

# **APPENDIX 3.V**

## **Hazardous Substances Management Plan**

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### 3.V.1 INTRODUCTION

#### 3.V.1.1 Purpose and Scope

The purpose of this document is to provide a summary of information on the safe and environmentally sound transportation, storage, and handling of hazardous materials used at the NICO Project during both the construction and operational phases. These procedures are an integral component of the General Environmental Protection Plan for the proposed NICO Project and will be periodically reviewed and updated as the project moves through construction, operations, and closure.

#### 3.V.1.2 Definition of Hazardous Material

A hazardous material is substance that, as a result of its physical, chemical, or other properties, poses a potential hazard to human health or the environment when it is improperly handled, used, stored, disposed, spilled, or otherwise managed. In combination with the Emergency Response and Spill Contingency Plan (Appendix 3.VI), the Hazardous Substances Management Plan provides instruction on the prevention, detection, containment, response, and mitigation of accidents that could result from handling of hazardous materials at the proposed NICO Project.

For the purposes of this document and simplicity, handling refers to storage, transportation, usage, distribution, and other processes involving potentially hazardous materials.

#### 3.V.1.3 General Control Procedures

The procedures outlined in this plan are based on the following principles:

- purchasing controls: control of shipping methods, appropriate packaging, shipping schedules, etc.;
- shipment tracking procedures;
- inventory controls on-site: periodic inventory of materials in storage on-site to identify usage and to manage unexpected loss;
- maintenance of current safe handling and storage procedures: Material Safety Data Sheets (MSDS), Workplace Hazardous Materials Identification System (WHMIS), Transportation of Dangerous Goods (TDG), data, and labelling made available to those in contact throughout the operating site;
- characterization of potential environmental hazards posed by these materials;
- allocation of clear responsibility for management and handling of potentially hazardous materials;
- defined methods for handling;
- preparation of contingency and emergency response plans;
- adequate type and delivery of training for management, workers and contractors whose responsibilities include handling potentially hazardous materials;
- maintenance and review of records of hazardous material consumption and incidents in order to anticipate and avoid impacts on personal health and the environment; and

- procedures to track and manage hazardous wastes generated, including regular shipments of potentially hazardous waste to appropriately licensed receivers following relevant regulatory requirements (packaging, labeling, inventory tracking, and waste manifesting).

Fortune will require that the handling of potentially hazardous materials at the NICO Project be conducted in a safe and efficient manner. Prevention, detection, containment, response, and mitigation are the key elements in the management of hazardous materials. Fortune is committed to minimizing the potential for adverse environmental effects that could result from accidental release.

Hazardous materials to be used at the NICO Project will be handled in compliance with applicable federal and territorial regulations. Fortune will institute programs for employee training, facility inspection, periodic drills to test systems, and procedural reviews to address deficiencies, accountability, and continuous improvement.

Fortune will actively work toward minimizing the generation of hazardous wastes by investigating alternatives to the use of hazardous materials, by recycling products and containers wherever feasible, and by treating wastes using appropriate technologies.

As with other aspects of the health and safety policy, employees will be expected to comply with applicable precautions and handling procedures with regard to hazardous materials. Employees will also be expected to report concerns to their supervisors, the health and safety committee, or senior site management. Staff will be encouraged to bring forward suggestions for improvements that can be incorporated into future procedure revisions, as appropriate.

### 3.V.1.4 Applicable Legislation

Both federal and territorial legislation regulates the management of hazardous materials. Copies of relevant legal documents will be kept on file at the mine site. The major acts, regulations, and guidelines pertinent to the hazardous products that will be used at the NICO Project are listed below.

#### *Federal*

- *Transportation of Dangerous Goods Act* and Regulations (TDGA and TDGR);
- *Explosives Act*;
- Ammonium Nitrate Storage Facilities Regulations;
- National Fire Code;
- *Canadian Environmental Protection Act*, and
  - Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations
- Canadian Council of Ministers for the Environment (CCME) Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.

#### *Territorial*

- *Environmental Protection Act*;
  - Spill Contingency Planning and Reporting Regulations;

- Used Oil and Waste Fuel Management Regulations ;
- Guideline for General Management of Hazardous Waste;
- Guideline on Waste Batteries;
- Guideline on Waste Antifreeze;
- Guideline on Waste Solvents; and
- Guideline on Waste Paint.
- *Transportation of Dangerous Goods Act* and Regulations;
- *Explosives Use Act*;
  - Explosives Regulations.
- *Fire Prevention Act* and Regulations;
  - Propane Cylinder Storage Regulations.
- *Mine Health and Safety Act* and Regulations; and
- *Safety Act*;
  - General Safety Regulations; and
  - Work Site Hazardous Materials Information System Regulations.

### 3.V.1.5 Training

Management and safety personnel will provide an overview of the applicable regulations to employees as part of their orientation training and through ongoing training. Training associated with safety, health, and the environment will be standardized, maintained, and updated on a continual basis to adequately educate and inform staff about potential hazards.

As part of the site orientation for employees, staff, and contractors at the site will receive the training in the following key areas associated with the handling of hazardous materials:

- WHMIS;
- emergency and spill response; and
- operations overview.

Mine employees will receive additional training in mine safety in accordance with the *Mine Health and Safety Act* and Regulations. Plant employees will receive additional training specific to their area of work and duties, including safe operating practices, safe handling and storage of chemicals, and use of personal protective equipment.

Periodically, NICO staff will carry out emergency response drills. The drills will test emergency response procedures and will be scheduled so as not to disrupt work. The results of the drills will be recorded and

forwarded to the mine manager and the health and safety committee. Should the results indicate that additional or refresher training is required, health and safety committee recommendations will be implemented.

Medical and mine rescue staff, and others responsible for first response to emergencies will conduct periodic drills to test their emergency response procedures. Reports on the drills will be provided to mine manager for action as required.

### 3.V.2 IDENTIFICATION, CLASSIFICATION, AND STORAGE OF HAZARDOUS MATERIALS

#### 3.V.2.1 Types of Hazardous Materials

The NICO Project will use the following types of hazardous materials in the day to day operation of the mine and in the extraction of a metals concentrate from the mined ore:

- **Fuel and Lubricants:** diesel fuel, gasoline, oils, greases, anti-freeze, and solvents for power generation, building heating, equipment operation, and maintenance;
- **Process Plant:** potassium amyl xanthate flotation collector, methyl isobutyl carbinol flotation frother;
- **Effluent Treatment:** hydrochloric acid, ferric chloride, phosphoric acid, sodium hydroxide;
- **Explosives:** ammonium nitrate, ammonium nitrate fuel oil (ANFO) emulsion, and pre-packaged high explosives (stick powder) used for blasting in the mine;
- **Flammable or oxidizing gases:** oxygen, acetylene, and propane; and
- **Laboratory chemicals:** small volumes of various chemicals in the on-site analytical laboratory to analyze rock and water samples for grade control, to monitor metallurgical performance and to monitor environmental performance.

Laboratory chemicals are generally very limited in quantity and will be handled only by specialist laboratory technicians.

#### 3.V.2.2 Purchasing

Purchase orders dealing with hazardous materials will require, as condition of payment, copies of applicable MSDSs with the shipments in protected envelopes marked as such, if a copy of the MSDS does not already exist on-site for the material or materials in the order. This procedure will ensure that hazardous materials shipped to the NICO site come with written data on the recommended safe handling and storage procedures attached to each shipment. Copies of the MSDSs will be retained in the mine office where they will be available to employees.

In many cases, the potentially hazardous materials used on-site will have no substitutes in the process or for the intended use. However, when alternatives exist, substances with a lower potential hazard will be favoured, if suitable.

Where alternatives exist, preference will be given to suppliers that accept the return of used containers, and/or excess/obsolete materials. Minimization of waste is a priority for the NICO Project and will be taken into account during the purchasing stage of potentially hazardous material.

### 3.V.2.3 Classification of Potentially Hazardous Materials

Potentially hazardous materials are classified in accordance with the *Transportation of Dangerous Goods Act* and Regulations (TDG) into nine main classes according to an internationally recognized system, as follows:

- Class 1 – Explosives;
- Class 2 – Gases;
- Class 3 – Flammable liquids;
- Class 4 – Flammable solids;
- Class 5 – Oxidizing substances and organic products;
- Class 6 – Poisonous (toxic) and infectious substances;
- Class 8 – Corrosives; and
- Class 9 – Miscellaneous products or substances.

Substances which fall under these regulations will be labelled accordingly to inform personnel of the hazards and to comply with government regulations. The materials addressed in this document are identified by TDG class in the product description tables in the following sections.

Material safety data sheets will be available for hazardous materials located on-site. Copies of pertinent MSDSs for products utilized at site will be available at the mine office and first aid station. Pertinent subsets of the MSDSs will also be available in the designated work areas where the hazardous materials are to be used. In addition, a digital data base of MSDSs will be maintained. Personnel working at site, who may have to handle or encounter hazardous materials, will be required to complete the WHMIS training module.

### 3.V.2.4 Life Cycle Management

Life cycle management refers to the assessment and management of a particular product from the time a material need is identified to the time the product is fully consumed or disposed. It covers product supply, handling, recycling and disposal. Fortune is committed to the proper life cycle management of potentially hazardous materials used at the NICO Project site. Fortune and its contractors will deal only with reputable, certified suppliers and carriers for the supply, delivery, and disposal of potentially hazardous materials.

#### 3.V.2.4.1 Delivery

Hazardous materials will be delivered to site by commercial carriers in accordance with the requirements of the TDGA. Carriers will be licensed and inspected as required by the Department of Transportation. Required permits, licences, and certificates of compliance will be the responsibility of the carrier. Shipments will be properly identified and placarded. Shipping papers must be accessible and include information describing the substance, immediate health hazards, fire and explosion risks, immediate precautions, fire-fighting information, procedures for handling leaks or spills, first aid measures, and emergency response telephone numbers.

Each transportation company will be required to have a current spill prevention, control, and response plan to address the materials they are transporting to the NICO Project. In the event of a release during transport, the commercial transportation company will be responsible for first response and cleanup.

### 3.V.2.4.2 On-Site Handling

Once potentially hazardous materials are received at the workplace, additional regulations apply. Workplace hazardous materials identification system legislation requires the proper labelling of products, the availability of product information in the form of MSDSs, and employee education on how to identify and handle hazardous products. Hazardous materials will be stored in secured areas to prevent access by unauthorized personnel or tampering.

Although supplies will be shipped to site on a regular basis using the proposed all-season road, inventory control and rotation will ensure that older stock is used ahead of newer stock to avoid shelf life expiry and minimize waste. Fortune will implement an inventory tracking and control system that documents items such as:

- expiration dates;
- quantities remaining in stock;
- priority of usage;
- rates of usage; and
- projected dates for re-ordering of stock items.

Hazardous materials will be stored in permanent purpose-built designated facilities such as fuel storage tanks, explosives magazines, steel shipping containers (sea cans), and within mill reagent storage containers. Tanks used for the storage of liquid materials will be installed within secondary containment sized to hold at least 110% of the volume of the largest tank. Tanks and vessels in the Plant will be installed on concrete surfaces sloping to interior sumps that will route spilled solutions to lined collection areas.

Hazardous materials released during handling have the potential to affect the environment as well as the personnel using these substances. The Emergency Response and Spill Contingency Plan (Appendix 3.VI) outlines the planned response protocols to address accidental spills or releases of potentially hazardous materials to minimize health risks and environmental effects. Included are procedures for initial response to halt and/or contain spilled material, evacuating personnel, cleanup activity, emergency contacts, internal and external notifications to regulatory authorities, and incident documentation. Site personnel involved in the handling of such hazardous materials will be trained in emergency response procedures.

### 3.V.2.4.3 Handling of Waste Generated from Use of Hazardous Materials

Waste generation at the NICO Project will follow a plan consisting of reduction, reuse, recycling, and recovery, as discussed in the Waste Management Plan (Appendix 3.IV). The use of hazardous materials at the NICO Project will, however, inevitably lead to the generation of potentially hazardous waste materials.

The types of hazardous waste to be generated by the NICO Project include the following:

- used engine and lubricating oil;
- used engine oil filters;
- used antifreeze;
- used hydraulic fluid;

- used grease;
- used petroleum-based solvent from parts cleaning;
- used vehicle batteries; and
- assay lab crucibles from fire assaying for gold.

Once the hazardous waste is generated, it will be stored and/or disposed in accordance with regulations and guidelines as well as proper management practices. Hazardous waste material will be stored securely, in appropriate containers, in the materials sorting facility with the exception of used engine oil, used explosives and waste from analytical laboratory. Hazardous waste material will be stored until quantities suitable for a shipment have been collected.

Used engine oil will be stored in a designated storage tank within the fuel tank farm. It may be used as a fuel source for heating or shipped off-site to a used oil recycler.

Unused explosives will be burned or destroyed on-site and unused chemicals as well as other hazardous material will be collected for off-site disposal at a licensed facility in an appropriate manner.

Waste from the analytical laboratory will be separated for collection and disposal or for incorporation in the mill process stream, as appropriate.

### 3.V.2.4.4 Empty Product Containers

In the Plant, reagent containers will be washed out at the time of reagent mixing so that the washings are retained and used within the process. Washed bulk bags will be collected in a designated container for incineration. Wood shipping crates may be incinerated, chipped for an organic amendment to the growth media stockpiles, or made available for site staff or area communities for use as fire wood.

Plastic and metal reagent pails and drums will be washed and stored to return to the supplier, where applicable. Pails and drums that had stored petroleum fluids will be allowed to gravity drain into a collecting drum and then similarly stored for return to the supplier, where applicable.

## 3.V.3 PETROLEUM PRODUCTS

### 3.V.3.1 Introduction

The NICO Project will consume relatively large volumes of petroleum fuels, mainly diesel, as well as oils and lubricants. These products will be handled in compliance with applicable legislation and in accordance with industry practices.

Fortune will regularly inspect storage and distribution facilities for mechanical soundness, leaks, or other issues of compliance.

### 3.V.3.2 Product Description

The anticipated types and quantities of petroleum fuels, oils, and lubricants to be shipped, stored, and used at the site during the mine's operating life are summarized in Table 3.V.3-1 along with the hazard classes, potential impacts, proper handling as recommended by MSDSs. Note that although not a petroleum product, ethylene glycol (antifreeze) has been included here.

## FORTUNE MINERALS LIMITED DEVELOPER'S ASSESSMENT REPORT

**Table 3.V.3-1: Petroleum Storage, Potential Impacts, and Proper Handling**

Material	TDG Class	Potential Impact	Product Handling	Protective Equipment		
				Eyes	Skin	Breathing
Diesel	3	snow, ice, water, vegetation, soil	Do not get in eyes, on skin, or on clothing. Avoid breathing vapours, mist, fume, or dust. Do not swallow. May be aspirated into lungs. Wear protective equipment and/or garments if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse. Use with adequate ventilation. Keep away from heat, sparks, and flames. Store in a well-ventilated area. Store in a closed container. Bond and ground during transfer.	Chemical goggles	Neoprene or nitrile gloves, protective garments	Not usually required
Motor Oil	3	snow, ice, water, vegetation, soil	Wear protective clothing and impervious gloves when working with used motor oils.	Chemical goggles	Neoprene or nitrile gloves, protective garments	Not usually required
Aviation Fuel	3	snow, ice, water, vegetation, soil	See diesel	Chemical goggles	Neoprene or nitrile gloves, protective garments	Not usually required, provide adequate ventilation
Gasoline	3	snow, ice, water, vegetation, soil	Avoid skin contact. Launder contaminated clothing before reuse. Store in a flammable liquids area. Store away from heat, ignition sources and open flames. Gasoline will burn vigorously and can explode with the right fuel-air mixture (between lower explosives limit and upper explosives limit).	Chemical goggles	Neoprene or nitrile gloves, protective garments	Not usually required, provide adequate ventilation
Hydraulic Fluid	3	snow, ice, water, vegetation, soil	Keep container closed until ready for use.	Chemical goggles	Not usually required	Not usually required
Varsol	3	snow, ice, water,	Avoid eye contact. Use with adequate ventilation. Wash thoroughly after handling. Empty container retains residue.	Chemical goggles	Rubber gloves, protective	Not usually required,

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**Table 3.V.3-1: Petroleum Storage, Potential Impacts, and Proper Handling (continued)**

Material	TDG Class	Potential Impact	Product Handling	Protective Equipment		
				Eyes	Skin	Breathing
		vegetation, soil	Follow label instructions. Avoid repeated skin contact. Store in cool, ventilated area, away from ignition sources and incompatibles. Keep container tightly closed.		garments	provide adequate ventilation
Grease	3	Negligible	Minimize breathing vapour, mist, or fumes. Avoid prolonged or repeated contact with skin. Remove contaminated clothing; launder or dry-clean before re-use. Remove contaminated shoes and thoroughly clean before re-use; discard if oil-soaked. Cleanse skin thoroughly after contact, before breaks and meals, and at end of work period. Product is readily removed from skin by waterless hand cleaners followed by washing thoroughly with soap and water. To prevent fire or explosion risk from static accumulation and discharge, effectively ground product transfer system in accordance with the National Fire Code. Keep containers closed when not in use. Do not store near heat, sparks, flame, or strong oxidants.	Chemical goggles	Neoprene or nitrile gloves, protective garments	Not usually required, provide adequate ventilation
Ethylene Glycol	3	Negligible	Ensure adequate ventilation. Wear protective gloves and chemical safety goggles. Keep in tightly closed container, stored in a cool, dry, ventilated area. Separate from acids and oxidizing materials. Empty containers of this product retain product residues and may be hazardous.	Chemical goggles	Neoprene or nitrile gloves, protective garments	Not usually required, provide adequate ventilation

TDG = Transportation of Dangerous Goods

Site vehicles will generally be equipped with diesel fuelled engines; however, relatively small quantities of gasoline will be required to fuel off-road vehicles, such as snowmobiles and all-terrain vehicles, and to power small portable generator units and small portable pumps. Consequently, a quantity of gasoline will be stored on-site within the plant site fuel tank farm.

There will be no aircraft de-icing fluids used at the NICO Project. Fixed wing aircraft traveling to the NICO site will typically off-load, re-load and then depart, minimizing their time on-site.

### 3.V.3.3 Delivery to Site

Diesel fuel will be delivered to site by standard highway fuel tanker truck along the all-weather road to the fuel tank farm at the NICO Project. Most other petroleum products will be delivered to site and stored in the original packing containers as received from the manufacturer. These types of containers include a variety of sealed drums, pails, cans, and tubes.

### 3.V.3.4 Fire and Explosion Risk Minimization

Different petroleum products present different risks for fire and explosion, and they are classified as flammable and combustible groups based on their flashpoint (the lowest temperature at which the vapour above a liquid can be ignited in air) as follows.

- **Flammable (Class I)** liquids have flash points below 37.8 degrees Celsius (°C). These liquids are further sub-divided depending on boiling points. Class IA liquids are the most hazardous, with flash points below 22.8 °C and boiling points below 37.8 °C (e.g., propane). Class IB liquids have flash points below 22.8 °C and boiling points at or above 37.8 °C (e.g., gasoline, acetone). Class IC liquids have flash points above 22.8 °C (e.g., alcohols, turpentine).
- **Combustible (Classes II and III)** liquids have flash points at or above 37.8 °C. Class II liquids have flash points below 60 °C (e.g., diesel, fuel oil, jet fuel, and kerosene). Class III liquids have flash points above 60 °C (e.g., ethylene glycol). These are further subdivided into Class IIIA (flash point below 93.3 °C) and Class IIIB (flash point at or above 93.3 °C).

The lower the class number the more hazardous the liquid. The greatest safety hazard in storage areas is fire or explosion. Fuel and oil in tanks or containers exposed to the air must not be stored where the temperature could rise to the liquid's flashpoint. Warning signs against smoking or using open flames within 30 metres (m) of petroleum products storage areas will be placed in or near storage areas.

### 3.V.3.5 Tank Storage Facilities

The most likely risk associated with petroleum, however, is not fire, but rather release of petroleum to the environment. This risk can be minimized or eliminated by following proper fuelling procedures and using well-designed tanks within containment areas to prevent a major spill from escaping the storage area.

Petroleum storage sites must be located at least 100 m from a flood area or high-water line, electrical power lines, public roads, and sources of drinking water. If the fuel storage area is intended to supply boats or float planes, the fuel storage area can be located closer than 100 m from the water, but it must be above the high-water level. To mitigate the impact of an accidental release close to the water, only the minimum required volume should be stored in such locations and secondary containment should be provided, such as portable mini-berms.

Petroleum storage should be in low traffic areas, with adequate protection against vehicular damage, and have a slope of not more than 5% and minimal vegetation or other combustible material in the area that could present a fire hazard.

For the NICO Project, 1 or 2 vertical storage tanks each with volumes of one million litres are proposed. The tanks will be located within a bermed, lined containment facility. Storage area will be available in the containment area for smaller quantities of petroleum, such as motor oil and coolant in totes and waste oil. One of the 2 vertical tanks could be replaced in the plan with the some or all of the eight 89 000 litre horizontal double-wall storage tanks currently on-site.

The secondary containment facility will have the following characteristics:

- The slope of the ground will be no greater than 1%.
- The contained volume inside containment will have the capacity to hold at least 110% of the largest tank it contains or 100% of the volume of the largest single fuel tank plus 10% of cumulative volume of additional tanks.
- Permanent containment structures must follow fire or fuel handling code requirements
- A petroleum-water separation system must be available and capable of being installed or used to facilitate water removal (from accumulated precipitation).
- Spill kits, fire extinguishers, and first aid kits must be available within 10 to 25 m of the storage area.
- Provisions to prevent vehicle impacts must be present, such as earthen berms, rock barriers, or steel/concrete bollards.

The tank farm at the Plant site has been designed in accordance with the principles outlined in *Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations* and the CCME's *Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products*. Bulk fuel storage tanks will be registered as required by the National Fire Code and each tank will be affixed with a clearly visible registration number plaque.

The secondary containment facility will incorporate a high density polyethylene (HDPE) or similar lined pad, with lined containment berms. The base of the containment area will be graded to a sump location that will be used to pump out storm water and snowmelt. Storm water and snowmelt will be pumped through an oil separator/collection system. The treated water will be directed to the Surge Pond.

### 3.V.3.6 Drum and Other Small Quantity Container Storage Facilities

Fuel drum storage on-site will be avoided to the extent possible, but for smaller quantities of fuel this will be the only practical means of transport and storage. Precautions against fire or spills will be taken with these containers. Drums in storage areas or in use must be in secondary containment facilities with properties similar to those outlined above for tanks. In addition, the drum and small container storage areas must meet the following requirements.

- Flammable liquids must only be stored in drums designed for that purpose.

- Full drums should be stored on their sides, with the bung halfway up, to keep the seal wetted and prevent rainwater from penetrating the seal, or on their bases in a secure level area.
- Only use portable containers specifically designed to transport flammable liquids and equipped with spouts to prevent spillage while pouring.
- Stacking of containers or drums should be avoided. If this is not possible, then sufficient support must be provided between levels to provide stability and relieve stress on the containers or drums, and on the outer sides to prevent containers from falling from the stack. Strapping drums in fours can be used to help secure the upper level in a stack. Stacks will not exceed two containers in height.
- Where small containers are placed inside a building, adequate ventilation must be available to remove the risk of vapour build-up.
- Absorbent materials should be used under stored petroleum in small volumes. In addition, the storage area must have an impermeable surface.

### 3.V.3.7 Training

Personnel who handle fuel and lubricants will be trained to be conversant with relevant MSDS information. As well, these personnel will be given training in the following:

- TDG;
- fuel handling procedures;
- spill response and cleanup procedures for petroleum; and
- emergency response, especially firefighting procedures.

### 3.V.4 FUEL TRANSFER PROCEDURES

#### 3.V.4.1 Bulk Fuel Transfers to Tank Farm

General procedures for the transfer of fuel into the NICO bulk fuel tanks will be as follows:

- before fuel transfer is started, verify that:
  - fuel transfer hoses have been connected properly and couplings are tight and transfer hoses are not obviously damaged;
  - fuel transfer personnel are familiar with procedures;
  - personnel are located at both the fuel delivery truck and fuel transfer tank(s) and can manually shut off the flow of fuel; and
  - if a high liquid level shutoff device is installed at the delivery tank, verify that the shutoff is operating correctly each time it is used.
- fuel transfer will then proceed; and

- accidents or spills must be reported immediately and emergency spill containment and clean up procedures should be initiated.

Vapours can ignite through static discharge, when loading and unloading large tank vehicles. This risk exists when fuelling smaller vehicles as well, although the risk is less. To avoid igniting vapours when loading or unloading tankers and other large vehicles, a grounding wire must be connected from the pump to the tank being filled to provide protection against static sparking by connecting.

### 3.V.4.1.1 Fuelling Operation from Tank Farm or Drums

The risk of spillage and fire exists when petroleum is moved from one tank to another, or to smaller containers or vehicles. Preventive measures must be taken against spills, even when doing something as simple as pouring oil into a crankcase (e.g., use a funnel and place the vehicle or motor being serviced on an oil absorbent mat or an impermeable surface).

Only persons trained in proper fuel handling will be permitted to undertake fuelling operations. In addition, the following notes provide further clarification on fuel handling.

- With the exception of refuelling of equipment operating in the open pit, fuelling will be undertaken at designated locations with appropriate secondary containment measures present.
- Vehicle or machine operators must stop their engines and get out of their vehicles or aircraft during fuelling.
- No smoking or open flames permitted in fuelling areas and signs to this effect must be posted.
- Dispensing hoses must not exceed 15 m in length.
- Nozzles must have automatic valve closures, such as ball valves to prevent fuel in hoses from being discharged in the event of accidental mishandling.
- If using powered dispensers, nozzles must close automatically and emergency shut off breakers must be easily reached in an emergency.
- Dispensing devices (e.g., pumps) must be mounted on concrete islands or suitably designed skids and must be protected from vehicular collision.
- Liquid fuels and oils that cannot be handled by pump must be in portable containers with pouring spouts, to minimize the chance of spillage.
- A log book must be maintained to record the quantities of fuel received and dispensed.

When pumping to a small vehicle, prior to touching the pump handle, static should be released from the body by touching metal away from the pump handle or vehicle tank. Alternatively, a grounding wire can be used, as discussed above.

If a spill occurs during fuelling, the filler caps should be replaced on the vehicle and the spillage cleaned up before starting the engine. All spills must be recorded in the log book along with all mitigation and remediation efforts.

### 3.V.4.2 Environmental Protection Procedures

The major concern regarding the safe handling of petroleum is release to the environment and subsequent adverse impacts on terrestrial or aquatic habitat, wildlife, and human health and safety. The following section outlines environmental protection procedures that apply to the use of fuel and other hazardous materials:

- Before installing fuel storage tanks, the necessary approvals must be obtained from regulatory authorities.
- Precautions must be taken to prevent and minimize spillage, misplacement, or loss of petroleum.
- Petroleum products will be stored at least 100 m from waterbodies with minor exceptions as described previously.
- Approved tanks exceeding 2500 litres in volume will be contained in a lined secondary containment facility surrounded by an impervious dyke of sufficient height to retain the greater of at least 110% of the capacity of the largest tank, or 100% of the capacity of the largest tank plus 10% of the aggregate capacity of the other tanks.
- Dykes of earthwork construction will have a flat top not less than 0.6 m wide, and be constructed and maintained with a low permeability liner system (such as HDPE). The distance between a storage tank shell and the centre line of a dyke will be at least one half the tank height.
- Fuel storage areas and transfer lines will be clearly marked or barricaded to prevent damage by moving vehicles. The signs will be visible under weather conditions following the WHMIS reference guide.
- Fuels and other hazardous materials must be handled only by trained personnel competent in handling these materials in accordance with standard operating procedures, the manufacturer's instructions and legislation. Operators must be in attendance for the duration of a refuelling operation.
- In the event of a fuel spill into a waterway (any volume) or on land (100 litres), the Spill Report Line must be contacted in accordance with the Emergency Response and Spill Contingency Plan (Appendix 3.VI). Spills of any volume and the responses to them will be logged in the mine site environmental data base, which will be made available to inspectors upon request.
- Storage tank systems will be inspected on a regular basis using a check list, including gauging or dipping and the maintenance of reconciliation records for the duration of the mine life.
- The contracted company used to transport or transfer fuel to the NICO Project will be required to have a copy of its fuel handling and spill contingency plans on file at the Fortune office before transporting fuel to the site.
- Smoking will be prohibited at fuel storage areas and during transferring and dispensing activities.
- Temporary fuelling or servicing of mobile equipment in areas other than the main fuel storage site will not be allowed within 30 m of a watercourse.
- Soil affected by petroleum will be removed and placed in a landfarm facility for remediation.

### 3.V.4.3 Used Petroleum Products

Used oils will be collected in suitable containers (pails or drums) and then transferred into a self-contained used oil tank, located in the tank farm. Similarly, contaminated diesel and similar petroleum will be separated and placed in labelled drums or a designated tank located in the tank farm. Empty petroleum containers will be stored on-site in a designated area and returned to the supplier on backhauls as supplies warrant. .

### 3.V.4.4 Landfarm

Soils contaminated by hydrocarbons from spills will be excavated and deposited within a landfarm for bioremediation.

Storm water and snowmelt collected within the bermed landfarm area will be pumped through a oil separator/collection system. The treated water will be directed to the Surge Pond or the Co-Disposal Facility.

### 3.V.4.5 Inventory, Inspection, and Records

#### 3.V.4.5.1 Inventory Management

Fuel use will be metered when pumped from the bulk fuel storage tanks. The metered volumes will be summarized weekly and reconciled against manual tank levels measurements. Diesel fuel consumption for the power generators will be recorded weekly.

Lubricants and other petroleum products will be inventoried monthly.

#### 3.V.4.5.2 Inspection

Fortune will inspect petroleum storage areas on a scheduled basis consistent with regulatory requirements. Inspections will be logged with the date and time of inspection, facility inspected, and name of the person making the inspection. Defects or deficiencies will be reported and repaired promptly.

Accidental damage to containment structures will be inspected immediately and appropriate repairs will be undertaken. The extent of damage will be reported in writing to the mine manager. The report will note remedial repairs to be made, the date of repairs, and the need for follow-up inspection.

#### 3.V.4.5.3 Records

Records pertaining to storage, use and loss of fuels and lubricants are recommended by the CCME and required by the Fire Marshal (under the National Fire Code). The following records will be prepared and maintained by Fortune:

- reconciliation of bulk inventory;
- weekly use summaries;
- weekly reconciliation for each storage tank;
- overfill alarm tests;
- pressure tests (if applicable);
- inspections and maintenance checks of the storage tank, piping and delivery systems;

- alteration to the systems;
- reports of leaks or losses;
- reports of spill responses; and
- records of training.

### 3.V.5 EXPLOSIVES

Explosives will be used for blasting of the underground and open pit mine developments. Explosives will also be used during the construction phase of the NICO Project to level areas for surface operations and for construction of the site facilities (i.e., roads, airstrip, building pads, co-disposal facility dams, etc.).

#### 3.V.5.1 Product Descriptions

The explosive material categories, site handling and storage requirements, and personal protective equipment as recommended by manufacturers' MSDSs are summarized in Table 3.V.5-1.

**Table 3.V.5-1: Explosives Storage, Potential Impacts and Proper Handling**

Material	TDG Class	Potential Impact	Product Handling	Protective Equipment		
				Eyes	Skin	Breathing
Ammonium Nitrate	5.1	Water	Avoid eye and skin contact; avoid breathing dust. Do not swallow. Separate from all organic materials or other possible incompatible substances. Store in well-ventilated location, away from all sources of heat, fire, or explosion.	Safety glasses or goggles	Non-absorbent rubber or equivalent gloves, protective garments	NIOSH/MSHA approved respirator, if required
Emulsion	1.5	Water	Avoid eye and skin contact; avoid inhalation. Do not swallow. Separate from all organic materials or other possible incompatible substances. Store in well-ventilated location, away from all sources of heat, fire, or explosion.	Safety goggles	Non-absorbent rubber or equivalent gloves, protective garments	NIOSH/MSHA approved respirator, if required
High Explosive Detonators	1	Negligible	Store under dry conditions in a well-ventilated magazine. Keep away from heat, sparks, and flames. Keep containers closed.	Safety glasses or goggles	Rubber gloves, protective cotton garments	NIOSH/MSHA approved respirator
Blasting Caps	1	Negligible	Store in a cool, well-ventilated area in an approved magazine	Safety glasses or goggles	Rubber gloves, protective cotton garments	NIOSH/MSHA approved respirator

TDG = Transportation of Dangerous Goods

Solid ammonium nitrate prills and diesel fuel oil are mixed to create ANFO explosives for rock blasting in the mine. At the NICO Project, this mixing process will be undertaken at the blast holes using a truck equipped with separate storage vessels for ammonium nitrate and diesel. As a result, the ANFO explosives will not exist in explosive form until emplaced in the hole. Only qualified personnel will handle explosives. Use of explosives will comply with governing regulations.

Where wet conditions are encountered, the use of pre-mixed liquefied emulsions of ammonium nitrate and diesel, with or without other minor components, such as sodium nitrate, urea and amines, will be necessary. This material will be delivered to site by transport and stored in a tank at the explosives storage facility.

### 3.V.5.2 Explosives Management

Explosives management for the NICO Project will focus on 2 important objectives: safety and environmental stewardship.

Only trained and qualified personnel will handle explosives. This activity will be conducted under an explosives plant licence from the Explosives Division of Natural Resources Canada under the *Canadian Explosives Act*. Some specialty packaged explosives will be used for specific blasting needs such as controlled wall blasting and wet conditions, as required. All explosives and detonators will be transported, stored and used on-site in an approved manner by trained and licensed personnel.

All explosives mixing, storage, and product delivery systems will be approved and subject to regulatory inspection administered by Natural Resources Canada, Explosives Division.

Fortune will arrange for formal training and on-the-job training to comply with legislation. Training requirements will include (but will not necessarily be limited to):

- specific fire procedures as per the federal *Explosives Act*;
- first aid;
- TDG; and
- pump and hydraulics training.

Blasting personnel will be required to have a valid Blasting Certificate or Provisional Blasting Certificate that is issued in accordance with the *Mine Health and Safety Act* and Regulations.

Fortune will develop explosives storage and handling procedures that will detail frequencies of inspections and documentation procedures.

#### 3.V.5.2.1 Safety

##### *Safe Distances*

The required setback distances for the explosives facilities are:

- 760 m from site operations involving personnel;
- 510 m from mining operations and medium traffic roads;
- 380 m from unbarricaded magazines; and
- 275 m from mine haul roads.

To address these requirements, the explosives storage facilities are proposed to be located near the current exploration camp, more than 2 kilometres from the mining camp and Plant, and 600 m from the north edge of the

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proposed Open Pit. A large hill between the explosives storage area and camp/plant area will provide additional safety buffering.

### **Restricted Access**

Access to the magazines will be restricted to authorized personnel and log books will be kept in each magazine for tracking. The route to the magazines will be a controlled road from the Plant/mine area. The magazines will be supplied and permitted by the explosives supplier. Authorized personnel will hold a Blasting Certificate or Provisional Blasting Certificate.

### **Notification**

Blasting for construction will take place approximately daily during site preparation and when rock is quarried. In addition, pre-stripping and initial pit development will also take place during the construction phase to have ore stockpiled to commence operation of the Plant.

The blasting supervisor will advise the mine manager if a blast will occur that day. Warning signs will be placed appropriately on access roads indicating the time of the blast. A warning will be transmitted on the mine radio watch frequency 1-hour, 30 minutes, and 15 minutes before the blast. Prior to detonation, the blast supervisor will clear the area to the plant-camp complex and guards will be stationed on access roads. A warning siren will be sounded 2 minutes before the blast. Following the blast, the blasting supervisor will inspect the blast area to ensure all explosives have detonated. Once satisfied that the blast site is safe, the all clear will be sounded and transmitted on the mine radio watch frequency.

For underground blasting, the procedure will be similar, except that underground mine workings will be inspected for personnel prior to the blast and underground personnel accounted for prior to detonation. An underground tag system will be in place to prevent people from going underground without notification.

### **Adverse Weather**

Adverse weather precautions will apply to Open Pit blasting. During adverse weather conditions the blast supervisor will notify the mine manager of the precautions to be taken. In the event of electrical storms, the blast site will be evacuated and no blasting connections will be made.

Except in extreme weather conditions, underground blasting operations are not anticipated to be affected by adverse weather.

### **Misfires**

Reporting and handling of misfires, as defined in Section 14.56 of the *Mine Health and Safety Regulations*, will be documented in a log book kept for the purpose by the blasting supervisor and periodically reviewed by the engineer.

When a misfire has been identified it will be treated as a loaded hole until made safe. A blast sign and markers will be placed at the hole as required by the regulations. The misfire will be made safe by an authorized person and the misfire and follow up logged. The authorized person will date and sign the log book. The engineer will use the survey location and log book information to correlate the incident to ground conditions, blast design, or product quality issues.

### 3.V.5.2.2 Environmental Management

#### 3.V.5.2.2.1 Ammonium Nitrate

##### *Properties*

Ammonium nitrate is a stable, inorganic, solid compound. It is completely soluble in water and, due to its hygroscopic nature it must be kept dry to remain effective for its intended purpose by storage in silos or sheds. For blasting purposes, ammonium nitrate is in the form of porous prills (pellets) to mix with and absorb diesel fuel oil to produce ANFO. The prills are generally white or off-white, and shelf life in a tightly closed container is unlimited. The internal structure of the prills is temperature sensitive and changes below -18°C and above 32°C. Repeated cycling through these temperatures can break down the structure of the prills. If exposure to temperature changes at these levels cannot be avoided or mitigated, the material should be consumed expeditiously.

Ammonium nitrate itself is not an explosive, but it is an oxidizer and can explode or decompose under specific conditions, such as high temperature (between 160 and 200°C), bulk storage in a confined space, contamination with organic substances such as oil or waxes, contamination with inorganic materials such as chlorides and metals (chromium, copper, cobalt, nickel), and exposure to strong shock waves from other explosions. Similarly, ammonium nitrate is not combustible in itself, but as an oxidizing agent it increases fire hazard when in contact with other combustible materials, even in the absence of air. Ammonium nitrate must be stored in a dry, well-ventilated area away from sources of heat, fire or explosion.

Ammonium nitrate is odourless under normal conditions but releases nitrous and ammonia fumes on explosion, decomposition, involvement in a fire or with excessive heating. Direct, unprotected contact with dry ammonium nitrate can cause discomfort and inflammation of eyes, skin, and respiratory membranes. Its oral toxicity is slight to moderate, although swallowing large amounts can have serious, if not fatal, effects from the ammonia and nitrate salts. It has no known chronic effects and repeated or prolonged exposure is not known to aggravate pre-existing medical conditions.

Ammonium nitrate is of low toxicity to aquatic life but may promote eutrophication in waterways (water becomes over-rich in dissolved nutrients). Ammonium nitrate dissociates to ammonia in water and ammonia at high enough concentrations (dependent on temperature and pH) is toxic to fish.

##### *Handling and Storage*

Although ammonium nitrate is classified as a hazardous product, its storage and handling at the NICO Project will not be considered to be a significant risk activity. The ammonium nitrate will be delivered in bulk by truck in the form of prills and stored in a silo on-site. The ammonium nitrate will be drawn from the silos directly into the transfer/mixing truck in a vessel separate from the diesel, for delivery to the blast hole sites. As a result, potential spillage will be minimized and generally containable.

At site, explosives will be handled and managed by qualified personnel trained in safe handling procedures and in accordance with applicable legislation and regulations. All personnel exposed to ammonium nitrate will wear suitable personal protective equipment.

The proposed explosives storage facility will be located away from water bodies. As a result, spilled ammonium nitrate can be kept away from water courses where risk of environmental impact is at its greatest. In the unlikely event of a larger spill outside the storage facility where the risk of potential transport of spilled ammonium nitrate

by precipitation runoff is greater, Fortune will deploy temporary silt curtains in the water path to prevent spills being carried into nearby water courses while the spill is cleaned up. Ammonium nitrate spills will be swept up and placed in suitable containers to be recycled.

### **3.V.5.2.2.2 Emulsion**

#### **Properties**

Ammonium nitrate diesel emulsion is a viscous (putty like) liquid/paste. It is slightly soluble in water and stable under normal conditions and under normal processing. It is explosive under shock conditions and an oxidizer. Above 210 °C, it can decompose and be explosive. Emulsion must be stored in a dry, well-ventilated area away from sources of heat, fire, or explosion.

Emulsion is odourless under normal conditions but releases nitrous and ammonia fumes on explosion, decomposition, involvement in a fire or with excessive heating. Direct, unprotected contact with emulsion can cause irritation of eyes and skin. Its oral toxicity is slight to moderate, although swallowing large amounts can have serious, if not fatal, effects from the ammonia and nitrate salts. Chronic exposure may cause methemoglobinemia (decreased oxygenation in the blood).

Similar to ammonium nitrate, the emulsion is of low toxicity to aquatic life but may promote eutrophication in waterways (water becomes over-rich in dissolved nutrients). Since the ammonium nitrate is emulsified in diesel, it dissolves slowly in water. Ammonium nitrate dissociates to ammonia in water and ammonia at high enough concentrations (dependent on temperature and pH) is toxic to fish.

#### **Handling and Storage**

At site, explosive emulsion will be handled and managed by qualified personnel trained in safe handling procedures and in accordance with applicable legislation and regulations. All personnel exposed to it will wear suitable personal protective equipment.

The proposed explosives storage facility will be located away from waterbodies. As a result, spilled emulsion can be kept away from water courses where risk of environmental impact is at its greatest. Spilled emulsion should not be cleaned up using equipment containing iron or copper due to the risk of sparking. In addition, shock, friction, and contact with grit should be avoided.

### **3.V.5.2.2.3 High Explosives and Blasting Caps**

The high explosives magazines will be designed to meet standards outlined in *Storage Standards for Industrial Explosives* (NRCan 1995). Where required, the magazines will be separated by berms that meet conditions of safe storage. Features of the magazines include the following:

- steel exterior shell;
- inside each magazine all walls and floors are covered with 20 millimetre plywood fastened with counter-sunk non-sparking fasteners;
- interiors are marked with stacking limit lines; and
- access is by a laminated door with high security locking hardware.

The magazines will be dedicated to storing high energy explosives and blasting caps. Caps and high explosives will be stored in separate magazines as required by the regulations. Labelling will clearly identify the explosives stored in the magazines. Inventory will be used on a first-in, first-out basis, to prevent degradation due to storage time and cold weather. Construction will use a combination of high explosives and ANFO.

### **Handling and Storage**

High explosives will be handled and managed by qualified personnel trained in safe handling procedures and in accordance with applicable legislation and regulations. All personnel exposed to it will wear suitable personal protective equipment.

#### **3.V.5.2.3 Blast Management Organization**

The proposed blast management organization for the NICO Project will be:

- Mine manager: overall responsibility for the NICO Project;
- Mine superintendent: overall responsibility for mining operations;
- Mine engineer: responsible for mine design and operation;
- Mine supervisor: responsible for day to day operations supervision;
- Blast supervisor: responsible for all blasting activities and explosives; and
- Blasters: certified mine personnel who carry out blasting.

#### **3.V.5.2.4 Housekeeping**

The magazines and area of the ammonium nitrate storage silo will be swept clean on a regular basis. Similarly the blasting vehicle will be kept tidy and washed periodically. Explosives will not be stored in the vehicles when not in use. The blasting supervisor will conduct a weekly inspection and identified deficiencies will be immediately remedied.

#### **3.V.5.2.5 Inventory Management**

Daily use of ammonium nitrate and high explosives will be recorded. The blasting supervisor will check the records weekly and complete a monthly reconciliation. Blasters will be responsible to account for all accessories and explosives. Blasting accessories that are not used during the workday will be returned to their respective magazine and signed in. Magazine inventories will be regularly audited for accuracy. Missing or found explosives will be reported to the blasting supervisor.

#### **3.V.5.2.6 Inspection**

Access to and use of explosives will be under the exclusive control of the blasting supervisor. The blasting supervisor will be responsible for inspection of explosives facilities, including the ammonium nitrate storage silo, the magazine for high explosives and blasting caps, and the explosives mixing/delivery vehicle.

#### **3.V.5.2.7 Records**

The *Explosives Act* requires records be kept with regard to annual quantity of each explosive issued to the mine site, including the dates of shipments and the annual quantity of each explosive present at the site.

Weekly records will be maintained relating to the handling and preparation of explosives through the explosives plant, as follows:

- Staffing;
- safety concerns or incidents;
- total explosives consumption;
- the amount of ammonium nitrate remaining on-site; and
- inventory of other explosives and accessories to be audited for fiscal month-end balances.

Daily reports (including the misfire log book) will be kept by blasters and the blast supervisors. The blaster in charge will sign in and sign out blasting accessories from the magazines, conduct, and record magazine inspections and inventory audits, acknowledge receipt of bulk product delivered to the mine and complete a blast report. The blast report will include deviations from the engineered design, the date and time of the blast and names of the blaster and helpers. The mine engineer will keep files on all production blasts and only the mine manager, mine engineer and blast supervisor will have access to the files.

### 3.V.5.2.8 Disposal

Explosives identified as deteriorated or damaged will be destroyed. Fortune will develop procedures for the destruction of such material prior to the start of mining in consultation with, and under the direction of, the explosive supplier. Only qualified personnel holding valid blasting certificates will handle these materials. Typically, such explosives are either burned or detonated under controlled conditions. The destruction-site will be dependent on the mining stage and will be chosen by the blasting supervisor in consultation with the mine manager. Normal safety precautions for blasting operations will apply.

At closure, unused explosives will be removed from site or safely burned or detonated if in small quantities.

## 3.V.6 REAGENTS AND CONSUMABLES

### 3.V.6.1 Product Description

The process plant and water, sewage, and effluent treatment plants will use several chemical reagents. The release or spill of these reagents could result in an adverse environmental impact and pose a potentially hazardous situation for personnel exposed to these materials. Safe handling of hazardous materials will be coordinated through standardized operating procedures, and the application of legislation related to hazardous materials.

Material categories, site handling and storage requirements and personal protective equipment recommended by manufacturers in MSDSs are summarized in Tables 3.V.6-1.

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**Table 3.V.6-1: Reagents – Use, Consumption, and Storage**

Material	State	TDG Class	Potential Impact	Product Handling	Protective Equipment		
					Eyes	Skin	Breathing
Potassium Amyl Xanthate	Solid	4.2	Negligible	Store in a cool well ventilated area away from ignition sources. Store in closed container. Protect from moisture and oxidants. Empty containers retain product residues and may be hazardous. Keep out of water and sewers. Do not get in eyes, on skin, or on clothing. Do not breathe vapours, mist, fume or dust.	Use safety glasses with side shields	No special garments required. Avoid unnecessary skin contamination. Use impervious rubber gloves	Use adequate ventilation to control exposure below recommended levels
Methyl-isobutyl Carbinol	Liquid	3.3	water	Stable, flammable. Incompatible with oxidizing agents, acids, acid chlorides. Store in a cool, dry place in sealed containers. Respiratory, skin and eye irritant. Keep away from sources of ignition.	Safety Glasses with side shields	Prevent contamination of skin or clothing. Use Rubber or neoprene gloves; impervious apron or coveralls and boots	None Required
Hydrochloric acid	Liquid	8	water	Do not get in eyes, on skin, or on clothing. Wear protective clothing. Avoid breathing vapours or fumes. Store in cool, dry ventilated area with acid-resistant floors. Keep container closed, out of direct sunlight, and away from heat, water, and incompatible materials. When diluting, add acid slowly to water and in small amounts. Never use hot water and never add water to acid. When opening metal drum, use non-sparking tools because hydrogen gas may be present. Do not wash out container and use for other purposes. Empty containers retain product residues and may be hazardous.	For splash protection use chemical goggles or full face shield	Rubber or neoprene gloves; impervious apron or coveralls and boots	NIOSH/MSHA approved respirator

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**Table 3.V.6-1: Reagents – Use, Consumption, and Storage (continued)**

Material	State	TDG Class	Potential Impact	Product Handling	Protective Equipment		
					Eyes	Skin	Breathing
Sodium Hydroxide	Solid		water	Can cause severe injury to eyes, skin, and respiratory tract. Use personal protective equipment at all times and DO NOT contact product directly. Wash thoroughly after handling. Store in dry, well-ventilated area. Keep in original container, tightly closed. Empty containers retain product residues and may be hazardous.	Tight-fitting goggles if dust is generated. For splash protection use chemical goggles or full face shield	Gauntlet type rubber or neoprene gloves; impervious apron or coveralls and boots	NIOSH/MSHA approved respirator
Hydrated Lime	Solid	8		Prevent contact with skin and eyes. Avoid inhalation. Corrosive to some metals. Store in a cool dry ventilated area.	Wear safety glasses with side shields or goggles	Wear protective gloves	Avoid inhaling dust
Phosphoric Acid	Liquid	8	Water	Do not get in eyes, on skin, or on clothing. Wear protective clothing. Avoid breathing vapours or fumes. Store in cool, dry ventilated area with acid-resistant floors. Keep container closed, out of direct sunlight, and away from heat, water, and incompatible materials. When diluting, add acid slowly to water and in small amounts. Never use hot water and never add water to acid. When opening metal drum, use non-sparking tools because hydrogen gas may be present. Do not wash out container and use for other purposes. Empty containers retain product residues and may be hazardous.	For splash protection use chemical goggles or full face shield	Rubber or neoprene gloves; impervious apron or coveralls and boots	NIOSH/MSHA approved respirator
Ferric Chloride	Solid	8	Water	Avoid skin and eye contact. Store in cool, dry, ventilated area.	Use chemical safety goggles or full face shield	Protective gloves	Ventilation of room

TDG = Transportation of Dangerous Goods

### 3.V.6.2 Storage Facilities

Reagents will be shipped to the NICO Project on pallets in the original packaging received from suppliers via transport truck along the all season road. The packaging will be labelled in accordance with applicable legislation. These labels will remain intact as the material is stored and used on-site.

The reagents will be stored inside shipping containers (sea cans) on their shipping pallets. The containers will be placed in the plant site reagent storage area and material will be withdrawn from them, as required. Proper personal protective equipment will be used when handling these materials.

The reagent mixing and storage equipment will be designed, properly labelled and protected for the material hazards. Gases, such as propane, acetylene and oxygen, will be provided in cylinders and stored as per National Fire Code of Canada requirements.

### 3.V.6.3 Inspection and Monitoring

Quantities of potentially hazardous reagents will be inventoried upon receipt and the daily usage will be reconciled to inventory. Adequate quantities of appropriate types of spill and fire contingency materials and equipment will be available, including fire extinguishers, acid neutralizing materials, inert absorbent materials, dust mitigating materials, masks and appropriate respiratory filters, and protective clothing, gloves, and safety eyewear.

Releases of hazardous materials will be reported immediately and appropriate measures will be taken to remediate the situation. Details of reporting protocols, procedures, and remedial measures are described in the Emergency Response and Spill Contingency Plan (Appendix 3.VI).

### 3.V.6.4 Personnel Training

Fortune employees will be trained in WHMIS procedures. Similarly, contractors will be responsible for the training of personnel in WHMIS prior to working on-site.

### 3.V.6.5 Inventory, Inspection, and Records

#### 3.V.6.5.1 Inventory Management

The Plant supervisor will be responsible for reconciling reagents and consumables against orders on receipt.

#### 3.V.6.5.2 Inspection

On each shift, the Plant operators will be responsible for daily inspection and operation of consumable storage facilities. Problems will be noted and reported to the Plant supervisor. The Plant supervisor will be responsible for weekly or monthly inspections of plant consumables and storage areas.

#### 3.V.6.5.3 Records

The Plant operators will keep daily records of consumable use. Weekly and monthly summaries will be provided to the Plant supervisor for records keeping.

### 3.V.6.6 Chemical Tracking

Fortune will develop and implement a procedure for tracking chemical purchase and use at the NICO Project.

### 3.V.7 PLAN REVIEW AND IMPROVEMENT

This plan will be reviewed periodically to identify components that need to be corrected, adjusted, upgraded, or otherwise modified. The plan will be reviewed annually by the mine health and safety committee considering the previous year's experience managing hazardous materials. Formal evaluations of the plan will be documented, deficiencies will be noted, and progress in addressing deficiencies will be tracked in writing. Individual responsibilities and accountabilities will be assigned, and deadlines will be set for addressing the required changes. The environmental coordinator will assume overall responsibility for the process.

In line with the goal of continuous improvement in health and safety matters, employees will be encouraged to offer suggestions for more efficient and safer materials handling procedures.

Recommendations for additions or improvements will be considered in plan revisions. Plan revisions will be submitted to the water board as a component of the annual report or more frequently depending on the nature of the updates.

### 3.V.8 REFERENCES

- PDAC. 2009. Excellence in Environmental Stewardship e-toolkit (EES), Version 01, e3plus – A Framework for Responsible Exploration.
- Government of Northwest Territories. 1998. Guideline for the General Management of Hazardous Waste in the NWT.
- Miramar Hope Bay Ltd. 2007. Hazardous Materials Management Plan. Doris North Project, Nunavut
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