ADVANCED BLASTING SERVICES, LLC
281 S. Conquest Circle, Wasilla, AK 99623 • Tel: 907-357-2900 • Fax: 907-357-2930

Lawing Airport Quarry
Drilling and Blasting Safety Plan

Updated: January 5th, 2026

General Contractor:

tutka LLC

Subcontractor:

ADVANCED BLASTING SERVICES, LLC

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OVERVIEW

The following plan covers general drilling and blasting operations anticipated for material production at Lawing Airport Quarry, located in Lawing/Crown Point, Alaska and east of approximately MP 24 along the Seward Hwy. Quarry production will primarily provide riprap for the Ninilchik Harbor Revetment Replacement Project, and be followed by rock material production for subsequent projects.

1. LOCATION

Drilling and Blasting operations are proposed to be conducted within the existing Lawing Airport Quarry (hereafter referred to as Quarry), located within the Kenai Peninsula Borough (KPB), Lawing/Crown Point, Alaska. The Quarry is identified by the Alaska Department of Transportation & Public Facilities (ADOT&PF) in the Statewide Material Site Inventory as MS 31-1-016-1. The Alaska Department of Natural Resources (ADNR) designated the Quarry with Master Material Site ADL number 231623. The subject property legal description is Township 4N, Range 1W, Section 24, Seward Meridian (SW Government Lot 13). KPB records list the parcel with ID number: 12532413. Blasting activity proposed under this plan would be adjacent to, yet specifically Off Airport property, directly to the east. The active quarry rock face is northeast of the Lawing Airport (9Z9) runway by approximately 770 feet.

Lawing Airport Quarry: Active Rock Face (approx.) - *WGS84 (WKID 4326)*
Latitude: 60° 24' 58.75" N Longitude: 149° 21' 56.52" W

2. SCHEDULE AND PROCEDURES

Tutka's Mining Schedule proposed for operations in the Lawing Airport Quarry will extend from February 2023 through approximately December 2026. Permitting began in the spring of 2022 and is anticipated to be completed in December 2022/January 2023. Initially, preparation for development will include construction of a haul road to allow access parallel to the Lawing Airport runway (so that access via the runway is no longer needed). Concurrent with construction of the haul road, Tutka will begin to improve access within the quarry, working around the existing rock face to facilitate drill rig staging at the top of the active quarry face.
After access is achieved, production of riprap will proceed in stages according to the project being served, beginning primarily with the Ninilchik Harbor Revetment Replacement project. A draft schedule (**Section 2.1.5** below) details the anticipated cadence of drilling and blasting that will be needed.

2.1. QUARRY DEVELOPMENT SCHEDULE

2.1.1. WORKDAYS AND TIMES

The below schedule is in accordance with KBP Standard 21.29.040(A)(4). No work involving heavy equipment operation will be performed in the quarry on Sundays.

- Workdays: ..... Monday - Saturday
- Work Times: ..... 7:00 AM - 6:00 PM

2.1.2. [JANUARY 2023] PERMITTING AND PLANNING APPROVAL

Planning and permitting approval completed through all relevant agencies.

2.1.3. [FEBRUARY 2023] HAUL ROAD CONST. AND QUARRY ACCESS

Tutka begins construction of haul road parallel to the Lawing Airport runway, including gaining winter access (snow removal), clearing and grubbing, roadway prism improvement (as needed), turnout construction per the submitted plan, and installation of a truck scale near the beginning of the new haul road. Quarry work will include clearing around and up to the top of the existing rock face. Tutka will also remove organics/overburden. ABS's drill rig(s) will then prepare the rock face by initially drilling and blasting to clear the toe of the slope - this will improve the rock yield in subsequent production blasts.

2.1.4. BLASTING DAYS AND TIMES

The below schedule describes the weekly window within which Tutka will be permitted to complete blasting operations. The days and times are in accordance with KBP Standard 21.29.040(A)(4). No blasting sessions will be performed on Saturdays or Sundays.

- Blasting Days: ..... Monday - Friday
- Blasting Times: ..... 9:00 AM - 5:00 PM

2.1.5. [2026 - 2027] BLASTING SCHEDULE / INTERVALS

The blasting schedule will generally follow a monthly cadence as listed below for material drilling, blasting, sorting, stockpiling, and hauling material. Quarry production rates will be dependent on the quantity of usable rock (meeting project specifications) from each blast event, sorting efficiency, (partly weather dependent), and truck hauling capacity. If required to meet project demands, blasting sessions are proposed to compress to two-week intervals. The estimated quantities are according to project needs; in-situ blasted volume will be greater.

All below blasting events will be scheduled formally in advance as described in **Section 2.2.1** to communicate the required notices to nearby residents, public facilities/personnel (i.e., ADOT M&O), businesses, and ADOT&PF Statewide Aviation (who will, in turn, issue NOTAMs). An *Air Traffic Safety Plan* is detailed in **Appendix 'H'**; ground-based safety procedures are addressed in **Sections 3-5**.

* Each blasting event is anticipated to take 30-minutes from clearing of personnel and equipment to detonation, followed by the all-clear to approach the quarry.

ESTIMATED BLASTING SCHEDULE – PROJECT DEMAND (TO BE DETERMINED)

EST. DATE	YEAR	EST QTY NEEDED	NO. OF BLASTS*
TBD JUN/JUL	2026	TBD	1
TBD JUL/AUG	2026	TBD	1
TBD	2027	TBD	1
TBD	2027	TBD	1

2.1.6. [NOVEMBER 2027] SITE RECLAMATION

Reclamation of depleted areas (or cells) will be completed as extraction progresses. Overall site reclamation plans will be coordinated between Tutka, the KPB, and ADNR prior to Tutka's equipment and personnel demobilizing from the quarry. Tutka's Material Site Development Plan and Reclamation Plan address planned reclamation measures to be implemented at the conclusion of extraction activities.

2.2. PROCEDURES

2.2.1. NOTIFICATION SCHEDULE

Tutka will coordinate with the KPB Planning & Zoning Division to assemble a list of contacts within the prescribed distance (from blasting) for whom a notice will be provided. Notifications to residents and businesses will be made according to the following schedule. The same notice sent to local contacts will also be sent to the KPB Planning Office for their records. At a minimum, the notice letter will identify: the blast date and time, contact information for Tutka personnel, contact information for KPB Planning Office, a description of the Blast Warning Signals that will be used, and it will allow for the resident/business to provide additional contact information (i.e., phone number, e-mail address, etc.…) should they prefer another form of contact. Records relating to notifications sent out will be kept by Tutka and included in **Appendix 'J'**.

- Notify All Individuals Within 1.5-miles:..... 30-days prior
  Per Tutka's Approved Conditional Land Use Permit with the KPB. Tutka "shall notify all residential or commercial properties within one and one-half miles (1.5 miles) of the blasting site prior to each blast". The prescribed radius for notifications is combined here with the ADNR timeline requirement for notifications to be made at least 30-days prior.
- Notify All Individuals Within 1.5 miles: ..... 24-hours prior
  Per Tutka's Approved Conditional Land Use Permit with the KPB. Tutka "shall notify all residential or commercial properties within one and one-half miles (1.5 miles) of the blasting site prior to each blast". The prescribed radius for notifications is combined here with the ADNR timeline requirement for notifications to be made 24-hours prior.

Tutka will also provide advanced notice to ADOT&PF Statewide Aviation in advance according to the below schedule.

- ADOT&PF Statewide Aviation: .... 10-days prior
  Tutka's designated personnel (singular Point-of-Contact) will directly contact ADOT&PF Statewide Aviation (Leasing) ROW through e-mail with follow up by phone as needed.

2.2.2. NOTIFICATION CONTACTS

❖ The following are primary contacts for agency notification prior to each blasting event.

↓ PROJECT CONTACTS ↓	↓ ADOT&PF NOTIFICATION & EMERGENCY ↓
Tutka, LLC (***Single Point-of-Contact**) JOHN SOMMER Tutka Owner / Construction Mgr. Office Phone: (907) 357-2238 Cell: [redacted] 2485 E Zak Cir., Suite A Wasilla, AK 99654	(Primary) DOT&PF CR, Kenai Peninsula * ADAM SULLIVAN Crown Point Station Foreman Office Phone: (907) 595-1262 Cell: [redacted] adam.sullivan@alaska.gov 30049 Seward Hwy Seward, AK 99664
Tutka, LLC (***Alt. Single Point-of-Contact**) AUSTIN KRUSE Project Manager Office Phone: (907) 357-2238 Cell: [redacted] 2485 E Zak Cir., Suite A Wasilla, AK 99654	(Secondary) DOT&PF CR, Kenai Peninsula ROBERT SMITH Aviation Project Mgr. / Safety Coordinator Office Phone: (907) 262-1187 Cell: [redacted] robert.smith2@alaska.gov P.O. Box 1327 Soldotna, AK 99669
Advanced Blasting Services, LLC (*** Single Point-of-Contact**) AXEL BODNAR Blaster in Charge Cell: [redacted] 281 S Conquest Cir. Wasilla, AK 99623	(Third) DOT&PF Statewide Aviation (***24/7 Available**) JOSH STUCKEY Airport Safety & Security Officer Office Phone: (907) 269-0751 Cell: [redacted] josh.stuckey@alaska.gov P.O. Box 196900 Anchorage, AK 99519-6900

❖ Additional contact information for local dispatch / emergency response is included below:

Moose Pass Vol. Fire Company (FDID: 26410) PHILLIP INGERSOLL Fire Chief FD Phone: (907) 288-3666 Emergency: Dial **911** 35390 Seward Hwy Moose Pass, AK 99631	Bear Cr. Fire & EMS Dept. (FDID: 26401) RICHARD BRACKIN Fire Chief FD Phone: (907) 224-3345 Emergency: Dial **911** 13105 Seward Hwy Seward, AK 99664

2.2.3. PHOTO PLAN

As drilling equipment concludes a set of blasting holes, and prior to complete loading of explosives, Tutka personnel will take several ground-level photos (from several angles when possible) of the active working face prior to each blast. After the blasting session is completed and the quarry is determined safe to approach by the Blaster-in-Charge, Tutka personnel will again take several ground-level photos of the active working face. Photos will be sent to ADNR staff via e-mail for State records in accordance with the Material Sale Agreement (MSA) Blasting Questionnaire requirement. An example photo submittal form is included in **Appendix 'I'** for reference. Photos will be submitted to the Southcentral Regional Land Office (SCRO), Natural Resource Specialist. ADNR personnel contact information is included in the table below. Contact information for a Natural Resource Technician is available to contact should the Natural Resource Specialist be temporarily unavailable.

AK Dept. of Natural Resources, Div. of MLW	AK Dept. of Natural Resources, Div. of MLW
CINNAMON MICELOTTA SCRO, NR Manager - Material Sales Program Office Phone: (907) 269-8566 Fax: (907) 269-8913 cinnamon.micelotta@alaska.gov 550 W 7th Ave., Suite 900C Anchorage, AK 99501	GRACE NEWCOMB SCRO, Natural Resource Specialist SCR Land Office: (907) 269-8560 Fax: (907) 269-8913 grace.newcomb@alaska.gov 550 W 7th Ave., Suite 900C Anchorage, AK 99501

2.2.4. DRILLING:

Drilling will be performed using self-contained hydraulic top-hammer drill rigs, and large down the hole (DTH) drill rigs. Specifically:

- **Furukawa DCR 20 (DTH)**
  - 46,000 lbs – 32' boom height
- **ECM 590 or Similar (Top Hammer)**
  - 24,500 lbs – 24' boom height

3. EXPLOSIVES

3.1 SUMMARY OF EXPLOSIVES TO BE USED:

1. **BLASTING AGENTS**
   a. Fortel Plus packaged emulsion – 3" and 5"
   b. AMEX WR
2. **BOOSTERS**
   a. Pentex BC 16 - 1 lb

3. NON-ELECTRIC DETONATORS

—→ NO ELECTRONIC BLASTING CAPS WILL BE USED. ←—

a. Handidet – various lengths
b. Connectadet – various lengths
c. Exel Lead-in-Line

*See **Appendix 'A'** for explosives products technical data sheets.

3.2 SAFETY DATA SHEETS

Safety Data Sheets (SDS) for all explosives products will be located onsite in an easily accessible and common location. See **Appendix 'B'** for SDS'.

3.3 EXPLOSIVES STORAGE AND TRANSPORTATION

3.3.1 ONSITE STORAGE

ABS will supply BATF approved storage magazines, with the intention of storing them within the limits of the quarry. Explosives will be stored in accordance with federal regulations set forth in 27 CFR 555 Subpart K and the minimum allowable distances set forth in ATF Table 555.218. Access to the storage area will be restricted and only authorized personnel will be allowed. At least three working days prior to transporting or using explosives, Tutka's Designated Representative (DR) will provide notice to the Federal Aviation Administration (FAA) the Airport Manager, ADOT Statewide Aviation, as well as police and fire authorities in the vicinity. Explosives will not be transported on or near the airport property until a NOTAM is issued.

3.3.2 EXPLOSIVES TRANSPORT EQUIPMENT

- All equipment will be inspected on a daily basis.
- Drivers will have the proper class driver's license.
- Each vehicle will be equipped with a first aid kit and fire extinguisher(s).
- Vehicles transporting explosives will not be overloaded.
- Vehicles containing explosives will not be left unattended.
- No person will smoke, carry matches or any other flame-producing device, or carry firearms or loaded cartridges while in or near a motor vehicle transporting explosives.
- Placards will be displayed on vehicles transporting explosives.

3.4 RECORD KEEPING

A detailed inventory will be kept in each powder magazine for all explosives removed from and returned to the storage facilities.

4. BLASTING

4.1 LICENSED POWDERMEN

Only State of Alaska Licensed Powdermen will be employed and used by Advanced Blasting Services in overseeing and firing each blast. Advanced Blasting Services will always maintain one Blaster in Charge as onsite blasting activities are taking place. See **Appendix 'C'** for copies of State of Alaska Explosives Handler licensing along with ABS' Federal Permit to purchase explosives.

4.2 BLASTING EQUIPMENT

4.2.1 REMOTE DETONATOR

To increase safety during each blast, radio remote wireless detonation equipment (HIEX Tellablaster II) will be used. The activation keys for the remote detonator will be under the control of the Blaster in Charge and the unit will remain deactivated until each shot is ready to be fired. The manufacturer's safety recommendations will be followed carefully.

The Tellablaster II (Rothenbuhler Eng. Model 1664 Remote Firing Device) operates over a standard carrier frequency band from **148 - 174 MHz**, modulated according to 11K0F3D (AFSK). See **Appendix 'D'** for information and specifications on blasting equipment to be used.

4.3 BLASTING CHECKLISTS AND REPORTS

An Advanced Blasting Services Pre-Blast Checklist and Blast Report will be completed by the Blaster in Charge for each blast. Additionally, a "Blasting Notification Form" will be sent to the General Contractor the day before each anticipated blast. The original documents will be kept onsite, and copies will be provided to the owner or owner's representative upon request**.** See **Appendix 'E'** for examples of the Pre-Blast Checklist, Blast Report, and Disposition Records.

4.4 NOTIFICATIONS

ABS will notify Tutka's Single Point-of-Contact about blasting operations by means of an e-mailed "Letter of Intent" (see **Appendix 'F'** for example):

1. Tutka, LLC
2. Local Flight Service (Tutka to provide notice)
3. Local Authorities (Tutka to provide notice)

Verbal notifications will be given on the day of the blast to all those noted above as well as onsite personnel.

4.5 SIGNS

The following signs will be used at locations of the project requiring blasting: "Danger Explosives," "No Smoking Within 500 Feet," "Blasting Zone 1000ft," "Quarry Ahead, Blasting Daily, Be Alert, Watch for Flagger", and "Whistler Warning." Signs will be posted at the beginning of each shift on the day(s) when blasting is planned to take place.

4.6 BLAST SIGNALS

- **Five Minute Blast Warning**

A series of long horn blasts five minutes prior to the blast.

- **One Minute Blast Warning**

A series of short horn blasts one minute prior to the blast.

- **All Clear Signal**

A prolonged horn blast following the inspection of the blast area.

Advanced Warning:

1. *We will perform all notifications as per MSHA Title 30 CFR Section 56.6306(f).*
2. *We will utilize multiple warning horns for sounding the Blast Signals (5-minute blast warning, 1-minute blast warning, and all clear signal). One or more horns will be staged in close proximity to the residential properties across the Seward Highway from the Quarry,*
3. *We will continue to provide advanced warning via emailed and mailed notification as required by our KPB permit.*
4. *We will implement, on the day of the blast, in-person, door-to-door notification for all properties within 0.5 miles of the blast location. If the resident is not at the property at the time of the visit, we will leave a flyer at the entrance to the property stating the time range in which the blast will occur.*

4.7 FIRING THE BLAST

- To avoid fly rock damage, all equipment will be moved a safe distance from the blast. The Blaster in charge will determine the distance on site, but the south end of the haul road will be the muster point.
- Traffic Control - Lane closures on the Seward Highway will occur during every blasting event.
- Aircraft watch personnel will be posted.
- Entrances to the blast area will be blocked.
- Aircraft lookouts will be in position throughout the blast firing sequence.
- Warning signals will be given.
- After the blast, sufficient time shall be allowed for smoke and fumes to clear before the Blaster in Charge returns to inspect the shot.
- After a careful inspection of the blast, all clear signals will be given by the Blaster in Charge.

4.8 REGULATORY REFERENCES

Advanced Blasting Services will comply with the following references as well as all federal, state, and local regulations:

Code of Federal Regulations (CFR)

29 CFR 1926, "Safety and Health Regulations for Construction"

29 CFR 1910, "Explosives and Blasting Agents"

**** Explosives storage and handling will be in accordance with the SSAC Section 70, "Legal Relations and Responsibility to the Public", Paragraph 70-10.*

5. Onsite Safety

5.1 PERSONAL PROTECTIVE EQUIPMENT

- **Fall Protection** will be worn by all personnel when the possibility of a fall exists.

- **Head Protection** is required at all times, Advanced Blasting Services will supply approved hard hats (ANSI Z89.1) with cold weather liners.
- **Hearing Protection** will be required, ear plugs or earmuffs at 82 dB or greater. Double hearing protection at 100 dB or greater.
- **Safety Glasses** are to be approved (Z 87.1) with side shields. Approved goggles are recommended in cold weather.
- **Hand Protection** will be worn when handling explosive materials**.**
- **Reflective Vests** will be supplied by Advanced Blasting Services and worn by the loading crew at all times.
- **Foot Protection** with steel toes (ANSI Z41) will be required except for winter packs or bunny boots**.**

5.2 SLIPS, TRIPS, AND FALLS

- Operators are required to use 3-point contact and face the ladder when mounting or dismounting equipment.
- All personnel working in an area where the potential for a fall exists will be required to use an approved harness attached to a secure anchor point.

5.3 EXPOSURE TO HARSH WEATHER

Blasting operations will be postponed during extreme weather conditions as determined by the Blaster in Charge.

5.4 LIGHTNING AND EXTRANEOUS ELECTRICITY

Although lightning storms are uncommon in this area the blasting crew will be constantly alert to atmospheric conditions that indicate the possibility of lightning or high levels of static electricity. The crew will be prepared to temporarily abandon all loading activities then clear and guard the area until the threat has passed.

5.5 ROAD CLOSURES

Flyrock and overpressure impacts are not anticipated at the nearby Seward Highway (approx. 1,140 feet to the west). Lane closures on the Seward Highway will occur during every blasting event. **Section 4.5** above lists several signs available for posting as the blasting event is staged.

5.6 PEDESTRIAN AND OFFROAD TRAFFIC

Though access to the project is restricted, the blasting area is in an area that may still be visited by vehicles, heavy equipment, ATV riders, and foot traffic. Precautionary measures taken will include, but will not be limited to the following:

- Posting of caution signs.
- Placing guards and lookouts at key points prior to and during blasting operations.

5.7 MISFIRES

Great care will be taken during the loading and timing of every shot to ensure that no misfires occur. However, in the unlikely event of a misfire, the blaster in charge will be prepared to handle it in a safe and efficient manner. The following is a list of actions that will be taken in the event of a misfire:

- The all-clear signal will NOT be given.
- Personnel will be notified of the potential danger.
- The area will be restricted, and caution signs will be posted.
- An attempt will be made to determine the cause of the misfire.
- A safe means of handling the misfire will be agreed upon.
- If needed, outside advice will be sought regarding safety and procedures.

5.8 METHODS FOR PROTECTION OF PUBLIC & PRIVATE PROPERTY

Public and private properties are at sufficient distances from the quarry/blasting zone that their protection is achieved through ABS' design of each blast event in a manner that achieves project production needs while minimizing potential adverse effects (excessive overpressure airblast, flyrock, and ground vibrations - see **Section 5.11**).

1. *Hole depths will be limited to 40' to avoid hole wandering from planned location and layout as the drill bit encounters different rock types.*
2. *Burden distance (distance from face vertical surface to first vertical hole where explosives will be loaded) will be checked before each shot both at the surface and at the bottom of the hole.*
3. *Weathered surface rock will be blasted down to competent rock with small blasts before large production blasts are performed.*
4. *All holes will be drilled plumb (not angled).*
5. *Borehole deviation monitoring will be performed.*
6. *Drone-based quarry face profiling will be performed.*

5.9 METHODS FOR PROTECTION OF NEW OR EXISTING WORK ON THE PROJECT

Existing work at the project/quarry will consist entirely of material stockpiles within the sorting and staging area. No additional methods are expected for their protection apart from the appropriate design of each blast event as described in **Section 5.11** below.

5.10 METHODS FOR PROTECTION OF WETLANDS, WATERS, AND WILDLIFE

Proposed quarry operations, including the haul road, sorting pad activities, and blasting at the active quarry rock face will not involve any in-water work, it will not involve any stream crossings, or intersect waters of the U.S., including wetlands. Under these circumstances, no blasting-specific precautions are proposed for protection of wetlands and waters.
Tutka consulted with the Alaska Department of Fish & Game (ADF&G), Habitat Section - Soldotna Office, regarding potential impacts to fish habitat (including water bodies and anadromous streams) as a result of blasting activity within the quarry. The Habitat Section concluded that, "**no** ADF&G Fish Habitat Permits will be required for the proposed Lawing Airport Quarry project based on the figures and description provided". A copy of the e-mail response from ADF&G personnel is included in **Appendix 'K'**.
Steps will be taken to ensure the safety of wildlife in the blasting area. No food or trash will be left in the blasting area and feeding animals will not be tolerated. A bird lookout will be posted during blasting operations. Blasting will be postponed if wildlife is found to be in harm's way.

5.11 AIRBLAST, FLYROCK, & GROUND VIBRATION

During the initial planning phase, ABS will configure each upcoming blast session using SHOTPlus 6 (blast design and modeling software) to layout a blast design based on existing site conditions, the desired material production, and governed by safe operation within the prescribed blast area. Measures will be taken during drilling and loading activities, based on experience of the Blaster in Charge (i.e., evaluation of observed rock cores at depth), to adjust the blast design accordingly to further limit overpressure effects of airblast, flyrock, and ground vibration. The reference distance for blast calculations is 930 feet, based on the nearest residential structure located north of the Quarry on Solar Mountain Road. To reduce the risk of injury and property damage within the Quarry, all equipment and personnel will be moved to a safe distance as determined by the Blaster in Charge. The predetermined muster point will be at the start of the proposed haul road located adjacent to the south end of the runway. If the Blaster in Charge is unable to fire the blast from a safe distance, adequate shelter will be provided. A preliminary design/pre-plot including blast design parameters including, in part: drill pattern, delay periods, decking, and scaled distance evaluation is included in **Appendix 'G'**. New or updated blast designs will be included in **Appendix 'G'** as needed; for example, when material removal progresses to the point where the blast burden will be in a differing rock geometry.

1. *Hole depths will be limited to 40' to avoid hole wandering from planned location and layout as the drill bit encounters different rock types.*
2. *Burden distance (distance from face vertical surface to first vertical hole where explosives will be loaded) will be checked before each shot both at the surface and at the bottom of the hole.*
3. *Weathered surface rock will be blasted down to competent rock with small blasts before large production blasts are performed.*
4. *All holes will be drilled plumb (not angled).*
5. *Borehole deviation monitoring will be performed.*
6. *Drone-based quarry face profiling will be performed.*

DNR EMERGENCY NOTIFICATION:

DNR will be notified within 24-hours in the event of any accidents, injuries, or operational problems associated with the operations authorized under this contract, including but not limited to fly-rock incidents, explosions, fires, and any other incident that jeopardizes the safety of the public.

Contact Personnel:

Cinnamon Micelotta, Material Sales Program Lead
Phone: (907) 269-8566
E-mail: cinnamon.micelotta@alaska.gov

SCRO Front Desk
Phone: (907) 269-8530
Leasing E-mail: dnr.scro.leasing@alaska.gov

5.12 AIR TRAFFIC SAFETY PLAN (See also Appendix 'H')

Air Traffic Safety will be insured for aircraft at the Lawing Airport and surrounding airspace by the below methods (an overview, See **Appendix 'H'** for the complete Air Traffic Safety Plan).

- Advanced notification (30-days) will be provided to ADOT&PF Statewide Aviation so that conflicts can be identified well ahead of planned blasting events/sessions.
- A nearer term advanced notification (10-days) will be provided to ADOT&PF Statewide Aviation so that a NOTAM can be issued 7-days prior for Lawing Airport as a warning to those preparing flight plans.
- On the of day each blasting, Tutka personnel will monitor the Common Traffic Advisory Frequency (CTAF) for nearby air traffic, make announcements to warn about the upcoming blast, and make a follow up announcement when the blasting session has concluded.
    - Tutka personnel will also watch and listen for aircraft in the area that may not be communicating over the radio.
    - In the event that an aircraft is identified to be passing through the airspace or approaching the runway, Tutka will halt blasting activity until the airspace is cleared or the aircraft has landed, and its occupants are duly informed about the planned blasting activity.

5.13 CONTACT INFORMATION FOR ADVANCED BLASTING SERVICES

Below are contacts for Advanced Blasting Services.

Advanced Blasting Services, LLC	Advanced Blasting Services, LLC
(* **Single Point-of-Contact**) AXEL BODNAR Blaster in Charge Cell: [redacted]	BILLY ROSSEAU ABS President Office Phone: (907) 357-2900 [redacted] 281 S Conquest Cir. Wasilla, AK 99623

APPENDICES

A. Explosives - Technical Data Sheets
B. Explosives - Safety Data Sheets
C. Federal and State Explosive Permits / Licenses
D. Blasting Equipment
E. Blasting Checklists and Reports
F. Blasting Notification Form (ABS)
G. Blasting Design and Sketches
H. Air Traffic Safety Plan
I. Pre-Blast & Post Blast Photo Submittal Forms
J. Records of Notices Sent
K. Supporting Documentation and Other Records

Appendix A:
Explosives - Technical Data Sheets

TECHNICAL DATA SHEET

Amex™ WR

USA & Canada

Description

Amex™ WR is an explosive blend of ammonium nitrate, fuel oil, and water resistant ingredients, and is economical for use in dewatered holes.

Application

Amex™ WR explosive can be gravity loaded in dewatered holes in surface applications.

Key Benefits

- Amex™ WR booster-sensitive explosive can be used in static water conditions as an alternative to packaged explosives.
- Amex™ WR loads easily and completely fills the borehole to give maximum explosive load per foot.
- Amex™ WR has low post blast fumes that result in reduced turnaround time.
- Amex™ WR is a low cost explosive that is resistant to dynamic pre-compression.

Technical Properties

Amex™ WR		
Properties		Poured in 100 mm (4 in. hole)
Density (g/cc)		0.84
Hole Type		Dry or Dewatered
Delivery System		Packaged
Recommended Pentex™ Primer for minimum hole diameter		See below
Typical VOD [1]	m/s (1,000's)	4.0
	ft/s (1,000's)	13.1
Water Resistance		Good
Fume Class		1
Relative Effective Energy (REE) [2]	RWS	97
	RBS	97

Recommendations for Use

Priming and Initiation

Amex™ WR is booster sensitive and must be in direct contact with an appropriately sized PentexTM booster. The use of detonating cord may adversely affect the performance of the Amex™ WR series and could result in misfires in boreholes less than 75 mm (3 in.) in diameter. Consult an Orica Technical Representative before attempting to use with detonating cord.

Ground Temperature

Explosives based on Ammonium Nitrate such as the Amex™ WR 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.

These products are available for use in ground temperatures 32°F (0°C) to a maximum of 150°F (65°C). If your application requires you to operate outside this temperature range please contact your local Orica Technical Representative.

Packaging

Amex™ WR explosive is available in 22.7 kg (50 lb) or 25 kg (55 lb) multi-wall paper bags, plastic bags in Canada. It is shipped on pallets or baler bags. In some areas it is also available in reusable, flexible, intermediate bulk containers (FIBCs) of various sizes.

Storage and Handling

Product Classification

Authorized Name:	Amex™ WR
Correct Shipping Name:	Explosive, blasting, type B
UN No:	0331
Classification:	1.5D

All regulations pertaining to the handling and use of such explosives apply.

Amex™ WR

USA & Canada

Storage
For maximum shelf life, Amex™ WR should be stored at ambient temperatures. Extreme changes in temperature that cause Amex™ WR explosive to cycle through -18°C (0°F) or 32°C (90°F) will reduce its shelf life, and make it lumpy and hard to handle. Amex™ WR should be stored in dry conditions in a well-ventilated, approved explosives magazine.

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 Services Representative for information on safe practices.

Safety
Amex™ WR is relatively insensitive to accidental initiation by shock, friction or mechanical impact under normal conditions of use. Detonation may occur from heavy impact or excessive heating particularly under conditions of confinement.

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Emergency Telephone Numbers

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

USA: Chemtrec 1-800- 424-9300

Notes:

(1.) The in-hole VODs of this product has been measured in excess of the values shown. Actual VOD will depend on hole diameter and confinement.

(2.) The Relative Effective Energy (REE) of an explosive is the energy calculated to be available to do effective blasting work. All energy values are calculated using the IDeX™ computer code owned by Orica for the exclusive use of its companies. Energy values are based on standard ANFO™ with a density of 0.84 g/cc and a cutoff pressure of 100 MPa. Other computer codes may give different values.

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Technical Data Sheet

Exel™ Connectadet™

Non-Electric, Short Delay Trunkline Assembly

The Power of Partnership

Description

Exel™ Connectadet™ non-electric, short delay trunkline assemblies provide out-of-hole delays in non-electric blast patterns. Used in conjunction with *Handidet™* or *Exel™ MS* in-hole shock tube detonator assemblies, *Exel™ Connectadet™* assemblies provide flexibility in blast design and ease of use. They can be used in quarries, surface coal operations, open pit and underground mines and construction projects to provide accurate surface timing.

Benefits

- Eliminates the need for detonating cord trunk lines
- Does not require burying - lower shrapnel damage potential
- Provides excellent, flexible blast control
- Allows easy connection, even with gloves
- Allows pre-blast changes to blast design
- Allows quick and easy hookup verification
- Does not tangle - no waste

Features

- Rugged, with abrasion resistant tubing
- New lower energy design
- Accurately timed in eight delays
- Quick and simple to connect; highly visible 6 tube ergonomic connector design
- In easy-to-handle figure-eight coils

Technical Properties

Exel™ Connectadet Non-Electric Detonator Assembly	
Surface Detonator	Low strength surface detonator designed for low shrapnel
Connection	**Connector Block**: Ergonomic connector block is color coded by surface delay time. Will initiate up to 6 shock tubes simultaneously. **White Connecting Clip**: Cobra™ Connector to connect to detonating cord if in use.
Shock Tube	Exel™ Shock Tube Color = Green
Identification	Color coded connector block and flag tag. Flag tag printed with delay time and length.

Delay Times*	
Time (ms)	**Connector Block Color**
9	Green
17	Yellow
25	Orange
33	Yellow
42	White
65	White
100	Black
200	Red

Initiation and Handling

Avoid damage to the shock tube. Never pull so hard as to stretch or break shock tubing. A premature detonation may result.

Exel™ Connectadet™ assemblies are unidirectional. They can be initiated with:

- Another Orica shock tube surface delay system
- An electric detonator
- An Orica electronic detonator

Technical Data Sheet

Exel™ Connectadet™

Non-Electric, Short Delay Trunkline Assembly

The Power of Partnership

The *Exel™ Connectadet™* assembly is not designed to initiate detonating cord. Misfires can result.

***Note**: The connector block of the Exel™ Connectadet™ assembly contains an explosive device that can be initiated by heat, impact or friction.*

Packaging

Exel™ Connectadet™ assemblies are wound in figure-eight coils and packed in bundles of five in fiberboard cases.

Length*		Quantity Per Case
Meters	Feet (approx)	
4	12	100
6	20	80
9	30	65
12	40	50
15	50	45

*Some lengths and delay combinations may not be available. Other lengths may be available by special arrangement. Contact your local supplier for details.

Storage

For best results, store under moderate temperatures and dry conditions in a well ventilated, approved detonator magazine.

Shelf Life

If stored in a cool, dry, well ventilated magazine and handled properly, the maximum shelf life of *Exel™ Connectadet™* is 5 years from date of manufacture. For best timing accuracy, use within 3 years.

Hazardous Materials Shipping Description

Authorized Names	EXEL Connectadet
UN Shipping Name	Detonator assemblies, non-electric
Hazard Class	1.4S
UN Number	0500
EX Number	1995120034
Packaging Group	II

Trademarks

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Emergency Contact Telephone Numbers

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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.**

Technical Data Sheet

Exel™ Handidet™

Non-Electric, Surface Delay and In-hole Detonator Assembly

The Power of Partnership

Description

Exel™ *Handidet*™ non-electric, surface delay and in-hole detonator assemblies are easy-to-use components in non-electric sequential blasting applications. Used in pipeline and utility trenching, quarries, open pits and construction projects, *Exel*™ *Handidet*™ assemblies are easy to connect, easy to verify, and provide accurate surface and in-hole timing.

Benefits

- Reduces the number of components on site
- Allows pre-blast changes to pattern design
- Reduces inventory
- Provides excellent blast control
- Allows easy hookup - increase productivity
- Facilitates rapid hookup verification
- Reduces chance of ground movement cutoff failures
- Can be used in all weather conditions
- No tangles, no waste
- Reduces operating costs

Features

- Surface and in-hole delays in one unit
- New lower energy design
- Accurately timed
- Quick and simple to connect
- Highly visible **6 tube** ergonomic connector design
- Highly visible
- Rugged, with new abrasion resistant tubing
- Resistant to hot or cold conditions; easy to handle in figure-eight coils

Properties

In-hole Detonator	High Strength, 12 grain (780 mg) PETN base charge (USBM 8+)
Surface Delay Initiator	New Low Shrapnel
Connector Block	**6 tube** capacity, color coded by surface delay time, indelibly printed with length and delays
Exel™ Shock Tube	Bright yellow color

Delay Nominal Times	
Surface/In-hole (ms)	**Connector block color**
17/500	Yellow
25/475	Orange
# 25/500	Orange
42/475	White
42/500	White
42/700	White
# Standard short delay combination	

Other delays may be available by special arrangements.

Handling and Initiation

Do not use the *Exel*™ *Handidet*™ assembly as a lowering line. Keep the shock tube taut until loading has been completed. Avoid damage to the shock tube during loading and stemming operations.

Never pull so hard as to stretch or break shock tubing. A premature detonation may result.

Exel™ *Handidet*™ detonator assemblies are unidirectional. They can be initiated by:

- The surface initiator from another *Exel*™ *Handidet*™
- An Orica electronic detonator
- An electric detonator
- An Orica shock tube surface delay system

Exel™ Handidet™

Non-Electric, Surface Delay and In-hole Detonator Assembly

The Power of Partnership

***Note**: The surface connector block of the Exel™ Handidet™ assembly contains an explosive device that can be initiated by heat, impact or friction. The surface connector is not designed to initiate detonating cord.*

Packaging

Exel™ Handidet™ detonator assemblies are wound in figure-eight coils. Assemblies are bulk packed in fiberboard cases.

Length (approx)		Quantity per Case	
Meters	Feet	1.1B	1.4B
4	12	100	90
5	16	100	90
7	23	75	70
8	26	75	70
9	30	65	60
12	40	50	50
15	50	45	45
18	60	40	30
25	80	25	25
30	100	25	25
37	120	20	20

Other lengths may be available by special arrangements. Some length/delay combinations may not be available.

Storage

For best results, store under moderate temperatures and dry conditions in a well ventilated, approved detonator magazine.

Hazardous Materials Shipping Description

Detonator Assemblies, Non-electric,
Class and Division 1.1B
UN 0360, PG II

Class and Division 1.4B
UN 0361, PGII

Trademarks

Disclaimer

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Emergency Contact Telephone Numbers

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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.

Technical Data Sheet

The Power of Partnership

Exel™ Lead-in Line

Bulk Shock Tube

Description

Exel™ Lead-in Line is a long length of shock tube without any detonator attached that is used to extend the length of non-electric assemblies. *Exel™ Lead-in Line* allows non-electric blast initiation from a safe location. They can be used at surface or underground mines, at quarries or at construction projects.

Benefits

- Reduce electrical hazards at blast initiation time
- Reduce blasting noise
- Provide positive blast initiation control

Features

- A cost effective replacement for electrical and detonating cord blast initiation systems when used with non electric assemblies
- Highly visible
- Easy to handle and deploy and will not easily tangle

Technical Properties

Exel™ Lead-in Line Bulk Shock Tube	
Connections	Splicing Sleeves: Clear plastic 25 mm (1") long supplied within the case End Caps: Red end closures protect tubing from debris
Shock Tube	Exel™ Shock Tube Yellow 3 mm (0.118") dia.
Delay Time	In tube firing time only at approx. 2000m/s (6562 f/s)

Initiation and Handling

Avoid damage to the shock tube. Never pull so hard as to stretch or break shock tubing. A premature detonation may result.

Exel™ Lead-in Line can be initiated with:

- A non-electric starter device
- A non-electric detonator assembly
- An electric or electronic detonator assembly

Exel™ Lead-in Line is designed to be spliced into non-electric assemblies.

- *Exel™*shock tube can be cut with a sharp knife or with anvil type pruning shears
- Cuts should be made clean and at right angles taking care not to crush or collapse the cut ends
- Place end caps on the cut ends on the spool to limit the exposure to moisture
- Push the spliced ends into the splicing sleeve so they butt together in the centre
- Do not place tubing splices under tension

Packaging

Exel™ Lead-in Line is spooled and packed in fiberboard cases.

Length Per Spool		**Spools Per Case***
Meters	**Feet (approx)**	
610	2000	2

**Each case also includes 10 end caps and 10 splicing sleeves.*

Exel™ Lead-in Line

Bulk Shock Tube

Storage

For best results, store under moderate temperatures and dry conditions in a well ventilated, approved explosives magazine.

Shelf Life

If stored in a cool, dry, well ventilated magazine and handled properly, the maximum shelf life of *Exel™ Lead-in Line* is 5 years from date of manufacture.

Hazardous Materials Shipping Description

Authorized Names	Exel Shock Tube
UN Shipping Name	Articles, explosive, n.o.s.
Hazard Class	1.4S
UN Number	0349
EX Number	1991050268
Packaging Group	II

Trademarks

Disclaimer

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

For lost, stolen or misplaced explosives:
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TECHNICAL DATA SHEET

Fortel™ Plus
USA and Canada

Description
Fortel™ Plus is a high energy, all-purpose, large diameter emulsion. The explosive is white in color with a firm putty-like consistency.

Application
Economical, booster-sensitive Fortel™ Plus emulsion explosive is an ideal wet-hole column load. Fortel™ Plus is energized to give it good heave and make it an effective toe load for tough rock conditions.

Key Benefits
- Fortel™ Plus reduces blasting costs and improves digging efficiency.
- Fortel™ Plus reduces costs when used to build a toe load out of water, allowing the use of Amex™ as a column load in holes with wet toes.
- Fortel™ Plus improves loading efficiency: no plugged holes.
- Fortel™ Plus makes a good combination primer for Amex™ blasting agent in large diameter holes.
- Fortel™ Plus is highly water resistant which minimizes leaching and reduces environmental impact.
- OH&S issues around the handling and storage of nitroglycerin are eliminated.
- Fortel™ Plus is an energized emulsion with very good heave energy.

Recommendations for Use

Blasthole Depth
Fortel™ Plus is suitable for use in holes of any practical depth providing contained water does not exceed 20m (65.6 ft.) depth.

Technical Properties

Fortel™ Plus		
Cartridge Density		1.26 - 1.30 g/cc
Velocity of Detonation[1]	m/s (1,000's)	4.2
	ft/s (1,000's)	13.8
Water Resistance		Excellent
Fume Class		2
Relative Effective Energy (REE) [2]	Relative Weight Strength (RWS)	110
	Relative Bulk Strength (RBS)	178

Priming and Initiation
Fortel™ Plus explosive is a booster sensitive explosive and must be in direct contact with the largest possible diameter Senatel™ detonator sensitive explosive or an appropriately sized Pentex™ booster. Use of detonating cord with Fortel™ Plus is not recommended. Detonating cord may adversely affect the performance of Fortel™ Plus and could result in misfires in boreholes less than 75 mm (3 in.) in diameter. Consult an Orica representative before attempting to use with detonating cord.

Charging
In small diameter blastholes the maximum energy per meter of blasthole can be achieved by tamping the explosive with a wooden tamping rod appropriate to the hole diameter. No metal instrument should be used to tamp explosives. The primer cartridge containing a detonator must not be tamped.

Sleep Time within Blastholes
The sleep time in a blasthole is influenced by the extent of damage to the packaging and by the nature of any water present. Fortel™ Plus will give good performance after two weeks immersion.

Fortel™ Plus
USA and Canada

Packaging

In large diameters, Fortel™ Plus is available in polywoven shot bags. For medium size holes, this product can be supplied in high strength, tear resistant film. Standard sizes are as follows:

Size (mm x kg)	Size (in. x lb)	Packaging
65 x 18	2 ½ x 8	Ribbed
75 x 6	3 x 13	Ribbed
90 x 7	3½ x 15	Ribbed
100 x 9	4 x 20	Polyweave
115 x 10	4½ x 22	Polyweave
125 x 10	5 x 22	Polyweave
125 x 13	5 x 30	Polyweave
140 x 16	5½ x 35	Polyweave
155 x 18	6 x 40	Polyweave
165 x 22	6½ x 50	Polyweave
175 x 22	7 x 50	Polyweave
200 x 23	8 x 50	Polyweave

Storage and Handling

Product Classification

Authorized Name: Fortel™ Plus
Proper Shipping Name: Explosive, blasting, type E
UN No: 0332
Classification: 1.5D

All regulations pertaining to the handling and use of such explosives apply.

Storage

Store Fortel™ Plus in a suitably licensed magazine for Class 1.5D explosives. The cases should be stacked in the manner designated on the case.

Fortel™ Plus has a storage **shelf life** of up to 12 months from manufacture date in a well ventilated, approved magazine, even in hot and humid extremes.

Fortel™ Plus is best stored at temperatures above -15°C (5°F). This is especially important in cold weather "load and shoot" worksites where there is insufficient inhole warm-up time. Fortel™ Plus should have an internal temperature of 0°C (32°F) or higher, before use with a pneumatic cartridge loading machine.

For recommended good practices in transporting, storing, handling, and using this product, refer to the "Always and Never" booklet packed inside each case.

Transport

Fortel™ Plus should be transported between -40°C (-40ºF) and +30°C (104ºF).

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 Services Representative for information on safe practices.

Safety

The post detonation fume characteristics of Fortel™ Plus make the product suitable for both underground and surface blasting applications. Users should ensure that adequate ventilation is provided prior to re-entry into the blast area.

Fortel™ Plus can be initiated by extremes of shock, friction or mechanical impact. As with all explosives, Fortel™ Plus should be handled and stored with care and must be kept clear of flame and excessive heat.

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Emergency Telephone Numbers
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USA: Chemtrec 1-800- 424-9300

Notes:

(1.) Unconfined at 5ºC (41ºF). VOD will depend on application including explosive density, blasthole diameter and degree of confinement. The VOD range is based on minimum unconfined and calculated ideal.

(2.) The Relative Effective Energy (REE) of an explosive is the energy calculated to be available to do effective blasting work. All energy values are calculated using the IDeX™ computer code owned by Orica for the exclusive use of its companies. Energy values are based on standard ANFO with a density of 0.84 g/cc and a cut-off pressure of 100Mpa. Other computer codes may give different values

TECHNICAL DATA SHEET

Pentex™ BC Cast Boosters

USA & Canada

Description

Pentex™ BC Cast Boosters are detonator sensitive boosters that provide high energy initiating power for a wide range of explosive applications. The internal through tunnel and detonator well of the Pentex™ BC Cast Boosters ensures reliable initiation with all types of detonator assemblies. They can be used to provide safe and reliable priming of booster sensitive explosives on most surface and underground blasting operations. They are ideal for use in detonator only blasting applications.

Key Benefits

- High velocity
- High density
- High detonation pressure
- Long shelf life
- Excellent water resistance
- High safety and reliability
- Concentrated detonation energy

Technical Properties

Pentex™ BC "Blasting Cap" Sensitive Booster				
Nominal Weight	200 g (7 oz)	340 g (12 oz)	454 g (16 oz)	908 g (32 oz)
Nominal Diameter	41 mm (1.6 in)	50 mm (2.0 in)	58 mm (2.3 in)	79 mm (3.1 in)
Nominal Length	117 mm (4.6 in)	119 mm (4.7 in)	119 mm (4.7 in)	129 mm (5.1 in)
Shell Material	Plastic			Cardboard
Shell Color	Fluorescent Orange			
Nominal Density	1.65 g/cc			
VOD	> 7,200 m/s (23,600 ft/s)			
Detonation Pressure	> 214 kb			
Water Resistance	Excellent			
Detonator Retention	Mold in Detlock			N/A
Tunnel Arrangement	One blind detonator well and one through tunnel			

Recommendations for Use

Priming and Initiation

Pentex™ BC Cast Boosters can be initiated by standard high strength electric, electronic and non-electric detonators.

Note: Detonating cords are not to be used to initiate Pentex™ BC Cast Boosters.

When used with booster-sensitive explosives, ensure that the primer is in intimate contact with, and surrounded by, the explosive.

Packaging

Pentex™ BC Cast Boosters are packed in fiberboard cases. External case dimensions: 420 mm x 330 mm x 140 mm (16.6 in x 13.0 in x 5.5 in).

Pentex™ BC Cast Boosters

USA & Canada

Product	Quantity Per Case	Gross Weight / Case kg (lbs)
Pentex™ BC 7 * 200	72	15.6 (34.4)
Pentex™ BC 12 * 340	49	17.6 (38.9)
Pentex™ BC 16 * 454	36	17.3 (38.2)
Pentex™ BC 32 * 908	18	17.0 (37.5)

Storage and Handling

Product Classification

Authorized Name: Pentex™ BC
Correct Shipping Name: Boosters, without detonator
UN No: 0042, PG II
Classification: 1.1D
EX No: 211010500

All regulations pertaining to the handling and use of such explosives apply.

Storage

Cast boosters are high explosives. For best results, store under moderate temperatures and dry conditions in a well ventilated, approved explosives magazine.

Shelf Life

If stored in a cool, dry, well ventilated magazine and handled properly, the maximum shelf life of Pentex™ BC Cast Boosters is 5 years from date of manufacture.

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 Services Representative for information on safe practices.

Disclaimer

For more information please visit our website: www.orica.com

Orica's North America headquarters can be reached at:
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Fax: +1 303 268 5250

Emergency Telephone Numbers

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

USA: Chemtrec 1-800- 424-9300

Appendix B:
Explosives - Safety Data Sheets

Amex™, Amex™ WR, Amex™ HD

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations And According To The Hazardous Products Regulation (February 11, 2015).

Revision Date: 02/08/2017 Date of Issue: 02/08/2017 Version: 1.0

SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: Amex™, Amex™ WR, Amex™ HD

Synonyms: ANFO, Ammonium Nitrate Fuel Oil, Water Resistant ANFO, Water Resistant Amex™, Underground AMEX, and Underground ANFO

Intended Use of the Product

Booster sensitive blasting agent and water resistant blasting agent. For professional use only.

Name, Address, and Telephone of the Responsible Party

USA:
Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137-9406
For SDS Requests: 1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com

Canada:
Orica Canada Inc.
301 Rue Hotel-de-Ville
Brownsburg-Chatham, QC
J8G 3B5
For SDS Requests:
1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com
www.oricaminingservices.com

Emergency Telephone Number

Emergency Number : **Canada:** 1-877-561-3636 (Orica Transportation Emergency Response)
USA: 1-800-424-9300 (CHEMTREC)

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 5400.5 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS-US/CA Classification

The explosive classification below only applies to US 29 CFR 1910.1200 (HCS/HazCom 2012). The explosive classification is excluded from Canada Hazardous Products Regulations (HPR, SOR/2015-17), it is regulated under the Canada Explosives Act (R.S.C., 1985, c. E-17).

Explosives, Division 1.5	H205
Ox. Sol. 3	H272
Skin Irrit. 2	H315
Eye Irrit. 2A	H319
Carc. 2	H351
STOT RE 2	H373
Aquatic Chronic 3	H412

Full text of hazard classes and H-statements : see section 16

Label Elements

GHS-US/CA Labeling

Any labeling elements (pictograms, signal word, hazard, and precautionary statements) related to explosive classifications apply to the OSHA Hazard Communication Standard (HCS, 29 CFR 1910.1200) only and are excluded from Canada's Hazardous Products Regulations (HPR, SOR/2015-17).

Hazard Pictograms (GHS-US/CA) :

GHS03 GHS07 GHS08

Signal Word (GHS-US/CA) : Danger

Hazard Statements (GHS-US/CA) :
H205 - May mass explode in fire.
H272 - May intensify fire; oxidizer.
H315 - Causes skin irritation.
H319 - Causes serious eye irritation.
H351 - Suspected of causing cancer.
H373 - May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary Statements (GHS-US/CA) :
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P220 - Keep away from clothing and other combustible materials.
P260 - Do not breathe dust, fume.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P273 - Avoid release to the environment.
P302+P352 - IF ON SKIN: Wash with plenty of water.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P314 - Get medical advice/attention if you feel unwell.
P321 - Specific treatment (see section 4 on this SDS).
P332+P313 - If skin irritation occurs: Get medical advice/attention.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P362+P364 - Take off contaminated clothing and wash it before reuse.
P405 - Store locked up.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P240 - Ground/bond container and receiving equipment.
P250 - Do not subject to friction, grinding, shock.
P280 - Wear protective gloves, protective clothing, and eye protection.
P370+P380 - In case of fire: Evacuate area.
P372 - Explosion risk in case of fire.
P373 - DO NOT fight fire when fire reaches explosives.
P401 - Store in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.
P501 - Dispose of contents/container in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.

Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions. Overexposure 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.

Unknown Acute Toxicity (GHS-US/CA)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product Identifier	% *

Ammonium nitrate	(CAS No) 6484-52-2	85 - 95
Fuels, diesel, no. 2	(CAS No) 68476-34-6	4 - 10

*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

SECTION 4: FIRST AID MEASURES

Description of First-aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Get medical advice/attention.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: Causes serious eye irritation. Causes skin irritation. There are potential chronic health effects to consider. Overexposure to this material may result in methemoglobinemia. Methemoglobinemia decreases the blood's ability to carry oxygen and results in symptoms such as dizziness, drowsiness, headache, shortness of breath, blue skin and lips, rapid heart rate, unconsciousness, and possibly death.

Inhalation: Prolonged exposure may cause irritation.

Skin Contact: Redness, pain, swelling, itching, burning, dryness, and dermatitis.

Eye Contact: Contact causes severe irritation with redness and swelling of the conjunctiva.

Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: Suspected of causing cancer. May cause damage to organs through prolonged or repeated exposure (thymus, liver, bone marrow).

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. 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: DO NOT fight fires involving explosives.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Explosive, could cause fire and secondary explosions. May intensify fire; oxidizer.

Explosion Hazard: Explosives, Division 1.5 - Very insensitive explosives that have a mass explosion hazard. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity: Explosive, insensitive but has a mass explosion hazard. Oxidizer: increases the burning rate of combustible materials.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire. This product is an explosive with a mass explosion hazard. DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS.

Firefighting Instructions: DO NOT ATTEMPT TO FIGHT FIRE. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Carbon dioxide, carbon monoxide and low molecular weight hydrocarbons. . Nitrogen oxides. Ammonia.

Other Information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections

Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Keep away from heat, sparks, open flames, hot surfaces. – No smoking. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Evacuate danger area. Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Keep away from combustible material. Avoid all contact with skin, eyes, or clothing.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel. Evacuate danger area.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area. Eliminate ignition sources.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up

For Containment: Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. Absorb and contain with inert material. Place contents in suitable container for disposal. Use only non-sparking tools.

Methods for Cleaning Up: Use only non-sparking tools. Be careful to avoid shock, friction, and contact with grit. Collect product for recovery or 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. Do not take up in combustible material such as: saw dust or cellulosic material.

Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: May cause or intensify fire; oxidizer.

Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Keep away from sources of ignition - No smoking. Keep away from heat, sparks, open flames, hot surfaces, combustible materials, incompatible materials. - No smoking. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Avoid contact with skin, eyes and clothing.

Hygiene Measures: This product is an explosive and should only be used under the supervision of trained and licensed personnel. Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment.

Storage Conditions: Store under moderate temperatures recommended by competent authority. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, spark and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Isolate from incompatibles. Keep in fireproof place.

Incompatible Materials: Combustibles, heat sources, copper, zinc, alloys of copper or zinc, aluminum powder, mild steel.

Special Rules on Packaging: Keep only in the original container.

Specific End Use(s)

Booster sensitive blasting agent and water resistant blasting agent. For professional use only.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), or Canadian provincial governments.

Fuels, diesel, no. 2 (68476-34-6)		
USA ACGIH	ACGIH TWA (mg/m³)	100 mg/m³ (inhalable fraction and vapor)
USA ACGIH	ACGIH chemical category	Skin - potential significant contribution to overall exposure by the cutaneous route,Confirmed Animal Carcinogen with Unknown Relevance to Humans
Alberta	OEL TWA (mg/m³)	100 mg/m³
British Columbia	OEL TWA (mg/m³)	100 mg/m³ (aerosol, inhalable, and vapour)
Manitoba	OEL TWA (mg/m³)	100 mg/m³ (inhalable fraction and vapor)
Newfoundland & Labrador	OEL TWA (mg/m³)	100 mg/m³ (inhalable fraction and vapor)
Nova Scotia	OEL TWA (mg/m³)	100 mg/m³ (inhalable fraction and vapor)
Nunavut	OEL STEL (mg/m³)	150 mg/m³ (vapour)
Nunavut	OEL TWA (mg/m³)	100 mg/m³ (vapour)
Northwest Territories	OEL STEL (mg/m³)	150 mg/m³ (vapour)
Northwest Territories	OEL TWA (mg/m³)	100 mg/m³ (vapour)
Ontario	OEL TWA (mg/m³)	100 mg/m³ (inhalable fraction and vapor)
Prince Edward Island	OEL TWA (mg/m³)	100 mg/m³ (inhalable fraction and vapor)
Saskatchewan	OEL STEL (mg/m³)	150 mg/m³ (vapour)
Saskatchewan	OEL TWA (mg/m³)	100 mg/m³ (vapour)

Exposure Controls

Appropriate Engineering Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Product to be handled in a closed system and under strictly controlled conditions. Use explosion-proof equipment. Gas detectors should be used when flammable gases or vapors may be released.

Personal Protective Equipment: Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.

Materials for Protective Clothing: Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection: Wear protective gloves.

Eye Protection: Chemical safety goggles.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Other Information: When using, do not eat, drink or smoke

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Solid
Appearance	:	Green, Blue, Gray, Orange, or Off-White Prills/Granules
Odor	:	Diesel fuel
Odor Threshold	:	Not available
pH	:	Not available
Evaporation Rate	:	Not available
Melting Point	:	170 °C (338 °F)
Freezing Point	:	Not available
Boiling Point	:	Not available

Flash Point	:	52 °C (126 °F)
Auto-ignition Temperature	:	210 - 265 °C (410 - 509 °F)
Decomposition Temperature	:	> 210 °C (410 °F)
Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	0.01 - 0.04 mm Hg @ 20 °C (68 °F)
Relative Vapor Density at 20°C	:	Not available
Relative Density	:	Not available
Density	:	0.76 - 0.99 g/cc
Specific Gravity	:	Not available
Solubility	:	Dissolves slowly with prolonged exposure to water
Partition Coefficient: N-Octanol/Water	:	Not available
Viscosity	:	Not available
Explosive Properties	:	Explosives, Division 1.5 - Very insensitive explosives that have a mass explosion hazard

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Explosive, insensitive but has a mass explosion hazard. Oxidizer: increases the burning rate of combustible materials.

Chemical Stability: Extreme risk of explosion by shock, friction, fire or other sources of ignition. May cause fire or explosion; strong oxidizer.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Keep away from open flames, hot surfaces and sources of ignition. Incompatible materials. Direct sunlight, extremely high or low temperatures, ignition sources, combustible materials, incompatible materials.

Incompatible Materials: Combustibles, heat sources, copper, zinc, alloys of copper or zinc, aluminum powder, mild steel.

Hazardous Decomposition Products: None expected under normal conditions of use.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity (Oral): Not classified

Acute Toxicity (Dermal): Not classified

Acute Toxicity (Inhalation): Not classified

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Causes skin irritation.

Eye Damage/Irritation: Causes serious eye irritation.

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Suspected of causing cancer.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Prolonged exposure may cause irritation.

Symptoms/Injuries After Skin Contact: Redness, pain, swelling, itching, burning, dryness, and dermatitis.

Symptoms/Injuries After Eye Contact: Contact causes severe irritation with redness and swelling of the conjunctiva.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: Suspected of causing cancer. May cause damage to organs through prolonged or repeated exposure.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Ammonium nitrate (6484-52-2)	
LD50 Oral Rat	2217 mg/kg

LC50 Inhalation Rat	> 88.8 mg/l/4h

Fuels, diesel, no. 2 (68476-34-6)	
LD50 Oral Rat	18.7 - 24.9 ml/kg
LD50 Dermal Rabbit	> 4300 mg/kg
LC50 Inhalation Rat	3.6 mg/l/4h

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecology - General: Harmful to aquatic life with long lasting effects.

Ammonium nitrate (6484-52-2)	
LC50 Fish 1	542 mg/l
EC50 Daphnia 1	555 mg/l

Fuels, diesel, no. 2 (68476-34-6)	
LC50 Fish 1	57 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

Persistence and Degradability

Amex™, Amex™ WR, Amex™ HD	
Persistence and Degradability	May cause long-term adverse effects in the environment.

Bioaccumulative Potential

Amex™, Amex™ WR, Amex™ HD	
Bioaccumulative Potential	Not established.

Ammonium nitrate (6484-52-2)	
BCF Fish 1	(no bioaccumulation expected)
Log Pow	-3.1 (at 25 °C)

Mobility in Soil

Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of contents/container in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.

Additional Information: Container may remain hazardous when empty. Continue to observe all precautions.

Ecology - Waste Materials: Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

In Accordance with DOT

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE Bor Agent blasting, Type B
Hazard Class : 1.5D
Identification Number : UN0331
Label Codes : 1.5D

Packing Group : II
ERG Number : 112

In Accordance with IMDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE B (AGENT, BLASTING, TYPE B)
Hazard Class : 1.5D
Identification Number : UN0331
Label Codes : 1.5D

EmS-No. (Fire) : F-B
EmS-No. (Spillage) : S-Y

In Accordance with IATA

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE B
Identification Number : 1.5D
Hazard Class : UN0331
ERG Code (IATA) : 1L

In Accordance with TDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE B
Hazard Class : 1.5D
Identification Number : UN0331
Label Codes : 1.5D

Packing Group : II

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Amex™, Amex™ WR, Amex™ HD	
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard Fire hazard Immediate (acute) health hazard Delayed (chronic) health hazard

Ammonium nitrate (6484-52-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Fuels, diesel, no. 2 (68476-34-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Ammonium nitrate (6484-52-2)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

Canadian Regulations

Ammonium nitrate (6484-52-2)
Listed on the Canadian DSL (Domestic Substances List)

Fuels, diesel, no. 2 (68476-34-6)
Listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision Date : 02/08/2017
Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR).

GHS Full Text Phrases:

Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Carc. 2	Carcinogenicity Category 2
Expl. 1.5	Explosive Category 1.5
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Ox. Sol. 3	Oxidizing solids Category 3
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H205	May mass explode in fire
H272	May intensify fire; oxidizer
H315	Causes skin irritation

H319	Causes serious eye irritation
H351	Suspected of causing cancer
H373	May cause damage to organs through prolonged or repeated exposure
H412	Harmful to aquatic life with long lasting effects

All information contained herein and in any supporting documents is provided for informational purposes only and is as accurate and up-to-date as possible at the time of publication. Since Orica and its related entities cannot anticipate or control the conditions under which this information may be used, users must review this information in the specific context of the intended application and must make their own determinations as to the suitability of this information for such users' purposes. To the maximum extent permitted by law, nothing contained herein and in any supporting documents shall be deemed to be an express or implied warranty, and Orica expressly disclaims all warranties and representations, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Orica will not be responsible for any loss whatsoever resulting from any use or reliance upon this information.

NA GHS SDS 2015 (Can, US)

Detonator Assemblies, Non-Electric

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Date of Issue: 12/20/2018 Version: 1.0

SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product Form: Mixture

Product Name: Detonator Assemblies, Non-Electric

Product Code: 4012

Synonyms: ExelTM HandidetTM 1.1B; ExelTM HandidetTM 1.4B; ExelTM HandidetTM LP 1.1B; ExelTM LP 1.1B; ExelTM LP 1.4B; ExelTM LP White 1.1B; ExelTM MS 1.1B; ExelTM MS 1.4B; ExelTM MS Connectors 1.1B; ExelTM MS Connectors 1.4B; ExelTM MS White 1.4B; ExelTM MSC-SP - 1.1B; ExelTM Noiseless Lead-in Line 1.4S; ExelTM SHD - 1.1B; ExelTM T&D - 1.1B; ExelTM T&D - 1.4B; ExelTM XT - 1.1B

1.2. Intended Use of the Product

Use of the Substance/Mixture: Explosive. For professional use only.

1.3. Name, Address, and Telephone of the Responsible Party

USA:

Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137-9406
For SDS Requests: 1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com

Canada:

Orica Canada Inc.
301 Rue Hotel-de-Ville
Brownsburg-Chatham, QC
J8G 3B5
For SDS Requests:
1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com
www.oricaminingservices.com

1.4. Emergency Telephone Number

Emergency Number : **Canada:** 1-877-561-3636 (Orica Transportation Emergency Response)
USA: 1-800-424-9300 (CHEMTREC)
MEXICO: 01-800- 002-1400

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 MEXICO CALL:** 01-800- 002-1400. **IN THE U.S.:** FOR LOST, STOLEN, OR MISPLACED EXPLOSIVES CALL: BATF **1-800-800-3855.** FORM ATF F 5400.5 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

Expl. 1.1	H201
Carc. 1B	H350
Repr. 1A	H360
Lact.	H362
STOT RE 1	H372
Aquatic Acute 1	H400
Aquatic Chronic 1	H410

Full text of hazard classes and H-statements : see section 16

2.2. Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :

GHS01 GHS08 GHS09

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) : H201 - Explosive; mass explosion hazard.
H350 - May cause cancer.
H360 - May damage fertility or the unborn child.
H362 - May cause harm to breast-fed children.
H372 - Causes damage to organs (central nervous system, blood and kidneys)

through prolonged or repeated exposure (Inhalation, oral).
H400 - Very toxic to aquatic life.
H410 - Very toxic to aquatic life with long lasting effects.

Precautionary Statements (GHS-US) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking.
P230 - Keep wetted with appropriate material.
P240 - Ground/Bond container and receiving equipment.
P250 - Do not subject to friction, grinding, shock.
P260 - Do not breathe dust.
P263 - Avoid contact during pregnancy/while nursing.
P264 - Wash hands, forearms, and exposed areas thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P273 - Avoid release to the environment.
P280 - Wear eye protection, protective gloves, protective clothing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P314 - Get medical advice/attention if you feel unwell.
P370+P380 - In case of fire: Evacuate area.
P372 - Explosion risk in case of fire.
P373 - DO NOT fight fire when fire reaches explosives.
P391 - Collect spillage.
P401 - Store in accordance with as defined in the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with as defined in the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.

2.3. Other Hazards

Exposure may aggravate pre-existing eye, skin, or respiratory conditions.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Not applicable

3.2. Mixture

Name	Product Identifier	%
Lead	(CAS-No.) 7439-92-1	0.1 - 50
Pentaerythrite tetranitrate	(CAS-No.) 78-11-5	0.02 - 4
Lead oxide (Pb3O4)	(CAS-No.) 1314-41-6	0.001 - 1.6
Lead azide	(CAS-No.) 13424-46-9	0.01 - 0.7
Cyclotetramethylenetetranitramine	(CAS-No.) 2691-41-0	0.1 - 0.3
Aluminum	(CAS-No.) 7429-90-5	0.006 - 0.02

SECTION 4: FIRST AID MEASURES

4.1. Description of First-aid Measures

First-aid Measures General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid Measures After Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

First-aid Measures After Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation develops or persists.

First-aid Measures After Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

First-aid Measures After Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

4.2. Most Important Symptoms and Effects Both Acute and Delayed

Symptoms/Injuries: May cause cancer. May damage fertility. May damage the unborn child. May cause harm to breast-fed children. Causes damage to organs (central nervous system, blood and kidneys) through prolonged or repeated exposure (Inhalation, oral).

Symptoms/Injuries After Inhalation: Prolonged exposure may cause irritation.

Symptoms/Injuries After Skin Contact: Prolonged exposure may cause skin irritation.

Symptoms/Injuries After Eye Contact: May cause slight irritation to eyes.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: May cause cancer. May damage fertility or the unborn child. Causes damage to organs (central nervous system, blood and kidneys) through prolonged or repeated exposure (Inhalation, oral).

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. 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: DO NOT fight fires involving explosives. Smothering this product could lead to decomposition and explosion. This product is more sensitive to explosion if contaminated with organic or oxidizable material or if heated while confined. Unless the mass of product on fire is flooded with water, re-ignition is possible. Dry chemical, foams, steam and smothering devices are not effective and can lead to possible explosion and should not be used to fight a fire near explosives.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Explosive, could cause fire and secondary explosions.

Explosion Hazard: Explosives, Division 1.1 - Chemicals and items which have a mass explosion hazard (a mass explosion is one which affects almost the entire quantity present virtually instantaneously).

Reactivity: Extreme risk of explosion by shock, friction, fire or other sources of ignition. Explosive detonator.

5.3. Advice for Firefighters

Precautionary Measures Fire: This product is an explosive with mass detonation hazard. DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS.

Firefighting Instructions: DO NOT ATTEMPT TO FIGHT FIRE. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Carbon oxides (CO, CO_2). Nitrogen oxides. Lead compound. Irritating fumes.

Other Information: Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Keep away from heat, sparks, open flames, hot surfaces. – No smoking. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Evacuate danger area. Use special care to avoid static electric charges.

6.1.1. For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel. Evacuate danger area.

6.1.2. For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area. Eliminate ignition sources.

6.2. Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

6.3. Methods and Materials for Containment and Cleaning Up

For Containment: Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. Absorb and contain with inert material. Place contents in suitable container for disposal.

Methods for Cleaning Up: Use only non-sparking tools. Be careful to avoid shock, friction, and contact with grit. Collect product for recovery or 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. Do not take up in combustible material such as: saw dust or cellulosic material.

6.4. Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Keep away from sources of ignition - No smoking. Do not handle until all safety precautions have been read and understood. Do not breathe dust. Obtain special instructions before use. Avoid contact during pregnancy/while nursing. Avoid contact with eyes, skin and clothing.

Hygiene Measures: This product is an explosive and should only be used under the supervision of trained and licensed personnel. Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Store as defined in the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR Part 555.

Storage Conditions: Store under moderate temperatures recommended by competent authority. Store under dry conditions in a well ventilated magazine that has been approved for detonator storage. Do NOT store explosives in a detonator magazine. Keep away from heat, spark and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Isolate from incompatibles. Keep in fire resistant place.

Incompatible Materials: Oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulfur, sodium nitrite, charcoal, coke and other finely divided combustibles. Strong oxidizing and reducing agents. Ingredients within initiator are incompatible with acids, alkalis, oxidizers and caustics.

Special Rules on Packaging: Keep only in the original container.

7.3. Specific End Use(s)

Explosive. For professional use only.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), or OSHA (PEL).

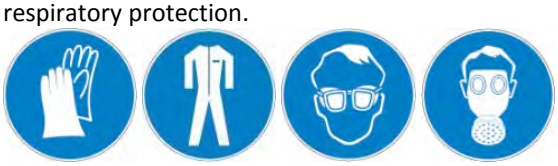
Lead (7439-92-1)		
USA ACGIH	ACGIH TWA (mg/m³)	0.05 mg/m³
USA ACGIH	ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans
USA ACGIH	Biological Exposure Indices (BEI)	200 µg/l Parameter: Lead - Medium: blood - Sampling time: not critical (Note: Persons applying this BEI are encouraged to counsel female workers of child-bearing age about the risk of delivering a child with a PbB (lead in blood level) over the current CDC reference value.)
USA NIOSH	NIOSH REL (TWA) (mg/m³)	0.05 mg/m³
USA IDLH	US IDLH (mg/m³)	100 mg/m³
USA OSHA	OSHA PEL (TWA) (mg/m³)	50 µg/m³

Aluminum (7429-90-5)		
USA ACGIH	ACGIH TWA (mg/m³)	1 mg/m³ (respirable particulate matter)
USA ACGIH	ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA NIOSH	NIOSH REL (TWA) (mg/m³)	10 mg/m³ (total dust) 5 mg/m³ (respirable dust)
USA OSHA	OSHA PEL (TWA) (mg/m³)	15 mg/m³ (total dust) 5 mg/m³ (respirable fraction)

8.2. Exposure Controls

Appropriate Engineering Controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Product to be handled in a closed system and under strictly controlled conditions. Use approved electrical equipment.

Personal Protective Equipment : Gloves. Protective clothing. Eye protection. Insufficient ventilation: wear respiratory protection.



Materials for Protective Clothing : Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection : Wear protective gloves.

Eye and Face Protection : Chemical safety goggles or safety glasses with side shield.

Skin and Body Protection : Wear suitable protective clothing.

Respiratory Protection : If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Consumer Exposure Controls : Avoid contact during pregnancy/while nursing.

Other Information : When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Ingredients pressed inside aluminum shell
Odor	: Odorless
Odor Threshold	: No data available
pH	: No data available
Evaporation Rate	: No data available
Melting Point	: No data available
Freezing Point	: No data available
Boiling Point	: No data available
Flash Point	: No data available
Auto-ignition Temperature	: No data available
Decomposition Temperature	: 70 °C (158 °F)
Flammability (solid, gas)	: No data available
Vapor Pressure	: No data available
Relative Vapor Density at 20°C	: No data available
Relative Density	: No data available
Solubility	: No data available
Partition Coefficient: N-Octanol/Water	: No data available
Viscosity	: No data available
Explosive Properties	: Class 1.1 - Explosives (with a mass explosion hazard) 49 CFR 173.21 Class 1.4 - Explosives (with no significant blast hazard) 49 CFR 173.50 (can be either depending on the preparation)

9.2. Other Information

No additional information available

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity: Extreme risk of explosion by shock, friction, fire or other sources of ignition. Explosive detonator.

10.2. Chemical Stability: Extreme risk of explosion by shock, friction, fire or other sources of ignition. PETN explodes at 190 - 210°C (374 - 410°F). Stable up to approximately 70°C (158 °F).

10.3. Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

10.4. Conditions to Avoid: Keep away from open flames, hot surfaces and sources of ignition. Incompatible materials.

10.5. Incompatible Materials: Oxidizable materials, metal powder, bronze & copper alloys, fuels (e.g. lubricants, machine oils), fluorocarbon lubricants, acids, corrosive liquids, chlorate, sulfur, sodium nitrite, charcoal, coke and other finely divided combustibles. Strong oxidizing and reducing agents. Ingredients within initiator are incompatible with acids, alkalis, oxidizers and caustics.

10.6. Hazardous Decomposition Products: Thermal decomposition may be explosive, especially if confined.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on Toxicological Effects

Acute Toxicity: Not classified

Pentaerythrite tetranitrate (78-11-5)	
LD50 Oral Rat	1660 mg/kg

Lead azide (13424-46-9)	
ATE (Oral)	500.00 mg/kg body weight
ATE (Dust/Mist)	1.50 mg/l/4h

Lead oxide (Pb3O4) (1314-41-6)	
ATE (Oral)	500.00 mg/kg body weight
ATE (Dust/Mist)	1.50 mg/l/4h

Cyclotetramethylenetetranitramine (2691-41-0)	
LD50 Oral Rat	1670 mg/kg
LD50 Dermal Rat	982 mg/kg (Species: New Zealand White)

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: May cause cancer.

Lead azide (13424-46-9)	
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.

Lead oxide (Pb3O4) (1314-41-6)	
IARC group	2A
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.

Lead (7439-92-1)	
IARC group	2A
National Toxicology Program (NTP) Status	Reasonably anticipated to be Human Carcinogen.
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.

Reproductive Toxicity: May damage fertility or the unborn child. May cause harm to breast-fed children. (This material or its emissions may appear in breast milk of nursing mothers).

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Causes damage to organs (central nervous system, blood and kidneys) through prolonged or repeated exposure (Inhalation, oral).

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Prolonged exposure may cause irritation.

Symptoms/Injuries After Skin Contact: Prolonged exposure may cause skin irritation.

Symptoms/Injuries After Eye Contact: May cause slight irritation to eyes.

Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: May cause cancer. May damage fertility or the unborn child. Causes damage to organs (central nervous system, blood and kidneys) through prolonged or repeated exposure (Inhalation, oral).

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General : Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

Lead (7439-92-1)

LC50 Fish 1	0.44 mg/l (Exposure time: 96 h - Species: Cyprinus carpio [semi-static])
EC50 Daphnia 1	600 µg/l (Exposure time: 48 h - Species: water flea)
LC50 Fish 2	1.17 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])

Cyclotetramethylenetetranitramine (2691-41-0)	
LC50 Fish 1	8.8 - 26 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
LC50 Fish 2	> 32 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])

12.2. Persistence and Degradability

Detonator Assemblies, Non-Electric	
Persistence and Degradability	May cause long-term adverse effects in the environment.

12.3. Bioaccumulative Potential

Detonator Assemblies, Non-Electric	
Bioaccumulative Potential	Not established.

12.4. Mobility in Soil

No additional information available

12.5. Other Adverse Effects

Other Information : Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste Treatment Methods

Waste Disposal Recommendations: Destroy and dispose of in accordance with applicable local, state, federal and international regulations. Consult with an Orica technical representative.

Ecology - Waste Materials: Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

To be shipped using the following classification, the material must pass the 1.1 criteria found in the Manual of Tests and Criteria - UN Transport of Dangerous Goods found in - 16.6.1.4.2

UN Number

UN-No.(DOT): 0360

UN Proper Shipping Name

DOT Proper Shipping Name : Detonator assemblies, non-electric for blasting

Hazard Labels (DOT) : 1.1B - Explosive substances and articles

Additional Information

Emergency Response Guide (ERG) Number : 112

To be shipped using the following classification, the material must pass the 1.4 criteria found in the Manual of Tests and Criteria - UN Transport of Dangerous Goods found in - 16.6.1.4.5

UN Number

UN-No.(DOT): 0361

UN Proper Shipping Name

DOT Proper Shipping Name : Detonator assemblies, non-electric for blasting

Hazard Labels (DOT) : 1.4B - Explosive substances and articles

Additional Information

Emergency Response Guide (ERG) Number : 114

To be shipped using the following classification, the material must pass the 1.4 S criteria found in the Manual of Tests and Criteria - UN Transport of Dangerous Goods found in - 16.6.1.4.6

UN Number

UN-No.: 0500

UN Proper Shipping Name

DOT Proper Shipping Name : Detonator, assemblies, non-electric for blasting

Transport Document Description : UN0500 Detonator, assemblies, non-electric (for blasting), II

Hazard Labels (DOT) : 1.4S - Explosive substances and articles

Additional Information

Emergency Response Guide (ERG) Number : 114

SECTION 15: REGULATORY INFORMATION

15.1. US Federal Regulations

Detonator Assemblies, Non-Electric	
SARA Section 311/312 Hazard Classes	Physical hazard - Explosive Health hazard - Carcinogenicity Health hazard - Reproductive toxicity Health hazard - Specific target organ toxicity (single or repeated exposure)

Pentaerythrite tetranitrate (78-11-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a final TSCA section 4 test rule.

Lead azide (13424-46-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Lead oxide (Pb3O4) (1314-41-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Lead (7439-92-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
CERCLA RQ	10 lb no reporting of releases of this hazardous substance is required if the diameter of the pieces of the solid metal released is >100 µm
SARA Section 313 - Emission Reporting	0.1 %

Cyclotetramethylenetetranitramine (2691-41-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Aluminum (7429-90-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
SARA Section 313 - Emission Reporting	1 % (dust or fume only)

15.2. US State Regulations

Pentaerythrite tetranitrate (78-11-5)
U.S. - New Jersey - Right to Know Hazardous Substance List

Lead azide (13424-46-9)
U.S. - Massachusetts - Right To Know List

Lead oxide (Pb3O4) (1314-41-6)
U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List

Lead (7439-92-1)
U.S. - Massachusetts - Right To Know List

U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

Cyclotetramethylenetetranitramine (2691-41-0)
U.S. - New Jersey - Right to Know Hazardous Substance List

Aluminum (7429-90-5)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

California Proposition 65

WARNING: This product can expose you to Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Chemical Name (CAS No.)	Carcinogenicity	Developmental Toxicity	Female Reproductive Toxicity	Male Reproductive Toxicity
Lead (7439-92-1)	X	X	X	X

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Date of Preparation or Latest Revision : 12/20/2018

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200

GHS Full Text Phrases:

Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Carc. 1B	Carcinogenicity Category 1B
Expl. 1.1	Explosive Category 1.1
Lact.	Reproductive toxicity (Lact.)
Repr. 1A	Reproductive toxicity Category 1A
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
H201	Explosive; mass explosion hazard
H350	May cause cancer
H360	May damage fertility or the unborn child
H362	May cause harm to breast-fed children
H372	Causes damage to organs through prolonged or repeated exposure
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

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SDS US (GHS HazCom)

Fortel Plus

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations And According To The Hazardous Products Regulation (February 11, 2015).

Date of Issue: 07/07/2017 Version: 1.0

SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: Fortel Plus

Intended Use of the Product

No use is specified.

Name, Address, and Telephone of the Responsible Party

USA:
Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137-9406
For SDS Requests: 1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com

Canada:
Orica Canada Inc.
301 Rue Hotel-de-Ville
Brownsburg-Chatham, QC
J8G 3B5
For SDS Requests:
1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com
www.oricaminingservices.com

Emergency Telephone Number

Emergency Number : **Canada:** 1-877-561-3636 (Orica Transportation Emergency Response)
USA: 1-800-424-9300 (CHEMTREC)

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 5400.5 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS-US/CA Classification

The explosive classification below only applies to US 29 CFR 1910.1200 (HCS/HazCom 2012). The explosive classification is excluded from Canada Hazardous Products Regulations (HPR, SOR/2015-17), it is regulated under the Canada Explosives Act (R.S.C., 1985, c. E-17)

Expl. 1.5	H205
Ox. Sol. 3	H272
Eye Irrit. 2A	H319
Carc. 1B	H350
STOT RE 2	H373
Aquatic Acute 3	H402
Aquatic Chronic 3	H412

Full text of hazard classes and H-statements : see section 16

Label Elements

GHS-US/CA Labeling

Any labeling elements (pictograms, signal word, hazard, and precautionary statements) related to explosive classifications apply to the OSHA Hazard Communication Standard (HCS, 29 CFR 1910.1200) only and are excluded from Canada's Hazardous Products Regulations (HPR, SOR/2015-17)

Hazard Pictograms (GHS-US/CA) :

GHS03 GHS07 GHS08

Signal Word (GHS-US/CA) : Danger

Hazard Statements (GHS-US/CA) : H205 - May mass explode in fire.
H272 - May intensify fire; oxidizer.
H319 - Causes serious eye irritation.
H350 - May cause cancer.
H373 - May cause damage to organs through prolonged or repeated exposure.
H402 - Harmful to aquatic life.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary Statements (GHS-US/CA) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P220 - Keep away from clothing and other combustible materials.
P260 - Do not breathe vapors, mist, spray, dust.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, and eye protection.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P314 - Get medical advice/attention if you feel unwell.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P240 - Ground/bond container and receiving equipment.
P250 - Do not subject to grinding/shock/friction.
P370+P380 - In case of fire: Evacuate area.
P372 - Explosion risk in case of fire.
P373 - DO NOT fight fire when fire reaches explosives.
P401 - Store in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.

Other Hazards

Overexposure 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. Exposure may aggravate pre-existing eye, skin, or respiratory conditions.

Unknown Acute Toxicity (GHS-US/CA)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product Identifier	% *
Ammonium nitrate	(CAS-No.) 6484-52-2	75 - 85
Water	(CAS-No.) 7732-18-5	10 - 20
Petroleum	(CAS-No.) 8002-05-9	3 - 7
Polyisobutylene	(CAS-No.) 9003-27-4	1 - 5
Polymer, acrylonitrile-methacrylonitrile-methyl methacrylate	(CAS-No.) 38742-70-0	0.03 - 0.1
Isopentane	(CAS-No.) 78-78-4	0.01 - 0.03
Silane, dichlorodimethyl-, reaction products with silica	(CAS-No.) 68611-44-9	0.005 - 0.03
Magnesium hydroxide	(CAS-No.) 1309-42-8	0.0005 - 0.005

*Percentages are listed in weight by weight percentage (w/w%) for liquid and solid ingredients. Gas ingredients are listed in volume by volume percentage (v/v%).

SECTION 4: FIRST AID MEASURES

Description of First-aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

Skin Contact: IF ON CLOTHING: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Get medical advice/attention.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention.

Ingestion: Rinse mouth. Do NOT induce vomiting. Obtain medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: Causes serious eye irritation. There are potential chronic health effects to consider. Overexposure to this material may result in methemoglobinemia. Methemoglobinemia decreases the blood's ability to carry oxygen and results in symptoms such as dizziness, drowsiness, headache, shortness of breath, blue skin and lips, rapid heart rate, unconsciousness, and possibly death.

Inhalation: Prolonged exposure may cause irritation.

Skin Contact: Prolonged exposure may cause skin irritation.

Eye Contact: Contact causes severe irritation with redness and swelling of the conjunctiva.

Ingestion: Ingestion may cause adverse effects.

Chronic Symptoms: May cause cancer. May cause damage to organs through prolonged or repeated exposure.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. If medical advice is needed, have product container or label at hand.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: DO NOT FIGHT FIRES INVOLVING EXPLOSIVES. 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: DO NOT fight fires involving explosives.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Explosive, could cause fire and secondary explosions. May intensify fire; oxidizer.

Explosion Hazard: Explosives, Division 1.5 - Very insensitive explosives that have a mass explosion hazard. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity: Explosive, insensitive but has a mass explosion hazard. Oxidizer: increases the burning rate of combustible materials.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire. This product is an explosive with a mass explosion hazard. DO NOT FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS.

Firefighting Instructions: DO NOT ATTEMPT TO FIGHT FIRE. Immediately evacuate all personnel from the area to a safe distance. Guard against re-entry. Thermal decomposition can lead to release of irritating gases and vapors.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Carbon oxides (CO, CO_2), hydrocarbons, nitrogen oxides. At temperatures above 210 °C (410 °F), decomposition may be explosive, especially if confined.

Other Information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections

Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Keep away from heat, sparks, open flames, hot surfaces. – No smoking. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Evacuate danger area. Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Keep away from combustible material. Avoid all contact with skin, eyes, or clothing.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protective equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel. Evacuate danger area.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit. Ventilate area. Eliminate ignition sources.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up

For Containment: Contain solid spills with appropriate barriers and prevent migration and entry into sewers or streams. Absorb and contain with inert material. Place contents in suitable container for disposal. Use only non-sparking tools.

Methods for Cleaning Up: Use only non-sparking tools. Be careful to avoid shock, friction, and contact with grit. Collect product for recovery or 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. Do not take up in combustible material such as: saw dust or cellulosic material.

Reference to Other Sections

See Section 8 for exposure controls and personal protection and Section 13 for disposal considerations.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: May cause or intensify fire; oxidizer.

Precautions for Safe Handling: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Keep away from sources of ignition - No smoking. Keep away from heat, sparks, open flames, hot surfaces, combustible materials, incompatible materials. - No smoking. Do not handle until all safety precautions have been read and understood. Do not breathe dust. Avoid contact with skin, eyes and clothing.

Hygiene Measures: This product is an explosive and should only be used under the supervision of trained and licensed personnel. Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment.

Storage Conditions: Store under moderate temperatures recommended by competent authority. Store under dry conditions in a well ventilated magazine that has been approved for either detonator storage or explosive storage. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep away from heat, spark and flames. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Isolate from incompatibles. Keep in fireproof place.

Incompatible Materials: Strong acids, strong bases, strong oxidizers.

Special Rules on Packaging: Keep only in the original container.

Specific End Use(s)

No use is specified.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), OSHA (PEL), or Canadian provincial governments.

Isopentane (78-78-4)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
Alberta	OEL TWA (mg/m³)	1770 mg/m³
Alberta	OEL TWA (ppm)	600 ppm
British Columbia	OEL TWA (ppm)	600 ppm

Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Nunavut	OEL STEL (ppm)	750 ppm
Nunavut	OEL TWA (ppm)	600 ppm
Northwest Territories	OEL STEL (ppm)	750 ppm
Northwest Territories	OEL TWA (ppm)	600 ppm
Ontario	OEL TWA (ppm)	600 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	750 ppm
Saskatchewan	OEL TWA (ppm)	600 ppm

Petroleum (8002-05-9)		
USA OSHA	OSHA PEL (TWA) (mg/m³)	2000 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	500 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m³)	350 mg/m³
USA NIOSH	NIOSH REL (ceiling) (mg/m³)	1800 mg/m³ (15 min)
USA IDLH	US IDLH (ppm)	1100 ppm (10% LEL)

Exposure Controls

Appropriate Engineering Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas. Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Product to be handled in a closed system and under strictly controlled conditions. Use explosion-proof equipment. Gas detectors should be used when flammable gases or vapors may be released.

Personal Protective Equipment: Gloves. Protective clothing. Protective goggles. Insufficient ventilation: wear respiratory protection.

Materials for Protective Clothing: Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection: Wear protective gloves.

Eye and Face Protection: Chemical safety goggles.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. In case of inadequate ventilation, oxygen deficient atmosphere, or where exposure levels are not known wear approved respiratory protection.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Solid
Appearance	:	Not available
Odor	:	Not available
Odor Threshold	:	Not available
pH	:	Not available
Evaporation Rate	:	Not available
Melting Point	:	Not available
Freezing Point	:	Not available
Boiling Point	:	Not available
Flash Point	:	Not available
Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Not available

Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	Not available
Relative Vapor Density at 20°C	:	Not available
Relative Density	:	Not available
Specific Gravity	:	Not available
Solubility	:	Not available
Partition Coefficient: N-Octanol/Water	:	Not available
Viscosity	:	Not available
Explosive Properties	:	Explosives, Division 1.5 - Very insensitive explosives that have a mass explosion hazard

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Explosive, insensitive but has a mass explosion hazard. Oxidizer: increases the burning rate of combustible materials.

Chemical Stability: Extreme risk of explosion by shock, friction, fire or other sources of ignition. May cause fire or explosion; strong oxidizer.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Keep away from open flames, hot surfaces and sources of ignition. Incompatible materials. Direct sunlight, extremely high or low temperatures, ignition sources, combustible materials, incompatible materials.

Incompatible Materials: Strong acids, strong bases, strong oxidizers.

Hazardous Decomposition Products: None expected under normal conditions of use.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity (Oral): Not classified
Acute Toxicity (Dermal): Not classified
Acute Toxicity (Inhalation): Not classified
LD50 and LC50 Data: Not available
Skin Corrosion/Irritation: Not classified
Eye Damage/Irritation: Causes serious eye irritation.
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Carcinogenicity: May cause cancer.
Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure.
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: Prolonged exposure may cause irritation.
Symptoms/Injuries After Skin Contact: Prolonged exposure may cause skin irritation.
Symptoms/Injuries After Eye Contact: Contact causes severe irritation with redness and swelling of the conjunctiva.
Symptoms/Injuries After Ingestion: Ingestion may cause adverse effects.
Chronic Symptoms: May cause cancer. May cause damage to organs through prolonged or repeated exposure.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Ammonium nitrate (6484-52-2)	
LD50 Oral Rat	2217 mg/kg
LC50 Inhalation Rat	> 88.8 mg/l/4h

Magnesium hydroxide (1309-42-8)	
LD50 Oral Rat	8500 mg/kg

Silane, dichlorodimethyl-, reaction products with silica (68611-44-9)

LD50 Oral Rat	> 5000 mg/kg
LC50 Inhalation Rat	0.45 mg/l/4h

Petroleum (8002-05-9)	
LD50 Oral Rat	> 4300 mg/kg
LD50 Dermal Rabbit	> 2000 mg/kg

Petroleum (8002-05-9)	
IARC Group	3

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecology - General: Harmful to aquatic life. Harmful to aquatic life with long lasting effects.

Ammonium nitrate (6484-52-2)	
LC50 Fish 1	542 mg/l
EC50 Daphnia 1	555 mg/l

Isopentane (78-78-4)	
EC50 Daphnia 1	2.3 mg/l (Exposure time: 48 h - Species: Daphnia magna)

Silane, dichlorodimethyl-, reaction products with silica (68611-44-9)	
LC50 Fish 1	> 10000 mg/l Brachydanio rerio, OECD Guide-line 203
EC50 Daphnia 1	> 10000 mg/l OECD Guide-line 202
ErC50 (algae)	<= 10000 mg/l Scenedesmus subspicatus, OECD Guide-line 201

Petroleum (8002-05-9)	
LC50 Fish 1	7.1 mg/l (Species: Pimephales promelas, Exposure time 96 h)
LC50 Other Aquatic Organisms 1	2.7 mg/l LL50 96 hr (Kelp forest mysid shrimp)
EC50 Daphnia 1	6.9 mg/l (Exposure time: 48 h)

Persistence and Degradability

Fortel Plus	
Persistence and Degradability	May cause long-term adverse effects in the environment.

Bioaccumulative Potential

Fortel Plus	
Bioaccumulative Potential	Not established.

Ammonium nitrate (6484-52-2)	
BCF Fish 1	(no bioaccumulation expected)
Log Pow	-3.1 (at 25 °C)

Isopentane (78-78-4)	
Log Pow	3.2 - 3.3

Mobility in Soil Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of contents/container in accordance with the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR part 555.

Additional Information: Container may remain hazardous when empty. Continue to observe all precautions.

Ecology - Waste Materials: Avoid release to the environment. This material is hazardous to the aquatic environment. Keep out of sewers and waterways.

SECTION 14: TRANSPORT INFORMATION

The shipping description(s) stated herein were prepared in accordance with certain assumptions at the time the SDS was authored, and can vary based on a number of variables that may or may not have been known at the time the SDS was issued.

In Accordance with DOT

DOT CA Number: EX1999030154

Proper Shipping Name **:** EXPLOSIVE, BLASTING, TYPE E

Hazard Class : 1.5D
Identification Number : UN0332
Label Codes : 1.5D

Packing Group : II

In Accordance with IMDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E (AGENT, BLASTING, TYPE E)
Hazard Class : 1.5D
Identification Number : UN0332
Label Codes : 1.5D

EmS-No. (Fire) : F-B
EmS-No. (Spillage) : S-Y

In Accordance with IATA

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Identification Number : 1.5D
Hazard Class : UN0332
ERG Code (IATA) : 1L

In Accordance with TDG

Proper Shipping Name : EXPLOSIVE, BLASTING, TYPE E
Hazard Class : 1.5D
Identification Number : UN0332
Label Codes : 1.5D

Packing Group : II

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Fortel Plus	
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard Fire hazard Immediate (acute) health hazard Delayed (chronic) health hazard

Ammonium nitrate (6484-52-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Water (7732-18-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Polyisobutylene (9003-27-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
EPA TSCA Regulatory Flag	XU - XU - indicates a substance exempt from reporting under the Inventory Update Reporting Rule, i.e, Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(C)).

Isopentane (78-78-4)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Magnesium hydroxide (1309-42-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Silane, dichlorodimethyl-, reaction products with silica (68611-44-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Petroleum (8002-05-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Ammonium nitrate (6484-52-2)
U.S. - Massachusetts - Right To Know List

U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

Isopentane (78-78-4)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Petroleum (8002-05-9)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Canadian Regulations

Ammonium nitrate (6484-52-2)
Listed on the Canadian DSL (Domestic Substances List)

Water (7732-18-5)
Listed on the Canadian DSL (Domestic Substances List)

Polyisobutylene (9003-27-4)
Listed on the Canadian DSL (Domestic Substances List)

Isopentane (78-78-4)
Listed on the Canadian DSL (Domestic Substances List)

Polymer, acrylonitrile-methacrylonitrile-methyl methacrylate (38742-70-0)
Listed on the Canadian DSL (Domestic Substances List)

Magnesium hydroxide (1309-42-8)
Listed on the Canadian DSL (Domestic Substances List)

Silane, dichlorodimethyl-, reaction products with silica (68611-44-9)
Listed on the Canadian DSL (Domestic Substances List)

Petroleum (8002-05-9)
Listed on the Canadian DSL (Domestic Substances List)

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Date of Preparation or Latest Revision : 07/07/2017

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200 and Canada's Hazardous Products Regulations (HPR).

GHS Full Text Phrases:

Expl. 1.5	Explosive Category 1.5
H205	May mass explode in fire
Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Carc. 1B	Carcinogenicity Category 1B
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Ox. Sol. 3	Oxidizing solids Category 3
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
H272	May intensify fire; oxidizer
H319	Causes serious eye irritation
H350	May cause cancer
H373	May cause damage to organs through prolonged or repeated exposure
H402	Harmful to aquatic life

H412	Harmful to aquatic life with long lasting effects

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NA GHS SDS 2015 (Can, US)

Pentex ™ BC Cast Boosters, Pentex ™ MP Cast Boosters

Safety Data Sheet

SECTION 1 – IDENTIFICATION

Name, Address, and Telephone of the Responsible Party

Canada:
Orica Canada Inc.
301 Rue Hotel-de-Ville
Brownsburg-Chatham, QC J8G 3B5
For SDS Requests: 1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com

SDS #: 1108
Date: 03/18/2015

Supersedes: 09/05/2014

USA:
Orica USA Inc.
33101 E. Quincy Avenue
Watkins, CO 80137-9406
For SDS Requests: 1-855-26-ORICA (1-855-266-7422)
sds.na@orica.com

www.oricaminingservices.com

Product Identifier
Product Name: Cast Boosters

Other Means of Identification
Synonyms:
Pentex™ BC Cast Boosters
Pentex™ MP Cast Boosters

Intended Use of the Product
Industrial blasting operations

Emergency Telephone Number
FOR 24 HOUR EMERGENCY, CALL
Canada: 1-877-561-3636 (Orica Transportation Emergency Response)
USA: 1-800-424-9300 (CHEMTREC)

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 5400.5 MUST BE COMPLETED AND LOCAL AUTHORITIES (STATE/MUNICIPAL POLICE, ETC.) MUST BE ADVISED.

SECTION 2 – HAZARD(S) IDENTIFICATION

Classification of the Substance or Mixture
Classification (GHS-US)

Expl. 1.1	H201
Acute Tox. 3 (Oral)	H301
Acute Tox. 3 (Dermal)	H311
Acute Tox. 3 (Inhalation:dust,mist)	H331
STOT SE 1	H370
STOT RE 2	H373
Aquatic Acute 3	H402
Aquatic Chronic 2	H411

Label Elements
GHS-US Labeling
Hazard Pictograms (GHS-US) :

Signal Word (GHS-US) : Danger
Hazard Statements (GHS-US) : H201 - Explosive; mass explosion hazard
H301+H311+H331 - Toxic if swallowed, in contact with skin or if inhaled
H370 - Causes damage to organs
H373 - May cause damage to organs through prolonged or repeated exposure
H402 - Harmful to aquatic life
H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements (GHS-US) : P210 - Keep away from open flames, sparks, heat, hot surfaces. - No smoking
P241 - Use explosion-proof electrical, lighting, ventilating equipment
P250 - Do not subject to grinding, friction, shock
P264 - Wash ... thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P273 - Avoid release to the environment
P280 - Wear eye protection, protective clothing, protective gloves
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P302+P352 - IF ON SKIN: Wash with plenty of soap and water
P314 - Get medical advice and attention if you feel unwell
P330 - If swallowed, rinse mouth
P363 - Wash contaminated clothing before reuse
P370+P378 - In case of fire: Use Do NOT attempt to fight fire. to extinguish
P370+P380 - In case of fire: Evacuate area
P372 - Explosion risk in case of fire
P373 - DO NOT fight fire when fire reaches explosives
P401 - Store in accordance with, local, regional, national, territorial, provincial, and international regulations
P402+P404 - Store in a dry place. Store in a closed container
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
P501 - Dispose of contents/container according to local, regional, national, territorial, provincial, and international regulations

Other Hazards
Hazards Not Otherwise Classified (HNOC): Not available
Other Hazards: None

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product identifier	% (w/w)	Ingredient Classification (GHS-US)
Pentaerythrite tetranitrate	(CAS No) 78-11-5	35 - 70	Unst. Expl, H200
2,4,6-Trinitrotoluene	(CAS No) 118-96-7	30 - 50	Expl. 1.1, H201 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation:dust,mist), H331

			STOT RE 2, H373 Aquatic Chronic 2, H411
Cyclonite	(CAS No) 121-82-4	0.1 - 25	Expl. 1.1, H201 Acute Tox. 3 (Oral), H301 STOT SE 1, H370 STOT RE 2, H373 Aquatic Acute 3, H402
Aluminum	(CAS No) 7429-90-5	0.1 - 15	Comb. Dust, H232 Flam. Sol. 1, H228 Water-react. 2, H261
Cyclotetramethylenetetranitramine	(CAS No) 2691-41-0	0.1 - 5	Expl. 1.1, H201 Acute Tox. 4 (Oral), H302 Acute Tox. 3 (Dermal), H311 Aquatic Acute 3, H402

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

Full text of H-phrases: see section 16

SECTION 4 - FIRST AID MEASURES

Description of First Aid Measures

This is a packaged product that will not result in exposure to the contents under normal conditions of use. In the event of contact, administer first aid appropriate for symptoms present.

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label if possible).

Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. Obtain medical attention if breathing difficulty persists.

Skin Contact: Remove contaminated clothing. Gently wash with plenty of soap and water followed by rinsing with water for at least 15 minutes. Wash contaminated clothing before reuse. If irritation develops or persists, get medical advice and attention.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists.

Ingestion: Rinse mouth. Do not induce vomiting. Immediately call a POISON CENTER or doctor/physician.

Most Important Symptoms and Effects Both Acute and Delayed

General: Avoid ingestion, contact with eyes and skin.

Inhalation: May cause respiratory irritation.

Skin Contact: Repeated exposure may cause redness, pain, yellow staining. TNT may be absorbed through the skin, which may be indicated by orange staining on exposed skin.

Eye Contact: May cause eye irritation.

Ingestion: Seek medical attention.

Chronic Symptoms: None expected under normal conditions of use.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5 - FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Unsuitable Extinguishing Media: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

Explosion Hazard: This product is an explosive with mass detonation hazard. Heating may cause an explosion.

Reactivity: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.

Advice for Firefighters
Firefighting Instructions: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Guard against re-entry.
Protection During Firefighting: DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS.
Hazardous Combustion Products: Nitrogen Oxides (NO_X), Carbon Monoxide (CO).
Reference to Other Sections: Refer to section 9 for flammability properties.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures
General Measures: Avoid all contact with skin, eyes, or clothing. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Eliminate every possible source of ignition.
For Non-Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.
For Emergency Personnel
Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Eliminate ignition sources. Ventilate area.

Environmental Precautions
Prevent entry to sewers and public waters.

Methods and Material for Containment and Cleaning Up
For Containment: Not applicable (article)
Methods for Cleaning Up: 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.
Reference to Other Sections
See heading 8, Exposure Controls and Personal Protection

SECTION 7 - HANDLING AND STORAGE

Precautions for Safe Handling
General Advice: This is a packaged product that will not result in exposure to the contents under normal conditions of use.
Additional Hazards When Processed: Avoid dust production. This product is an explosive and should only be used under the supervision of trained and licensed personnel. Use accepted safe industry practices when handling and using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.
Conditions for Safe Storage, Including Any Incompatibilities
Technical Measures: Store as defined in the Explosives Act of Canada and the provisions of the Bureau of Alcohol, Tobacco and Firearms regulations contained in 27 CFR Part 555.
Storage Conditions: Store in cool, dry, well-ventialated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flame, ignition sources and strong shock. Do NOT store explosives in a detonator magazine or detonators in an explosive magazine. Keep containers closed. Explosives should be kept well away from initiating explosives; protected from physical damage; separated from oxidizing materials, combustibles, and sources of heat. Isolate from incompatibles.
Incompatible Materials: Corrosives (strong acids and bases or alkalis).

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

2,4,6-Trinitrotoluene (118-96-7)		
Mexico	OEL TWA (mg/m³)	0.5 mg/m³
Mexico	OEL STEL (mg/m³)	3 mg/m³
USA ACGIH	ACGIH TWA (mg/m³)	0.1 mg/m³
USA OSHA	OSHA PEL (TWA) (mg/m³)	1.5 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	0.5 mg/m³
USA IDLH	US IDLH (mg/m³)	500 mg/m³
Alberta	OEL TWA (mg/m³)	0.1 mg/m³
British Columbia	OEL TWA (mg/m³)	0.1 mg/m³
Manitoba	OEL TWA (mg/m³)	0.1 mg/m³
New Brunswick	OEL TWA (mg/m³)	0.1 mg/m³
Newfoundland & Labrador	OEL TWA (mg/m³)	0.1 mg/m³
Nova Scotia	OEL TWA (mg/m³)	0.1 mg/m³
Nunavut	OEL Ceiling (mg/m³)	0.5 mg/m³
Northwest Territories	OEL Ceiling (mg/m³)	0.5 mg/m³
Ontario	OEL TWA (mg/m³)	0.1 mg/m³
Prince Edward Island	OEL TWA (mg/m³)	0.1 mg/m³
Québec	VEMP (mg/m³)	0.5 mg/m³
Saskatchewan	OEL STEL (mg/m³)	0.3 mg/m³
Saskatchewan	OEL TWA (mg/m³)	0.1 mg/m³
Yukon	OEL Ceiling (mg/m³)	0.5 mg/m³
Cyclonite (121-82-4)		
Mexico	OEL TWA (mg/m³)	1.5 mg/m³
USA ACGIH	ACGIH TWA (mg/m³)	0.5 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	1.5 mg/m³
USA NIOSH	NIOSH REL (STEL) (mg/m³)	3 mg/m³
Alberta	OEL TWA (mg/m³)	0.5 mg/m³
British Columbia	OEL TWA (mg/m³)	0.5 mg/m³
Manitoba	OEL TWA (mg/m³)	0.5 mg/m³
New Brunswick	OEL TWA (mg/m³)	0.5 mg/m³
Newfoundland & Labrador	OEL TWA (mg/m³)	0.5 mg/m³
Nova Scotia	OEL TWA (mg/m³)	0.5 mg/m³
Nunavut	OEL STEL (mg/m³)	3 mg/m³
Nunavut	OEL TWA (mg/m³)	1.5 mg/m³
Northwest Territories	OEL STEL (mg/m³)	3 mg/m³
Northwest Territories	OEL TWA (mg/m³)	1.5 mg/m³
Ontario	OEL TWA (mg/m³)	0.5 mg/m³
Prince Edward Island	OEL TWA (mg/m³)	0.5 mg/m³
Québec	VEMP (mg/m³)	1.5 mg/m³
Saskatchewan	OEL STEL (mg/m³)	1.5 mg/m³
Saskatchewan	OEL TWA (mg/m³)	0.5 mg/m³
Yukon	OEL STEL (mg/m³)	3 mg/m³
Yukon	OEL TWA (mg/m³)	1.5 mg/m³
Aluminum (7429-90-5)		
Mexico	OEL TWA (mg/m³)	10 mg/m³

USA ACGIH	ACGIH TWA (mg/m³)	1 mg/m³
USA OSHA	OSHA PEL (TWA) (mg/m³)	5 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	5 mg/m³
Alberta	OEL TWA (mg/m³)	10 mg/m³
British Columbia	OEL TWA (mg/m³)	1.0 mg/m³
Manitoba	OEL TWA (mg/m³)	1 mg/m³
New Brunswick	OEL TWA (mg/m³)	10 mg/m³
Newfoundland & Labrador	OEL TWA (mg/m³)	1 mg/m³
Nova Scotia	OEL TWA (mg/m³)	1 mg/m³
Nunavut	OEL STEL (mg/m³)	20 mg/m³
Nunavut	OEL TWA (mg/m³)	10 mg/m³
Northwest Territories	OEL STEL (mg/m³)	20 mg/m³
Northwest Territories	OEL TWA (mg/m³)	10 mg/m³
Ontario	OEL TWA (mg/m³)	1 mg/m³
Prince Edward Island	OEL TWA (mg/m³)	1 mg/m³
Québec	VEMP (mg/m³)	10 mg/m³
Saskatchewan	OEL STEL (mg/m³)	20 mg/m³
Saskatchewan	OEL TWA (mg/m³)	10 mg/m³

Exposure Controls

Appropriate Engineering Controls: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure, but are not required. Product to be handled under strictly controlled conditions. Ensure all national/local regulations are observed.

Personal Protective Equipment: Gloves. Safety glasses.

Materials for Protective Clothing: Not available

Hand Protection: Recommend non-permeable gloves and work clothing to avoid skin contact.

Eye Protection: Safety glasses are recommended.

Skin and Body Protection: Wear suitable work clothing to avoid skin contact.

Respiratory Protection: If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Solid (article)
Appearance	:	Tan to brown solid. May also be silvery gray.
Odor	:	None
Odor Threshold	:	Not available
pH	:	Not available
Relative Evaporation Rate (butylacetate=1)	:	Not available
Melting Point	:	80 °C (176° F) (TNT)
Freezing Point	:	Not available
Boiling Point	:	Not available
Flash Point	:	Not available
Auto-ignition Temperature	:	Not available
Decomposition Temperature	:	Not available

Flammability (solid, gas)	:	Not available
Lower Flammable Limit	:	Not available
Upper Flammable Limit	:	Not available
Vapor Pressure	:	0.042 mm Hg @ 80 °C (TNT)
Relative Vapor Density at 20 °C	:	Not available
Relative Density	:	Not available
Specific Gravity	:	1.55 - 1.65
Solubility	:	Water: < 0.01 %
Partition coefficient: n-octanol/water	:	Not available
Viscosity	:	Not available
Explosive properties	:	Explosive; mass explosion hazard
Explosion Data – Sensitivity to Mechanical Impact	:	Sensitive to mechanical impact
Explosion Data – Sensitivity to Static Discharge	:	Not sensitive to static discharge

SECTION 10 - STABILITY AND REACTIVITY

Reactivity: Keep away from heat, flame, friction, impact, ignition sources and strong shock.
Chemical 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.
Possibility of Hazardous Reactions: Hazardous polymerization will not occur.
Conditions to Avoid: Keep away from heat, flame, friction, impact, ignition sources and strong shock.
Incompatible Materials: Corrosives (strong acids and bases or alkalis).
Hazardous Decomposition: Products Nitrogen Oxides (NO_X), Carbon Monoxide (CO)

SECTION 11 - TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product
Acute Toxicity: Toxic if swallowed. Toxic in contact with skin. Toxic if inhaled.
LD50 and LC50 Data: Not available
Skin Corrosion/Irritation: Not classified
Serious Eye Damage/Irritation: Particulates in the eye may cause irritation, redness, and tearing. Prolonged or repeated contact may cause cataracts, optic neuritis, blurred vision or amblyopia.
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not available
Carcinogenicity: Not classified
Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure.
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Causes damage to organs.
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: Toxic if inhaled. In high concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.
Symptoms/Injuries After Skin Contact: Toxic in contact with skin. Prolonged contact may cause irritation, severe eczema and sensitization dermatitis. TNT may be absorbed through the skin, which may be indicated by orange staining on exposed skin.
Symptoms/Injuries After Eye Contact: May cause eye irritation.
Symptoms/Injuries After Ingestion: Toxic if swallowed.
Chronic Symptoms: **TNT** is an irritant, neurotoxin, hepatotoxin, nephrotoxin and bone marrow depressant. Although

exposure is unlikely, acute or chronic exposure may cause sensitization dermatitis, headache, dizziness, jaundice, lethargy, or problems with the liver or blood such as toxic nephritis, aplastic anemia, hemolytic anemia or methemoglobin formation. **PETN** is a known coronary vasodilator, and ingestion or inhalation may result in a lowering of blood pressure, headache or faintness, and a decreased tolerance for grain alcohol. Repeated over-exposure may result in chest pains in the absence of exposure.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Cyclonite (121-82-4)	
LD50 Oral Rat	100 mg/kg
ATE CLP (oral)	100.000 mg/kg

Cyclotetramethylenetetranitramine (2691-41-0)	
LD50 Oral Rat	1670 mg/kg
LD50 Dermal Rat	982 mg/kg (Species: New Zealand White)
ATE CLP (oral)	500.000 mg/kg body weight
ATE CLP (dermal)	300.000 mg/kg body weight

2,4,6-Trinitrotoluene (118-96-7)	
IARC Group	3

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecology - General: Harmful to aquatic life. Toxic to aquatic life with long lasting effects.

Cyclonite (121-82-4)	
LC50 Fish 1	11.14 - 14.97 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

Cyclotetramethylenetetranitramine (2691-41-0)	
LC50 Fish 1	8.8 - 26 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
LC 50 Fish 2	> 32 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])

Persistence and Degradability

Not available

Bioaccumulative Potential

2,4,6-Trinitrotoluene (118-96-7)	
Log Pow	1.6 (at 20 °C)

Cyclonite (121-82-4)	
Log Pow	0.87 (@ 23 °C/73.4 °F)

Mobility in Soil

Not available

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: 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.

Additional Information: None

SECTION 14 - TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name	:	BOOSTERS without detonator
Hazard Class	:	1.1D
Identification Number	:	UN0042
Label Codes	:	1.1D
Packing Group	:	II
Marine Pollutant	:	Marine pollutant
ERG Number	:	112

14.2 In Accordance with IMDG

Proper Shipping Name	:	BOOSTERS
Hazard Class	:	1.1D
Identification Number	:	UN0042
Label Codes	:	1.1D
EmS-No. (Fire)	:	F-B
EmS-No. (Spillage)	:	S-X
Marine pollutant	:	Marine pollutant
MFAG Number	:	112

14.3 In Accordance with IATA

Proper Shipping Name	:	BOOSTERS
Identification Number	:	UN0042
Hazard Class	:	1
Label Codes	:	1.1D
ERG Code (IATA)	:	1L

14.4 In Accordance with TDG

Proper Shipping Name	:	BOOSTERS without detonator
Packing Group	:	II
Hazard Class	:	1.1D
Identification Number	:	UN0042
Label Codes	:	1.1D
Marine Pollutant (TDG)	:	Marine pollutant

SECTION 15 - REGULATORY INFORMATION

US Federal Regulations

1108 Cast Boosters

SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Reactive hazard Fire hazard

2,4,6-Trinitrotoluene (118-96-7)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Cyclonite (121-82-4)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Aluminum (7429-90-5)

Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on SARA Section 313 (Specific toxic chemical listings)

SARA Section 313 - Emission Reporting	1.0 % (dust or fume only)

Cyclotetramethylenetetranitramine (2691-41-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

Pentaerythrite tetranitrate (78-11-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA.

US State Regulations

2,4,6-Trinitrotoluene (118-96-7)	
U.S. - California - Proposition 65 - Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer.

2,4,6-Trinitrotoluene (118-96-7)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

Cyclonite (121-82-4)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

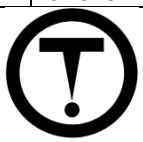
Aluminum (7429-90-5)
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List

Cyclotetramethylenetetranitramine (2691-41-0)
U.S. - New Jersey - Right to Know Hazardous Substance List

Pentaerythrite tetranitrate (78-11-5)
U.S. - New Jersey - Right to Know Hazardous Substance List

Canadian Regulations

Cast Boosters	
WHMIS Classification	Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects **Note: Explosives are not regulated under WHMIS. They are subject to the regulations of the Explosives Act of Canada.**

2,4,6-Trinitrotoluene (118-96-7)	
Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class D Division 2 Subdivision B - Toxic material causing other toxic effects Class F - Dangerously Reactive Material

Cyclonite (121-82-4)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects Class F - Dangerously Reactive Material

Aluminum (7429-90-5)

Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class B Division 6 - Reactive Flammable Material Class B Division 4 - Flammable Solid

Cyclotetramethylenetetranitramine (2691-41-0)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Pentaerythrite tetranitrate (78-11-5)

Listed on the Canadian DSL (Domestic Substances List) inventory.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all of the information required by CPR.

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision date : 03/18/2015

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 3 (Dermal)	Acute toxicity (dermal) Category 3
Acute Tox. 3 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 3	Hazardous to the aquatic environment - Acute Hazard Category 3
Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Expl. 1.1	Explosive Category 1.1
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
STOT SE 1	Specific target organ toxicity (single exposure) Category 1
Unst. Expl	Unstable explosives
H200	Unstable explosives
H201	Explosive; mass explosion hazard
H301	Toxic if swallowed
H302	Harmful if swallowed
H311	Toxic in contact with skin
H331	Toxic if inhaled
H370	Causes damage to organs
H373	May cause damage to organs through prolonged or repeated exposure
H402	Harmful to aquatic life
H411	Toxic to aquatic life with long lasting effects

Disclaimer

Party Responsible for the Preparation of This Document

Orica USA Phone Number: 1-303-268-5000

All information contained herein and in any supporting documents is provided for informational purposes only and is as accurate and up-to-date as possible at the time of publication. Since Orica and its related entities cannot anticipate or control the conditions under which this information may be used, users must review this information in the specific context of the intended application and must

make their own determinations as to the suitability of this information for such users' purposes. To the maximum extent permitted by law, nothing contained herein and in any supporting documents shall be deemed to be an express or implied warranty, and Orica expressly disclaims all warranties and representations, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Orica will not be responsible for any loss whatsoever resulting from any use or reliance upon this information.

North America GHS US 2012 & WHMIS

Appendix C:
Federal and State Explosive Permits / Licenses

ALASKA DEPARTMENT OF LABOR
Certificate of Fitness

Explosive Handler **20070385**

Renewal

Issued 12/17/2024

Expires 12/17/2027

AXEL R BODNAR

6831 E LAMAR R ROAD
WASILLA AK 99654

Catherine Muñoz
Commissioner

State of Alaska
Department of Labor and Workforce Development

This certifies that the person identified on the reverse side has successfully completed Department of Labor and Workforce Development requirements and has been approved to perform work in the category indicated on the reverse side. This license is to be carried on your person at all times while performing work under the applicable Alaska statutes and must be shown to a representative of the Department upon request.
Information on the Certificate/License renewals. fees. statutes. or regulations. may be obtained by calling the Mechanical Inspection office:
Mechanical Inspection Office (907) 269-4925

Alteration of this document is a criminal offense under AS 11.56.820.

This is your Certificate of Fitness

Cut out the card on the left, as desired.

You are required to maintain the boxed portion of this page on your person (printed or digital) while performing work in the trade.

You may print this card and laminate it, if desired.

Email: alaskapyro@gmail.com

CURRENT ELECTRICAL AND PLUMBING CODES ADOPTED BY ALASKA:

- 2020 National Electric Code (NFPA 70)
- 2017 National Electric Safety Code (NFPA 70E)
- 2018 Uniform Plumbing Code

As of October 17, 2023, the Mechanical Inspection Office is issuing Certificates of Fitness (COFs) in this format. This format is valid in either printed and digital form. You may maintain this digital copy on your cell phone in place of carrying a physical card on your person. It is suggested that you maintain a separate copy to reprint as needed if your original is lost. Duplicate certificates requested through our office may be requested for a $25 fee.

Renewal notifications will be delivered via email starting in 2024. Please call or email our office if you need to update your email on file.

The Licensing Desk at 1251 Muldoon Road in Anchorage issues all licenses electronically. Note that this creates a longer delay for Anchorage customers as we now have one statewide processing queue. All requests are now processed in the order received. It may take 7-10 business days to receive your COF, so be sure to apply or renew early. Renewals may be submitted 90 days prior to the expiration date.

We encourage you to send renewal requests via email. Send the following information and we will email your renewed license once we process the request (5-7 business days). Email to mi@alaska.gov and include the following:

- Current COF number.
- Copies of Continuing Education Certificates, if applicable, completed within the past two years.
- A phone number to call for payment information.
- For a Trainee License, include a current RAPIDS Letter demonstrating sponsorship in the Registered Apprenticeship Program.

U.S. Department of Justice
Bureau of Alcohol, Tobacco, Firearms and Explosives

Federal Explosives License/Permit
(18 U.S.C. Chapter 40)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 555), you may engage in the activity specified in this license or permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. **THIS LICENSE IS NOT TRANSFERABLE UNDER 27 CFR 555.53.** See "WARNINGS" and "NOTICES" on reverse.

Direct ATF Correspondence To: ATF - Chief, FELC 244 Needy Road Martinsburg, WV 25405-9431	License/Permit Number: **9-AK-170-20-6K-00338**
Chief, Federal Explosives Licensing Center (FELC): Mama Howard	Expiration Date: **October 1, 2026**

Name
ADVANCED BLASTING SERVICES LLC

Premises Address (Changes? Notify the FELC at least 10 days before the move.)
281 S CONQUEST CIRCLE
WASILLA, AK 99623-

Type of License or Permit
20-MANUFACTURER OF EXPLOSIVES

Purchasing Certification Statement

The licensee or permittee named above shall use a copy of this license or permit to assist a transferor of explosives to verify the identity and the licensed status of the licensee or permittee as provided by 27 CFR Part 555. The signature on each copy must be an original signature. A faxed, scanned or e-mailed copy of the license or permit with a signature intended to be an original signature is acceptable. The signature must be that of the Federal Explosives Licensee (FEL) or a responsible person of the FEL. I certify that this is a true copy of a license or permit issued to the licensee or permittee named above to engage in the business or operations specified above under "Type of License or Permit."

Mailing Address (Changes? Notify the FELC of any changes.)

ADVANCED BLASTING SERVICES LLC
281 S CONQUEST CIRCLE
WASILLA, AK 99623-

Licensee/Permittee Responsible Person Signature	President Position/Title
William J. Rossman Printed Name	09/27/23 Date

ATF Form 5400.14/5400.15 Part I
Revised September 2011

Previous Edition is Obsolete ADVANCED BLASTING SERVICES LLC:281 S CONQUEST CIRCLE:99623:9-AK-170-20-6K-00338:October 1, 2026:20-MANUFACTURER OF EXPLOSIVES

Federal Explosives License (FEL) Customer Service Information

Federal Explosives Licensing Center (FELC)
244 Needy Road
Martinsburg, WV 25405-9431

Toll-free Telephone Number: (877) 283-3352
Fax Number: (304) 616-4401
E-mail: FELC@atf.gov

ATF Homepage: www.atf.gov

Change of Address *(27 CFR 555.54(a)(1))*. Licensees or permittees may during the term of their current license or permit remove their business or operations to a new location at which they intend regularly to carry on such business or operations. The licensee or permittee is required to give notification of the new location of the business or operations not less than 10 days prior to such removal with the Chief, Federal Explosives Licensing Center. The license or permit will be valid for the remainder of the term of the original license or permit. **(The Chief, FELC, shall, if the licensee or permittee is not qualified, refer the request for amended license or permit to the Director of Industry Operations for denial in accordance with § 555.54.)**

Right of Succession *(27 CFR 555.59)*. (a) Certain persons other than the licensee or permittee may secure the right to carry on the same explosive materials business or operations at the same address shown on, and for the remainder of the term of, a current license or permit. Such persons are: (1) The surviving spouse or child, or executor, administrator, or other legal representative of a deceased licensee or permittee; and (2) A receiver or trustee in bankruptcy, or an assignee for benefit of creditors. (b) In order to secure the right provided by this section, the person or persons continuing the business or operations shall furnish the license or permit for for that business or operations for endorsement of such succession to the Chief, FELC, within 30 days from the date on which the successor begins to carry on the business or operations.

(Continued on reverse side)

Cut Here ✂

Federal Explosives License/Permit (FEL) Information Card

License/Permit Name: **ADVANCED BLASTING SERVICES LLC**

Business Name:

License/Permit Number: **9-AK-170-20-6K-00338**

License/Permit Type: **20-MANUFACTURER OF EXPLOSIVES**

Expiration: **October 1, 2026**

Please Note: Not Valid for the Sale or Other Disposition of Explosives.

Appendix D:
Blasting Equipment

The HiEx TeleBlaster II

The Hiex Teleblaster II is an intelligent and discrete 2-way VHF or UHF telemetrey blast initiation system intended for commercial blasting operations.

The radio system's signal is digitally encoded(addressed). The latest microprocessor and message encoding/validation technology has been combined to provide a safe, reliable, accurate and compact remote blast initioation device.

A SAFER SYSTEM

- **Eliminates need for safety fuse and its inherent complications.**
- **Blaster not tethered to blast by shooting line or nonel lead-in line that is often too short.**
- **Increased stand off distances - up to 5 kilometer (not dependent on line of sight).**
- **Instantaneous blast initiation with test and abort and automatic shutdown functions.**
- **Blaster has superior control when working in areas with frequent air, marine, and other radio equipped traffic or personnel.**
- **Audible status confirmation to blaster**
- **Secure transmissions at 4 levels to prevent accidental initiation.**
- **Easy-to-use instructions and operating procedures.**

INCREASED PRODUCTIVITY

- **Better communication cuts down on lost productivity and time when locating and moving workers away from the blast zone.**
- **More efficient guarding and control of blast zones, and Blaster can guard a position.**
- **Speeds up drill/blast cycles for continuous operations.**
- **Requires much less time and cost in layout of expensive lead-in line for the blaster to be in a safe position.**

MORE CONTROL

- **Blaster is free to initiate from guard position or vantage point.**
- **Eliminates "burn time" concerns of safety fuse assemblies.**
- **Built-in retreat timer with audible confirmation for blaster to move clear of the blast zone.**
- **Housed in durable case, built for working in tough environments.**

ROTHENBUHLER ENGINEERING

HOME OF THE *Talkie Tooter!*

1664 Remote Firing Device

Department of Commerce license may be required

The **1664 REMOTE FIRING DEVICE** (**RFD**) is an intelligent and discrete 2-way radio controlled remote blast initiation system. The radio system's signal is digitally encoded (addressed). The latest microprocessor and message encoding/validation technology has been combined to provide a **SAFE, RELIABLE** and **ACCURATE** Remote Firing Device. Rothenbuhler Engineering engineered this system using over 15 years of military and commercial RFD experience.

The **1664 RFD** has the capability to initiate non-electric shock tube, as well as up to 8 standard electric blasting caps wired in series. The system can be used repeatedly throughout an operation and will give an "answer back" or confirmed status of the Remote a distance of 1 mile, typical line-of-sight. The Remote can be held in the standby (not armed) mode for 7+ hours and still maintain the energy to initiate shock tube or blasting caps.

The **1664 Remote Firing Device** includes redundant internal safety circuitry and a timed automatic disarming feature. If the Remote does not receive a properly addressed firing signal within 2 minutes of being armed, the system will automatically return to the disarmed state.

Rugged – The Controller and Remote are packaged in separate heavy duty watertight cases and have a vent for pressure equalization. For handling and transporting to the work site, the Remote is nested in the Controller case. The Remote includes an accessory pouch mounted in the lid. The cases provide shock and environmental protection to the system while being used. Tests included multiple drops of over 10 feet onto concrete, and water submersion.

MODEL 1664 REMOTE FIRING DEVICE

STANDARD FEATURES & FUNCTIONS

SPECIFICATIONS

Capability: Non-electric shock tube or 8 standard electric caps wired in series
Communications Range: 1 mile typical, line-of-sight
System Weight/Size: 24.5 lbs (11.2kg) – 20.5"W x 17.5"D x 9"H (52W x 44.5D x 23H centimeters)

CARRIER FREQUENCY
STANDARD – VHF 148 – 174 MHz
Other frequencies may be available as custom order

OPERATING TEMPERATURE RANGE
-30°C to +60°C
-22°F to +140°F

CERTIFICATIONS: **US- Federal Communications Commission (FCC)**
CANADA – Department of Communications (DOC)
SAFETY CERTIFICATIONS: **Chief Inspector of Mines – British Columbia, Canada**
Institution of Investigation and Control of the Chilean Army
Department of Mineral and Petroleum Resources, Western Australia

CONTROLLER

Frequency Stability	± 5 ppm VHF ± 3 ppm UHF
Modulation	11K0F3D (AFSK)
Transmit Power	5 Watts
Operating Voltage	12 VDC
Transmission Range	1 mile
Receiver Sensitivity	12 dB SINAD:<0.28uV
Size (in)	20.5"W x 17.5D x 9H
Size (cm)	52W x 44.5D x 23H
Weight	17.25 lbs.
Weight	8.0 kg
Case	Waterproof Pelican
Color	Orange
Battery Pack	Rechargeable NiCad
Battery Life	
Standby	7+ hours
Complete Recharge	18 hours
Current Draw	
Standby	100 mA
Transmitting	2.5 Amps

REMOTE

Frequency Stability	± 5 ppm VHF ± 3 ppm UHF
Modulation	11K0F3D (AFSK)
Transmit Power	2 Watt
Operating Voltage	12 VDC
Transmission Range	1 mile
Receiver Sensitivity	12 dB SINAD:<0.28uV
Size (in) (nests in Cntrlr Case)	10W x 12D x 4.5H
Size (cm) (nests in Cntrlr Case)	25.5W x 30.5D x 11.5H
Weight	7.25 lbs.
Weight	3.3 kg
Case	Waterproof Pelican
Color	Orange
Battery Pack	Rechargeable NiCad
Battery Life	
Standby	7+ hours
Complete Recharge	18 hours
Current Draw	
Standby	100 mA
Transmitting	1.1 Amp
Fire Output (Electric)	27 Volts (1.2 joules)
Fire Output (Non-electric)	2.5 kV (0.625 joules)

BATTERY CHARGER

Input: 120VAC, 60Hz, 7 watts Output: DC 12V, 300mA
International supply available on request.
Typical charge time 14-18 hours depending on residual battery level

WARRANTY

The 1664 Remote Firing Device is guaranteed for 2 years (batteries - 1 year, spark tips excluded) against defects in workmanship and materials. If the equipment should fail during this period, we will repair it at our factory or at the nearest authorized service facility. Warranty service on this equipment must be performed only by an authorized dealer. Unauthorized service procedures or parts will void and cancel your warranty, and may cause radio equipment to fail, resulting in accidents and/or personal injury. This is a limited warranty and is given in place of legally implied warranties of merchantability and fitness for a particular purpose. Our liability is expressly limited to the cost of repair or replacement of the RFD under this guarantee, and does not extend to additional or consequential damages resulting from the operation of equipment.

ROTHENBUHLER ENGINEERING

P. O. Box 708, 524 Rhodes Road, Sedro Woolley, WA 98284 U.S.A.
Phone: 360-856-0836 Fax: 360-856-2183
www.RothenbuhlerEng.com

Appendix E:
Blasting Checklists and Reports

ADVANCED
BLASTING SERVICES, LLC

Pre- Blast Check List

Ninilchik Revetment Replacement

****SAMPLE****

Date	Time	Shot no

This checklist will be completed by the Blaster and submitted with the Blast Report.

1. Has the blasting crew attended the daily onsite safety meeting?
   Yes [ ] No [ ]
2. Have the proper signs been posted at all entrances to the blast area?
   Yes [ ] No [ ]
3. Has all equipment used in the loading operations been inspected?
   Yes [ ] No [ ]
4. Has the blast area been restricted to only those directly involved with the loading operation?
   Yes [ ] No [ ]
5. Are the Traffic Control and Aircraft Watch Personnel in place?
   Yes [ ] No [ ]
6. Are all entrances to the blast area blocked?
   Yes [ ] No [ ]
7. Has the five minute blast warning been sounded?
   Yes [ ] No [ ]
8. Has the one minute blast warning been sounded?
   Yes [ ] No [ ]
9. Has adequate time been given for the smoke to clear?
   Yes [ ] No [ ]
10. Has the after blast inspection been performed?
    Yes [ ] No [ ]
11. Has the all clear blast signal been sounded?
    Yes [ ] No [ ]
12. Are all unused explosives accounted for and back in storage?
    Yes [ ] No [ ]

Blaster _____

ADVANCED
BLASTING SERVICES, LLC
281 S. Conquest Circle, Wasilla, AK 99623 • Tel: 907-357-2900 • Fax: 907-357-2930

Ninilchik Revetment Replacement--Lawing Quarry

Shot # / Date: @

******SAMPLE******

Products Used

Product	Date and Shift Code	Quantity Used

***Blaster in Charge:**

***Number of holes loaded:**

*** Pattern specifics (hole size, burden & spacing, hole depth):**

ADVANCED BLASTING SERVICES, LLC

BLAST REPORT

Shot Number: Sample

BLASTER IN CHARGE (Print)	LICENSE NUMBER	CONTRACTOR
Axel R. Bodnar		Tutka, LLC

DATE	TIME OF SHOT	PROJECT
TBD	TBD	Ninilchik Harbor Revetment Replacement

SITE CONDITIONS
- ☐ CLEAR
- ☐ CLOUDY
- ☐ RAIN
- ☐ SNOW
- ☐ DRY

TEMPERATURE:
WIND: MPH
WET HOLES? Yes
WERE BLAST MATS USED? No

TYPE OF MATERIAL
- ☐ HARD
- ☐ SOFT
- ☑ MIXED
- ☐ JOINTED
- ☐ LAMINATED
- ☐ MASSIVE

LOCATION: Lawing Quarry

STA. | TO STA.

DISTANCE TO NEAREST CONTROL STRUCTURE:
EXAMPLES: Home, Public Building, Church, School, Well, Bridge, Utility, Bridge, Etc.
• INDICATE DIRECTION ARROW ON PLAN

WAS SEISMOGRAPH USED? Yes

PRODUCTION HOLE DRILLING DETAILS:

HOLE DEPTH	FT	HOLE DIAMETER	IN
HOLE BURDEN	FT	HOLE SPACING	FT
NUMBER OF HOLES		SUB-DRILL DEPTH	FT

WALL CONTROL HOLE DRILLING DETAILS:

HOLE DEPTH	FT	HOLE DIAMETER	IN
HOLE SPACING	FT	SUB-DRILL DEPTH	FT
NUMBER OF HOLES		HOLE ANGLE	%

PRODUCTION HOLE PRODUCT AND INITIATION DETAILS

PRODUCTS USED: ☐ ANFO ☐ SLURRY ☐ CARTRIDGES
PRIMER USED: ☐ CAST BOOSTER ☐ CARTRIDGE
IN-HOLE INITIATION: ☐ NONEL ☐ EBC ☐ DET CORD ☐ OTHER
SURFACE INITIATION: ☐ NONEL ☐ EBC ☐ DET CORD
SHOT INITIATION: ☐ FUSE ☐ SHOCK TUBE ☐ EBC ☑ REMOTE

WALL CONTROL LINE HOLE LOADING DETAILS

PRODUCT (Trade Name) | TOTAL LBS.
LBS. OF PRODUCT PER FT | STEMMING HEIGHT FT
TYPE OF STEMMING | HOLES PER DELAY
EVERY HOLE LOADED? Yes | IF NO, WHY NOT?

PRODUCTION EXPLOSIVE QUANTITY DETAILS

STEMMING HEIGHT FT | STEMMING TYPE
HOLES DECKED? Yes | MAX POWDER PER HOLE
MAX HOLES PER 8ms DELAY | MAX LBS. PER 8ms DELAY
TOTAL POWDER IN SHOT LBS. | TOTAL YD³ IN SHOT
POWDER FACTOR = LBS. EXPLOSIVES / YD³ ROCK

BLAST RESULT REMARKS

Sample

SIGNATURE Axel R. Bodnar | DATE TBD

SKETCH IN PLAN VIEW HERE OF BLAST AREA; SHOWING OUTLINE OF SHOT, PROMINENT FEATURES, HOUSES, ROADS, NORTH ARROW, LOCATION AND DISTANCE TO SEISMOGRAPH IF USED.

FOR AGENCY USE ONLY
Reviewed and Approved By

AUTHORIZED SIGNATURE

Appendix F:
Blasting Notification Form (ABS)

ADVANCED
BLASTING SERVICES, LLC
281 S. Conquest Circle, Wasilla, AK 99623 • Tel. 907-357-2900 • Fax: 907-357-2930

Ninilchik Revetment Replacement

Blasting Notification Form

Shot @

Submit to: Tuka, LLC

Location of Blast:

Time Frame:

Responsible Party:

- Single point of contact: Axel Bodnar
  - [redacted]
  - ABS Main Office: (907) 357-2900

Time Blast Area is Clear:

- Blast area will be cleared 30 minutes prior to blast.

Radio Instructions / Radio Restrictions: All ABS personnel will carry handheld radios and coordinate with the on-site contractors to make sure everyone is in a safe location and accounted for.

Distance and Description of nearest structure:

Additional Information:

Appendix G:
Blasting Design and Sketches

tutka llc
general contractor
tutkallc.com
2485 E ZAK CIR, STE A
WASILLA, AK 99654
P: 907-357-2238 F: 907-357-2215
WWW.TUTKALLC.COM

N

LAWING AIRPORT QUARRY - BLASTING PLAN
TUTKA, LLC
CROWN POINT, AK

VICINITY MAP AND SITE OVERVIEW

NOTE:
Imagery (KPB GIS 10/15/2021)

SHEET:
BP01

DRAWN BY:
KAJ

SCALE:

DATE:
11/18/2025

JOB NUMBER:

tutka LLC
general contractor
tutkallc.com
2485 E ZAK CIR, STE A
WASILLA, AK 99654
P: 907-357-2238 F: 907-357-2215
WWW.TUTKALLC.COM

N

LAWING AIRPORT QUARRY - BLASTING PLAN
TUTKA, LLC

QUARRY GENERAL LAYOUT

CROWN POINT, AK

NOTE:
Imagery (KPB GIS 10/15/2021)

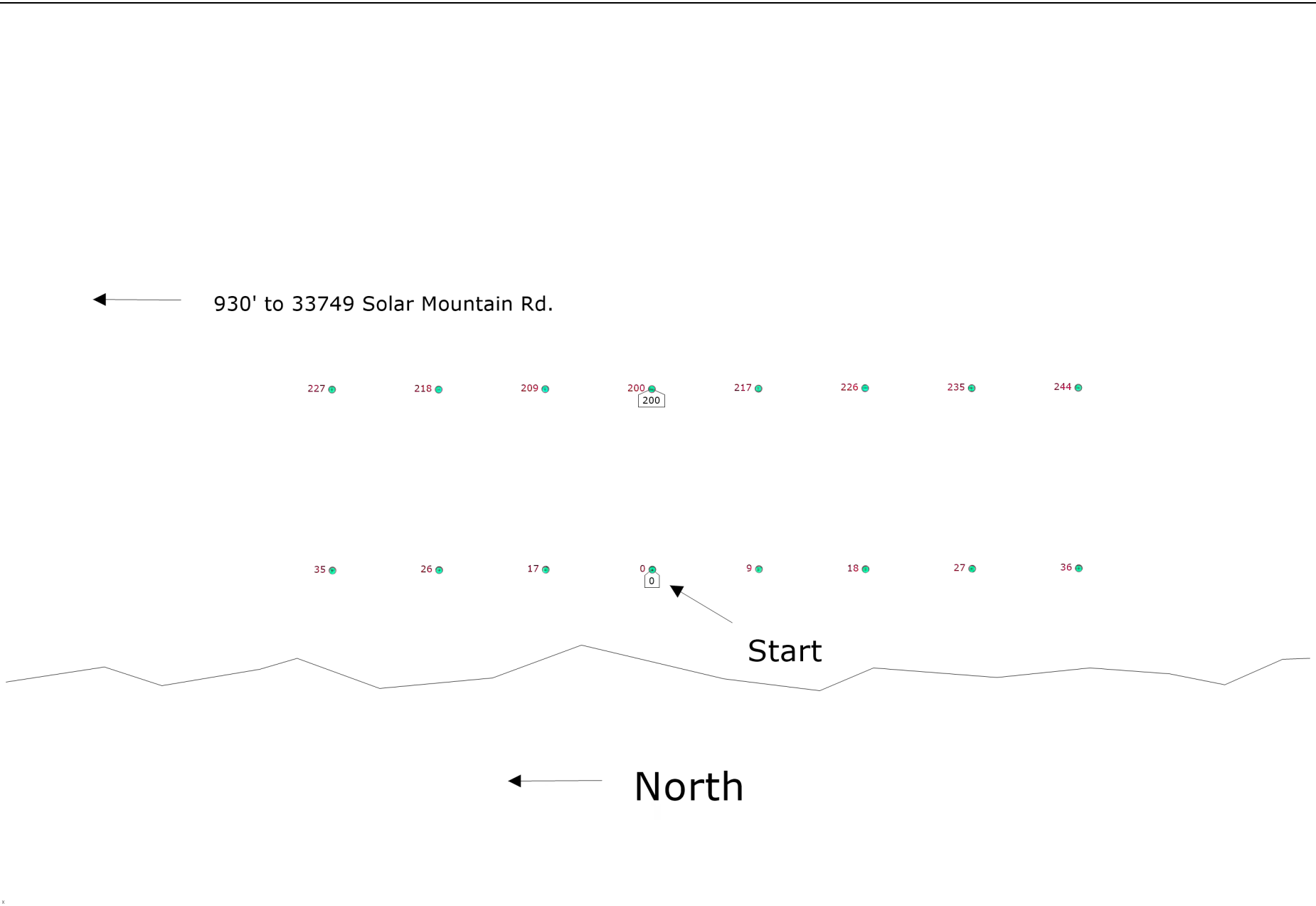
SHEET:
BP02

DRAWN BY:
KAJ

SCALE:

DATE:
11/18/2025

JOB NUMBER:

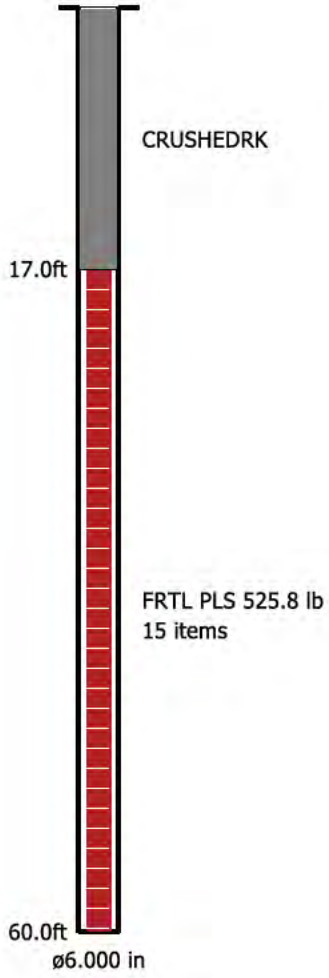


Not to scale

SHOTPlus™ 6 Standard 6.11.2		11/29/2022
Mine	Lawing Airport	
Location	Lawing Airport Quarry	
Title/author	Lawing Airport Quarry Billy Rosseau	
Filename	Lawing Airport Quarry--Sample Blast Diagram.	

ADVANCED
BLASTING SERVICES, LLC
281 S. Conquest Circle, Wasilla, AK 99623 • Tel: 907-357-2900 • Fax: 907-357-2930

Typical Loaded Hole – Lawing Airport Quarry



ADVANCED
BLASTING SERVICES, LLC
281 S. Conquest Circle, Wasilla, AK 99623 • Tel: 907-357-2900 • Fax: 907-357-2930

Blast Parameters

Burden: 22’

Spacing: 13’

Subdrill: 13’

Explosives Per Hole: 475 – 550 lbs

Holes per Delay (8ms): 2 ea

Pounds per Delay (8ms): 950 – 1100 lbs

Total Pounds Per 10,000 cy: 8,400 lbs

Powder Factor: .826 lbs / cy

Flyrock: 0 – 50’ AGL

Scaled Distance

Scaled Distance
43.504 sd

Distance to Nearest Structure	930 ft
Explosive Charge per Blasthole	457 lb
Scaled Distance	0 sd

Powder Factor

0.754 lbs/yd3	0.000 tons/lbs

Burden	22 ft
Spacing	13 ft
Hole Depth	60 ft
Stemming	16 ft
Explosive Diameter	5 in
Explosive Density	1.28 g/cc

Overpressure Prediction

163.1 dB	Open Air Detonations
153.0 dB	Coal Mine Parting or Cast Shot
135.9 dB	Quarry Blast

Distance to Nearest Structure	930 ft
Weight of Explosives	1371 lb

Ground Vibration Prediction

1.271 in/sec

Distance to Seismograph	930 ft
Explosive Charge Per Delay	1371 lb
H or K Factor	160
Attenuation Value (a-b)	1.5

Appendix H:
Air Traffic Safety Plan

AIR TRAFFIC SAFETY PLAN - LAWING AIRPORT (9Z9)
- Subsidiary to: Drilling and Blasting Safety Plan -

➢ Area of Concern - Quarry Location

Tutka proposes to mine rock from the Lawing Airport Quarry, a material site located northeast of Lawing Airport. Blasting will be required to develop the quarry for rock extraction. Blasting activity along the current active quarry face will be just east of and outside of the Lawing Airport Boundary. Approximate coordinates of the active quarry face are listed below:

Quarry Blasting Location:

WGS84 (WKID 4326)

Lawing Airport Quarry: Active Rock Face (approx.)
Latitude: 60° 24' 58.75" N Longitude: 149° 21' 56.52" W

Drilling and blasting operations within the Lawing Airport Quarry will incorporate the below plan for Air Traffic Safety regarding potential flight activity on and surrounding the adjacent Lawing Airport.

➢ Safety Plan Overview:

- ☐ Tutka's Designated Representative (DR) will be responsible for the overall *Air Traffic Safety Plan* implementation. Their duties will include:
  - o Communicating directly with ADOT Statewide Aviation as the Single Point-of-Contact. The DR will provide a blasting schedule and subsequent updates to ADOT.
  - o Ensure that there are no air traffic conflicts throughout a blasting session, and have the authority to delay or halt a blasting session if conditions unsafe to surrounding air traffic are identified, until the unsafe condition is resolved.
  - o Keep ADOT informed regarding any complications (air traffic related) that arise throughout a blasting session to resolve the issue if immediate assistance is needed, and to make amendments to the safety plan that will allow the newfound conflict to be avoided during future blasting sessions.
  - o Directly monitoring the Common Traffic Advisory Frequency (CTAF) using a handheld ground to air radio and make announcements regarding blasting activity.

- ☐ Communication Frequency(ies)
  - o CTAF for Lawing Airport: **122.900 Mhz**
  - o Kenai FSS - (for IFR Inbounds out of Seward): **122.600 Mhz**

- ☐ Ground Radio (Handheld) - Equipment Examples:
  - o *Icom IC-A25C-S (SPORT COM) Handheld VHF Transceiver*
  - o *Icom IC-A16B (COM) VHF Transceiver*
  - o *Yaesu FTA-250L (COM) Li-Ion Handheld VHF Transceiver*

Wasilla
2485 E. Zak Circle, Suite A
Wasilla, AK 99654
main [907] 357-2238
fax [907] 357-2215
www.tutkallc.com

➢ Procedures and Phraseology

☐ Advanced Notices / Scheduling

At least ten (10) days prior to each blasting event date, Tutka will provide a written notice to ADOT Statewide Aviation's assigned Airport Leasing Specialist of the planned date and time when a blast will be scheduled. If a conflict arises such that blasting on a proposed date would conflict with a previously scheduled airport activity, ADOT personnel will inform Tutka's DR to adjust the schedule accordingly.

(Although less directly related to air traffic safety, Tutka will also be providing a 30-day and 24-hour advanced notice to all local residents and businesses in accordance with ADNR's blasting requirements.)

☐ NOTAM Issuance

ADOT personnel will issue Notices to Airmen (NOTAMs) as appropriate for each blasting event or series of events according to the proposed blasting schedule.

☐ CTAF Observation and Announcement

- T-Minus 60 Minutes

  Sixty minutes prior to the scheduled blast event, Tutka's DR will turn on the handheld radio and begin monitoring the local CTAF at **122.900 Mhz**. The DR will continue to actively monitor the CTAF throughout the blasting session, until blasting is complete and the final announcement is made.

  >> At this time the DR will also make radio contact with the Kenai (ENA) Flight Service Station (FSS) **(122.600 Mhz)** as follows:

  Tutka: "ENA FSS, Tutka Safety"

  Kenai FSS: ENA FSS will respond to the call

  Tutka: "Tutka Safety is conducting blasting approximately 700 (seven hundred) feet north, northeast of Lawing Airport at XX:XX hours, please advise of inbound and outbound traffic until XX:XX hours."

- T-Minus 30 Minutes

  Thirty minutes prior to the scheduled blast event, Tutka's DR will announce the following warning over the CTAF:

  Tutka: "Lawing Traffic, Tutka Safety, Blasting is commencing in 30 (thirty) minutes, Tutka Safety, Lawing."

- T-Minus 10 Minutes

  Ten minutes prior to the scheduled blast event, Tutka's DR will announce the following warning over the CTAF:

  Tutka: "Lawing Traffic, Tutka Safety, Blasting is commencing in 10 (ten) minutes, Tutka Safety, Lawing."

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Wasilla, AK 99654
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fax [907] 357-2215
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- o T-Minus 5 Minutes
  Five minutes prior to the scheduled blast event, Tutka's DR will announce the following warning over the CTAF:

  Tutka: "Lawing Traffic, Tutka Safety, Blasting is commencing in 5 (five) minutes, Flyrock height to 50 (five zero) possible, Tutka Safety, Lawing."

- o T-Minus 1 Minute
  One minute prior to the scheduled blast event, Tutka's DR will announce the following warning over the CTAF:

  Tutka: "Lawing Traffic, Tutka Safety, Blasting is commencing in 1 (one) minute, Flyrock height to 50 (five zero) possible, Tutka Safety, Lawing."

- o T-Plus(+) 1 Minute
  One to five minutes after to the scheduled blast event, Tutka's DR will announce the following over the CTAF to provide information about the conclusion of blasting activity:

  Tutka: "Lawing Traffic, Tutka Safety, Blasting completed approximately 700 (seven hundred) feet north, northeast of Lawing Airport at XX:XX hours,Tutka Safety, Lawing."

  >> At this time the DR will also make radio contact with the Kenai FSS **(122.600 Mhz)** as follows:

  Tutka: "ENA FSS, Tutka Safety"

  Kenai FSS: ENA FSS will respond to the call

  Tutka: "Tutka Safety has concluded blasting approximately 700 (seven hundred) feet north, northeast of Lawing Airport at XX:XX hours, Over"

□ CTAF Announcement Guidance

- o Phraseology

  In all communications over the CTAF, it is essential that the DR identify the location of concern (Lawing Traffic) who is speaking (Tutka Safety), and what the safety message is (blasting time, hazard height, runway obstruction, etc…).

- o NOTAM Closure

  After blasting is complete and Kenai FSS has been apprised to the status, Tutka's DR will again contact ADOT Statewide Aviation so that the day's NOTAM can be closed.

- o Non-Responsive Aircraft

  A response to CTAF announcements by Tutka from aircraft in the vicinity is not guaranteed for a variety of reasons. Tutka and ABS personnel must remain vigilant by listening and visually observing for flights approaching the airspace to insure that the blasting crew can respond promptly if needed (by delaying blasting).

Wasilla
2485 E. Zak Circle, Suite A
Wasilla, AK 99654
main [907] 357-2238
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www.tutkallc.com

➢ Personnel

Tutka's Designated Representative:

Tutka, LLC (***Single Point-of-Contact**)	Tutka, LLC (***Alt. Single Point-of-Contact**)
JOHN SOMMER Tutka Owner / Construction Mgr. Office Phone: (907) 357-2238 Cell: [redacted] 2485 E Zak Cir., Suite A Wasilla, AK 99654	KYLE JOHNSON Project Manager Office Phone: (907) 357-2238 Cell: [redacted] 2485 E Zak Cir., Suite A Wasilla, AK 99654

Tutka, LLC (***Alt. Single Point-of-Contact**)	
AUSTIN KRUSE Project Manager Office Phone: (907) 357-2238 Cell: [redacted] 2485 E Zak Cir., Suite A Wasilla, AK 99654	

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2485 E. Zak Circle, Suite A
Wasilla, AK 99654

[redacted] (907) 357-2238
fax (907) 357-2215
www.tutkallc.com

ADOT&PF Statewide Aviation - Notification & Emergency:

(Primary) DOT&PF CR, Kenai Peninsula	(Secondary) DOT&PF CR, Kenai Peninsula
ADAM SULLIVAN Crown Point Station Foreman Office Phone: (907) 595-1262 Cell: [redacted] adam.sullivan@alaska.gov 30049 Seward Hwy Seward, AK 99664	ROBERT SMITH Aviation Project Mgr. / Safety Coordinator Office Phone: (907) 262-1187 Cell: [redacted] robert.smith2@alaska.gov P.O. Box 1327 Soldotna, AK 99669

(Third) DOT&PF Statewide Aviation (***24/7 Available**)	
JOSH STUCKEY Airport Safety & Security Officer Office Phone: (907) 269-0751 Cell: [redacted] josh.stuckey@alaska.gov P.O. Box 196900 Anchorage, AK 99519-6900	

Wasilla
2485 E. Zak Circle, Suite A
Wasilla, AK 99654
[redacted] (907) 357-2238
fax (907) 357-2215
www.tutkallc.com

Appendix I:
Pre-Blast & Post Blast
Photo Submittal Forms

PRE-BLAST PHOTOS for LAWING AIRPORT QUARRY

Blasting Session Date: ___/___/ 2026

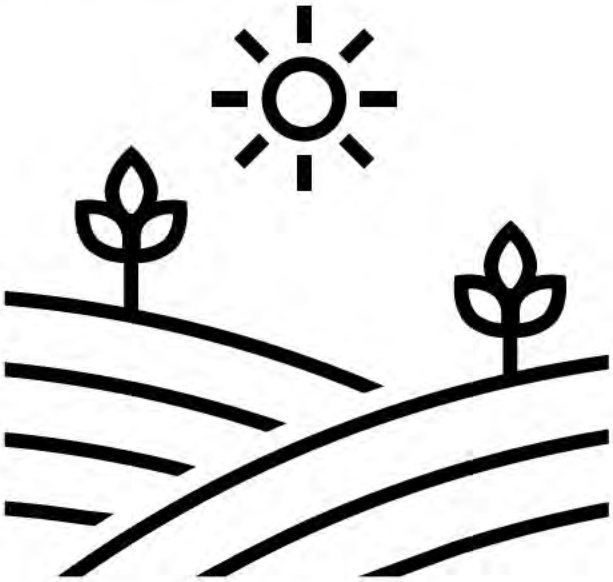
[N/S/E/W] Photo: 01 – (Pre-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: [Photo description.]	
Approx. Time: 14:00	Coord: N/A

[N/S/E/W] Photo: 02 – (Pre-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: [Photo description.]	
Approx. Time: 14:00	Coord: N/A

PRE-BLAST PHOTOS for LAWING AIRPORT QUARRY

Blasting Session Date: ___/___/ 2026

[N/S/E/W] Photo: 03 – (Pre-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: **[Photo description.]**	
Approx. Time: **14:00**	Coord: **N/A**

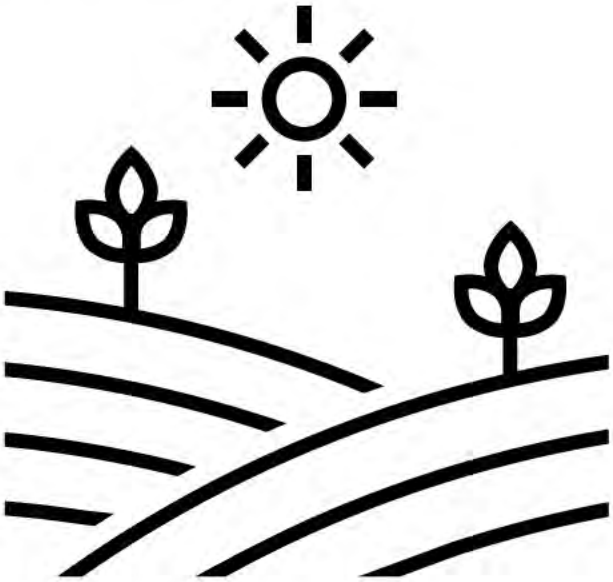


[N/S/E/W] Photo: 04 – (Pre-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: **[Photo description.]**	
Approx. Time: **14:00**	Coord: **N/A**

POST-BLAST PHOTOS for LAWING AIRPORT QUARRY

Blasting Session Date: ___/___/ 2026

[N/S/E/W] Photo: 01 – (Post-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: **[Photo description.]**	
Approx. Time: **15:00**	Coord: **N/A**

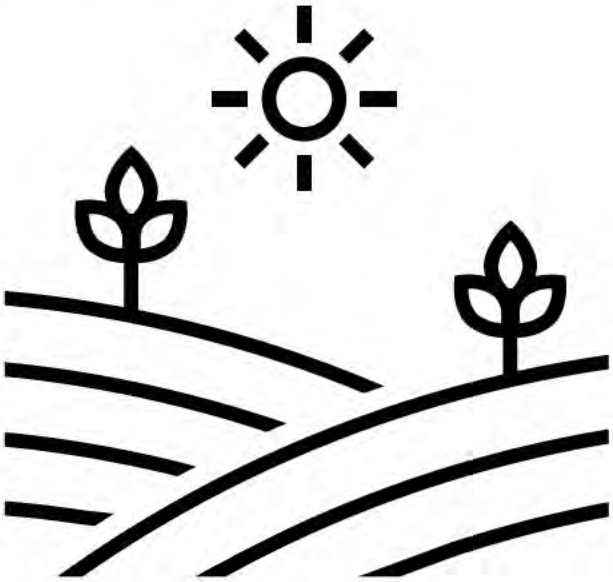


[N/S/E/W] Photo: 02 – (Post-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: **[Photo description.]**	
Approx. Time: **15:00**	Coord: **N/A**

POST-BLAST PHOTOS for LAWING AIRPORT QUARRY

Blasting Session Date: ___/___/ 2026

[N/S/E/W] Photo: 03 – (Post-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: [Photo description.]	
Approx. Time: 15:00	Coord: N/A



[N/S/E/W] Photo: 04 – (Post-Blast) Lawing Airport Quarry, MS ADL 231623	
Description: [Photo description.]	
Approx. Time: 15:00	Coord: N/A

Appendix J:
Records of Notices Sent

Appendix K:
Supporting Documentation and Other Records

Kyle Johnson

From: Munter, Tony P (DFG) <tony.munter@alaska.gov> on behalf of Munter, Tony P (DFG)
Sent: Monday, November 14, 2022 10:31 AM
To: Kyle Johnson
Cc: Scott Nygard; John Sommer
Subject: Re: Lawing Airport Quarry: FHP Review

Hi Kyle,

Thanks for your inquiry.

ADF&G, Habitat Section, has determined that there at this time, there are no known anadromous or native fish waterbodies within your project area. Therefore, **no** ADF&G Fish Habitat Permits will be required for the proposed Lawing Airport Quarry project based on the figures and description provided.

Any modifications or future projects will warrant further determination.

Thanks.

Tony Munter
Kenai Peninsula Area Manager
Department of Fish and Game
Habitat Section
Soldotna Office
907-714-2478
ADF&G Habitat Section

From: Kyle Johnson [redacted]
Sent: Friday, November 11, 2022 2:27 PM
To: Munter, Tony P (DFG) <tony.munter@alaska.gov>
Cc: Blossom, Brian D (DFG) <brian.blossom@alaska.gov>; Scott Nygard [redacted] John Sommer <[redacted]
Subject: Lawing Airport Quarry: FHP Review

Hi Tony,

Tutka is in the process of permitting to operate out of the Lawing Airport Quarry (for Riprap production), located in Lawing/Crown Point. One of the items that ADNR has required in their *Questionnaire for Use of Explosives* includes:

> **IV. Local Waterbodies**
> Are there any waterbodies or anadromous waterbodies within one-half mile of the blast area? [**Yes** is Tuka's answer.]
> If yes, consult the Alaska Dept. of Fish and Game, Habitat Section to determine if a habitat permit is necessary.

This requirement appears to originate from *AS 16.05.871*. At this particular quarry, the proposed activity is geographically isolated from nearby waterbodies as it has been for the duration of recent development. No in-water work is involved and there aren't any stream crossings at the quarry or along the proposed haul road (parallel to the runway). I believe that should limit consideration of ground vibration due to blasting as an avenue for potential waterbody impact.
Will you please review the attached maps showing Tutka's proposed quarry operations and let us know if further coordination/approval is likely to be needed from the Habitat Section?

Thank you,

Kyle Johnson
[redacted]
o: 907-357-2238
[redacted]

"Where Engineering Meets the Environment"