



EMERGENCY
MANAGEMENT
PROGRAM

Manual 4

Environmental Emergency Response
Plan

Updated November 2014

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1.0 ENVIRONMENTAL EMERGENCY RESPONSE – GENERAL BACKGROUND

The **Environmental Emergency Response Plan (EERP)** was designed to provide pre-determined courses of action and contingency plans to guide the emergency response teams in managing an environmental emergency situation effectively and professionally.

An **Environmental Emergency** or **Spill** is any discharge outside the normal course of operations which may have an impact on the environment or cause harm to an individual or property. It is important to remember that emergency responders must ensure that their own personal safety is not jeopardized. Emergency responders should only attempt to stop further release or spillage of a material when it is safe.

An environmental emergency or spill, whether accidental or intentional, must be reported to the proper authorities (or company representative) by the person who had possession, charge or control of the substance immediately before its spill.

Under the provincial *Environmental Management Act* and federal *Fisheries Act*, a spill is a release or discharge (unless authorized) into the environment of a substance, product, material or other thing that may have a deleterious (harmful) effect on the environment.

Damage to the environment may result in legal prosecution of companies and/or individuals who do not attempt to contain a spill or report an emergency. As a company and a responsible individual, we must ensure that we act with an immediate and appropriate response to an emergency, or in other words, act diligently to protect the environment from damage. Practicing **Due Diligence** during an environmental emergency is of critical importance in all cases. Due Diligence in this context is ensuring the person(s) took all reasonable precautions to prevent future occurrences (before the event took place) and during an emergency response to mitigate environmental damage (after the event).

In order to prevent or minimize the impact of an environmental emergency or spill, the initial responses are the most important. This manual provides guidelines on how to deal with an emergency which involves products most frequently handled in significant quantities or having potentially high consequence impacts.

The **Material Safety Data Sheets (MSDS Binder)** should be consulted for additional detailed information on the products as well as when dealing with products not covered by this manual. The full set of MSDS binders is maintained at the First Aid Office. Individual work areas may have their own MSDS binders with relevant sheets for materials used in those areas.

Nyrstar Myra Falls Ltd. emergency management organization must be flexible in order to deal effectively with incidents of varying types and severity and allow effective response when key managers are unavailable.

Environmental emergencies may require the use of mitigative measures, contingency plans and potentially the deployment of emergency response teams. Potential teams that could be mobilized are:

Emergency Command Group

The Emergency Command Group will be responsible for the on-site management of emergency situations at the operation. The ECG Chair will direct communications with the Corporate Crisis Response Team.

Mine Rescue Team

The Mine Rescue Team will be responsible for handling specific underground rescues under the direction of the Emergency Command Group.

Surface Emergency Response Team (SERT)

The Surface Emergency Response Team will be responsible for handling surface fires, spills and specific emergencies under the direction of the Emergency Command Group, Emergency Command Group Coordinator and SERT Leader.

Special Response Team

A Special Response Team consisting of appropriate management staff and specialist resources may be called upon by the Emergency Command Group Chair to assist in the handling of an emergency incident at Discovery Terminal (Spit).

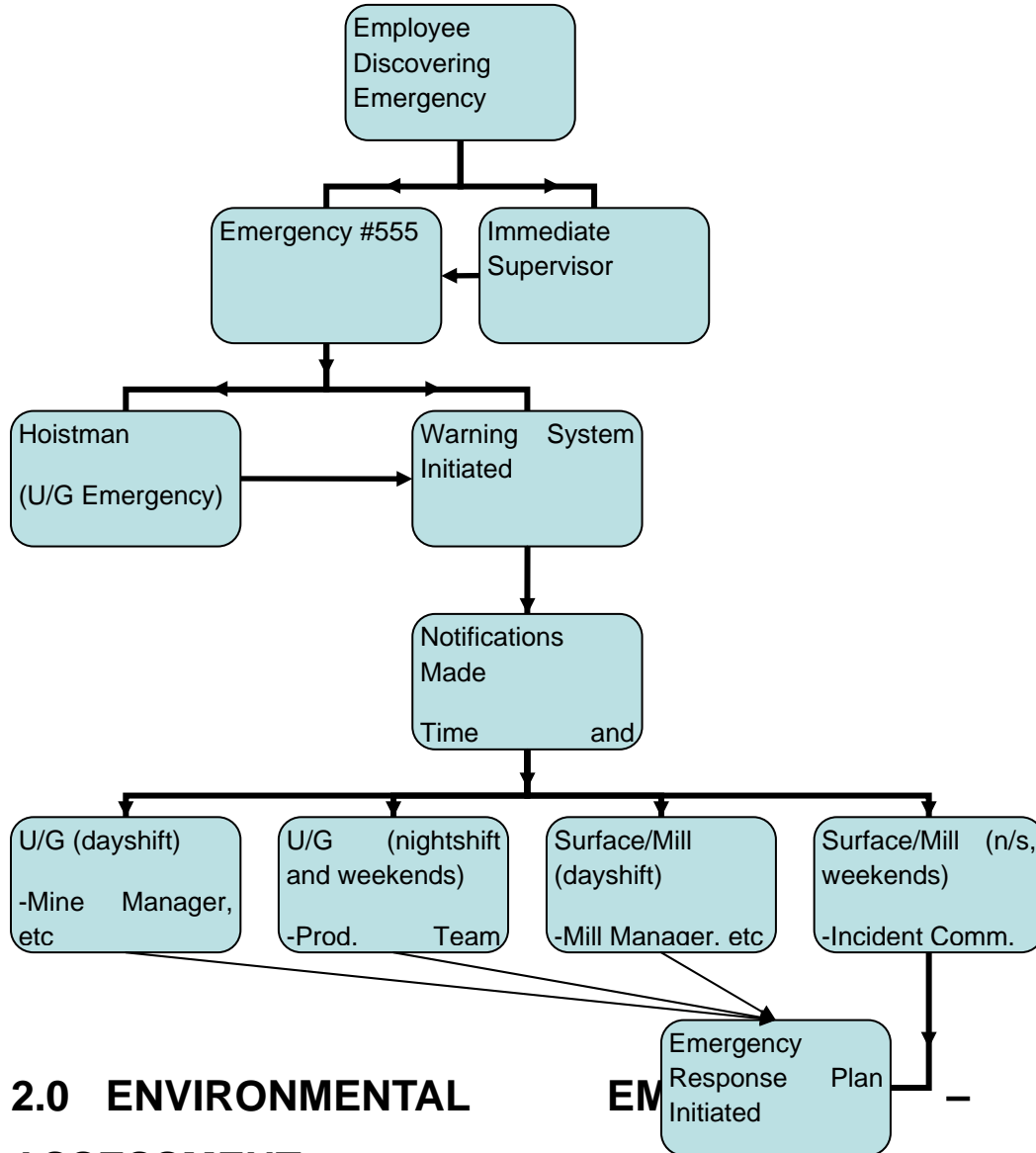
These teams will be used to respond to accidents and malfunctions associated with any emergencies.

The detailed procedures presented in the separate Emergency Preparedness and Response Plan should be followed. Responsibilities for the various personnel are also described. Plans are in place to inform the media and general public in an emergency situation. The responsibility for alerting stakeholders will usually fall under the control of the Emergency Command Group Chair until the emergency plan is implemented. Senior management staff has received Emergency Communications training. Only those persons specifically authorized are to speak on behalf of the company to other employees, the public, and the media or outside agencies. This would normally be assigned to the General Manager, Human Resources Manager or other delegated senior staff person.

Upon identifying an environmental emergency, employees are to follow the flow chart, Figure 1-1, as outlined below.

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Figure 1-1 Emergency Response Flow Chart



2.0 ENVIRONMENTAL ASSESSMENT

EM - SITE RISK

The purpose of the Site Risk Assessment (SRA) is to identify environmental risks that can reasonably be expected to occur which may cause harm to the environment or constitute a danger to human life or health.

The SRA incorporates a number of key components:

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Site Description

Identification of Possible Environmental Emergencies & Aspects

Possible Ecological and Human Health Effects & Significance

SRA Evaluation Table

Section 8 contains detailed information pertaining to the SRA.

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3.0 ENVIRONMENTAL EMERGENCY RESPONSE and REPORTING - GENERAL PROCEDURES

3.1 SPILL / ENVIRONMENTAL EMERGENCY - FIRST RESPONSE

A person observing a spill, leak or environmental emergency should immediately:

- Stop or contain the spill if this can be done safely (without risk or personal injury).
- Make observations and immediately call:
 - a) First Aid (555) to report a major spill, fire or medical emergency, or
 - b) Mill Control Room (3216) if any hazardous material has entered a water body or is not containable.
- The Mill Control Operator and/or the 555 number responders will report the spill to supervisors, the Surface Emergency Response Team (SERT) Leader, and the Environmental Department. (3316/3290).
- If possible, continue with spill containment until clean-up crew arrives.
- If possible, make notes as to the cause of the event, time, weather conditions, etc. This information will be very valuable when it comes time to file a spill report.
- Find the blank copy of the Spill Report Sheet in Appendix I and fill it out.

The SERT Leader is responsible for mobilization of the Surface Emergency Response Team, directing the clean-up of operations, and for notifying the Environmental Department with full details of the emergency without delay. Water sampling and monitoring of the spill may be legally required - directions and assistance will be provided by the Environmental Department.

3.2 SPILL REPORT SHEET

All spills or environmental emergencies having potential environmental impacts must be reported to the Environmental Department as soon as possible. A **SPILL REPORT** sheet must be filled out by the employees involved in the incident and forwarded to the Environmental Manager. A blank copy of the **SPILL REPORT is provided in APPENDIX I**. Electronic copies are also available.

The Environmental Department is responsible for notifying the appropriate Government Authorities through the Environmental Management BC (EMBC) (formerly the Provincial Emergency Program (PEP)) and Environment Canada. Alternatively, the Mill and Surface Manager or designate may be requested to handle reporting duties.

3.3 MYRA CREEK

Since Myra Creek feeds into Buttle Lake, a spill of hazardous material into the creek is very serious.

The response to a spill into the creek should be:

1. If safe, stop or contain the spill.
2. Notify Mill Shifter (3216), and the Environment Department (3316/3290).
3. Deploy Surface Emergency Response Team (SERT) if necessary.
4. The Environmental Department will notify downstream users of the situation (City of Campbell River, BC Parks and the Vancouver Island Health Authority).
5. The Environmental Department will notify government authorities immediately (PEP, Ministry of Environment and Environment Canada)

Water samples should be taken immediately downstream of the spill location (where the spill is entering the creek) if Environmental personnel are not on site. The Spill Sampling Kit contains sample bottles and buckets and is located in the yellow box outside of the Environmental offices at Lynx, and sample bottles are also provided in the Spill Response Stations located around the site.

Since the creek has a high flow velocity, it may not be possible to prevent spilled material from being carried over some distance. Spills of tailings, backfill, contaminated water, etc. into the creek cannot be recovered easily, and downstream sampling will have to begin immediately to help determine impacts.

Spills of oils, fuels and other floating materials may be contained by employing booms across the creek. **A fast response is essential in order to prevent spilled material from reaching Buttle Lake.**

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3.4 BUTTLE LAKE AND HIGHWAY

Spills of harmful materials into Buttle Lake and other watercourses along the highway would most likely involve those shipped freight on buyer by trucks in larger quantities and on a fairly frequent basis. Such materials may include the following (Note: these materials do not become Nyrstar Myra Falls Ltd. property until they are received at the Warehouse):

- a) diesel fuel, gasoline and propane
- b) concentrates
- c) mill reagents
- d) acids
- e) bottled gasses
- f) explosives

Spills would most likely be the result of accidents caused by road conditions or traffic and could, therefore, be associated with other emergencies such as personal injuries and/or fire. Such emergencies should always take priority and be dealt with before environmental impacts are considered.

The observer (first person on the scene) should also consider his/her safety. Spilled fuels could ignite or explode at any time; be aware of all potential risks before approaching injured persons inside or close to vehicles! Observe first, then act safely.

How to proceed and who to call may depend on the following factors:

- a) location of accident
- b) location of nearest phone
- c) material / product spilled

In general, Nyrstar Myra Falls Ltd. concentrate trucks, pick-up trucks and many other commercial vehicles (including buses) carry vehicle radios. Drivers can be asked to relay information and issue calls for assistance quickly.

Other traffic may be stopped and asked to go for help.



To Deal with First Priority Emergencies (Fire or Medical Aid):

- a) Closer to Nyrstar Myra Falls Ltd. operations - Call First Aid or Radio Mill Control Room.
- b) Closer to Campbell River - Call RCMP and/or local emergency services.

A Spill Involving a Nyrstar Myra Falls Ltd. Vehicle (concentrate truck or other vehicle):

Such incidents must be reported to Nyrstar Myra Falls Ltd. (First Aid, Mill Control, Mill Shift Supervisor, and Environmental Manager) or Discovery Terminal. Any necessary follow-up will be handled from these locations. Remain on the scene until help arrives.

3.5 A SPILL INVOLVING A NON-COMPANY VEHICLE

These events should be responded to as follows:

- 1. a. Closer to Nyrstar Myra Falls Ltd.:

Call site or radio Mill Control Room or the Environmental Department. Nyrstar Myra Falls Ltd. will handle further notifications as required,

- b. Closer to Campbell River:

Call RCMP at 911 or have someone relay a radio message to town or Nyrstar Myra Falls Ltd. and have them call it in.

- 2. Remain on the scene until help arrives. Offer help and if possible, contain spill to prevent entry into Buttle Lake or other watercourses.

Cleanup Procedure

Refer to **SECTION 6** for details on dealing with specific products.

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3.6 LIABILITY (Non-company materials/vehicles)

Almost all fuels and supplies are brought in F.O.B. mine site and hence do not become Nyrstar Myra Falls Ltd. property until delivered to the mine.

In the event of a spill, therefore, responsibility for clean-up rests with the product owners and/or shippers. They should be notified as soon as possible and supplied with full details of the spill. Assurance should be obtained from them that a response action will be initiated immediately.

Nevertheless, Nyrstar Myra Falls Ltd. would be expected to provide an initial response to control and stabilize an emergency situation whenever possible, particularly, if the accident took place along the Westmin Mine Road, south of the turnoff to Gold River.

Nyrstar Myra Falls Ltd. will not assume any liability for spill recovery and clean up, or for any other actions taken to control the situation.

For this reason, it is important to involve the local authorities (RCMP, ambulance, etc.) as soon as possible and to confine Nyrstar Myra Falls Ltd.'s role to that of a "Good Samaritan" only.

3.7 ASSISTANCE (by the Company)

Nyrstar Myra Falls Ltd. may agree to provide assistance if/when required in some instances. Specifically, we may provide first aid support to the injured, transportation support, and crews and equipment for firefighting in Strathcona Park. Other companies or agencies may also request our help. Every effort should be made to comply with such requests if possible.

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4.0 ENVIRONMENTAL EMERGENCY RESPONSE OF SPECIFIC MATERIALS / PRODUCTS

Note: This section provides general response procedures to selected products. For more details refer to the specific MSDS sheets available at the First Aid Office, workplace MSDS sheets or from the product supplier.

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ACETONE

CAS Reg No. 67-64-1
Uses: Lab reagent
Locations & Quantities: Assay Lab

Potential Hazards

Fire or Explosion: Extremely flammable. Vapors formed from the product may travel or be moved by air currents and ignited by pilot lights, other flames, sparks, heaters, electrical equipment, static discharges or other ignition sources at locations distant from handling point. Vapor forms explosive mixture with air. Container explosion may occur under fire conditions when heated. Contact with oxidizers may cause fire and/or explosion. The product is not sensitive to impact. The product is sensitive to static discharge. Emits toxic fumes under fire conditions.

Health: Self-contained breathing apparatus, rubber boots and heavy rubber gloves.

Emergency Action:

General: Keep away from flame. Do not breathe vapour.

Protective Clothing: Wear goggles and rubber or plastic gloves when handling liquid.

Fire: Dry chemical, carbon dioxide or alcohol resistant foam. Water may be ineffective.

Spill or Leak: Stop leak if without risk.

Dyke to prevent runoff. Cover with absorbent material: Use Zorball, sand earth, other inert absorbents. Small spills may be cleaned with absorbent pads or Zorball.

ACETONE cont.

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Disposal: Absorbents should be sealed in plastic lined drums as soon as saturated. Drums to be shipped offsite as hazardous waste.

First Aid: In case of contact with skin or eyes, flush with running water for 15 minutes.
Remove contaminated clothing. Wash with plenty of water. Seek medical attention if necessary.

Notifications: Refer to the Notifications Procedure found in Section 5

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

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ACIDS: NITRIC ACID / HYDROCHLORIC ACID / SULPHURIC ACID / ACETIC ACID

Nitric Acid:

CAS Reg No. 7697-37-2 (Nitric acid at 52-71%)
7732-18-15 (Water at balance)

Uses: Laboratory chemical

Locations & Quantities: Assay lab and storage shed, in 3-4 litre carboys

Hydrochloric Acid:

CAS Reg No. 7647-01-0 (Hydrogen chloride at 30-38%)
7732-18-5 (Water at balance)

Uses: Laboratory chemical

Locations & Quantities: Assay lab and storage shed, in 3-4 litre carboys

Sulphuric Acid:

CAS Reg No. 7664-93-9

Uses: Laboratory chemical

Locations & Quantities: Assay lab and storage shed, in 3-4 litre carboys

Acetic Acid:

CAS Reg No. N/AV

Uses: Laboratory chemical

Locations & Quantities: Assay lab and storage shed, in 3-4 litre carboys

ACIDS: NITRIC ACID / HYDROCHLORIC ACID / SULPHURIC ACID / ACETIC ACID cont.

Potential Hazards

Fire or Explosion: Some may burn but do not ignite readily.

Vapours are heavier than air. They are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.).

May react violently with water (nitric, hydrochloric, sulphuric). They are very corrosive and will readily attack many metals (steel and iron).

Containing vessels may explode when heated.

Health: Inhalation of vapour or contact with vapour or liquid may cause severe burns, injury or death. May produce corrosive and/or poisonous gases on contact with moist air or water.

Fire may produce irritating, poisonous and/or corrosive gases.

Run off may pollute waterways.

Emergency Action:

General: Isolate hazard area. Keep upwind, out of low areas. Keep unnecessary people away.

Protective Clothing: Wear SCBA and special protective clothing.

Evacuation: Consider evacuation in case of a significant spill inside a building or confined area.

Consider downwind evacuation in case of a large spill.

Fire:

Small Fire: Use dry chemical, CO2, foam or water spray.

Large Fire: Use water spray, fog or foam, DO NOT USE WATER JET. DO NOT GET WATER IN CONTAINING VESSELS.

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ACIDS: NITRIC ACID / HYDROCHLORIC ACID / SULPHURIC ACID / ACETIC ACID cont.

Move containing vessels from fire area if without risk. Cool containing vessels with water.

Spill or Leak: Eliminate ignition sources.

DO NOT touch spilled material.

Stop leak if without risk.

Small Spills in Confined Areas - May be contained by "Chemosorb" pillows and neutralized by "Spill-X" available from the Assay Lab. Spill-X will solidify these acids allowing their removal.

Spills Outside (Well-ventilated Areas) - May be diluted with large quantities of water (lime could also be added) and flushed into the water treatment ponds. Flushing into Myra Creek should be avoided but would be of low impact if quantities are small (5 gallons or less).

Small spills can also be treated with Chemosorb and Spill-X.

Large Spills - Dyke to prevent entry into Myra Creek. Allow to soak up into the ground. Control vapour cloud drift with water spray. DO NOT ADD water to spilled material. Add lime, tailings or backfill material and/or sand to soak up spill. Stay upwind, as instant fuming is likely to occur.

Disposal: Smaller amount of Spill-X, lime or sand should be placed in plastic bags and sealed in plastic pails (5 gallon pails available from warehouse).

Larger quantities should be placed in plastic lined drums. Pails and drums may be buried in the garbage dump if approved by Environment Department.

Alternately, acid solutions or slurries can be neutralized with alkaline material and disposed of in back of Lynx Pit, as directed by Environmental Department.

Notifications: Refer to the Notifications Procedure found in Section 5

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

AEROFLOT 5100

CAS Reg No. 78-92-2 (5 - 7.5% Butanol, sec)
(1 – 3% modified thioncarbamate #2)
(60 – 90% modified thioncarbamate #1)
(3.4% Unidentified impurities)
78-83-1 (5 - 7% Isobutanol)

Uses: Mill Reagent

Locations & Quantities: Reagent room in Mill

Potential Hazards:

Fire or Explosion: Combustible under high heat. Keep away from heat and flame.

Keep away from strong acids or bases and also oxidizing agents.

Health: Respiratory protection is required under high exposure situations.

Eye protection recommended. Do not eat or smoke around product.

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. This material is not readily biodegradable.

Emergency Action:

General: Isolate hazard area. Keep upwind, out of low areas. Keep unnecessary people away.

AEROFLOT 5100 cont.

Protective Clothing: Wear SCBA and special protective clothing. Impermeable boots, gloves, goggles.

Evacuation: Consider evacuation in case of a significant spill inside a building or confined area.

Consider downwind evacuation in case of a large spill.

Fire:

Small Fire: Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires. Water stream may be ineffective.

Large Fire: Use water spray, alcohol foam, carbon dioxide or dry chemical to extinguish fires. Water stream may be ineffective.

Move containing vessels from fire area if without risk. Cool containing vessels with water.

Spill or Leak: Stop leak if without risk.

Remove sources of ignition.

Cover spills with some inert absorbent material; sweep up and place in a waste disposal container.

Flush spill area with water, but do not get into creek.

Disposal: This material must be disposed of as hazardous waste. Avoid release to the environment.

Notifications: Refer to the Notifications Procedure found in Section 5

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

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AEROFLOT AF 3418A

CAS Reg No. 13360-78-6 (50-52% Sodium diisobutyl-dithiophosphinate)
(0-1% Alkylphosphine sulfide)

Uses: Mill Reagent

Locations & Quantities: Reagent room in Mill

Potential Hazards:

Fire or Explosion: Combustible liquid and vapour.
Keep away from heat and flame.
Keep away from strong mineral acids and strong oxidizing agents.

Health: Do not get in eyes, on skin or on clothing.
Food, beverages, and tobacco products should not be carried, stored, or consumed where this material is in use. Before eating, drinking, or smoking, wash face and hands thoroughly with soap and water.

Emergency Action:

General: Isolate hazard area. Keep upwind, out of low areas. Keep unnecessary people away.

Protective Clothing: Where exposure level is known, wear approved respirator suitable for level of exposure.

Prevent eye and skin contact. Provide eye wash fountain and safety shower in close proximity to points of potential exposure.

Wear eye/face protection such as chemical splash proof goggles or face shield.

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AEROFLOT AF 3418A cont.

Evacuation: Consider evacuation in case of a significant spill inside a building or confined area.

Consider downwind evacuation in case of a large spill.

Fire:

Use water spray, carbon dioxide or dry chemical.

Move containing vessels from fire area if without risk. Cool containing vessels with water.

Spill or Leak:

Cover spills with some inert absorbent material; sweep up and place in a waste disposal container. Flush spill area with water.

This material is readily biodegradable. This material is not classified as dangerous for the environment.

Disposal:

Notifications:

Refer to the Notifications Procedure found in Section 5

Spill Reporting:

The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

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AMMONIUM HYDROXIDE

CAS Reg No. 1336-21-6 Ammonium hydroxide
7664-41-7 (20-30% Anhydrous ammonia)
7732-18-5 (water balance)

Uses: Laboratory chemical

Locations & Quantities: Assay lab and storage shed

Potential Hazards

Fire or Explosion: Stable but avoid high temperatures, sparks, open flames and all other sources of ignition, contamination.

When heated, toxic and flammable vapours are emitted.

Fire hazard is increased around oil and other combustible material.

Health: Do not inhale or ingest. Avoid skin and eye contact. Use PPEs.

Emergency Action:

General: Evacuate and ventilate the area.
Eliminate all sources of ignition.
Stay upwind. Keep out of low areas.
Dyke the area with sand or a natural barrier.
Stop leak if without risk.
Dilute with a large volume of water.

AMMONIUM HYDROXIDE cont.

Wash spill site after material pick up is complete.

Do NOT empty into drains.

Do NOT touch damaged container or spilled material.

Protective Clothing: Wear goggles, gloves, SCBA and protective clothing.

Evacuation: Consider evacuation in case of a significant spill inside a building or confined area.

Consider downwind evacuation in case of a large spill.

Fire:

Use extinguishing media appropriate to surrounding fire conditions.

CO2 may react with ammonia vapours.

Wear adequate personal protection (including SCBA).

Cool containing vessels with flooding quantities of water.

Do NOT get water inside container.

Disperse vapours with water spray if they have not ignited.

Spill or Leak: Evacuate and ventilate the area.

Eliminate all sources of ignition.

Stay upwind.

Keep out of low areas.

Stop leak if without risk.

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Dilute with a large volume of water.

DO NOT touch spilled material or damaged container.

Dyke the area with sand or a natural barrier.

Disposal:

Do not empty down the drain. Dispose of according to all applicable regulations (clean up materials should be considered hazardous waste and will be removed from site by contractors).

Harmful to aquatic life at low concentrations.

Notifications:

Refer to the Notifications Procedure found in Section 5

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

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CARBON DIOXIDE (CO₂) (CRYOGENIC GAS)

CAS Reg No.	124-38-9 (Carbon dioxide at 100%)
Uses:	pH modification of contaminated runoff and process waters during treatment: to lower the alkalinity (pH) of the water
Locations & Quantities:	8 tonne cryogenic storage tank and injection system located at Myra Out.

Potential Hazards:

Fire or Explosion:	Non Flammable. CO ₂ is often used to extinguish fires. Containing vessels may explode when heated, ruptured cylinders may rocket.
Health:	High concentrations of gas may cause asphyxiation without warning. Contact with liquefied gas may cause severe frostbite.

Emergency Action:

Protective Clothing:	Wear protective clothing when handling liquified gas. SCBA may be required.
Evacuation:	If road tanker is involved in a fire, consider evacuation for 800 meters in all directions.
Fire:	Use extinguishing agent suitable for type of surrounding fire (CO ₂ , itself will not burn). Move containing vessels from fire area if without risk. Cool containing vessels with water. Handle damaged cylinders with care. Fire involving CO ₂ , storage tank or tanker trucks: Fight fire from maximum distance or use unmanned monitor nozzles. Withdraw immediately in case of rising sound from venting safety valves or discolouration of the tank. The storage tank is foam insulated which may release poisonous gases in a fire. Stay upwind. Stay away from tank ends.

CARBON DIOXIDE (CO₂) (CRYOGENIC GAS) cont.

Spill or Leak:	DO NOT touch spilled material. Stop leak if without risk. DO NOT direct water at spill or leak. If possible, turn leaking container so that gas escapes rather than liquid. Allow spilled material to evaporate. DO NOT enter cloud (fog) without a SCBA.
Notifications:	Refer to the Notifications Procedure found in Section 5
Spill Reporting:	The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

CHLORINE (LIQUEFIED GAS)

NOTE : Chlorine is considered the most hazardous chemical product in terms of overall risks from a large spill/release. Therefore, the following procedure is the most in-depth of those presented in this Plan.

CAS Reg No. 7782-50-5

UN No. 1017

Uses: Drinking water disinfection

Locations & Quantities: Stored and used in pumphouse adjacent to Mill Fresh Water Tank. Maximum site inventory consists of 8 cylinders at 68 kg apiece of liquefied chlorine gas. Gas is drawn into a circulating line of water being pulled out of fresh water tank and going back into the top.

Potential Hazards:

Fire or Explosion: Substance does not burn but will support combustion. Vapours from liquefied gas are initially heavier than air and spread along the ground. (usually visible as a greenish colored cloud).

These are strong oxidizers and will react vigorously or explosively with many materials. May ignite combustibles (wood, paper, oil, clothing, etc.)

Some will react violently with air, moist air and/or water.

Containing vessels can explode when heated.

Ruptured cylinders may "rocket" when punctured.

Health: **TOXIC:** May be fatal if inhaled or absorbed through skin.

High concentrations of gas may cause asphyxiation without warning. Contact with liquefied gas may cause severe frostbite.

Fire may produce carbon monoxide as well as carbon dioxide gases.

CHLORINE (LIQUEFIED GAS) cont.

Emergency Action:

Protective Clothing:

Wear SCBA when handling liquified gas.

Wear protective clothing, boots and gloves.

Evacuation:

Consider downwind evacuation.

If transport vehicle is involved in a spill or fire, consider initial evacuation for 1500 meters in all directions.

Fire:

Small Fire:

Use dry chemical, CO₂, water spray or foam.

Large Fire:

DO NOT use water jet.

Move containing vessels from area if without risk.

Cool vessels with water until well after fire is out.

DO NOT extinguish a leaking gas flame unless leak can be stopped.

Extinguish secondary fire.

Handle damaged cylinders with extreme care.

Fire involving Tanks:

Fight fire from maximum distance or use unmanned monitor nozzles.

DO NOT direct water at source of leak or venting safety valves.

(as icing may occur).

Withdraw immediately in case of rising sound from venting safety devices or from discoloration of tank.

Stay away from tank ends.

CHLORINE (LIQUEFIED GAS) cont.

Response Planning:	<p>A minimum of two properly trained SERT members to respond if audible or visual Chlorine alarm is activated.</p> <p>Mill Shift Supervisor must be notified immediately, as he will provide Chlorine meter and assess the hazard.</p> <p>Isolate hazard area.</p> <p>Keep upwind.</p> <p>Keep all unnecessary people away.</p> <p>Keep out of low lying areas.</p>
Spill or Leak:	<p>Eliminate <u>ALL</u> ignition sources.</p> <p>DO NOT touch spilled material.</p> <p>Stop leak (if it is safe to do so.)</p> <p>Use water spray curtain to divert vapour cloud.</p> <p>DO NOT direct water at spill or source of leak.</p> <p>If possible, turn the leaking containment vessel so that the gas escapes rather than the liquid.</p> <p>Dike to prevent entry into sewers, basements, or confined areas.</p> <p>Allow to evaporate.</p> <p>Evacuate the Lynx, HW offices and shop complex to the H.W. training centre, until the area is declared safe.</p>
First Aid:	<p>Remove victim to fresh air.</p>

CHLORINE (LIQUEFIED GAS) cont.

First Aid (cont): Apply artificial respiration (if victim is not breathing). Administer oxygen, if breathing is difficult.

 Remove any contaminated clothing (including shoes/boots).

 Obtain medical aid.

CHLORINE SPILL / LEAK / FIRE - PROCEDURE

In the event of a chlorine spill or leak leave area immediately in an upwind and/or uphill direction. Chlorine gas is heavier than air and will tend to travel downhill and downwind.

Immediately notify Mill Control Room (3216) and report:

1. Your name and location
2. Location of spill / leak and its source (tank, pipeline, heater, ...)
3. Direction of spill / leak and wind direction and strength

Ensure your location will remain safe (i.e. wind change)

FIRST AID DEPARTMENT / MILL CONTROL ROOM RESPONSE

Follow INITIAL RESPONSE PROTOCOL (located on next page).

If an evacuation is required follow the **EMERGENCY RESPONSE PROTOCOL**

Approach spill / leak area with extreme caution using appropriate safety gear (**minimum of two trained responders**).

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CHLORINE (LIQUEFIED GAS) cont.

FIRE

Follow EMERGENCY RESPONSE PROTOCOL.

EMERGENCY CALL	C.R. FIRE DEPT.	(911)
CANUTEC	613-996-6666	
	BRENNTAG Canada	1-855-273-6824
	C.R. RCMP	(911)
	FIRST-AID	555 / 3318
	MILL CONTROL	3216
	WCB prevention div.	1-800-663-7921
		1-800-661-2112

EMERGENCY PROCEDURES - CHLORINE SYSTEM**CHLORINE IS AN EXTREMELY HAZARDOUS MATERIAL**

See CHLORINE tab in MSDS binder, CANUTEC guide, system location drawings.

Chlorine cylinders are stored and utilized at a single site only. This site (CHLORINE BUILDING) contains a maximum of eight (8), sixty-eight kilogram cylinders of liquified chlorine. Cylinders connected to injection system should be considered full. Extra cylinders are tagged as being full or empty. Empty cylinders are to be handled with the same care as the full ones as they still contain residual chlorine. Site location is at the base of the fresh water tank, in the vicinity of the Lynx Administration area.

A visual alarm (RED LIGHT) is situated outside the chlorine building.

CHLORINE (LIQUEFIED GAS) cont.

An audible alarm (HORN) is situated outside the chlorine building. Sensor is located INSIDE.

An alarm is also enunciated in the mill control room on the WONDERWARE SYSTEM.

These systems will alarm if chlorine levels exceed one (1) Part per Million (PPM) in the air.

SPECIFIC PROCEDURES**I) INITIAL RESPONSE**

Initiated upon activation of any chlorine alarm or field report (from operator).

PROCEDURE follow INITIAL RESPONSE PROTOCOL.

II) EMERGENCY RESPONSE

Initiated by shift supervisor upon confirmation of a chlorine emergency.

PROCEDURE follow EMERGENCY RESPONSE PROTOCOL.

NOTE: for any shipping, handling, or transport related incidents follow the EMERGENCY RESPONSE PROTOCOL.

INITIAL RESPONSE PROTOCOL

Upon activation of any audible or visual chlorine alarm, notify Mill Shift Supervisor immediately, **A MINIMUM OF TWO PEOPLE MUST RESPOND.**

Shift supervisor will provide the chlorine meter and assess hazards.

Determine wind direction and lay of land, chlorine is heavier than air and tends to flow downhill and downwind.

If there is an obvious hazard such as yellow/green gas cloud or intolerable chlorine odour, activate EMERGENCY RESPONSE PROTOCOL.

CHLORINE (LIQUEFIED GAS) cont.

If hazard is not obvious, approach area with caution to establish chlorine level using the hand held monitor (range 0 to 10 PPM).

If chlorine gas level in the air (OUTSIDE THE BUILDING) is greater than TEN (10) PPM initiate EMERGENCY RESPONSE PROTOCOL.

If less than 10 PPM, proceed with caution to establish source of chlorine leakage or alarm state (WEAR CANISTER RESPIRATOR). Continue to monitor chlorine level as it may rise as you approach the source of the leak.

If the source of the problem is:

a leak, shut down the chlorine system, VENTILATE, and then repair;

an alarm malfunction, contact Electrical Department.

NOTE: IF ANY ALARM IS ACTIVATED, OR LEAKAGE IS SUSPECTED, APPROACH WITH CAUTION AND HAVE BACKUP.

EMERGENCY RESPONSE PROTOCOL

Upon Mill Shift Supervisor's assessment to evacuate or upon a visual observation of chlorine gas cloud the following steps must be undertaken:

- NOTE WIND DIRECTION SPEED AND TOPOGRAPHY
- ESTABLISH DIRECTION OF GAS FLOW (DOWNHILL AND DOWNWIND)
- EVACUATE AREAS POTENTIALLY IN FLOW PATH.
- NOTIFY EMPLOYEES OF THE LOCATION OF THE EMERGENCY.

CHLORINE (LIQUEFIED GAS) cont.

TABLE OF INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES.

NAME OF MATERIAL	SMALL SPILLS				LARGE SPILLS		
	From a small package or small leak from a large package				From a large package or from many small packages		
	First ISOLATE	Then PROTECT			First ISOLATE	Then PROTECT	
In all directions	Persons Downwind during:			In all directions	Persons Downwind during:		
Meter Feet	DAY Kilometers Miles	NIGHT Kilometers Miles		Meter Feet	DAY Kilometers Miles	NIGHT Kilometers Miles	
1017 Chlorine	60 m (200 ft)	0.3 km (.2mi)	0.8 km (.5 mi)	185 M (800 ft)	0.8 km (.5 mi)	3.1 km (1.9 mi)	

ASSESS POSSIBILITY OF SPILL/LEAK CONTAINMENT (must have a minimum of two trained responders in complete responder suits including self-contained breathing apparatus, SCBA).

EMERGENCY RESPONSE EQUIPMENT AND LOCATION

Chlorine emergency response equipment consists of the following:

EQUIPMENT

Chlorine emergency response manual

Chlorine A kit

Chlorine canister respirators

Responder, pvc level A, fully encapsulated suit

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CHLORINE (LIQUEFIED GAS) cont.

Flash light

Walkie talkies

LOCATION SERT CABINET AT FOOT OF MAIN MILL STAIRS

THREE Emergency self-contained breathing apparatus (SCBA)

TWO Chlorine canister kits

TWO Blue responder suits

SIX pair orange rubber gloves

LOCATION CHLORINE BUILDING NEXT TO FRESH WATER TANK

Chlorine tank repair kit (large black trunk)

LEAK DETECTION AND CONTROL

If the "ammonia" test indicates a leak after a cylinder change, **immediately close the main cylinder valve**. Allow the room to ventilate and repeat the cylinder hook-up procedure. Open (and immediately close) the main cylinder valve. If a leak is still indicated, make one further attempt using a **new lead gasket**. If the leak cannot be corrected remove this cylinder from use. **ENSURE THERE IS NO LEAK FROM THIS CYLINDER WITH THE MAIN VALVE CLOSED. TAG IT AS NOT FOR USE, AND CONTACT THE SUPPLIER FOR REMOVAL.** Connect a different cylinder to the chlorination system and ensure there is no leakage.

CONTAINER REPAIR

For any emergency repairs, trained personnel only will attempt a cylinder repair as per the chlorine institute emergency kit "A" guideline. (RED BOOK)

CHLORINE (LIQUEFIED GAS) cont.

DISPOSAL OF DAMAGED CONTAINERS

Contact the chlorine supplier for disposal/removal of any damaged or suspect cylinders.

MAINTENANCE OF EQUIPMENT

Maintenance and equipment specifications are provided in the PWC, GAS CHLORINATION SYSTEM instruction manual (located in the shifters, mechanical and electrical supervisors offices).

No welding or burning is to occur on the chlorine system until is isolated and lines are purged with nitrogen. Also never use hydrocarbon or alcohol solvents for cleaning and ensure cutting oils, grease and other foreign materials are removed from pipes, lines, and fittings prior to use.

RESPIRATOR PROGRAM

Only approved (safety department) chlorine canisters with full face mask may be used for routine cylinder changes and leak investigation. Emergency response will require full protective vapour suits and SCBA.

OPERATIONS-Routine System Inspections**TAILING OPERATORS:**

- Include chlorine area on ONE routine round per shift. (12 hours).
- Approach area with caution, ALARMS ARE NOT PERFECT, assure continuing radio contact.
- If chlorine odour is discernable initiate INITIAL RESPONSE PROTOCOL.
- If odour is negligible, switch ventilation on, inspect system for leaks using dilute ammonia solution. Fill in report (log) sheet.

CHLORINE (LIQUEFIED GAS) cont.

CHANGING CYLINDERS

Observe "buddy" system. NEVER CHANGE CYLINDERS ALONE.

Follow CHANGING CYLINDERS procedure precisely

MAINTENANCE

SYSTEM MUST BE SHUT DOWN AND ISOLATED BY OPERATIONS PRIOR TO ANY MAINTENANCE.

Complete Maintenance and PM inspections as per standardized inspection sheets.

ELECTRICAL/INSTRUMENTATION

Observe "buddy" system. NEVER WORK ON SYSTEM ALONE. OPERATIONS ARE TO ISOLATE AND SHUT DOWN SYSTEM IF REQUIRED.

WAREHOUSE

Ensure valve protection bonnets are securely fastened.

Ensure cylinders are secure in cage. Secure cage to forklift and notify mill shifter prior to transport to chlorine building. Ensure tags are on cylinders prior to moving. (eg. full/empty).

NOTE: Empty cylinders are to be treated like full ones.

RESPONSIBILITIES**SAFETY DEPT.**

- Maintain response documentation up to date and appropriately available.
- Maintain response equipment up to date and fully functional.

CHLORINE (LIQUEFIED GAS) cont.

- Test and evaluate response system.

MILL OPERATIONS/MAINTENANCE/ELECTRICAL

- Ensure all safety functions, alarms, preventive maintenance etc. are operational.
- Ensure portable chlorine meter is functional.
- Ensure that log books are current and properly filled out.

WAREHOUSE

- Ensure shipping and handling procedures are appropriate and adhered to.
- Empty containers are to be treated as full.
- Cylinders are to be stored only in the Chlorine Building next to the fresh water tank.

ACCIDENT INVESTIGATION

The WCB Safety & Health Regulations require that:

1. The WCB Prevention Division is immediately notified of any leak other than those immediately corrected during a cylinder change.
2. A formal investigation of any accident involving any chlorine release be undertaken by the employer to determine causes and detail remediation. Copies are to be forwarded to the employer's Occupational Health & Safety Committee and WCB (prevention division).

CHLORINE (LIQUEFIED GAS) cont.

CHANGING CHLORINE CYLINDERS

1. TURN VALVE STEM CLOCKWISE TO CLOSE CYLINDER VALVE.
2. ALLOW FLOAT IN FLOWMETER TO DROP TO ZERO. INDICATOR ON FRONT OF GAS FEEDER SHOULD INDICATE NO GAS.
3. WAIT APPROXIMATELY ONE MINUTE. FLOAT SHOULD REMAIN AT ZERO. IF FLOAT FLUTTERS OR DOES NOT DROP TO ZERO, VALVE MAY NOT BE CLOSED TIGHTLY. *MAKE CERTAIN VALVE IS CLOSED BEFORE PROCEEDING.*
4. TURN OFF EJECTOR WATER SUPPLY AND MAKE CERTAIN THE GAS SUPPLY INDICATOR STAYS IN THE "NO GAS" POSITION BY TURNING THE "RESET" KNOB. IF THE INDICATOR RESETS, EITHER GAS PRESSURE IS STILL PRESENT OR THERE IS AN AIR LEAK (NOT VACUUM TIGHT) IN THE SYSTEM. REFER TO INSTRUCTION MANUAL IF AN AIR LEAK IS EVIDENT.
5. LOOSEN GAS FEEDER YOKE SCREW. REMOVE GAS FEEDER FROM VALVE.
6. REPLACE GAS CYLINDER.
7. REMOVE OLD LEAD GASKET. INSPECT AND CLEAN MATING SURFACES OF GAS FEEDER, AND VALVE. ***INSTALL NEW UNUSED LEAD GASKET.***
8. POSITION GAS FEEDER ON NEW GAS CYLINDER AND TIGHTEN YOKE SCREW. **DO NOT TIGHTEN EXCESSIVELY.**
9. CRACK OPEN GAS CYLINDER VALVE AND RECLOSE QUICKLY. CHECK FOR LEAKS. IF LEAKS EXIST TURN ON EJECTOR AND REPEAT STEP NUMBER (2), (3), AND (4) AND CORRECT LEAKS.

LEAK TEST SOLUTIONS;

CHLORINATOR/SULFONATOR-AMMONIA

AMMONIATOR-BLEACH

10. OPEN GAS CYLINDER VALVE APPROXIMATELY ¼ TURN ONLY AND LEAVE CYLINDER WRENCH ON VALVE. RESET INDICATOR
11. TURN ON EJECTOR WATER SUPPLY.



CHLORINE (LIQUEFIED GAS) cont.

NOTES:

- A. REFER TO GAS FEEDER INSTRUCTION BULLETIN FOR MORE DETAILED INSTRUCTIONS.
- B. CONTACT YOUR GAS SUPPLIER IF THE CYLINDER VALVE OR CYLINDER IS CONSIDERED TO BE DEFECTIVE.
- C. FOR ADDITIONAL INFORMATION ON CHLORINE HANDLING, REFER TO THE "CHLORINE MANUAL" PUBLISHED BY THE CHLORINE INSTITUTE INC., 2001 L STREET SUITE 506, WASHINGTON, DC 20036. PH: 202-775-2790.

OTHER GASES – COMPRESSED GAS ASSOCIATION: 703-412-0900.

FOR CHEMICAL EMERGENCIES CALL: 1-800-424-9300 OR

FOR EQUIPMENT SERVICE CALL: 1-800-523-6526.

3000 Advance Lane Colmar, Pennsylvania 18915 * (215) 997-4000 * FAX (215)997-4062

CHLORINE (LIQUEFIED GAS) cont.

CHLORINE SYSTEM OPERATION LOG

NAME						
DATE						
TIME						
WIND DIRECTION						
CHLORINE DOSAGE (kg/hr)						
CHLORINE ROOM						
PUMP ROOM						
LEAK TEST (25% AMMONIA solution)						
CYLINDER (pass/fail)						
PIPING (pass/fail)						
CYLINDER CHANGE (YES/NO)						
ALARM TEST (5% CHLORINE solution)						
PASS/FAIL						

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CHLORINE (LIQUEFIED GAS) cont.

ALARM TEST PROCEDURE

- ENSURE CHLORINE TEST SOLUTION IS USABLE (SMELLS LIKE A SWIMMING POOL)
- NOTIFY MILL CONTROL ROOM THAT AN ALARM TEST IS TO BE UNDERTAKEN;
- PLACE CHLORINE SOLUTION NEAR DETECTOR (FOR 10 SECONDS);
- LISTEN FOR HORN (AUDIBLE ALARM);
- VERIFY THAT RED ALARM LIGHT IS ON (OUTSIDE BUILDING);
- CHECK WITH CONTROL ROOM TO ESTABLISH IF AN ALARM HAS COME UP ON THEIR PANEL
- RECORD RESULTS ON LOG SHEET.

NOTE: IF ANY OF THE THREE ALARMS SYSTEMS (LOCAL AUDIBLE, LOCAL RED LIGHT, CONTROL ROOM ALARM) DO NOT ALARM, NOTIFY MILL SHIFTER/SHIFT ELECTRICIAN TO DETERMINE ALARM STATUS AND REPAIR, AS REQUIRED.

CONTAMINATED WATER (various sources)

CAS Reg No. N/AV

Uses: Water that is directed for treatment prior to release to environment

Locations & Quantities: TDF Inner and Outer Drains, Pumphouse #4, Minewater and Mill effluent, contaminated site runoff and seepage waters, etc.

Potential Hazards:

Fire or Explosion: None

Health: Run off may pollute waterways – may be toxic at high concentrations. Contaminated water may be acidic or alkaline and may contain high concentrations of heavy metals and mill reagents.

Use gloves and protective clothing.

Emergency Action:

Spill or Leak: Stop leak, shut-off pumps in appropriate pumphouse if applicable.

Contain spilled material. Respond with Surface Crew equipment or SERT.

Dyke spill to prevent entry into Myra Creek, if possible. Minimize turbidity of runoff waters by using hay bales and silt curtains as appropriate. Use bladder balloons to stop pipe leaks. Use portable pumps to maintain operations. Consider bringing in vacuum truck to collect or re-locate spilled material.

(Emergency response materials are stored in SERT Trailer or under Warehouse control)

Notify Environmental Department immediately. Water quality sampling must be initiated to monitor impacts.

CONTAMINATED WATER (various sources) cont.

Water Quality sampling: Initiate water quality sampling program. Sample bottles stored in a yellow box outside of the Lynx Environmental Office and in Spill Response Kits. Take samples of spilled material, upstream samples and downstream samples. Take samples for biological toxicity testing. If spill is large in scope or impact appears severe, immediately contact expert environmental consultants to assess impacts. Possible consultants are Nautilus Environmental Ltd or Maxxam Analytics. Analyses of samples and additional work by outside consultants and labs will be coordinated by Environmental Department.

Disposal: A large, contained spill may be recovered by a fire pump or submersible pump for discharge into the Super Pond, the Myra Ponds or the Tailings Disposal Facility (TDF). If not practical, apply lime to the contained spill and allow water to dissipate into the ground. Excavate any sludge formed for disposal into the tailings area or the waste rock dump.

Notifications:

Refer to the Notifications Procedure found in Section 5

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

DIESEL FUELS, LIGHT OILS

Diesel Fuel:

CAS Reg No. 68476346 (Diesel Fuel No.2 at 60-100%) for Chevron Heating Fuel No. 2

Uses: Underground and surface vehicles and stationary equipment including powerhouse generators

Locations & Quantities: Storage tanks located at HW Warehouse and the Mill Fuel Bay area.

Light Oils:

CAS Reg No. 8042475 (White Mineral Oil at 100%) for Chevron Clarity White Oil USP 100

Uses: Lubrication of motorized equipment

Locations & Quantities: Areas where product is stored include warehouses, shops, etc.

Potential Hazards:

Fire or Explosion May be ignited by heat, flame Vapours are heavier than air.

Liquid is lighter than water.

Health Fire may produce irritating, poisonous and/or corrosive gases.

Run off may pollute waterways.

DIESEL FUELS, LIGHT OILS cont.**Emergency Action**

- General:** Isolate hazard area. Keep upwind and out of low areas.
- Protective Clothing:** Wear protective clothing (rain gear, boots, gloves).
- Evacuation:** If a large spill or fire, consider initial evacuation for 800 m in all directions.
- Fire:**
- Small Fire:** Use dry chemical, CO₂, water spray or foam.
 - Large Fire:** Use water spray, fog or foam. DO NOT use water jet.
- DO NOT get water inside containing vessels. Move containing vessels from area if without risk. Keep cool with water flood.
- Spill or Leak:** Eliminate ignition sources.
- DO NOT touch spilled material.
- Stop leak of without risk.**
- Dyke to prevent entry into waterways, sewers, ditches.
- Use packed earth or sand for dyking material lined with plastic sheeting or other material that will reduce infiltration.
- If spill has entered water treatment ponds, contain it with booms. Also place booms across pond decant(s) to prevent migration to other ponds or to Myra Creek. Absorbent booms are available from the Fire Hall and warehouse.
- Small Spills:**
- (a) On land, in buildings or confined places. Preferred method is by soaking up with Zorball or absorbent pads. Sand may be used as an alternative but must be disposed of as soon as possible.
 - (b) Contained in Pond(s) – mop up with absorbent pads.

DIESEL FUELS, LIGHT OILS cont.

-
- Large Spills:
- (a) On land, dyke off the area using heavy equipment or with booms or absorbent material.

If practical, use small submersible pump (s) to recover bulk of spill. Mop up with absorbent pads, or sand.

Use of a vacuum truck should be considered if spill is large enough, contained in dykes and in an area where power is not readily available.
 - (b) Contained in Pond(s)

Recover by submersible pump or vacuum truck.

Mop up with absorbent pads.
- Disposal:
- Diesel fuel and other light oils recovered as liquids should be put in drums for recycling, if possible. If not reusable, this material should be placed in appropriately labeled salvage waste oil drums.
- Absorbent pads should be removed as soon as they become saturated and placed in drums. Sand and contaminated earth or rock must be excavated and placed in drums for disposal as hazardous waste. Drums must be sealed.
- If quantities of sand or earth make drum disposal impractical then this material may temporarily be disposed of on the waste rock dump by placing it on a heavy tarp / plastic sheeting and covering it with plastic sheeting. It must then be covered with a layer of clean sand/earth (+/- 3" thick).
- Final disposal is usually coordinated by the Materials Management group and may be determined through contact with government officials.
- First Aid:
- Victim of gas inhalation: Remove victim to fresh air. Apply artificial respiration if victim is not breathing; oxygen if breathing is difficult. Remove contaminated clothing and shoes. Keep victim warm and quiet. Obtain immediate medical care.

DIESEL FUELS, LIGHT OILS cont.

In case of contact with material, flush skin or eyes with running water for at least 15 minutes.

Notifications: Refer to the Notifications Procedure found in Section 5

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

Discovery Terminal: Spills of diesel fuel or oils on land may be dealt with as described previously – if possible, divert spill away from the ocean or foreshore areas.

A separate supply of absorbent booms and pads should be kept on hand at all times, in the event of an emergency. Locations are truck shop-storage room and main office building.

In the event of a major fuel or oil spill into the foreshore waters at the Discovery Terminal, the observer should:

1. Stop spill if possible and without risk of personal injury.
2. Initiate steps for containment and clean-up.
3. Notify Terminal Supervisor (3335), Environmental Manager (3316), and Mill Manager (3269).
4. Notify RCMP and Coastguard.
5. Call for outside emergency assistance, if necessary.

The Terminal Supervisor or his designate will be responsible for mobilization of the necessary crews and equipment. Appropriate Nyrstar Myra Falls Ltd. personnel, Environmental Manager and Mill Manager should be notified immediately:

DIESEL FUELS, LIGHT OILS cont.

- Small spills on the foreshore or on the water should be contained with absorbent booms and mopped up with pads.
- Large spills, too large to contain by absorbent booms (large diesel spill, bunker/diesel spill from a ship, etc). The initial response is to deploy the boom (Bennett boom). This will usually involve the use of a tug boat. The material should be removed by vacuum truck, pumps or skimmer and mopped up with absorbents.
- Once contained, one or more smaller boats may be used to recover and mop up the spill.

Dispersants:

The use of chemical dispersants is expressly forbidden by Environment Canada. Use is limited to cases where there is an immediate threat to life and property (i.e. an oil slick on fire).

Buttle Lake:

Although clean-up of a spill of diesel fuel (or any other commodity into Buttle Lake involving a supplier truck or tanker) would not be Nyrstar Myra Falls Ltd. responsibility, the Company would nevertheless be expected to respond to an emergency situation.

This response may include the following:

- Supply of manpower and equipment to contain a spill in order to minimize escape into the lake.
- Supply of "first response" boat, manpower, booms, pads, etc., to contain a spill on the lake, due to close proximity to site.
- Notification of authorities, supplier office or agents.
- Supply of first aid treatment.

EXPLOSIVES

ANFO Explosives: (Ammonium Nitrate and Fuel Oil - Blasting Agents)

Blasting Gelatins (MSDS No. 1019)

Emulsion Explosives (MSDS Nos. 1062 and 1030)

Cast Booster (MSDS No. 1108)

Electric Detonators (MSDS No. 1076)

Non-electric Detonators (MSDS No.1080)

Detonating Cords (MSDS Nos. 1126 and 400040)

Inert Stemming Charges (MSDS No. 1100)

Uses: Blasting rock in underground mining

Locations and Quantities: Explosives magazine and Caps Magazine located on road to Tennent Powerhouse and underground

Potential Hazards:

Fire or Explosion: May burn vigorously if subjected to heat, shock or friction.

May produce localized detonations with projection of fragments.

Risks are limited to the immediate vicinity.

Health: Run off may pollute waterways.

Fire may produce irritating, poisonous and/or poisonous gases.

Contact may be irritating to throat, nose, eyes or skin.

Prolonged contact with skin may cause dermatitis.

Emergency Action:

General: Isolate hazard area. Notify Mine Manager or his designate.

EXPLOSIVES cont.

Evacuation: If fire or heat threatens material consider initial evacuation for 100 meters in all directions.

Protective Clothing: Wear SCBA when involved in a fire. Wear coveralls and impermeable gloves, dust mask and safety glasses.

Reactivity: Is not compatible with copper, organics, chlorates, metal powders, acids or alkalis. Avoid high temperatures and static build up.

Fire:

Small Fire: Fight small fires of unconfined materials with dry chemicals, sand or flooding quantities of water. Contain run off as much as possible. Wear SCBA.

Large Fire: Evacuate area. Use unmanned monitor nozzles to prevent fire from spreading. Do not move packaged material that was exposed to heat.

Spill or Leak: Eliminate ignition sources. Contain spill. Stop leak if no risk. Recover with brooms and non-sparking tools. Keep material dry if possible.

Disposal: Place clean, recovered material in plastic buckets, sealed and labeled and then deliver to H-W Mine for re-use, as directed by Mine Manager.

Damp material and/or material contaminated with dirt, grit, etc. should be placed in plastic bags and delivered to H-W Mine in buckets.

May be destroyed during a regular blast.

Notify Mine Superintendent in advance, for approval.

First Aid: Wash skin with soap and water. Flush eyes with running water for 20 minutes.

Inhalation: Move victim to fresh air. Give artificial respiration if victim is not breathing.

EXPLOSIVES cont.

Ingestion:	Give large amounts of water or milk to induce vomiting, unless victim is unconscious. Obtain medical aid.
Product Support:	Dyno-Nobel 24 hour Emergency 1-800-424-9300 ORICA Canada Inc. 1-877-561-3636
Notifications:	Refer to the Notifications Procedure found in Section 5
Spill Reporting:	The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

FLOCCULANTS (PERCOL, Drewfloc 3237 & OTHERS)

Superfloc 1128:

CAS Reg No. 64742-47-8 (Petroleum Distillate at 25%)

Drewfloc 3237:

CAS Reg No. 64742-47-8 (Mineral spirits at 10-30%)

9016-43-9 (Alkyl Phanol Ethoxylate at 3-7%)

68131-39-3 (Ethocylated Alcohol at 1-8%)

Uses: Mill reagent, to assist with settling of fine particulates in water solutions

Locations & Quantities: Mill thickeners, in small make-up tanks in their pumphouse buildings and in the mill reagent prep area

Potential Hazards

Fire or Explosion: No particular fire or explosion hazards.

Thermal decomposition may occur when heated producing carbon monoxide and/or carbon dioxide.

Health: Avoid breathing vapours. Spilled emulsion is VERY SLIPPERY.

Avoid walking in spilled material.

Emergency Action:

Fire: Treat as Class II Combustible Liquid.

Use dry chemical CO₂, water spray or foam.

Remove containing vessels from area if without risk.

Spill or Leak: Stop leak if without risk. Contain spill by dyking with sand, earth or absorbent booms. Cover with absorbent material: Use sand, earth.

**FLOCCULANTS (PERCOL, Drewfloc 3237 & OTHERS)**

Sweep up and shovel into drums. Flush area with lots of water, may be allowed to run into sewers, ditches and treatments ponds with sufficient dilution.

Disposal:
area.

Drums containing absorbents may be buried in the garbage disposal

Sand may be disposed of in the waste dump.

Notifications:

Refer to the Notifications Procedure found in Section 5

Spill Reporting:

The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

GASOLINE OR SOLVENTS

Gasoline:

CAS Reg No. N/AV for Petroleum Gasoline Base (60-100%)

71432 for Benzene (1-5%)

Uses: fuel in internal combustion engines: light vehicles

Locations & Quantities: Main inventory of stored gasoline is in one self-contained and double walled ENVIRO-Tank at the main fuel farm located off of the main road between the Powerhouse and Mill buildings.

Solvent:

CAS Reg No. 64742-47-8 (Light Distillate, Hydratreated at 100%) Chevron Solvent 350

Uses: Cleaning of oils and greases

Locations & Quantities: Shops and warehouse. Received in 45 gallon drums.

Potential Hazards:

Fire or Explosion: Very Flammable. May be ignited by heat, sparks or flames.

Liquid lighter than water.

Vapour may form explosive mixture with air.

Vapour may travel to a source of ignition and flash back.

Containing vessels may explode when heated.

Health Vapour may be irritating

Fire may produce irritating, poisonous and/or corrosive gases.

Run off may pollute waterways.

GASOLINE OR SOLVENTS

Emergency Action:

General: Isolate hazard area. Keep upwind. Keep unnecessary people away.

Eliminate ALL ignition sources, including radios.

Protective Clothing: Wear Protective clothing, boot, gloves.

Wear SCBA in case of fire.

Evacuation: If a large spill, evacuate for 800m in all directions.

Fire:

Small Fire: Use dry chemical, CO2, water spray or foam.

Large Fire: Use water spray, fog or foam.

DO NOT use water jet.

DO NOT get water in containment vessels.

Move containment vessels from fire area if without risk.

Cool vessels with water flood.

Spill or Leak: Eliminate ALL ignition sources, including (two-way) radios. If radio communications are required, use radios at a safe distance from the spill, upwind.

Stop leak if without risk to personal safety.

Use water spray curtain to divert vapor cloud drift. Do not get water inside containing vessels.

Spill or Leak: Dyke to prevent entry into waterways, sewers, ditches, basements or confined areas.

GASOLINE OR SOLVENTS

If any quantity has entered water treatment ponds: place absorbent booms across pond decants to prevent release to Myra Creek.

- Small Spills:
- (a) Confined in water treatment pond(s)

Use absorbents such as “3M Sorbent” pads to soak up material. When saturated, remove from water and place into a plastic lined drum (that has a proper lid for sealing). Available from warehouse or SERT group, or in Spill Response Stations located throughout the site.
 - (b) On land, open space, or other well ventilated spaces. Use absorbent such as “Zorball” available from warehouse or SERT group. When saturated, place in plastic lined drum or bucket, and label with identification of contents and date.
 - (c) In confined areas with risk of fire or explosion. Use “Spill-X-S” available in the Assay Lab (small quantities only). Absorbent pillows for dyking are also kept with the SERT spill kit. “ZORBALL” may also be used but must be mopped up carefully. Saturated sorbents should be placed in a plastic lined drum or bucket, using brooms and aluminum shovels. Eliminate sparks!
- Large Spills:
- (a) Confined in Water Treatment Pond(s).

Immediately isolate pond(s), stop all inflows to and outflows from affected pond(s). Eliminate all sources of ignition, heat, (i.e. shut-off electrical/instrumentation equipment, car engines, radios, etc. unless this equipment is known to be explosion proof).

Gasoline and most solvents will evaporate quickly. Vapour cloud drift to sensitive areas will pose the greatest danger (i.e. drift to diesel generator plant, mill, or H-W area). Use water spray curtain to divert vapour cloud drift. Evacuate and seal off area in 800m radius.

Allow bulk of spill to evaporate if without risk and if ground is solid to minimize underlying soil contamination.

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GASOLINE OR SOLVENTS cont.

Otherwise recover with absorbent pads.

Consider covering spill with foam (from fire extinguishers) or fog if fire/explosion hazard obvious.

Recover absorbent pads when saturated and place in labeled drums.

(b) On land, dyked off (contained)

Eliminate ALL ignition sources.

Evacuate and seal off area 800 m radius from spill.

Use fog or foam to minimize evaporation and fire/explosion risk, if necessary.

Use earth, sand or other non-combustible material to absorb spill. Apply fog to cover.

Since there is a likelihood that seepage from a spill will enter the water treatment ponds or Myra Creek, it is recommended that after initial response measures have been taken, booms be placed across pond discharge decants.

Disposal:

Saturated absorbents (Pads, Zorball) should be placed in drums, barrels or buckets, labeled with contents and removed to the Lynx Open Pit burn pile area, where the materials may be burned when safe.

Sand, earth and other non-combustibles should be spread out on the waste rock dump or other appropriate designated areas.

First Aid:

Remove victim to fresh air. Apply artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.

Remove contaminated clothing and shoes. In case of contact with material, flush skin or eyes with running water for at least 15 minutes. Keep victim warm and quiet. Obtain medical care.

Notifications:

Refer to the Notifications Procedure found in Section 5



GASOLINE OR SOLVENTS cont.

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

LIME (CALCIUM OXIDE – QUICK LIME & CALCIUM HYDROXIDE)

CAS Reg No. 1305-78-8 (Calcium oxide at 94-98%)

1488-0860-7 (Silica at N/AV %)

1317-65-3 (Calcium carbonate at N/AV %)

Uses: For pH modification: to add alkalinity to solution streams

Locations & Quantities: Outdoor lime storage silo and slakers, Mill building, upstream of effluent treatment ponds.

Potential Hazards:

Fire or Explosion: None.

Health: Contact may cause irritation and burning to mouth, nose, throat and lungs.

Prolonged contact with skin may cause dermatitis.

Emergency Action:

General: Incompatible with acids, hydrofluoric acid, chlorine and water. Produces heat. It is usually used as a slurry (mixed with water) to neutralize acids.

Protective Clothing: Wear protective clothing, gloves, dust mask, full face mask.

Fire: Use extinguisher suitable for surrounding materials.

Small Spills: May be removed with brooms and shovels

Large Spills: May be recovered by backhoe or front end loader.

Mop up area by flushing with large amount of water which may be directed to water treatment ponds or drainage ditches.

Disposal: Dispose of by burying in garbage dump, waste rock dump or into tailings area.



LIME (CALCIUM OXIDE – QUICK LIME & CALCIUM HYDROXIDE) cont.

Presents a low hazard to Myra Creek unless large quantities are involved and enter at low creek water levels.

First Aid:

Wash skin with water and soap. Remove contaminated clothing.

Flush eyes with running water for 15 minutes.

If ingested, DO NOT induce vomiting, obtain Medical Aid.

Notifications: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

METHYL ISOBUTYL CARBINOL (MIBC)

CAS Reg No. 108-11-2 (Methyl isobutyl carbinol at 100%)

Uses: Mill Reagent

Locations & Quantities: Mill flotation circuit and reagent prep area

Potential Hazards:

Fire or Explosion: Highly flammable, easily ignited by heat, sparks or flames. Vapours may form explosive mixtures with air.

Vapours may travel to a source of ignition and flash back.

Containing vessels may explode when heated.

Flames appear almost invisible.

Health: Inhalation of vapour or ingestion of liquid may cause anesthesia, headache, dizziness, depression of the central nervous system or death. Fire may cause irritating, corrosive and/or toxic gases.

Run off may pollute waterways.

Emergency Action:

General: Isolate area. Keep upwind. Keep unnecessary people away. Keep out of low areas, as most vapours are heavier than air.

Protective Clothing: Wear SCBA and full protective clothing.

Evacuation: Consider downwind evacuation.

Fire:

Small Fire: Use dry chemical, CO₂, fog or foam

METHYL ISOBUTYL CARBINOL (MIBC) cont.

Large Fire: Use water spray, fog or foam. DO NOT use water jet. Move containing vessels from area if without risk. Cool containing vessels with water flood, DO NOT get water inside vessel.

Spill or Leak: Eliminate ALL ignition sources (including two-way radios). Flashpoint.

Do not touch or walk through spilled material.

Stop leak if without risk.

Dyke to prevent entry into waterways, ditches, manholes, sewers and confined areas. Use water fog to reduce vapours, spray to divert vapour cloud drift. Consider downwind evacuation if vapour cloud drift can be avoided or controlled. Mop up with absorbents. Place Absorbent booms across water treatment pond.

Place absorbent booms across water treatment pond discharge decants.

Disposal: Absorbents should be placed in plastic lined drums or buckets and labeled for storage in upper warehouse yard and final shipping off-site as hazardous waste (coordinated by Materials Management group). Sand, earth and other non-combustible materials should be disposed of in the same manner.

First Aid: Remove to fresh air. Apply artificial respiration if victim is not breathing, oxygen if breathing is difficult.

Remove contaminated clothing.

In case of contact with material, flush skin or eyes with running water for at least 15 minutes.

Keep victim warm and quiet. Effects of contact or inhalation may be delayed. Obtain immediate medical care.



METHYL ISOBUTYL CARBINOL (MIBC) cont.

Notifications: Refer to the Notifications Procedure found in Section 5

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

PROPANE and ACETYLENE

As per the Environmental Emergency (E2) Regulations, developed under Section 200 of the Canadian Environmental Protection Act, 1999 (CEPA, 1999), this summary provides background information and details concerning the use and location of Propane at NMF. As previously reported, propane (Part 1: Flammables - CAS Registry Number 74-98-6) is the only substance at Myra Falls that meets reporting criteria under the Regulations. It qualifies on both the total quantity on site as well as the largest individual container size criteria.

Propane:

CAS Reg No. 74-98-6 (Propane at >90%)

115-07-1 (Propylene at <5%)

74-84-0 (Ethane at <5%)

106-97-8 (Butane at <3%)

75-08-1 (Mercaptan at 50 ppm)

UN No. 1075

Uses: Fuel for building heat and in the case of the main tank for filling small tanks used for small propane powered equipment such as the forklift, Bobcat and such.

Locations & Quantities: Storage tank locations include outside the following buildings: Powerhouse (18,000gal), Staffhouse (1,000gal), Lynx Mine building (2*2000gal), HW training trailer (1,000gal), warehouse cold storage building (2,000gal) and Discovery Terminal (1,000gal).

Acetylene:

CAS Reg No. N/AV

Uses: Fuel Atomic Absorption (AA) Spectrophotometer (Assay Lab)

Fuel for oxy-acetylene torches

PROPANE and ACETYLENE cont.

Locations & Quantities: Warehouses, mechanical shops

Potential Hazards:

Most Likely Scenarios

Leak due to break in pipeline, valve or tank

Fire after leak and ignition

Fire or Explosion:

May be ignited by heat, sparks or flame

May form explosive mixtures with air gas explodes spontaneously when mixed with chloride dioxide.

Vapours from liquefied gas are initially heavier than air.

Vapours may travel to a source of ignition and flash back.

Containing vessels may explode when heated.

Ruptured cylinder may rocket.

Health:

Propane gas is colorless but has a rotten egg odor

Acetylene is colorless but has a garlic odor

High concentrations of gas may cause asphyxiation without warning.

Contact with liquefied gas may cause severe frostbite.

Maintenance of Equipment:

Propane:

Only certified gas fitters are permitted to perform maintenance work on any of the propane equipment on site. Required inspections and maintenance of storage tanks, distribution systems and equipment is performed by the propane supplier, Superior Propane.

Maintenance of smaller portable tanks is also to be done by certified gas fitters. Tanks that have passed their expiry date are to be removed

PROPANE and ACETYLENE cont.

from service and set aside for the Materials Management group to arrange for re-conditioning or disposal.

Acetylene: Maintenance of cylinders is undertaken by the supplier. Any deficiencies with the tanks are to be noted to the Materials Management group for them to forward to the supplier.

Emergency Action:

General: Isolate hazard area. Keep upwind. Keep unnecessary people away. Keep out of low areas, as gases may be heavier than air.

Protective Clothing: Wear SCBA and protective clothing when handling liquefied gas.

Evacuation: Consider downwind evacuation. If road tanker is involved in a spill or fire, consider initial evacuation for 1500m in all directions

Small Fire: Use dry chemical, CO₂, water spray or foam.

Large Fire: Use water spray, fog or foam.

DO NOT use water jet.

Move containing vessels from area if without risk.

Cool vessels with water until well after fire is out.

DO NOT extinguish a leaking gas flame unless leak can be stopped

Extinguish secondary fire.

Handle damaged cylinders with extreme care

Fire Involving Tanks: Fight fire from maximum distance or use unmanned monitor nozzles. DO NOT direct water at source of leak or venting safety valves, icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

Stay Away from Tank Ends

PROPANE and ACETYLENE cont.

Spill or Leak:	<p>Eliminate <u>ALL</u> ignition sources, including radios.</p> <p>DO NOT touch or walk through spilled material.</p> <p>Stop leak if without risk.</p> <p>Use water spray curtain to divert vapor drift. DO NOT direct water at spill or source of leak. If possible, turn leaking containing vessel so that gas escapes rather than liquid.</p> <p>Dyke spilled liquid to prevent entry into sewers, basements or confined areas. Allow to evaporate.</p>
First Aid	<p>Remove victim to fresh air. Apply artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.</p> <p>Remove contaminated clothing and shoes. In case of frostbite, thaw frosted parts with lukewarm water. Keep victim warm and quiet.</p> <p>Obtain medical care.</p>
Notifications:	Notify Environment Canada
Spill Reporting:	The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

PROPANE and ACETYLENE cont.

Nyrstar Myra Falls Ltd. - List of Propane Tanks

i) Nyrstar Myra Falls Ltd. mine site:

No.	Location	Size (gals)	Serial No.	Capacity 85% (litres)	Weight of Product (kgs.)
1	Mill / Camp	18,000	25379	57970	29275
2	Staff House	1,000	28801A	3217	1625
3a	Lynx Mine Building Tank #1	2,000	29144A/02	6435	3250
3b	Lynx Mine Building Tank #2	2,000	2H466A	6435	3250
4	Warehouse Cold Storage Building	2,000	15079/01	6435	3250
5	HW Training Trailer	1,000	N4225	3217	1625
Totals		26,000		83709	42275

ii) Discovery Terminal:

No.	Location	Size (gals)	Serial No.	Capacity 85% (litres)	Weight of Product at 85%
1	Adjacent to parking lot-south fence	1,000	XX4420	3217	1625
Totals		1,000		3217	1625

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PROPANE and ACETYLENE cont.

Notes:

Listing of tanks and capacities spreadsheet received from Don Gove (NMF) on Oct.22, 2003;

Tank gallon ages are in US gallons;

Tanks are filled to 80-85% of capacity, as specified on individual tanks;

Maximum quantities may vary slightly, depending on temperature;

Weight of product determined using stated 85% capacity and light weight of 0.505 kgs/litre (verbal communication with Grant Faber, Superior Propane Industrial Technician on Jan. 7, 2004)

PROPANE and ACETYLENE cont.

Nyrstar Myra Falls Ltd. operations – Propane Tank Photographs (Sept-Oct 2003)

1. Staffhouse Propane Tank #28801A (ref: photo 03SEP30 001.jpg)



2. Main Mill Propane Tank at Powerhouse #25379 (ref: photo 03SEP30 020.jpg)



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PROPANE and ACETYLENE cont.

3. Lynx Buildings Propane Tanks #7275N (ref: photo 03SEP30 003.jpg)



4. HW Warehouse Cold Storage Propane Tank #15079/01 (ref: photo 03OCT02 002.jpg)



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PROPANE and ACETYLENE cont.

5. HW Training Trailer Propane Tank #N4225 (ref: photo 03OCT02 003.jpg)



SLUDGE from TREATMENT PONDS

CAS Reg No.	N/AV
Uses:	By-product of treating mine water, acid mine drainage and tailings area effluent waters
Locations & Quantities:	Sludge material is allowed to accumulate in Superpond, Lynx and Myra Ponds and the tailings disposal facility.

Potential Hazards:

Fire or Explosion:	None
Health:	Run off may pollute waterways. Contaminated sludge may be acidic or alkaline, may contain high concentrations of heavy metals and mill reagents. Use gloves and protective clothing.

Emergency Action:

Spill or Leak:	Stop leak, shut-off sludge pumps. Contain spill; dyke with sand, earth or rock. Excavate sludge with backhoe, front-end loader or shovels. Scrape up sludge and power wash / vacuum spill site if possible.
Disposal:	Dispose of sludge into tailings disposal facility (TDF) or on waste rock dump. If necessary, after excavation and disposal, flush spill site with large quantities of water (from fire hose, etc.)
Notifications:	Refer to the Notifications Procedure found in Section 5



SLUDGE from TREATMENT PONDS

Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

TAILINGS AND BACKFILL

CAS Reg No. N/AV

Uses: Residual solid waste product of mining and milling processes, after valuable component has been removed.

Locations & Quantities: Impounded in TDF or pumped back to underground as backfill slurry

Potential Hazards:

Fire or Explosion: None

Health: Run off may pollute waterways. Contaminated tailings or backfill may be acidic or alkaline, may contain high concentrations of heavy metals and mill reagents. Mill tailings usually begin strongly alkaline but become progressively more acidic over time due to effects of sulphide mineralization and exposure to air and water.

Use gloves and protective clothing.

Emergency Action:

Fire: Not applicable

Spill or Leak: Stop leak, shut-off flow. Contain spill.

Try to prevent material from entering Myra Creek or waterways. Maintain a supply of emergency construction materials at all times, such as:

- 1000 m³ of sand
- 3000 m³ of riprap (various sizes)
- Geofabric (large roles of filter cloth)
- Siphon pipe with valves (30 cm diameter, 15m long)

Notify Mill Shift Supervisor, Surface Manager and Environmental Department immediately. Remove spill with backhoe, shovels, brooms, etc. Good clean up essential; will produce acid and contaminate area if material is left behind.

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TAILINGS AND BACKFILL cont.

- Disposal: Dispose of material into Lynx Tailings Disposal Facility (Lynx TDF) as directed by Mill Shift Supervisor or Environmental Department.
- First Aid: Prolonged contact with material may cause skin dryness and irritation. Wash with warm water and mild soap. Apply moisturizing skin cream.
- Notifications: Refer to the Notifications Procedure found in Section 5
- Spill Reporting: The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department. The Environmental Department will immediately notify AMEC Foster Wheeler of any spill related to a tailings dam performance failure.

XANTHATE

Potassium Amyl Xanthate:

CAS Reg No. 2720-73-2 (PAX at >90%)
 1310-58-3 (Potassium hydroxide at 1-5%)
 123-51-3 (Isoamyl Alcohol at 1-5%)

Uses: Mill Reagent

Locations & Quantities: Mill flotation circuit and reagent prep area

Potential Hazards:

Fire or Explosion: Flammable Material.
 Trapped moisture may cause ignition on exposure to air.
 May give off sulphur dioxide and hydrogen sulphide during combustion.

Health: May cause irritation to dry skin, burn to abraded or moist skin.
 May cause irritation on contact with eyes.
 Run off may pollute waterways.

Emergency Action:

Fire: Wear SCBA in case of fire.
 Use dry chemical, water fog or spray.
 Remove containers from fire area if without risk.
 Keep containers cool. Keep upwind.

XANTHATE cont.

Spill or Leak:	Small spills may be swept up and residues washed with large quantities of water. Larger spills may be swept up after dyking to prevent run off from entering waterways. Residues may be flushed with water.
Disposal:	Recovered material should be placed in drums for re-use in the mill, if possible. Otherwise, drums must be sealed, labeled, stored in Upper Warehouse yard and shipped off-site as hazardous waste (coordinated by Materials Management group).
First Aid:	Wash skin with soap and water. Apply moisturizing cream after washing. Flush eyes with running water for 15 minutes. Obtain medical care if irritation persists after washing. Remove contaminated clothing. If swallowed, induce vomiting at once, obtain medical aid.
Notifications:	Refer to the Notifications Procedure found in Section 5
Spill Reporting:	The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

ZINC and COPPER CONCENTRATES (METAL SULPHIDES)

Zinc Concentrate:

CAS Reg No.	7440-66-6 (Zinc at 52%)
	7704-34-9 (Sulphur at 34%)
	7439-89-6 (Iron at 8%)
	14808-60-7 (Silica, crystalline at <3%)
	7631-86-9 (Silica, amorphous at <3%)
	7439-92-1 (Lead at 2%)
	7440-38-2 (Arsenic at 0.2%)

Uses: Product of minesite, used to produce zinc metal

Locations & Quantities: Mill Storage Bays, trucked from Mill to Discovery Terminal at Campbell River spit in 33T loads per B-train truckload, stored in warehouse and loaded onto ships for export

Copper Concentrate:

CAS Reg No.	7704-34-9 (Sulphur at 37%)
	7439-89-6 (Iron at 28%)
	7440-50-8 (Copper at 25%)
	7439-92-1 (Lead at 2%)
	7440-66-6 (Zinc at 3.5%)
	14808-60-7 (Silica, crystalline at <0.3%)
	7631-86-9 (Silica, amorphous at <0.3%)
	7440-38-2 (Arsenic at 0.6%)

ZINC and COPPER CONCENTRATES (METAL SULPHIDES) cont.

Uses: Product of mine site, used to produce zinc and copper metal

Locations & Quantities: Mill Storage Bays, trucked from mill load-out to Discovery Terminal at Campbell River spit in 33T loads per B-train truckload, stored in warehouse and loaded onto ships for export

Potential Hazards:

Fire: May burn under extreme conditions but will not ignite readily.

Health: Run off will pollute waterways.

Fire may produce irritating, poisonous and/or corrosive gases.

Concentrate contains high concentrations of heavy metals and mill reagents. Use gloves and protective clothing.

Emergency Action:

Protective Clothing: Wear SCBA and protective clothing when concentrates are involved in a fire.

Fire: Use water spray.

Extinguish secondary fire. Be aware of potential for sulphur fumes.

Spill: Contain spill. Concentrate must not enter waterways. Dyke immediately to prevent runoff. Divert runoff away from spill area if possible.

Recover spilled material with front-end loader, backhoe, brooms and shovels.

Good cleanup is essential. Residue may oxidize and produce acidic runoff if left behind.

ZINC and COPPER CONCENTRATES (METAL SULPHIDES) cont.

Disposal:	Recovered material should be returned to the mill (through Lynx crusher) for re-processing, if relatively clean, as directed by the Mill Shift Supervisor. Badly contaminated material may be disposed of on the waste rock dump in the tailings disposal facility (TDF).
First Aid:	Wash contact areas with soap and warm water. Flush eyes with running water.
Notifications:	Refer to the Notifications Procedure found in Section 5
Spill Reporting:	The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

ZINC and COPPER SULPHATES and SODIUM METABISULPHITE (MBS)

Zinc Sulphate:

CAS Reg No. 7733-02-0 (Zinc sulphate at >99%)

Uses: Mill Reagent

Locations & Quantities: Mill flotation circuit and reagent prep area

Copper Sulphate:

CAS Reg No. 7758-98-7 (Copper sulphate at 64%)

Uses: Mill and Laboratory Reagent

Locations & Quantities: Mill flotation circuit and reagents prep area, assay lab

Sodium Meta Bi-Sulphite:

CAS Reg No. 7681-57-4 (Sodium metabisulphite at 99%)

7757-82-8 (Sodium sulfate at 1%)

Uses: Mill Reagent

Locations & Quantities: Mill flotation circuit and reagents prep area

Potential Hazards

(Low hazard substances)

Fire or Explosion: Non-Flammable.

Dust explosion possible.

May decompose in a fire to produce SO₂ gas.

Health

Inhalation or ingestion of dust may cause nausea and vomiting, gastric pain.

Fire may produce irritating, poisonous gases.

Soluble in water. Run off would pollute waterways and drinking water.
Toxic to aquatic life.

ZINC & COPPER SULPHATES & SODIUM (MBS) META BI-SULPHITE Cont.

Emergency Action:

General:	Isolate hazard area.
Protective Clothing:	Wear Dust Mask, Gloves. Wear SCBA in case of fire.
Fire:	Move containment vessels from fire area if without risk.
Small Fire:	Use dry chemical, CO ₂ , water spray or foam.
Large Fire:	Use water spray, fog or foam. Avoid excessive wetting of material, containing run-off.
Spill:	Contain Spill. Recover Material and place in drums. DO NOT allow to enter waterways, treatment ponds, etc. Contain run-off. Gather samples as per instructions of the Environmental Department.
Disposal:	Recovered material may be reused in the mill or taken to upper warehouse yard for temporary storage in drums (to be shipped out as hazardous waste).
First Aid:	Wash skin with water containing baking soda. Wash eyes with running water. In case of ingestion, give teaspoon of warm water and repeat till vomit is clear. Obtain medical aid.
Notifications:	Refer to the Notifications Procedure found in Section 5
Spill Reporting:	The person observing the spill and/or his immediate supervisor are to utilize the standard Spill Report Sheet, found in Appendix I. For additional information, contact the Environmental Department.

5.0 DRINKING WATER SYSTEM EMERGENCY RESPONSE PLAN

Background:

Nyrstar Myra Falls Ltd. (NMF) operates a drinking water system that is inspected and authorized by the Vancouver Island Health Authority. The water system at NMF was given a “moderate” hazard rating upon inspection on December 9, 2011. It is a requirement of the Drinking Water Protection Regulation that an Emergency Response Plan is in place.

Distribution System:

NMF supplies drinking water (potable water) to its employees in three main forms:

- Bottled water (often used in conjunction with water coolers) throughout surface work areas and also underground mine locations.
- Treated tap water for surface work areas. For treatment, NMF injects chlorine gas into the water, and in some locations (such as the HW complex) also uses UV sterilization units. Many high use water taps also use water filters.
- Water distribution system underground. Water is supplied by natural groundwater aquifers primarily from HW 13 level and conveyed by gravity to mine headings, refuge stations and general work areas. All taps should use filters.

Chlorination System:

The chlorine gas injection system (chlorine building) is located next to the two main water towers, which are west of the Lynx mine buildings. See Site Map

The chlorine is injected as a gas into the water line from pressurized tanks. The system is checked every 12 hours by an operator who records his observations on a Chlorine System Operation Log.

Water Quality Testing:

MFO tests the free chlorine concentration in the system once every 12 hours at the Mill Sink and records this value on the daily Water Treatment and Tailings Pond report.

MFO tests the water quality monthly by selecting high use stations throughout the distribution system to sample. A minimum of four samples are taken each month and sent to outside labs for analysis. Typically, the Environmental Department undertakes the water quality sampling (see Environmental Laboratory Procedures Manual for more details).

Water quality results are sent immediately to VIHA and MFO. If a result is unacceptable (eg. fecal coliform count >1) than initiate the following procedure:

Procedure for Unacceptable Water Quality Result or System Off-line Event

1. Immediately notify First Aid, General Manager, Mill Manager, Mill Shifter, Safety Manager and Environmental Manager.
2. Notify VIHA (the Drinking Water Officer or Environmental Health Officer) of the status of the drinking water system, alternatives provided, contingency and remedial measures plans.
3. Advise all drinking water system users that the water is not potable and offer alternative, safe drinking water (eg. use bottled water or issue boil water advisory). Advising employees means to post signs at every tap, and where possible to communicate the message verbally and electronically (email).
4. Begin confirmation water quality sampling (Environmental Department) using potable water sampling bottles (with sodium thiosulfate preservative) found in the Environmental Lab. Immediately send out samples to Maxxam Analytics – samples must arrive within 24 hours to initiate tests. Have samples tested for *E. coli* and total coliforms.
5. Identify and begin corrective actions to restore system.
6. Disinfect and flush potable water system.

Internal Notification:

Position	Name	Local	Home Telephone
First Aid	n/a	555 /3318	n/a
Mill Supervisor	Gord, Cory	3282	n/a
General Manager	John Knapp	3279	██████████
Mill & Surface Manager	Hugh Drummond	3269	n/a
Health & Safety Manager	Ron Sizer	3222	██████████
Environmental Manager	Nicole Pesonen	3316	n/a

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External Notification:

VIHA – Public Health After-hours Emergency Number: 1-800-204-6166

Contact: Joseph Baratta, Environmental Health Officer: 250-850-2110

Medical Health Officer: Dr. Charmaine Enns – 250-331-8591

References:

Drinking Water Protection Act

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_01009_01

Drinking Water Protection Regulation

http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/10_200_2003

6.0 EMERGENCY CONTACT INFORMATION

Refer to **Manual 3 (Emergency Communications Plan)** of the Emergency Management Program for company, regulator and stakeholder contact information. The manuals also contain contact information for the SERT and Mine Rescue Teams.

In case of an emergency, the General Manager (or designate), will advise the Corporate Crisis Coordinator of the emergency situation should he determine the situation warrants their attention or that it requires the resources of external resources like local fire, police and/or EMS crews or that the media or other external constituents are calling or inquiring about the situation. Corporate contact information can be found in **Manual 3**.

Following the notification of the corporate office, as per the corporate crisis plan, certain members of the corporate team may be in contact with Nyrstar Myra Falls Ltd. to offer assistance and coordinate efforts in the areas of human resources, communications, legal and finance.

It is important to note that Nyrstar Myra Falls Ltd. will provide overall management of the emergency situation in consultation with the Corporate Crisis Team. Any actions between Nyrstar Myra Falls Ltd. and the corporate office are to be approved beforehand by the General Manager.

7.0 SURFACE EMERGENCY RESPONSE TEAM TRAINING

This section outlines the mandate of the SERT team and provides some examples of typical training correspondence. **See Manual 3 (Emergency Communications Plan)** for list of SERT members and contact information.

7.1 Surface Emergency Response Team (SERT) Mandate

Nyrstar Myra Falls Ltd. Surface Emergency Response Team (SERT) is a group of volunteers committed to providing a timely and effective response to all emergency situations at Nyrstar Myra Falls Ltd. operations.

First Aid and Rescue

The SERT Team will assist the first aid attendants to provide emergency first aid service in situations where accessibility to a casualty is a problem, where there are multiple casualties, or where other hazardous emergency conditions exist.

Fire Protection

The SERT Team is committed to providing trained industrial fire fighters to provide command and control at the fire scene to protect personnel and minimize damage.

Personal/ Property Protection

The SERT Team will initiate the control and handling of hazardous materials spills and assist in evacuation of personnel as required.



Evacuation

The SERT Team will facilitate a timely evacuation of the surface operations in event of earthquake, flood, fire or any other natural event which threatens personnel on site.

Equipment

The SERT Team, SERT Trainer and Safety Personnel will maintain and upgrade rescue and response equipment as required to maintain readiness of response.

Safety and Education

The SERT Team is committed to safety through training. The team will be proactive by providing instruction for existing and new employees wherever possible.

8.0 SITE RISK ASSESSMENT

8.1 Site Description

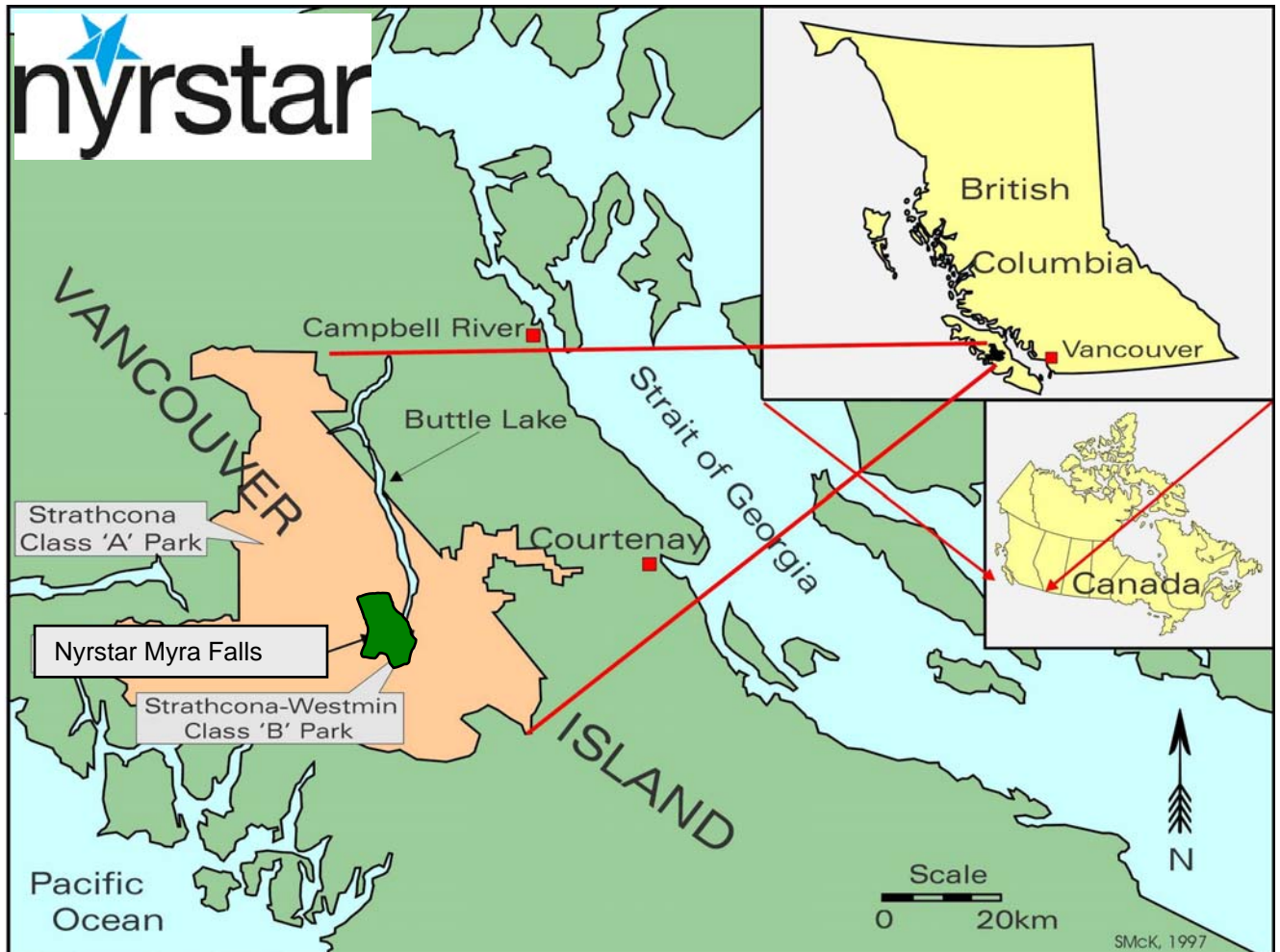
Nyrstar Myra Falls Ltd. is a zinc-copper-gold-silver-lead mining operation located entirely within Strathcona-Westmin Provincial Park, a Class B provincial park occupying 3,328 hectares. The geographic area includes the watersheds of Thelwood Creek and Myra Creek and the southern part of Buttle Lake that lies entirely within Strathcona-Westmin Provincial Park (see map on next page).

The park was created as a Class "B" provincial park by Order-in-Council No. 1418. The land management policies of BC Parks have been codified in a Master Plan for Strathcona-Westmin Provincial Park. The Nyrstar Myra Falls Ltd. mine is authorized by two Park Use Permits (PUPs) 100633 and 102201 (for mining, power generation, power transmission, and roads). Myra Falls is subject to strict environmental controls, which are appended to the park use permits, administered by the Ministry of Environment and the Ministry of Energy and Mines. Federally, Environment Canada regulates environmental protection through the Metal Mine Effluent Regulations (MMER).

The temporal boundaries for the site risk assessment were assumed to encompass any likely projects or activities that would occur during Nyrstar Myra Falls Ltd.'s mine life. On the basis of current ore reserves the mine is expected to continue operations for another 10 to 15 years.

Once operations cease, the goal is to guide the reclamation of the mine site towards achieving near-natural conditions once all mining activities have stopped. The area would ultimately be returned to Park use.

Location Map: Nyrstar Myra Falls Ltd. is a zinc-copper-gold-silver mining operation located entirely within Strathcona-Westmin Provincial Park, a Class B provincial park occupying 3,328 hectares.



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8.2 Identification of Possible Environmental Emergencies

The following examples of failures could occur at Nyrstar Myra Falls Ltd. and would require immediate attention. Examples of emergency situations and possible explanations include:

8.2.1 Spill of Deleterious Substance into Myra Creek, Thelwood Creek or Buttle Lake

Spill of materials or products listed in Section 5 or MSDS sheet into water body. For example, a broken pipeline causing release of material outside of facility. This could include the following materials that are pumped into and out of the TDF facility:

- Paste tails from mill to Paste Plant located atop waste rock dump No.1;
- Reclaim sands from mill to reclaim sands area;
- Reclaim sands from mill around perimeter of Old TDF to Backfill Plant;
- Paste from the Paste Plant to the tailings in the APAI;
- Decant pipelines from the APA, TDF Strip, and Reclaim Sands Area to Superpond; Paste Plant overflow water from the plant to Superpond feed trench;
- No.4 pump house discharge water line along the perimeter of the Old TDF to Superpond feed trench;
- Backfill slurry line to Backfill Plant;
- Backfill Plant overflow water line across the Old TDF to Reclaim Sands Area;
- Backfill Plant overflow water line across the Old TDF to Lynx TDF;
- Surface water pump lines from Lynx TDF to Superpond feed trench;

Other scenarios include metal concentrates and petroleum hydrocarbon products that could potentially be spilled into the water bodies. These scenarios are assessed in the site risk assessment table in Appendix I.

8.2.2 Power Supply Interruption

A power failure may cause a shutdown of pumps at Pump house #4 (Inner and Outer drain systems). In a short period of time the wet well below the pumphouse will overflow with water and cause a release to the environment if the drain gates are not closed.

Electrical power for Pump house #4 is fed from the main site electrical grid but from opposite ends of the mine site. Pump house #4 is fed with power from the HW mine complex.

8.2.3 Tailings Dam Facility (TDF) Breach

- Allowing the APA to overflow with water can cause overtopping of tailings surface water through the spillway. This water would be lost to the environment.
- Allowing Lynx TDF, Old TDF Strip, or Reclaim Sands Areas to overflow with water can cause overtopping of the containing embankments, potentially leading to dam failure.
- Overfilling is most likely caused by:
- Lack of throughput capacity in the pumping system due to excessive (above-design) inputs from:
 - Storms / Heavy Precipitation / Flood Events that fill the retention areas;
 - Failure of upstream fresh water diversion ditches releasing water into the impoundments, or;
 - Excess groundwater discharge within the impoundment catchment areas;
- Operational problems such as a previous extended shutdown of pumping or decant systems due to reasons including dirty decant water, pump servicing, etc.;

- Poor operation of decants (not running as much as possible) and/or maintenance of pumping systems (not keeping pumps in fully operational condition),
- Partial plugging or closed valves in discharge pipeline, or
- A combination of the above elements

Excess pond water on top of the facility can have a number of other impacts. These include:

- seepage of water through the embankment as water will have encroached close to the perimeter;
- elevation of pore water pressures

The above conditions could lead to failure of the integrity of the facility.

8.2.4 Tailings Dam Facility (TDF) Embankment Cracking / Sloughing / Sinkhole Formation

- Cracking and sloughing on the TDF Embankment could lead to embankment instability and indicate potential for failure.
- Cracking and sloughing is most likely caused by:
 - Uneven settlement within the embankment or foundation;
 - Internal erosion of the embankment material;
 - Poor construction practices (insufficient compaction, etc.);
 - Wave or ice action
 - Displacement of the embankment due to slope movement;
 - A combination of the above elements

Cracking and sloughing of the embankment can have a number of other impacts. These include:

- Development of deeper erosional features due to focussed run-off;
- Small failures of the embankment resulting in the release of tailings water and sediment into the surrounding environment.
- Overtopping of the embankment due to reduced freeboard;

The above conditions are indications of a failure of the integrity of the facility.

8.2.5 Storms / Heavy Precipitation / Floods

Nyrstar Myra Falls Ltd.'s geographic location makes it susceptible to extreme storms, heavy precipitation (even as snow) and floods. These events can lead to a number of system failures, the most severe of which are outlined separately in this section. Operating permits state that the treatment facilities at the site should be designed to contain a 1 in 200 year event. The tailings impoundments and associated structures are designed to larger events.

8.2.6 Terrain Hazards / Mudslides / Avalanches

Steep terrain around the mine site can result in terrain hazards from rapid downhill movement of earth materials, snow, and/or water. For example, a slide of waste rock into tailings facility: A slope failure of the waste rock dump lying behind and above the TDF or Lynx TDF could fill the impoundment with rock, displacing a volume of tailings and push any surface water out toward the perimeter.

Significant potential hazards include:

- Rockfall from the bluffs above the HW area;
- Debris flows in the significant drainages around Myra and Thelwood Valleys, such as Cascade Creek, Webster Creek, or the streams crossed by the access road to Jim Mitchell Lake.
- Waste dump failures including the dumps above Lynx TDF and the Old TDF.
- Snow avalanches from Mt. Myra.

Impacts associated with these events can include:

- Destruction of mine infrastructure (roads, etc.) due to impact or inundation by debris;
- Blockage of critical drainage structures, such as the Lower Lynx Drainage Ditch; or,
- In the case of a waste dump failure into a tailings facility, displacement of tailings or waste water over the containing embankment;

8.2.7 Earthquake (Seismic Event)

Nyrstar Myra Falls Ltd. is located in one of the most seismically active zones in Canada. The probability of a large magnitude earthquake occurring is high. The fundamental concern is of the Old Tailings Disposal Facility (TDF) or Lynx TDF being shaken during an earthquake event, with the effect of:

- Causing liquefaction of the tailings and overloading the perimeter embankment causing a breach, and/or;
- Causing internal failure of the Lynx pit floor, potentially flooding the Lynx Underground Mine workings;
- Causing deformation of perimeter embankment, and/or;
- Triggering slope failures as described in the previous section.

These can lead to weakening of the tailings facility outer embankments and a possible catastrophic release of tailings.

The second concern is an earthquake causing weakening of the outer embankment that is not immediately apparent. A failure may occur later or the facility may remain weakened for an extended period of time. A comprehensive post-event visual inspection with survey monuments and instrumentation downloads will help determine any indications of problems.

8.2.8 Failure of the under-drain system

The TDF under-drain system intercepts groundwater through two sets of drainage systems that run the length of the TDF from west to east. They are known as the Inner and Outer Drains.

An indication of this problem is finding elevated metal values in Myra Creek (especially zinc) in the area around and downstream of the TDF. The TP4 sampling site is a prime location to check as daily composites of Myra Creek water are gathered at this station with an automatic sampler. Daily visual inspections of the TDF including the toe area along Myra Creek will help to reveal any suspicious seeps from the impoundment, possibly indicating an outer drain failure.

The problem could be caused by:

- Blinding of the perforated pipes that make up the under drain systems;
- Collapsed or plugged connecting and conveyance pipelines
- Plugged drains
- For the Outer Drain, incorrect adjustment of level control system located in access chambers

Each of the above scenarios has a number of possible failure mechanisms and resultant outcomes. Unfortunately, these can often lead to a spill to the environment. It is imperative the flow be stopped as quickly as possible, to limit the damage done.

8.3 Possible Environmental Health Effects and Significance

In order to determine if possible adverse environmental effects were considered significant or not, seven criteria were taken into consideration: magnitude (severity), geographical extent, duration, reversibility, and ecological context. It is clearly acknowledged that this form of evaluation is somewhat subjective, and includes evaluator biases. However, the inherent subjectivity in this evaluation can be partially eliminated by setting out definitions under each criterion as to degree. The definitions and ranking used in this evaluation of significance is set out in the following:

- **Likelihood** of the adverse environmental emergency actually occurring. The ranking of likelihood in this evaluation is given as Low, Moderate, or High depending on the perceived probability of occurrence.
- **Magnitude** of the adverse environmental effect, where magnitude refers to severity. Minor or inconsequential effects may not be significant, but effects that are major or catastrophic will be

significant. The ranking of magnitude in this evaluation is given as Low, Moderate, or High depending on the perceived severity of the impacts and is a subjective ranking

- **Geographic extent** of the adverse environmental effect. Localized adverse effects may not be significant, but widespread effects may be significant. The ranking of geographic extent in this evaluation is given as Minor if the effect is confined to a localized area on site, Limited if the effect encompasses the site area, or Extensive if the effects extend beyond the limits of the site.
- **Duration** of the adverse environmental effect. Long term and/or frequent adverse effects may be significant, but those of a short term and/or temporary nature may not be significant. A ranking of Short Term is given if the duration of the impact is only for a few hours or days; Medium Term if the effect is projected to last for extended periods of time; and Permanent if the effects become fixtures, such as in the case of a washed-out creek.
- Degree to which the adverse effect is **Reversible or Irreversible**. Reversible adverse environmental effects may be less significant than effects that are irreversible. A ranking of reversible is given if the immediate effects cease when the event ceases, and irreversible if the effects are long lasting. For example, the effect of works in and about a stream which is likely to cause sedimentation but would cease as soon as the work ceases, would be ranked reversible. The ranking of irreversible is given when the effects are found to be permanent such as constriction of the stream.
- **Ecological Context** of the adverse environmental effect. Ranked as Low, Moderate or High. The adverse effects of events may be significant if they occur in areas or regions that have already been adversely affected by human activities and/or are ecologically fragile and have little resilience to imposed stresses. As the mine is located within Strathcona-Westmin Provincial Park, possible effects may occur within an area of important ecological context. However, they may also occur within an area that is already subject to mine development. Consequently, the effects are divided into two categories; those that may have an effect on the aquatic environment or fisheries habitat (i.e. Myra Creek) and those that may have an effect on the terrestrial environment or park topography (i.e. public visibility, wilderness experience, Strathcona-Westmin Provincial Park). The potential impacts on the aquatic environment and fisheries habitat of Myra Creek and Buttle Lake are judged to have a more important ecological context than those on the terrestrial environment because the water bodies could more easily transport deleterious substances further downstream.
- **Overall Significance** is ranked as Low, Moderate or High based on a subjective assessment of the overall cumulative impacts of an environmental emergency.

The results of the Significance Evaluation are presented in Table 8-1. Various substances are listed as potential environmental emergencies. For an index of the substances please refer to Section 5 and the Material Safety Data Sheet (MSDS) system.

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In overall terms, any possible environmental emergencies that may have an aquatic aspect or a potential to affect the water quality in, or the fish habitat capability of, Myra Creek, Thelwood Creek or Buttle Lake were judged as being more significant. However, the environmental emergency may be minor in magnitude, of very limited geographical extent, of short duration, and completely reversible.

Environmental emergencies that are essentially terrestrial or topographical in nature, such as a mudslide, were judged as being less significant since these events are naturally occurring and are more likely to impact the terrestrial and not the aquatic environments. Again it is stressed that this analysis is subjective, and is not intended to examine a multitude of possible minor indirect and secondary effects of any given environmental emergency.

Also as part of Table 8-1, an assessment of Nyrstar Myra Falls Ltd.'s ability to manage a significant environmental emergency is presented as to whether there is some form of risk management in place. An outcome of Yes or No is based on the judgment that the criteria are satisfied. The categories and criteria used in this assessment are as follows:

- **Proper Handling** of substances to avoid an emergency is considered common practice.
- **Proper Storage** of substances to avoid an emergency is considered common practice.
- **Preventative Maintenance** is performed to limit the likelihood of an emergency.
- **Training and Manuals** are available to provide sufficient competence to employees.
- **Initial Response Teams** are available to provide immediate assistance to an emergency.
- **Emergency Manuals** are available to assist employees when faced with an emergency.

8.4 Impact Potential

Fuels, chemicals and products can be grouped according to their potential impact when spilled or involved in an emergency.

1. High Risk Potential - Those products are shipped/handled frequently, in large quantities, or with high hazard ratings. These include:
 - diesel fuel, gasoline (and other light fuels, solvents)
 - acids (sulphuric, nitric, hydrochloric, hydrofluoric)
 - contaminated water

- tailings/backfill
- explosives
- chlorine

2. Medium Risk Potential – Smaller quantities, lower hazards

- concentrates
- lime, mill reagents
- carbon dioxide
- bottled gasses
- pond sludges
- used oils
- shotcrete and Portland cement

3. Low Risk Potential – Small quantities, low hazards

- laboratory chemicals
- cleaning solvents
- lubricants
- flocculants
- ore and (mineralized) waste rock (long term acid-generating potential)

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APPENDIX I - SPILL REPORT SHEET

Material Spilled:	
Amount Spilled:	
Location of Spill:	
Cause of Spill:	
Area Affected by Spill:	
Impact Assessment:	
Action Taken:	
Key Personnel Involved:	
Spill Reported To:	
Description/Comments:	



APPENDIX 2 – 2014 Tailings Inundation Study (AMEC)

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