NAME OF UNDERTAKING: Newfoundland Hard-Rok Inc.
Blasting Agent (Emulsion) Manufacturing Plant
Corner Brook, NF

PROPONENT:

(i) Name of Corporation Body: Newfoundland Hard-Rok Inc.

(ii) Address: P.O. Box 605
25 Union Street
Corner Brook, NL
A2H 6G1

P.O. Box 8776, Stn. “A”
21 Pippy Place
St. John’s, NL
A1B 3T2

(iii) Chief Executive Officer: Mr. Carl W. Foss, President
Telephone: 709-639-9179
Fax: 709-639-7303

(iv) Principal contact person for purpose of environmental assessment: Carl W. Foss, President
THE UNDERTAKING:

The purpose of the undertaking is the construction and operation of a blasting agent (emulsion) manufacturing plant near Corner Brook, Newfoundland.

(i) Nature of Undertaking:

The Manufacturing Plant will produce an Emulsion Blasting Agent, which is primarily used in quarry blasting, road building, site development and mining. The two primary components used to manufacture the emulsion are ammonium nitrate and no. 2 diesel fuel oil. The plant will produce a bulk emulsion which is pumped into 20 tonne bulk tankers. The tankers are then used to transport the finished product to our satellite storage site near Northwest Brook or used for temporary storage on site. The product will then be transferred from the tankers via pumps to our bulk re-pump trucks and then delivered to the blast holes for loading.

(ii) Purpose of the Undertaking:

Newfoundland Hard-Rok Inc. is the exclusive distributor for Dyno Nobel Inc., for all of Newfoundland & Labrador. Dyno Nobel Inc. is a global explosives manufacturer. In 1998 Newfoundland Hard-Rok Inc. built an ANFO blasting agent plant near the same location we are proposing to construct this new facility. Since that time customer demands for improved production and cost savings have caused the demand and production of ANFO to diminish greatly. Emulsion is a water proof product with greater energy then ANFO and it can be delivered to the customer in bulk form, saving the customer considerable labour costs. This demand has caused our ANFO production to drop by 50% over the last five years while sales of emulsion have increased greatly. Newfoundland Hard-Rok Inc. currently sources its’ bulk emulsions from Dyno Nobel’s plant in Ormstown, Quebec. The product is shipped in 20 tonne bulk carrier tankers by road from Quebec into Newfoundland through the Gulf of St. Lawrence onboard Marine Atlantic’s vessels. This method of transportation in itself is one of the primary reasons we decided to build this plant. During the spring there are weight restrictions on some Quebec highways that limit the quantity of explosives our trucker can haul. The long haul of the emulsion product also increases the risk of an explosives spill. Marine Atlantic does not offer daily transportation of dangerous goods crossings until June month of each year and therefore at times we cannot supply our customers. Transportation of explosives (Class 1) by ferries, which includes emulsions, restricts Marine Atlantic by limiting the number of passengers to 12 adding considerable expense to their operations and the tax payer.
DESCRIPTION OF UNDERTAKING:

(i) Geographical Location:

The site is located 5 km west of Corner Brook at N48-53.2, W57-54.5 (Refer: Appendix A). Access to the site is by way of a forest access road which intersects the east side of the Trans Canada Highway 1.5 km west of the intersection of the TCH and Route 450. The manufacturing building will be located within a 1.0 hectare of granted land that is 400 meters southwest of our existing ANFO plant.

(ii) Physical Features:

The site has a sparse cover of new growth forest, predominantly fir, with a variety of under growth. The soil consists of a thin humus organic layer overlaying a coarse layer of unoxidized soil, powdered rock and limited glacier deposited rock. Limestone bedrock is exposed in various places in the area.

The site will require only minimum excavation to remove existing soil and to level the site using primarily on site material. The existing secondary access road will be upgraded to facilitate transport trucks.

This location was chosen for its close proximity to transportation routes and existing ANFO plant. All drainage from the site is in a southwest direction away from the Corner Brook City water shed area.

(iii) Construction:

It is anticipated that construction will begin in the second quarter of 2008 after all permits and licenses are obtained. The construction phase is estimated at 5000 man hours with an average work force of 6 people. Labour requirements will consist of pipe fitters, electricians, steel workers, carpenters, equipment operators and casual labour. The facility consists of a pre-engineered steel building 15 meters wide by 18 meters length and a 50 tonne steel silo that will be located next to the steel building. The building and silo will have concrete footings and frost walls manufactured from material that is sourced locally. (Refer: Appendix B). Manufacturing equipment will be purchased locally whenever possible. The main equipment to be installed in the building will consist of two ammonium nitrate solution tanks that have steam jackets, two fuel phase tanks, pumps, flow meters and mixers and one electric boiler. All tanks that contain liquids are located in a concrete containment pit, in case of spillage.

A three kilometer Transmission Line, (3 Phase, 347/600 volt service) will be installed from Watson Pond Industrial Park to the manufacturing plant, by Newfoundland Power.
All electrical components will be installed in compliance with the Canadian Electrical Code.

Potential sources of pollutants during construction would be limited to airborne emissions and small risk of petroleum product leakage from transportation and excavation equipment use on site. Noise pollution would be minimal.

Potential resource conflict would be limited as the existing timber cover is new growth and very sparse. The existing timber has little or no commercial value. The main access road is already well maintained.

(iv) Operation:

Emulsion explosives are new generation explosives, as they exhibit ‘near-ideal’ detonation characteristics among present commercial explosives. In an emulsion explosive, the oxidizer and fuel ingredients are in liquid form.

The bulk emulsion offered is a water-in-oil type, in which the oxidizers are dispersed as micro droplets in a continuous and thin layer of fuel (oil). This results in an intimate contact of ingredients, leading to a high order detonation reaction, resulting in higher velocity of detonation and higher energy release. Since the oxidizer is covered by fuel, emulsion explosives exhibit excellent water resistance and perform reliably at low temperatures.

The raw ingredients for emulsion are ammonium nitrate and no. 2 diesel fuel plus trace chemicals and emulsifiers. Material Safety Data Sheets are attached. (Refer: Appendix C). The ammonium nitrate is shipped to the plant from Ontario in 38 tonne B-train bulk carriers. During the time of shipment the ammonium nitrate is a dry prill form, very similar to agriculture fertilizer. The ammonium nitrate is loaded into a 50 tonne silo using a 200mm auger, for storage.

During manufacturing the two 3,000 liter fuel phase tanks are filled with No. 2 diesel fuel purchased from local fuel suppliers. Emulsifiers are added to the fuel at this time. Inside the building will be a 4,000 liter water storage tank that will be used for dissolving the ammonium nitrate (AN) and also used for making steam in the electric boilers. Water is then pumped into the two AN solution tanks until approximately 20% of the tank is filled. The water is then heated to approximately 80 degrees C. using steam heat from the electric boiler.

Since the ammonium nitrate is in a prill form it is necessary to dissolve the prill into a liquid form using water and heat. This operation is sometimes referred to as a “melt down” plant. The ammonium nitrate prill is augured from the storage silo into the two solution tanks with the heated water at a slow rate until the correct volume is obtained. The heated water will dissolve the prill until the total contents are in a liquid form. To
keep the ammonium nitrate solution in a liquid form the temperature must be maintained at approximately 75 degrees Celsius.

Quality control checks are then performed, such as density, acidity and temperature before blending begins. The ammonium nitrate solution (95%) and the fuel phase (5%) are blended together using a high speed shearing blender. Flow rates, pressures, mixing ratios, temperatures are carefully monitored at the blending structure. After the two liquids are blended the end result is non-sensitized emulsion matrix that will be pumped into 20 tonne bulk carrier tankers and trucked to other storage locations or temporarily stored on site.

A similar emulsion plant was operational at the Baie Verte Mines until 1986, using the same “melt down” process.

Since the melt down process is heated with an electric boiler the operation will not have any airborne emissions. Dry chemical spills such as sodium and ammonium nitrate would easily be contained and cleaned up with very little or no harm to the environment. Little or no risk exists for the loss of fuel, chemicals or AN solution, because all storage tanks inside the building are located in a concrete containment pit, capable of holding 110% of the total storage. Spillage of liquid chemical or waste water will be collected in the drainage sump and disposed of by a licensed waste management contractor. Should an emergency take place Newfoundland Hard-Rok Inc. has an Emergency Response Plan (No. 2-1343) filed in accordance with the Dangerous Goods Act.

All resources to produce and market Emulsion Blasting Agents are readily available to Newfoundland Hard-Rok Inc. One other Emulsion Plant “melt down” is operating in the Province of Newfoundland Labrador at Voisey’s Bay and is operated by Newfoundland Hard-Rok Inc. for VBNC exclusively. One other “non melt down” plant is operated near Labrador City to supply IOC and Wabush Mines. This proposed plant does not have any resource conflicts.

(v) Occupations:

During construction the phase we estimated 5000 man hours with an average work force of 6 people. Labour requirements will consist of pipe fitters, electricians, steel workers, carpenters, equipment operators and casual labour.

The first year of operations of the Emulsion Plant will result in the creation of one new full time permanent and two seasonal full time jobs, with additional full and part time staff hired as production warrant. It is estimated that an additional four full time seasonal jobs will be created for a contract trucking company to ship raw supplies to the plant.
National Occupational Classification Codes for operating the plant are the following:

2- Employee’s for Plant Operator (Machine Operator) code (9421)

1 –Employee for Labors, processing code (9619)

All NOC Codes for any future expansion will be the same. Employment opportunities for both genders will be evaluated on past experience in similar environments or formal training.

(vi) **Project Related Documents:**

<table>
<thead>
<tr>
<th>Appendix A</th>
<th>Site Location Map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix B</td>
<td>Building and Site Layout</td>
</tr>
<tr>
<td>Appendix C</td>
<td>Material Safety Data Sheets</td>
</tr>
<tr>
<td>Appendix D</td>
<td>Natural Resources Canada (ERD) Approval in Principle</td>
</tr>
<tr>
<td>Appendix E</td>
<td>Quantity Distance Tables for Explosives</td>
</tr>
</tbody>
</table>

**APPROVAL OF THE UNDERTAKING:**

The Emulsion Plant will be constructed and operated in strict accordance with all rules, regulations, permits and licenses in place through federal, provincial and municipal authorities. Regulatory bodies would include, but not restricted to the following.

Natural Resources Canada  
Explosives Regulatory Division  
580 Booth Street, 15th Floor  
Ottawa, Ontario

Transport Canada  
Transportation of Dangerous Goods

The City of Corner  
Development and Planning  
Building Inspection
Newfoundland Hard-Rok Inc.
Environmental Assessment

Department of Environment and Conservation Lands Branch
Corner Brook

**SCHEDULE:**

Newfoundland Hard-Rok Inc. wishes to receive approval for this undertaking in accordance with the Environmental Assessment Act by February 1\textsuperscript{st}, 2008. This will allow time for procurement of equipment and obtaining permits during the winter and start construction in May of 2008.

**FUNDING:**

The total capital investment for this project is estimated at $1,500,000 and will be funded from equity capital and bank loans.

November 20, 2007

Carl Foss
Chief Executive Officer
APPENDIX A

Site Location Map
APPENDIX B

Building and Site Layout
APPENDIX C

Material Safety Data Sheet
SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):
- DYNO GOLD®
- DYNOGOLD® C
- DYNO GOLD® C EXTRA
- DYNO GOLD® C LITE
- DYNO GOLD® C LITE SUPER
- DYNO GOLD® CS LITE
- DYNO GOLD® B
- DYNO GOLD® B LITE
- RUG-1 (Canada Only)
- TITAN® 1000
- TITAN® 1000G
- TITAN® PB 1000
- TITAN® XL1000
- TITAN® 2000
- TITAN® 2000G

Product Class: Emulsion, Bulk

Product Appearance & Odor: Translucent to opaque, viscous liquid. May be silvery in color. May have fuel odor.

DOT Hazard Shipping Description: As Transported:
- Oxidizing Liquid, n.o.s. (Ammonium Nitrate) 5.1 UN3139 III
- Ammonium Nitrate Emulsion, 5.1 UN3375 II

After Blending with Density Control Agent On-site:
- Explosive, Blasting, Type E 1.5D UN0332 II

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS#</th>
<th>% (Range)</th>
<th>ACGIH TLV-TWA</th>
<th>OSHA PEL-TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium Nitrate</td>
<td>6484-52-2</td>
<td>60-80</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Sodium Nitrate</td>
<td>7631-99-4</td>
<td>10-18</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Calcium Nitrate</td>
<td>10124-37-5</td>
<td>0-35</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>68476-34-6</td>
<td>0-10</td>
<td>100 ppm</td>
<td>None</td>
</tr>
<tr>
<td>Mineral Oil</td>
<td>64742-35-4</td>
<td>0-3</td>
<td>5 mg/m³ (mist)</td>
<td>None</td>
</tr>
<tr>
<td>Aluminum*</td>
<td>7429-90-5</td>
<td>0-15</td>
<td>10 mg/m³ (dust)</td>
<td>15 mg/m³ (total)</td>
</tr>
</tbody>
</table>

* This ingredient is not found in the majority of listed products.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).
SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: (Air = 1) Not Applicable
Percent Volatile by Volume: <30
Evaporation Rate (Butyl Acetate = 1): <1
Vapor Pressure: Not Applicable
Density: 0.8 - 1.5 g/cc
Solubility in Water: Nitrates are completely soluble, but emulsion dissolution is very slow.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable
Flammable Limits: Not Applicable
Extinguishing Media: (See Special Fire Fighting Procedures Section)
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials or emulsion explosive precursors. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.
Unusual Fire and Explosion Hazards: May explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: Can cause irritation, redness and tearing.
Skin: Prolonged contact may cause irritation.
Ingestion: Large amounts may be harmful if swallowed.
Inhalation: May cause dizziness, nausea or intestinal upset.
Systemic or Other Effects: None known.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Remove contaminated clothing. Wash with soap and water.
Ingestion: Seek medical attention.
Inhalation: Remove to fresh air. If irritation persists, seek medical attention.
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.
Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.
Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).
Hazardous Decomposition Products: Nitrogen Oxides (NOx), Carbon Monoxide (CO)
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES
Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State and local spill reporting requirements.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Not required for normal handling.
Respiratory Protection: None normally required.
Protective Clothing: Gloves and work clothing that reduce skin contact are suggested.
Eye Protection: Safety glasses are recommended.
Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flame, ignition sources and strong shock.
Precautions to be taken during use: Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
Other Precautions: It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.

SECTION X - SPECIAL INFORMATION

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listings of the previously referenced regulation should be reviewed.

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SECTION I - PRODUCT IDENTIFICATION

Trade Name: DYNO NAL          Chemical Name: Ammonium Nitrate, NH₄NO₃

Synonyms: Strong Ammonium Nitrate Solution, AN Solution, AN Liquor, Nitrate of Ammonia Liquor (NAL)


DOT Hazard Shipping Description: Hazard labeling needed if 35% or less water.

Ammonium Nitrate, Liquid 5.1 UN2426

NOTE: If shipped at or above 100°C, the word "HOT" must precede the proper shipping name on shipping papers. An exemption from DOT must be obtained to ship at a temperature exceeding 240°F (116°C).

Label: Oxidizer

NFPA Hazard Classification

Health (Blue) = 3
Flammability (Red) = 0
Reactivity (Yellow) = 3
Specific Hazard (White) = Oxidizer

HMIS Classification:

Health  3
Flammability  0
Reactivity  3
PPE  D

SECTION II - HAZARDOUS INGREDIENTS

Ingredients:          CAS#       % (Range)  ACGIH-TLV  OSHA-PEL

Ammonium Nitrate     6484-52-2  80 – 90%     Not Established  Not Established

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations.

SECTION III - PHYSICAL DATA

Boiling Point: 128 – 146°C (263 – 295°F)          Vapor Pressure: 182 mm Hg (85% AN @ 200°F)
Melting Point: 85% AN solidifies below 75°C       Density: 1.33 – 1.42 g/cc
Percent Volatile by Volume: 10 – 20% (Water)     Solubility in Water: 192 g (dry) / 100 ml @ 20°C
Evaporation Rate (Butyl Acetate = 1): Not Applicable
SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Extinguishing Media: Water

Special Fire Fighting Procedures: Use large quantities of water to cool. Minimize confinement, providing as much ventilation as possible. If yellow or brown gas/vapors are present, wear a self-contained breathing apparatus. Fight small fires only in initial stages when not confined in containers. In advanced stage or for any large fire or fire engulfing confining containers, abandon fire-fighting efforts and evacuate personnel to a safe distance of at least 2,500 feet.

Unusual Fire and Explosion Hazards: Dry material may decompose explosively under confinement and high temperature. Presence of organic materials may lower decomposition temperature. Emits toxic vapors when heated to decomposition temperature.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure
Not found to be toxic by oral, dermal and inhalation exposure as defined by OSHA.

Eyes: May cause irritation, redness and tearing.

Skin: Contact with hot solution will cause thermal burns.

Ingestion: Large amounts are harmful if swallowed. Can cause abdominal spasms, nausea and pain.

Inhalation: May cause dizziness, nausea or intestinal upset and may aggravate lung conditions.

Systemic or Other Effects: Decomposition of AN solution at high temperatures produces highly toxic Nitrogen Oxides (NO\textsubscript{x}). Chronic exposure to NO\textsubscript{x} can produce respiratory and/or kidney damage.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.

Skin: Remove contaminated clothing. Flush area with copious amounts of water and treat as appropriate for thermal burns.

Ingestion: Seek medical attention.

Inhalation: Remove to fresh air, seek medical attention.

Special Considerations: If an exposure to toxic NO\textsubscript{x} vapors occurs, restore or support breathing as necessary, seek medical attention. Observe for delayed reactions to NO\textsubscript{x} exposure that may involve pulmonary edema.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions.

Conditions to Avoid: Keep away from excessive heat, flame and ignition sources.

Materials to Avoid (Incompatibility): Flammable liquids, organic materials, metal powders, explosives and other combustible materials. Corrosives (strong acids and strong bases).

Hazardous Decomposition Products: Nitrogen Oxides (NO\textsubscript{x}), Ammonia (NH\textsubscript{3}), Nitric Acid (HNO\textsubscript{3}).

Hazardous Polymerization: Does not occur.
SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Evacuate unnecessary personnel. Dike and contain spill. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. Follow applicable federal, state, and local spill reporting requirements. Contact of this product with water may result in a reportable release.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. Ammonium Nitrate is used as a fertilizer and, in some cases, recovered material may be put to beneficial use. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any hazardous material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: General room ventilation is normally adequate.

Respiratory Protection: None normally required.

Protective Clothing: Chemical resistant gloves and work clothing that reduce skin contact are recommended.

Eye Protection: Safety glasses with side shields and/or face shield. Eye baths should be provided when direct eye contact is likely.

Other Precautions Required: Ammonium Nitrate solution is normally handled at temperatures exceeding 176°F (80°C). Personal protective equipment should always reflect a thermal burn hazard.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storage: Keep separate from other chemicals and combustible material.

Other Precautions: AN solution is normally handled at 176°F (80°C) or above. AN is corrosive to carbon steel and some other materials. Stainless steel or aluminum is preferred construction. Avoid mixing with basic materials that cause evolution of ammonia vapors.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>% By Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate Compounds</td>
<td>N511</td>
<td>62 – 70%</td>
</tr>
<tr>
<td>(Water dissociable reportable only when in aqueous solution)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ammonia</td>
<td>7664-41-7</td>
<td>17 – 19%</td>
</tr>
<tr>
<td>(Aqueous from dissociable salts)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Slightly toxic to aquatic organisms as defined by USEPA.

DYNO NOBEL INC. Disclaimer

The information contained herein is provided for reference purposes only and is intended only for persons having relevant technical skills. Because conditions and manner of use are outside of our control, the user is responsible for determining the conditions of safe use of the product. While the information is believed to be correct, DYNO NOBEL INC. shall in no event be responsible for any damages whatsoever, directly or indirectly, resulting from the publication or use of or reliance upon the information contained herein. (No warranty, either expressed or implied, of merchantability or fitness for a particular purpose, or of any nature with respect to the product, or to the information, is made herein.)
MATERIAL SAFETY DATA SHEET

SECTION I. MATERIAL IDENTIFICATION

UN#: 1942
CAS: 006 484 522

Emergency Telephone#: 613-348-3990
Canutec #: 613-996-6666
Chemtrec#: 1-800-424-9300

NFPA/HMIS RATING: Health 2, Flammability 0, Reactivity 3
WHMIS Class 'C' Oxidizer

Manufacturer: Nitrochem Corp
Trade/Material Name: Ammonium Nitrate - Industrial Grade

Description: Solid granule,
Other Designations: AMMONIUM SALT
Chemical Formula: \( \text{NH}_3\text{NO}_3 \)

SECTION II. INGREDIENTS AND HAZARDS

**INGREDIENT NAME** | **HAZARD** | **PROVISIONAL LIMIT**
--- | --- | ---
AMMONIUM NITRATE | No TLV established | Air 0.05 mg/m³
 | No IDHL established | Data by TRW Systems
 | Recommend Nuisance Rating (SAX) | Group for EPA contract (August 1973, NTIS PB 244 591)
 | Respirable: 5 mg/m³ | LD₅₀: 5300 mg/kg
 |  | LC₅₀: NOT AVAILABLE

COATING (PRILLS WILL BE COATED WITH ONE OF THE THREE ANTICAKING AGENTS LISTED BELOW):

1. Clay - CAS NO:1332-58-7: ≤1.0%
   - Respiratory Nuisance
2. Galoryl ATH - CAS NO: 57-11-4:
   - Mineral Oil - CAS NO: 67254-74-4;<0.2%
   - No TWA established
   - TLV 5mg/M³ suggested
   - for oil mist
3. Hydrogenated Tallow Amine-CAS NO: 61788-45-2:
   - Hydrotreated Mineral Oil distillate - CAS NO: 64742-52-5;<0.2%
   - No TLV established
SECTION III. PHYSICAL DATA

Appearance and Odour
Solid odourless granule

Boiling Point: 210°C (410°F)
Vapour Pressure: N.A.
Vapour Density: N.A.
Solubility, Cold water: 118g/100g H₂O

Bulk Density: 750-820 kg/m³ (47-51 lb/cubic ft.)
Melting Point: 169.6°C (336°F)
pH [0.1N Solution]: 5.4
Molecular Weight: 80.06

SECTION IV. FIRE AND EXPLOSION DATA

FLASH POINT N/A
AUTOIGNITION TEMP. N/A
FLAMMABILITY LIMITS IN AIR:
LOWER: N/A
UPPER: N/A

EXTINGUISHING MEDIA

Use flooding amounts of water in early stages of fire. Keep upwind. This is an oxidizing agent which supports combustion and is an explosive hazard if heated under confinement that allows high pressure build-up. Upon heating, it gives off toxic gases of nitrogen oxides. Prevent contamination of NH₄NO₃ with other combustible materials that may cause possible explosion of the entire mass. Evacuate surrounding area of ammonia nitrate if sensitized with fuel and if detonation is anticipated. Desensitize material with flooding amounts of water.

Firefighters should wear self-contained breathing apparatus.

SECTION V. REACTIVITY DATA

NH₄NO₃ is stable when stored and used under proper conditions. It is hygroscopic. Strong oxidizing agent. Reacts with strong alkalies to liberate ammonia.

Conditions to Avoid

Avoid unintentional contact with diesel oil. Many powdered metals react violently or explosively with fused NH₄NO₃ below 200°C (392°F) as follows: Al, Sb, Bi, Cd, Cr, Co, Cu, Fe, Pb, Mg, Mn, Ni, Sn, Zn, and brass. When contaminated with oil, charcoal, or other organic substances or flammable liquids can be considered an explosive, capable of detonation by combustion when confined or by shock from adjacent explosions. Sensitivity to detonation increases when heated (particularly dangerous if confined). The effect of various impurities on the thermal stability of solid NH₄NO₃ has been examined. [Ubanski, chem 1/2 Tech of Explosives. 1965 vol.2]
SECTION VI. HEALTH HAZARD INFORMATION

SUMMARY OF RISKS

Contact with skin may cause mild skin irritations. Individuals may be exposed to nitrogen oxides due to decomposition of NH₄NO₃ at high temperatures. This is a toxic gas which can quickly cause acute respiratory problems.

Use NIOSH/MSHA approved respirator/ total dust respirator when handling clay coated prills.

FIRST AID

Eye Contact:  Immediately flush with tempered running water. Get medical attention.

Skin Contact:  Flush with tempered water. Wash immediately with soap and water. Get medical attention.

Inhalation:  Remove to fresh air. Restore and/or support breathing as needed.

Ingestion:  Seek immediate medical attention.

This product is not known as a carcinogen. Toxic hazard rating (SAX)

TOXICITY

Acute Local:  Slight irritant, allergen, inhalation
Acute Systemic:  No information
Chronic Local:  Slight irritant, allergen, inhalation
Chronic Systemic:  No information
Reproductive Toxicity:  N/A
Mutagenicity:  N/A
Teratogenicity:  N/A
Toxicologically:  

LD₅₀: 5300 mg/kg
LC₅₀: NOT AVAILABLE

Synergistic Products:  N/A

SECTION VII. SPILL, LEAK AND DISPOSAL PROCEDURES

Report all spills immediately. Remove sources of heat or ignition. Sweep spill into a non-combustible container.

Disposal - For discharge follow Federal, Provincial, State or Municipal Regulations.

Aquatic Toxicity Rating:  TLm 96, over 1000-100 ppm
Provisional Limit:  Water and Soil 45 mg/l (as NO₃)
SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general exhaust ventilation in the workplace and storage area.
A NIOSH/MSHA approved dust respirator should be available when the work situation warrants its use.
Wear rubber gloves and chemical goggles to minimize exposure and skin contact during handling.

SECTION IX. SPECIAL PRECAUTIONS AND COMMENTS

STORAGE SEGREGATION

Store in well-ventilated area with building made of noncombustible material equipped with automatic sprinkler system. Prevent entrapment of NH\textsubscript{4}NO\textsubscript{3} by eliminating floor drains and depressions. Protect containers against physical damage. Store separate from other chemicals and combustible materials.
[See code for storage of NH\textsubscript{4}NO\textsubscript{3}, NFPA 490 and 495]. Do not store above 54\textdegree C (129\textdegree F).
Store under dry conditions. A possible explosive hazard when contaminated with many other materials.

DOT: oxidizer
LABEL: oxidizer
DOT CLASS: OXIDIZER

ABBREVIATIONS

TC\textsubscript{LO}: Lowest Published Toxic Concentration
LC\textsubscript{LO}: Lowest Published Lethal Concentration
TWA: Time Weighted Average
TLV: Threshold Limit Value
LD\textsubscript{50}: Lethal Dose 50
LC\textsubscript{50}: Lethal Concentration 50
TLm: Median Tolerance Limit

SECTION X. PREPARATION INFORMATION

Contact Health/Safety Assistant, Nitrochem Corp. during business hours 08:00 to 16:00 EST. Phone 1-613-348-3681 extension 209.

NOTICE: The information presented herein is based on data considered to be accurate as of the date of preparation of this Material Safety Data Sheet. However, no warranty or representation expressed or implied, is made of the accuracy of the foregoing data and safety information.

Date: 2000-03-09
SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):
- DYNO GOLD®
- DYNOGOLD® C
- DYNO GOLD® C EXTRA
- DYNO GOLD® C LITE
- DYNO GOLD® C LITE SUPER
- DYNO GOLD® CS LITE
- DYNO GOLD® LITE
- DYNO GOLD® B
- DYNO GOLD® B LITE

Product Class: Emulsion, Bulk

Product Appearance & Odor: Translucent to opaque, viscous liquid. May be silvery in color. May have fuel odor.

DOT Hazard Shipping Description:
- As Transported:
  - Oxidizing Liquid, n.o.s. (Ammonium Nitrate) 5.1 UN3139 III
  - or -
  - Ammonium Nitrate Emulsion, 5.1 UN3375 II
- After Blending with Density Control Agent On-site:
  - Explosive, Blasting, Type E 1.5D UN0332 II

NFPA Hazard Classification: Not Applicable (See Section IV - Special Fire Fighting Procedures)

SECTION II - HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS#</th>
<th>% (Range)</th>
<th>Occupational Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium Nitrate</td>
<td>6484-52-2</td>
<td>60-80</td>
<td>ACGIH TLV-TWA: None</td>
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<tr>
<td>Sodium Nitrate</td>
<td>7631-99-4</td>
<td>10-18</td>
<td>OSHA PEL-TWA: None</td>
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<tr>
<td>Calcium Nitrate</td>
<td>10124-37-5</td>
<td>0-35</td>
<td>100 ppm</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>68476-34-6</td>
<td>0-10</td>
<td>5 mg/m³ (mist)</td>
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<tr>
<td>Mineral Oil</td>
<td>64742-35-4</td>
<td>0-3</td>
<td>10 mg/m³ (dust)</td>
</tr>
<tr>
<td>Aluminum*</td>
<td>7429-90-5</td>
<td>0-15</td>
<td>15 mg/m³ (total)</td>
</tr>
</tbody>
</table>

* This ingredient is not found in the majority of listed products.

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).
SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: (Air = 1) Not Applicable
Percent Volatile by Volume: <30
Evaporation Rate (Butyl Acetate = 1): <1
Vapor Pressure: Not Applicable
Density: 0.8 - 1.5 g/cc
Solubility in Water: Nitrate salts are completely soluble, but emulsion dissolution is very slow.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable
Flammable Limits: Not Applicable
Extinguishing Media: (See Special Fire Fighting Procedures Section)
Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials or emulsion explosive precursors. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.
Unusual Fire and Explosion Hazards: May explode or detonate under fire conditions. Burning material may produce toxic vapors.

SECTION V - HEALTH HAZARD DATA

Effects of Overexposure
Eyes: Can cause irritation, redness and tearing.
Skin: Prolonged contact may cause irritation.
Ingestion: Large amounts may be harmful if swallowed.
Inhalation: May cause dizziness, nausea or intestinal upset.
Systemic or Other Effects: None known.

Emergency and First Aid Procedures
Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention.
Skin: Remove contaminated clothing. Wash with soap and water.
Ingestion: Seek medical attention.
Inhalation: Remove to fresh air. If irritation persists, seek medical attention.
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.
Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.
Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).
Hazardous Decomposition Products: Nitrogen Oxides (NOX), Carbon Monoxide (CO)
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES
**Material Safety Data Sheet**

**Steps to be taken in Case Material is Released or Spilled:** Protect from all ignition sources. In case of fire evacuate area not less than 2,500 feet in all directions. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. If no fire danger is present, and product is undamaged and/or uncontaminated, repackage product in original packaging or other clean DOT approved container. Ensure that a complete account of product has been made and is verified. Follow applicable Federal, State and local spill reporting requirements.

**Waste Disposal Method:** Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

**SECTION VIII - SPECIAL PROTECTION INFORMATION**

- **Ventilation:** Not required for normal handling.
- **Respiratory Protection:** None normally required.
- **Protective Clothing:** Gloves and work clothing that reduce skin contact are suggested.
- **Eye Protection:** Safety glasses are recommended.
- **Other Precautions Required:** None.

**SECTION IX - SPECIAL PRECAUTIONS**

- **Precautions to be taken in handling and storage:** Store in cool, dry, well-ventilated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flame, ignition sources and strong shock.
- **Precautions to be taken during use:** Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
- **Other Precautions:** It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.

**SECTION X - SPECIAL INFORMATION**

The reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR 372 may become applicable if the physical state of this product is changed to an aqueous solution. If an aqueous solution of this product is manufactured, processed, or otherwise used, the nitrate compounds category and ammonia listings of the previously referenced regulation should be reviewed.

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MATERIAL SAFETY DATA SHEET

Product Name:
Diesel Fuel (3092)

SECTION 1 – PRODUCT IDENTIFICATION AND USE

Product name: Diesel Fuel
Chemical name: None
Common names and Product use: API No. 2 fuel oil. Home heating oil No. 2. Number 2 burner oil.

WHMIS classification:
Combustible liquid
(3) Highly flammable
Health hazard
NFPA Health 2, 4 for S-containing. 1, if no S
HMIS Health 4 for S-containing. 1, if no S
Reactivity 0
Recactivity 0
NFPA & HMIS Ratings: 0=Insignificant/No Hazard. 1=Slight Hazard. 2=Moderate Hazard. 3=High/Serious Hazard. 4=Extreme/Severe Hazard.

Supplier: Irving Oil Limited, Refining Division
Box 1260, Saint John
New Brunswick Canada E2L 4H6

SECTION 2 – HAZARDOUS INGREDIENTS

--- | --- | --- | --- | --- | --- | --- | ---
Diesel fuel | 68476-30-2 | 100 | 100 mg/m3 TWA (vapour & aerosol) | NA for this product name or CAS# | >5 g/kg | ~5 g/m3
May contain:
Benzene | 71-43-2 | Trace | 0.5 ppm TWA 2.5 ppm STEL | 10 ppm TWA 25 ppm CEILING 50 ppm PEAK | 0.1 ppm TWA 1.0 ppm STEL | 0.9 g/kg | 13,200 ppm
Polycyclic aromatic hydrocarbons (PAHs) which may include: | Various | Up to 10 | Various | Various | Various | Various | Various
Naphthalene | 91-20-3 | Trace | 10 ppm TWA 15 ppm STEL | 10 ppm TWA 15 ppm STEL | 0.49 g/kg | >170 mg/m3
May also contain:
Sulphur which may result in the production of: | 7704-34-9 | Varied | NA | NA | NA | NA | 0.008 g/kg | NA
Hydrogen sulphide (H2S) | 7783-04-6 | NAp | 10 ppm TWA 15 ppm STEL | 20 ppm CEILING 50 ppm PEAK | 10 ppm CEILING | NA | 444 ppm

Product may also contain dye, at concentrations well below the lowest reporting limit, i.e., 0.1%.

Diesel fuel is a complex mixture of hydrocarbons. Its exact composition depends on the source of the crude oil from which it was produced and the refining methods used. Diesel fuel contains hundreds of individual organic chemicals. This section identifies only some of the well-known chemical constituents.

SECTION 3 – PHYSICAL DATA

Form: Slightly viscous, oily liquid
Colour: Yellowish-brown
Odour: Rotten eggs if sulphur present; kerosene-like if sulphur-free

**Note:** H2S deadens the sense of smell. Absence of rotten egg smell does not mean absence of H2S.

Odour threshold: <0.15 ppm for H2S. Not available for sulphur-free product.
Coefficient of water/oil distribution: 3.3 to 7.06 (Log Kow)

Specific gravity: 0.830 to 0.879 @ 20°C
Vapour density: NA
Vapour pressure: 2.12 to 26.4 mm Hg @ 21°C
Evaporation rate: NA
Boiling point: 160 to 358°C (321 to 676°F)
Freezing point: NA
pH: NA

SECTION 4 – FIRE AND EXPLOSION HAZARDS

**Flammability:** Yes
**Flash point:** 38 to 54°C (100 to 130°F) (cc)
**Auto ignition temperature:** 257°C (494°F)
**Lower flammable limit:** 0.6 to 1.3%
**Upper flammable limit:** 6 to 7.5%
**Explosion data:** Sensitivity to: Mechanical impact Not expected to be sensitive
**Means of extinction:** In general, do not extinguish fire unless flow can be stopped. Use carbon dioxide, dry chemical, or foam.
**Special precautions:** Vapour is heavier than air. It will spread along the ground & collect in low or confined areas (sewers, basements). Travels to source of ignition and flashes back. Containers may explode when heated.
**Hazardous combustion products:** Carbon monoxide. Nitrogen oxides. PAHs and other aromatic hydrocarbons. H2S and sulphur dioxide (SO2) if product contains sulphur.
SECTION 5 – REACTIVITY INFORMATION

Stability: Stable
Conditions to avoid: Sources of ignition. Static discharges. High temperatures.
Incompatible substances: Oxidizers such as peroxides, nitric acid, and perchlorates.

SECTION 6 – HEALTH HAZARD INFORMATION

Route of Entry
- Inhalation: Diesel fuel itself, as well as benzene & naphthalene
- Ingestion:
- Skin absorption: Diesel fuel itself, as well as benzene & naphthalene
- Hazards Contact: Inhalation

Acute exposure: Coughing, headache, and giddiness following inhalation. Aspiration into the lungs can cause severe pneumonia (serious lung irritation), with coughing, gagging, shortness of breath, chest pain, and/or pulmonary edema (fluid in the lungs). Ingestion may produce nausea, vomiting, and cramping. Kidney effects and systemic edema have been reported after severe exposure.

H2S is very toxic. At concentrations as low as 1 to 5 ppm, nausea and severe eye irritation may occur. Sense of smell may be impaired at about 20 ppm, with headache and respiratory tract lung irritation. At 250 to 500 ppm, potentially fatal pulmonary edema may occur. Dizziness, sudden (often fatal) collapse, unconsciousness, and death occur at higher concentrations. Note: Pulmonary edema may be delayed as long as 48 hours after exposure.

Chronic exposure: Kidney, gastrointestinal, blood, and skin disorders. Headache, nausea, vomiting. Fatigue, and severe nervous and respiratory system symptoms may follow survival of H2S poisoning.

Carcinogenicity: Benzene and certain PAHs are known to be carcinogenic. Exposure to fuel oils during refining is considered “probably carcinogenic to humans”.

IARC and NTP classify untreated and mildly treated mineral oils as known human carcinogens. ACGIH, EPA, NIOSH, and OSHA have not classified them.

Toxicologically synergistic products: Other CNS depressants can be expected to produce additive or synergistic effects.

SECTION 7 – FIRST AID

Inhalation: Move victim to fresh air. Give artificial respiration if breathing has stopped and if a qualified AR administrator is available. Apply CPR if both pulse and breathing have stopped. Obtain medical attention immediately.

Ingestion: Never give anything by mouth if the person is unconscious, rapidly losing consciousness, or convulsing. If the person is conscious, have them drink 8 to 10 ounces of water or milk to dilute the material in the stomach. Do not induce vomiting. If vomiting occurs spontaneously, have the person lean forward to avoid aspiration. Obtain medical attention immediately.

Eye: If irritation occurs, flush eye with lukewarm, gently flowing fresh water for at least 10 minutes.

Skin: Quickly and gently blot away excess chemical. Gently remove contaminated clothing and shoes under running water. Wash gently and thoroughly with water and non-abrasive soap. Obtain medical assistance.

SECTION 8 – PRECAUTIONARY MEASURES

Do not attempt rescue of an H2S knockdown victim without the use of proper respiratory protective equipment.

Personal protective equipment:
- Gloves: Nitrile, Viton™, Polyvinylchloride, Tychem®BR/LV, or Tychem®TK preferred.
- Eye: Chemical safety goggles or face shield, as a good general safety practice.
- Respiratory: NIOSH-approved SCBA or air line respirator with escape cylinder for confined spaces or work with sulphur-containing product. A qualified occupational health and safety professional should advise on respirator selection. If an air-purifying respirator is appropriate, use a “P series” filter & organic vapour cartridges.

Clothing & footwear: Coveralls to prevent skin contact with product. If clothing or footwear becomes contaminated with product, completely decontaminate it before re-use, or discard it.

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Engineering controls
Handling procedures & equipment
Leak & spill Procedure
Waste disposal
Storage
Shipping

Enclose processes. Use local exhaust ventilation to remove vapour at its site of generation. Handle laboratory samples in a fume hood. Use mechanical ventilation in confined spaces. Avoid heating open containers of product so as to minimize vapour production and accumulation. Use non-sparking equipment, explosion-proof ventilation, and intrinsically safe electrical equipment. Ground handling equipment. Have clean emergency eyewash and shower readily available in the work area. Keep unauthorized persons away. Eliminate all sources of ignition. Ventilate area. Stop leak if it can be done safely. Prevent entry into sewers, waterways, or confined spaces. Absorb or cover with dry earth, sand or other non-combustible material and use clean, non-sparking tools to transfer to container. Consult local authorities for advice. May be stored at ambient temperatures. Containers should be vented and equipped with a flame arrester. Stable during transport. May be transported hot.

SECTION 9 – PREPARATION OF MSDS
Prepared by Irving Oil Limited, Refining Division
Revision date July 12, 2006
Phone (506) 202-3000
To re-order MSDS, phone (506) 202-2000
SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): L Series (L-2; L-3; L-4; L-5; L-6)  
NL Series (NL-2; NL-3; NL-4; NL-4(W); NL-5; NL-6)  
L-10 Series (L-10-3; L-10-4; L-10-5; L-10-6)  
NL-10 Series (NL-10-3; NL-10-4; NL-10-5; NL-10-6)  

Product Class: Trace Gassing Ingredients  

Product Appearance & Odor: Clear to pale yellow liquid. Very little if any odor.  

DOT Hazard Shipping Description: Not hazardous per DOT regulations.

SECTION II - HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS#</th>
<th>%</th>
<th>ACGIH TLV-TWA</th>
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</thead>
<tbody>
<tr>
<td>Inorganic Nitrite Salts</td>
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<tr>
<td>Sodium Nitrite</td>
<td>7632-00-0</td>
<td>0-35</td>
<td>No Value Established</td>
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<tr>
<td>Calcium Nitrite</td>
<td>13780-06-8</td>
<td>0-35</td>
<td>No Value Established</td>
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<tr>
<td>Potassium Nitrite</td>
<td>7758-09-0</td>
<td>0-35</td>
<td>No Value Established</td>
</tr>
<tr>
<td>Sodium Nitrate</td>
<td>7631-99-4</td>
<td>0-25</td>
<td>No Value Established</td>
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<tr>
<td>Calcium Nitrate</td>
<td>10124-37-5</td>
<td>0-25</td>
<td>No Value Established</td>
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<tr>
<td>Sodium Thiocyanate</td>
<td>540-72-7</td>
<td>0-35</td>
<td>No Value Established</td>
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Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: >100°C (212°F)  
Vapor Pressure: Less than pure water  
Vapor Density: Same as water  
Density: 1.10 - 1.35 g/cc  
Percent Volatile by Volume: <90% (water)  
Solubility in Water: Completely Soluble  
Evaporation Rate (Butyl Acetate = 1): <1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable  
Extinguishing Media: Water, CO₂, Dry Chemical  
Special Fire Fighting Procedures: Fire fighters must be equipped to prevent breathing vapors or fumes of combustion.  
Unusual Fire and Explosion Hazards: Highly toxic gases may result from exposure to fire or high temperatures.
SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation. Prolonged contact may cause damage (corneal burns).
Skin: Contact may result in skin irritation. Prolonged or repeated exposure can result in temporarily yellowing the skin.
Ingestion: Moderately toxic. Not a likely route of exposure. Swallowing small amounts may irritate the mouth, throat and stomach and cause dizziness and nausea. Large doses taken internally can lead to convulsions, cyanosis, coma and possibly death.
Inhalation: Inhalation of mist may cause irritation.
Systemic or Other Effects: Under certain conditions, a component of this product may react with secondary amines to form carcinogenic nitrosamines. Prolonged or repeated skin exposure may cause dermatitis. Repeated ingestion of small amounts may cause hives, abnormal bleeding, enlarged thyroid, weakness, confusion, diarrhea, psychosis and collapse.

Emergency and First Aid Procedures

Eyes: Immediately flush eyes with water for fifteen minutes. Seek medical attention.
Skin: Remove contaminated clothing. Immediately wash skin with soap and water. If irritation persists, seek medical attention.
Ingestion: Seek immediate medical attention.
Inhalation: Remove to fresh air. If irritation persists, seek medical attention.
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable
Conditions to Avoid: Avoid exposing the material to temperatures above 95°C. Avoid allowing the solution to dry out (evaporate water) due to extended exposure to air. Slowly decomposes on exposure to light. Avoid storing in direct sunlight.
Materials to Avoid (Incompatibility): Strong acids. Will react mildly to moderately with ammonium salts, amines, reducing agents, and combustible organic materials. Reactivity increases dramatically when heated or when the solution is allowed to dry out.
Hazardous Decomposition Products: Nitrogen oxides (NOₓ), oxides of sulfur (SOₓ), possibly cyanides or hydrogen sulfide (H₂S).
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK

Steps to be taken in Case Material is Released or Spilled: Wear appropriate chemical resistant clothing including rubber gloves, rubber boots and protective apron on coveralls. Contain spill and keep out of sewers, storm drains, surface waters and soil. Keep away from incompatible materials. Follow applicable Federal, State and local reporting requirements.
Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any hazardous material.
SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Not required for normal handling.
Respiratory Protection: None normally required. Wear self-contained breathing apparatus if products of decomposition are present.
Protective Clothing: Chemical resistant gloves and work clothing that minimizes skin contact are recommended.
Eye Protection: Chemical splash resistant goggles are recommended.
Other Precautions Required: None.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Keep away from all other chemicals and potential sources of contamination. Keep container tightly closed when not in use. Avoid storing in direct sunlight and in clear containers.
Other Precautions: Do not get in eyes, on skin or on clothing. Do not allow to mix with ammonium nitrate products except in trace amounts under controlled conditions. Empty containers should be rinsed prior to disposal.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>% By Weight</th>
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</thead>
<tbody>
<tr>
<td>Sodium Nitrite</td>
<td>7632-00-0</td>
<td>0-35</td>
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<tr>
<td>(Use Toxic Chemical Category Code)</td>
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<tr>
<td>Nitrate Compounds</td>
<td>N511</td>
<td>0-25</td>
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<tr>
<td>(Water dissociable reportable only when in aqueous solution)</td>
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</tbody>
</table>

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The information contained herein is provided for reference purposes only and is intended only for persons having relevant technical skills. Because conditions and manner of use are outside of our control, the user is responsible for determining the conditions of safe use of the product. While the information is believed to be correct, DYNO NOBEL INC. shall in no event be responsible for any damages whatsoever, directly or indirectly, resulting from the publication or use of or reliance upon the information contained herein. (No warranty, either expressed or implied, of merchantability or fitness for a particular purpose, or of any nature with respect to the product, or to the information, is made herein.)
SECTION I - PRODUCT IDENTIFICATION

Trade Name(s): N-17

Product Class: Trace Ingredient

Product Appearance & Odor: Clear to light blue liquid, sharp vinegar odor

DOT Hazard Shipping Description: Corrosive liquid, n.o.s. (acetic acid) 8 UN1760 II

Precautionary Label Statement: DANGER! Causes severe skin and eye burns. Harmful if swallowed. Vapor irritating to eyes and respiratory tract.

SECTION II - HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS#</th>
<th>%</th>
<th>ACGIH TLV-TWA</th>
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</thead>
<tbody>
<tr>
<td>Acetic Acid</td>
<td>64-19-7</td>
<td>50-60</td>
<td>10 ppm (25 mg/m³)</td>
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Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: >100°C  
Vapor Density: (Air = 1) ~0.7  
Percent Volatile by Volume: 100%  
Evaporation Rate (Butyl Acetate = 1): <1  
Vapor Pressure: ~17 mm Hg @ 20°C  
Specific Gravity: 1.03 - 1.07  
Solubility in Water: Completely soluble  
Odor Threshold: 0.48 ppm for acetic acid

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not applicable  
Extinguishing Media: Not applicable  
Special Fire Fighting Procedures: Wear self-contained breathing apparatus and protective clothing.  
Unusual Fire and Explosion Hazards: None.
SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation, redness and tearing. Higher levels of exposure may cause acid burns.
Skin: Likely to cause acid burns.
Ingestion: Will cause acid burns. Large amounts are harmful if swallowed.
Inhalation: Irritating to the respiratory system and may lead to pulmonary edema.
Systemic or Other Effects: None Known

Emergency and First Aid Procedures

Eyes: Immediately flush eyes with water for at least fifteen minutes. Seek immediate medical attention.
Skin: Immediately flush skin with water and remove contaminated clothing. Seek immediate medical attention.
Ingestion: If swallowed DO NOT induce vomiting. If conscious, give victim a glass of water or milk. Seek immediate medical attention.
Inhalation: Move to fresh air. If not breathing give artificial respiration. Get immediate medical attention.
Special Considerations: None.

SECTION VI - REACTIVITY DATA

Stability: Stable
Conditions to Avoid: None
Materials to Avoid (Incompatibility): Strong oxidizing agents, strong bases.
Hazardous Decomposition Products: Carbon monoxide (CO).
Hazardous Polymerization: Will not occur.

SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Evacuate unnecessary personnel to safe area upwind of spill. Wear appropriate protective clothing and respiratory protection. Contain spills and avoid discharging into sewer or streams. Neutralize small spills with soda ash or lime. Absorb with vermiculite or other inert material. Follow applicable Federal, State and local reporting requirements.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any hazardous material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Always handle with adequate ventilation. Mechanical ventilation and/or local exhaust is recommended where needed to meet TLV requirement.
Respiratory Protection: Not required for normal operations. Use a NIOSH-approved respirator or supplied air at higher exposure levels.
Protective Clothing: Chemical splash-resistant clothing, rubber gloves and rubber boots.
Eye Protection: Splash-resistant goggles.
Other Precautions Required: None.
SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Keep away from heat and flame. Keep container closed at all times when not in use.

Other Precautions: None.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CER Part 372.

<table>
<thead>
<tr>
<th>Chemical Name</th>
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<th>% By Weight</th>
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DYNO NOBEL INC. Disclaimer
The information contained herein is provided for reference purposes only and is intended only for persons having relevant technical skills. Because conditions and manner of use are outside of our control, the user is responsible for determining the conditions of safe use of the product. While the information is believed to be correct, DYNO NOBEL INC. shall in no event be responsible for any damages whatsoever, directly or indirectly, resulting from the publication or use of or reliance upon the information contained herein. (No warranty, either expressed or implied, of merchantability or fitness for a particular purpose, or of any nature with respect to the product, or to the information, is made herein.)
1. Substance/preparation and company identification

Company
BASF CANADA
100 Milverton Drive
Mississauga, ON L5R 4H1

24 Hour Emergency Response Information
CANUTEC (reverse charges): (613) 996-6666
BASF HOTLINE: (800) 454-COPE (2673)

Synonyms: EMULSIFIER

2. Hazardous ingredients

Not WHMIS controlled.

3. Hazard identification

Emergency overview
NO PARTICULAR HAZARDS KNOWN.

Potential health effects

Acute toxicity:
No reliable data was available concerning acute toxicity. Not expected to be acutely toxic.

Irritation:
Not irritating to eyes and skin. The product has not been tested. The statement has been derived from products of a similar structure and composition.

4. First-aid measures

If inhaled:
Keep patient calm, remove to fresh air. Assist in breathing if necessary. Consult a physician.

If on skin:
Wash affected areas thoroughly with soap and water. Remove contaminated clothing. If irritation develops, seek medical attention.

If in eyes:
In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. If irritation develops, seek medical attention.
If swallowed:
If person is conscious and can swallow, give two glasses of water. Induce vomiting. Immediate medical attention required.

5. Fire-fighting measures

Flash point: approx. 127 °C (ASTM D93)
Autoignition: No data available.

Suitable extinguishing media:
water, dry extinguishing media, carbon dioxide, foam

Hazards during fire-fighting:
No particular hazards known.

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

6. Accidental release measures

Personal precautions:
Wear appropriate respiratory protection. Use personal protective clothing. Ensure adequate ventilation.

Environmental precautions:
Do not discharge into drains/surface waters/groundwater.

Cleanup:
For small amounts: Pick up with suitable absorbent material. Dispose of absorbed material in accordance with regulations.
For large amounts: Dike spillage. Pump off product.

7. Handling and storage

Handling
Protection against fire and explosion:
No special precautions necessary.

Storage
General advice:
Keep container tightly closed. Store in metal or glass containers. Do not store in plastic containers.

8. Exposure controls and personal protection

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>OSHA</th>
<th>PEL 5 mg/m3 Mist</th>
<th>ACGIH</th>
<th>TWA value 5 mg/m3 Mist</th>
<th>STEL value 10 mg/m3 Mist</th>
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</thead>
<tbody>
<tr>
<td>Paraffin oils</td>
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Personal protective equipment

Hand protection:
Chemical resistant protective gloves, Suitable materials, rubber, plastic
9. Physical and chemical properties

<table>
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<th>Value</th>
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<tr>
<td>Form</td>
<td>liquid, viscous</td>
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<td>Odour</td>
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<tr>
<td>Colour</td>
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</tr>
<tr>
<td>pH value</td>
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</tr>
<tr>
<td>Boiling point</td>
<td>&gt; 149 °C (1,013 hPa)</td>
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<tr>
<td>Vapour pressure</td>
<td>&lt; 1.3 hPa (25 °C)</td>
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<tr>
<td>Relative density</td>
<td>0.9 (25 °C)</td>
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<tr>
<td>Vapour density</td>
<td>Heavier than air.</td>
</tr>
<tr>
<td>% volatiles</td>
<td>35 %</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>insoluble</td>
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</table>

10. Stability and reactivity

Conditions to avoid:
No data available.

Substances to avoid:
strong oxidizing agents

Hazardous reactions:
The product is chemically stable.

Thermal decomposition:
No data available.

Corrosion to metals:
No corrosive effect on metal.

11. Toxicological information

Chronic toxicity

Other information:
The product has not been tested.

12. Ecological information

Environmental toxicity

Other ecotoxicological advice:
The product should not be allowed to reach either ground or open waters.
13. Disposal considerations

Waste disposal of substance:
Do not discharge substance/product into sewer system.
Dispose of in a licensed facility.

Container disposal:
Dispose of in a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers.

14. Transport information

Land transport
TDG
Not classified as a dangerous good under transport regulations

Sea transport
IMDG
Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO
Not classified as a dangerous good under transport regulations

15. Regulatory information

Federal Regulations
Registration status:
DSL, CA released / listed

Not WHMIS controlled.
THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.

16. Other information

Local contact information
BASF Canada Product Safety
289-360-1300

END OF DATA SHEET
1. Substance/preparation and company identification

Company
BASF CANADA
Milvertont Drive 100
Mississauga, ON L5R 4H1

24 Hour Emergency Response Information
CANUTEC (reverse charges): (613) 996-6666
BASF HOTLINE (800) 454-COPE (2673)

Synonyms:
SORBITAN MONOTALLATE

2. Hazardous ingredients

Not WHMIS controlled.

3. Hazard identification

Emergency overview
NO PARTICULAR HAZARDS KNOWN.

Potential health effects

Acute toxicity:
No reliable data was available concerning acute toxicity.

Irritation:
Not irritating to eyes and skin. The product has not been tested. The statement has been derived from products of a similar structure and composition.

4. First-aid measures

If inhaled:
Keep patient calm, remove to fresh air. Assist in breathing if necessary. Consult a physician.

If on skin:
Wash affected areas thoroughly with soap and water. Remove contaminated clothing. If irritation develops, seek medical attention.

If in eyes:
In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. If irritation develops, seek medical attention.

If swallowed:
If person is conscious and can swallow, give two glasses of water. Induce vomiting. Immediate medical attention required.
5. Fire-fighting measures

Flash point:  > 149 °C  (ASTM D93)
Autoignition:  No data available.

Suitable extinguishing media:
water, dry extinguishing media, carbon dioxide, foam

Hazards during fire-fighting:
No particular hazards known.

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

6. Accidental release measures

Personal precautions:
Wear appropriate respiratory protection. Use personal protective clothing. Ensure adequate ventilation.

Environmental precautions:
Do not discharge into drains/surface waters/groundwater.

Cleanup:
For small amounts: Pick up with suitable absorbent material. Dispose of absorbed material in accordance with regulations.
For large amounts: Dike spillage. Vacuum up spilled product.

7. Handling and storage

Handling
General advice:
Keep away from sources of ignition - No smoking. Keep container tightly sealed. Handle and open container with care.

Storage
General advice:
Store in metal or glass containers. Do not store in plastic containers. Keep container tightly closed in a cool, well-ventilated place.

Storage incompatibility:
General: Segregate from acids and bases. Segregate from strong oxidizing agents.

8. Exposure controls and personal protection
Safety data sheet
N 7A Sorbitan Monotallate

Revision date: 2006/03/23
Version: 1.0

Personal protective equipment
Respiratory protection:
Wear a NIOSH-certified (or equivalent) respirator as necessary.

Hand protection:
Chemical resistant protective gloves, Suitable materials, rubber, plastic

Eye protection:
Tightly fitting safety goggles (chemical goggles).

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

General safety and hygiene measures:
Avoid prolonged and/or repeated contact with the skin. Avoid inhalation of vapours/mists. Do not get in eyes, on skin, or on clothing. Avoid all routes of exposure including ingestion, skin absorption and inhalation. Wash soiled clothing immediately.

9. Physical and chemical properties

Form: liquid
Odour: mild, ester-like
Odour threshold: No data available.
Colour: dark amber
pH value: No data available.
Boiling point: > 149 °C (1,013 hPa)
Vapour pressure: < 1.3 hPa (25 °C)
Density: 1 g/cm³ (25 °C)
Relative density: 1
% volatiles: < 1 %
Solubility in water: dispersible

10. Stability and reactivity

Conditions to avoid:
No data available.

Substances to avoid:
No data available.

Hazardous reactions:
The product is chemically stable.

Thermal decomposition:
No data available.

Corrosion to metals:
No corrosive effect on metal.
11. Toxicological information

Chronic toxicity

Other information:
No data available for the preparation.

12. Ecological information

Environmental toxicity

Other ecotoxicological advice:
Ecological data are not available.

13. Disposal considerations

Waste disposal of substance:
Dispose of in accordance with local authority regulations.
Do not discharge into drains/surface waters/groundwater.

Container disposal:
Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. Dispose of container and any rinsate in an environmentally safe manner.

14. Transport information

Land transport
TDG
Not classified as a dangerous good under transport regulations

Sea transport
IMDG
Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO
Not classified as a dangerous good under transport regulations
15. Regulatory information

**Federal Regulations**

**Registration status:**

- DSL, CA released / listed

Not WHMIS controlled.

**THIS PRODUCT HAS BEEN CLASSIFIED IN ACCORDANCE WITH THE HAZARD CRITERIA OF THE CPR AND THE MSDS CONTAINS ALL THE INFORMATION REQUIRED BY THE CPR.**

16. Other information

**Local contact information**

BASF Canada Product Safety
289-360-1300

END OF DATA SHEET
Material Safety Data Sheet

SECTION I - PRODUCT IDENTIFICATION

Trade Name: Mixed Acid
Product Class: Nitrating Acid
Product Appearance & Odor: Colorless to light yellow, cloudy liquid. Acrid odor.

DOT Hazard Shipping Description: If > 50% Nitric Acid: Nitrating Acid Mixtures 8 UN1796 I RQ*
< 50% or less Nitric Acid: Nitrating Acid Mixtures 8 UN1796 II RQ*
*RQ* required if container (drum, rail tank car, etc.) has more than 1,000 pounds of either nitric acid or sulfuric acid.

NFPA Hazard Classification:
Health (blue) = 3
Flammability (Red) = 0
Reactivity (Yellow) = 2
Special Hazard (White) = No Water

SECTION II - HAZARDOUS INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS#</th>
<th>% (Range)</th>
<th>Occupational Exposure Limits</th>
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</thead>
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<td>Nitric Acid</td>
<td>7697-37-2</td>
<td>25-75</td>
<td>ACGIH TLV-TWA: 5 mg/m³, OSHA PEL-TWA: 5 mg/m³</td>
</tr>
<tr>
<td>Sulfuric Acid</td>
<td>7664-93-9</td>
<td>25-80</td>
<td>ACGIH TLV-TWA: 10 mg/m³ (STEL), 1 mg/m³, OSHA PEL-TWA: 3 mg/m³ (STEL)</td>
</tr>
</tbody>
</table>

Ingredients, other than those mentioned above, as used in this product are not hazardous as defined under current Department of Labor regulations, or are present in deminimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

SECTION III - PHYSICAL DATA

Boiling Point: 180 - 270°F
Vapor Density: (Air=1) 2.5 – 3.0
Percent Volatile by Volume: Not Available
Evaporation Rate (Butyl Acetate = 1): <1
Vapor Pressure: Not Available
Density: 1.55 - 1.85 g/cc
Solubility in Water: Completely soluble.
**SECTION IV - FIRE AND EXPLOSION HAZARD DATA**

**Flash Point:** Not Applicable  
**Flammable Limits:** Not Applicable

**Extinguishing Media:** Use water spray or other suitable agent for fires adjacent to leaking tanks or other containers.  
**Special Fire Fighting Procedures:** Use water spray to cool non-leaking fire-exposed containers and to reduce and knock down vapors. **Do not** use solid water streams near ruptured tanks or spills of sulfuric acid. Acid reacts violently with water and can splatter acid on personnel. Apply water from as far away as possible and avoid directing water into the acid. Neutralize small amounts of spilled acid with crushed limestone, soda ash or lime. Wear self-contained breathing apparatus and full fire fighting protective gear.  
**Unusual Fire and Explosion Hazards:** Will emit oxides of nitrogen and sulfur upon heating. Strong oxidizer. May cause spontaneous combustion when in contact with organic or combustible materials. Reacts vigorously with water to liberate heat, oxides of nitrogen and sulfur and acid fumes.

**SECTION V - HEALTH HAZARD DATA**

**Effects of Overexposure**

**Eyes:** Will produce severe, immediate damage and may result in permanent damage or loss.  
**Skin:** Will produce immediate, penetrating chemical burns, with a characteristic yellow coloration. Severe and fatal skin burns can occur with necrosis and scarring.  
**Ingestion:** Will cause immediate irritation, chemical burns to mouth and throat, and may cause hemorrhaging, necrosis and perforation of the gastrointestinal tract. Based on toxicity data for other acids, not expected to be toxic by oral exposure as defined by OSHA.  
**Inhalation:** Highly toxic by inhalation as defined by OSHA. Mild exposure may cause irritation and burning of the nose and throat. Extreme inhalation may cause difficult breathing, loss of consciousness, pulmonary edema or death. Lung damage may appear after a delay of up to 48 hours after exposure.

**Emergency and First Aid Procedures**

**Eyes:** Irrigate with running water for at least fifteen minutes. Seek immediate medical attention.  
**Skin:** Immediately remove contaminated clothing. Flush with running stream of water for at least fifteen minutes. Wash with soap. Seek medical attention.  
**Ingestion:** Do not induce vomiting. Drink three or more glasses of water or milk to dilute acid. Seek immediate medical attention.  
**Inhalation:** Remove from exposure immediately. Restore or support respiration. Seek immediate medical attention for unprotected exposures beyond exposure limits.  
**Special Considerations:** If exposure to acid vapors occurs, medical observation should continue for 24-48 hours after exposure. Delayed reactions may cause pulmonary edema.

**SECTION VI - REACTIVITY DATA**

**Stability:** Stable under normal conditions.  
**Conditions to Avoid:** Avoid exposure to heat or sunlight, which promotes oxide formation.  
**Materials to Avoid (Incompatibility):** Bases. Organic and combustible materials. Will corrode most metals. Beware of containers, pumps and hoses of inadequate construction and/or contamination by incompatible chemicals.  
**Hazardous Decomposition Products:** Nitrogen oxides (NOₓ) and sulfur oxides (SOₓ)  
**Hazardous Polymerization:** Will not occur.
SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Evacuate unnecessary personnel to safe area upwind of spill. Acid vapor is denser than air and will concentrate in low spots. If necessary to enter spill area, wear full protective clothing including boots and proper breathing apparatus. Dike large spills and pump to salvage. If not possible to salvage, neutralize with soda ash or lime. If possible, carefully dilute acid or neutralizing material with water to slow down extremely vigorous neutralization reactions. Water spray can be used to reduce and knock down the vapors. Apply water from as far away as possible and avoid directing it into the acid. Do not get water in salvage containers since a violent reaction may occur. Notify authorities in accordance with emergency response procedures. Only personnel trained in emergency response should respond. Follow Federal, State and local spill reporting requirements.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any hazardous material.

SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Mechanical ventilation and/or local exhaust is indicated where needed to meet TLV requirement.
Respiratory Protection: For concentrations above the exposure limits, use full face supplied air respirator approved by NIOSH for nitric acid, nitrogen oxide gases or mists, sulfuric acid, and sulfur oxides. Chemical cartridge or canister respirators are not suitable for nitric acid or nitrogen oxide use. Protective Clothing: Neoprene or vinyl gloves should be required. Where spill or splash potential exists, rubberized aprons or chemical resistant suits are strongly recommended. Eye Protection: Acid proof goggles and face shield should be required where acid is transferred, sampled, or where persons are otherwise potentially exposed. Eye baths should be provided when direct contact is possible. Other Precautions Required: Provide safety showers and eyewashes in immediate vicinity.

SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in clean, cool, well-ventilated area away from organic chemicals, bases and metal powders. Other Precautions: Avoid hydrocarbon lubricants and packing materials. Wood structures or other organic material should be avoided within diked area or near mixed acid storage tanks. Corrosion rates are increased at elevated temperatures and by dilution with water. Refer to CMA Data Sheet SD-65 for additional information.

SECTION X - SPECIAL INFORMATION

This product contains the following substances that are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>% By Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitric Acid</td>
<td>7697-37-2</td>
<td>25-75</td>
</tr>
</tbody>
</table>

Moderately toxic to aquatic organisms based on algae data and on fish data for other acids as defined by USEPA.

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APPENDIX D

Natural Resources Canada (ERD) Approval in Principle
15 November 2007

To: Jim Kasemets
Newfoundland Hard-Rok Inc
P.O. Box 605
Corner Brook, Newfoundland & Labrador
A2H 6G1

Phone 709-639-9179
Fax 709-639-7303

Re: New Emulsion Plant at Factory Licence 2007(03)-F434, Corner Brook, Newfoundland & Labrador

Jim,

As per your letter and attachments of August 2nd, I grant an approval in principle for your new emulsion plant as described in the attached documents. Let me know if you would like a formal letter confirming this.

Neil Maclean will send you some information about environmental assessments. You will need one for this plant.

Before licensing the plant we will want to inspect it to make sure it meets the standards laid out in the "Guidelines for Bulk Explosives Facilities"; recommendations that come out of your internal Hazard Study of the plant design and the explosives regulations. You will also have to comply with all other applicable regulations and by-laws, federal, provincial and local. Please note that by the time the plant is scheduled to be complete our new Explosives Regulations should be in effect.

The process appears very similar to your plant at Voisey's Bay which we have inspected and licensed.

If you are in any doubt about our regulations as they will affect your plant or have any other questions please contact us. We always suggest that you talk to us before building anything which you are not confident will get our approval.

Sincerely yours,

cc. Atlantic Region by Fax

John Buszard
Senior Inspector of Explosives
APPENDIX E

Quantity Distance Table for Explosives
The Quantity-Distance (Q-D) tables give the minimum permissible distance between a donor site containing a quantity of explosives and a susceptible site requiring protection. These distances are functions of quantity of explosives (NEQ) and hazard division (HD). For more information see the Quantity Distance Principles User Manual (refer to priced publications section on the Publications page).

**Q-D Table for HD 1.1 & 1.5 - Mass explosion hazard** (pdf)

D1 - Distance to a barricaded magazine containing only HD 1.5 explosives

D2 - Distance to a barricaded magazine

D3 - Smaller distance to a process building

D4 - Standard distance to a process building/distance to a light traffic route

D5 - Distance to a medium traffic route

D6 - Distance to a magazine (no barricade)

D7 - Distance to an inhabited building/distance to a heavy traffic route

D8 - Distance to building of vulnerable construction
<table>
<thead>
<tr>
<th>NEQ (kg)</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
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