SNAP LAKE MINE
EXTENDED CARE AND MAINTENANCE SPILL CONTINGENCY PLAN

December 2017
## REVISION HISTORY

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<td>The Extended Care and Maintenance Spill Contingency Plan has been updated to reflect the proposed extended care and maintenance conditions at Snap Lake Mine, including periods of occupancy and periods of camp vacancy and updated organizational structures. This is considered an addendum to the previously provided Spill Contingency Plan</td>
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Appendix D Hazardous Materials Potentially Stored at Site for Mine Operations

ACRONYMS

AANDC Aboriginal Affairs and Northern Development
Canada, INAC See DIAND
AEP Advanced Exploration Program
AEMP  Aquatic Effects Monitoring Plan
AMP    Adaptive Management Plan
ANFO   Ammonium Nitrate Fuel Oil
BSP    Bulk Sample Plant
CANUTEC Canadian Transport Emergency Centre
DFO    Federal Department of Fisheries and Oceans
DIAND  Department of Indian and Northern Affairs Canada
EC     Environment Canada
EMR    Environmental Management Representative
EMS    Environmental Management System
ERT    Emergency Response Team (includes spills)
GNWT   Government of the Northwest Territories
HAZWOPER Hazardous Waste Site Operations and Emergency Response Worker
HDPE   High-density Polyethylene
MBR    Membrane Biological Reactor
MSDS   Material Safety Data Sheets
NFCC   National Fire Code of Canada
PK     Process Kimberlite
POLs   Petroleum, Oils and Lubricants
PPE    Personal Protective Equipment
SBR    Sequencing Batch Reactor
SHE    De Beers Safety Health and Environment
STP    Sewage Treatment Plant
TDG    Transportation of Dangerous Goods
TWTP   Temporary Water Treatment Plant
WHMIS  Workplace Hazardous Materials Information System
WMP    Water Management Pond
WTP    Water Treatment Plant
WWTP   Wastewater Treatment Plant
### TABLE 1  SPILL CONTINGENCY PLAN DISTRIBUTION LIST

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<tr>
<td>De Beers Canada Inc.</td>
<td>General Manager of Sustainability</td>
<td>Erik Madsen</td>
</tr>
<tr>
<td>Calgary Alberta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>De Beers Canada Inc.</td>
<td>Superintendent: Snap Lake Asset 7 Environment</td>
<td>Michelle Peters</td>
</tr>
<tr>
<td>Snap Lake, NT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>De Beers Canada Inc.</td>
<td>Snap Lake Site – Emergency Control Centre</td>
<td>Snap Lake Site Supervisor</td>
</tr>
<tr>
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<tr>
<td>De Beers Canada Inc.</td>
<td>Safety, Health and Risk Manager</td>
<td>Erik Madsen (until vacancy is filled)</td>
</tr>
<tr>
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<tr>
<td>De Beers Canada Inc.</td>
<td>Environment and Permitting Manager</td>
<td>Andrew Williams</td>
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<tr>
<td>Department of Lands (North Slave Regional Office)</td>
<td>Resource Management Officer</td>
<td>Tracy Covey</td>
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<td>Mackenzie Valley Land and Water Board</td>
<td>Regulatory Officer</td>
<td>Kierney Leach</td>
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<td>Yellowknife, NT</td>
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1 INTRODUCTION

The Snap Lake Mine Spill Contingency Plan (“the Plan”), describes how De Beers will manage spills throughout the period of Extended Care and Maintenance consistent with the requirements of Water License MV2011L2-0004. The Plan is intended to complement other related documents (i.e., Care and Maintenance Emergency Response Plan) to provide a holistic approach to environmental management.

During Care and Maintenance of the Snap Lake Mine De Beers will continue to investigate options for:

- The re-opening of Snap Lake Mine;
- Further Optimization of Care and Maintenance
- The final closure of the Snap Lake Mine.

Prior to re-opening or final closure of the Snap Lake Mine, an updated spill contingency plan will be provided for review and MVLWB approval.

This Plan reflects the scope of work undertaken at the Snap Lake Mine, with supplemental information provided in alternate documents on the public record:

- The Tibbitt to Contwoyto Winter Road Joint Venture Spill Contingency Plan
- Tli Cho Logistics / Ventures West Transport Inc. Emergency Preparedness Plan
- The Emergency Response Plan for the transportation of potentially hazardous materials along public roads.

This Plan is not intended to address fires, explosions, accidents, injuries or fatalities. These aspects are provided in the De Beers Extended Care and Maintenance Emergency Response Plan.

The Plan is deemed to be iterative in nature and is subject to revision due to operational changes and or continual improvement(s).

The scope of the Plan is to describe how De Beers will manage spills throughout the period of Extended Care and Maintenance. Prior to re-opening or final closure of the Snap Lake Mine, an updated spill contingency plan will be provided for review and MVLWB approval.
Figure 1 Location of Snap Lake Mine
1.0 De Beers Environmental Policy

De Beers is committed to the concept of sustainable development, which requires balancing responsible stewardship in the protection of human health and the natural environment with the need for economic growth. Diligence in the application of technically proven and economically feasible environmental protection measures will be exercised throughout exploration, mining, processing and decommissioning activities, to meet the requirements of legislation and following De Beers’ best management practices. De Beers Safety, Health and Environmental (SHE) policy is to:

- assess, plan, construct and operate its facilities in compliance with all applicable legislation;
- provide for the protection of the environment, employees and the public;
- foster research directed at expanding scientific knowledge of the impact of the industry’s activities on the environment, of environment/economy linkages and of improved treatment technologies;
- work proactively with government and the public in the development of equitable, cost effective and realistic laws for the protection of the environment; and,
- enhance communications and understanding with government, employees and the public.

1.1 PURPOSE AND SCOPE

The purpose of this Spill Contingency Plan is to:

- Facilitate the prompt, efficient and safe clean-up of materials used during the construction and operation of the Snap Lake Mine;
- Identify the members, responsibilities and reporting procedures of the De Beers Emergency Response Team (ERT) in the event of an emergency or spill; and,
- Provide support and information on available resources, facilities and trained personnel in the event that a spill or an emergency occurs.

This Spill Contingency Plan has been prepared in accordance with the Indian and Northern Affairs Canada (INAC) Spill Reporting Protocol for Mining Operations in the NWT and NU (2004) and with the AANDC’s “Guidelines for Spill Contingency Planning” (2007).

The Plan has been organized as follows:

- **Section 2** outlines the contact information, the response organization and reporting responsibilities. Training courses taken by spill response teams and an overview of spill response exercises for the response team is also included.
- **Section 3** provides information on De Beers’ cleanup strategies to be followed for initial response actions and clean-up and a brief description of the major facilities found at the site that have the greatest potential to have a large or environmentally significant spill. Preventative measures to be taken to avoid environmental incidents at the mine site are included. Basic emergency response actions and procedures are also presented.
• **Section 4** provides information on basic spill response theory and actions to be taken.
• **Section 5** provides a list of spill response equipment.
• **Section 6** provides a list of support documents used in preparation of this Plan.
• **Appendix A** provides a summary of initial response actions together with detailed chemical and physical properties for each hazardous material used on site.
• **Appendix B** provides a copy of the Government of NWT Spill Report Form.
• **Appendix C** provides a copy of the Reportable Spill Volumes by type.
• **Appendix D** provides a list of volumes of Hazardous Materials.
Figure 2- Snap Lake Site Plan
Of all the facilities at the site, those having the greatest potential for spills are the following:

- fuel storage and transfer systems;
- chemical storage and transfer systems;
- hazardous materials handling and storage facility;
- water treatment and management systems;
- sewage treatment system; and
- auxiliary systems (pipelines).

The mine site is located on a peninsula in Snap Lake with a channel of water to the north, referred to as the Northwest Arm and the main body of the lake to the east and south. The storage locations have been placed to optimize space and reduce travel where possible. Bedrock is close to the surface in most locations. Characteristics specifically considered in developing this plan were:

- the proximity to fresh water;
- land is naturally sloped down towards the lake on both sides of the developed site; and,
- bedrock is close to surface.

This Plan deals with the following types of materials that are handled on the Mine site:

I. Fuels, Oils, Lubricants and Coolants:
   - gasoline, diesel (P-50) and Jet B;
   - hydraulic, lube and waste oils; and,
   - propylene and ethelene glycol.
   - Antifreeze and ultra/compressant coolant

II. Compressed Gases:
   - acetylene;
   - oxygen;
   - argon;
   - nitrogen; and,
   - propane.
   - Blue shield (Gas for welding)

III. Process and Water Treatment Chemicals:
   - sulfuric acid;
   - ferric sulfate;
- ferrosilicon;
- aluminum sulfate; and,
- chlorine (sodium hypo-chlorite).

IV. Effluents and Slurries:
- raw and treated sewage;
- process kimberlite (PK); and,
- mill process wastes and slurries.

Spill volumes beyond set limits require reporting to regulatory agencies in the NWT. These volumes are found in Appendix B. Details on hazardous materials stored onsite can be found in Appendix D.
2 RESPONSE ORGANIZATION AND REPORTING PROCEDURES

2.1 EMERGENCY/SPILL RESPONSE CONTACT INFORMATION

Table 2 presents the names, positions and contact information for the Emergency Spill Response Team. Supplemental external contact information is also included here. Detailed responsibilities for each of the team members are provided in Section 2.2.

Table 2 De Beers Snap Lake Emergency Spill Response Team – Contact Information

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<tr>
<th>Spill Response Team Member Position</th>
<th>Name</th>
<th>Contact</th>
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<tr>
<td>On-Scene Coordinator</td>
<td>Felix Mensah-Yeboah/ Larry Turco</td>
<td>(867) 767-8763</td>
</tr>
<tr>
<td>Superintendent Environment and Monitoring</td>
<td>Michelle Peters</td>
<td>(867) 767-8567</td>
</tr>
<tr>
<td>Environmental Coordinator</td>
<td>Felix Mensah-Yeboah</td>
<td>(867) 767-8763</td>
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<tr>
<td>Environmental Technicians</td>
<td>André Boulanger</td>
<td>(867) 767-8533 or (867) 767-8532</td>
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Table 3 De Beers Snap Lake Administrative – Contact Information

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<td>Superintendent, Asset &amp; Environment</td>
<td>Michelle Peters</td>
<td>(867) 767-8567</td>
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<tr>
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<td>(867) 688-7333</td>
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<tr>
<td>Environment and Permitting Manager</td>
<td>Andrew Williams</td>
<td>TBC</td>
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<tr>
<td>Regulatory Specialist</td>
<td>Alexandra Hood</td>
<td>(867) 766-7308</td>
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<td>(867) 688-9870</td>
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<tr>
<td>Manager, Safety, Health &amp; Risk</td>
<td>Current Vacancy (Erik Madsen)</td>
<td>(403) 930-0991 ex 2744</td>
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<td>(403) 464-5282</td>
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<tr>
<td>General Manager Sustainability</td>
<td>Erik Madsen</td>
<td>(403) 930-0991 ex 2744</td>
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<td>Fax</td>
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<td>Government 24-Hour Spill Report Line</td>
<td>N/A</td>
<td>(867) 920-8130</td>
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<tr>
<td>Government of NWT Environmental Protection Division, ENR</td>
<td>Hazardous Substance Specialist</td>
<td>(867) 873-7562</td>
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<td>Government of NWT, Department of Lands (North Slave Regional Office)</td>
<td>Resource Management Officer</td>
<td>(867) 765-6655</td>
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<tr>
<td>Mackenzie Valley Land and Water Board</td>
<td>Regulatory Officer</td>
<td>(867) 766-7467</td>
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<tr>
<td>Environment Canada (24-hour pager)</td>
<td>Enforcement Officer</td>
<td>(867) 669-4730</td>
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Supplemental external contacts are found in Table 5.
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<td>Environmental Protection Services, ENR</td>
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<td>Chief Inspector of Mines, Prevention Services, WCB</td>
<td>(867) 669-4412</td>
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<td>Federal Government</td>
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<td>RCMP, Yellowknife</td>
<td>(867) 669-1111</td>
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<tr>
<td>Resource Management Inspector,</td>
<td>(867) 765-6655</td>
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<tr>
<td>Environmental Canada (24 hr duty officer)</td>
<td>(867) 669-4730</td>
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<tr>
<td>Department of Fisheries and Oceans</td>
<td>(867) 669-4729</td>
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<td>Adjacent Mine Sites</td>
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<td>Dominion Diamond Mine Yellowknife</td>
<td>(867) 880-2279</td>
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<tr>
<td>Diavik Diamond Mine Yellowknife</td>
<td>(867) 669-6500</td>
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<tr>
<td>De Beers Gaucho Kué Diamond Mine</td>
<td>416 645 1695 ext. 6699</td>
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2.2 SPILL EMERGENCY RESPONSE TEAM MEMBER RESPONSIBILITIES

Detailed roles, responsibilities and reporting activities are provided below.

FIRST RESPONDERS

- Approach with caution.
- Ensure the safety of all personnel.
- Secure the area, evacuate if necessary.
- Contact the On-Scene Coordinator.
- If safe to do so, remove all sources of ignition.
- Provide basic spill response actions (stop or contain the leak, only if safe to do so).
- 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 the best location for containing the spill, avoiding any water bodies.
ON-SCENE COORDINATOR

- Controls the spill scene and directs personnel to spill clean-up.
- Evaluates the situation and assesses the magnitude of the problem.
- Activates the response plan and calls out the key personnel in the response team, as deemed appropriate (Environmental and/or Emergency Response Coordinator).
- Develops the overall plan of action for containment and clean-up of the specific incident as well as directs and implements the plan.
- Determines the support needed for people, equipment, materials, and tools to control and/or contain the spill. The urgency will depend on the nature of the spill.
- Ensures assigned responsibilities are carried out and coordination exists between supervisory team members.
- Reviews the Incident Report with Team Members and Management.
- Ensures that all spill response personnel receive adequate training upon arrival to site to fulfill their responsibilities as part of the spill response team.

ENVIRONMENTAL COORDINATOR

Supports the On-Scene Coordinator.

- Advises on the availability of various containment, recovery, and disposal equipment.
- Coordinates the sampling and monitoring program for the collection and analysis of samples to identify and monitor possible contaminant levels.
- Reports on the effectiveness of the clean-up and remediation activities.
- Reports the spill to the Mine General Manager.
- Calls the Permitting & Environmental Superintendent to advise of situation.
- Calls the Environmental Technician, if required (to take samples of impacted areas, photo-document situation, etc.).
- Calls the Environmental Consultant, if required (provides overview of situation and requests specific advice on environmental actions to be taken such as sampling and monitoring).
- Reviews the draft Incident Report and provides comments, as necessary.
- Reports the spill to the NWT 24-hour spill report line at (867) 920-8130. Completes the NWT Spill Report Form (in Appendix B). The spill must be reported within 24 hours and the AANDC Inspector must be contacted immediately.
• Follows up with regulatory/licensing reporting requirements, as necessary.

ENVIRONMENTAL TECHNICIAN

• Supports the Environmental Coordinator.
• Collects details of the spill – coordinates, volume, and substance spilled.
• Takes samples, as directed.
• Takes photos of situation, as directed.
• Participates in Incident Review.

ENVIRONMENTAL CONSULTANTS

(depending on the nature and scale of spill)

• Support the Environmental Coordinator on an as-needed basis.
• Advise on the effectiveness of various containment, recovery, and disposal options, suggesting the most appropriate approach.
• Develop and/or recommend the sampling program to identify and monitor possible contaminant levels; suggest potential sample collection points and analytical requirements.
• Review the effectiveness of the clean-up operation and recommend further remedial work, if necessary.
• Provide technical advice on what the anticipated environmental impacts of the spill will likely be.
• Review the Incident Report and recommend suggestions to improve the response actions taken.

SUPPORT PERSONNEL

Snap Lake Mine will have limited personnel onsite during extended care and maintenance, and propose to have zero occupancy during certain periods of time as per variation in seasonal work plans. If required, De Beers Gahcho Kue Mine and partners could be used to aid in spill clean-up.
MANAGEMENT, ADMINISTRATIVE AND TECHNICAL SUPPORT

Environment Permitting Specialists

- Is advised of the spill situation, determines if additional support is needed.
- In the event of a major spill, may assist with on-site coordination of technical and administrative activities.
- Reviews the Incident Report.
- Provides follow-up with regulatory/licensing reporting requirements.

Snap Lake Mine Asset & Environment Superintendent

- Ensures adequate resources are made available to support the needs of the spill team.
- Determines if the care and maintenance activities can continue in a safe manner.
- Coordinates support activities with the Designated Snap Lake Operations Team, including but not limited to:
  - Obtaining any additional resources not available on-site for spill response and clean-up (e.g., the Petro-Canada Spill Response Vehicle, etc.).
  - Advises the Director, External and Corporate Affairs and Chief Operating Officer of the spill and provides updates, as necessary.
- If required, will act as the spokesperson for the media/stakeholders.
- Reviews the Incident Report.

General Manager Sustainability Snap Lake Mine

- Is advised of the spill situation, determines if additional corporate support is needed.
- In the event of a major spill will advise other Corporate Officers of the clean-up activities.
- Reviews the Incident Report.
- If required, will act as the spokesperson for the media/stakeholders.
Figure 3  Spill Response Team Basic Responsibilities

Support Personnel, Mine Management, Superintendents of Monitoring and Permitting

Environmental Coordinator/Permitting Coordinator
- Liaise with De Beers Mining Management and Permitting staff
- Ensure on-site resources are available
- Liaise with Government
- Report the spill to the NWT Spill Response line within 24 hours of the spill

First Person Response
- Assess personal safety
- Secure the site from safety standpoint
- Stop the spill if possible

On-Scene Responder(s)
- Direct all clean up and containment activities
- Assign company resources and direct spill response team
- Report to NWT 24 hr spill line if necessary
- Report the spill to Environment personnel if not already notified

Environmental Consultant
- Provide advice on anticipated environmental impacts
- Advise on containment, recovery, disposal and clean up
- Monitoring and follow up analysis

Environmental Technician
- Document spill details
- Create photographic record
- Record GPS coordinates

Spill Response Team
- Clean up
- Containment
- Remediate
3 TRAINING

The employee and contractor training program was developed by the De Beers Training Superintendent with input from the De Beers Safety department, and has been disseminated by the camp manager through Site Orientation at the Learning Center. The following are key steps in the program:

- All individuals entering the site are required to participate in a site orientation session.
- During this session, all locations of the spill plan and spill kits are provided on a map in a hard copy.
- An overview of the spill plan is provided through a SHE-Ops training module.
- A database of training is kept by the Head office indicating specific training undertaken and expiry dates of this training, e.g., First aid. It is regularly updated.

3.1 SPILL RESPONSE TRAINING

All members of the designated Emergency/Spill Response Team (ERT) have current Spill Response Training. Annual training is provided by recognized training personnel.

The designated personnel within the Emergency/Spill Response Team are trained to respond to spills, be aware of the dangers the spill presents and how to respond in a safe manner. The use and availability of Personnel Protective Equipment (PPE) by all ERT and mine/mill personnel is mandatory. Typical PPE includes work boots, hardhat, coveralls, neoprene gloves, goggles, face shield and chemical/dust respirators, as appropriate.

By taking the time to create spill response scenarios and holding regular drills, spill responders can be kept safe during response and minimize harm to the environment.

All personnel and contractors at the Mine site are familiar with spill reporting requirements and are encouraged to constantly check for leaks and spills. Refresher ERT training is conducted annually.

Contractors are trained for Workplace Hazardous Materials Information System (WHMIS), Transportation of Dangerous Goods (TDG), Hazardous Atmospheres and Confined Space Entry, as required. Contractors will also provide support to De Beers for major spill response activities, upon request. They are responsible for cleanup of their own spills at their specific job-sites.

Fuel handling crews are fully trained in the safe operation of the facilities, spill prevention techniques and initial spill response. Similarly, the staff involved with the process, tailings and wastewater systems are trained in the safe operation of these systems.

Training programs include regular WHMIS and TDG training for all employees who use or are responsible for chemicals or hazardous materials on-site. Additional safe chemical handling training will be conducted for employees handling or working in the vicinity of dangerous chemicals. This includes Spill Response, Self-Contained Breathing Apparatus (SCBA) and Confined Space Entry.
Completion dates of all training taken are recorded and tracked, and re-training occurs annually or as required by the specific course. Any other training such as First Aid, Rescue, Fire Fighting, etc, is also tracked.

ERT members receive training in:

- On-Scene Spill Commander Course; and,
- Spill Responder (First Responder).

The designated personnel within ERT must be familiar with:

- a review of the most current spill response plan;
- emergency contact lists;
- responsibilities of the team members;
- the nature, status, and location of fuel and chemical storage facilities (Figure 3);
- the on-site and off-site spill response equipment;
- response procedures for specific types of spills (Appendix A);
- the spill response procedures for ‘on land’, ‘oil on water’, ‘boat handling’ and ‘winter spills’;
- desktop exercises of “worst case” scenarios;
- the likely causes and possible effects of spills; and,
- other De Beers emergency response plans, as required (e.g., fires, explosions, injuries, non-mine rescue, etc.).

All instructors are qualified in spill response and prevention methods.

3.2 EMERGENCY/SPILL EXERCISE

De Beers conducts regular emergency/spill exercises on an annual basis to test the response capabilities of the Emergency/Spill Response Team. The exercises are geared to spills, system failures and other emergencies. Depending upon the material, spill exercises may be conducted several times per year (fuel storage areas). Actual spill responses are counted towards the exercise requirements for that material.

An internal report is made by the On-Scene Coordinator noting the response time, personnel involved and any problems or deficiencies encountered. This report is used to evaluate the ability of personnel to respond to spills and to identify areas of improvement.
4 CLEAN UP STRATEGIES

The Snap Lake Mine is located in the Slave Geological Province of the Canadian Shield. The site is characterized by numerous lakes and rocky hills of limited relief (up to 50 metres) situated on the Northwest Peninsula of Snap Lake. The land is covered with extensive bedrock outcrops and muskeg in low-lying areas. The site is located in a zone of continuous permafrost.

De Beers has taken extra precautions to include in their design of the site:

- double walled piping;
- lined berms in fuel transfer areas;
- liquid storage with secondary containment or berms where spills are trapped for easy clean-up;
- drip mats or absorbent pads under fittings, valves, hose connections, drum spigots where spills and leaks occur;
- use of funnels and a drip mat or pan when transferring liquids from one container to another;
- use of tarps or ground cloths;
- spill kits are located wherever fuel is used or stored;
- product substitution is employed to the maximum extent possible so that products contain the least toxic materials possible; and,
- regular maintenance and oil checks of all motorized vehicles are undertaken to avoid preventable leaks

Pollution prevention is the best strategy for avoiding potential harm to human health and the environment. However, once a spill occurs, the best approach for containing and controlling the spill is to respond quickly in a well-organized manner. A response will be quick and organized if response measures have been planned ahead of time.

Spill kits, emergency response signs, emergency use telephones, first aid kits and fire alarms are strategically located throughout the entire mine site complex to allow staff to quickly and safely respond to any type of emergency, spills included.

As hydrocarbons will be the most likely of all products to spill at the site, natural processes such as evaporation, oxidation, and biodegradation can start the clean-up process. However, they are generally too slow to provide adequate environmental recovery. Physical methods such as the use of a vacuum truck and or absorption with sorbent materials will be used. Pressure washing, and raking and bulldozing may be used to assist these natural processes depending on the sensitivity of the impacted area.
The smaller volumes of contaminated soils encountered in the initial stages of the Mine will be managed in accordance with the mining industries best practices and regulatory requirements. If contaminated soil is identified, the nature of the contamination will be established and the disposal options confirmed prior to removal of the soil from the site. All wastes will be promptly cleaned up, stored in marked containers, and moved to containment within the Waste Management Area before final disposal at an approved off-site treatment and disposal facility. Soil sampling will be conducted in larger impacted areas such that clean-up activities are satisfactory. Petroleum-contaminated snow will be recovered and stored for later disposal.

A land farm was constructed to handle bio-degradable contaminated soils. The land farm was never commissioned or used for its intended purpose, however, it will be used as a storage area for materials that require containment (i.e. waste oil, hydrocarbon impacted soil, mineral oil, etc) until development of the West Cell.

4.1 FUEL SYSTEM

Diesel, gasoline, Jet B and hydraulic fluid may be harmful to water and aquatic life. They have the potential for bioaccumulation in the environment and volatize relatively quickly; dermal and inhalation exposure should be avoided.

Refer to Spill Response Action Sheets (in Appendix A) for diesel (P-50), gasoline, Jet B, and hydraulic oil, lube oil and waste oil.

In the event of a large or environmentally significant spill, a sampling program for the collection and analysis of soil and/or water samples is administered to identify and monitor possible contaminant levels. A ‘spill specific’ sampling program will be implemented along with recommendations from Environmental Consultants.

The main fuel storage facility is made up of twelve (12) steel single-wall tanks each containing approximately 330,000 litres of diesel fuel (P-50); the permanent fuel tank farm consists of three (3) 12.78 million litre steel single-wall tanks. These tanks are filled to capacity during the winter ice haul road programmes. The tank areas are lined and bermed. Additionally, there is a backup double-wall fuel storage tank located at Laydown 1. Fuel transfer to this tank is primarily by means of a fuel truck. One 10 million litre tank was constructed and commissioned during 2014.

As of September 2017 only seven million liters (7 000 000 L) of fuel is stored on site, and all three of the 12 Million L tanks temporarily withdrawn from service.

Fuel transfer lines run between the main fuel storage facility and the Powerhouse, the Process Plant, the shops, Warehouse and Accommodation Complex.

Vehicles and equipment will obtain fuel either at pump stations or fuel service trucks. Fuelling is conducted in controlled areas. Fuel containers (including drums) are marked with the product type and organized according to a ‘first in-first out’ strategy.
Fuel, specialty chemicals and most lube oils normally arrive by tanker truck via the winter road; however, on occasion they may also arrive by air. Federal TDG aviation regulations apply during air shipments. Upon arrival, these materials are moved by forklift to a designated storage area.

A vehicle containing approximately 2 cubic meters of aircraft de-icing fluids (propylene glycol based) is situated at the airstrip. Approximately 4 cubic meters of additional de-icing fluid is kept in inventory and is stored in 205 litre drums within a lined containment area at the airstrip apron. Quantities of other glycols for use in heating / cooling systems are also kept in inventory and stored in 205 litre drums and/or 1000 litre totes within a designated storage area.

Spill kits are located at all areas where fuel, glycol, and chemicals are stored and/or dispensed.

4.2 FUEL STORAGE AND TRANSFER SYSTEM - SPILL PREVENTATIVE MEASURES

Fuel spills could occur from:

- leaks in storage;
- transfer between fuel storage and vehicles;
- transfer between tanks;
- broken pipes, leaking hoses or nozzles used at transfer facilities and pumping stations;
- fuel transfer vehicle or equipment accidents and roll-overs;
- helicopter fuel slinging; and,
- operator error.

The following procedures are designed to reduce the risks of spills and equipment failure:

- scheduled inspection and maintenance of all fuel related systems;
- double locking mechanisms on valves and transfer hoses and spring-loaded valves on loading nozzles;
- careful measurement of fuel levels in tanks (particularly when transferring fuel);
- scheduled testing of fuel level devices and alarms in tanks (once every 2 months);
- hydrostatic or equivalent testing of bulk fuel storage tanks conducted annually;
- fuel is distributed by service vehicles with small capacity tanks;
- service vehicles are equipped with spill kits;
- training in fuel handling operations (manned at all times);
- spill response training;
restricted access to the fuel storage and handling areas;
strategic placement of spill kits;
use of absorbent pads during all vehicle and all operating machinery maintenance activities;
maintaining a supply of ‘over-pack’ drums for any leaking drums;
maintaining a supply of empty drums for storage of spilled materials;
immediate cleanup of all spills; and,
the decanting of snow or water from the tank bermed areas will proceed only when chemical analysis has determined the contents meet the requirements of Section 36.3 of the Fisheries Act.

4.3 CHEMICAL AND EXPLOSIVES STORAGE AND TRANSFER SYSTEMS

Corrosives (sulphuric acid) are contained in three carbon steel tanks with a capacity of 90,000 litters each, and are housed inside the Water Treatment Plant.

Explosives, including ANFO in bulk and packaged emulsions, have been removed from site and noneremain at site.

Various compressed gases (e.g., acetylene) are not expected in large quantities.

A cold storage facility with a cement floor was constructed in 2009 to house bulk ammonium and sodium nitrate material, when in use. The construction of bunker walls, containment wall, curbs, floor slab and door threshold surround the entire internal perimeter of the building address any risks to the environment. This building is not currently in use.

Chemical and Explosives Storage and Transfer System - Spill Preventative Measures

Chemical spills and explosives incidents could occur from:

- leaks in storage;
- transfer between chemical storage and work areas;
- transfer between tanks;
- broken pipes, hoses or nozzles in transfer facilities and at pumping stations;
- vehicle or equipment accidents or roll-overs;
- operator error.

The following mechanisms will reduce the risks of spills and equipment failure:
• secondary containment around all tanks, totes and barrels;
• double-locking mechanisms on valves and transfer hoses and spring-loaded valves on loading nozzles;
• restricted and locked access to the chemical or explosives areas; and,
• smaller pressurized bottles/bullets will be stored in appropriate containers in the vertical and upright position and chained to prevent unexpected falling over. Protective caps will be used when not in service.

The following procedures will reduce the risks of spills and equipment failure:

• scheduled inspection and maintenance of all chemical related systems;
• careful measurement of levels in tanks (particularly when transferring chemicals);
• training in chemical handling operations (manned at all times); and,
• the decanting of snow or water from the tank bermed areas will proceed only when chemical analysis has determined the contents meet the requirements of Section 36.3 of the *Fisheries Act*.

The following procedures will reduce the effects of spills:

• strategic placement of spill kits, absorbent pads and neutralizing agents;
• maintaining a supply of empty drums for storage of spilled materials;
• spill response training; and,
• immediate clean-up of all spills.

### 4.4 CHEMICAL AND EXPLOSIVES SYSTEM – SPILL RESPONSE ACTIONS

• Refer to Spill Response Action Sheets (in Appendix A) for sulphuric acid, ferric sulphate, sodium hydroxide, ammonium nitrate, sodium nitrate, and ANFO.

• In the event of a spill, safety measures will be implemented whereby personnel will be removed from the area of the spill until the spill is contained. Suitable personnel protective equipment (PPE) must be used by the first and all subsequent spill responders.

• Vapours cannot be contained when released. If pressurized tanks are damaged, the gas shall be allowed to disperse and no attempt at recovery will be made. Evacuation of the area will be mandatory.

• Corrosive materials will be neutralized with lime and/or soda ash prior to containment.
In the event of a large or environmentally significant spill, a developed sampling program for the collection and analysis of soil and/or water samples are implemented to identify and monitor possible contaminant levels.
5  HAZARDOUS MATERIALS HANDLING AND STORAGE FACILITY

De Beers has developed and implemented a Hazardous Materials Management Plan (De Beers 2005b). Information on classification, transportation, handling, disposal, inspections, record keeping and training are found within this referenced document. Information on how to deal with spills of these hazardous materials is found within the Spill Contingency Plan (this document).

Potential soil and groundwater impacts may result from spills, leaks, and runoff from hazardous materials storage areas. Spills may occur during material handling and storage.

Hazardous materials include both flammable and non-flammable petroleum products (e.g., gasoline, aviation fuel, diesel, solvents, paints, oils and greases), ethylene glycol, process chemicals (e.g., acids and flocculants) and water treatment chemicals (e.g., sulphuric acid and sodium hypo-chlorite), explosives and compressed gases (e.g., propane, acetylene and oxygen).

All containers will be labelled according to the requirements of the WHMIS System.

Only persons authorized to enter this facility have access. These individuals are trained in waste handling procedures.

The Snap Lake ERT will be informed of the types of hazardous materials located in the facility. Inventories are conducted on a regular basis or as materials are added or removed. The ERT are trained in emergency response procedures and conduct drills and other training exercises on a regular basis.

5.1  HAZARDOUS MATERIALS STORAGE FACILITY – SPILL PREVENTATIVE MEASURES

Hazardous materials spills and related incidents could occur from:

- leaks in storage;
- transfer between storage and work areas;
- transfer between tanks;
- mixing of incompatible materials (e.g., acids with bases);
- broken pipes, hoses or nozzles in transfer facilities and at pumping stations;
- vehicle or equipment accidents or roll-overs;
- operator error

The following mechanisms will reduce the risks of spills and equipment failure:

- secondary containment around all tanks, totes and barrels;
double-locking mechanisms on valves and transfer hoses and spring-loaded valves on loading nozzles;

- restricted and locked access to the hazardous materials areas; and,

- smaller pressurized bottles/bullets will be stored in appropriate containers in the vertical and upright position and chained to prevent unexpected falling over. Protective caps will be used when not in service.

The following procedures will reduce the risks of spills and equipment failure:

- scheduled inspection and maintenance of all hazardous materials related systems;

- careful measurement of levels in tanks (particularly when transferring hazardous materials);

- training in hazardous materials handling operations (manned at all times); and,

- the decanting of snow or water from the tank bermed areas will proceed only when chemical analysis has determined the contents meet the requirements of Section 36.3 of the *Fisheries Act*.

The following procedures will reduce the effects of spills:

- strategic placement of spill kits, absorbent pads and neutralizing agents;

- maintaining a supply of empty drums for storage of spilled materials;

- spill response training; and,

- immediate cleanup of all spills.

### 5.2 HAZARDOUS MATERIALS STORAGE FACILITY – SPILL RESPONSE ACTIONS

- Refer to Spill Response Action Sheets (in Appendix A) for the hazardous material that has spilled (they are all located within this document).

- In the event of a spill, safety measures will be implemented whereby personnel will be removed from the area of the spill until the spill is contained. Suitable personnel protective equipment (PPE) must be used by the first and all subsequent spill responders.

- Vapours cannot be contained when released. If pressurized tanks are damaged, the gas shall be allowed to disperse and no attempt at recovery will be made. Evacuation of the area will be mandatory. Select ERT members will don SCBA PPE
as a precautionary measure only if they will be going to the leaking container to facilitate stopping the leak or some other purpose.

- When a spill of an oxidizing substance such as ammonium nitrate occurs, spills on land shall be contained by dyking or some other barrier, as required. As ammonium nitrate is water soluble, spills in water may be dammed or diverted, as appropriate.

- Corrosive materials will be neutralized with lime and/or soda ash prior to containment.

- Only those personnel specifically trained to handle hazardous materials will be allowed to deal with those types of spills, all unauthorized personnel will be evacuated from the spill area.

- In the event of a large or environmentally significant spill, a sampling program for the collection and analysis of soil and or water samples to identify and monitor possible contaminant levels would be developed. The sampling program will be “spill-specific”. 
6 WATER AND WASTE WATER TREATMENT AND ASSOCIATED MANAGEMENT SYSTEMS

The Snap Lake Water Treatment and Management System include a Water Treatment Plant (WTP), Temporary Water Treatment Plant (TWTP), Modular Water Treatment Plant(s), Water Management Pond (WMP), Wastewater Treatment Plants (membrane biological reactors (MBRs), and a potable Water Treatment Plant. Components of the water and waste water treatment are discussed in detail in the Waste Management Plan and Water Management Plan.

6.1 WATER TREATMENT PLANT – SPILL PREVENTATIVE MEASURES

System failures may occur due to pipe blockage, electrical power outage, equipment malfunctions, or foreign objects or material in the influent. Spills may occur due to pipe rupture or control system failure and overflow. Degradation of effluent quality may also result from equipment malfunction or operational error.

Only during periods of operation, a high and low level alarm system is installed on the tanks in the WTP and the alarms are tripped in the Utilities Control Room as well as the Process Control Room to provide immediate notice of system failure. Both Control Rooms are manned continuously so all alarms are dealt with expeditiously. The camp emergency electrical power generator will be used in the case of failure of the main site generators.

Chemicals used in the water treatment process are contained within tanks positioned inside concrete dykes designed for that purpose. Trained WTP operators conduct visual inspections twice per day.

During periods of vacancy the modular WTP would be winterized and restarted prior to freshet.

6.2 WATER TREATMENT PLANT – RESPONSE ACTIONS FOR NON-COMPLIANT EFFLUENT

During periods of operation:

- Effluent is sampled and analyzed continuously by in-line monitoring for flow, temperature, pH, nitrates, dissolved oxygen, conductivity and turbidity.

- On-site measurements for total suspended solids, nitrates, ammonia, temperature and turbidity are conducted. Additional samples for laboratory analysis will be collected until effluent quality is satisfactory (usually following major adjustments to the WTP). The sampling frequency will be dependent upon the nature and severity of the problem.

- If the water quality does not fall within the acceptable pH and turbidity range, the plant will automatically bypass to the WMP.
• An alarm will automatically sound in the Water Treatment Plant Control Room which will, in turn, alert the appropriate personnel to check the plant in the event of a malfunction.

6.3 WATER MANAGEMENT POND

The WMP was created by two dams that were constructed in 2000. The WMP receives water from the catchment area, North Pile sumps, and excess mine water and water from the WTP that does not meet the discharge criteria. Additionally, the WMP was used as a contingency in the event that the sewage treatment plant(s) (STP) (MBR’s) could not meet discharge criteria, however, the new STP, currently housed in the Utility Building, will discharge treated effluent directly to the WMP as opposed to using the WMP as a contingency when treated effluent from the plant does not meet discharge criteria. The dams consist of a rock fill embankment supporting an 80 mil textured HDPE liner on the upstream side. The liner is keyed into the underlying intact bedrock (using a mixture of sand and powdered bentonite) and compacted into a key trench to minimize the seepage beneath the dams. Suitable granular bedding and cover layers were placed on either side of the liners. As-built reports were submitted to the Mackenzie Valley Land and Water Board as required under the Snap Lake Class ‘A’ Water License MV2011L2-0004. Small seepage losses are expected to occur but are not expected to be of significant environmental concern.

6.4 WATER MANAGEMENT POND – SYSTEM FAILURE PREVENTATIVE MEASURES

Routine visual inspections and elevation surveys of the dams are conducted monthly and yearly and the frequency of inspections increase during freshet. In addition, daily/weekly/monthly monitoring of the inflow from the underground workings, site weather conditions and WMP water levels are recorded.

Weekly inspections of the upstream face, crest and downstream face of the dams are carried out to identify water levels relative to the crest, erosional features, and displaced or eroded rip rap, sinkholes, or visible seepage, tears in the liner or cracks in the dam structure.

Since 2012, when seepage from the WMP was appearing on above ground, De Beers has initiated the following preventative measures:

Regular clearing of snow from Dam 1 to influence below ground seepage;

Relocation of outlet pipes which previously caused temperature differentials that led to ice formation and above ground seepages; and

Maintaining the WMP at lower levels to prevent above ground seepage

Standpipe piezometers and thermistors are installed adjacent to and within both dams. During ice-free conditions, the piezometers are read at least monthly. Thermistors are read at least bi-monthly year-round.
The WMP is surveyed for vertical settlement using a builder’s level and augmented with periodic surveys of ice elevation during the winter months.

An annual geotechnical inspection is undertaken by geotechnical engineers during ice-free conditions and consists of the following tasks:

- Visual inspection of the crest, upstream and downstream sides, followed by an inspection of the toe area for seepage;
- review of instrumentation data collected to monitor the performance of the dams;
- review of site-specific weather information, including monthly temperature and precipitation values;
- review of processed kimberlite tonnages and water volumes disposed within the facility; and,
- preparation of a report outlining physical conditions and recommendations for maintenance and additional monitoring.

The capacity of the WMP and associated freeboard allowances were established as part of the approved design. The original water balance calculations for the design were based on the assumed site conditions and operating parameters for the Advanced Exploration Program (AEP). Daily records of all measurable inflows to the WMP are maintained by site personnel. This information provides a basis for periodic reviews and updates of the water balance of water storage and WMP levels. De Beers is currently revising the water balance calculations to reflect mining operations to the end of mine life. The updated water balance will be provided in the Water Management Plan (De Beers 2013).

Water quality sampling of inflows and water stored in the WMP is ongoing as per the Water Licence MV2011L2-0004.

Appropriate remedial measures will be developed in consultation with the geotechnical engineers if:

- unusual changes or damage are seen in the WMP dams during routine or annual inspections; and/or,
- significant water balance discrepancies are noted during data reviews.

Remedial measures could include repair of erosion areas, re-levelling subsidence of the dam crest, placement of seepage barriers, or stabilization of the toe berms.

6.5 WATER MANAGEMENT POND – SYSTEM FAILURE RESPONSE ACTIONS

WMP maintenance preparations may include:

- stockpile dam construction materials for repairs;
have adequate supplies of geo-composite liners for emergency repairs (e.g., bentomat) and bagged bentonite to seal minor leaks; and,

• maintain a list of earth-moving equipment on-site to move fill materials to where they may be needed.

Following consultation with geotechnical engineers, the following actions may be taken immediately prior to a major system failure (i.e., instability or water holding capacity concerns):

• test water quality and initiate treatment of WMP seepage water to ensure its acceptability for release;
• pump and glaciate water, during freezing conditions, within the WMP basin; or,
• cease underground operations (temporarily) and draw down the WMP by flooding the underground workings (only when it is safe to do so).

In the event that capacity problems in the WMP are encountered, the dam crests could be raised to a safe level/elevation.

To control seepage from the WMP, the dams were constructed with impermeable HDPE liners that are tied to intact bedrock. The liners minimize seepage by preventing seepage through the dams. Hydrostatic pressure from water in the WMP results in a small amount of seepage through the bedrock in the pre-existing talik (unfrozen ground) underneath Dam 1; however, this small amount of seepage is not expected to pose any environmental concerns. Dam 2 is constructed completely in permafrost and no seepage is expected to occur underneath this dam. In the "Reasons for Decision" for the Water License for the Snap Lake Mine, the MVLWB made the following statement (Part D, Item 3):

The Board recognizes that a relatively small amount of seepage (from the WMP) may occur via bedrock fractures. While not approving of it, the Board understands that the volumes and concentrations of such waste will be minor and there should be no impact to the receiving environment. Any seepage exiting the WMP via bedrock fractures is likely to be free of processed kimberlite solids and of quality comparable to that of the effluent from the Water Treatment Plant (WTP, one of whose primary functions is the removal of processed kimberlite solids. The Board also recognizes that DBCMI is responsible to manage and control these seepages.

The quality and quantity of seepage from the WMP through dams 1 and 2 are monitored. The current estimate of seepage under Dam 1 is 17 m³/day (at full supply level) based on piezometer monitoring results and two-dimensional groundwater flow modeling. The Environmental Assessment (De Beers 2002) assessed the effects of 33 m³/day of seepage from Dam 1 entering Snap Lake and determined that the effect on water quality and aquatic life would be negligible.

If signs of an impending failure are detected, the dam and downstream areas will be evacuated. An urgent request for advice from the geotechnical engineers would also be undertaken. In the event that rockfill or other granular materials are needed in an urgent manner, permission from the regulatory agencies will be sought.
Under serious yet manageable operating conditions, steps would be undertaken to conduct an emergency discharge. Time permitting, regulatory approvals will be obtained. However, if a catastrophic failure or release is imminent, the water will be discharged and the regulators will be notified.

Rehabilitation of any failure area would include steps to contain and/or recover released processed kimberlite (PK) and return it to the WMP. All remedial activities would be specified by the geotechnical engineer and/or an Environmental Consultant, as needed.

As information becomes available in the future, De Beers is committed to compiling physical and chemical data on PK. This information will be used to prepare specific spill response action plans, as appropriate.

In the event of a PK spill or release to Snap Lake, attempts will be made to contain and recover as much of the spilled material as possible. A ‘spill-specific’ sampling and monitoring program will be established and implemented. Certain components of the Aquatic Effects Monitoring Plan (AEMP) may be implemented to measure potential impacts to Snap Lake.
7 SEWAGE TREATMENT SYSTEM

Sewage is being treated through a Sequencing Batch Reactor, as there have been issues with solids build up on the membranes in the new treatment plant. De Beers does have a Membrane Bio Reactor technology that utilizes a biological process (bacteria and aeration) to break down sewage influent but is not currently in use due to commissioning issues. All process water in the Water Management Pond is first pumped to the Temporary Water Treatment Plant and on to the Water Treatment Plant to be re-processed and mixed with treated Mine water prior to release to Snap Lake.

The sewage treatment plants included phosphorus removal as part of an overall water management strategy to meet the total phosphorus loading limit set out in the Water License. Alum and caustic soda will be added to control total phosphorus (TP) level and pH adjustment in the effluent. Existing chemical storage and metering pump system will be used. Alum dosage will be manually set to minimum chemical usage while keeping TP under 1 ppm. Caustic soda dosage will be manually set to minimum chemical usage while keeping pH above 6.5. Management of sewage treatment is linked with the Aquatic Effects Monitoring Plan, as one component of the monitoring is to evaluate the effects of nutrients from the mine on productivity within Snap Lake.

System failures and/or spills may occur due to pipe blockage, electrical power outage, equipment malfunctions, operator error or foreign objects or material in the influent, which cannot be processed by the MBRs.

7.1 SEWAGE TREATMENT SYSTEM – SPILL PREVENTATIVE MEASURES

At the Snap Lake mine site, STP effluent will be directed to the WMP and subsequently treated with the surface water through the Temporary Water Treatment Plant and WTP, and then discharged to Snap Lake.

Visual inspections of the STPs are carried out daily during periods of operation. An alarm system is installed in the camp complex to provide immediate notice of system failure. If the main mine site electrical generators fail, the camp emergency power generator will be used.

Trained personnel, whose responsibilities are dedicated to operating the STPs, will ensure that the facilities are monitored on a consistent basis and will respond to non-compliances in a timely manner. Response measures may include:

- Adjustment to the system would be made in consultation with the manufacturer’s technical expert.
- Unfavourable sampling trends will be evaluated on a case-by-case basis. The sampling frequency will be based upon the nature and severity of the problem.
- If the non-compliance trend continues whereby the operators are unable to bring the plant back on line within a timely manner, action will be implemented to have
the technical representative brought to site on a priority basis to assist the operators.

- Technical assistance from the manufacturer is available, by agreement, on a 24-hour, 7 day a week basis.
- Technical assistance and equipment from the manufacturer can be mobilized to site on 24-hour notice should repair, replacement or adjustments be necessary.
- Spare parts for certain system components are available on site in case of equipment failure.

### 7.2 SEWAGE TREATMENT PLANT – SPILL RESPONSE ACTIONS

Refer to Spill Response Action Sheet for Raw Sewage should a spill occur (in Appendix A).

Spills of partially treated or untreated sewage that occur inside the plants would involve:

- the removal of spilled materials (spills of untreated waste will be contained using a vacuum truck and necessary spill cleanup materials and re-routed to the front end of the system);
- site sanitation (by spreading hydrated lime over the area);
- treatment of recovered sewage and any materials contaminated with sewage by incineration; and,
- decontamination of workers.
8 AUXILIARY SYSTEMS (PIPELINES)

A line break or malfunction along any of the pipeline systems could be caused from:

- being struck by construction equipment;
- internal corrosion;
- uneven settlement along the line (frost or permafrost heave); and,
- poor materials or workmanship during installation.

8.1 SYSTEM COMPONENTS (PIPELINES) – SPILL PREVENTION

Spills can be prevented by implementing the following precautions:

- marking the locations of all overhead or buried lines;
- locating lines in non-permafrost areas;
- making all departments and/or contractors aware of all buried and overhead lines in their work areas;
- monitoring the flows and pressures in the lines;
- inspecting, maintaining and repairing the lines and related pumps, etc.;
- using cathodic protection systems for metal lines; and,
- installing lines in non-permafrost areas.

The following water pipeline inspection checks are carried out by Site Services:

- the STP inflow line;
- the STP outfall pipe;
- WTP to the WMP;
- WTP to Snap Lake; and,
- the mine portal to the WTP.

8.2 SYSTEM COMPONENTS (PIPELINES) – SPILL RESPONSE

Refer to the Spill Response Action Sheets for the specific chemical spill (in Appendix A).

The mine operational plan for a pipeline failure would be to:

- shutdown the line;
- contain and cleanup the spill;
- repair or replace the line;
- repair or replace the line;
- reconnect and test the line; and,
- resume operations.

In the event of a spill, the On-Scene Coordinator will initiate the process of shutdown and the ERT will be deployed. Immediate action to reduce and minimize impacts to the tundra and adjacent water bodies is required. Spill containment and recovery of the spilled material will be a priority. Personnel safety is first.

Any material that has escaped from the pipelines and deposited on the surrounding ground would be recovered and disposed of in containment drums or, if the volume is significant, in the WMP. Crushed gravel and/or stockpiled esker material would be used to re-contour the area to original ground elevation.

Any PK tailings or sediment slurry that has escaped from the system to a water body would be left in place until further advice has been received on the cleanup from an qualified Consultant.

In the event of a PK spill or release to Snap Lake, attempts will be made to contain and recover as much of the spilled material as possible. A ‘spill-specific’ sampling and monitoring program will be established and implemented. Certain components of the Aquatic Effects Monitoring Plan (AEMP) may be implemented to measure potential impacts to Snap Lake.

If a minewater spill should occur, the faulty component(s) would be identified and repaired or replaced where necessary. Any spilled material would be cleaned up and disposed of into the WMP.
9 SPILL RESPONSE ACTION PLANS

9.1 SPILL RESPONSE THEORY

Knowing what to do when spills happen is essential to employee safety as well as minimizing harm to the environment. Planning, training and drills are vital to ensuring everyone knows what to do and when to do it when an emergency arises.

Basic Procedures
The following steps are taken during any spill response:

- **Assess Spill Hazards and Risks:** the ERT are trained to not endanger themselves in order to identify a spilled material.

- **Notify Site Management:** this is required any time a spill is observed or when a spill cannot be identified (no matter the volume), or when the spill response team will be needed. By notifying the proper people, efforts can be coordinated and initiated.

- **Protect responders:** when a spill has been properly identified, appropriate personal protective equipment is available to handle the hazardous materials on site and is stored in the ERT building. Ensuring the safety of the response team is critical.

- **Review Material Safety Data Sheets (MSDSs):** MSDS are used to determine the necessary PPE required for a response to spill situations (e.g., protective suits, boots, gloves, respiratory protection, detection equipment and monitors, etc.).

- **Refer to Spill Response Action Sheets found in Appendix A.**

- **Check operating systems, spill response equipment and PPE,** on a regular basis.

- **Tend to injured personnel:** personnel safety is the highest priority. Attending to injured personnel in the spill area is the first goal. Weekly drills are conducted to ensure ERT responders are trained to perform these functions quickly and efficiently.

- **Stop the source:** this could mean rolling or up-righting a drum so that the hole is on top, patching a leaking hole, or locating and turning off emergency valves. This step can occur at the same time as the spill is being contained.

- **Contain the spill:** the most common method is to place either absorbent or non-absorbent dikes around the perimeter of the spill.

- **File a spill report:** a copy of the Government of NWT Spill Report Form can be found in Appendix A.

- **Clean up the spill:** after injured personnel are removed from the spill zone, the perimeter of the spill is clearly marked and the source of the spill is stopped,

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responders will begin to clean up the spill. They will work from the outside edge of the spill toward the centre. Various tools such as absorbent mats, socks and pillows are used to soak up small liquid spills, while vacuums and portable pumps can be utilized for larger spills. Heavy equipment can also be used for very large spills (e.g., bulldozers, gravel trucks, and forklifts). Neutralization of acidic spills using lime or soda ash is an option.

- **Contain or bag spent response materials:** to facilitate recycling or disposal.

The following decontamination steps may be taken during a spill response:

- **Set up decontamination facilities:** responders are trained to do this before entering a spill response area. This is especially important if there are victims, as these persons will need to be decontaminated prior to triage and treatment.

- **Decontaminate the area where the spill occurred:** may include cleaning tools, spill response equipment, PPE and the responders themselves.

- **Monitor the condition of responders:** on-site safety officers are trained to monitor the condition of personnel working on the decontamination lines, particularly if these people wear confined and bulky PPE (e.g., Level I suits). Decontaminating responders and tools can be labour intensive and workers can easily become fatigued from heat stress.

### 9.2 SPILL RESPONSE ACTION PLANS - GENERAL

For large volume hazardous materials on site, the Spill Response Action Plan and supplemental information on the chemical and physical properties are found in Appendix A.

**Respond Quickly**

- Identify spilled material.
- Protect yourself and others (e.g., be alert and take all necessary precautions).
- Assess the hazards in the immediate vicinity of the spill or leak.
- Shut off ignition sources in the vicinity of the spill for flammable liquids, – NO SMOKING.
- Call for assistance IMMEDIATELY, if anyone is injured.
- Attend to injured, if possible.
- Assess the severity of the spill. Assess if the spill, leak or system failure can be readily stopped or brought under control.
- Call for assistance: the Emergency Control Centre (ECC).
- Mobilize the ERT (the On-scene Coordinator does this).
• Keep people away from the spill site.
• Wear impervious clothing, goggles and gloves (appropriate for the material being dealt with).
• Approach spill from up-wind - ONLY IF IT IS SAFE TO DO SO.
• Stop product flow if possible.
• Contain and recover spill as soon as possible.

Respond Safely

• Do not contain gasoline/aviation fuel as vapours might ignite.
• Allow gasoline or aviation fuel spills to evaporate.
• Follow specific spill response actions (see Appendix A for Spill Response Actions and for Chemical and Physical Properties of Hazardous Materials).
• Report spill to the 24 hour spill report line 867-920-8130.

Generic actions to be taken on land, water, snow and ice follow.

Action Plan for Liquid Spills on Land

Liquid spills on gravel, rock, soil and vegetation can be contained or cleaned up by:

• Placing soil berms in front of the leading edge of the spill, down slope of the spilled liquid. Plastic tarps can then be placed over the berm and at the foot of it to permit the liquid to pool on the plastic for easy recovery. Absorbents can also be used for this purpose. These pads can possibly be squeezed into empty drums and re-used. Larger pools can be pumped back into drums or empty storage tanks or a ‘TIDY’ tank, if readily available. It is very important to prevent the liquid from entering a body of water where it will likely have a greater environmental impact.

• Soaking up stained rock with absorbent materials or absorbent sheeting. Depending upon the volumes generated, the spent absorbent should be placed in drums for later disposal in dumpsters.

• Removing the contaminated soil and/or vegetation. This can be followed by contacting the government authority identified by the 24-Hour Spill Report Line 867-920-8130 to discuss the approach and to obtain approval to proceed with the approach.

• Storing the contaminated soil or gravel in drums at the Hazardous Waste Storage Facility until they are shipped off-site for disposal.
Action Plan for Fuel Spills on Water

The following steps can be taken for spills on water:

- Limit the area of the spill on water.
- Recover small spills on water with absorbent pads and similar materials.
- Deploy containment and/or absorbent boom(s) to contain the spill area. The effectiveness of this action can be limited by winds, waves and other factors. Absorbent booms can be drawn slowly in to encircle spilled fuel and absorb it. These materials are hydrophobic (absorb hydrocarbons and repel water). Sorbent booms are often relied on to recover hydrocarbons that escape containment booms.

- Placing a large wide board (e.g., plywood) vertically across the culvert inlet to control the water level while retaining the spilled fuel. The board can be secured by stakes and absorbent materials used to recover the fuel on the water surface.

Action Plan for Fuel Spills on Snow

Fuel spills on snow can be contained and recovered by:

- Using the snow as a natural absorbent to collect spilled fuel.
- Compacting the snow into snow-berms and then placing a liner of plastic sheeting.
- Scraping up and storing the snow-fuel mixture in a lined containment area or placing it in drums for later disposal or incineration.

Action Plan for Fuel Spills on Ice

Fuel spills on ice can be contained or cleaned up by:

- the snow around the edge of the spill to act as a berm. Time permitting, the berm can be lined with plastic sheeting. The underlying ice will prevent or reduce the rate of seepage of the fuel into the water below the ice.
- Scraping up contaminated snow/ice and placing it in covered drums or in a lined berm area on land.
- Deploying skimmers in open-water areas may be an option in the early fall or late spring. However, under normal ice-covered periods, this is unlikely in the Snap Lake region.
- Deploying skimmers in broken-ice conditions may be effective as spills tend to spread far less than in ice-free water.
• Pumping fuel spills through holes cut into the ice is extremely difficult under those conditions. Fuel that flows through breaks or cracks in the ice and gets trapped under the ice, is extremely difficult to recover.

• Burning on-ice offers the potential to remove the majority of a spill with minimal residue volumes left for manual recovery. Burning on-ice has always been considered as a primary arctic spill countermeasure. Permission may be given from the government to burn off pools of fuel (contact the NWT 24-Hour Spill Report Line).

9.3 SPILL RESPONSE EQUIPMENT AVAILABLE ON-SITE

General Equipment

The following general equipment is available on-site to assist in spill response:

- various types of heavy equipment such as Loaders, Excavators, Boom Trucks, etc;
- various hand held tools including shovels; and,
- sand bags, bentonite, and a variety of absorbent materials.

An Oil Spill Contingency Unit is located next to the Environmental Shop. Spill response materials maintained within the unit are provided in Table 6 below.

<table>
<thead>
<tr>
<th>Qty</th>
<th>Unit</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>bags</td>
<td>Absorbent Peat Moss, Oil (only), 44 liters/bag</td>
</tr>
<tr>
<td>10</td>
<td>ea</td>
<td>Absorbent Rolls, Oil (only), 100’ x 3’</td>
</tr>
<tr>
<td>100</td>
<td>pk</td>
<td>Absorbent Pads, Oil (only), 17” x 17” x 100/pk</td>
</tr>
<tr>
<td>40</td>
<td>boxes</td>
<td>Absorbent Socks, Oil (only), 8’ x 3’ x 6/box</td>
</tr>
<tr>
<td>40</td>
<td>bags</td>
<td>Absorbent Boom, Oil (only), 4” x 10’ x 5/bag</td>
</tr>
<tr>
<td>12</td>
<td>boxes</td>
<td>Absorbent Pillows, Oil (only), 17” x 17” x 10/box</td>
</tr>
<tr>
<td>24</td>
<td>ea</td>
<td>Drip Defenders, 17” x 17”</td>
</tr>
<tr>
<td>12</td>
<td>ea</td>
<td>Mini Berm, 4’ x 4’ x 8”</td>
</tr>
<tr>
<td>6</td>
<td>ea</td>
<td>Absorbent Rolls, Universal, 100’ x 3’</td>
</tr>
<tr>
<td>24</td>
<td>pk</td>
<td>Absorbent Pads, Universal, 17” x 17”, 100/pk</td>
</tr>
<tr>
<td>48</td>
<td>pk</td>
<td>Absorbent Pads, Chemical, 17” x 17”, 100/pk</td>
</tr>
<tr>
<td>6</td>
<td>boxes</td>
<td>Absorbent Socks, Chemical, 3” x 4’ x 12/box</td>
</tr>
<tr>
<td>100</td>
<td>ea</td>
<td>Heavy Duty Poly Disposal Bags, Yellow, 36” x 48”</td>
</tr>
</tbody>
</table>
The following spill response equipment is located in an Oil Spill Response Unit near the fresh / fire water Pumphouse, which is included in table 7 below:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Unit</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>meters</td>
<td>Oil Containment Boom, 18” c/w associated hardware</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Oil Skimmer c/w power pack and transfer hosing</td>
</tr>
<tr>
<td>6</td>
<td>ea</td>
<td>Boats c/w outboard engines (seasonal)</td>
</tr>
</tbody>
</table>

Spill Kits by Location

Spill kits come in a variety of sizes and are located throughout site being positioned adjacent all fuel / chemical storage and dispensing areas.
Figure 4: Location of Spill Kits
Small Spill Kits

Numerous small spill kits with an absorption capacity of less than 95 Litres are located throughout the mine site. These small spill kits are used as a first line of defence when a spill is encountered. Table 6 identifies typical contents.

<table>
<thead>
<tr>
<th>Qty</th>
<th>Unit</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>ea</td>
<td>Absorbent Pads, Oil (only), 17” x 17”</td>
</tr>
<tr>
<td>25</td>
<td>ea</td>
<td>Absorbent Pads, Universal, 17” x 17”</td>
</tr>
<tr>
<td>5</td>
<td>litres</td>
<td>Absorbent Granular and/or Peat</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Heavy Duty Poly Disposable Bag, Yellow, 36” x 48”</td>
</tr>
<tr>
<td>1</td>
<td>pr</td>
<td>Chemical Resistant Gloves</td>
</tr>
<tr>
<td>1</td>
<td>pr</td>
<td>Uvex Safety Goggles</td>
</tr>
</tbody>
</table>

Large Spill Kits

Large spill kits with an absorption capacity of less than 425 Litres are located throughout the mine site. These spill kits contains a variety of spill response equipment. This is summarized in Table 7.

<table>
<thead>
<tr>
<th>Qty</th>
<th>Unit</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>ea</td>
<td>Tyvek Splash Suits</td>
</tr>
<tr>
<td>2</td>
<td>ea</td>
<td>Large Tarps</td>
</tr>
<tr>
<td>5-10</td>
<td>ea</td>
<td>Absorbent Socks, Universal, 4” x 3”</td>
</tr>
<tr>
<td>1-4</td>
<td>ea</td>
<td>Absorbent Boom, Oil (only), 10’ x 5”</td>
</tr>
<tr>
<td>50 - 100</td>
<td>ea</td>
<td>Absorbent Pads, Oil (only), 17” x 17”</td>
</tr>
<tr>
<td>25 - 50</td>
<td>ea</td>
<td>Absorbent Pads, Universal, 17” x 17”</td>
</tr>
<tr>
<td>13 – 44</td>
<td>litres</td>
<td>Absorbent Granular and/or Peat</td>
</tr>
<tr>
<td>2 – 10</td>
<td>ea</td>
<td>Heavy Duty Poly Disposable Bags, Yellow, 36” x 48”</td>
</tr>
<tr>
<td>4</td>
<td>pr</td>
<td>Chemical Resistant Gloves</td>
</tr>
<tr>
<td>1</td>
<td>pr</td>
<td>Uvex Safety Goggles</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Roll Duct Tape</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Utility Knife</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Field notebook and pencil</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Rake</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Pick axe</td>
</tr>
<tr>
<td>3</td>
<td>ea</td>
<td>Aluminum scoop shovels</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Instruction binder</td>
</tr>
<tr>
<td>1</td>
<td>ea</td>
<td>Containment Drum</td>
</tr>
</tbody>
</table>
10 SUPPORTING DOCUMENTS


**INAC. 2004.** Spill Reporting Protocol for Mining Operations in the Northwest Territories and Nunavut.

**NWT Water Board. 1987.** Guidelines for Contingency Planning.

APPENDIX A

MATERIAL SAFETY DATA SHEETS AND PHYSICAL AND CHEMICAL INFORMATION FOR MATERIALS STORED ON SITE

PLEASE REFER TO MVLWB APPROVED SPILL CONTINGENCY PLAN- NO CHANGES PROPOSED
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPORT DATE (MM/DD/YY)</td>
<td>REPORT TIME (HH-MM)</td>
<td>OCCURRENCE DATE (MM/DD/YY)</td>
<td>OCCURRENCE TIME (HH-MM)</td>
<td>LOCATION OF SPILL OR DAMAGE NAME</td>
<td>WATER LICENCE NUMBER (IF APPLICABLE)</td>
<td>GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION</td>
<td>REGION</td>
<td>NUNAVUT</td>
<td>NWT</td>
<td>ADJACENT JURISDICTION OR OCEAN</td>
<td>EASTING</td>
<td>NORTING</td>
</tr>
<tr>
<td>ANY CONTRACTOR INVOLVED</td>
<td>CONTRACTOR ADDRESS OR OFFICE LOCATION</td>
<td>PRODUCT SPILLED</td>
<td>QUANTITY IN LITRES, KILOGRAMS OR CUBIC METERS</td>
<td>UN NUMBER</td>
<td>SECOND PRODUCT SPILLED (IF APPLICABLE)</td>
<td>QUANTITY IN LITRES, KILOGRAMS OR CUBIC METERS</td>
<td>UN NUMBER</td>
<td>SPILL SOURCE</td>
<td>SPILL CAUSE</td>
<td>AREA OF CONTAMINATION IN SQUARE METERS</td>
<td>FACTORS AFFECTING SPILL OR RECOVERY</td>
<td>DESCRIBE ANY ASSISTANCE REQUIRED</td>
</tr>
<tr>
<td>ADDRESS, INFORMATION, CONTACTS, ALTRES PROPOSED OR GIVES TO CONTACT, RECIPIENT OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS</td>
<td>REPORTED TO SPILL LINE BY</td>
<td>POSITION</td>
<td>EMPLOYER</td>
<td>LOCATION CALLING FROM</td>
<td>TELEPHONE</td>
<td>ANY ALTERNATE CONTACT</td>
<td>POSITION</td>
<td>EMPLOYER</td>
<td>ALTERNATE CONTACT LOCATION</td>
<td>ALTERNATE TELEPHONE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**REPORT LINE USE ONLY**

<table>
<thead>
<tr>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECEIVED AT SPILL LINE BY</td>
<td>POSITION</td>
<td>STATION OPERATOR</td>
<td>EMPLOYER</td>
<td>LOCATION CALLED</td>
<td>REPORT LINE NUMBER</td>
<td>LEAD AGENCY</td>
<td>EC</td>
<td>CCC</td>
<td>KG</td>
<td>OR</td>
<td>QA</td>
<td>WA</td>
</tr>
<tr>
<td>AGENCY</td>
<td>CONTACT NAME</td>
<td>CONTACT PHONE</td>
<td>REMARKS</td>
<td>LEAD AGENCY</td>
<td>FIRST SUPPORT AGENCY</td>
<td>SECOND SUPPORT AGENCY</td>
<td>THIRD SUPPORT AGENCY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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APPENDIX C

SPILL VOLUMES THAT MUST BE REPORTED TO THE GOVERNMENT OF THE NORTHWEST TERRITORIES
<table>
<thead>
<tr>
<th>Transportation of Dangerous Goods Class</th>
<th>Description of Contaminant</th>
<th>Amount Spilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>explosives</td>
<td>any amount</td>
</tr>
<tr>
<td>2.1</td>
<td>compressed gas (flammable) (eg. propane, acetylene, hydrogen, butane)</td>
<td>any amount of gas from containers with a capacity greater than 100 L or if it comes into contact with water</td>
</tr>
<tr>
<td>2.2</td>
<td>compressed gas (non-corrosive, non flammable) (eg. Halocarbon, nitrogen, argon)</td>
<td>any amount of gas from containers with a capacity greater than 100 L or if it comes into contact with water</td>
</tr>
<tr>
<td>2.3</td>
<td>compressed gas (toxic)</td>
<td>any amount</td>
</tr>
<tr>
<td>2.4</td>
<td>compressed gas (corrosive)</td>
<td>any amount</td>
</tr>
<tr>
<td>3.1, 3.2, 3.3</td>
<td>flammable liquid (eg. Jet B, gasoline, etc)</td>
<td>100 L</td>
</tr>
<tr>
<td>4.1</td>
<td>flammable solid</td>
<td>25 kg</td>
</tr>
<tr>
<td>4.2</td>
<td>spontaneously combustible solids</td>
<td>25 kg</td>
</tr>
<tr>
<td>4.3</td>
<td>Water reactant solids</td>
<td>25 kg</td>
</tr>
<tr>
<td>5.1</td>
<td>oxidizing substances</td>
<td>50 L or 50 kg</td>
</tr>
<tr>
<td>5.2</td>
<td>organic peroxides</td>
<td>1 L or 1 kg</td>
</tr>
<tr>
<td>6.1</td>
<td>poisonous substances</td>
<td>5 L or 5 kg</td>
</tr>
<tr>
<td>6.2</td>
<td>infectious substances (eg. Sewage)</td>
<td>any amount</td>
</tr>
<tr>
<td>7</td>
<td>radioactive substances</td>
<td>any amount</td>
</tr>
<tr>
<td>8</td>
<td>corrosive substances (eg. Sulfuric acid)</td>
<td>5 L or 5 kg</td>
</tr>
<tr>
<td>9.1 (in part)</td>
<td>miscellaneous product or substances, excluding PCB mixtures</td>
<td>50 L or 50 kg</td>
</tr>
<tr>
<td>9.2</td>
<td>environmentally hazardous (eg. Fluorescebt bulbs- mercury, refrigerant, oil from crushed filters)</td>
<td>1 L or 1 kg</td>
</tr>
<tr>
<td>9.3</td>
<td>dangerous wastes (eg. Waste that may pose a risk to human health)</td>
<td>5 L or 5 kg</td>
</tr>
<tr>
<td>9.1 (in part)</td>
<td>PCB mixtures of 5 or more parts per million</td>
<td>0.5 L or 0.5 kg</td>
</tr>
<tr>
<td>None</td>
<td>other contaminants</td>
<td>100 L or 100 kg</td>
</tr>
</tbody>
</table>
APPENDIX D

HAZARDOUS MATERIAL MAXIMUMS POTENTIALLY STORED AT SITE FOR MINE OPERATIONS

<table>
<thead>
<tr>
<th>Material</th>
<th>Site Category</th>
<th>Approximate Amount</th>
<th>Storage Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>AdBlue</td>
<td>POL</td>
<td>2,000 litres</td>
<td>-Fuel Bay underground</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-heated storage on surface to be decided.</td>
</tr>
<tr>
<td>Diesel fuel</td>
<td>POL</td>
<td>7,000,000 litres</td>
<td>Tank Farm</td>
</tr>
<tr>
<td>Gasoline</td>
<td>POL</td>
<td>2,500 litres</td>
<td>Adjacent Environment Shop</td>
</tr>
<tr>
<td>Gear Oils and Lubricants</td>
<td>POL</td>
<td>150,000 litres</td>
<td>- Lay down Area 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>150,000 litres</td>
<td>- Services Complex</td>
</tr>
<tr>
<td>Jet-A Fuel</td>
<td>POL</td>
<td>31,000 litres</td>
<td>Waste Management Area</td>
</tr>
<tr>
<td>Windshield Washer Fluid</td>
<td>Other Hazardous Materials</td>
<td>9,500 litres</td>
<td>- Warehouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500 litres</td>
<td>- Services Complex</td>
</tr>
<tr>
<td>Ethylene Glycol</td>
<td>Other Hazardous Materials</td>
<td>4270 litres</td>
<td>-Lube Shop</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16,176 litres</td>
<td>-Powerhouse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3300 litres</td>
<td>-Laydown 1</td>
</tr>
<tr>
<td>Propylene Glycol</td>
<td>Other Hazardous Materials</td>
<td>Only what is used in current system circulation</td>
<td>None stored</td>
</tr>
</tbody>
</table>

Note: L = litre; kg = kilogram; PCB = polychlorinated biphenyls.
<table>
<thead>
<tr>
<th>Material</th>
<th>Site Category</th>
<th>Approximate Amount</th>
<th>Storage Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propane</td>
<td>Other Hazardous Materials</td>
<td>95 (20 pounds)</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 (100 pounds)</td>
<td></td>
</tr>
<tr>
<td>Acetylene</td>
<td>Other Hazardous Materials</td>
<td>30 bottles</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Oxygen</td>
<td>Other Hazardous Materials</td>
<td>60 bottles</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Paint</td>
<td>Other Hazardous Materials</td>
<td>500 litres</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Solvents</td>
<td>Other Hazardous Materials</td>
<td>500 litres</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Sulphuric Acid (Batteries)</td>
<td>Other Hazardous Materials</td>
<td>0 litres (batteries are sealed)</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Sulphuric Acid (water treatment)</td>
<td>Other Hazardous Materials</td>
<td>109,000 litres</td>
<td>Outside Utilities Bldg.</td>
</tr>
<tr>
<td>Lime</td>
<td>Other Hazardous Materials</td>
<td>18,360 kg</td>
<td>Sewage Treatment Plant # 2</td>
</tr>
<tr>
<td>Sodium Hypochlorite (12%)</td>
<td>Other Hazardous Materials</td>
<td>500 litres</td>
<td>Potable Water Plant</td>
</tr>
<tr>
<td>Cement</td>
<td>Other Hazardous Materials</td>
<td>20,000 tonnes</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Concrete Additives</td>
<td>Other Hazardous Materials</td>
<td>2,000 litres</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Curing Compounds</td>
<td>Other Hazardous Materials</td>
<td>100 litres</td>
<td>Laydown Area 1</td>
</tr>
<tr>
<td>Flocculants</td>
<td>Other Hazardous Materials</td>
<td>10 tonnes</td>
<td>- Process Plant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 tonnes</td>
<td>- Water Treatment Plant</td>
</tr>
<tr>
<td>Material</td>
<td>Site Category</td>
<td>Approximate Amount</td>
<td>Storage Location</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------</td>
<td>--------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Ferric Sulphate</td>
<td>Other Hazardous Materials</td>
<td>17,000 kg</td>
<td>Water Treatment Plant.</td>
</tr>
<tr>
<td>Ferrosilicon</td>
<td>Other Hazardous Materials</td>
<td>500 tonnes</td>
<td>Process Plant</td>
</tr>
<tr>
<td>Alum</td>
<td>Other Hazardous Materials</td>
<td>2,000 litres</td>
<td>Laydown Area 1</td>
</tr>
</tbody>
</table>