
- GNWT Environmental Health and Social Services: (867) 767-9066 ext 49262
- RCMP (Yellowknife): (867) 669-1111
- Stanton Medical Centre: (867) 669-3100 or (867) 669-4111
- Great Slave Helicopters (Yellowknife): (867) 873-2081

- Air Tindi (Yellowknife): (867) 669-8218 or 669-8200
- Summit Air (Yellowknife): (867) 873-4464 or (855) 355-5527

The Primary Contractor must also include a company 24-hour emergency line.

5 Training Program

Planning for an emergency situation is imperative due to the remoteness of the site and will require an employee and contractor training program. The training program will include the following minimum information:

- All individuals entering the site will be required to participate in an orientation session.
- All locations of the Plan and spill kits will be provided on a map in hard copy.
- An overview of the Plan will be presented to all workers.
- Specific training sessions will be scheduled for individuals directly involved in handling hazardous materials to ensure familiarity with handling protocols, spill response techniques and available resources.
- All employees and contractors are required to have their basic first aid training, as well as WHMIS training before working on the site.
- Supervisors are required to have advanced level First Aid training, as well as Transport of Dangerous Goods training.

Appendix A – Material Safety Data Sheets (Primary Products)

Material Safety Data Sheet

GASOLINE - ETHANOL

1. Product and company identification

Product name : GASOLINE - ETHANOL

Synonym : SuperClean, SuperClean 94 (Montreal), GASOHOL, Regular, Mid-Grade, Plus, WinterGas, RegularClean, PlusClean, marked or dyed gasoline, Super Premium (94 RO), E-10, Ethanol blended gasoline

Code : GASOHOL

Material uses : Gasoline-Ethanol is used in spark ignition engines including motor vehicles, farm vehicles, inboard and outboard boat engines, small engines and recreational vehicles.

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 : Clear liquid.

Odour : Gasoline

WHMIS (Canada) :

Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview : WARNING!

FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.

Flammable liquid. Irritating to eyes, respiratory system and skin. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Avoid contact with eyes, skin and clothing. Can cause cancer. Risk of cancer depends on duration and level of exposure. Contains material which may cause heritable genetic effects. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : 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 : 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.

Skin : Irritating to skin.

Eyes : Irritating to eyes.

Potential chronic health effects

2. Hazards identification

Chronic effects : This product contains an ingredient or ingredients, which have been shown to cause chronic toxic effects. Repeated or prolonged exposure to the substance can produce blood disorders.

Carcinogenicity : Can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : Contains material which may cause heritable genetic effects.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : 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	%
Gasoline	86290-81-5	90 - 97
Toluene	108-88-3	10-20
Ethanol	64-17-5	5-10
Benzene	71-43-2	0.5-1.5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Flammable.

Extinguishing media

Suitable : Use dry chemical, CO_2, alcohol-resistant foam or water spray (fog).

Not suitable : Do not use water jet.

5 . Fire-fighting measures

Special exposure hazards : 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. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), lead, aldehydes, ketones, phenols, polynuclear aromatic hydrocarbons, smoke and irritating vapours as products of incomplete combustion.

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 : Extremely flammable in presence of open flames, sparks, and heat. This product can accumulate static charge and ignite. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire. Runoff to sewer may create fire or explosion hazard.

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. Shut off all ignition sources. No flares, smoking or flames in hazard area. 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

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

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). Use spark-proof tools and explosion-proof equipment. 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 : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. Ground all equipment containing material.

7 . Handling and storage

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Gasoline	**ACGIH TLV (United States).** TWA: 300 ppm 8 hour(s). STEL: 500 ppm 15 minute(s).
Toluene	**ACGIH TLV (United States).** TWA: 20 ppm 8 hour(s).
Ethanol	**ACGIH TLV (United States).** STEL: 1000 ppm 15 minute(s).
Benzene	**ACGIH TLV (United States). Absorbed through skin.** TWA: 0.5 ppm 8 hour(s). STEL: 2.5 ppm 15 minute(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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.

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: 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 : 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: polyvinyl alcohol (PVA), Viton. 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.

8 . Exposure controls/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 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.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Clear liquid.

Flash point : -43°C (-45.4°F) (NFPA)

Auto-ignition temperature : Not available.

Flammable limits : Lower: 1.4% (NFPA)
Upper: 7.6% (NFPA)

Colour : Clear, undyed liquid. May be dyed for taxation purposes.

Odour : Gasoline

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : 26 to 200°C (78.8 to 392°F)

Melting/freezing point : Not available.

Relative density : 0.7 to 0.78 kg/L @ 15°C (59°F)

Vapour pressure : 41 to 107 kPa (307 to 802 mm Hg) @ 15°C (59°F)

Vapour density : 3 to 4 [Air = 1] (NFPA)

Volatility : Not available.

Evaporation rate : Not available.

Viscosity : 0.6 cSt @ 40°C (104°F)

Pour point : Not available.

Solubility : Hydrocarbon components virtually insoluble in water. Ethyl alcohol is completely soluble in water.

10 . Stability and reactivity

Chemical stability : The product is stable.

Hazardous polymerisation : Under normal conditions of storage and use, hazardous polymerisation will not occur.

Materials to avoid : Reactive with oxidising agents, acids and interhalogens.

Hazardous decomposition products : May release COx, NOx, aldehydes, ketones, phenols, polynuclear aromatic hydrocarbons, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Gasoline	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	13600 mg/kg	-
Toluene	LD50 Dermal	Rabbit	12125 mg/kg	-
	LD50 Oral	Rat	636 mg/kg	-
	LC50 Inhalation Vapour	Rat	7585 ppm	4 hours
Ethanol	LD50 Dermal	Rabbit	>15800 mg/kg	-
	LD50 Oral	Mouse	3450 mg/kg	-

11 . Toxicological information

Benzene	LC50 Inhalation Vapour	Rat	8850 mg/m³	4 hours
	LD50 Dermal	Rabbit	>8240 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-
	LC50 Inhalation Vapour	Rat	13228 ppm	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Gasoline	A3	2B	-	-	-	-
Toluene	A4	3	D	-	-	-
Ethanol	A3	-	-	-	-	-
Benzene	A1	1	A	+	Proven.	+

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : There is a wealth of information about the teratogenic hazards of Toluene in the literature; however, based upon professional judgement regarding the body of evidence, WHMIS classification as a teratogen is not warranted.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. 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.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

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

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1203	GASOLINE	3	II		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Flammable liquid
Irritating material
Carcinogen

Canada

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

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

International regulations

Canada inventory : All components are listed or exempted.

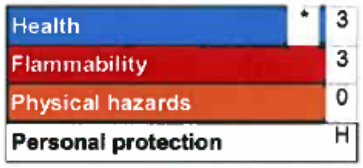
United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.

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



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

References : Available upon request.
™ Trademark of Suncor Energy Inc. Used under licence.

Date of printing : **4/22/2010.**

Date of issue : 22 April 2010

Date of previous issue : 4/22/2010.

Responsible name : **Product Safety - RS**

Indicates information that has changed from previously issued version.

Canada

16 . Other information

For Copy of (M)SDS : 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

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.

Material Safety Data Sheet

DIESEL FUEL

1. Product and company identification

Product name	: DIESEL FUEL
Synonym	: Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, D60, P40, 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, Furnace special
Code	: W104, W293; SAP: 120, 121, 122, 129, 135, 287
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.
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	: Bright oily liquid.
Odour	: Mild petroleum oil like.
WHMIS (Canada)	:  Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). Class D-2B: Material causing other toxic effects (Toxic).
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview	: WARNING! COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION. Combustible liquid. Severely irritating to the skin. Irritating to eyes. Keep away from heat, sparks and flame. Do not get in eyes. Avoid breathing vapour or mist. Avoid contact with skin and clothing. Use only with adequate ventilation. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation	: 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	: Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.
Skin	: Severely irritating to the skin.
Eyes	: Irritating to eyes.

Potential chronic health effects

Chronic effects	: No known significant effects or critical hazards.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.

2. Hazards identification

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
Kerosine (petroleum), hydrodesulfurized/Fuels, diesel/Fuel Oil No. 2	64742-81-0/68334-30-5/68476-30-2	100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention 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.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Combustible liquid

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : 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. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

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.

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 : 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.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Runoff to sewer may create fire or explosion hazard.

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. Shut off all ignition sources. No flares, smoking or flames in hazard area. 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

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

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). Use spark-proof tools and explosion-proof equipment. 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 : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Kerosine (petroleum), hydrodesulfurized	**ACGIH TLV (United States). Absorbed through skin.** TWA: 200 mg/m³ 8 hour(s).
Fuels, diesel	**ACGIH TLV (United States). Absorbed through skin.** TWA: 100 mg/m³, (inhalable fraction and vapour) 8 hour(s).
Fuel oil No. 2	**ACGIH TLV (United States). Absorbed through skin.** TWA: 100 mg/m³, (inhalable fraction and vapour) 8 hour(s).

Consult local authorities for acceptable exposure limits.

8 . Exposure controls/personal protection

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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.

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 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 : 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: nitrile, neoprene, polyvinyl alcohol (PVA), Viton. 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.

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 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.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state : Bright oily liquid.

Flash point : Diesel fuel: Closed cup: ≥40°C (≥104°F)
Marine Diesel Fuel: Closed Cup: ≥60°C (≥140°F)
Mining Diesel: Closed Cup: ≥52°C (≥126°F)

Auto-ignition temperature : 225°C (437°F)

Flammable limits : Lower: 0.7%
Upper: 6%

Colour : Clear to yellow (This product may be dyed red for taxation purposes).

Odour : Mild petroleum oil like.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : 150 to 371°C (302 to 699.8°F)

9 . Physical and chemical properties

Melting/freezing point	: Not available.
Relative density	: 0.80 to 0.88 kg/L @ 15°C (59°F)
Vapour pressure	: 1 kPa (7.5 mm Hg) @ 20°C (68°F).
Vapour density	: 4.5 [Air = 1]
Volatility	: Semivolatile to volatile.
Evaporation rate	: Not available.
Viscosity	: Diesel fuel: 1.3 - 4.1 cSt @ 40°C (104°F) Marine Diesel Fuel: 1.3 - 4.4 cSt @ 40°C (104°F)
Pour point	: Not available.
Solubility	: Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

10 . Stability and reactivity

Chemical stability	: The product is stable.
Hazardous polymerisation	: Under normal conditions of storage and use, hazardous polymerisation will not occur.
Materials to avoid	: Reactive with oxidising agents and acids.
Hazardous decomposition products	: May release COx, NOx, SOx, H2S, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Kerosine (petroleum), hydrodesulfurized	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>5000 mg/m³	4 hours
Fuels, diesel	LD50 Dermal	Mouse	24500 mg/kg	-
	LD50 Oral	Rat	7500 mg/kg	-
Fuel oil No. 2	LD50 Oral	Rat	12000 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Kerosine (petroleum), hydrodesulfurized	A3	-	-	-	-	-
Fuels, diesel	A3	3	-	-	-	-
Fuel oil No. 2	A3	3	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. 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.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

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

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1202	DIESEL FUEL	3	III		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Combustible liquid
Irritating material

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2B: Material causing other toxic effects (Toxic).

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

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.

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

Health	2
Flammability	2
Physical hazards	0
Personal protection	H

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

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

Date of printing : 12/17/2009.

Date of issue : 3 July 2009

Date of previous issue : No previous validation.

Responsible name : **Product Safety - DSR**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : 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

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.

Superior Propane
A division of Superior Plus LP

MATERIAL SAFETY DATA SHEET

GUARDIAN

SECTION 1 – PRODUCT INFORMATION

Product Name:	Propane	Supplier:	Superior Propane A Division of Superior Plus LP 1111 - 49th Avenue N.E. Calgary, AB T2E 8V2 Business: (403) 730-7500
Trade Name:	LPG (Liquefied Petroleum Gas), LP-Gas		
Chemical Formula:	C_3H_8		
WHMIS Classification:	Class A – Compressed Gas Class B, Division 1 – Flammable Gas	24-Hour Emergency Contact:	Canutec (613) 996-6666

Application and Use: Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in industry as a refrigerant, solvent and as a chemical feedstock.

SECTION 2 – HAZARDOUS INGREDIENTS

COMPONENTS	CAS No	% VOLUME (v/v)	LD_{50} (RAT, ORAL)
Propane	74-98-6	90% -99%	Not Applicable
Propylene	115-07-1	0% - 5%	Not Applicable
Ethane	74-84-0	0% - 5%	Not Applicable
Butane and heavier hydro carbons	106-97-8	0% - 2.5%	Not Applicable

Occupational Exposure Limit:
Based upon animal test data, the acute toxicity of this product is expected to be inhalation: 4 hour LC50 = 280,000 ppm (Rat)

Note: Composition is typical for HD-5 Propane per The Canadian General Standard Board CGSB 3.14 National Standard of Canada. Exact composition will vary from shipment to shipment.

SECTION 3 – CHEMICAL AND PHYSICAL DATA

Form:	Liquid and vapour while stored under pressure	pH:	Not available
Boiling Point:	-42°C @ 1 atm	Solubility in Water :	Slight, 6.1% by volume @ 17.8°C
Freezing Point:	-188°C	Specific Gravity:	0.51 (water = 1)
Evaporation Rate:	Rapid (Gas at normal ambient conditions)	Appearance/Odour:	Colourless liquid and vapour while stored under pressure. Colourless and odourless gas in natural state at any concentration. Commercial propane has an odourant added, ethyl mercaptan, which has an odour similar to boiling cabbage.
Vapour Pressure:	1435 kPa (maximum) @ 37.8°C		
Vapour Density:	1.52 (Air = 1)		
Coefficient of Water/ Oil Distribution:	Not available	Odour Threshold:	4800 ppm

With proper handling, transportation and storage, adding a chemical odourant such as ethyl mercaptan has proven to be a very effective warning device, but all odourants have certain limitations. The effectiveness of the odourant may be diminished by a person's sense of smell, by competing odours and by oxidation which may cause a potentially dangerous situation.

SECTION 4 – FIRE OR EXPLOSION HAZARD

Flash Point: -103.4°C

Method: Closed cup

Flammable Limits: Lower 2.4%, Upper 9.5%

Auto Ignition T emperature: 432°C

Hazardous Combustion Products: Carbon monoxide can be produced when primary air and secondary air are deficient while combustion is taking place.

Fire and Explosive Hazards to leak to atmosphere. : Explosive air -vapour allowed

Sensitivity to Impact: No

Sensitivity to Static Discharge: Yes

Fire Extinguishing Precautions: Use water spray to cool exposed cylinders or tanks. Do not extinguish fire unless the source of the escaping gas that is fueling the fire can be turned off. Fire can be extinguished with carbon dioxide and/or dry chemical (BC). Container metal shells require cooling with water to prevent flame impingement and the weakening of metal. If sufficient water is not available to protect the container shell from weakening, the area will be required to be evacuated. If gas has not ignited, liquid or vapour may be dispersed by water spray or flooding.

Special Fire Fighting Equipment: Protective clothing, hose monitors, fog nozzles, self-contained breathing apparatus.

SECTION 5 – REACTIVITY DATA

Stability: Stable

Conditions T o A void: Keep separate from oxidizing agents. Gas explodes spontaneously when mixed with chloride dioxide.

Incompatibility: Remove sources of ignition and observe distance requirements for storage tanks from combustible material, drains and openings to building.

Hazardous Decomposition Products: Deficient primary and secondary air can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

SECTION 6 – TOXICOLOGICAL PROPERTIES OF MATERIAL

Routes of Entry: Skin Contact, Eye Contact, Inhalation

Inhalation: Simple asphyxiant. No effect at concentrations of 10,000 ppm (peak exposures). Higher concentrations may cause central nervous system disorder and/or damage. Lack of oxygen may cause dizziness, loss of coordination, weakness, fatigue, euphoria, mental confusion, blurred vision, convulsions, breathing failure, coma and death. Breathing high vapour concentrations (saturated vapours) for a few minutes may be fatal. Saturated vapours may be encountered in confined spaces and/or under conditions of poor ventilation. Avoid breathing vapours or mist.

Skin and Eye Contact: Exposure to vapourizing liquid may cause frostbite (cold burns) and permanent eye damage.

Ingestion: Not considered to be a hazard.

Acute Exposure: Contact with Liquefied Petroleum Gas may cause frostbite or cold burns. Propane acts as a simple asphyxiant as oxygen content in air is displaced by the propane. At increasing concentration levels, propane may cause dizziness, headaches, loss of coordination, fatigue, unconsciousness and death.

Chronic Exposure: No reported effects from long term low level exposure.

Sensitization to Product: Not known to be a sensitizer.

Occupational Exposure Limits: American Conference of Governmental Industrial Hygienists (ACGIH) lists as a simple asphyxiant.

ACGIH TLV: 1000 ppm

Carcinogenicity, Reproductive Toxicity, Teratogenicity, Mutagenicity: No effects reported.

Other Toxicological Effects: None

SECTION 7 – PREVENTATIVE MEASURES

Eyes:	Safety glasses or chemical goggles are recommended when transferring product.
Skin:	Insulated gloves required if contact with liquid or liquid cooled equipment is expected. Wear gloves and long sleeves when transferring product.
Inhalation:	Where concentration in air would reduce the oxygen level below 18% air or exceed occupational exposure limits in section 6, self-contained breathing apparatus is required.
Ventilation:	Use in well-ventilated areas. Use with explosion proof mechanical ventilation in confined spaces or poorly ventilated areas.

SECTION 8 – EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Should eye contact with liquid occur, flush eyes with lukewarm water for 15 minutes. Obtain immediate medical care.
Skin:	In case of "Cold Burn" from contact with liquid, immediately place affected area in lukewarm water and keep at this temperature until circulation returns. If fingers or hands are frostbitten, have the victim hold his hand next to his body such as under the armpit. Obtain immediate medical care.
Ingestion:	None considered necessary.
Inhalation:	Remove person to fresh air. If breathing is difficult or has stopped, administer artificial respiration. Obtain immediate medical care.
Spill or Leak:	Eliminate leak if possible. Eliminate source of ignition. Ensure cylinder is upright. Disperse vapours with hose streams using fog nozzles. Monitor low areas as propane is heavier than air and can settle into low areas. Remain upwind of leak. Keep people away. Prevent vapour and/or liquid from entering into sewers, basements or confined areas.

SECTION 9 – TRANSPORTATION, HANDLING AND STORAGE

- Transport and store cylinders and tanks secured in an upright position in a ventilated space away from ignition sources (so the pressure relief valve is in contact with the vapour space of the cylinder or tank).
- Cylinders that are not in use must have the valves in the closed position and be equipped with a protective cap or guard.
- Do not store with oxidizing agents, oxygen, or chlorine cylinders.
- Empty cylinders and tanks may contain product residue. Do not pressurize, cut, heat or weld empty containers.
- Transport, handle and store according to applicable federal and provincial codes and regulations.

Transportation of Dangerous Goods (TDG)
TDG Classification: Flammable Gas 2.1

TDG Shipping Name: Liquefied Petroleum Gas (Propane)

PIN Number: UN1075

SECTION 10 – PREPARATION INFORMATION

Prepared by: Superior Propane
Health Safety and Environment Team

Telephone: (403) 730-7500
Revision: March 1, 2008
Supersedes: March 24, 2005

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JET A/A-1 AVIATION TURBINE FUEL

000003001081

Version 1.0 | Revision Date 2015/05/14 | Print Date 2015/05/14

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	JET A/A-1 AVIATION TURBINE FUEL
Synonyms	:	Jet A-1; Jet A-1-DI; Aviation Turbine Kerosene (ATK); JP-8; NATO F-34; Jet F-34; Aviation Turbine Fuel, Kerosene Type (CAN/CGSB 3.23 & CAN/CGSB 3.24)
Product code	:	101851, 100123
Manufacturer or supplier's details		Petro-Canada P.O. Box 2844, 150 - 6th Avenue South-West Calgary Alberta T2P 3E3 Canada
Emergency telephone number		Suncor Energy: +1 403-296-3000; Poison Control Centre: Consult local telephone directory for emergency number(s).

Recommended use of the chemical and restrictions on use

Recommended use	:	Used as aviation turbine fuel. May contain a fuel system icing inhibitor. In the arctic, Jet A-1 may also be used as diesel fuel (if it contains a lubricity additive) and heating oil.
Prepared by	:	Product Safety: +1 905-804-4752

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance	Clear liquid.
Colour	Clear and colourless
Odour	Kerosene-like.

GHS Classification

Flammable liquids	:	Category 3
Skin irritation	:	Category 2
Reproductive toxicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Central nervous system)
Aspiration hazard	:	Category 1

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GHS Label element

Hazard pictograms :

Signal word : Danger

Hazard statements :
H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H361 Suspected of damaging fertility or the unborn child.

Precautionary statements :

Prevention:
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ eye protection/ face protection.
P281 Use personal protective equipment as required.

Response:
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P331 Do NOT induce vomiting.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Potential Health Effects

Primary Routes of Entry : Eye contact
Ingestion
Inhalation
Skin contact

Inhalation : Inhalation may cause central nervous system effects. Symptoms and signs include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.

Skin : May irritate skin.

Eyes : May irritate eyes.

Ingestion : Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea.
Aspiration hazard if swallowed - can enter lungs and cause damage.

Aggravated Medical Condition : None known.

Carcinogenicity:

IARC No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH Confirmed animal carcinogen with unknown relevance to humans

Kerosene 8008-20-6

OSHA No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance/mixture : Mixture

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
kerosine (petroleum)	8008-20-6	90 - 100 %
2-(2-methoxyethoxy)ethanol	111-77-3	0 - 0.2 %

SECTION 4. FIRST AID MEASURES

If inhaled	:	Move to fresh air. Artificial respiration and/or oxygen may be necessary. Seek medical advice.
In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Wash clothing before reuse. Seek medical advice.
In case of eye contact	:	Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
If swallowed	:	Rinse mouth with water. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Never give anything by mouth to an unconscious person. Seek medical advice.
Most important symptoms and effects, both acute and delayed	:	First aider needs to protect himself.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Dry chemical Carbon dioxide (CO_2) Water fog. Foam
Unsuitable extinguishing media	:	Do NOT use water jet.
Specific hazards during firefighting	:	Cool closed containers exposed to fire with water spray.
Hazardous combustion products	:	Carbon oxides (CO, CO_2), nitrogen oxides (NO_x), sulphur oxides (SO_x), smoke and irritating vapours as products of incomplete combustion.
Further information	:	Prevent fire extinguishing water from contaminating surface water or the ground water system.
Special protective equipment for firefighters	:	Wear self-contained breathing apparatus for firefighting if necessary.

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SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Material can create slippery conditions.
Environmental precautions	:	If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Prevent further leakage or spillage if safe to do so. Remove all sources of ignition. Soak up with inert absorbent material. Non-sparking tools should be used. Ensure adequate ventilation. Contact the proper local authorities.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	For personal protection see section 8. Smoking, eating and drinking should be prohibited in the application area. Use only with adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Avoid contact with skin, eyes and clothing. Do not ingest. Keep away from heat and sources of ignition. Keep container closed when not in use.
Conditions for safe storage	:	Store in original container. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Keep in a dry, cool and well-ventilated place. Keep in properly labelled containers. To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
kerosine (petroleum)	8008-20-6	TWA	100 mg/m3	NIOSH REL

Engineering measures : Use only in well-ventilated areas.

Ensure that eyewash station and safety shower are proximal to the work-station location.

Personal protective equipment

Respiratory protection	:	Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. 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.
Filter type	:	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.
Hand protection Material	:	polywinyl alcohol (PVA), Viton(R). 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.
Remarks	:	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.
Eye protection	:	Wear face-shield and protective suit for abnormal processing problems.
Skin and body protection	:	Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place.
Protective measures	:	Wash contaminated clothing before re-use.
Hygiene measures	:	Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash face, hands and any exposed skin thoroughly after handling.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Clear liquid.
Colour	:	Clear and colourless

Odour	:	Kerosene-like.
Odour Threshold	:	No data available
pH	:	No data available
Pour point	:	-51 °C (-60 °F)No data available
Boiling point/boiling range	:	140 - 300 °C (284 - 572 °F)
Flash point	:	> 38 °C (100 °F) Method: Tagliabue
Auto-Ignition Temperature	:	210 °C (410 °F)
Evaporation rate	:	No data available
Flammability	:	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.
Upper explosion limit	:	5 %(V)
Lower explosion limit	:	0.7 %(V)
Vapour pressure	:	5.25 mmHg (20 °C / 68 °F)
Relative vapour density	:	4.5
Relative density	:	0.775 - 0.84 (15 °C / 59 °F)
Solubility(ies)		
Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Viscosity		
Viscosity, kinematic	:	1.0 - 1.9 cSt (40 °C / 104 °F)
Explosive properties	:	Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire.

SECTION 10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	Hazardous polymerisation does not occur. Stable under normal conditions.
Conditions to avoid	:	Extremes of temperature and direct sunlight.

Incompatible materials	:	Reactive with oxidising agents, acids and alkalis.
Hazardous decomposition products	:	May release COx, NOx, SOx, aldehydes, acids, ketones, smoke and irritating vapours when heated to decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure: Eye contact, Ingestion, Inhalation, Skin contact

Acute toxicity

Product:

Acute oral toxicity	Remarks: No data available
Acute inhalation toxicity	Remarks: No data available
Acute dermal toxicity	Remarks: No data available

Components:

kerosine (petroleum):

Acute oral toxicity	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	LC50 (Rat): > 5 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	LD50 (Rabbit): > 2,000 mg/kg

Skin corrosion/irritation

Product:

Remarks: No data available

Serious eye damage/eye irritation

Product:

Remarks: No data available

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

No data available

Reproductive toxicity

No data available

STOT - single exposure

No data available

STOT - repeated exposure

No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

Toxicity to fish	:	Remarks: No data available
Toxicity to daphnia and other aquatic invertebrates	:	Remarks: No data available
Toxicity to algae	:	Remarks: No data available
Toxicity to bacteria	:	Remarks: No data available

Persistence and degradability

Product:

Biodegradability	:	Remarks: No data available

Bioaccumulative potential

No data available

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	The product should not be allowed to enter drains, water courses or the soil. Offer surplus and non-recyclable solutions to a licensed disposal company. Waste must be classified and labelled prior to recycling or disposal. Send to a licensed waste management company. Dispose of as hazardous waste in compliance with local and national regulations. Dispose of product residue in accordance with the instructions of the person responsible for waste disposal.
Contaminated packaging	:	Empty pressure vessels should be returned to the supplier.

Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International Regulation

IATA-DGR

UN/ID No.	: 1863
Proper shipping name	: Fuel, aviation, turbine engine
Class	: 3
Packing group	: III
Labels	: 3
Packing instruction (cargo aircraft)	: 366

IMDG-Code

UN number	: 1863
Proper shipping name	: FUEL, AVIATION, TURBINE ENGINE
Class	: 3
Packing group	: III
Labels	: 3
EmS Code	: F-E, S-E
Marine pollutant	: no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

49 CFR

UN/ID/NA number	: 1863
Proper shipping name	: Fuel, aviation, turbine engine
Class	: 3
Packing group	: III
Labels	: 3
ERG Code	: 128
Marine pollutant	: no

Special precautions for user

Not applicable

SECTION 15. REGULATORY INFORMATION

The components of this product are reported in the following inventories:

DSL	On the inventory, or in compliance with the inventory
TSCA	All chemical substances in this product are either listed on the TSCA Inventory or are in compliance with a TSCA Inventory exemption.
EINECS	On the inventory, or in compliance with the inventory

SECTION 16. OTHER INFORMATION

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Further information

NFPA:

HMIS III:

HEALTH	2*
FLAMMABILITY	2
PHYSICAL HAZARD	0
PERSONAL PROTECTION	H

0 = not significant, 1 = Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds
Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228
For Product Safety Information: 1 905-804-4752

Prepared by : Product Safety: +1 905-804-4752

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Material Safety Data Sheet

AIR LIQUIDE

Acetylene

1. Product and company identification

Product name	:	Acetylene
Synonym	:	ethyne; Ethyne (acetylene); Ethine; Methyl cyanide
Material uses	:	Various
CAS number	:	74-86-2
Supplier/Manufacturer	:	Air Liquide Canada Inc. 1250, René-Lévesque West, Suite 1700 Montreal, QC H3B 5E6 www.airliquide.ca 1-800-817-7697
Prepared by	:	IHS
In case of emergency	:	(514) 878-1667

2. Hazards identification

Physical state	:	Gas.
Color	:	Colorless.
Odor	:	Mild. Ethereal.
Emergency overview		
Signal word	:	DANGER!
Hazard statements	:	FLAMMABLE GAS. MAY CAUSE FLASH FIRE. UNSTABLE. SENSITIVE TO HEAT OR SHOCK. MAY BECOME EXPLOSIVE. HIGH PRESSURE GAS. GAS REDUCES OXYGEN AVAILABLE FOR BREATHING. AT VERY HIGH CONCENTRATIONS, CAN DISPLACE THE NORMAL AIR AND CAUSE SUFFOCATION FROM LACK OF OXYGEN. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
Precautions	:	Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode. At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen. Avoid shock and friction. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not enter storage areas and confined spaces unless adequately ventilated. Do not breathe gas. Avoid contact with skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Keep container tightly closed.
Routes of entry	:	Dermal contact. Eye contact. Inhalation.
Potential acute health effects		
Inhalation	:	At very high concentrations, can displace the normal air and cause suffocation from lack of oxygen.
Ingestion	:	As this product is a gas, refer to the inhalation section.
Skin	:	Contact with rapidly expanding gas may cause burns or frostbite.
Eyes	:	Contact with rapidly expanding gas may cause burns or frostbite.
Potential chronic health effects		
Chronic effects	:	May cause target organ damage, based on animal data.
Carcinogenicity	:	No known significant effects or critical hazards.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.

2. Hazards identification

Fertility effects : No known significant effects or critical hazards.

Target organs : May cause damage to the following organs: lungs, upper respiratory tract, central nervous system (CNS).

Over-exposure signs/symptoms

Inhalation : No specific data.

Ingestion : No specific data.

Skin : No specific data.

Eyes : No specific data.

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

3. Composition/information on ingredients

Name	CAS number	%
acetylene	74-86-2	100

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : As this product is a gas, refer to the inhalation section.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Antidote information

Product/ingredient name	Antidote information
No antidote information known	

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

Flammability of the product : Contains gas under pressure. Flammable gas. Material will produce a vigorous reaction under conditions of shock, pressure or temperature. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. First move people out of line-of-sight of the scene and away from windows. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Do not fight fire when it reaches the material. Withdraw from fire and let it burn.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

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. Fire-fighters' protective clothing will only provide limited protection.

6. Accidental release measures

Personal precautions : Accidental releases pose a serious fire or explosion hazard. Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8). If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. Never fix a leak while the system is under pressure. If leak is on container or container valve, contact the closest Air Liquide Canada location.

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other

7. Handling and storage

ignition source. Use a specifically designed Cap Removal Tool to loosen over tightened or stuck valve protection caps. NEVER insert an object such a wrench, screwdriver, pry bar, etc... into the closed valve protection cap openings. Doing so may inadvertently damage or open the valve resulting in uncontrolled product release with dangerous consequences. If you experience any difficulty using the cylinder package, discontinue its use and contact the supplier. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Valve protection caps must remain in place unless cylinder is secured with valve outlet piped to usage point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow to the cylinder. Do not tamper with (valve) safety device. Close valve after each use and when empty.

Storage : Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 52°C/125°F. Cylinders must be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders being stored for excessive periods of time. Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Protect from sunlight. Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use.

8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
acetylene	Simple asphyxiant.										[2]

[2]Oxygen Depletion [Asphyxiant]

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

Engineering measures : Use only with adequate ventilation. Engineering controls may be required to control the primary or secondary risks associated with this product. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

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.

Personal protection

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. If operating conditions cause high gas concentrations to be produced or any recommended or statutory exposure limit is exceeded, use an air-fed respirator or self-contained breathing apparatus. The gas can cause asphyxiation without warning by replacing the oxygen in the air. 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.

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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

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 or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

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.
When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state : Gas.

Flash point : Closed cup: -18.15°C (-0.67°F)

Auto-ignition temperature : 305°C (581°F)

Flammable limits : Lower: 2.5%
Upper: 100%

Color : Colorless.

Odor : Mild. Ethereal.

Molecular weight : 26.04 g/mole

Molecular formula : C2-H2

pH : Not available.

Boiling/condensation point : Not available.

Melting/freezing point : -81°C (-113.8°F)

Critical temperature : 35.25°C (95.4°F)

Relative density : 0.9

Density : 0.001 g/cm³ [20°C (68°F)]

Vapor pressure : 4535 kPa (34015.26 mm Hg) [room temperature]

Vapor density : 0.907 [Air = 1]

Odor threshold : Not available.

Evaporation rate : Not available.

Viscosity : Not available.

9. Physical and chemical properties

Solubility : Not available.
Water solubility (g/l) : 1.2 g/l
LogK$_{ow}$: 0.37

10. Stability and reactivity

Chemical stability : Unstable (reactive) material. See "Possibility of Hazardous Reactions" for further information.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid shock and friction.

Incompatible materials : Reactive or incompatible with the following materials: oxidizing materials.
Reacts with oxygen. Violent reaction may occur.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Possibility of hazardous reactions : Hazardous reactions or instability may occur under certain conditions of storage or use.
Conditions may include the following:
shock
friction
high temperature
Reactions may include the following:
risk of explosion
Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity
Not available.

Chronic toxicity
Not available.

Irritation/Corrosion
Not available.

Sensitizer
Not available.

Carcinogenicity
Classification
Not available.

Mutagenicity
Not available.

Teratogenicity
Not available.

Reproductive toxicity
Not available.

12. Ecological information

Ecotoxicity : This product shows a low bioaccumulation potential.

Aquatic ecotoxicity

Not available.

Persistence/degradability

Not available.

Partition coefficient: n-octanol/water : 0.37

Bioconcentration factor : Not available.

Mobility : Not available.

Toxicity of the products of biodegradation : Not available.

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. 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. Empty pressure vessels should be returned to the supplier. Waste packaging should be recycled.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

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

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1001	ACETYLENE, DISSOLVED	2.1	-		Explosive Limit and Limited Quantity Index 0 Passenger Carrying Ship Index 75 Passenger Carrying Road or Rail Index Forbidden Special provisions 38
IMDG Class	UN1001	ACETYLENE, DISSOLVED	2.1	-		Emergency schedules (EmS) _F-D_, _S-U_

Acetylene

14. Transport information

IATA-DGR Class	UN1001	Acetylene, dissolved	2.1	-		Passenger and Cargo Aircraft Quantity limitation: Forbidden Packaging instructions: Forbidden Cargo Aircraft Only Quantity limitation: 15 kg Packaging instructions: 200 Limited Quantities - Passenger Aircraft Quantity limitation: Forbidden Packaging instructions: Forbidden Special provisions A1

PG* : Packing group

15. Regulatory information

United States inventory (TSCA 8b) : This material is listed or exempted.

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.
Class F: Dangerously reactive material.

Canadian lists

Canadian NPRI : This material is listed.

CEPA Toxic substances : This material is not listed.

Canada inventory : This material is listed or exempted.

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

International regulations

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

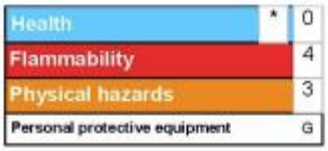
Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16. Other information

Label requirements : FLAMMABLE GAS. MAY CAUSE FLASH FIRE. UNSTABLE. SENSITIVE TO HEAT OR SHOCK. MAY BECOME EXPLOSIVE. HIGH PRESSURE GAS. GAS REDUCES OXYGEN AVAILABLE FOR BREATHING. AT VERY HIGH CONCENTRATIONS, CAN DISPLACE THE NORMAL AIR AND CAUSE SUFFOCATION FROM LACK OF OXYGEN. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

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



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on MSDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

Date of issue : 9/4/2015

Date of previous issue : 3/27/2014

Version : 6.01

Indicates information that has changed from previously issued version.

Notice to reader

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AIR PRODUCTS

MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

PRODUCT NAME: **Oxygen, Compressed**
CHEMICAL NAME: **Oxygen** **FORMULA:** O_2
SYNONYMS: Oxygen gas, Gaseous Oxygen, GOX
MANUFACTURER: **Air Products and Chemicals, Inc.**
7201 Hamilton Boulevard
Allentown, PA 18195 - 1501
PRODUCT INFORMATION: 1-800-752-1597
MSDS NUMBER: 1012 **REVISION:** 5
REVISION DATE: January 1995 **REVIEW DATE:** August 1997**

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Oxygen is sold as pure product > 99%.
CAS NUMBER: 7782-44-7
EXPOSURE LIMITS:
OSHA: Not established **ACGIH:** Not established **NIOSH:** Not established

SECTION 3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW

Oxygen is an odorless, colorless, nonflammable gas stored in cylinders at high pressure. It is an oxidizing gas and vigorously accelerates combustion. Keep away from oils or grease. Rescue personnel should be aware of the extreme fire hazards associated with oxygen-enriched (greater than 23%) atmospheres, and that self contained breathing apparatus (SCBA) may be required.

EMERGENCY TELEPHONE NUMBERS
(800) 523-9374 Continental U.S., Canada and Puerto Rico
(610) 481-7711 other locations

POTENTIAL HEALTH EFFECTS INFORMATION:

INHALATION: Breathing 80% or more oxygen at atmospheric pressure for more than a few hours may cause nasal stuffiness, cough, sore throat, chest pain and breathing difficulty. Breathing oxygen at higher pressure increases the likelihood of adverse effects within a shorter time period. Breathing pure oxygen under pressure may cause lung damage and also central nervous system effects resulting in dizziness, poor coordination, tingling sensation, visual and hearing disturbances, muscular twitching, unconsciousness and convulsions. Breathing oxygen under pressure may cause prolongation of adaptation to darkness and reduced peripheral vision.

EYE / SKIN CONTACT: No adverse effect.

EXPOSURE INFORMATION:

ROUTE OF ENTRY: Inhalation

TARGET ORGANS: Eyes, central nervous system

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Patients with chronic obstructive pulmonary disease retain carbon dioxide abnormally. If oxygen is administered to them, raising the oxygen concentration in the blood depresses their breathing and raises their retained carbon dioxide to a dangerous level.

CARCINOGENIC POTENTIAL: Oxygen is not listed as a carcinogen or potential carcinogen by NTP, IARC, or OSHA Subpart Z.

SECTION 4. FIRST AID

INHALATION: Move victim to fresh air or if in elevated pressures reduce oxygen pressures to one atmosphere. Call a physician. The physician should be advised that the victim has been exposed to a high concentration of oxygen. No treatment is required in the absence of symptoms or high pressure exposure.

EYE / SKIN CONTACT: Not applicable

NOTES TO PHYSICIAN: Animal studies suggest that the administration of certain drugs, including phenothiazine drugs and chloroquine, increase the susceptibility to toxicity from oxygen at high pressures. Animal studies also indicate that vitamin "E" deficiency may increase susceptibility to oxygen toxicity.

Airway obstruction during high oxygen tension may cause alveolar collapse following absorption of the oxygen. Similarly, occlusion of the Eustachian tubes may cause retraction of the eardrum and obstruction of the paranasal sinuses may produce "vacuum-type" headache.

All individuals exposed for long periods to oxygen at high pressure and who exhibit overt oxygen toxicity should have ophthalmologic examinations.

SECTION 5. FIRE AND EXPLOSION

FLASH POINT:	AUTOIGNITION:	FLAMMABLE LIMITS:
Not applicable	Nonflammable	Nonflammable

EXTINGUISHING MEDIA: Oxygen is nonflammable but will support combustion. Use extinguishing media appropriate for surrounding fire.

HAZARDOUS COMBUSTION PRODUCTS: None

SPECIAL FIRE FIGHTING INSTRUCTIONS: Evacuate all personnel from the danger area. If possible, shut off flow of oxygen which is supporting the fire. Immediately cool containers with water spray from maximum distance. When cool move cylinders from fire area, if possible without risk. Self contained breathing apparatus may be required for rescue workers.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Oxygen vigorously accelerates combustion. Some materials which are noncombustible in air will burn in the presence of an oxygen enriched atmosphere (greater than 23%). Fire resistant clothing may burn and offer no protection in oxygen rich atmospheres. Oxygen may form explosive compounds when exposed to combustible materials or oil, grease, and other hydrocarbon materials. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function. Upon exposure to intense heat or flame cylinder will vent rapidly and/or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Evacuate all personnel from affected area. Shut off source of oxygen if possible. Increase ventilation to release area. Personnel who have been exposed to high concentrations of oxygen should stay in a well-ventilated or open area for 30 minutes before going into a confined space or near an ignition source.
If leak is from container or its valve, call the Air Products emergency telephone number. If leak is in user's system close cylinder valve and vent pressure before attempting repairs.

SECTION 7. STORAGE AND HANDLING

STORAGE: Cylinders should be stored upright in a well-ventilated, secure area, protected from the weather. Storage area temperatures should not exceed 125 °F (52 °C) and area should be free of combustible materials. Storage should be away from heavily traveled areas and emergency exits. Avoid areas where salt or other corrosive materials are present. Cylinders should be separated from flammables by a minimum distance of 20 ft. or by a barricade of non-combustible material at least five ft. high having a fire resistance rating of at least 1/2 hour. Valve protection caps and valve outlet seals should remain on cylinders not connected for use. Separate full from empty cylinders. Avoid excessive inventory and storage time. Use a first-in first-out system. Keep good inventory records.

HANDLING: Do not drag, roll, or slide cylinder. Use a suitable handtruck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure reducing regulator or separate control valve to safely discharge gas from cylinder. Use a check valve to prevent reverse flow into cylinder. Do not overheat cylinder to increase pressure or discharge rate. Always open cylinder valve slowly. Do not use rapid opening valves (i.e., ball valves). If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may damage valve causing a leak to occur. Use an adjustable strap-wrench to remove over-tight or rusted caps.

All gauges, valves, regulators, piping and equipment to be used in oxygen service must be cleaned for oxygen service in accordance with Compressed Gas Association pamphlet G-4.1.

Carbon steel, stainless steel, copper, brass, nickel and their alloys are materials of construction that can be used in oxygen service. Use piping and equipment adequately designed to withstand pressures to be encountered. Oxygen is not to be used as a substitute for compressed air. Never use an oxygen jet for cleaning purposes of any sort, especially clothing, as it increases the likelihood of an engulfing fire. Use a check valve or other protective apparatus in any line or piping from the cylinder to prevent reverse flow.

When used in welding and cutting read and understand the manufacturer's instructions and the precautionary label on the products. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

SPECIAL REQUIREMENTS: Always store and handle compressed gases in accordance with Compressed Gas Association, Inc. (ph. 703-412-0900) pamphlet CGA P-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage or use.

CAUTION: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner's written consent is a violation of federal law.

SECTION 8. PERSONAL PROTECTION / EXPOSURE CONTROL

ENGINEERING CONTROLS: Provide ventilation and/or local exhaust to prevent accumulation of high concentrations of gas (greater than 23%).

RESPIRATORY PROTECTION:

GENERAL USE: None required

EMERGENCY: Use SCBA do to possibility of fire when concentrations exceed 23%.

OTHER PROTECTIVE EQUIPMENT: Safety shoes and work gloves are recommended when handling cylinders. Clothing exposed to high concentrations may retain oxygen 30 minutes or longer and become a potential fire hazard. Stay away from ignition sources.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Colorless gas
ODOR: Odorless
MOLECULAR WEIGHT: 32.0
BOILING POINT (1 atm): -297.3 °F (-183.0 °C)
SPECIFIC GRAVITY (Air =1): 1.10
SPECIFIC VOLUME (at 70 °F 21.1 °C) and 1 atm): 12.08 ft^3/lb (0.754 m^3/kg)
FREEZING / MELTING POINT: -361.9 °F (-218.8 °C)
VAPOR PRESSURE: Not applicable at 70°F
GAS DENSITY (At 70°F (21.1°C) and 1 Atm): 0.083 lb /ft^3 (1.326 kg/m^3)
SOLUBILITY IN WATER (Vol./Vol. at 32°F (0°C)): 0.049

SECTION 10. REACTIVITY / STABILITY

CHEMICAL STABILITY: Stable
CONDITIONS TO AVOID: None
INCOMPATIBILITY: Oils, grease, hydrocarbons and flammable materials.
HAZARDOUS DECOMPOSITION PRODUCTS: None
HAZARDOUS POLYMERIZATION: Will not occur

SECTION 11. TOXICOLOGICAL INFORMATION

At atmospheric concentration and pressure, oxygen poses no toxicity hazards.

Premature infants exposed to high oxygen concentrations may suffer delayed retinal damage which can progress to retinal detachment and blindness. Retinal damage may also occur in adults exposed to 100% oxygen for extended periods (24 to 48 hr).

At two or more atmospheres central nervous system (CNS) toxicity occurs. Symptoms include nausea, vomiting, dizziness or vertigo, muscle twitching, vision changes, and loss of consciousness and generalized seizures. At three atmospheres, CNS toxicity occurs in less than two hours, and at six atmospheres in only a few minutes.

SECTION 12. ECOLOGICAL INFORMATION

The atmosphere contains 21% oxygen. No adverse ecological effects are expected. Oxygen does not contain any Class I or Class II ozone depleting chemicals. Oxygen is not listed as a marine pollutant by DOT (49 CFR 171).

SECTION 13. DISPOSAL

UNUSED PRODUCT / EMPTY CONTAINER: Return container and unused product to supplier. Do not attempt to dispose of residual or unused quantities.

DISPOSAL: For emergency disposal, secure cylinder and slowly discharge gas to the atmosphere in a well ventilated area or outdoors.

SECTION 14. TRANSPORTATION

DOT HAZARD CLASS: 2.2 (Nonflammable Gas)
DOT SHIPPING LABEL: Nonflammable Gas, Oxidizer
DOT SHIPPING NAME: Oxygen, compressed
IDENTIFICATION NUMBER: UN 1072
REPORTABLE QUANTITY (RQ): None
PLACARD: Nonflammable Gas or Oxygen

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure upright position in a well ventilated truck. Never transport in passenger compartment of a vehicle. An oxygen label may be used for domestic shipment in the United States and Canada in place of the Non-flammable and Oxidizer labels (49CFR Part 172).

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

EPA - ENVIRONMENTAL PROTECTION AGENCY:

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 requires notification to the National Response Center of releases of quantities of hazardous substances equal to or greater than the reportable quantities (RQ) in 40 CFR 302.4.

CERCLA Reportable Quantity: None

SARA TITLE III: Superfund Amendments and Reauthorization Act of 1986

SECTION 302: Requires emergency planning based on threshold planning quantities (TPQ) and release reporting based on reportable quantities (RQ) of EPA's extremely hazardous substances (40 CFR 355).

Oxygen is not listed as an Extremely Hazardous Substance.

SECTIONS 311/312: Require submission of material safety data sheets (MSDSs) and chemical inventory reporting with identification of EPA defined hazard classes. The hazard classes for this product are:

IMMEDIATE:	No	PRESSURE:	Yes
DELAYED:	No	REACTIVITY:	No
		FIRE:	Yes

SECTION 313: Requires submission of annual reports of releases of toxic chemicals that appear in

40 CFR 372.

Oxygen is not listed as a toxic chemical.

40 CFR PART 68: Risk Management for Chemical Accident Release Prevention. Requires the development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Oxygen is not listed as a regulated substance.

TOXIC SUBSTANCE CONTROL ACT (TSCA): Oxygen is listed on the TSCA inventory.

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals. Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Oxygen is not listed as a Highly Hazardous Chemical.

STATE REGULATIONS

CALIFORNIA:

Proposition 65: This product does NOT contain any listed substances for which the State of California requires warning under this statute.

SCAQMD Rule: VOC = Not applicable

SECTION 16. SUPPLEMENTAL INFORMATION

HAZARD RATINGS:

NFPA RATINGS:		HMIS RATINGS:	
HEALTH:	0	HEALTH:	0
FLAMMABILITY:	0	FLAMMABILITY:	0
REACTIVITY:	0	REACTIVITY:	0
SPECIAL:	OX (oxidizer)		

**Documents with Revision Date January 1995 and Review Date August 1997 are identical in content and either may be used.

Appendix B – NT/NU Spill Report Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca

REPORT LINE USE ONLY

A	Report Date: MM DD YY	Report Time:	☐ Original Spill Report OR ☐ Update # _____ to the Original Spill Report	**Report Number:**
B	Occurrence Date: MM DD YY	Occurrence Time:		
C	Land Use Permit Number (if applicable):		Water Licence Number (if applicable):	
D	Geographic Place Name or Distance and Direction from the Named Location:		Region: ☐ NT ☐ Nunavut ☐ Adjacent Jurisdiction or Ocean	
E	Latitude: _____ Degrees _____ Minutes _____ Seconds		Longitude: _____ Degrees _____ Minutes _____ Seconds	
F	Responsible Party or Vessel Name:		Responsible Party Address or Office Location:	
G	Any Contractor Involved:		Contractor Address or Office Location:	
H	Product Spilled: ☐ Potential Spill	Quantity in Litres, Kilograms or Cubic Metres:	U.N. Number:	
I	Spill Source:	Spill Cause:	Area of Contamination in Square Metres:	
J	Factors Affecting Spill or Recovery:	Describe Any Assistance Required:	Hazards to Persons, Property or Environment:	
K	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:			

L	Reported to Spill Line by:	Position:	Employer:	Location Calling From:	Telephone:
M	Any Alternate Contact:	Position:	Employer:	Alternate Contact Location:	Alternate Telephone:

REPORT LINE USE ONLY

N	Received at Spill Line by:	Position:	Employer:	Location Called:	Report Line Number:

Lead Agency: ☐ EC ☐ CCG/TCMSS ☐ GNWT ☐ GN ☐ ILA ☐ AANDC ☐ NEB ☐ Other: _____

Significance: ☐ Minor ☐ Major ☐ Unknown

File Status: ☐ Open ☐ Closed

Agency:	Contact Name:	Contact Time:	Remarks:
Lead Agency:			
First Support Agency:			
Second Support Agency:			
Third Support Agency:			

Canada

Instructions for Completing the NT-NU Spill Report Form

This form can be filled out electronically and faxed to the spill line at 867-873-6924. Commencing on January 2, 2007, the form can also be e-mailed as an attachment to spills@gov.nt.ca. Until further notice, please verify receipt of e-mail transmissions with a follow-up telephone call. Spills can still be phoned in by calling collect at 867-920-8130.

A. Report Date/Time	The actual date and time that the spill was reported to the spill line. If the spill is phoned in, the Spill Line will fill this out. **Please do not fill in the Report Number**: the spill line will assign a number after the spill is reported.
B. Occurrence Date/Time	Indicate, to the best of your knowledge, the exact date and time that the spill occurred. Not to be confused with the report date and time (see above).
C. Land Use Permit Number /Water Licence Number	This only needs to be filled in if the activity has been licenced by the Nunavut Water Board and/or if a Land Use Permit has been issued. Applies primarily to mines and mineral exploration sites.
D. Geographic Place Name	In most cases, this will be the name of the city or town in which the spill occurred. For remote locations – outside of human habitations – identify the most prominent geographic feature, such as a lake or mountain and/or the distance and direction from the nearest population center. **You must include the geographic coordinates** (Refer to Section E).
E. Geographic Coordinates	This only needs to be filled out if the spill occurred outside of an established community such as a mine site. Please note that the location should be stated in degrees, minutes and seconds of Latitude and Longitude.
F. Responsible Party Or Vessel Name	This is the person who was in management/control/ownership of the substance at the time that it was spilled. In the case of a spill from a ship/vessel, include the name of the ship/vessel. Please include full address, telephone number and e-mail. Use box K if there is insufficient space. **Please note that, the owner of the spilled substance is ultimately responsible for any spills of that substance, regardless of who may have actually caused the spill.**
G. Contractor involved?	Were there any other parties/contractors involved? An example would be a construction company who is undertaking work on behalf of the owner of the spilled substance and who may have contributed to, or directly caused the spill and/or is responding to the spill.
H. Product Spilled	Identify the product spilled; most commonly, it is gasoline, diesel fuel or sewage. For other substances, avoid trade names. Wherever possible, use the chemical name of the substance and further, identify the product using the four digit UN number (eg: UN1203 for gasoline; UN1202 for diesel fuel; UN1863 for Jet A & B)
I. Spill Source	Identify the source of the spill: truck, ship, home heating fuel tank and, if known, the cause (eg: fuel tank overfill, leaking tank; ship ran aground; traffic accident, vandalism, storm, etc.). Provide an estimate of the extent of the contaminated/impacted area (eg: 10 m^2)
J. Factors Affecting Spill	Any factors which might make it difficult to clean up the spill: rough terrain, bad weather, remote location, lack of equipment. Do you require advice and/or assistance with the cleanup operation? Identify any hazards to persons, property or equipment: for example, a gasoline spill beside a daycare centre would pose a safety hazard to children. Use box K if there is insufficient space.
K. Additional Information	Provide any additional, pertinent details about the spill, such as any peculiar/unique hazards associated with the spilled material. State what action is being taken towards cleaning up the spill; disposal of spilled material; notification of affected parties. If necessary, append additional sheets to the spill report. Number the pages in the same format found in the lower right hand corner of the spill form: eg. "Page 1 of 2", "Page 2 of 2" etc. **Please number the pages to ensure that recipients can be certain that they received all pertinent documents.** If only the spill report form was filled out, number the form as "Page 1 of 1".
L. Reported to Spill Line by	Include your full name, employer, contact number and the location from which you are reporting the spill. Use box K if there is insufficient space.
M. Alternate Contact	Identify any alternate contacts. This information assists regulatory agencies to obtain additional information if they cannot reach the individual who reported the spill.
N. Report Line Use Only	**Leave Blank**. This box is for the **Spill Line's use only.**

Appendix C – Immediately Reportable Spill Quantities

Reportable Quantities for NWT Spills

Note: L = litre; kg = kilogram; PCB = Polychlorinated Biphenyls; ppm = parts per million

Substance	Reportable Quantity	TDG Class
Explosives	Any amount	1.0
Compressed gas (toxic/corrosive)		2.3/2.4
Infectious substances		6.2
Sewage and Wastewater (unless otherwise authorized)		6.2
Radioactive materials		7.0
Unknown substance		None
Compressed gas (Flammable)	Any amount of gas from containers with a capacity grater than 100L	2.1
Compressed gas (Non-corrosive, non-flammable)		2.2
Flammable liquid	≥100 L	3.1/3.2/3.3
Flammable solid	≥ 25 kg	4.1
Substances liable to spontaneous combustion		4.2
Water reactant substances		4.3
Oxidizing substances	≥ 50 L or 50 kg	5.1
Organic peroxides	≥1 L or 1 kg	5.2
Environmentally hazardous substances intended for disposal		9.0
Toxic substances	≥ 5 L or 5 kg	6.1
Corrosive substances		8.0
Miscellaneous products, substances or organisms		9.0

Substance	Reportable Quantity	TDG Class
PCB mixtures of 5 or more ppm	≥ 0.5 L or 0.5 kg	9.0
Other contaminants--for example, crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, wastewater.	≥ 100 L or 100 kg	None
Sour natural gas (i.e., contains H_2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more	None
Flammable liquid Vehicle fluid	≥ 20 L When released on a frozen water body that is being used as a working surface	3.1/3.2/3.3 None
Reported releases or potential releases of any size that: are near or in an open water body; are near or in a designated sensitive environment or habitat; Pose an imminent threat to human health or safety; or Pose an imminent threat to a listed species at risk or its critical habitat	Any amount	None