The Power of Partnership

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Baffinland Iron Mines: Mary River Project

Explosives Management Plan

Nunavut Territory, Canada

Project Number	Mary River
Revision Number	3
Date	16 January 2012

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1 Introduction

1.1 Project Description

Baffinland Iron Ore Mines Corporation (BIM) is currently in the process of developing an iron ore mine at Mary River in the Territory of Nunavut, Canada. BIM retains the lease right to four iron ore deposits in this area. This Explosives Management Plan focuses on the developments of the Mary River Site.

The Mary River project is located on the northern half of Baffin Island, approximately 160km south of Mittimatalik (Pond Inlet) and 1,000km northwest of Iqaluit, the capital of the Nunavut Territory. There is an existing port, Milne Inlet, approximately 100km north of the project area. It includes a dock facility, connected to the project via a tote road. This road will be maintained to facilitate transportation of all equipment, construction materials, and consumables (including pre-packaged explosives and raw materials required for explosives manufacture) required for supporting the project.

Approximately 145km south of the Mary River site is a proposed location for a new dock facility (Steensby port). This port is being proposed to receive all equipment, construction materials and consumables (again including pre-packaged explosives and raw materials required for explosives manufacture) to support construction activities. The current proposal will see the construction of a rail line from the proposed Steensby Port to the mine site which will be dedicated to ore shipment.

1.2 Explosives Project Description

In supporting the overall Mary River project development the use of explosives will be required. The use of ammonium nitrate based explosives is being proposed based on the expected site conditons. The purpose of this Explosives Management Plan is to outline the systems, procedures and best practices to minimize environmental impacts, specifically water quality and wildlife during the period where blasting operations will be conducted.

General infrastructure to support the project will include:

- Construction of two (2) temporary emulsion manufacturing plants.
    - One (1) located in the vicinity of the proposed Steensby Port
    - One (1) located at the Mary River Project
- Storage areas for bulk Ammonium Nitrate
- Storage for pre-packaged explosives
- Raw Materials Storage
- Construction of one permanent plant (including storage as defined above) at the Mary River Project (estimated construction to commence in 2015).

The project will be completed in two distinct phases. The first phase of the project will be a construction phase. This will include developmental work in the vicinity of the Steensby Port, the Mary River mine site and on rail right of ways to support future full scale operations.

Drawings outlining the various temporary and permanent infrastructures are attached at Appendix A.

Preliminary drawings outlining the general layout for each of the proposed sites are attached at Appendix B.

1.3 General Operating Considerations

Based on the remote nature of the site, ensuring adequate on-site support and response to any potential environmental considerations is critical. All essential equipment required to support spill contianment and recovery will be located on the mine site property and will be operated by the BIM mine site staff.

The design premise for all explosives manufacturing sites is based on working to achieve a zero effluent process. Although described in more detail below, each of the manufacturing sites will be equipped with a purpose built explosives contaminated waste water collection and evaporation system. Contaminated

waste water generated from manufacturing operations will be collected in the evaporation system. Following evaporation of the water any residual solid material will be collected, packaged into appropriate explosives packaging (refered to as “Special E”) which will be disposed of through consumption in follow on blasts.

1.4 Management Plan – General

This plan will outline the actions that will be taken to address any environmental spill issue at the point of origin related to the explosives manufacturing process which will in turn assist in the reduction of potential contaminant release into the environment

The control and use of explosives within Canada and the Territorial area are covered by existing federal and territorial regulations. Orica Canada Inc. will put into place operational policies and procedures which meet or exceed the required regulations. The main applicable regulations in the case of the Mary River project include (but are not limited to):

- The Canada Explosives Act
- Transportation of Dangerous Goods Act
- Occupational Health & Safety, Nunavut – Explosives Use Act
- Northwest Territories / Nunavut Mine Health and Safety Act and Regulations

Orica maintains detailed “Basis of Safety” documentation for the safe handling, use and manufacturing of explosives. In addition to those “Basis of Safety” documents, there will be overlapping reference to other critical model procedures, training requirements and integration with mine site activites.

As a precondition of receipt of federal licensing for the storage, use, transportation and manufacture of explosives there is the requirement to have in place a detailed site specific Emergency Response Plan (ERP). Orica utilizes the CAN/CSA Z731-03 Standard for “Emergency Preparedness and Response” as the guiding document for the preparation of site specific ERP’s.

A detailed ERP, prepared in accordance with the guidance provided in this standard will be prepared during development of the project. It will be integrated with the mine site ERP to maximize resource utilization, training and planning efforts. As indicated above this document must be prepared in advance of receipt of any federal explosives license.

1.5 Products & Raw Materials – General

Orica Canada will include a detailed operations manual for the conduct of operations on the Mary River and Steensby Port sites for the purposes of transporation, storage, handling and manufacture of explosives. Individual scope of works documents have been prepared and submitted for review under separate cover. The recommended products are currently listed as approved products federally. They are indstry proven for use in northern climates and are accepted globally. Orica has experience operating in open pit iron ore mines within both Canada and globally. All proposed infrastructure and manufacturing processes will be licensed and approved by Natural Resources Canada – Explosives Regulatory Division.

In addition to the raw materials required for explosives manufacture, Orica will be providing pre-packaged commercial products to support the operations at the Mary River and Steensby Port sites. This will include detonators, boosters, pre-packaged commercial explosives for specialty operations and detonating cord. All of these materials will be transported and stored in accordance with the regulations identified above. Magazine storage sites will be included in the overall federally issued explosives license.

2 Explosives Management

2.1 Operational Phases / Timelines

Based on the overall operational BIM mine site developmental planning the project will be delivered in two (2) distinct phases: 1) Construction / Pre-Development and 2) Full Scale Operations.

2.1.1 **Construction Phase:** The initial construction phase will begin with delivery of explosives, raw materials and infrastructure during a sea lift completed during the period July – October 2012. At this time pre-packaged explosives products will be shipped and stored for future use in approved and licensed explosives magazines. Magazines will be constructed in accordance with the 2001 Storage Standards for Explosives. Raw materials required for the production of bulk explosives will be shipped during the 2012 sea lift. These materials will include Ammonium Nitrate Prills (See Attached MSDS / TDS). These raw materials will be stored in accordance with industry accepted storage procedures and will be subject to routine storage site inspections. Storage standards outlined in Appendix E to the Explosives Regulatory Division Bulk Guidelines, Revision 5 for the storage of large quantities of Ammonium Nitrate will be followed. While it is anticipated that an explosives manufacturing facility will be shipped to the site during the 2012 sea lift, it will not be commissioned until early 2013 based on mine site forecasting. The use of on-site manufactured bulk explosives will commence in early 2013 based on the mine site forecast.

2.1.2 **Operations Phase:** Following completion of the construction phase the mine site will move into full scale production. This will include the construction of a permanent explosive manufacturing facility located at the Mary River mine site. Details for this site are included below. Based on the current mine site forecast it is anticipated that this phase will commence in calendar year 2016. The materials to support infrastructure construction will be shipped via sea lift during the 2014 – 2015 period. Assembly of the manufacturing plant will be based on mine site demand and will be subject to formal notice of commencement submission through the Canadian Environmental Assessment Registry.

2.2 Overview

Orica maintains strict handling policies with regards to the safe handling, transporation, manufacture and storage of explosives. Through “Basis of Safety” documentation and established Model Procedures sites will be established to ensure adherence to all relevant regulations.

2.3 Steensby Port Site

2.3.1 See Appendix A for location information. A temporary modular manufacturing plant will be established to support operations at the Steenby Port Site. In order to support these operations the plant will be capable of producing up to 10 million kilograms of explosive product per year for four years, based on 365 operating days per year. While the capability number identified above speaks to the maximum operating capacity, it is forecasted that the plant constructed in the Steensby Port area will manufacture a total of 13 million kilograms of explosive product to support port construction and an additional 13 million kilograms to support the south end of the rail right-of-way over the four year duration.

Packaged explosives will also be required to support the site. An explosives magazine storage area will be establsihed to support this requirement. Magazines will be of Type 4 construction (refer to the document “Explosives Storage Standards – 2001 published by the NR Can Explosives Regulatory Division for specific means of construction).

2.4 Mary River Site

2.4.1 The temporary modular manufacturing plant located at the Mary River site will mirror the site set-up utilized for providing support to the Steensby Port site. It will be capable of the same volume of manufacturing. It is forecasted that 13 million kilograms of explosive products will be required to support the construction of the site and an additional 13 million kilograms of explosive product will be required to support the construction of the northern end of the rail right-of-way.

2.4.2 As above there will be the requirement to provide pre-packaged explosive products to support the site and rail construction activities. It is forecasted that up to 1.5 million kilograms of pre-packaged product will be required to support these activities. The magazine storage site will be established respecting the requirements outlined in the NR Can ERD issued Quantity Distance Manual.

2.4.3 As construction progresses a permanent plant will be established on the Mary River site. This plant will be operational beginning in June 2016. This plant will be capable of manufacturing bulk emulsion explosives. This permanent plant will be based on the manufacture of up to 35,000 Te/a of bulk emulsion product. A general site layout for this plant is attached at Appendix B.

2.5 Remote Storage

2.5.1 In order to support rail line construction pre-packaged emulsion and blasting accessories will be required. Based on the operational plan a total of 20 storage sites will be required along the proposed route. Ten (10) each will be supplied from the Steensby Port Site and Mary River Sites. Each site will be capable of storage of up to 80,000 kilograms of explosive product and one month of blasting accessories. These sites will include up to three (3) Type 4 explosive magazines. Two (2) will be designated for pre-packaged explosives products and one (1) will be used to store detonators. Based on the climactic conditions it is highly likely that at least one magazine in each set-up will require internal heating to ensure product performance. This will be accomplished using heaters designed for use in explosive environments (NEC Class 2, Division 2). Power will be supplied via on-site generator. Fueling of the on-site generator will be accomplished via portable tanker. In the event a generator is required appropriately sized spill kits will be located on site. The generator will be located within a secondary containment system.

2.6 Raw Materials Storage

2.6.1 **AN Prill.** Ammonuim Nitrate Prills (solid) will be stored in bulk within a dedicated storage area. AN Prill will be stored in either 1 Te FIBC containers approved for storage of this material loaded into shipping containers. If stored in this manner there will be 22 Te of AN Prill stored in each container. In order to ensure sufficient supply of AN Prill for each of the two temporary modular manufacturing plants a total of 9.5M kilograms of AN Prill will be required.

The AN Prill, in shipping containers will be transported from the bulk storage area to the manufacturing site using mine site heavy equipment. Container doors will be secured and internal 1 Te FIBC's will be tied closed to ensure no spillage during transportation from the storage site to the manufacturing site. The AN Prills will be transferred into storage silos located at the manufacturing facility for use in the manfuacturing process. AN Prill silos will meet storage standards for this product as well as for the climactic region. Individual AN 1 Te FIBC's will be transferred into silo using a hopper / bucket elevator configuration. Spill containment will be in place at the transfer site. A similar equipment configuration, utilizing a hopper and auger will be used to transfer the same material into explosives process vehicles for delivery to the borehole. This AN Prill will be blended on a process vehicle to result in a 70:30 blend (emulsion to AN Prill), or other formulation as required for supporting specialty operations, for delivery down the borehole.

AN Prill is a granular or "pellet" form material. In the event of a spill of product it will be recovered using locally provided spill kits. Recovered material will be disposed of through consumption in subsequent blast holes or worked into manufactured product.

2.6.2 **Surfactant.** A surfactant is used in the manufacturing process to enable the manufacture of bulk emulsion products. This material will be transported to the manufacturing sites in 20,000 kg UN approved portable containers. This material and other additives are blended with a diesel based fuel to create a "Fuel Phase" for supporting emulsion manufacture. These UN Approved portable containers will be stored separate from the manufacturing site and separate from the storage of bulk AN Prill. They will be transported to the manufacturing site as required to support the manufacturing process. At either the storage location or in proximity to the manufacturing process these containers will be located on top of secondary containment designed to 100% of the total maximum volume.

2.7 Emulsion Manufacture

The manufacturing process will be capable of producing up to 10 million kilograms of bulk emulsion product annually at each of the temporary modular plant sites and up to 35 million kilograms at the permanent site to be constructed at the Mary River project site. The primary product to be produced will be based on a 70:30 emulsion ANFO blend. In order to mitigate the potential for any spill the plants will be designed to be self bunded to contain up to 110% of the largest internal storage tank.

In the process AN Prill is blended with water and other additives and heated to create an oxidizer phase. This is then mixed, using proprietary process with the fuel phase defined above to create an explosives emulsion. Quality control procedures are established to ensure consistency of manufactured product.

The emulsion explosives manufactured will be transferred into a process vehicle, along with additional AN Prill which will be blended further on the vehicle for delivery down the borehole.

The manufacturing process is an industry-proven process. It is utilized at multiple sites across Canada and globally. There are documented processes and procedures for controlling the manufacture. Procedural items include the receiving of AN Prill, QA Testing, equipment calibration and preventative maintenance procedures to highlight but a few. A field reference guide outlining core and critical model procedures is available for review as required.

Orica maintains a rigid hazardous materials handling process. All chemical components are stored and handled in accordance with their respective MSDS and copies are posted in conspicuous areas. In addition copies of chemical handling guides are posted in each storage area. Chemical registers are also maintained.

2.8 On-Site Handling

All on-site transportation will be done in accordance with Section 14 of the Mines Act and Regulations as well as with the Transportation of Dangerous Goods Act. Non-process vehicles (i.e. Forklifts, on-site vehicles,etc) will be maintained in sound mechanical condition and equipped with safety equipment as required under mine site policy / regulations. Process Vehicles will be maintained in accordance with internal maintenance schedules and will be subject to tank certifications under CAN/CSA B620-03.

Where possible, manual handling tasks will be minimized to contribute to injury prevention and reduction. Site specific manual handling tasks will be identified and an internal Job Site Environmental Risk Assessment (JSERA) will be prepared.

2.9 Personnel Qualifications / Exposure

The base premise when dealing with explosives is to reduce exposure to non-essential personnel. The site will be established with appropriate man-limits agreed to by the NR Can Explosives Regulatory Division and published on the site license. As required under either federal or territorial regulations all personnel will hold valid permits / certificates.

2.10 Process Vehicles

Orica recommends the use of what is referred to internally as a BulkMaster process vehicle for the purposes of delivering bulk emulsion into the borehole. This vehicle has the capability to blend a 70:30

emulsion: AN Prill formulation using internal auger systems. It also has the ability to manufacture an AN Prill Fuel Oil blend (ANFO) directly into boreholes.

This flexibility allows the process vehicle to use either an emulsion based product to provide superior blasting results as well as blends to meet the requirements of each blast area.

The vehicle is based on a standardized design which has gone through an internal hazard study process to ensure conformance with safety standards and best practices. Product is delivered through a delivery hose down the borehole. QA measurements are taken during delivery (density information) to ensure product consistency. There is on board electronics to monitor delivery volumes to ensure adherence to blast design.

These vehicles adhere to a preventative maintenance program to ensure continued safe and compliant operation. Tanks installed on the process vehicle are subject to periodic testing requirements in accordance with CAN/CSA B620-03 as required by Transport Canada. In order to reduce the possibility of potential loss of containment of explosives product these tanks are designed to meet the TC-412 design specification.

2.11 Daily Planning / Control

Daily loading volumes will be provided to Orica, as the explosives provider. This information will be used to determine the quantity to load onto any process vehicle of bulk emulsion product. Careful communications between the blast planner and the manufacturing plant will ensure that no significant volume of excess material is loaded onto the vehicle. The maximum net explosive quantity (NEQ) that can be carried by the vehicle is based on the design configuration and is recorded on the vehicle license. In no case will this volume exceed 20,000kg which is the maximum allowable NEQ under Transport Canada regulations. This will ensure that in the unlikely event of a spill that the quantity is minimized.

As indicated above process vehilces will be routinely washed using a self contained wash bay system. This will ensure that any explosives residue which may be present on the vehicle does not enter the environment. All waste water is collected and run through an evaporation process. Any residual solids are packaged in approved packaging and are loaded down available boreholes and is consumed during subsequent blasts.

Orica maintains strict magazine management policies and procedures. Only explosives will be stored in explosives magazines. Detailed inventory management and authorized key control procedures ensure that only those authorized to handle explosives have access. Waste resulting from explosives packaging (boxes, etc) are considered contaminated and do not enter any landfill. They are disposed of through incineration. Resultant ash will be disposed of in accordance with the mine site waste disposal plan.

Any waste or scrap explosives product generated through the manufacturing process will be disposed of in the same manner as for residue generated through the evaporation process.

2.12 Blast Design / Operations

Blast design and control of blasting parameters will be controlled by BIM. The current blasting parameters anticipate that 254mm boreholes will be drilled. In order to minimize the production of “fines” the blast pattern will be based on a 6.5m x 7.5m pattern with a 15m bench and 10% sub-drill. The product that will be utilized has been selected to utilize only the minimum quantity of explosive product. This will contribute to ensuring minimum AN quantity entering the environment.

Based on product formulation and the forecasted annual volumes required to support blasting operations during the construction phase of the project an annual amount of 9.5MM Te of AN will be consumed during all blasting operations. It is important to note that as the mine site moves to full scale production this number will increase to approximately 22MM Te of AN consumed annually. It is forecasted that based on the remote nature of the site and the difficulty in ensuring security of supply that up to an additonal 25% safety stock of AN Prill will be required during both construction phase years and the full scale operations.

3 Safety Procedures

Orica maintains several model procedures which outline on-bench activities as well as safety systems required for the handling, transport and manufacture of explosives. In addition, a comprehensive continuous training plan is used (via both computer based training modules and paper based training). Orica is committed to ensuring that federal and territorial individual mandated qualifications and skills are maintained. As an example, all employees must complete on-bench basis of safety training, use of personnel protective equipment, working at heights training and numerous other courses prior to being permitted to work on bench.

Prior to undertaking any activities on bench a safety meeting is conducted by the blaster in charge. Any access to the site must be authorized by the blasting supervisor. All loading is done under the direct supervision of the blaster in charge of the pattern. Loading is based on the engineered design.

As an example of standard blast protocols, no personnel are permitted within 500m of the blast area. This safety zone is also under observation for the potential entry of local wildlife. Blast will not be fired if this area is not clear. When the area is clear and the pattern is ready for blasting, there are a number of notifications that will occur (including sirens and radio communications as required). Following the blast, guards will remain in place.

The Orica document “Blasting Safety Guidelines” is available should additional information be required on safe blasting best practices.

4 Spills & Spill Containment

As indicated Orica uses CAN/CSA Z731-03 as the basis for preparing site specific emergency response plans. An example of the included headings is attached at Appendix C. A sample site emergency response plan is available if required.

4.1 AN Spills

Ammonium Nitrate is commonly used in a variety of agricultural applications and as itself is not classified as an explosive. It is WHMIS classified as 5.1 (Oxidizer). AN is soluble in water and can be disolved to create AN Solution (ANS) which is in turn used in the manufacture of explosives. A copy of the AN Prill technical data sheet and MSDS is attached at Appendix D.

The attached data sheet outlines the nature of the product and the appropriate spill response.

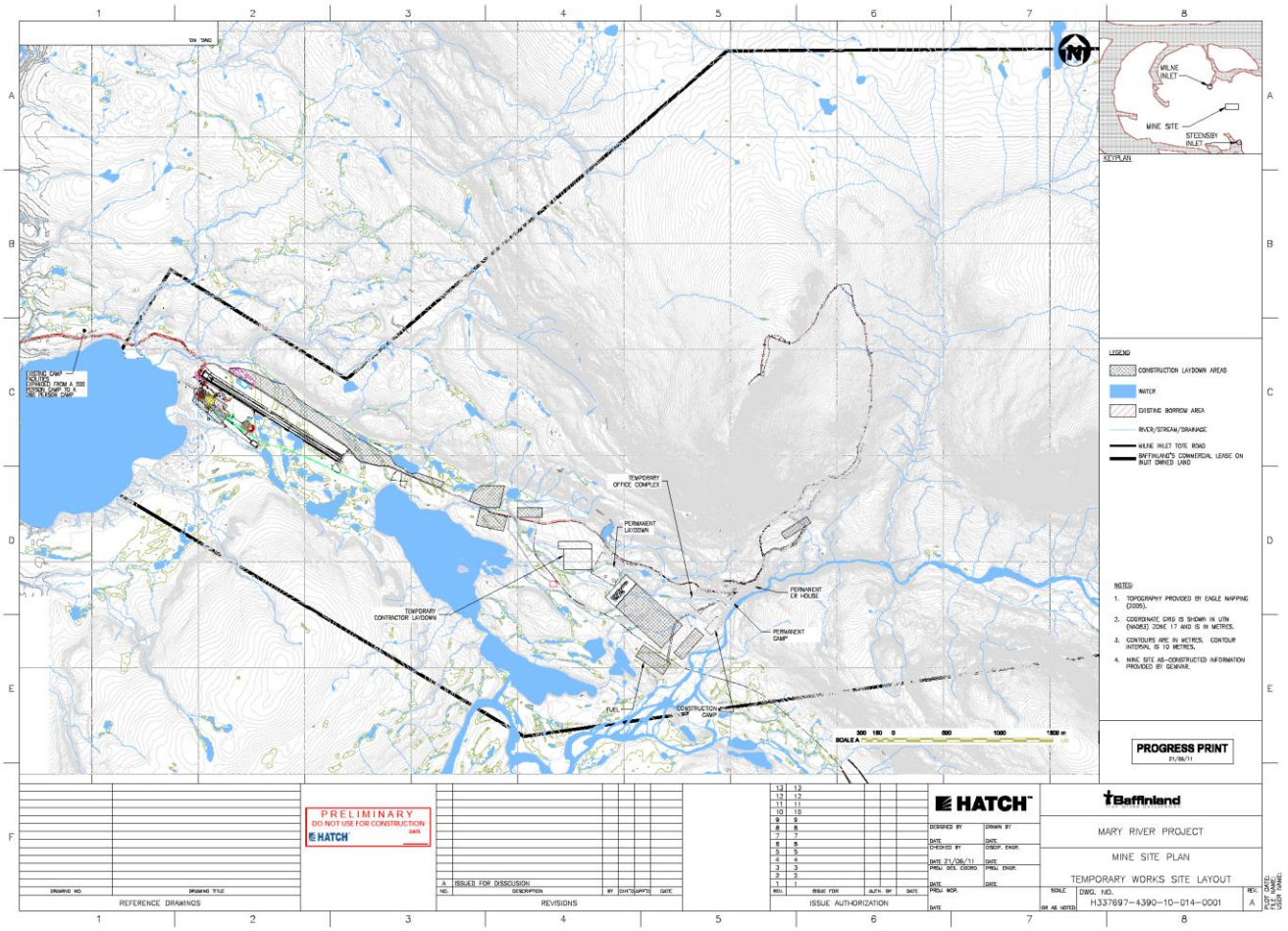
Tailings areas will be monitored for the presence of ammonia to indicate any potential for AN leaching into ground water. The product proposed is a viscous product (approx 35,000 cps). The mine site will be loading and blasting in the same day so the potential for any AN leaching is minimized.

Typical spill response measures for AN Prill are recovery using non-sparking shovels and packaging into designated containers. Spilled AN Prill will be worked into product and consumed in subsequent blasts. Spills of ANS will typically be recovered through excavation and soil disposal. In the case of operations at either the temporary modular plant sites or permanent plant ANS will be manufactured by dissolving AN Prill in water. This activity will be performed inside the plant building. The plants will be constructed to ensure a self bunded capacity of 110% of the largest means of containment. In the event of an ANS spill inside the plant the material will be recovered and if possible reworked through the process. If this is not possible it will be processed through the on-site evaporator. The resultant residue will be disposed of as described above.

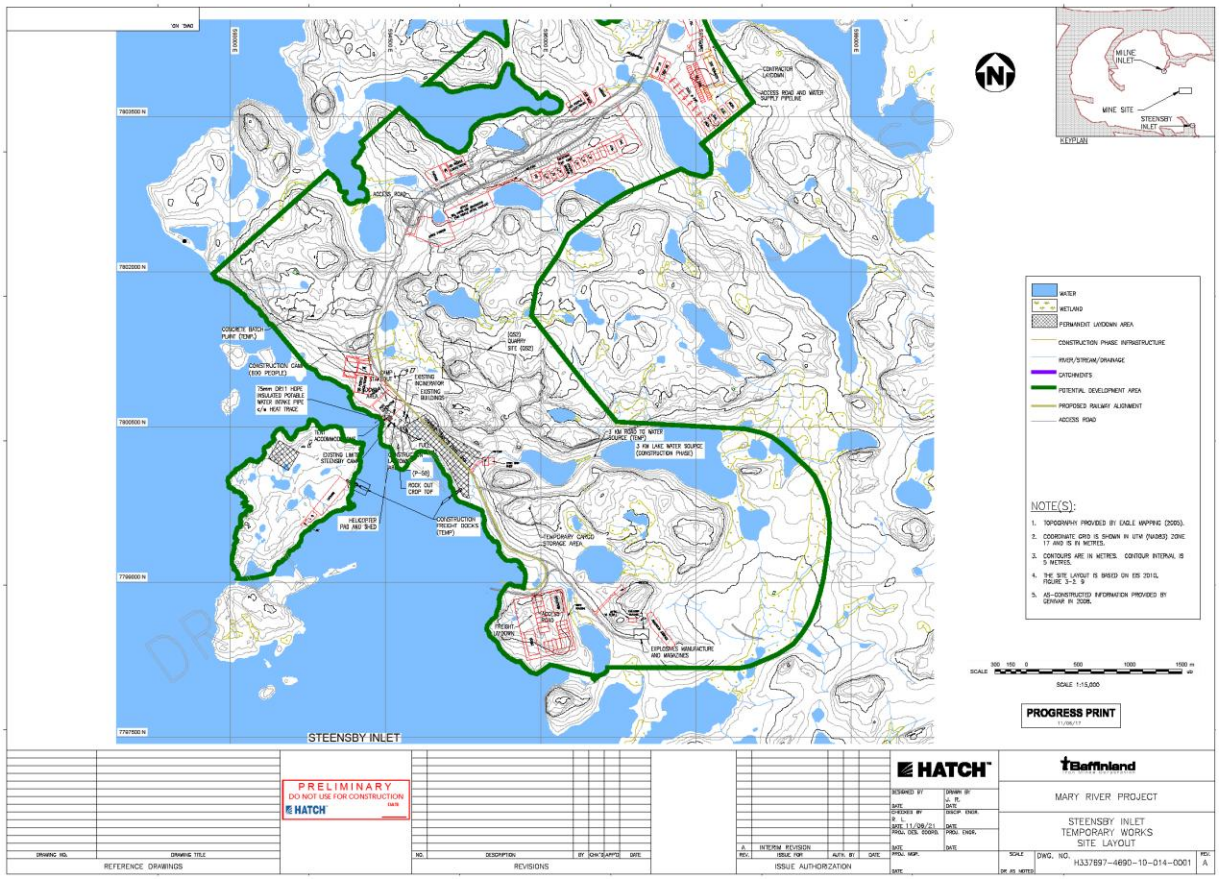
4.2 Other Chemical / Product Spills

All on site containers of hazardous material will be located inside of a secondary means of containment. Where required piping will be of double wall construction. Response to any chemical spill or loss of containment will be covered under the site emergency response plan.

5 Appendix A – General Layouts

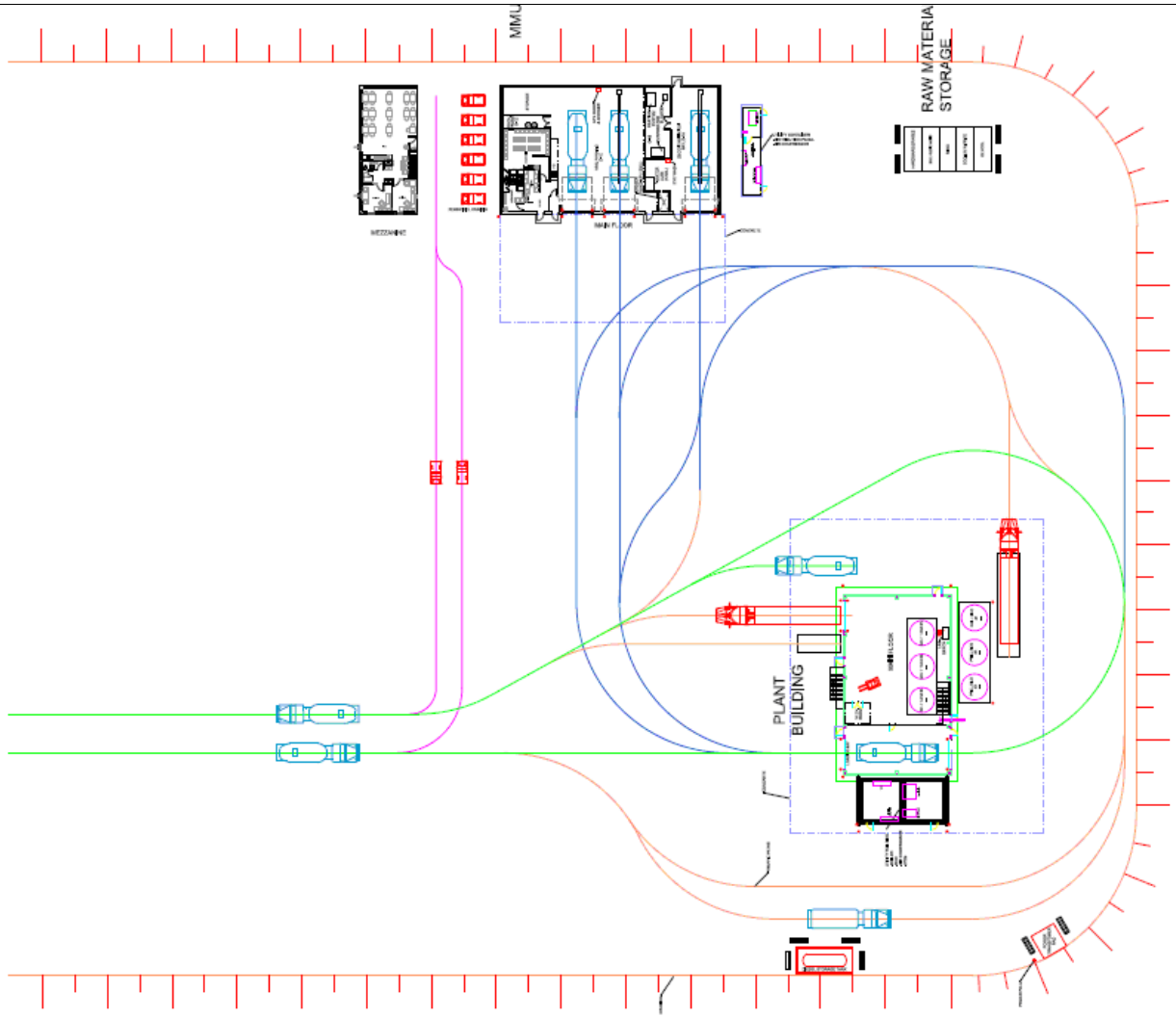


*MARY RIVER PROJECT SITE LAYOUT

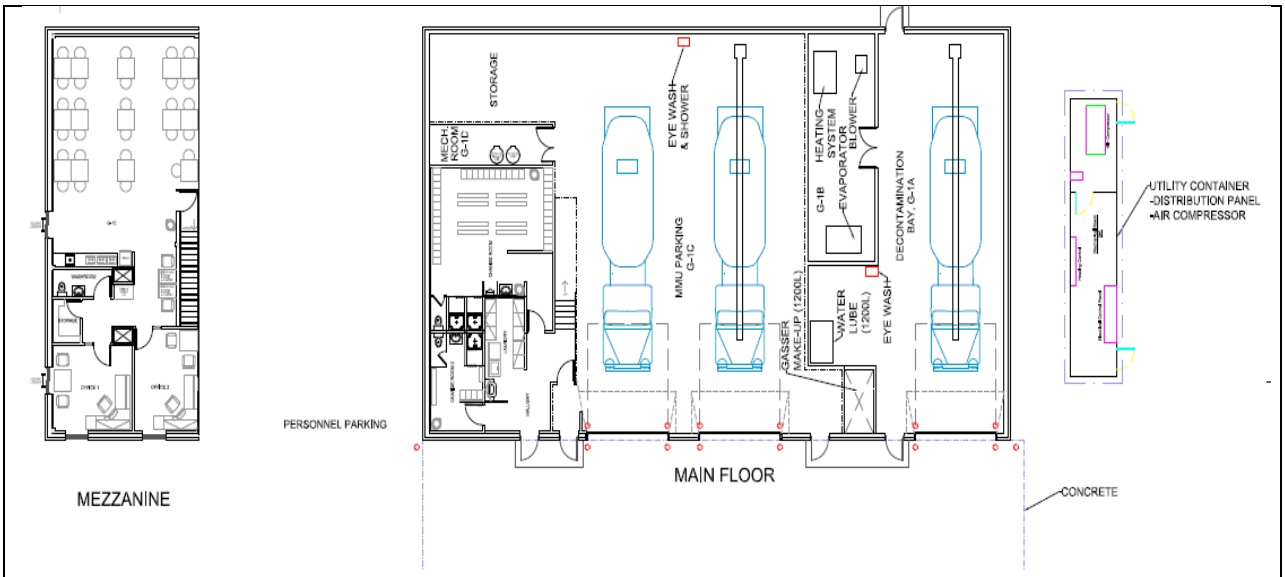


*STEENSBY PORT SITE LAYOUT

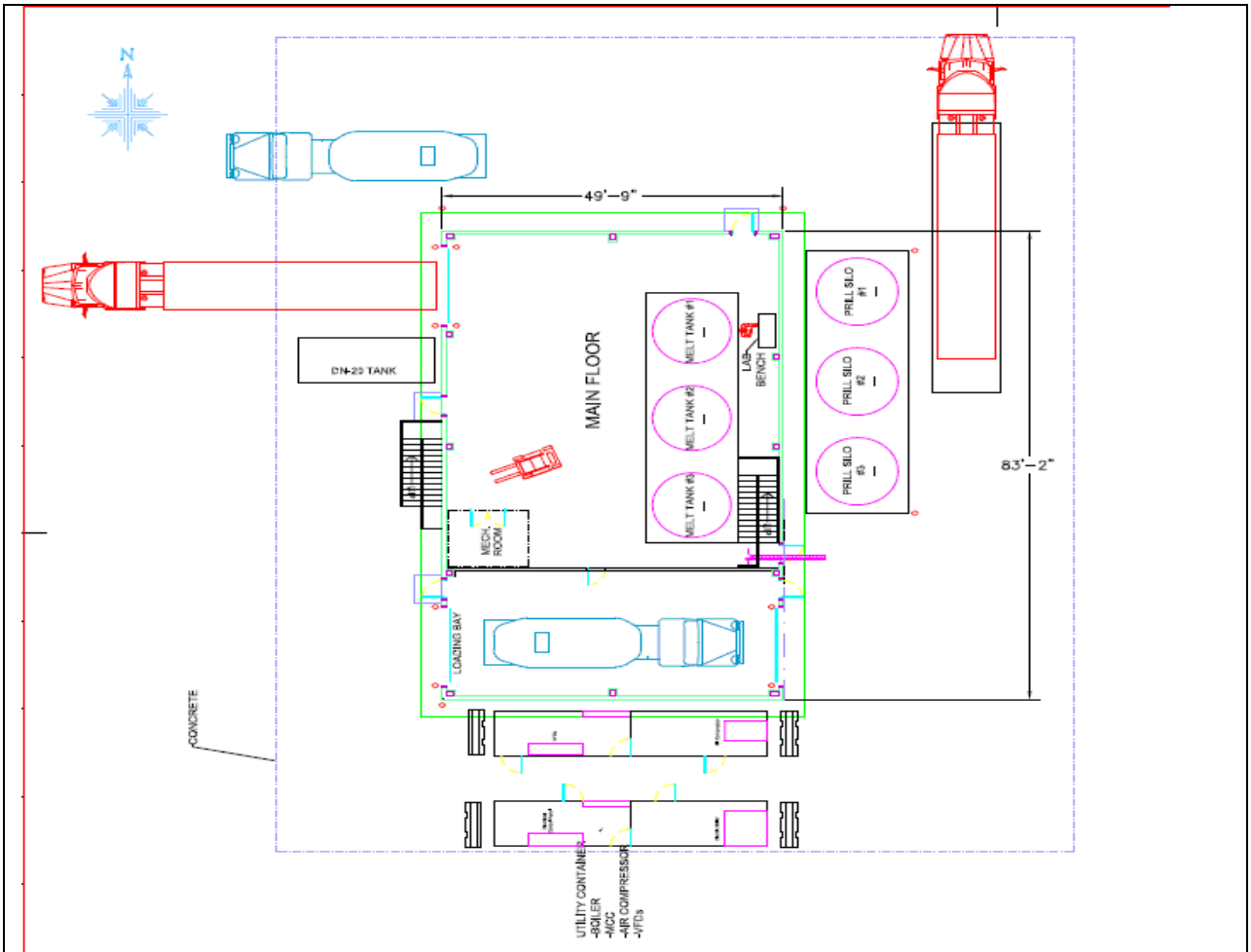
6 Appendix B – Site Layouts



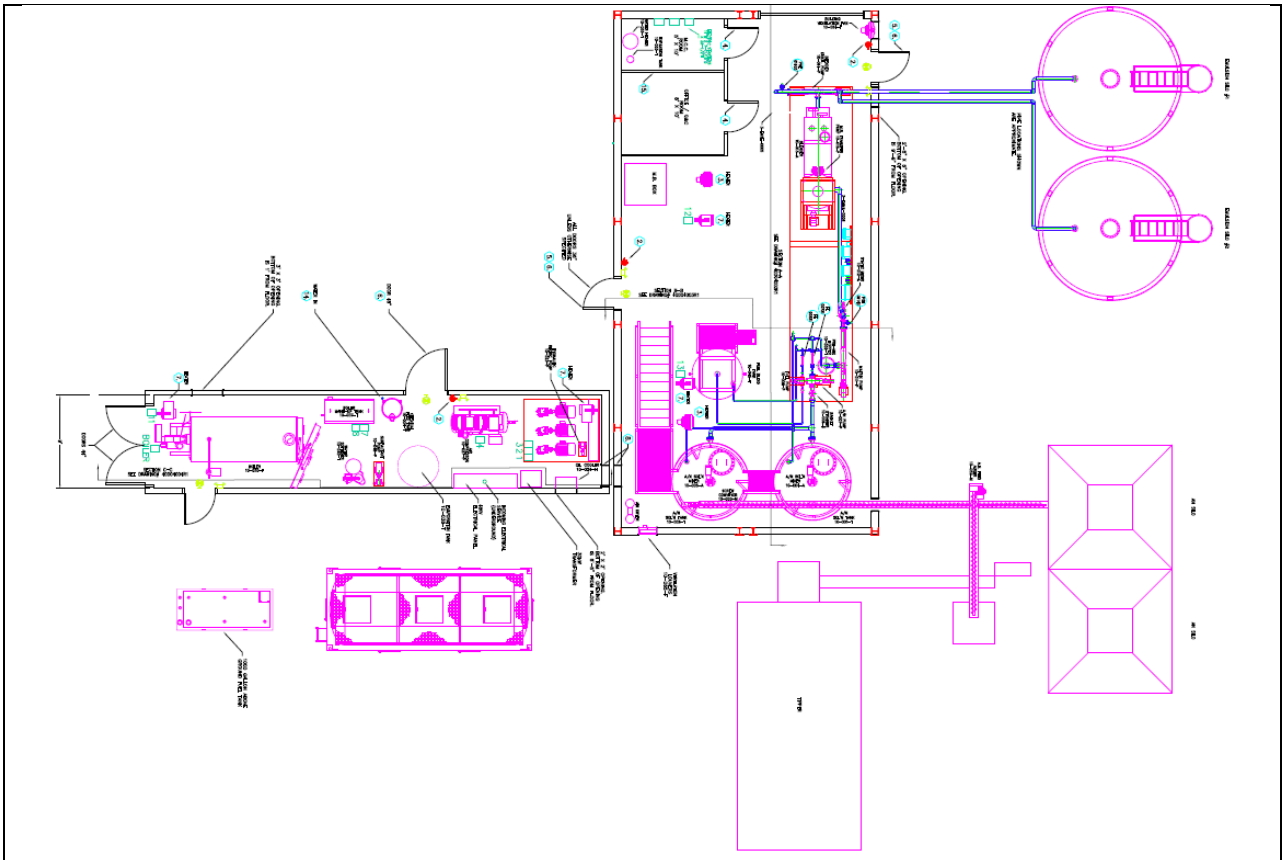
PERMANENT PLANT SITE LAYOUT ARRANGEMENT



PERMANENT PLANT MAINTENANCE AND WASHBAY FACILITY



PERMANENT PLANT MANUFACTURING BUILDING LAYOUT



TEMPORARY MODULAR MANUFACTURING PLANT LAYOUT

7 Appendix C – Typical Site ERP Contents

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8 Appendix D – Material Information

See Attached MSDS / TDS for major material information

Technical Data Sheet

The Power of Partnership

Ammonium Nitrate

Description
Low density Industrial Grade Prills.

Application
Prilled Ammonium Nitrate (NH4NO3) is the primary oxidizer used in the production of ammonium nitrate fuel oil mixtures (ANFO); the most cost-effective bulk explosive for dry, surface and underground blasting applications.

Key Benefits
- Manufacture of Ammonium Nitrate / Fuel Oil blends, bulk emulsion blends, packaged emulsion products, packaged slurry products, and NCN explosives.
- Ammonium Nitrate is transported as an oxidizer.

Technical Properties

Ammonium Nitrate	
Bulk Density (g / cc)	0.74 – 0.87
Oil Absorption (wt%)	> 5.7
Size Distribution (wt%)	Tyler 6 – 20 (3.3 – 0.83 mm) > 95%
Total Nitrogen (wt%)	> 34
Moisture[1]	< 0.25
Coating (wt%)	0.04 - 0.15 organic
PH (10% solution)	4.5 – 6.0

Packaging
Bagged Production: Available in 25 kg (55 lb) two-ply polyethylene valve bags, or 25 kg (55 lb) polypropylene bags.

FIBC Production: Available in 400 kg (882 lb) to 1000 kg (2205 lb) capacities.

Bulk: Available in road truck, or rail car quantities (volumes per DOT restrictions).

Product Classification USA

Authorized Name:	*Ammonium nitrate*
Proper Shipping Name:	Ammonium nitrate
Classification:	5.1
UN No:	1942
Packaging Group :	III

Product Classification Canada

Authorized Name:	*Ammonium Nitrate*
Proper Shipping Name:	*Ammonium Nitrate*
Classification:	5.1
UN No:	1942
Packaging Group :	III

Storage and Handling
Storage

Due to its hygroscopic nature, it is important that the product be stored in dry silos or storage sheds, and not in humid or wet conditions. The internal crystalline structure of the product transitions at 32° C (90° F) and -18° C (0° F). In conjunction with these changes there are corresponding volume changes of 3.6% and 2.8% respectively. Repeated cycling through these temperatures can break down the structure of the product. This is most important during summer and winter months, where day/night temperature variations pass through either of these transition temperatures. If such exposure is unavoidable, expedient consumption is recommended.

If there is any concern an Orica Technical Representative should be contacted.

Disposal

Disposal of explosive materials can be hazardous. Methods of safe disposal of explosives may vary, depending on the user's situation. Please contact an Orica Technical Representative for information on safe practices.

Safety
Ammonium Nitrate poses the following hazards:
- Supports combustion
- Decomposes with excessive heating, releasing toxic fumes
- Potential for fire of explosion if heated during confinement
- Thermal and chemical burns
- Toxic to aquatic organisms
- See the MSDS for complete product details.

ORICA
www.oricaminingservices.com

Ammonium Nitrate

Trademarks

Disclaimer

The information contained herein is based on experience and is believed to be accurate and up to date as at the date of its preparation. However, uses and conditions of use are not within the manufacturer's control and users should determine the suitability of such products and methods of use for their purposes. Neither the manufacturer nor the seller makes any warranty of any kind, express or implied, statutory or otherwise, except that the products described herein shall conform to the manufacturer's or seller's specifications. The manufacturer and the seller expressly disclaim all other warranties, INCLUDING, WITHOUT LIMITATION, WARRANTIES CONCERNING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Under no circumstances shall the manufacturer or the seller be liable for indirect, special, consequential, or incidental damages without limitation, damages for lost or anticipated profits. Explosives based on Ammonium Nitrate may react with pyritic materials in the ground and create potentially hazardous situations. Orica accepts no responsibility for any loss or liability arising from use of the product in ground containing pyritic or other reactive material.

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Orica USA Inc.
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Tel: +1 303 268 5000
Fax: +1 303 268 5250

Emergency Contact Telephone Numbers

For chemical emergencies (24 hour) involving transportation, spill, leak, release, fire or accidents:

Canada: Orica Canada emergency response **1-877-561-3636**

USA: Chemtrec **1-800- 424-9300**

For lost, stolen or misplaced explosives:

USA: BATFE **1-800-800-3855**. Form ATF F5400.0 must be completed and local authorities (state / municipal police, etc) must be advised.

Notes

1. Ammonium Nitrate is hygroscopic. Any contact with moisture or humid air can weaken and break down the prill's internal crystalline structure.

Material Safety Data Sheet

Preparation Date: 21-Nov-2006 **Revision Date:** 1-May-2009 **Revision Number:** 1

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Supplier(s):

Orica Canada Inc.
Maple Street
Brownsburg, QC
For MSDS Requests: 1-450-533-4201

Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137-9406
For MSDS Requests: 1-303-268-5000

Product Name:	**Ammonium Nitrate Solution, Nitric Acid Ammonium Salt Solution**
Product Code:	20011
Alternate Name(s):	Not Available
UN-No:	UN2426
Recommended Use:	Fertilizer, manufacture of explosives.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: **IN CANADA CALL:** THE ORICA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT **1-877-561-3636. IN THE U.S. CALL: CHEMTREC 1-800-424-9300. IN THE U.S.:** FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF **1-800-800-3855.** FORM ATF F 5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 – HAZARD IDENTIFICATION

Emergency Overview:
Danger. Oxidizing agent. The product causes burns of eyes, skin and mucous membranes. Irritating to respiratory system. May cause methemoglobinemia.

Appearance:	**Physical State:**	**Odor:**
Opaque Liquid	Liquid	Mild ammoniacal

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	**CAS-No**	**Weight %**
Ammonium Nitrate	6484-52-2	80-90

SECTION 4 – FIRST AID MEASURES

General Advice:	In case of accident or if you feel unwell, seek medical advice IMMEDIATELY (show the product label where possible)
Eye Contact:	Immediately flush with plenty of water, also under the eyelids, for at leat 15 minutes. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediate medical attention is required.
Skin Contact:	Wash off immediately with soap and plenty of water, removing all contaminated clothes and shoes. If skin irritation persists, call a physician.
Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. If breathing is difficult, give oxygen. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.
Ingestion:	Rinse mouth. Do not induce vomiting. Never give anything by mouth to an unconscious person. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Immediate medical attention is required.

Notes to physician: Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

SECTION 5 – FIRE-FIGHTING MEASURES

Flammable properties: Oxidizer. The product itself does not burn.

Suitable extinguishing media: Use Water only, in as much volume as possible to cool the burning mass quickly. Chemical extinguishers will not work. Fire-fighters should wear positive pressure self-containing breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate.

Unsuitable extinguishing media: Chemical extinguishers will not work. Attempts to smother a fire involving this product will be ineffective as it is its own oxygen source. Smother this product could lead to decomposition and explosion. This product is more sensitive to detonation if contaminated with organic or oxidisable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible.

Specific hazards arising from the chemical: Toxic gases and vapours will be released by the thermal decomposition of this material. At higher temperatures, decomposition may be explosive, especially if confined. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry.

Protective equipment and precautions for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Methods for containment: No information available.

Methods for cleaning up: Carefully collect spilled material in a closed, metal container. Keep in suitable, closed containers for disposal. For release to land, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Collect contaminated soil and water, and absorbent for proper disposal. Notify applicable government authority if release is reportable or could adversely affect the environment. Clean contaminated surface thoroughly.

SECTION 7 – HANDLING AND STORAGE

Handling: Use only in area provided with appropriate exhaust ventilation. Avoid breathing vapors or mists. Handle in accordance with good industrial hygiene and safety practice. Wear personal protective equipment.

Storage: 10-30°C above crystallization temperature of product. Ammonium Nitrate Liquor, in low concentrations, is very corrosive to mild steel and untreated concrete. Stainless steel and aluminium are adequate. Avoid materials made of copper, iron, or bronze.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Other exposure guidelines: Ammonium Nitrate: ORICA Guideline 5 mg/m^3 (internal TWA)

Engineering Measures: Full-Handling precautions should be taken at all times. Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction.

Personal Protective Equipment

- **Eye/Face Protection:** Face-shield. Tightly fitting safety goggles.
- **Skin Protection:** Impervious gloves and protective clothing made from cotton
- **Respiratory Protection:** In case of insufficient ventilation wear suitable respiratory equipment. A NIOSH-approved respirator, if concentrations in air are unknown or in excess of established exposure guidelines

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name:	Nitric Acid Ammonium Salt Solution	**Chemical Family:**	Nitrates
Appearance:	Opaque Liquid	**Odor:**	Mild Ammoniacal
Physical State:	Liquid	**Viscosity:**	No information available
pH:	5 – 6 (0.1M solution in water)	**Flash Point:**	Not applicable
Autoignition Temperature:	Not applicable	**Boiling Point/Range:**	Not applicable
Melting Point/Range:	Not available	**Flammable Limits (Upper):**	Not applicable
Flammable Limits (Lower):	Not applicable	**Explosion Power:**	No data available
Specific Gravity:	1.3-1.38 g/cc	**Water Solubility:**	Not applicable
Other Solubility:	Soluble in alcohols.	**Vapor Pressure:**	no data available
Oxidizing Properties:	Oxidizer	**Partition Coefficient (n-octanol/water):**	No data available

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions.

Conditions to avoid: Keep away from heat, flame, and sparks.

Incompatible materials: Avoid oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles, strong oxidizing and reducing agents. Keep away from combustible material.

Hazardous decomposition products: The following toxic decomposition products may be released. At temperatures above 210°C, decomposition may be explosive, especially if confined. Nitrogen oxides (NOx). Carbon oxide. Hydrocarbons. At higher temperatures, decomposition may be explosive, especially if confined.

Hazardous Polymerization: Hazardous polymerization does not occur

SECTION 11 – TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information: Irritating to eyes. May cause skin irritation. Harmful if swallowed. May cause methemoglobinemia.

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ammonium Nitrate	2217 mg/kg Rat	3000 mg/kg Rabbit	88.8 mg/L Rat 4 h

Subchronic Toxicity (28 Days): Ammonium Nitrate: Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and, possibly shock.

Chronic Toxicity: May cause methemoglobinemia.

Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by T\NTP (National Toxicology Program).

Mutagenic effects: There is no evidence of mutagenic potential.

Irritation: Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons.

Reproductive effects: No information is available and no adverse reproductive effects are anticipated.

Developmental effects: No information is available and no adverse developmental effects are anticipated.

Target Organ: Eyes, skin, respiratory system, blood, liver, urinary tract, gastrointestinal tract (GI), endocrine system, & immune system.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity effects: There is no known ecological information for this product.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose of in accordance with National, State and local regulations. Should not be released into the environment. Do not dispose of waste with normal garbage, or to sewer systems. Call upon the services of an Orica Technical Representative.

Contaminated packaging Empty containers should be taken for local recycling, recovery or waste disposal.

SECTION 14 – TRANSPORT INFORMATION

DOT Proper Shipping Name: Ammonium Nitrate Liquid
Hazard Class: 5.1
UN-No: UN2426
Packing group: II
TDG Proper Shipping Name: Ammonium Nitrate Liquid
Hazard Class: 5.1
UN-No: UN2426
Packing group: II

Transportation Emergency Telephone Number: 1-877-561-3636 or CHEMTREC: 1-800-424-9300

SECTION 15 – REGULATORY INFORMATION

CANADIAN CLASSIFICATION: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

WHMIS hazard class: C: Oxidizer. D-2B. Toxic.

USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements, Ammonium Nitrate (6484-52-2).

SARA 311/312 Hazardous Categorization

Acute Heath Hazard: Yes
Chronic Health Hazard: No
Fire Hazard: Yes
Reactive Hazard: No
Sudden Release of Pressure Hazard: No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

Other Regulations/Legislations which apply to this product: New Jersey Right-to-Know, Pennsylvania Right-to-Know, Massachusetts Right-to-Know, Rhode Island Right-to-Know, Florida, New Jersey Special Health Hazard Substance List, Minnesota Hazardous Substance List, California Director's List of Hazardous Substances, California Proposition 65.

TSCA: Complies **DSL:** Complies **NDSL:** Complies

The components in the product are on the following international inventory lists:

Chemical Name	TSCA	DSL	NDSL	ENCS	EINECS	ELINCS	CHINA	KECL	PICCS	AICS
Ammonium Nitrate	X	X	-	X	X	-	X	X	X	X

Legend: X – Listed

SECTION 16 – OTHER INFORMATION

Prepared by: **Safety Health & Environment**
303-268-5000

Preparation Date: 14-May-2004
Revision Date: 1-May-2009

The information contained herein is offered only as guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

End of MSDS

Technical Data Sheet

The Power of Partnership

Ammonium Nitrate Solution

Description

Liquid Ammonium Nitrate (NH4NO3: hot concentrated solution).

Application

Ammonium Nitrate (AN) Solution is the primary oxidizer used in the manufacture of bulk and packaged emulsion explosives; required for more complex blasting applications than conventional ammonium nitrate fuel oil (ANFO) mixtures.

Key Benefits

- AN Solution is low cost.
- Easily moved by bulk, rail or truck shipments.
- Ammonium Nitrate Solution is transported as an oxidizer.
- Solution can be used in the production of bulk and packaged explosives.

Technical Properties

Ammonium Nitrate Solution (ANS)	
AN (wt%)	65-85[1]
PH	3.5-5.5
Appearance	Clear
Hole Type	Wet or Dry
Delivery System	Pumped
Freeze Point	18°-75°C (64°-167°F)[2]
Shipping Temperature (summer)	93°-107°C (200°-225°F)[2]
Shipping Temperature (winter)	104°-116°C (220°-245°F)[2]

Packaging

Available in Bulk loads only. Shipments can be made in either an insulated DOT approved bulk road truck or rail car.

Product Classification USA

Authorized Name:	*Ammonium nitrate, liquid*
Proper Shipping Name:	Ammonium Nitrate, Liquid
Classification:	5.1
UN No:	2426

Product Classification Canada

Authorized Name:	*Ammonium nitrate, liquid*
Proper Shipping Name:	Ammonium Nitrate, Liquid
Classification:	5.1
UN No:	2426

Storage and Handling

Storage

Ammonium Nitrate (AN) Solution must be stored at 10°-30° C (18°-48° F) above the product's freeze point, dependent upon concentration required / shipped.

If there is any concern an Orica Technical Representative should be contacted.

Disposal

Disposal of explosive materials can be hazardous. Methods of safe disposal of explosives may vary, depending on the user's situation. Please contact an Orica Technical Representative for information on safe practices.

Safety

Ammonium Nitrate Solution poses the following hazards:

- Supports combustion
- Decomposes with excessive heating, releasing toxic fumes
- Thermal and chemical burns
- Toxic to aquatic organisms
- See the MSDS for complete product details.

Trademarks

ORICA
www.oricaminingservices.com

Ammonium Nitrate Solution

Disclaimer

The information contained herein is based on experience and is believed to be accurate and up to date as at the date of its preparation. However, uses and conditions of use are not within the manufacturer's control and users should determine the suitability of such products and methods of use for their purposes. Neither the manufacturer nor the seller makes any warranty of any kind, express or implied, statutory or otherwise, except that the products described herein shall conform to the manufacturer's or seller's specifications. The manufacturer and the seller expressly disclaim all other warranties, INCLUDING, WITHOUT LIMITATION, WARRANTIES CONCERNING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Under no circumstances shall the manufacturer or the seller be liable for indirect, special, consequential, or incidental damages without limitation, damages for lost or anticipated profits. Explosives based on Ammonium Nitrate may react with pyritic materials in the ground and create potentially hazardous situations. Orica accepts no responsibility for any loss or liability arising from use of the product in ground containing pyritic or other reactive material.

Orica Canada Inc.
301 Hotel De Ville
Brownsburg, QC J8G 3B5
Tel: +1 303 268 5000
Fax: +1 303 268 5250

Orica USA Inc.
33101 East Quincy Ave
Watkins, CO 80137
Tel: +1 303 268 5000
Fax: +1 303 268 5250

Emergency Contact Telephone Numbers

For chemical emergencies (24 hour) involving transportation, spill, leak, release, fire or accidents:
Canada: Orica Canada emergency response **1-877-561-3636**
USA: Chemtrec **1-800- 424-9300**

For lost, stolen or misplaced explosives:
USA: BATFE **1-800-800-3855**. Form ATF F5400.0 must be completed and local authorities (state / municipal police, etc) must be advised.

Notes

1. Minimum of 65%.
2. Dependent upon concentration required / shipped, maximum shipping temperature 116° C (240° F).

Material Safety Data Sheet

Preparation Date: 18-Feb-2008 **Revision Date:** 15-Mar-2011 **Revision Number:** 2

SECTION 1 – PRODUCT AND COMPANY IDENTIFICATION

Supplier(s):

Orica Canada Inc.
Maple Street
Brownsburg, QC
For MSDS Requests: 1-450-533-4201

Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137-9406
For MSDS Requests: 1-303-268-5000

Product Name: **Ammonium Nitrate Prill**
Product Code: 40002
Alternate Name(s): AN Prill
UN-No: UN1942
Uses: Fertilizer, Manufacture of Explosives. Manufacture of Blasting Agents.

Emergency Telephone Number: FOR CHEMICAL EMERGENCIES (24 HOUR) INVOLVING TRANSPORTATION, SPILL, LEAK, RELEASE, FIRE OR ACCIDENTS: **IN CANADA CALL:** THE ORICA TRANSPORTATION EMERGENCY RESPONSE SYSTEM AT **1-877-561-3636. IN THE U.S. CALL: CHEMTREC 1-800-424-9300. IN THE U.S.:** FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF **1-800-800-3855.** FORM ATF F 5400.0 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 – HAZARD IDENTIFICATION

Emergency Overview:
Irritating to eyes, respiratory system and skin. May cause methemoglobinemia.

Appearance:	**Physical State:**	**Odor:**
Grey or white prills	Prills	Odorless

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	**CAS-No**	**Weight %**
Ammonium Nitrate	6484-52-2	98-100

SECTION 4 – FIRST AID MEASURES

General Advice: In case of accident or if you feel unwell, seek medical advice IMMEDIATELY (show the product label where possible)

Eye Contact: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediate medical attention is required.

Skin Contact: Wash off immediately with soap and plenty of water, removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Inhalation: Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical advice IMMEDIATELY.

Ingestion: Immediate medical attention is required. If victim is alert and not convulsing, rinse mouth out and give 200-300 mL (1 cup) of water to dilute material. Do no induce vomiting. Clean mouth with water and afterwards drink plenty of water. If spontaneous vomiting occurs, have victim lean forward with head positioned to avoid breathing in of vomitus, rinse mouth and administer more water. Never give anything by mouth to and unconscious person.

Notes to physician: Symptomatic. Administer oxygen if there are signs of cyanosis. If clinical condition deteriorates, administer 10cc Methylene Blue intravenously. It is unlikely for this to be required with methemoglobin level of less than 40%.

SECTION 5 – FIRE-FIGHTING MEASURES

Flammable properties: Not itself combustible by assists fire in burning materials. The product does not flash. Rate of burning: attempts to smother a fire involving this product will be ineffective as it is its own oxygen source.

Suitable extinguishing media: Use Water only, in as much volume as possible to cool the burning mass quickly. Chemical extinguishers will not work. Fire-fighters should wear positive pressure self-containing breathing apparatus (SCBA) and full turnout gear. Water may be applied through fixed extinguishing system (sprinklers) as long as people need not be present for the system to operate.

Unsuitable extinguishing media: Chemical extinguishers will not work. Attempts to smother a fire involving this product will be ineffective as it is its own oxygen source. Smother this product could lead to decomposition and explosion. This product is more sensitive to detonation if contaminated with organic or oxidisable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible.

Specific hazards arising from the chemical: Toxic gases and vapours will be released by the thermal decomposition of this material. At higher temperatures, decomposition may be explosive, especially if confined. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry.

Protective equipment and precautions for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH approved (or equivalent) and full protective gear.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Methods for containment: Avoid dust formation. Do not breathe dust. Prevent further leak if safe to do so.

Methods for cleaning up: Avoid the use of metal tools containing iron and/or copper. Collect product in suitable containers for recovery or disposal. Prevent product from entering drains. Notify applicable government authority if release is reportable or could adversely affect the environment.

SECTION 7 – HANDLING AND STORAGE

Handling: Avoid contact with eyes or skin. Wash thoroughly with soap and water after handling. Wash clothing before re-use. Locate safety shower and eyewash station closest to chemical handling area. The use of coveralls is recommended. Use good industrial hygiene and housekeeping practices. Keep away from open flames, hot surfaces and sources of ignition

Storage: Store in a cool, well-ventilated area. Keep away from heat, sparks, and flames. Keep storage containers closed. Store at 10-27°C (50-80°F). Do not expose closed containers to temperatures above 40°C (104°F). Product is mildly corrosive to concrete and steel. Stainless steel and aluminium are adequate. Avoid materials made of copper, iron, or bronze.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Other exposure guidelines: Ammonium Nitrate: ORICA Guideline 5 mg/m^3 (internal TWA)

Engineering Measures: Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction.

Personal Protective Equipment

Eye/Face Protection: Tightly fitting safety goggles.

Skin Protection: Gloves and protective clothing made from cotton should be impervious under normal conditions

Respiratory Protection: In case of insufficient ventilation wear suitable respiratory equipment. A NIOSH-approved respirator, if concentrations in air are unknown or in excess of established exposure guidelines

Hygiene Measures: Handle in accordance with good industrial hygiene and safety practice. Recommendations listed in this section indicate the type of equipment, which will provide protection against over exposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Chemical Name:	Nitric Acid Ammonium Salt	**Chemical Family:**	Nitrates
Appearance:	Grey or white prills	**Odor:**	Odorless
Physical State:	Solid prills	**Viscosity:**	No information available
pH:	5 – 6 (0.1M solution in water)	**Flash Point:**	Not applicable
Autoignition Temperature:	Not applicable	**Boiling Point/Range:**	210°C/ 410°F
Melting Point/Range:	160–165°C/ 320-329°F	**Flammable Limits (Upper):**	Not applicable
Flammable Limits (Lower):	Not applicable	**Explosion Power:**	No data available
Specific Gravity:	1.72 g/cc	**Water Solubility:**	79% @25
Other Solubility:	Soluble in Alkalies, alcohols, acetone. Insoluble in ether.	**Vapor Pressure:**	0 mm Hg @20°C
Oxidizing Properties:	Oxidizer	**Partition Coefficient (n-octanol/water):**	No data available

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable under normal conditions. Decomposition Temperature: Ammonium Nitrate will spontaneously decompose at 210°C.

Conditions to avoid: Keep away from open flames, hot surfaces and sources of ignition. Not expected to be sensitive to static discharge. Not expected to be sensitive to mechanical impact. Keep away from light.

Incompatible materials: Avoid oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulphur, sodium nitrite, charcoal, coke and other finely divided combustibles, strong oxidizing and reducing agents. Keep away from combustible material.

Hazardous decomposition products: The following toxic decomposition products may be released. At temperatures above 210°C, decomposition may be explosive, especially if confined. Nitrogen oxides (NOx). Carbon oxide. Hydrocarbons. At higher temperatures, decomposition may be explosive, especially if confined.

Hazardous Polymerization: None under normal processing. Hazardous polymerization does not occur. Explosive material under shock conditions.

SECTION 11 – TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information: Irritating to eyes. May cause skin irritation. Harmful if swallowed. May cause methemoglobinemia.

Chemical name	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ammonium Nitrate	2217 mg/kg Rat	3000 mg/kg Rabbit	88.8 mg/L Rat 4 h

Subchronic Toxicity (28 Days): Ammonium Nitrate: Ingestion may cause methemoglobinemia. Initial manifestation of methemoglobinemia is cyanosis, characterized by navy lips, tongue and mucous membranes, with skin color being slate grey. Further manifestation is characterized by headache, weakness, dyspnea, dizziness, stupor, respiratory distress and death due to anoxia. If ingested, nitrates may be reduced to nitrites by bacteria in the digestive tract. Signs and symptoms of nitrite poisoning include methemoglobinemia, nausea, dizziness, increased heart rate, hypotension, fainting and, possibly shock.

Chronic Toxicity: May cause methemoglobinemia.

Carcinogenicity: The ingredients of this product are not classified as carcinogenic by ACGIH (American Conference of Governmental Industrial Hygienists) or IARC (International Agency for Research on Cancer), not regulated as carcinogens by OSHA (Occupational Safety and Health Administration), and not listed as carcinogens by T\NTP (National Toxicology Program).

Mutagenic effects: There is no evidence of mutagenic potential.

Irritation: Irritating to eyes. May cause irritation of respiratory tract. May cause skin irritation in susceptible persons.

Reproductive effects:	No information is available and no adverse reproductive effects are anticipated.
Developmental effects:	No information is available and no adverse developmental effects are anticipated.
Target Organ:	Eyes, skin, respiratory system, blood, liver, urinary tract, gastrointestinal tract (GI), endocrine system, & immune system.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity effects:	Dissolves slowly in water. Harmful to aquatic life at low concentrations. Environmental Effects: Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.
Persistence/Degradability:	No data available.
Mobility in Environmental media:	Dissolves slowly in water

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Method:	Dispose of in accordance with National, State and local regulations. Should not be released into the environment. Do not dispose of waste with normal garbage, or to sewer systems. Call upon the services of an Orica Technical Representative.

SECTION 14 – TRANSPORT INFORMATION

DOT Proper Shipping Name:	Ammonium Nitrate
Hazard Class:	5.1
UN-No:	UN1942
Packing group:	III
TDG Proper Shipping Name:	Ammonium Nitrate
Hazard Class:	5.1
UN-No:	UN1942
Packing group:	III

Transportation Emergency Telephone Number: 1-877-561-3636 or CHEMTREC: 1-800-424-9300

SECTION 15 – REGULATORY INFORMATION

CANADIAN CLASSIFICATION: This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS contains all the information required by the CPR

WHMIS hazard class: C: Oxidizer. D-2B. Toxic.

USA CLASSIFICATION:

SARA Regulations Sections 313 and 40 CFR 372: This product contains the following toxic chemical(s) subject to reporting requirements, Ammonium Nitrate (6484-52-2).

SARA 311/312 Hazardous Categorization

Acute Heath Hazard:	Yes
Chronic Health Hazard:	No
Fire Hazard:	Yes
Reactive Hazard:	No
Sudden Release of Pressure Hazard:	No

Ozone Protection and 40 CFR 42: No reportable quantities of ozone depleting agents

Other Regulations/Legislations which apply to this product: New Jersey Right-to-Know, Pennsylvania Right-to-Know, Massachusetts Right-to-Know, Rhode Island Right-to-Know, Florida, New Jersey Special Health Hazard Substance List, Minnesota Hazardous Substance List, California Director's List of Hazardous Substances, California Proposition 65.

TSCA: Complies **DSL:** Complies **NDSL:** Complies

The components in the product are on the following international inventory lists:

Chemical Name	TSCA	DSL	NDSL	ENCS	EINECS	ELINCS	CHINA	KECL	PICCS	AICS
Ammonium Nitrate	X	X	-	X	X	-	X	X	X	X

Legend: X – Listed

SECTION 16 – OTHER INFORMATION

Prepared by: **Safety Health & Environment**
303-268-5000

Preparation Date: 18-Feb-2008
Revision Date: 15-Mar-2011

The information contained herein is offered only as guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Orica will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein.

End of MSDS