



June 2010

HAZARDOUS MATERIALS MANAGEMENT PLAN

De Beers Snap Lake Mine

Hazardous Materials Management Plan

June 2010

Rev 1.2

Document History

Date	Revision	Description of Change
July 2009	Rev 1.0	Draft for Review
February 2010	Rev 1.1	Final
June 2010	Rev 1.2	Final

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ACRONYMS

AN	ammonium nitrate
ANFO	ammonium nitrate fuel oil
BBEX	Braden Burry Expediting
BMP	Best Management Practices
CCME	Canadian Council of Ministers of the Environment
EMR	Environmental Management Representative
EMS	Environmental Management System
GNWT	Government of the Northwest Territories
HDPE	high-density polyethylene
MSDS	Material Safety Data Sheets
NFCC	National Fire Code of Canada
POLs	Petroleum, Oils and Lubricants
PPE	Personal Protective Equipment
SHE	Safety, Health, and Environment
TDG	Transportation of Dangerous Goods
WHMIS	Work Site Hazardous Materials Information System

1.0 INTRODUCTION

De Beers Canada (De Beers) is committed to the concept of sustainable development, which requires balancing 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 to ensure the adoption of Best Management Practices (BMP). The De Beers approach is to assess, plan, construct and operate its facilities in compliance with all applicable legislation, providing 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.

De Beers is committed to the safe and efficient transportation, storage, handling, and use of all hazardous materials including hydrocarbon products, ammonium nitrate and associated explosive materials, and all other potentially hazardous chemicals. De Beers will minimize the potential for adverse effects on human health and the environment that may result from accidental release. The primary element in accomplishing this is the site-wide application of consistent practices and procedures in the management of hazardous materials. Hazardous materials management is an important component of the Environmental Management System (EMS).

The management of hazardous materials requires that safety and proper techniques must be considered during the transportation, handling, storage, distribution, use, and final disposal of any hazardous material. Procedures will be discussed for all potentially hazardous materials that will be present on the Snap Lake mine site during operations.

1.1 Mine Operations

The purpose of this document is to establish the principles of hazardous materials' management during the operation of the Snap Lake Mine. The

management of hazardous materials may change from time to time and will be addressed in annual updates of this document.

1.2 Classification of Hazardous Materials

Because of the remoteness of the Snap Lake mine site, considerable volumes of materials are transported and stored on-site to ensure availability of supplies during the periods when winter road access is not available. The majority of hazardous materials that will be used during mining can be grouped into the following three site categories:

- Petroleum, Oils and Lubricants (POLs);
- Explosives; and
- Other Hazardous Chemicals.

Lists of hazardous materials and estimated quantities that will be stored at the mine site are provided in Tables 1 and 2, respectively. These lists are approximate, and will be subject to change. Miscellaneous materials are those that are used in small volumes and/or not regularly stocked on site.

Table 1: Hazardous Materials Potentially Stored at Site for Mine Operations

MATERIAL	SITE CATEGORY	APPROXIMATE AMOUNT	STORAGE LOCATION
Diesel fuel	POL	40,000,000 litres	Tank Farm
Gasoline	POL	2,500 litres	Adjacent Enviro Shop
Gear Oils and Lubricants	POL	150,000 litres 150,000 litres	- Lay down Area 1 - Services Complex
Jet-B Fuel	POL	5,000 litres	Haz Cell (Waste Management Area)
Emulsion (AN + SN + oil phase)	Explosives	10,000 kg 30,000 kg	- Emulsion Plant - U/G Explosives Area
Ammonium Nitrate	Explosives	1,500,000 kg	AN Storage Building
Sodium Nitrate	Explosives	15,000 kg	AN Storage Pad
Detonator Caps and Delays	Explosives	500,000 units	U/G Explosives Mag
Tentex Boosters	Explosives	500,000 units	U/G Explosives Mag
Windshield Washer Fluid	Other Hazardous Materials	500 litres 100 litres	- Warehouse - Services Complex
Fuel Conditioner	Other Hazardous Materials	800 litres 200 litres	- Warehouse - Services Complex
Propylene Glycol	Other Hazardous Materials	5,000 litres	Laydown Area 1
Ethylene Glycol	Other Hazardous Materials	25,000 litres	Laydown Area 1
Propane	Other Hazardous Materials	50 ea (20 lbs) bottles	Laydown Area 1
Acetylene	Other Hazardous Materials	200 bottles	Laydown Area 1
Oxygen	Other Hazardous Materials	500 bottles	Laydown Area 1
Paint	Other Hazardous Materials	500 litres	Laydown Area 1
Solvents	Other Hazardous Materials	500 litres	Laydown Area 1
Sulphuric Acid (Batteries)	Other Hazardous Materials	50 litres	Laydown Area 1
Sulphuric Acid (water treatment)	Other Hazardous Materials	100,000 litres	Outside Utilities Bldg.
Lime	Other Hazardous Materials	400 kg	Sewage Treatment Plant # 2
Sodium Hypochlorite (12%)	Other Hazardous Materials	1,200 litres	Potable Water Plant
Cement	Other Hazardous Materials	10,000 tonnes	Laydown Area 1
Concrete Additives	Other Hazardous Materials	2,000 litres	Laydown Area 1
Curing Compounds	Other Hazardous Materials	100 litres	Laydown Area 1
Flocculants	Other Hazardous Materials	20 tonnes 20 tonnes	- Process Plant - Water Treatment Plant
Ferric Sulphate	Other Hazardous Materials	2,200 kg	Water Treatment Plant.
Ferrosilicon	Other Hazardous Materials	1000 tonnes	Process Plant
Sodium Hydroxide	Other Hazardous Materials	20,000 litres	Laydown Area 1
Alum	Other Hazardous Materials	3,000 litres	Laydown Area 1 Whse

Note: This table summarizes the hazardous materials that will be stored in significant or bulk quantities. A full inventory of these materials, along with minor amounts of miscellaneous hazardous materials, organized by storage location, will be maintained by the De Beers.

1.3 Monitoring, Mitigation, and Review

The Hazardous Materials Management Plan has been incorporated into the EMS and as such subject to periodic review and to the adaptive nature of the EMS.

Inventory control of all hazardous materials is managed on-site by the Materials Management Logistics Supervisor. The supervisor is also responsible for insuring that Transportation of Dangerous Goods (TDG) paperwork is completed as required by TDG legislation. This includes shipments of hazardous materials received at the Snap Lake Mine, as well as hazardous waste materials that are shipped off-site for disposal. Departments and/or Contractors are required to submit to the Materials Management Supervisor copies of Material Safety Data Sheets (MSDS) for all hazardous materials prior to or accompanying all shipments to the site. All MSDS for materials used on site will be maintained in the on-line database. All DBC work computers will have a link to this database. Any copies printed and maintained in binders will be considered “uncontrolled” versions.

Compliance with all environmental laws, regulations and guidelines, as well as the Snap Lake Mine EMS, will be monitored using the following mechanisms:

- Environmental inspections;
- Environmental audits (internal and external);
- Communication with regulatory authorities (federal, provincial, regional, and municipal); and
- Communication with De Beers Corporate Legal Department and other De Beers facilities.

2.0 LEGISLATION

Several agencies are involved in regulating the transportation, handling, and storage of hazardous materials. The Motor Carrier Services of the Government of the Northwest Territories (GNWT) Department of Transportation is responsible for administering the *Transportation of Dangerous Goods Act* and Regulations. The Transportation Department is also responsible for driver, vehicle, and load safety under additional transportation legislation. This body regulates the transportation of hazardous materials and wastes, classifies dangerous goods into nine classifications, and sets requirements for the packaging and labelling of the materials. The Act also requires that personnel involved in the shipping and control of hazardous materials be trained in the application of the Act.

The Government of the Northwest Territories Office of the Fire Marshal is responsible for the general approval in matters dealing with the storage of flammable, combustible, and hazardous materials under the territorial *Fire Prevention Act*, which incorporates the National Fire Code of Canada (NFCC) in its regulations. The NFCC mandates requirements for the storage and handling of combustible products and dangerous goods, including inspection, reporting, and training.

Detailed requirements for the design, construction, and operation of bulk fuel storage tanks with associated piping, valves, and fittings are also specified in the NFCC. Furthermore, the GNWT Fire Marshal recommends compliance with the Canadian Council of Ministers of the Environment (CCME) publication, "*Environmental Code of Good Practice for Aboveground Storage Tank Systems Containing Petroleum Products*". This CCME code deals with inventory control, inspections, corrosion protection, records, and monitoring. Other detailed requirements regarding the design, construction, and operation of storage facilities for various hazardous materials can be found in the NFCC.

The Northwest Territories *Mine, Health and Safety Act* and Regulations (Sections 9.07 to 9.11) also regulate the handling, storage, and management of hazardous materials. Under the NWT *Safety Act*, the Occupational Health and Safety Regulations address the safety of workers and the work place. The Act states that the employer shall maintain their establishment and take all reasonable precautions to ensure the safety and health of every person in the establishment. The regulations also prescribe standards for protective clothing and equipment to be used by workers.

The Work Site Hazardous Materials Information System (WHMIS) has been adopted to ensure employee training and safe storage and handling of controlled products at the employer's work site. All personnel will be trained in WHMIS protocol.

The Federal *Explosives Act*, pursuant to Section 84 of its regulations, addresses recording and reporting requirements for explosives.

Radioactive materials are regulated under the Canadian Federal *Nuclear Safety and Control Act*. Their transportation is dealt with in detail in the Transport Packaging of Radioactive Materials Regulations of the Act. Contractors dealing with instrumentation with integral nuclear isotopes (such as nuclear density gauges) will be responsible for obtaining and complying with the appropriate Federal, Provincial and Territorial regulations and guidelines pertaining to the safe transport, handling, storage, and usage of these materials.

Other jurisdictional legislation that applies to the Hazardous Materials Management Plan includes:

- The *Canadian Environmental Protection Act*,
- The *Fisheries Act*,
- The *Northwest Territories Waters Act*,
- The *Mackenzie Valley Resource Management Act*,
- The *Territorial Lands Act*,
- The *Environmental Protection Act*,
- *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations*;
- *Transportation of Dangerous Goods Regulations*; and
- *Used Oil and Waste Fuel Management Regulations*

The legislative requirements and regulations listed in this section will comprise the minimum standard acceptable for Snap Lake Mine and ensures the mine site is operated in an environmentally conscientious manner.

De Beers seeks continuous improvement in all aspects of its activities at all sites. De Beers views the legislated requirements as minimum requirements and has

developed a management program that will assist the company to exceed the standard requirements, wherever possible.

3.0 IDENTIFICATION, CLASSIFICATION, AND STORAGE OF HAZARDOUS MATERIALS

3.1 Introduction

The management of hazardous materials requires that safety and proper techniques must be considered during the transportation, handling, storage, distribution, use, and final disposal of any hazardous materials. All hazardous materials will be labelled and classified according to TDG and WHMIS regulations. Specific instructions for the storage and handling of hazardous materials are outlined in the Snap Lake Mine Operating Procedure, *SLM SHEOP-0002 Storage and Handling of Hazardous Materials*. This operating procedure forms part of the Snap Lake Mine Environmental Management System. Appendix I contains a copy of the procedure. The procedure is considered an uncontrolled document, as part of the EMS, and is subject to change without notification. Specific instructions for the storage of hazardous wastes are included in the Snap Lake Mine *Waste Management Plan*.

3.2 Identification of Hazardous Materials

It is important that personnel working on the mine site be knowledgeable of the potentially hazardous products that they may be exposed to. Therefore, all personnel who may come into contact with or manage hazardous materials will be trained in proper procedures. The Training Department ensures that environmental training needs are identified and that training is delivered and effective. Any employees working with acids, oils, fuel, radioactive materials, or other hazardous substances must be trained on the procedure for the storage, handling, and disposal of these products, and their containers, and be made aware of the consequences of not conforming to relevant procedures.

Specific procedures for training employees in environmental safety are included in the EMS system procedure, SYS 4.4.2 Training and Awareness. Specific procedures for implementing, maintaining, and ensuring compliance with the WHMIS at the Snap Lake Mine are included in the Safety, Health, and Environment (SHE) operating procedure, *SLM SHEOP-0003 Workplace Hazardous Materials Information System*.

3.3 Classification of Hazardous Materials

Hazardous materials are classified according to the Federal *Transportation of Dangerous Goods Act*, its Regulations and the territorial Guideline for Industrial Waste Discharges. All of the substances that fall under these regulations will be

labelled to inform personnel as to their toxicity and to comply with governmental regulations. Material Safety Data Sheets will be available on-line at <http://ccinfoweb.ccohs.ca/msds/search.html> for all hazardous materials located onsite. Hazardous materials will be grouped according to TDG categories by the Site Supervisor. Specific categories of hazardous materials that may be present on-site include:

- Class 1. Explosives (e.g., caps, ANFO, Emulsion, stick powder);
- Class 2. Compressed gases (acetylene, oxygen, propane tanks);
- Class 3. Flammable liquids (e.g., gasoline, diesel);
- Class 4. Flammable solids (e.g., calcium carbide);
- Class 5. Oxidizers (e.g., peroxide);
- Class 6. Poisonous and infectious substances (e.g., cyanide);
- Class 7. Radioactive material (e.g., nuclear density gauges);
- Class 8. Corrosive material (e.g., caustic soda, acids); and,
- Class 9. Miscellaneous hazardous materials (e.g., PCBs, asbestos, pesticides, leachable toxic waste).

Storage, handling, and transportation procedures will comply with Federal and Territorial TDG and WHMIS regulations. For example, the shipper /receiver must ensure that the carrier or transporter has the proper placards and labelling. The shipper/receiver must also ensure that handling and storage of dangerous goods comply with TDG requirements. Labelling of containers must comply with WHMIS standards.

3.4 Storage Facilities for Hazardous Materials

At the mine site, hazardous materials will be stored in various locations associated with their intended use to minimize site transport and handling requirements. All hazardous, non-combustible and contaminated waste materials will be temporarily stored in the Waste Management Area in sealed, steel, or plastic drums and shipped off-site for disposal or recycling. Specific storage locations can be found in Tables 1 and 2, and in the Snap Lake Mine *Waste Management Plan*. Figure 1 shows the overall site plan for the Snap Lake Mine.

These storage locations and facilities will follow all the protocols mentioned in this Hazardous Materials Management Plan. All containers used to store hazardous materials will be closed and sealed when not in use. All storage

facilities will be in compliance with the GNWT legislation and the NFCC. All storage tanks will be regularly inspected and maintained as per regulatory requirements. Storage facilities will be clearly identified with proper labelling as storage facilities for hazardous materials. They will also be well ventilated in order to prevent the build-up of toxic fumes or dust, which could harm both the personnel present and the environment. The facilities will be secured and only authorized personnel will have access to the area.

3.5 Protective Clothing and Equipment for Hazardous Materials

It is of the utmost importance that personnel are aware of waste products they are handling and wear appropriate personal protective equipment (PPE) as outlined by WHMIS and TDG regulations and the Snap Lake Mine Operating Procedure, *SLM SHEOP-0002, Storage and Handling of Hazardous Materials*. Appropriate protective equipment and clothing, spill kits, and MSDS will be available to personnel responsible for the transportation, handling, storage, distribution, use, and disposal of hazardous materials. These safety items will be available in every vehicle that transports these goods, and in all facilities that store and handle hazardous materials. All personnel involved in handling hazardous materials at the Snap Lake Mine will receive an orientation related to hazardous materials and WHMIS training as part of the general safety training for all employees. More specific information on procedures is included in the Snap Lake Mine *Spill Contingency Plan*.

Figure 1: Site Plan for the Snap Lake Mine



3.6 Disposal of Wastes

The overall waste management philosophy, under De Beers' environmental policy, is based on the following principles:

- Health and safety all of site employees and visitors is paramount.
- The "Three R" principles (Reduce, Reuse and Recycle) will be implemented.
- Adherence to applicable regulations and waste handling guidelines required under the *Environmental Protection Act* (GNWT Department of Environment and Natural Resources) is mandatory.
- Treatment, disposal and management of waste will be performed on site to the maximum practical and economic extent in order to minimize the volume of waste shipped off site.
- The generation of wastes that may attract wildlife or the interaction between humans and wildlife will be minimized.
- Measures will be implemented to reduce waste generation at the source and minimize wildlife attractants.
- A materials procurement policy will stipulate which types of materials are prohibited on site, due to known unacceptable waste products, and will require that products with minimal waste generation be given priority over alternatives where economic and practical.
- Waste management principles and procedures will form a fundamental component of personnel site orientation and education. Environmental awareness training and waste management training will form part of the EMS. Procedures outlined in this program will be enforced by site management personnel, through regular site inspections and auditing. Construction and services contracts will also include contractual requirements to comply with site waste management procedures.

Efforts will focus on recycling where possible. Waste oil will be used as an alternate fuel source to offset diesel oil consumption for heating some of the ancillary buildings. Destination of individual products is being reviewed. De Beers will ensure that receivers of hazardous waste are licensed facilities and ISO compliant where available.

A landfill for inert waste and a land farm for contaminated soils are utilized on the mine site the full operation of both these facilities is discussed in the Ore Storage, Waste Rock and Processed Kimberlite Facility as set out in the license.

3.7 Emergency Measures

The Snap Lake Mine *Spill Contingency Plan* has been prepared in accordance with the Indian and Northern Affairs Canada, NWT Region *Guidelines for Spill Contingency Planning*. The plan outlines the response organization, reporting responsibilities, and procedures for spills. It provides specific information about site facilities, response plans, and the training of response teams.

4.0 TRANSPORTATION PLAN

4.1 Introduction

The transportation of hazardous materials to the Snap Lake Mine site will be either by winter ice road or by air. The winter ice road will be the major transportation route for bulk materials. Hazardous materials will require special handling and specific documentation to comply with GNWT and Highway Department regulations.

De Beers and their contractors will ensure that the transporters of hazardous materials are aware of their legal responsibilities. De Beers is currently a member of the Tibbitt to Contwoyto Winter Road Joint Venture and will adhere to the Tibbitt to Contwoyto Joint Venture Spill and Emergency Response Plan, and to the Rules of the Road Manual.

4.2 Contractor Requirements

Materials to be shipped to the mine site will initially be received in Yellowknife or Edmonton by Braden Burry Expediting (BBEX). When possible, the material will be stored indoors in a secure area. Once transported to the site, the originator of the requisition will perform the final material receipt confirmation.

All TDG and WHMIS labelled materials must have accompanying MSDS. The MSDS will be faxed to the BBEX receiving agent by Materials Management when they process a purchase requisition for a controlled product.

If materials are spilled while receiving, the receiver will be the first responder and contact SHE Department and/or Materials Management and they may initiate the Spill Contingency Plan. A review of the MSDS for the spilled material will determine what personal protective equipment and other precautions may be required. The receiver will ensure spill kits are present at the unloading area in case a spill occurs.

5.0 PETROLEUM, OILS, AND LUBRICANTS

5.1 Introduction

The mine operation will use large amounts of petroleum fuels, oils, and lubricants (POLs). These products will be transported, stored, handled, and used in compliance with the appropriate legislation such as Environment Canada's *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* and with best management practises. A full year's supply of POLs will be transported to site during the winter road seasons.

5.2 Types and Quantities

The types and quantities of POLs to be stored and used are summarized in Table 1.

5.3 Design and Location of POL Storage Facilities

All single-walled fuel storage tanks are contained within a perimeter berm lined with high-density polyethylene (HDPE) geo-membrane. The berm has been designed as required by the NFCC, API-650, and NWT Public Works and Services design standards.

The berms provide secondary containment for all fuel storage tanks and the capacity of the secondary containment has the equivalent to the volume of the largest tank plus 10% of the cumulative volume of the rest of the tanks, as per the NFCC.

Fuel storage tanks approved for the Snap Lake Mine include:

- Eight 300,000 litre aboveground single-wall tanks located within a tank farm;
- Four 330,000 litre aboveground single-wall tanks located within a tank farm;
- Six 500,000 litre aboveground single-walled tanks located within a tank farm;
- One 500,000 litre aboveground single-walled tank located within a lined berm adjacent the Utilities building;
- One 100,000 litre aboveground double-walled tank located at the Fresh Air Raise;

- Three 12 million litre above ground single-walled tanks located within the tank farm; and,
- One 100,000 litre capacity Enviro tank located .within laydown 1.

5.4 Inspection and Monitoring

Site Services are responsible for formal inspection of fuel storage, dispensing pumps, and pipelines. Visual Inspections of all tanks and associated pipelines are conducted weekly or more frequent if deemed necessary. The inspection frequency will be determined by the legislation in place at that time and by BMP.

Any release of hazardous materials will be reported immediately and appropriate measures will be taken to remediate the situation. Details of reporting protocol, procedures, and remedial measures are specified in the Snap Lake Mine *Spill Contingency Plan*.

5.5 Records Keeping

Specific procedures for documentation of activities related to the EMS and to Safety and Health are included in the EMS system procedures, *SYS 4.4.4 Documentation* and *SYS 4.4.5, Document Control*, as well as in the Safety and Health Management System Procedures, *SLM SH SYS 4.4.4, Documentation*, and *SLM SH SYS 4.4.5 Document and Data Control*.

Inventory control and reconciliation records are kept on site in an acceptable manner and format and maintained for a period of one year. They are then archived and stored on site for examination or reference if required.

5.6 Training of Personnel

WHMIS training is provided to all personnel working on-site. The Emergency Response Team will be trained in the following fields, regardless of previous training and experience: transporting, handling, and transferring petroleum products; emergency response; and WHMIS.

Specific procedures for training employees in environmental safety and health are included in the EMS system procedure, *SYS 4.4.2 Training and Awareness*, and the Safety and Health Management System Procedure, *SLM SH SYS 4.4.2, Training, Awareness, and Competence*.

6.0 EXPLOSIVES

6.1 Introduction

Explosives are used during Snap Lake Mine development activities. The primary explosive material will be emulsion, which is a mixture of ammonium nitrate, sodium nitrate, an oil phase (typically vegetable oil), and a solution phase (water). ANFO consists of ammonium nitrate and fuel oil. This section focuses on explosives management with respect to the potential environmental hazards of each of the constituent components making up the explosive mixtures, and how to maintain personnel safety and training while working with these constituents.

The transportation, storage, or use of explosives or their constituents could result in hazardous situations or adverse environmental impacts. Procedures to prevent such an outcome are outlined in this section. These measures will ensure that the utmost safety and environmental responsibility will be maintained during the operation of the Snap Lake Mine.

6.2 Types and Quantities

The most common explosive that is used is Emulsion (a mixture of ammonium nitrate prill, sodium nitrate prill, an oil phase (typically vegetable oil based), and a solution phase (water)). ANFO is produced on an “as needed” basis for specific requirements. ANFO is a mixture of ammonium nitrate and fuel oil.

6.3 Design and Location of Storage Facilities

Ammonium nitrate and sodium nitrate are stored in a lined and bermed area adjacent to the Emulsion Plant. From time to time, surplus volumes may be temporarily stored in other areas with appropriate containment as approved by the INAC inspector. Ammonium nitrate (AN) is stored in 1000 kg plastic-lined tote bags. Sodium nitrate is stored in 907 kg plastic lined tote bags and/or 22.68 kg plastic lined bags. The oil phase used in emulsion is stored in a 10,000 liter enviro tank located within a lined dyke area immediately adjacent the emulsion plant. Care will be taken to ensure that the storage and use of explosive materials will not pose undue danger to personnel working on-site or to the local environment. The Emulsion plant is certified under the *Federal Explosives Act* for explosives containing nitrate mixtures.

Earthwork was initiated June 2009 to construct a pad and fabricate a building to accommodate the bulk storage of sodium and ammonium nitrate in sufficient volumes to support operations. Design of the structure and related equipment will

be in accordance with all national and territorial standards pertaining to the storage and handling of ammonium and sodium nitrates. The applicable codes and standards will include, but will not necessarily be limited to the following:

- National Fire Code of Canada 2005 (NFCC)
- National Building Code of Canada 2005 (NBCC)
- NFPA 490 Code for the Storage of Ammonium Nitrate
- NWT Fire Marshal
- ANSI American National Standards Institute
- ASME American Society of Mechanical Engineers
- CEMA Conveyor Equipment Manufacturers Association
- CSA Canadian Standards Association – Canadian Electrical Code
- MSHA Mine Safety and Health Administration
- OSHA Occupational Safety and Health Administration
- Workers' Compensation Act of Northwest Territories

The Bulk AN Storage Facility has been designed and constructed of suitable building foundation and base slab for support of the building and designated loads within the building. The foundation and base slab system includes an embedded membrane for the secondary containment of nitrates and corrosion reduction.

The design of the interior of the building includes two concrete walled storage areas, one for the storage of bulk ammonium nitrate and the second for the storage of bagged sodium nitrate. The total combined storage capacity is 2400 mega tonnes.

The materials handling system consists of three screw conveyors for the purpose of moving the bulk ammonium nitrate. No materials handling systems were provided for the moving of bagged sodium nitrate. The building houses an exhaust fan and filtering system to provide adequate ventilation for equipment contained within the building; a cathodic protection system to reduce corrosion from exposure to the ammonium nitrate and surface treatment for limiting penetration of ammonium nitrate and sodium nitrate.

6.4 Inspection and Monitoring

Explosives are strictly regulated and only qualified and certified personnel will be employed in the handling of explosives. Periodic audits of all working areas and

roads used to transport the explosives will be conducted by SHE and/or Mine Operations personnel to ensure proper handling procedures are used.

Any release of hazardous materials will be reported immediately and appropriate measures will be taken to remediate the situation. Details of reporting protocol, procedures, and remedial measures are specified in the SLM *Spill Contingency Plan*.

6.5 Records Keeping

Specific procedures for documentation of activities related to the EMS and to Safety and Health are included in the EMS system procedures, *SYS 4.4.4 Documentation* and *SYS 4.4.5, Document Control*, as well as in the Safety and Health Management System Procedures, *SLM SH SYS 4.4.4, Documentation*, and *SLM SH SYS 4.4.5 Document and Data Control*.

6.6 Training of Personnel

WHMIS training is provided to all personnel working on-site. The Emergency Response Team will be trained in the following fields, regardless of previous training and experience: transporting, handling, and transferring petroleum products; emergency response; and WHMIS.

Specific procedures for training employees in environmental safety, and safety and health are included in the EMS system procedure, *SYS 4.4.2 Training and Awareness*, and the Safety and Health Management System Procedure, *SLM SH SYS 4.4.2, Training, Awareness, and Competence*.

7.0 OTHER HAZARDOUS CHEMICALS

7.1 Introduction

Bulk chemicals such as ferric sulphate; granular flocculants such as aluminum nitrate and Magnafloc 351; granular ferrosilicon; and sulphuric acid (93%) are used in different processes at the Snap Lake mine site. Gases such as propane, oxygen, and acetylene; solvents; etc are also used. Nuclear density gauges are used in specific areas on the mine site. The release or spill of any of these substances could possibly result in an adverse environmental impact and pose a potentially hazardous situation for those personnel exposed to these materials.

Safe storage, handling, transportation, and use of hazardous materials will be coordinated through standardized operating procedures, and the application of all legislation related to hazardous wastes. These measures will ensure that the safety and environmental responsibility will be maintained with respect to these chemicals at all times during the operation of the Snap Lake Mine.

7.2 Types and Quantities

The types and quantities of other hazardous materials to be stored and used during operations are referenced in Table 1.

7.3 Design and Location of Storage Facilities

Chemical storage containers will be of the appropriate design and material to safely contain and identify the hazardous materials. Gases, such as propane, acetylene and oxygen will be provided in cylinders and stored as per NFCC requirements. The nuclear density gauges used will adhere to all pertinent legislative requirements regarding the licensing, transportation, handling, storage, and use of these devices.

7.4 Inspection and Monitoring

Quantities of all hazardous chemicals transported to the on-site storage facilities via the winter road will be inventoried upon receipt. The daily usage will be reconciled to inventory. Adequate quantities of appropriate types of spill and fire clean-up materials and equipment will be made available for the hazardous materials on-site. These materials and equipment include, but are not restricted to:

- Fire extinguishers;

- Acid neutralizing materials;
- Inert absorbent materials;
- Dust mitigating materials;
- Masks and appropriate respiratory filters; and
- Protective clothing, gloves, and safety eyewear.

Any release of hazardous materials will be reported immediately and appropriate measures will be taken to remediate the situation. Details of reporting protocol, procedures, and remedial measures are specified in the SLM *Spill Contingency Plan*.

7.5 Records Keeping

Specific procedures for documentation of activities related to the EMS and to Safety and Health are included in the EMS system procedures, *SYS 4.4.4 Documentation* and *SYS 4.4.5, Document Control*, as well as in the Safety and Health Management System Procedures, *SLM SH SYS 4.4.4, Documentation*, and *SLM SH SYS 4.4.5 Document and Data Control*.

7.6 Training of Personnel

WHMIS training is provided to all personnel working on-site. The Emergency Response Team will be trained in the following fields, regardless of previous training and experience: transporting, handling, and transferring petroleum products; emergency response; and WHMIS.

Specific procedures for training employees in environmental safety, and safety and health are included in the EMS system procedure, *SYS 4.4.2 Training and Awareness*, and the Safety and Health Management System Procedure, *SLM SH SYS 4.4.2, Training, Awareness, and Competence*.

Appendix I: Snap Lake Mine Operating Procedure *SLM SHE OP 0002 Storage and Handling of Hazardous Materials*

SHE PROGRAMMES AND PROCEDURES			
Division:	Mining	P & P No:	SLM SHE OP 0002
Section:	Safety Management (General)	Effective:	April 30, 2009
Issued By:	SHE Manager		
Subject:	Storage and Handling of Hazardous Materials		
Revision:	April 30, 2009	Replaces:	January 1, 2004

PURPOSE

To provide personnel with safe storage practices for all hazardous materials used on site. The handling practices outlined below comply with territorial and federal legislation, including Transportation of Dangerous Goods (TDG) regulations, Workplace Hazardous Material Information System (WHMIS) regulations, and De Beers Canada Safety, Health and Environmental (SHE) policies.

SCOPE

This procedure applies to all employees including independent contractors, working at the Snap Lake Mine (SLM) and designated sites.

RESPONSIBILITY

SHE Manager is responsible for:

- Ensuring these procedures are implemented and maintained.
- Ensuring on-site personnel have up-to-date WHMIS training, and where applicable, TDG training.
- Initiating the Spill Response Plan.
- Transport and removal of hazardous waste.

Environmental Coordinator/Environmental Technician is responsible for:

- Working with the On-Scene Coordinator or designate to react to spills using the Spill Response Plan.
- Inspecting hazardous materials storage per Environmental Management System Operational Procedure – Site Inspection.
- Helping the Emergency Response Team leader or designate plan and conduct spill response activities.
- Arranging transport and removal of hazardous waste from the site.

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All on-site personnel who handle hazardous materials and wastes are responsible for:

- Having proper WHMIS and TDG training.
- Complying with these procedures and relevant WHMIS and TDG regulations.
- Ensuring all hazardous materials are stored in a safe and organized manner, which minimizes or eliminates the potential for spills, accidents, incidents or hazards.
- Consulting with their supervisor or designate with any questions about storage or handling of hazardous materials.
- Informing their supervisor or designate immediately when a spill occurs.
- If it is safe to do so and appropriate personal protective equipment (PPE) is worn, beginning immediate clean up of a spill with absorbent material.

DEFINITIONS

Hazardous Material:

Any material identified in the TDGR or WHMIS, including:

- Explosives (e.g., caps, ANFO, stick powder)
- Compressed Gases (e.g., acetylene, oxygen)
- Flammable Liquids (e.g., gasoline, diesel)
- Flammable Solids (e.g., calcium carbide)
- Oxidisers (e.g., peroxide)
- Poisonous and infectious substances (e.g., cyanide)
- Radioactive material (e.g., nuclear density gauges)
- Corrosive material (e.g., caustic soda, acids)
- Environmentally hazardous material (e.g., PCBs)
- Hazardous wastes (e.g., used oil, vehicle batteries, empty barrels)
- Miscellaneous dangerous goods (e.g., asbestos).

PROCEDURE

It is of the utmost importance that personnel handling waste products are aware of what they are handling and wear appropriate PPE as outlined by WHMIS regulations and SLM SHEOP. Personnel must always be certain of PPE requirements, so check with the supervisor and review the Material Safety Data Sheet (MSDS) for the products handled **before** work begins.

Smoking is not allowed when handling flammable waste products.

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The following categories identify hazardous materials with similar handling and storage requirements:

1. BATTERIES

- Batteries will be stored in acid-resistant secondary containment trays to catch leaks.
- Where practical, batteries must be kept from freezing to prevent cracking of the outer casing.

2. EXPLOSIVES

- Immediately upon arrival, explosives and detonators must be transferred into existing separate approved surface magazines or underground storage areas.
- Magazines shall be kept locked. Only authorized persons shall have access.
- No smoking or open flame is permitted within 20 m (60 ft) of magazines.
- Handling and transportation of explosives from the magazine shall comply with the federal, provincial, and territorial acts and regulations.
- If for any reason explosives must be discarded, (i.e., expired) they shall be kept in a separate location, clearly labelled and returned to the supplier.

3. COMPRESSED GAS CYLINDERS

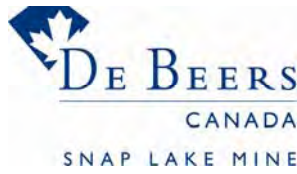
- Upon delivery to the site all compressed gas cylinders must be stored in the area designated specifically for compressed gas cylinders.
- The storage area must be well marked to clearly identify the storage of compressed gases. "NO SMOKING" signs will also be posted.
- Full cylinders in the storage area must be grouped according to the types of gas they contain and stored separately from empty cylinders.
- Cylinders emptied on site must be marked "MT" with white chalk and returned to the area designated for empty cylinder storage.
- All full and empty cylinders must be securely fastened by a chain to the wall and kept upright at all times.
- Acetylene and oxygen must be stored separately.
- All cylinders must be equipped with protective valve caps.

5. PROCESS PLANT REAGENTS:

- All plant reagents must be stored in the appropriate bulk container, the designated reagent storage yard, or inside the plant.
- As compatibility and reactivity of reagents are fundamental to safe work practices, only approved reagents will be permitted on site. Any additional

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reagents will be subject to review before their arrival per the Operational procedure for Purchasing.

- The inventory of reagents stored inside the plant, excluding volume in mix and stock tanks, is limited to a maximum 7-day supply, or one container, when in operation.
- Cutting or welding is not permitted in a reagent mixing or storage area without the prior approval of the Plant Superintendent or the Maintenance Superintendent. The SLM SHEOP Hot Work Procedure and Hot Work Permit must be followed.
- Reagents stored in barrels must be kept on pallets and secured during delivery.

6. LUBRICANTS AND FUEL

- Storage of lubricants underground is only permitted in areas that have been approved in accordance with provincial or territorial regulations. Consult the supervisor and the Environmental Coordinator before storing lubricants underground.
- Lubricants stored in the plant are limited to one container of each product, or a 7-day supply, when in operation.
- Lubricants must remain stored in containers supplied by the product manufacturer or distributor, or may be transferred to appropriate containers bearing appropriate workplace labels in accordance with WHMIS regulations.
- The storage of bulk fuel and lubricants is approved under permit. Each tank must be registered and approved before arriving on site.

7. HAZARDOUS WASTE

- All hazardous waste containers must be properly labelled according to WHMIS requirements.
- Contractors are responsible for proper storage in designated areas and must advise camp maintenance personnel and the Environmental Technician when material is moved to the Waste Management Area.

All hazardous waste products listed below marked with an asterisk (*) will be stored in barrels or crates in accordance with SLM SHEOP Waste Management Log.

If a spill occurs, ensure it is cleaned up safely and immediately with absorbent pads or other appropriate material, and safely disposed of as hazardous waste. Notify the supervisor so a Spill Report Form can be filled out.

Note: All barrels and drums must be stored upright on pallets unless otherwise noted.

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- **All Full or Partially-Full Barrels or Drums:** will be palletized and strapped before being moved by mechanical means per the SHEOP Material Handling.
- **Reagent Containers:** All empty barrels or bags must be **thoroughly** flushed with water in the plant to remove any residuals. The residual water is then placed back into the process water. Rinsed metal or plastic barrels should be stored upside-down at the Hazardous Waste (HW) storage.
- **Glycol Containers:** All empty glycol barrels must be used only for waste glycol storage. The containers must be numbered per SLM SHEOP Waste Management Log.
- **Waste Oil*:** Waste oil shall be collected in empty 45 gallon oil drums set in drip trays to prevent spills or totes. The drums must first be checked to ensure they contain no holes. The drums must be sealed with bungs. Waste oil will be stored at the Hazardous Waste Cell within the Waste Management Area.
- **Waste Solvents*:** Waste solvents must be placed in clean barrels and stored at the Hazardous Waste Cell within the Waste Management Area.
- **Waste Glycol*:** Waste glycol must be placed in empty glycol barrels and stored at the Hazardous Waste Cell within the Waste Management Area.
- **Incinerator Ash*:** Partial barrels of incinerator ash will be stored at the incinerator until they are full. Full barrels must have the tops covered and deposited in the landfill and covered with waste rock.
- **Lubricating Grease*:** Full barrels must have the tops covered and be stored at the Hazardous Waste Cell within the Waste Management Area.
- **Used Oil Filters*:** These are stored in enviro-drums, complete with snap ring lid, at the maintenance shop. The filters will be crushed to allow oil to drain. When the drum is full, the enviro-drums are stored at the Waste Management Area.
- **Corrosives, Caustics, and Oxidizers*:** These are stored in bunged barrels at the Hazardous Waste Cell within the Waste Management Area. Note that these materials are incompatible and must be stored separately and at a safe distance from each other according to WHMIS requirements.
- **Contaminated Soil – Hydrocarbons and Waste Water*:** These are stored in enviro-drums, complete with snap ring lid, and stored at the Waste Management Area.
- **Contaminated Fuel (Diesel and Jet-B)*:** These are stored in bunged barrels at the Hazardous Waste Cell within the Waste Management Area and may be blended with other fuels and used to fuel the waste oil furnaces on-site.
- **Printer/Copier Toner Cartridges:** These are returned to the supplier in the packaging recovered from the newly installed cartridge.
- **Wet Cell Batteries:** Used batteries must be delivered to the maintenance shop where they will be stored in a poly-lined crate for removal by winter road.

- **Asbestos Products (brake linings)*:** Where possible, these will be returned to the supplier. If suppliers will not take asbestos parts, they are stored in an enviro-drum at the maintenance shop. When the enviro-drum is full it will be stored at the Hazardous Waste Cell within the Waste Management Area.
- **Empty Fuel Drums and Lube Drums:** These are stored at the empty barrel laydown area at the Waste Management Area, lying on their sides, with bungs at 3 and 9 o'clock.
- **Fluorescent Tubes:** These are stored in properly labelled poly-lined crates at the Waste Management Area for shipment off-site. Old fluorescent tubes are given to camp maintenance for storage in the appropriate lined crate or to be broken in a fluorescent tube crusher. Crushed remnants will be appropriately stored for shipment off site.
- **Small Dry Cell Batteries:** These are turned in at the main office where they will be consolidated for shipment to appropriate facilities.

Hazardous waste is stored for shipment to appropriate facilities.

Hazardous waste will receive a Waste Management Log number from the Environmental Technician as described in SLM SHEOP Waste Management Log. All waste containers will receive a Waste Management Log number, which must be affixed to the container.

REFERENCES AND RELATED DOCUMENTS

- De Beers Canada Corporate Safety and Health Management System Elements CORP SH SYS 4.3.4 and CORP SH SYS 4.4.6
- De Beers Canada SLM Safety and Health Management System Elements SLM SH SYS 4.3.4 and SLM SH SYS 4.4.6
- Mine Health and Safety Regulations NWT Sections 9.01 – 9.18, Sections 9.28 – 9.42, Sections 9.61 and 15.05
- Consolidation of the Workplace Hazardous Material Information System (WHMIS) Regulations. R.R.N.W.T. 1990, c.S – 2.
- Explosives Act. R.S., c. E-15, s. 1.
- National Research Council of Canada – 1995 – National Fire Code of Canada.
- De Beers Canada Mining Inc. – Snap Lake Diamond Project Spill and General Contingency Plan.
- Federal Transportation of Dangerous Goods Regulations (TDGR) – 1991.
- SLM SHE OP 0003 (Workplace Hazardous Materials Information System (WHMIS) Procedure).
- SLM SHE OP 0006 (Disposal of Empty Aerosol or Pressurized Containers and Dry Cell Batteries).



- SLM SHE OP 0011 (Purchasing).
- SLM SHE OP 0021 (Transportation and Disposal of Hazardous Wastes).
- SLM SHE OP 0023 (Solid Waste Handling and Disposal).
- SLM SHE OP 0038 (Waste Management Log).
- SLM SHE OP 0046 (Material Handling).
- SLM SHE OP 0053 (Compressed Gas Cylinders).
- SLM SHE OP 0060 (Fire Protection).
- SLM SHE OP 0096 (Hot Work and Hot Work Permits).

