



ENVIRONMENTAL ASSESSMENT REGISTRATION

BLASTING AGENTS (EMULSION) MANUFACTURING PLANT



Newfoundland Hard-Rok Inc.
Environmental Assessment

Registration Form

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

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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 use 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.

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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, incase 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.

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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

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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.

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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:

Appendix A	Site Location Map
Appendix B	Building and Site Layout
Appendix C	Material Safety Data Sheets
Appendix D	Natural Resources Canada (ERD) Approval in Principle
Appendix E	Quantity Distance Tables for Explosives

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.
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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 1st, 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

1. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND CONDITIONS ON SITE BEFORE PROCEEDING WITH ANY PORTION OF THIS WORK. DO NOT SCALE FROM DRAWINGS.

REVISIONS

TAMP	PERMIT
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LIMITED
CONSULTING ENGINEERS

TELEFAX: (709) 726-4499
e-mail: admin@nidel.com

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06/07/17	AS NOTED	S2	B
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APPENDIX C

Material Safety Data Sheet

Material Safety Data Sheet

Dyno Nobel Inc.

2650 Decker Lake Boulevard, Suite 300
Salt Lake City, Utah 84119
Phone: 801-364-4800 Fax: 801-321-6703
E-Mail: dnn.hse@am.dynonobel.com

FOR 24 HOUR EMERGENCY, CALL **CHEMTREC (USA) 800-424-9300**
CANUTEC (CANADA) 613-996-6666

MSDS # 1052
Date 07/15/07

Supersedes
MSDS # 1052 3/27/07

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):

DYNO GOLD [®]	RUG-1 (Canada Only)
DYNOGOLD [®] C	TITAN [®] 1000
DYNO GOLD [®] C EXTRA	TITAN [®] 1000G
DYNO GOLD [®] C LITE	TITAN [®] PB 1000
DYNO GOLD [®] C LITE SUPER	TITAN [®] XL1000
DYNO GOLD [®] CS LITE	TITAN [®] 2000
DYNO GOLD [®] LITE	TITAN [®] 2000G
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

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

* 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 de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

Material Safety Data Sheet

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: (Air = 1) Not Applicable
Percent Volatile by Volume: <30

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.

Evaporation Rate (Butyl Acetate = 1): <1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable
Extinguishing Media: (See Special Fire Fighting Procedures Section)
Flammable Limits: Not Applicable
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 (NO_x), 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.

Disclaimer

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MATERIAL SAFETY DATA SHEET
DYNOL NOBEL INC.
11TH FLOOR CROSSROADS TOWER
SALT LAKE CITY, UTAH 84144
PHONE: 801-364-4800 FAX: 801-328-6452
E-MAIL: DNNA.HSE@AM.DYNOLNOBEL.COM
FOR 24 HOUR EMERGENCY CALL 800-424-9300

MSDS #1021

DATE: 01/22/03

Supersedes MSDS
1021 03/01/02

SECTION I - PRODUCT IDENTIFICATION

Trade Name: DYNOL NAL

Chemical Name: Ammonium Nitrate, NH_4NO_3

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

Product Appearance & Odor: Colorless liquid. Slight ammonia odor.

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	HMIS Classification:	Health	3
	Flammability (Red) = 0		Flammability	0
	Reactivity (Yellow) = 3		Reactivity	3
	Specific Hazard (White) = Oxidizer		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_x). Chronic exposure to NO_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_x vapors occurs, restore or support breathing as necessary, seek medical attention. Observe for delayed reactions to NO_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_x), Ammonia (NH₃), Nitric Acid (HNO₃).

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.

Chemical Name	CAS Number	% By Weight
	(Use Toxic Chemical Category Code)	
Nitrate Compounds	N511	62 – 70%
(Water dissociable reportable only when in aqueous solution)		
Ammonia	7664-41-7	17 – 19%
(Aqueous from dissociable salts)		

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.)**



P.O. Box 681, 1 Brockchem Rd.
Maitland, On K0E 1P0
Tel: (613)348-3681
Fax: (613)348-3043

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 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: NH_4NO_3

SECTION II. INGREDIENTS AND HAZARDS

<u>INGREDIENT NAME</u>	<u>HAZARD</u>	<u>PROVISIONAL LIMIT</u>
AMMONIUM NITRATE	No <u>TLV</u> established No <u>IDHL</u> established Recommend Nuisance Rating (SAX) Respirable: 5 mg/m ³	Air 0.05 mg/m ³ Data by TRW Systems Group for EPA contract (August 1973, NTIS PB 244 591) LD ₅₀ : 5300 mg/kg LC ₅₀ : 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: | No <u>TWA</u> established |
| - Mineral Oil | - CAS NO: 67254-74-4: {<0.2%} | <u>TLV</u> 5mg/M ³ 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 alkalis 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, harcoal, 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 NH_4NO_3 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:	LD ₅₀ : 5300 mg/kg
	LC ₅₀ : 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 NO_3)

SECTION VIII. SPECIAL PROTECTION INFORMATION

Provide general exhaust ventilation in the workplace and storage area.

A NIOSH/MHSA 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_4NO_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_4NO_3 , NFPA 490 and 495]. Do not store above 54C (129F).

Store under dry conditions. A possible explosive hazard when contaminated with many other materials.

DOT: oxidizer

LABEL: oxidizer

DOT CLASS: OXIDIZER

ABBREVIATIONS

TC_{LO} :	Lowest Published Toxic Concentration
LC_{LO} :	Lowest Published Lethal Concentration
TWA:	Time Weighted Average
TLV:	Threshold Limit Value
LD_{50} :	Lethal Dose 50
LC_{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

Material Safety Data Sheet

Dyno Nobel Inc.

2650 Decker Lake Boulevard, Suite 300
Salt Lake City, Utah 84119
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E-Mail: dnn.hse@am.dynonobel.com

FOR 24 HOUR EMERGENCY, CALL **CHEMTREC (USA) 800-424-9300**
CANUTEC (CANADA) 613-996-6666

MSDS # 1052
Date 07/15/07

Supersedes
MSDS # 1052 3/27/07

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):

DYNO GOLD [®]	RUG-1 (Canada Only)
DYNOGOLD [®] C	TITAN [®] 1000
DYNO GOLD [®] C EXTRA	TITAN [®] 1000G
DYNO GOLD [®] C LITE	TITAN [®] PB 1000
DYNO GOLD [®] C LITE SUPER	TITAN [®] XL1000
DYNO GOLD [®] CS LITE	TITAN [®] 2000
DYNO GOLD [®] LITE	TITAN [®] 2000G
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

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

* 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 de minimus concentrations (less than 0.1% for carcinogens, less than 1.0% for other hazardous materials).

Material Safety Data Sheet

SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable
Vapor Density: (Air = 1) Not Applicable
Percent Volatile by Volume: <30

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.

Evaporation Rate (Butyl Acetate = 1): <1

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 (NO_x), 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.

Disclaimer

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MATERIAL SAFETY DATA SHEET

Product Name:
Diesel Fuel (3092)

SECTION 1 – PRODUCT IDENTIFICATION AND USE

Product name	Diesel Fuel	PIN #, UN #	1202
Chemical name	None	TDG, DOT class	Class 3
Common names and Product use	API No. 2 fuel oil. Home heating oil No. 2. Number 2 burner oil.	Packing group	III
WHMIS classification	Fuel	Shipping Name	Diesel Fuel
WHMIS classification	Combustible liquid Class B Div 3 (Very) toxic Class D Div 1 Subdivision A – sulphur (S)-containing, or Div 2 Subdivision B – no S		
Hazard codes	NFPA Health 4 for S-containing. 1 if no S Flammability 2 Reactivity 0	HMIS Health 4 for S-containing. 1 if no S Flammability 2 Reactivity 0	
<i>NFPA & HMIS Ratings: 0=Insignificant/No Hazard. 1=Slight Hazard. 2=Moderate Hazard. 3=High/Serious Hazard. 4=Extreme/Severe Hazard.</i>			
Supplier	Irving Oil Limited, Refining Division Box 1260, Saint John New Brunswick Canada E2L 4H6	Phone	(506) 202-2000
		Emergency (Chemtrec)	1-800-424-9300
		Refinery	(506) 202-3000

SECTION 2 – HAZARDOUS INGREDIENTS

Ingredients	CAS#	Wt (%)	ACGIH-TLVs (2004)	OSHA PELs (2004) (general industry)	NIOSH RELs (2004)	LD ₅₀ (rat, oral)	LC ₅₀ (rat, 4 hours)
Diesel fuel	68476-30-2	100	100 mg/m ³ TWA (vapour & aerosol)	NAv for this product name or CAS#		>5 g/kg	~5g/m ³
<i>May contain:</i>							
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)	Various	Up to 10	Various	Various	Various	Various	Various
<i>which may include:</i>							
Naphthalene	91-20-3	Trace	10 ppm TWA 15 ppm STEL	10 ppm TWA	10 ppm TWA 15 ppm STEL	0.49 g/kg	>170 mg/m ³
<i>May also contain:</i>							
Sulphur	7704-34-9	Varied	NAv	NAv	NAv	>0.008 g/kg	NAv
<i>which may result in the evolution of:</i>							
Hydrogen sulphide (H ₂ S)	7783-04-6	NAp	10 ppm TWA 15 ppm STEL	20 ppm CEILING 50 ppm PEAK	10 ppm CEILING	NAp	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	Specific gravity	0.830 to 0.879 @ 20°C
Colour	Yellowish-brown	Vapour density	NAv
Odour	Rotten eggs if sulphur present; kerosene-like if sulphur-free	Vapour pressure	2.12 to 26.4 mm Hg @ 21°C
	Note: H₂S deadens the sense of smell. Absence of rotten egg smell does not mean absence of H₂S.	Evaporation rate	NAv
Odour threshold	<0.15 ppm for H ₂ S. Not available for sulphur-free product.	Boiling point	160 to 358°C (321 to 676°F)
Coefficient of water/oil distribution	3.3 to 7.06 (Log K _{ow})	Freezing point	NAv
		pH	NAp

SECTION 4 – FIRE AND EXPLOSION HAZARDS

Flammability	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Conditions	Easily ignited by heat, sparks or flames.
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	Static discharge Vapour: yes
Means of extinction	In general, do not extinguish fire unless flow can be stopped. Use carbon dioxide, dry chemical, or foam. Cool containers with flooding quantities of water until well after the fire is out.		
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. H ₂ S and sulphur dioxide (SO ₂) if product contains sulphur.		

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MATERIAL SAFETY DATA SHEET

Product Name:
Diesel Fuel (3092)

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.
Hazardous decomposition products	H ₂ S and SO ₂ if product contains sulphur. Carbon monoxide, nitrogen oxides, and numerous aromatic hydrocarbons.

SECTION 6 – HEALTH HAZARD INFORMATION

Route of Entry	<input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion <input type="checkbox"/> Eyes	Hazardous Contact <input checked="" type="checkbox"/> Eye
	<input checked="" type="checkbox"/> Skin absorption Diesel fuel itself, as well as benzene & naphthalene	<input checked="" type="checkbox"/> Skin contact
Acute exposure	Coughing, headache, and giddiness following inhalation. Aspiration into the lungs can cause severe pneumonitis (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. H ₂ S 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 H ₂ S 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.	Mutagenicity Not known to be mutagenic Sensitization No Irritancy Skin and respiratory tract Teratogenicity Not available Reproductive toxicity Not available
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

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



MATERIAL SAFETY DATA SHEET

Product Name:
Diesel Fuel (3092)

Engineering controls	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.
Handling procedures & equipment	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.
Leak & spill Procedure	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.
Waste disposal	Consult local authorities for advice.
Storage	May be stored at ambient temperatures. Containers should be vented and equipped with a flame arrester.
Shipping	Stable during transport. May be transported hot.

SECTION 9 – PREPARATION OF MSDS

Prepared by	Irving Oil Limited, Refining Division	Phone	(506) 202-3000
Revision date	July 12, 2006	To re-order MSDS, phone	(506) 202-2000

Material Safety Data Sheet

Dyno Nobel Inc.

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FOR 24 HOUR EMERGENCY, CALL **CHEMTREC (USA) 800-424-9300**
CANUTEC (CANADA) 613-996-6666

MSDS # 1201**Date 12/09/05**

Supersedes
MSDS # 1201 02/07/05

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

Ingredients:	CAS#	%	ACGIH TLV-TWA
Inorganic Nitrite Salts		12-35	
Sodium Nitrite	7632-00-0	0-35	No Value Established
Calcium Nitrite	13780-06-8	0-35	No Value Established
Potassium Nitrite	7758-09-0	0-35	No Value Established
Sodium Nitrate	7631-99-4	0-25	No Value Established
Calcium Nitrate	10124-37-5	0-25	No Value Established
Sodium Thiocyanate	540-72-7	0-35	No Value Established

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 de minimus 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 Density: Same as water

Percent Volatile by Volume: <90% (water)

Evaporation Rate (Butyl Acetate = 1): <1

Vapor Pressure: Less than pure water

Density: 1.10 - 1.35 g/cc

Solubility in Water: Completely Soluble

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: 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.

Material Safety Data Sheet

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 (NO_x), oxides of sulfur (SO_x), 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.

Material Safety Data Sheet

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.

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

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Material Safety Data Sheet

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FOR 24 HOUR EMERGENCY, CALL **CHEMTREC (USA) 800-424-9300**
CANUTEC (CANADA) 613-996-6666

MSDS # 1202**Date 02/07/05**

Supersedes
MSDS # 1202 01/28/03

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

<u>Ingredients:</u>	<u>CAS#</u>	<u>%</u>	<u>ACGIH TLV-TWA</u>
Acetic Acid	64-19-7	50-60	10 ppm (25 mg/m ³)

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 de minimus 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.**Flammable Limits:** Not applicable

Material Safety Data Sheet

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.

Material Safety Data Sheet

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.

<u>Chemical Name</u>	<u>CAS Number</u>	<u>% By Weight</u>
None		

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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.)**

Safety data sheet

N 23 P Emulsifier

Revision date : 2006/07/04
Version: 1.0

Page: 1/4
(30085078/MDS_GEN_CA/EN)

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.

Safety data sheet

N 23 P Emulsifier

Revision date : 2006/07/04

Version: 1.0

Page: 2/4

(30085078/MDS_GEN_CA/EN)

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

Paraffin oils

OSHA

PEL 5 mg/m3 Mist ;

ACGIH

TWA value 5 mg/m3 Mist ; STEL value 10 mg/m3 Mist

;

Personal protective equipment

Hand protection:

Chemical resistant protective gloves, Suitable materials, rubber, plastic

Safety data sheet

N 23 P Emulsifier

Revision date : 2006/07/04

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(30085078/MDS_GEN_CA/EN)

Eye protection:

Tightly fitting safety goggles (chemical goggles).

General safety and hygiene measures:

Wash soiled clothing immediately.

9. Physical and chemical properties

Form:	liquid, viscous	
Odour:	mild, of hydrocarbons	
Odour threshold:	No data available.	
Colour:	dark	
pH value:		No data available.
Boiling point:	> 149 °C	(1,013 hPa)
Vapour pressure:	< 1.3 hPa	(25 °C)
Relative density:	0.9	(25 °C)
Vapour density:		Heavier than air.
% volatiles:	35 %	
Solubility in water:		insoluble

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.

Safety data sheet

N 23 P Emulsifier

Revision date : 2006/07/04

Version: 1.0

Page: 4/4

(30085078/MDS_GEN_CA/EN)

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

Safety data sheet

N 7A Sorbitan Monotallate

Revision date : 2006/03/23
Version: 1.0

Page: 1/5
(30085088/MDS_GEN_CA/EN)

1. Substance/preparation and company identification

Company
BASF CANADA
Milverton 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.

Safety data sheet

N 7A Sorbitan Monotallate

Revision date : 2006/03/23
Version: 1.0

Page: 2/5
(30085088/MDS_GEN_CA/EN)

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

Page: 3/5
(30085088/MDS_GEN_CA/EN)

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/cm ³	(25 °C)
Relative density:	1	(25 °C)
% 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.

Safety data sheet

N 7A Sorbitan Monotallate

Revision date : 2006/03/23

Version: 1.0

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(30085088/MDS_GEN_CA/EN)

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

Safety data sheet

N 7A Sorbitan Monotallate

Revision date : 2006/03/23
Version: 1.0

Page: 5/5
(30085088/MDS_GEN_CA/EN)

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

Dyno Nobel Inc.

2650 Decker Lake Boulevard, Suite 300
Salt Lake City, Utah 84119
Phone: 801-364-4800 Fax: 801-321-6703
E-Mail: dnn.hse@am.dynonobel.com

FOR 24 HOUR EMERGENCY, CALL **CHEMTREC (USA) 800-424-9300**
CANUTEC (CANADA) 613-996-6666

MSDS # 1026**Date 01/31/05**

Supersedes
MSDS # 1026 01/27/03

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

Ingredients:	CAS#	% (Range)	<u>Occupational Exposure Limits</u>	
			ACGIH TLV-TWA	OSHA PEL-TWA
Nitric Acid	7697-37-2	25-75	5 mg/m ³ 10 mg/m ³ (STEL)	5 mg/m ³
Sulfuric Acid	7664-93-9	25-80	1 mg/m ³ 3 mg/m ³ (STEL)	1 mg/m ³

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 de minimus 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.

Material Safety Data Sheet

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 (NO_x) and sulfur oxides (SO_x)

Hazardous Polymerization: Will not occur.

Material Safety Data Sheet

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.

<u>Chemical Name</u>	<u>CAS Number</u>	<u>% By Weight</u>
Nitric Acid	7697-37-2	25-75

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

Disclaimer

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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

Quantity-Distance Tables

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

QUANTITY-DISTANCE TABLE FOR HAZARD DIVISIONS 1.1 & 1.5

NEQ kg	Quantity-Distance (metres)							
	D1	D2	D3	D4	D5	D6	D7	D8
50	5	10	18	30	180	45	270	400
60		10	19	32		45		
70		10	20	33		45		
80		11	21	35		48		
90		11	22	36		50		
100		12	23	38		53		
120		12	24	40		55		
140		13	25	42		60		
160		14	27	44		63		
180		14	28	46		65		
200	5	15	29	47		65		
250	6	16	31	51		70		
300	6	17	33	54		75		
350	6	17	34	57		80		
400	6	18	36	59		83		
450	7	19	38	62		88		
500	7	20	39	64		90		
600	7	21	42	68		95		
700	8	22	45	72		100		400
800	8	23	48	75		105		415
900	8	24	50	78		108		430
1000	8	24	53	80		113		445
1200	9	26	58	86		120		475
1400	9	27	63	90		125		500
1600	10	29	68	94		130		520
1800	10	30	73	98		135		540
2000	11	31	78	105	180	140	270	560
2500	11	33	90	110	185	153	275	610
3000	12	35	105	120	205	163	305	640
3500	13	37	115	125	220	170	330	680
4000	13	39	130	130	235	178	350	710
5000	14	42	140	140	255	190	380	760
6000	15	44	150	150	270	203	405	810
7000	16	46	155	155	285	213	425	850
8000	16	48	160	160	300	223	445	890
9000	17	50	170	170	310	235	465	930
10000	18	52	175	175	320	240	480	960
12000	19	55	185	185	340	255	510	1020
14000	20	58	195	195	360	270	540	1080
16000	21	61	205	205	375	280	560	1120
18000	21	63	210	210	390	295	590	1180
20000	22	66	220	220	405	305	610	1220
25000	24	71	235	235	435	325	650	1300
30000	25	75	250	250	460	345	690	1380
35000	27	79	265	265	485	365	730	1460
40000	28	83	275	275	510	380	760	1520
50000	30	89	295	295	550	410	820	1640
60000	32	94	315	315	580	435	870	1740
70000	33	99	330	330	610	460	920	1840
80000	35	105	345	345	640	480	960	1920
90000	36	110	360	360	670	500	1000	2000
100000	38	115	375	375	690	520	1040	2080
120000	40	120	395	395	730	550	1100	2200
140000	42	125	420	420	770	580	1160	2320
160000	44	135	435	435	810	610	1220	2420
180000	46	140	455	455	840	630	1260	2520
200000	47	145	470	470	870	650	1300	2600
250000	51	155	510	510	940	700	1400	2800