

### An Employee-Owned Company

November 1, 2019

Mr. Alex Plishner Vice President Lennar 16465 Via Esprillo, Suite 150 San Diego, CA 92127

Reference: Noise Analysis for the Avion Project (RECON Number 8958)

Dear Mr. Plishner:

The purpose of this report is to assess potential short-term noise and vibration impacts resulting from development of the Avion Project (project) located in the city of San Diego, California. The project site was previously analyzed as Southeast Perimeter Parcel C in the Black Mountain Ranch (Subarea I) Subarea Plan EIR (96-7902) (Subarea Plan EIR). Because the project would be consistent with the Transportation Phasing Plan for the Subarea Plan, implementation of the project would not result in new operational impacts associated with noise. However, the currently proposed project would require construction and blasting activity that was not previously analyzed. Consequently, this focused Noise Analysis analyzes short-term impacts associated with construction. The analysis of impacts is based on standards established in the City's Municipal Code, the County of San Diego Consolidated Fire Code (County Fire Code), the U.S. Bureau of Mines, and the U.S. Fish and Wildlife Service.

### 1.0 PROJECT DESCRIPTION

The project site consists of a 41.48-acre parcel of undeveloped land located in the northern part of the City of San Diego, approximately 1.2 miles west of Interstate 15 (Figure 1). Carmel Valley Road/Bernardo Center Drive is located approximately 0.6 mile to the north, and Black Mountain Road is located approximately 1.4 miles to the west. Heritage Bluffs, a new residential development currently under construction, abuts the northern edge of the property. Future access would be provided at the northeast corner of the project site via Winecreek Road. Land uses surrounding the project site include a portion of the Black Mountain Open Space Park to the west, east, and south, Heritage Bluffs residential development to the north, and additional Black Mountain Open Space Park open space lands to the northwest (Figure 2).

The project would develop 84 detached multi-family residential units and associated infrastructure (i.e., private drives sewer, water, etc.), which would be consistent with the land use identified for the project site (Southeast Perimeter Parcel C) in the Subarea Plan EIR. Project density on-site would be less than what was assumed and analyzed for the property under the Subarea Plan EIR, and the project would transfer the remaining density (14 market-rate units and 19 affordable housing units) to the Black Mountain Ranch North Village Town Center, pursuant to the density transfer allowances established by the Subarea Plan. Consequently, the project would be consistent with the Transportation Phasing Plan for buildout of the Subarea Plan.

Based on initial site investigations, non-rippable rock was found in a majority of the cut locations (see Figure 3) and would therefore require blasting during the subgrade rock removal stage. The blasting operations required for the project site would be similar to those conducted at the adjacent Heritage Bluffs site to the northeast.





## FIGURE 1 Regional Location





Project Boundary Heritage Bluffs Boundary

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0 Feet 600

FIGURE 3 Possible Blasting Locations



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Blasting operations would require the drilling or hammering of small holes into the rock in a pattern that allows each hole to remove a small amount of rock. This analysis assumes the use of a mounted impact hammer and a drill rig. The area around the blast site would be watered the day before and the morning of the blast in order to dampen the dust.

In order to comply with the County of San Diego Fire Code, the blasting contractor would calculate and use only the amount of explosive in each of the small holes necessary to break the rock around each hole while crushing the rock for removal. The explosive would be detonated at each hole in a sequence with at least 8 milliseconds delay between charges to limit the total amount of vibration generated by the explosive fire at any one time. The blasting orientation would also be controlled in such a way that fractures and the energy from each blast would move the rock towards a hole that has already been cleared, limiting the containment of the explosive and reducing potential vibrations at nearby structures. Another factor the blasting contractor can use to limit vibrations from blasting includes timing of energy release, i.e., the delay between each charge.

### 2.0 FUNDAMENTALS OF NOISE AND VIBRATION

### 2.1 Fundamentals of Noise

Sound levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; a halving of the energy would result in a 3 dB decrease. However, human perception of noise has no simple correlation with acoustical energy. A change in noise levels is generally perceived as follows: 3 A-weighted dB [dB(A)] barely perceptible, 5 dB(A) readily perceptible, and 10 dB(A) perceived as a doubling or halving of noise (California Department of Transportation 2013).

In technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while commonly confused are two distinct characteristics of sound. Both share the same unit of measure, the dB. However, sound power, expressed as  $L_{pw}$ , is the energy converted into sound by the source. As sound energy travels through the air, it creates a sound wave that exerts pressure on receivers such as an ear drum or microphone, the sound pressure level. Sound measurement instruments only measure sound pressure, and limits used in standards are generally sound pressure levels.

The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale, which approximates the frequency response of the average young ear when listening to most ordinary everyday sounds, was devised. When people make relative judgments of the loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Therefore, the "A-weighted" noise scale is used for measurements and standards involving the human perception of noise. Noise levels using A-weighted measurements are designated with the notation dB(A).

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors has been developed. The noise descriptors used for this study is the equivalent noise level ( $L_{eq}$ ). The  $L_{eq}$  is the equivalent steady-state noise level in a stated period of time that is calculated by averaging the acoustic energy over a time period; when no period is specified, a 1-hour period is assumed.

Sound from a localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern, known as geometric spreading. The sound level decreases or drops off at a rate of 6 dB(A) for each doubling of the distance.

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Traffic noise is not a single, stationary point source of sound. The movement of vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. The drop-off rate for a line source is 3 dB(A) for each doubling of distance.

The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site (such as parking lots or smooth bodies of water) receives no additional ground attenuation, and the changes in noise levels with distance (drop-off rate) are simply the geometric spreading of the source. A soft site (such as soft dirt, grass, or scattered bushes and trees) provides an additional ground attenuation value of 1.5 dB(A) per doubling of distance. Thus, a point source over a soft site would drop off at 7.5 dB(A) per doubling of distance.

### 2.2 Fundamentals of Vibration

Groundborne vibration consists of oscillatory waves that propagate from the source through the ground to adjacent structures. The frequency of a vibrating object describes how rapidly it is oscillating. The number of cycles per second of oscillation is the vibration frequency, which is described in terms of hertz, abbreviated hertz (Hz). The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz.

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings caused by construction activities may be perceived as motion of building surfaces or rattling of windows, items on shelves, and pictures hanging on walls. Vibration of building components can also take the form of an audible low-frequency rumbling noise, which is referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), and when the structure and the construction activity are connected by foundations or utilities, such as sewer and water pipes.

Although groundborne vibration is sometimes noticeable in outdoor environments, groundborne vibration is almost never annoying to people who are outdoors (Federal Transit Administration [FTA] 2006). The primary concern from vibration is the ability to be intrusive and annoying to local residents and other indoor vibration sensitive land uses.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High frequency vibrations reduce much more rapidly than low frequencies, so that low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances. When vibration encounters a building, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under certain circumstances, the ground-to-foundation coupling may also amplify the vibration level due to structural resonances of the floors and walls.

Vibration levels are usually expressed as single-number measure of vibration magnitude, in terms of velocity or acceleration, which describes the severity of the vibration without the frequency variable. The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal, usually measured in inches per second (in/sec). Since it is related to the stresses that are experienced by buildings, PPV is often used in monitoring of blasting vibration.

Vibration-sensitive receivers are generally considered the same as noise-sensitive receivers, but may also include historical structures, laboratories, research facilities, and similar facilities. All vibration-sensitive receivers in the vicinity of the project are typical residential uses. There are no special uses or historic structures affected by the project.

### 3.0 APPLICABLE STANDARDS

### 3.1 City of San Diego Municipal Code

Section 59.5.0404 of the City's Noise Abatement and Control Ordinance states that:

- A. It shall be unlawful for any person, between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday, or on Sundays, to erect, construct, demolish, excavate for, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise....
- B. [I]t shall be unlawful for any person, including the City of San Diego, to conduct any construction activity so as to cause, at or beyond the property lines of any property zoned residential, an average sound level greater than 75 decibels during the 12-hour period from 7:00 a.m. to 7:00 p.m.

The project construction would be restricted to between the hours of 7:00 a.m. and 7:00 p.m. and construction noise levels may not exceed 75 dB(A)  $L_{eq(12)}$  as assessed at or beyond the property line of a property zoned residential.

### 3.2 Vibration

Based on best available data, impacts for hydraulic breakers, or hammers, and other non-transient sources such as those associated with project construction shall be considered significant if the PPV exceeds 0.2 in/sec.

The threshold for blasting vibration impacts, as established by the U.S. Bureau of Mines, is 2.0 in/sec PPV at the closest structure. Additionally, as required by the County of San Diego Fire Code, pre- and post-blast inspections for building damage would be conducted by the blasting contractor prior to the first blast.

### 3.3 Multiple Species Conservation Program Subarea Plan

The City of San Diego's Multiple Species Conservation Program (MSCP) and Multi-Habitat Planning Area (MHPA) adjacency requirements, as well as associated guidelines produced by the U.S. Fish and Wildlife Service, require that noise be limited to a level not to exceed an hourly limit of 60 dB(A)  $L_{eq}$  or the average ambient noise level, whichever is greater, at the edge of MHPA habitat during the, identified sensitive species breeding season of February 1 to September 15.

### 4.0 EXISTING CONDITIONS

The project site is located in a developing area that consists primarily of residential development and open space. A majority of the project site is surrounded by open space. The nearest circulation element roadway is Carmel Valley Road, which is approximately 2,800 feet to the north. Local residential streets are located in the newly constructed single family residential neighborhood to the northeast. However, these local streets only provide access to the neighborhood and do not carry a significant amount of traffic. Existing noise levels on the project site would be similar to an open space and single family residential neighborhood, which are relatively quiet. Distant vehicle traffic on Carmel Valley Road is the main transportation-related noise source. The existing traffic volume and speed for Carmel Valley Road were obtained from the San Diego Association of Governments Traffic Forecast Information Center (SANDAG 2019). Based on an existing traffic volume of 26,800 and a speed of 50 mph on Carmel Valley Road, using FHWA algorithms, it was calculated that the existing vehicle traffic noise level on the project site is approximately 57 CNEL (Attachment 1).

### 5.0 METHODOLOGY

### 5.1 Noise Formulas and Calculations

Noise impacts from construction are a function of the noise generated by equipment, the distance to and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Noise levels from construction activities are typically considered as point sources and would drop off at a rate of -6 dB(A) per doubling of distance over hard site surfaces, such as streets and parking lots. The drop-off rate would be approximately -7.5 dB(A) per doubling of distance for soft site surfaces, such as grass fields and open terrain with vegetation (FTA 2006).

The magnitude of construction noise impacts depends on the type of construction activity, the noise level generated by various pieces of construction equipment, the duration of the activity, and the distance between the activity and noise sensitive receivers. As shown in Table 1, maximum noise levels from construction equipment range from approximately 70 dB(A) to 90 dB(A) at 50 feet from the source (Federal Highway Administration [FHWA] 2008). The noise levels vary for each type of equipment, as equipment may come in different sizes and with different engines. Construction equipment noise levels also vary as a function of the activity level or duty cycle. In a typical construction project, the loudest short-term noise levels are those of earth-moving equipment under full load, which are on the order of 85 to 90 dB(A) at a distance of 50 feet from the source.

Typical construction projects, with equipment moving from one point to another, work breaks, and idle time, have long-term noise averages that are lower than louder short-term noise events, such as revving an engine to maximum revolutions per minute during a heavy load and a piece of equipment moving from one end of the project site to the other after completing a task. Additionally, due to the dynamic nature of a construction site, noise levels are calculated from the center of the activity.

Noise impacts from construction were calculated using the FHWA road construction noise model, version 1.1 (RCNM). RCNM is a national model based on the noise calculations and extensive construction noise data compiled by the FHWA. The predictions originated from the Environmental Protection Agency and FTA noise level database, and an Empire State Electric Energy Research Corporation Guide, which utilized an "acoustical usage factor" to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. The maximum noise levels in the model represent the A-weighted maximum sound level ( $L_{max}$ ), measured at a distance of 50 feet from the construction equipment, which is converted to an  $L_{eq}$  by RCNM through the incorporation of the acoustical usage factor.

The ground absorption factor accounts for typical increases or decreases of sound level, depending upon the ground condition between the source and receiver. An acoustically "hard" site has a ground absorption factor of "0." Acoustically hard sites include surfaces such as pavement, bare hard-tamped ground, water, ice, and other surfaces with high reflectivity. A higher ground factor defines more absorptive ground, such as vegetation or tilled and loose soil. Additionally, an acoustically "hard" site provides the most conservative results.

Table 1						
Typical Construction Eq	uipment Noise Levels					
	Noise Level at 50 Feet	Typical Duty				
Equipment	[dB(A) L <sub>eq</sub> ]	Cycle				
Auger Drill Rig	85	20%				
Backhoe	80	40%				
Blasting	94	1%				
Chain Saw	85	20%				
Clam Shovel	93	20%				
Compactor (ground)	80	20%				
Compressor (air)	80	40%				
Concrete Mixer Truck	85	40%				
Concrete Pump	82	20%				
Concrete Saw	90	20%				
Crane (mobile or stationary)	85	20%				
Dozer	85	40%				
Dump Truck	84	40%				
Excavator	85	40%				
Front End Loader	80	40%				
Generator (25 kilovolt amps or less)	70	50%				
Generator (more than 25 kilovolt amps)	82	50%				
Grader	85	40%				
Hydra Break Ram	90	10%				
Impact Pile Driver (diesel or drop)	95	20%				
Insitu Soil Sampling Rig	84	20%				
Jackhammer	85	20%				
Mounted Impact Hammer (hoe ram)	90	20%				
Paver	85	50%				
Pneumatic Tools	85	50%				
Pumps	77	50%				
Rock Drill	85	20%				
Roller	74	40%				
Scraper	85	40%				
Tractor	84	40%				
Vacuum Excavator (vac-truck)	85	40%				
Vibratory Concrete Mixer	80	20%				
Vibratory Pile Driver	95	20%				
SOURCES: Federal Highway Administration 20	008; Federal Transit Admir	nistration 2006.				

### 5.2 Vibration Formulas and Calculations

A quantitative assessment of potential vibration impacts from construction activities, such as blasting, piledriving, vibratory compaction, demolition, drilling, or excavation, may be conducted using the following equations (FTA 2006; Caltrans 2013). Mr. Alex Plishner Page 10 November 1, 2019

### **Damage Assessment**

Vibration impacts from normal equipment to structures may be estimated at any distance from the following equation:

 $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$ 

Where: PPV<sub>equip</sub> is the peak particle velocity in in/sec of the equipment adjusted for distance, PPV<sub>ref</sub> is the reference vibration level in in/sec at 25 feet as shown in Table 2, and D is the distance from the equipment to the receiver.

Table 2Typical Construction Equipment Vibration Levels							
	Peak Particle Velocity at 25 feet						
Equipment (inches per second)							
Large Bulldozer	0.089						
Caisson Drill	0.089						
Trucks	0.076						
Mounted Impact Hammer	0.089						
SOURCE: Federal Transit Administration 2006							

For blasting, PPV is defined by the following equation:

 $PPV=K(D/\sqrt{W})^m$ 

Where: PPV is the peak particle velocity in in/sec, D is the distance between the shot and the nearest dwelling in feet, W is the total weight of explosive per a minimum of 8-millisecond delay in pounds, and the constants K and m are called site factors.

Based on *Ground Vibration Monitoring for Construction Blasting in Urban Areas*, which reports on blast monitoring conducted in San Diego County for various roadway projects across the County, the average K factor in San Diego is 714, and based on the U.S. Bureau of Mines recommendation, m, the vibration decay with distance, is -1.6 (Caltrans 2001). As these formulas are empirically based and well documented, they are considered appropriate for assessing point vibration sources with normal propagation conditions.

As discussed in Section 3.2, the thresholds for hydraulic breakers, or hammers, and other non-transient sources such as those associated with project construction is a PPV greater than 0.2 in/sec. The threshold for blasting vibration impacts, as established by the U.S. Bureau of Mines, is 2.0 in/sec PPV at the closest structure.

Note that there are no special buildings (i.e., concert halls, television studios, recording studios, auditoriums or theatres) located in the project area; as such, the additional vibration and noise impact levels for these types of structures are not discussed in this report.

### **Annoyance Assessment**

The root mean square (RMS) of a vibration is relative to the PPV; thus, vibration impacts to humans due to annoyance or interference with vibration-sensitive activities are estimated based on the following equation:

RMS = PPV x  $(\sqrt{2})/2$ 

However, isolated events such as blasting, pile driving, and impact hammering are not evaluated for RMS impacts due to the very short duration between each impact and the separation of the vibration event from

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the following event. Thus, annoyance due to blasting, pile driving, and impact hammering is not assessed in this analysis.

### 6.0 GROUNDBORNE VIBRATION AND NOISE IMPACTS TO RESIDENTIAL RECEIVERS

Construction activities produce varying degrees of ground vibration, depending on the equipment and methods employed. However, with a few exceptions, ground vibrations from typical construction activities very rarely reach levels high enough to cause damage to structures. Noise and vibration generated by general construction activities associated with the project were assessed in the Subarea Plan EIR; thus, excavation and other general construction activities are not assessed in this analysis. The noise and vibration analysis presented in this report is focused on the recently identified options for rock removal, including hammering, drilling, and blasting. As with noise, vibrations are attenuated by distance. The vibrations that would be produced by hammering, drilling, and blasting would travel relatively short distances as compared to noise; thus, this analysis is focused on the receivers located northeast of the project site (see Figure 3). The nearest receivers are the single-family homes associated with the Heritage Bluffs project, which is currently under construction and will be occupied once construction on this project begins. The nearest receivers is (will be) located approximately 175 feet northeast of the nearest hammering, drilling, and blasting location.

### 6.1 Impact Hammering

### Noise

Mounted hydraulic impact hammers would be used to remove the top of the rock formation. Hydraulic hammers used for rock breaking are assumed to operate at maximum power for approximately 20 percent of a given hour (FHWA 2008). A loader/backhoe would likely be used to clear broken concrete and would have a utilization factor of approximately 40 percent. Rock breaking with hydraulic hammers is calculated to generate maximum noise levels on the order of 90 dB(A) at 50 feet. Assuming two hydraulic hammers and one loader/backhoe are operating for a full hour, hydraulic-hammer rock breaking would generate hourly noise levels of 86 dB(A)  $L_{eq}$  at 50 feet. Based on standard point source propagation noise levels, at the nearest residential property line 175 feet to the northeast, noise levels would attenuate to 75 dB(A)  $L_{eq}$ , which is the City's applicable construction noise level limit. Thus, it is not anticipated that hammering would exceed City standards.

### Vibration

According to the FTA, vibration levels associated with the use of mounted impact hammers are 0.089 in/sec PPV at 25 feet, as shown in Table 2. Using FTA's recommended procedure for applying a propagation adjustment to these reference levels, vibration levels would exceed Caltrans-recommended threshold (0.2 in/sec PPV) at distances of 14 feet or less from a mounted hydraulic hammer. Vibrations at various distances are shown in Table 3. The nearest residence is approximately 175 feet from the nearest point of hydraulic hammering; thus, vibration levels are anticipated to be 0.005 in/sec PPV. Therefore, vibration levels would not exceed 0.2 in/sec PPV from hydraulic hammering at local residences, and impacts associated with vibration from hydraulic hammering would be less than significant.

	Table 3									
Predicted Hyd	Predicted Hydraulic Hammering Vibration Levels									
Distance to Construction	Impact	Predicted	Potential							
Non-rippable Rock	Criteria	Vibration Level	Significant							
(feet)	(in/sec PPV)	(in/sec PPV)	Impact							
5		0.995	Yes							
10		0.352	Yes							
11		0.305	Yes							
12		0.268	Yes							
13	0.9	0.237	Yes							
14	0.2	0.212	Yes							
15		0.191	No							
20		0.124	No							
25		0.089	No							
175 – nearest residence		0.005	No							
in/sec = inches per second: PI	PV = peak partic	le velocity								

### 6.2 Drilling

### Noise

As an alternative to hammering, drilling may be used to prepare the boreholes for explosives. While the numbers and diameters of the boreholes are dependent on the actual blasting process, the noise levels generated by a rock drill would not vary. According to the FHWA, a rock drill typically generates maximum noise levels of 85 dB(A)  $L_{eq}$  at 50 feet. As discussed previously, this is reduced by the actual time the equipment is generating the maximum noise in a given hour. Based on the FHWA data, a rock drill generates the greatest noise levels approximately 20 percent of an hour. Thus, a single rock drill would generate an hourly noise level of 78 dB(A)  $L_{eq}$  at 50 feet. Assuming the use of a rock drill and a loader/backhoe are operating for a full hour, rock drilling operations would generate hourly noise levels of 80 dB(A)  $L_{eq}$  at 50 feet. Based on standard point source propagation noise levels, at the nearest residential property line 175 feet to the northeast, noise levels would attenuate to 69 dB(A)  $L_{eq}$ , which is less than the City's applicable construction noise level limit of 75 dB(A)  $L_{eq}$ . Therefore, it is not anticipated that hammering would exceed City standards, and impacts would be less than significant.

### Vibration

According to the FTA, vibration levels associated with the use of rock drills are estimated to generate 0.089 in/sec PPV at 25 feet, which is the same level as the hydraulic impact hammer (Table 2). Consequently, vibration levels generated by rock drilling would be the same as those shown in Table 3. Therefore, vibration levels from rock drilling would not exceed 0.2 in/sec PPV at local residences, and impacts would be less than significant.

### 6.3 Blasting

### Noise

Blasting involves drilling boreholes and placing small amounts of explosives in each hole. By limiting the amount of explosives in each hole, the blasting contractor can limit the fraction of the total energy released at any single time, which can limit noise and vibration levels. When explosive charges detonate in rock, almost all of the available energy from the explosion is used in breaking and displacing the rock mass. However, some blast energy escapes into the atmosphere as a sequence of airborne sound waves, a phenomenon known as "air blast over-pressure." These sound waves are very low frequency, below the audible range. Very high blast over-pressure levels can rattle or in some cases break windows. However, airblast over pressure rarely reaches levels that could cause building damage with modern blasting practices.

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According to the FHWA, within the audible frequency range, a blast generates maximum noise levels on the order of 101 dB(A)  $L_{max}$ . However, the total time for a blast would be a fraction of a minute and only one blasting event would occur in a given hour. Consequently, hourly noise levels from blasting are calculated at 74 dB(A)  $L_{eq}$  at 50 feet, and would not exceed 75 dB(A)  $L_{eq}$  at the nearest residence. Therefore, blasting noise levels would not exceed the City's noise level limit for construction, and impacts would be less than significant.

### Vibration

Vibration levels associated with blasting are site-specific and are dependent on the amount of explosive used, soil conditions between the blast site and the receptor, and the elevation where blasting would take place (specifically, how far below surface elevation where bedrock would be encountered). At the current stage of project design, a blasting and monitoring plan has not been completed; thus, specifics, such as the explosive, blasting quantities, and exact locations, have not been identified. However, it can be assumed all blasting locations would be within the boundaries of the non-rippable rock, and to be conservative, all the non-rippable rock is considered a blasting location. Consequently, noise and vibration impacts from blasting are calculated from the nearest location of the non-rippable rock to the nearest receiver, which is approximately 175 feet to the northeast (see Figure 3).

As with noise, while almost all of the available energy from an explosion is used in breaking and displacing the rock mass, a small portion of the energy is released in the form of vibration waves that radiate away from the charge location. The strength, or 'amplitude,' of the waves reduces as the distance from the charge increases. The rate of amplitude decay depends on local geological conditions, but can be estimated with a reasonable degree of consistency, which allows regulatory agencies to control blasting operations by means of relationships between distance and explosive quantity.

The explosive charges used in mining and mass grading are typically wholly contained in the ground. Based on extensive research conducted by the U.S. Bureau of Mines and the Office of Surface Mining, universities, and private groups, vibration standards, vibration damage criteria, seismographs standards, and techniques to predict and control blast vibrations have been developed that greatly reduce the risk of off-site impacts from blasting. These methods and techniques are incorporated into blasting and monitoring requirements of the County Fire Code.

Based on the Supplemental Blasting Analysis prepared for the Heritage Bluffs project (Helix 2015), using an assumption of 0.5 pounds of explosive material required per ton of material removed and a typical granite weight of 166.5 pounds per cubic foot, or 2.25 tons per cubic yard, a typical shot designed to break up 10 cubic yards of material (typical truck load) would require about 11.25 pounds of explosive charge. The explosive would be detonated at each hole in a sequence with at least 8 milliseconds delay between charges to limit the total amount of vibration generated by the explosive fire at any one time.

Ranges of vibration levels have been predicted at various distances from potential blasting sites for quantities of explosives ranging from 0.25 pound to 12 pounds per charge weight. The range of vibration levels in this analysis is due primarily to the quantity of explosive, as all other parameters were held constant. As shown in Table 4, at the nearest residence, blasting is predicted to generate vibration levels ranging from 0.06 in/sec PPV (from a 0.25-pound charge) to 1.34 in/sec PPV (from a 12-pound charge). Calculations are based on a receiver distance of 175 feet, which is the approximate distance to the nearest receiver from a potential blasting location.

The resulting PPV from blasting can be decreased through best engineering practices used by professional, licensed, blasters, including, but not limited to, orienting the progressions of the charges away from receivers, decreasing confinement of the explosive energy, increasing spatial distribution of the charges, and increasing time of energy release or detonation. The County of San Diego Fire Code includes a minimum energy release time for individual charges of 8 milliseconds to limit vibrations. Additionally, empirical data has shown that

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delays of as little as 5 milliseconds can minimize vibration in very close blasting situations (10 to 25 feet) (Bender 2007).

Table 4Predicted Blasting Vibration Levels by Charge Weight										
Distance to		Predicted Vibration Level by Charge Weight								
Non-Rippable Rock				(in/sec	PPV)					
(feet)	12 lb.	10 lb.	8 lb.	4 lb.	2 lb.	1 lb.	0.5 lb.	0.25 lb.		
10	130.93	113.16	94.66	54.37	31.23	17.93	10.30	5.92		
50	9.97	8.62	7.21	4.14	2.38	1.37	0.78	0.45		
100	3.29	2.84	2.38	1.37	0.78	0.45	0.26	0.15		
150	1.72	1.49	1.24	0.71	0.41	0.24	0.14	0.08		
175 – nearest residence	1.34	1.16	0.97	0.56	0.32	0.18	0.11	0.06		
200	1.08	0.94	0.78	0.45	0.26	0.15	0.09	0.05		
i	al DDV - a	l		—						

in/sec = inches per second; PPV = peak particle velocity; lb. = pounds

NOTE: Bold numbers indicate an exceedance of 2.0 in/sec PPV, which would be considered an impact.

As shown in Table 4, the nearest receiver located 175 feet to the northeast of the proposed blasting locations is not anticipated to be exposed to vibration levels in excess of 2.0 in/sec PPV. Although a project-specific blasting plan and exact amount of explosive needed is not known at this time, the project would comply with the County Fire Code and would implement all feasible vibration reduction strategies, including conducting pre- and post-construction surveys of the nearest residence to any blast. The project would also monitor blasting vibrations and overpressure levels, the results of the monitoring would be used to reduce charge weights, increase timing between charges, or other appropriate measures as required to reduce vibrations from blasting. Furthermore, the proposed blasting activities would be subject to the following County Fire Code (County of San Diego 2017) and City requirements:

- 1. Per Section 59.5.0404 of the City's Noise Abatement and Control Ordinance, construction, including blasting, shall be prohibited between the hours of 7:00 p.m. and 7:00 a.m., or on Sundays, or on legal holidays as specified in Section 21.04 of the San Diego Municipal Code, with exception of Columbus Day and Washington's Birthday.
- 2. The blasting contractor shall obtain a permit from the Fire Chief of the City of San Diego per the requirements of Section 53.01 of the Municipal Code.
- 3. Blasting activities would follow guidance provided in the General Blasting Management Plan that would include an estimate of air blast overpressure and vibration levels of each shot at the nearest structure. A preliminary General Blasting Management Plan is included as Attachment 2. Blasting shall not commence until the City and Sherriff's Department has approved the General Blasting Management Plan.
- 4. Each blast shall be monitored and recorded with an air blast over-pressure monitor that is located outside the nearest residence to the blast.
- 5. The City project engineer shall review the request for each blast to verify blasting only of material that requires blasting.
- 6. To verify compliance with the blasting vibration limitations, all blasting operations shall be monitored with a seismograph located at the nearest structure. All seismograph reports shall be submitted to the City.
- 7. The City shall require a one-time notice in writing for each blast to the local fire agency and dispatch center and to all residences, including mobile homes, and businesses within 300 feet of potential minor blast locations. The notice shall be given not less than 24 hours, but not more than one week, before each blasting operation.

Mr. Alex Plishner Page 15 November 1, 2019

8. If any measure identified cannot be complied with, the project contractor shall obtain a City-approved noise consultant to perform noise and vibration monitoring until all measures can be complied with.

The noise consultant shall conduct noise and vibration measurements at the nearest residence(s). The noise measurements shall be conducted for the duration of construction activities that do not comply with all measures. The noise consultant shall have the authority to stop work if noise levels exceed the City standards for construction (Section 59.5.0404 of the City's Noise Abatement and Control Ordinance), or exceed applicable vibration limits as defined in this report. At the conclusion of monitoring, the noise consultant shall prepare a letter report summarizing the measurements and findings, including any measures used to reduce noise and vibrations levels. The report shall include all measurement and calculation data used in determining impacts and resolutions and submitted to the Director of Community Development.

Implementation of these strategies would further ensure that vibrations from blasting would not exceed 2.0 in/sec PPV at the nearest residence, and impacts would be less than significant.

### 7.0 NOISE IMPACTS TO MULTI-HABITAT PLANNING AREA

MHPA lands are those that have been included within the City's MSCP Subarea Plan for habitat conservation. These lands have been determined to provide the necessary habitat quality, quantity, and connectivity to sustain the unique biodiversity of the San Diego region. MHPA lands are considered by the City to be a sensitive biological resource that can be indirectly impacted by noise. MHPA lands are located immediately adjacent to and on the project site. An MHPA Boundary Line Adjustment is proposed that would remove minor encroachment areas and add un-disturbed on-site habitat not currently in the MHPA into the preserve (Figure 4). The occupied MHPA habitat is subject to an hourly limit of 60 dB(A)  $L_{eq}$  or the average ambient noise level, whichever is greater, at the edge of habitat during the identified sensitive species breeding season of February 1 to September 15.

As discussed in Sections 5.1 through 5.3, impact hammering, rock drilling, and blasting generate noise levels of 86, 80, and 74 dB(A) L<sub>eq</sub> at 50 feet, respectively, and could therefore indirectly impact the adjacent habitat should construction and blasting activities occur during the breeding season. However, the Biological Technical Report prepared for the project determined that the project would be consistent with all of the MSCP MHPA Land Use Adjacency Guidelines, including guidelines for noise. Per the MSCP MHPA Land Use Adjacency Guidelines, if coastal California gnatcatcher is present within the MHPA, construction noise levels at the MHPA boundary shall not exceed 60 A-weighted decibels. Additionally, development adjacent to the MHPA has been designed to minimize noise impacts to coastal California gnatcatcher. A benefit of the project design is the MHPA is at a lower elevation than the entire project site; therefore, it is not anticipated that the MHPA will be impacted by excessive noise.

If you have any questions about the results of this analysis, please contact me at (619) 308-9333 x177 or jfleming@reconenvironmental.com.

Sincerely. Jessich Semine

Jessica Fleming () Associate Environmental Analyst

JLF:jg:sh

Attachments



Project Boundary Limit of Disturbance Possible Blasting Locations

Existing MHPA MHPA Addition MHPA Deletion

RECON M:\JOBS5\8958\common\_gis\fig4\_nosltr.mxd 4/16/2019 bma

FIGURE 4 Adjacent MHPA

Feet

### 8.0 REFERENCES CITED

#### Bender, Wesley L.

2007 Back to Basics, The Fundamentals of Blast Design.

### California Department of Transportation (Caltrans)

- 2001 Ground Vibration Monitoring for Construction Blasting in Urban Areas, F-00-OR-10, Final Report, April.
- 2013 Transportation and Construction Vibration Guidance Manual, September, available at: http://www.dot.ca.gov/hq/env/noise/pub/TCVGM\_Sep13\_FINAL.pdf.
- Federal Highway Administration (FHWA)
  - 2008 Roadway Construction Noise Model. V1.1. Washington, DC.

Federal Transit Administration (FTA)

2006 Transit Noise and Vibration Impact Assessment. Washington, DC. May.

### Helix Environmental Planning, Inc.

- 2015 Addendum to the November 2014 Acoustical Analysis Report for Heritage Bluffs, Black Mountain Ranch Subarea, Assessor's Parcel Number 312-010-15 and 312-160-02. Prepared for Project Design Consultants. March 3, 2015.
- **RECON Environmental, Inc. (RECON)** 
  - 2019 Biological Technical Report for the Avion Project San Diego, California. Prepared for CalAtlantic Homes. November 1.

### San Diego Association of Governments (SANDAG)

2019 Traffic Forecast Information Center. Series 13 Year 2020 data. http://tfic.sandag.org/map.html. August 26, 2019.

### San Diego, County of

2017 County of San Diego 2011 Consolidated Fire Code, 4<sup>th</sup> Edition, April 14.

# ATTACHMENTS

# **ATTACHMENT 1**

### FHWA RD-77-108 Traffic Noise Prediction Model Data Input Sheet

Project Name : Avion Project Number : 8958 Modeled Condition : Existing

Surface Refelction: CNEL Assessment Metric: Soft Peak ratio to ADT: 10.00 Traffic Desc. (Peak or ADT) : ADT

		Segm	ent		Speed	Distance							
Segmen	t Roadway	From	То	Traffic Vol.	(Mph)	to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	K-Factor
1	Carmel Valley Road			26,800	50	2800	96.00	3.00	1.00	80.00	10.00	10.00	

### FHWA RD-77-108 Traffic Noise Prediction Model Predicted Noise Levels

Project Name : Avion Project Number : 8958 Modeled Condition : Existing Assessment Metric: Soft

		Segn	Segment Noise Levels, dBA Soft				Distance to Traffic Noise Level Contours, Fee				irs, Feet		
Segment	t Roadway	From	То	Auto	MT	HT	Total	75 dB	70 dB	65 dB	60 dB	55 dB	50 dB
1	Carmel Valley Road			55.2	47.8	47.2	56.5	164	352	759	1,636	3,525	7,594

# **ATTACHMENT 2**

## GENERAL BLASTING MANAGEMENT PLAN AVION

### A. Codes and Regulations Governing Project Blasting Operations

California Occupational Safety and Health Standards Title 8, Group 18 "Sections 5236-5374". Title 3, Divisions 5, Chapter III of the County Code of Regulatory Ordinances, "Section 35.377.101-35.377.306". Section 7-1.10, "Use of Explosives", and 19-2.03, "Blasting", of the Standard Specifications, and to the Project Special Provisions.

### B. Blasting Subcontractor

Tom C. Dyke Drilling & Blasting, Inc. California Contractors License Number 542984 P.O. Box 352 Alpine, CA 91903, (619) 445-2270

### C. Certificate of Liability Insurance

(see Attachment A)

### D. Responsible Blasters

Mike Burkett	P.O. Box 352 Alpine, CA 91903	(619) 445-2270	Blasters License Number 1259
Anthony J. Corirossi	P.O. Box 352 Alpine, CA 91903	(619) 445-2270	Blasters License Number 7974
Chad Bartley	P.O. Box 352 Alpine, CA 91903	(619) 445-2270	Blasters License Number 9953

### E. Contact Person for Project Blasting

Mike Burkett P.O. Box 352 Alpine, CA 91903, (619) 445-2270

### F. Blast Plan Designer

Mike Burkett P.O. Box 352 Alpine, CA 91903, (619) 445-2270

### G. Safety Officer

Mike Burkett P.O. Box 352 Alpine, CA 91903, (619) 445-2270

### H. Local Fire and Law Enforcement Agencies Responsible for Project Blasting

San Diego Fire-Rescue Department Fire Prevention Bureau 1010 Second Ave., Suite 300 San Diego, CA 92101 (619) 533-4449 (see Attachment B)

### I. Explosive Storage

The blasting subcontractor's explosive storage facility is located in San Diego County. The facility is approved by the San Diego County Sheriffs Department; the U.S. Department of Justice Bureau of Alcohol, Tobacco, Firearms and Explosives and the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration. The blasting subcontractor's facility meets the above agencies security requirements for the storage of explosives. Explosives will be transported to the site from the blasting subcontractor's storage facility in San Diego County. Unused explosives will be returned daily to the blasting subcontractor's storage facility. The blasting subcontractor's drivers and vehicles will be used to transport explosives to and from the project site. All vehicles and drivers will be licensed and permitted to transport explosives. The blasting subcontractor's personnel will be allowed to handle the explosives. The blasting subcontractor's personnel will be allowed to handle the explosives. The blasting subcontractor's personnel are approved "Employee Possessors" by the Bureau of Alcohol, Tobacco, Firearms and Explosives and approved "Explosives Handlers" by the County of San Diego Sheriff's Department and San Diego Fire Rescue Department..

### J. The Effective Exclusion Zone

Minimum of fifty feet from loading operations. Warning signs, cones and caution tape will be employed where blasting is on going to prevent the entry of unauthorized personnel. After the shot is loaded and ready to initiate, the area's adjacent to the blast site will be secured for a minimum distance of 600 feet.

### K. Blast warning signals

The blasting subcontractor will provide an audible warning signal and guards in sufficient numbers to assure that people, property and improvements will not be endangered during blasting operations. Blasting signals will be posted at one or more conspicuous locations at the project. The blasting signals will be as specified in Section 5291 of the General Industry Safety Orders. Job site personnel will be made aware of the blasting signals during the job site safety meeting. Blasting area warning signs and cones will be used in the area when the shot is being loaded. (see Attachment C)

### L. Blasting Procedures

- 1. The Contractor will obtain all necessary federal, state and local permits prior to the commencement of blasting operations. (see Attachment B)
- 2. The Contractor will employ a state licensed blaster with a non-electric rating to conduct all blasting operations. The responsible blaster will be experienced in supervising the loading and firing of charges for rock slope and open trench excavations. (see Attachment B)
- 3. The Contractor will not store explosives on site. Explosives will be transported to the site from the contractor's storage facility in San Diego County. Unused explosives will be returned daily to the contractor's storage facility. The transportation of explosives will be in accordance with the rules and regulations as prescribed by the California Highway Patrol and the General Industry Safety Orders for the transportation and use of explosives.
- 4. The contractor will provide written notice to all residences or businesses within 600 feet of the blast area 7 days prior to commencement of blasting operations. Residences or businesses requesting additional notifications, 24 hours in advance of a blasting event, will be notified by phone or email. The project management will be notified 1 day in advance of all project blasting. Underground Service Alert will be contacted prior to the start of drilling operations.
- 5. The Contractor will make and document a pre-blast survey of properties and improvements located within 300 feet of the blasting site. (see Attachment D)
- 6. The Contractor will monitor all blasting operations with two NOMIS 5300 and/or Mini Super Graph X2G portable seismographs to determine the ground motion particle velocity and air noise. (see Attachment D)
- 7. The Contractor will provide for limiting the maximum peak particle velocity at the nearest residential or commercial structure to the following:

Frequency (hertz)	Maximum Peak Particle Velocity (inch per second)
2.5 to 10	0.50
11 to 40	0.05 x frequency
>40	2.0

The maximum particle velocity at the nearest point to any underground pipelines/utilities from the blast area will not be greater than 5.0 inches per second at a minimum frequency of 10 hertz. Blast induced air-overpressure at residential or other occupied structures will not exceed 0.012 psi (133dBL) at 2Hz or lower.

8. The Contractor will drill blast holes not larger than 4 inches in diameter and drill patterns will not be greater than 12 feet by 12 feet. Blast hole depths will be 10 - 40 feet. The typical blast volume will be

approximately 12,000 to 15,000 cubic yards and consist of 100-200 holes. The blast will require nine-tenths to 1 pound of explosives per cubic yard of rock.

- 9. The Contractor will control project blasting so that vibration, fly rock and air noise do not cause damage to nearby structures, undue annoyance to nearby residents, or danger to employees on the project. When there is a possibility of "fly rock" leaving the project right-of-way or if air noise exceeds 133 dBL a protective layer of dirt will be placed on top of exposed rock formation to limit the risk of "fly rock" and to limit air noise levels.
- 10. The Contractor will use explosives manufactured by Dyno Nobel, Inc. Alpha Explosive Company is the manufacturer of the Blasting Agents. (see Attachment E)
- 11. The Contractor will use a non-electric blast imitation system manufactured by Dyno Nobel, Inc.
- 12. The Contractor will use multi deck hole detonation to comply with particle velocity limitations as specified by these blasting procedures.
- 13. The Contractor will stem all blast holes with drill cuttings. The stemming height of each blast hole will be determined by the amount of overburden or cover on the rock and the powder charge weight for each individual hole.
- 14. The Contractor will not blast within 100 feet of concrete which has been placed less than seven (7) days. Blasting will not be performed within 50 feet of any underground utility and 100 feet from any buildings or structures.
- 15. The Contractor will provide an audible warning signal and guards in sufficient numbers to assure that people, property and improvements will not be endangered during blasting operations. Blasting signals will be posted at one or more conspicuous locations at the project. The blasting signals will be as specified in section 5291 of the General Industry Safety Orders. Job site personnel will be made aware of the blasting signals during the job site safety meeting. Blasting area warnings signs and cones will be used in the area when the shot is being loaded. (see Attachment C)
- 16. The Contractor will keep accurate records of each blast including explosive quantities, delay system used and hole diameter and spacing. Blasting Records will be available to the project management at all times.
- 17. The contractor will review seismic records and blasters log after each blast to insure that particle velocity and overpressure limits are within project limits.
- 18. Blasting complaints will be accurately recorded by the Contractor as to the complaint, name of the person receiving complaint, the complaint investigation conducted, and the disposition of the complaint. Complaint records will be available to the project management at all times (see Attachment C)
- 19. Blasting will be done between the hours of 12:00 p.m. and 2:00 p.m. Monday through Friday.
- 20. The contractor will clear the blasting site of all debris associated with the blasting operations at the end of each day of blasting and transport it to contractor's facility for approved disposal.

### M. Lightning Protection Procedures

Prior to commencing the loading of a blast, the blaster will determine if lightning is forecasted. If there is a possibility that an electrical storm may interfere with the loading schedule, loading will either be rescheduled or be accomplished in such a sequence that, should an electrical storm approach loading could be terminated, the area secured, traffic controlled and the loaded portion of the blast fired safely prior to the arrival of the storm. A Safety Device Inc., Model SD-250 (or equivalent) lightning detector will be utilized to detect the approach of electrical storms if lightning is forecasted.

### N. Emergency Evacuation Procedures

The blasters in charge will determine if circumstance require the evacuation of personnel from the vicinity of a blast site. The blaster will immediately notify project management and the project engineer and coordinate with them the steps he will be taking to properly clear the blast site. The blasting crew members will instruct job site personnel to move to a safe location away from the blast site. Project management will notify the highway patrol (or traffic authority) if traffic will be either routed away from the area or halted until the emergency issue is resolved. While this is being accomplished the blast site will remain guarded.

### O. Misfires

After each shot the blast area will be examined for misfires. Only the blaster and his minimum necessary crew should be present.

Some signs of a misfire could be:

- Unexploded shock tube or remnants.
- Undetonated surface delay detonators.
- Undetonated explosive residue.
- Results of a shot not as expected.
- Shot didn't sound as expected.

It is possible that a misfire could be discovered during three separate phases of the operation;

-A misfire that is obvious during the detonation of the blast

-A misfire that is discovered during inspection of the blast site, before the "All Clear" signal is given, and

-A misfired hole or undetonated explosive discovered during some subsequent operation following the blast and the "All Clear"

signal.

To assist in the discovery of misfires and to assure that they are properly cleared without undue hazards to persons or property, the following procedures will be followed by project personnel involved in the blasting operation:

### a. Obvious misfire during detonation of the blast:

During the detonation of each blast, the blaster will carefully evaluate the blast detonation timing. If the blaster suspects that a misfire has occurred, he will immediately notify project management who will notify the project engineer and the Highway Patrol (or traffic authority) of the likelihood of a misfire and the following steps will be taken:

The "All Clear" signal will <u>not</u> be given, traffic will <u>not</u> be released and the blast site will continue to remain guarded. Following a minimum mandatory 30-minute wait after the blast, the blaster and only those personnel necessary to the task will approach and investigate the suspected misfire.

If **no misfire is found** to exist after adequate inspection by the blaster, he will so notify project management and will give the order to sound the "All Clear" signal, after which traffic can be released.

If <u>a misfire is found</u> to exist, the blaster will immediately notify project management and the project engineer and coordinate with them the steps he will be taking to properly clear the misfire. If the blaster determines that the area of potential hazard has increased beyond that of the original blast, the area will be cleared to the new limits. The blaster will not proceed to clear the misfire until the area has been secured. He will take the steps necessary to safely clear the misfire. While this is being accomplished, the blast site will remain guarded.

Following successful clearing of the misfire and a subsequent inspection of the blast site by the blaster, he will give the order to sound the "All Clear" signal, after which traffic can be released.

### b. Misfire discovered during inspection of the blast site:

After a minimum mandatory wait of 5-minutes after the blast, the blaster will conduct a thorough inspection of the blast site to be certain that no misfire exists.

If **no misfire is found** to exist after adequate inspection by the blaster, he will so notify project management and will give the order to sound the "All Clear" signal, after which traffic can be released.

If <u>a misfire is found</u> to exist, the blaster will immediately notify project management and the project engineer and coordinate with them the steps he will be taking to properly clear the misfire. The "All Clear" signal will <u>not</u> be given, traffic will <u>not</u> be released and the blast site will continue to remain guarded. Following a minimum mandatory 30-minute wait after the blast, the blaster and only those personnel necessary to the task will approach and investigate the misfire.

If the blaster determines that the area of potential hazard has increased beyond that of the original blast, the area will be cleared to the new limits. The blaster will not proceed to clear the misfire until the area has been secured. He will take the steps necessary to safely clear the misfire. While this is being accomplished, the blast site will remain guarded. Following successful clearing of the misfire and a subsequent inspection of the blast site by the blaster, he will give the order to sound the "All Clear" signal, after which traffic can be released.

### c. Misfire discovered in subsequent operation:

-In the event that an unexploded charge is discovered during some subsequent operation following blasting (such as excavating, loading, hauling, etc.) the following steps will be taken:

-The person discovering the undetonated charge will immediately notify the Licensed Blaster, project management and the project engineer, and take steps to guard the charge.

-Excavating, loading, hauling and other activities in the immediate vicinity of the blast zone will be suspended.

-The Licensed Blaster will proceed to the area and will evaluate the problem and determine the likelihood of additional explosive charges being involved. After this inspection, safe remediation procedures will be developed.

If the inspection reveals that one or more individual cartridges of explosive require removal from the site, the explosive supplier will be notified and the explosives will be returned to storage or destroyed as determined by the supplier.

If the inspection reveals that explosives will have to be fired in place or removed from the drill hole, the Licensed Blaster will advise project management and the project engineer of the steps necessary to properly clear the misfire.

The Licensed Blaster will determine the area surrounding the misfire that needs to be cleared and secured for safety. Steps will be taken to properly secure this area, including notification of the Highway Patrol (or traffic authority).

The blaster will then proceed to clear the misfire. If clearing the misfire involves detonating the explosives, all provisions of the Explosive Safety Orders pertaining to the firing of blasts will be followed.

Following successful clearing of the misfire and a subsequent inspection of the blast site by the blaster, he will give the order to sound the "All Clear" signal, after which traffic can be released.

Equipment requirement that may be needed to resolve misfire includes the following:

- Backhoe or excavator
- Dozer
- Track drill
- Hand held shovel

Specific procedures concerning misfires cannot be made. Every misfire will be evaluated on an individual basis. All information regarding the misfire will be analyzed completely and a plan of action will be outlined to safely handle, neutralize and dispose of the explosives involved.

### P. Blasting Zone Signage

A sign with the blasting warning signals printed on it will be posted at one or more conspicuous locations near the blast site. Signs that identify the blast area and to keep out of that area will be posted at ingress and egress areas to the blasting site and at a minimum distance of 50 feet from the perimeter of the blast area. Warning cones with blasting area keep off printed on them will be displayed and blast warning area tape will be used at a distance of 50 feet from the perimeter of the blaster in charge will assign a member(s) of the blasting crew to place the signage prior to the loading of each shot.

### Q. Traffic Control

Traffic will be routed at least 50 feet from blast loading operations. Traffic will be stopped at a safe distance at the time the "5 Minute Warning" signal is given. Traffic will remain stopped at a safe distance until the blast has been detonated and the "All Clear" signal has been given, after which traffic can be released.

### R. Traffic Control in the Event of a Misfire or Blast Related Phenomenon

The blaster in charge will immediately notify project management who will notify the project engineer and the Highway Patrol (or traffic authority.) All project activity in the vicinity of the blast zone will be suspended and traffic will be stopped or routed at a safe distance from the incident. Following a successful clearing of the misfire or resolving other blast related safety issues the blaster will sound the "All Clear" signal after which traffic can be released.

### S. Postblast Fumes

The following is a list of the safe guards to protect employees, and the public from exposure to postblast fumes.

- Proper priming of the explosives column.
- Sufficient in hole explosives confinement.
- The use of explosives with sufficient water resistance when wet blast hole conditions are encountered.
- Only explosives with an IME "Fume Class 1" classification will be used for project blasting.
- Sufficient time will be allowed after the blast for the fumes to be dispersed before any personnel are allowed to return to the blast area.

### T. Blasting Complaints

(see Attachment C)

### U. Material Safety Data Sheets and Manufacturer Data Sheets

(see Attachment E)

### V. Drill Noise Levels

Rock drills generate a noise level of 85 dB(A) Lmax at 50 feet with a usage factor of 20 percent, resulting in an average hourly noise level of 78 dB(A) Leq at 50 feet. Noise levels at the nearest residential property line would attenuate to 69 dB(A) Leq.

### W. Demonstration of Capability

The following is a list of previous projects of similar character successfully completed by Tom C. Dyke Drilling and Blasting Company:

Harmony Grove Phase I Residential Development, Escondido, CA Sukut Construction Inc Project Manager: Todd Gunnell 714.461.1017

Black Mountain Ranch Phase VI Residential Development, San Diego, CA Pinnick, Inc. Project Superintendent: Mike Severtson 619.921.2167

East Clusters II Residential Development, San Diego, CA Pinnick, Inc. Project Superintendent: Mike Severtson 619.921.2167

Harmony Grove Phase II Residential Development, Escondido, CA Pinnick, Inc. Project Superintendent: Mike Severtson 619.921.2167

Heritage Bluffs II Residential Development, San Diego, CA Pinnick, Inc. Project Superintendent: Mike Severtson 619.921.2167

The following is a list of the Supervisors to be employed by Tom C. Dyke Drilling and Blasting, Inc. for the Avion Project:

Mike Burkett employed by Tom C. Dyke Drilling and Blasting, Inc. since May of 1975 as Drilling and Blasting Superintendent and Blaster. Licensed State of California Blaster since December 1975.

Anthony J. Corirossi employed by Tom C. Dyke Drilling and Blasting, Inc. since July 1996 as Blasters Helper and Blaster. Licensed State of California Blaster since February 1998.

Chad Bartley employed by Tom C. Dyke Drilling and Blasting, Inc. since August 2002 as Blasters Helper and Blaster. Licensed State of California Blaster since December 10, 2012.

**ATTACHMENT A** 

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INSURANCE CERTIFICATES



### P.O. BOX 8192, PLEASANTON, CA 94588

### CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

ISSUE DATE: 06-20-2016

GROUP: POLICY NUMBER: 9040857-2016 CERTIFICATE ID: 94 CERTIFICATE EXPIRES: 01-01-2017 01-01-2016/01-01-2017

JOB:HERITAGE BLUFFS II

BLACK MOUNTAIN RANCH

SD

15360 BARRANCA PKWY IRVINE CA 92618-2215

CALATLANTIC GROUP, INC.

SAN DIEGO Ca 92127

This is to certify that we have issued a valid Workers' Compensation insurance policy in a form approved by the California Insurance Commissioner to the employer named below for the policy period indicated.

This policy is not subject to cancellation by the Fund except upon 30 days advance written notice to the employer.

We will also give you 30 days advance notice should this policy be cancelled prior to its normal expiration.

This certificate of insurance is not an insurance policy and does not amend, extend or alter the coverage afforded by the policy listed herein. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate of insurance may be issued or to which it may pertain, the insurance afforded by the policy described herein is subject to all the terms, exclusions, and conditions, of such policy.

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Authorized Representative President and CEO EMPLOYER'S LIABILITY LIMIT INCLUDING DEFENSE COSTS: \$1,000,000 PER OCCURRENCE.

ENDORSEMENT #0015 ENTITLED ADDITIONAL INSURED EMPLOYER EFFECTIVE 2016-06-20 IS ATTACHED TO AND FORMS A PART OF THIS POLICY. NAME OF ADDITIONAL INSURED: CALATLANTIC GROUP, INC.

ENDORSEMENT #1600 - DYKE TOM PRES - EXCLUDED.

ENDORSEMENT #2065 ENTITLED CERTIFICATE HOLDERS' NOTICE EFFECTIVE 01-01-2013 IS ATTACHED TO AND FORMS A PART OF THIS POLICY.

EMPLOYER

TOM C DYKE DRILLING & BLASTING INC AND/OR INC AND/OR DYKE, TOM AND/OR C. PO BOX 352 Alpine CA 91903

[P1Q,HO]



### P.O. BOX 8192, PLEASANTON, CA 94588

CERTIFICATE OF WORKERS' COMPENSATION INSURANCE

ISSUE DATE: 06-20-2016

GROUP: POLICY NUMBER: 9040857-2016 CERTIFICATE ID: 93 CERTIFICATE EXPIRES: 01-01-2017 01-01-2016/01-01-2017

JOB:HERITAGE BLUFFS II BLACK MOUNTAIN RANCH

SAN DIEGO

CA 92127

PINNICK, INC

SD

PO BOX 945 El Cajon ca 92022-0945

This is to certify that we have issued a valid Workers' Compensation insurance policy in a form approved by the California Insurance Commissioner to the employer named below for the policy period indicated.

This policy is not subject to cancellation by the Fund except upon 30 days advance written notice to the employer.

We will also give you 30 days advance notice should this policy be cancelled prior to its normal expiration.

This certificate of insurance is not an insurance policy and does not amend, extend or alter the coverage afforded by the policy listed herein. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate of insurance may be issued or to which it may pertain, the insurance afforded by the policy described herein is subject to all the terms, exclusions, and conditions, of such policy.

Va Kan and

Authorized Representative President and CEO EMPLOYER'S LIABILITY LIMIT INCLUDING DEFENSE COSTS: \$1,000,000 PER OCCURRENCE.

ENDORSEMENT #0015 ENTITLED ADDITIONAL INSURED EMPLOYER EFFECTIVE 2016-06-20 IS ATTACHED TO AND FORMS A PART OF THIS POLICY. NAME OF ADDITIONAL INSURED: PINNICK, INC

ENDORSEMENT #1600 - DYKE TOM PRES - EXCLUDED.

ENDORSEMENT #2065 ENTITLED CERTIFICATE HOLDERS' NOTICE EFFECTIVE 01-01-2013 IS ATTACHED TO AND FORMS A PART OF THIS POLICY.

EMPLOYER

TOM C DYKE DRILLING & BLASTING INC AND/OR INC AND/OR DYKE, TOM AND/OR C. PO BOX 352 Alpine CA 91903

[P1Q,HO]

(REV.7-2014)

**ATTACHMENT B** 

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

### Federal Explosives License/Permit

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(18 U.S.C. Chapter 40) dance 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 wity specified in this license or permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the the expiration date shown. THIS LICENSE IS NOT TRANSFERABLE UNDER 27 CFR 555.53. See "WARNINGS" and "NOTICES" on reverse. Direct ATF ATF - Chief. FELC License Permit Correspondence To 244 Needy Road 9-CA-073-26-8H-00598 Number Martinsburg. WV 25405-9431 Chief. Federal Explosives Licensing Center (FELC Expiration August 1, 2018 Date 00 Name TOM C DYKE BLASTING CC

Federal Explosives License (FEL) Customer Service Information

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.

Cut Here X Federal Explosives License/Permit (FEL) Information Card License Permit Name: DYKE, TOM C Business Name: TOM C DYKE BLASTING CO License Permit Number: 9-CA-073-26-8H-00598 License Permit Type: 26-DEALER OF EXPLOSIVES Expiration: August 1, 2018 Please Note: Not Valid for the Sale or Other Disposition of Explosives.

(Continued on reverse side)



EXPLOSIVES PERMIT							
THE BOARD OF SUPERVISORS of the County of San Diego, has prescribed as defined in Chapter 1, Title 3, Divison 5 of the San Diego County Code of Regulatory Ordinances that is shall be unlawful for any person to manufacture, sell, furnish, give away, receive, transport, use, store or possess any explosives in San Diego County without first obtaining a permit from the Sheriff.							
NAME <u>TOM C. DYKE DRILLING &amp; BLASTING INC.</u> REPRESENTING <u>TOM C. DYKE DRILLING &amp; BLASTING COMPANY</u>							
ADDRESS 1115 TAVERN ROAD ADDRESS 1115 TAVERN ROAD							
CITY <u>ALPINE STATE CA</u> ZIP <u>91901</u> CITY <u>ALPINE STATE CA</u> ZIP <u>91901</u>							
OCCUPATION <u>CONSTRUCTION</u> , <u>DRILLING &amp; BLASTING</u> TYPE OF BUSINESS <u>CONSTRUCTION</u> , <u>DRILLING &amp; BLASTING</u>							
VEHICLE USED TO TRANSPORT - VEHICLES LISTED ON BACK OF PERMIT							
TRAVEL ROUTE AS PERSCRIBED BY CALIFORNIA HIGHWAY PATROL							
WARNING Notify Local Authorities Prior to Blasting Operations	rities at ons						
ACTIVITY PERMITED: PARK VEHICLE, RECEIVE, TRANSPORT, SELL, STORE, USE, & DISPOSE_STORAGE LOCATION: 1115 TAVERN ROAD, ALPINE, CA 91901 PARCEL # 403-380-49; 403-380-50; 402-220-32							
RESTRICTIONS: <u>ALL RECEIVING, USING, SELLING, STORING, DISPOSING, PARK VEHICLE AND TRANSPORTING MUST COMPLY WITH ALL RULES.</u> REGULATIONS AND SAFETY STANDARDS AS SET FORTH UNDER THE STATE OF CALIFORNIA AND THE COUNTY OF SAN DIEGO							
TERM OF THIS LICENSE IS NOVEMBER 20, 2015 TO NOVEMBER 20, 2016 INCLUSIVE.							
THIS LICENSE IS NOT TRANSFERABLE FROM PERSON TO PERSON OR FROM William William							
This permit does not excuse any owner or operator from complying with all applicable federal, state, county or local laws, ordinances or regulations. The owner or operator is required to determine if another permit or approval from any other agency or department is necessary. The County, by issuing this permit, does not reliaquish its right to enforce any violation of law.							
SEE ATTACHED FOR APPROVED EXPLOSIVE HANDLERS Date Issued NOVEMBER 23, 2015							

and in the second state of the								
CALIFORNIA	STATE OF CALIFORNIA	CONTROL NUMBER	LICENSE NUMBER	ISSUE DATE	EFFECTIVE DATE	EXPIRATION DATE		
HICHWAY PATROL	DEPARTMENT OF CALIFORNIA HIGHWAY PATROL	218478	30454	2/2/2016	2/29/2016	2/28/2017		
	HAZARDOUS MATERIALS	CHP CARRIER NUMBER	LOGATION	Duplicat	ie 🗌	Replacement		
	TRANSPORTATION LICENSE	CA 3963	680	Initial	$\overline{\checkmark}$	Renewal		
$\checkmark$	CHP 360H (REV. 1/00) OPI 062	PROPERTY O The original valid license and a legible copy must b	F THE CALIF	ORNIA HIGH	WAY PATE	NAY PATROL (CHP) siness as indicated on the license apporting hazardous waste		
LICENSEE NA	ME AND PHYSICAL STATION ADDRESS (if different than below)	materials and must be pro TRANSFERABLE and mi	esented to any CHP out of the surrendered to	officer upon reques the CHP upon der	it. This license is M mand or as require	NON- ed by law. A		
TOM C DYK Tom C. Dyk 1115 TAVER ALPINE CA,	E DRILLING & BLASTING e Drilling & Blasting Company IN RD US 91901	majority change in owner license may be renewed licenses have expired or license. THERE IS NO G Section at (916) 843-340 This carrier is on the	ship of control of the by submitting an appl are otherwise no long RACE PERIOD. For ), special routing/sage s	licensed activity sr lication and approp ger valid must imm licensing informations stopping place mail	iall require a new i riate fee to the CH ediately cease the on contact CHP, C	Incense. This IP. Persons whose activity requiring a commercail Vehicle ted below:		
	LICENSEE NAME AND MAILING ADDRESS	(HMX) Explo	sives subject to Div	ision 14, Californi	ia Vehicle Code (	CVC).		
	Attention: MIKE BURKETT TOM C DYKE DRILLING & BLASTING Tom C. Dyke Drilling & Blasting Company PO BOX 352 ALPINE CA, US 91903-0352	(HMPH) Poison Inhalation Hazard materials in bulk packages subject to D   14.3, CVC.   (HMRCQ) Highway Route Controlled Quantity radioactive materials subjectives   Division 14.5, CVC.   Any person who dumps, spills, or causes the release of hazardous materials or hazardous upon any highway shall immediately notify the CHP or the agency having jurisdiction for the minimum fine for failure to make the appropriate notification is \$2,000.00. (CVC Section 10.000)						



Federal Motor Carrier Safety Administration

1200 New Jersey Ave., S.E. Washington, DC 20590

January 29, 2016

In reply refer to: USDOT Number: 501781

TOM C DYKE PRESIDENT TOM DYKE DRILLING AND BLASTING CO INC PO BOX 352 ALPINE, CA 91903

#### HAZARDOUS MATERIALS SAFETY PERMIT HM Safety Permit ID: US-501781-CA-HMSP Effective Date: January 29, 2016

Dear TOM C DYKE:

The Hazardous Materials Safety Permit (HMSP) is verification of the motor carrier's permission to engage in the transportation of hazardous materials listed in 49 CFR 385.403 by motor vehicle in interstate, intrastate, or foreign commerce.

This HMSP will be effective beginning January 29, 2016 and remain effective through January 31, 2018 if your company maintains compliance with the requirements pertaining to the safe and secure movement of hazardous materials for the protection of the public (49 CFR 385 and other applicable Federal Motor Carrier Safety Regulations and Hazardous Material Regulations). Failure to maintain compliance will constitute sufficient grounds for suspension or revocation of this authority.

Willful and persistent noncompliance with applicable safety fitness regulations as evidenced by a Department of Transportation safety fitness rating less than "Satisfactory" or by other indicators, could result in a proceeding requiring the holder of this permit to show cause as to why this authority should not be suspended or revoked.

For questions regarding this document you may contact the FMCSA Hazardous Materials Division at 202-366-6121.

Sincerely,

Joseph P. DeLorenzo Director, Office of Enforcement and Compliance
CALIFORNIA STATE TRANSPORTATION AGENCY

DEPARTMENT OF MOTOR VEHICLES Registration Operations Division MS H875 O. BOX 932370 Sacramento, CA. 94232-3700 (916) 657-8153



04/28/2016

#### TOM C DYKE DRILLING AND BLASTING PO BX 352 ALPINE, CA 91903

A Public Service Agency DEPARTMENT OF MOTOR VEHICLES			06/01/2016	Valid Through:	05/31/2017
Registration Operations Division P.O. BOX 932370 Sacramento, CA. 94232-3700		CA#:	0003963		
TOM C DYKE DRILLING AND BLASTING PO BX 352 ALPINE, CA 91903		the Carr the Depa carrier o met the of the fo	artment of Motor Vehicle f property as defined in v requirements and paid the llowing classification:	s for a permit to vehicle code secti e appropriate fee:	operate as a motor on 34601, and having s, is granted a permit
Pmt Date: 04/27/2016 Office #: 154			P Ful	rivate Il Year	
Account #: 369	Tech ID: AC		Corp	oration	
Sequence #: 0056	Amt Paid: \$813.00				

#### **!!!IMPORTANT REMINDERS!!!**

1. Your permit will expire at midnight on the 'Valid Through' date. If you do not receive a renewal notice 30 days prior to the expiration date, please submit an original application and check the "Renewal" box.

- 2. Your insurance must remain valid through the term of your permit or a suspension action could occur.
- 3. Changes to your fleet are not required to be reported until your renewal.
- 4. Changes to your business entity may require a new CA# and application for another Motor Carrier Permit.
- 5. If you decide to no longer operate as a motor carrier of property, you must submit a 'Voluntary Withdrawal' form.
- For changes to the address, business name, officers, or authorized representative's name, please complete the 'Notice of Change' form. Changes during your renewal period may be submitted on your renewal application.
- 7. You may download forms from the Internet at www.dmv.ca.gov or receive further information by calling: (916) 657-8153.

California Relay Telephone Service for the deaf or hearing impaired from TDD Phones: 1-800-735-2929; from Voice Phones: 1-800-735-2922

MC 2100 M (REV. 01/2011)

#### UNITED STATES OF AMERICA DEPARTMENT OF TRANSPORTATION PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION



#### HAZARDOUS MATERIALS CERTIFICATE OF REGISTRATION FOR REGISTRATION YEAR(S) 2016-2017

**Registrant:** 

TOM C DYKE DRILLING & BLASTING Attn: MIKE BURKETT PO BOX 352 ALPINE, CA 91903

This certifies that the registrant is registered with the U.S. Department of Transportation as required by 49 CFR Part 107, Subpart G.

This certificate is issued under the authority of 49 U.S.C. 5108. It is unlawful to alter or falsify this document.

Reg. No: 051716 600 011Y

Effective: 07/01/2016

Expires: 06/30/2017

HM Company ID: 026509



must keep a copy of the current Certificate of Registration or another document bearing the registration requirement number identified as the "U.S. DOT Hazmat Reg. No." in each truck and truck tractor or vessel (trailers and semi-trailers not included) used to transport hazardous materials subject to the registration requirement. The Certificate of Registration or document bearing the registration number must be made available, upon request, to enforcement personnel.

For information, contact the Hazardous Materials Registration Manager, PHH-52, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue, SE, Washington, DC 20590, telephone (202) 366-4109.

CALIFORNIA DRIVER LICENSE DL B3391795 CLASS A EXP 03/24/2019 END TX LN CORIROSSI 03241976 RSTR NONE 

State of California Division of Occupational Safety and Health 1367 E. Lassen Ave., Suite B-4 Chico, CA 95973 (530) 895-6938 No. 7974 ANTHONY JOHN CORIROSSI D.O.B. 3/24/76 is hereby certified/licensed as a \_\_\_\_\_BLASTER Classification: (B) GENERAL ABOVE GROUND MINING AND CONSTRUCTION. SEE. REVERSE Limitation: NONFLECTRIC INTTIATION ONLY This certification or license may be suspended or revoked if the holder violates the safety orders or regulations of the Division. Expires: 12/10/17 of Holds Date of 12/10/12 JH Rev. 04/05 Stephen Calart 0805 05 NTY SHERIFF S DELARTMENT NUMBER OF BRIDE STATES ANTHONY CORIROSSI Name: Height: 603 Weight: 190 Hair BRN Eyes: BLU Under approved License #: EP0002

Issued: 11/20/2015 Expires: 11/19/2016 For: TOM C. DYKE DRILLING & BLASTING Authorized Activities: Receive Transport Use COE: 10974 Issued By: SHERIFF, San Diego County

State of California Department of Justice
CERTIFICATE OF ELIGIBILITY
Number: 10974
Issued to:
ANTHONY JOHN CORIROSSI
This is to certify that the Department of Justice, Bureau of Firearms has completed a firearms eligibility check on the above named individual. As of the date of issue, there is nothing that would prohibit the individual from acquiring or possessing a firearm.
Date of Issue: March 22, 2016 Expiration Date: March 21, 2017
Signature of Issuing Officer:



State of Castornia Division of Occupational Safety and Health 1367 E. Lassen Ava., Suite B-4 Chico, CA 95973 (530) 895-6938 No	
MICHAEL JAMES BURKETT DOB 10/03/53	
BT.4 STTEP	
is hereby certified/licensed as a	
Classification: (B) GENERAL ABOVE GROUND	
MINING AND CONSTRUCTION.	
SEE REVERSE	
	-
UNITATION NONELECTRIC INTITATION	
United and the second s	- 1
Signifure of Holder <u>Hephren</u> C. Hart Date of <u>12/10/1</u> Issue of By OSP os seasstephen C.	7
SAN DIRAMA UL STE SHERIFT S DEF MEMIENT	A STATE
Name: MICHAEL BURKETT	
Bright: 508 Wright: 195 Hair GRY Eyes BRN	
Usider approved License #: EP0002 Issued: 11/20/015 Expires: 11/10/2018 Fer: TOM C. DYKE DRILLING & BLASTING Astroniced Activities: Recoive Transport Use COE: 9805	
Issued By: Alternov Southers	時日の発

	Department of Justice	
	CERTIFICATE OF ELIGIBILITY	
	Number: 9905	
	Issued to:	
	MICHAEL JAMES BURKETT	
This is to eligibility would pro	certify that the Department of Justice, Bureau of Firearms has completed a firearms check on the above named individual. As of the date of issue, there is nothing that hibit the individual from acquiring or possessing a firearm.	
	Date of Issue: April 3, 2016 Expiration Date: April 2, 2017	
	Signature of Issuing Officer:	

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CALIFORNIA DRIVER LICEARE a D4082276 ULASS C CM 08/12/2020 tino H IN BARTLEY PN CHAD M 009 08/12/1984 MATR L 08121984 SEX W HAR DEN HET C 42 WET 145 ID EVES HZL BO STAROSISSI GARDERCESS 17/18/2015 State of California, Division of Occupational Safety and Health 1367 E. Lassen Ave., Suite B-4 Chico, CA 95973 - (530) 895-6938 No. 9953 CHAD MITCHELL BARTLEY D.O.B. 08/12/84 is hereby certified/licensed as a BLASTER Classification: (B) GENERAL ABOVE GROUND CONSTRUCTION AND MINING. . A. Carlo SEE REVERSE Limitation NONELECTRIC INITIATION ONLY. This certification or license may be suspended or revoked if the holder violates the safety orders or regulations of the Division. Expires: 12/10/17 Signature of Holder Date of 12/10/12 Chier OSP os seaos Stephen Celart JH Rev. 04/05 CHAD BARTLEY Namet Eyes: GRN Height: 603 Weight: 155 Hair BRO Under approved License #: EP0002 Issued: 11/20/2015 Expires: 11/19/2016 For: TOM C. DYKE DRILLING & BLASTING Authorized Activities: Receive Transport Use COE: 11810 William W. Are **Issued By:** SHERIFF, San Diego County

C	State of California Department of Justice	
	CERTIFICATE OF ELIGIBILITY	
	Number: 11810	
	Issued to:	
	CHAD MITCHELL BARTLEY	
	This is to certify that the Department of Justice, Bureau of Firearms has completed a firearms eligibility check on the above named individual. As of the date of issue, there is nothing that would prohibit the individual from acquiring or possessing a firearm.	
	Date of Issue: February 7, 2016 Expiration Date: February 6, 2017	
	Signature of Issuing Officer:	



#### **ATTACHMENT C**

### GENERAL PLAN FOR BLAST WARNING

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**BLAST SIGNAGE** 

GENERAL PLAN FOR BLASTING COMPLAINTS

### **GENERAL PLAN FOR BLAST WARNING**

All personnel working in the blasting area will be notified at the beginning of the work shift of the impending blast.

All residences or businesses within 600 feet or less will be notified in writing two days prior to blasting. Any residence requesting additional notification on the day of the blast will be notified by phone prior to blasting.

Prior to firing a shot, all persons in the danger area will be warned of the blast and be ordered to a safe distance from the area. A competent flagger will be posted at all access points to the danger area. The flaggers will be equipped with radios and will be in constant contact with the blaster in charge.

Blasts shall not be fired without a signal and definite assurance that all surplus explosives are in a safe place, all persons and vehicles are at a safe distance or under sufficient cover and that adequate warning has been given.

The warning signal will be given by use of a compressed air horn, and will be clearly audible at the most distant point in the blast area. The following signals will be used;

WARNING SIGNAL

5 minutes prior to the blast signal A series of 6 long audible Signals

#### **BLASTING SIGNAL**

1 minute prior to the shot

A series of short audible signals

#### ALL - CLEAR SIGNAL

Following inspection of the blast area One prolonged audible signal

Blasting signals will be posted at one or more conspicuous locations and all employees shall be made familiar with the signals and instructed accordingly.

The "ALL CLEAR" signal will not be sounded until the licensed blaster has made a thorough, visual inspection of the blast area for misfires.



#### **GENERAL PLAN FOR BLASTING COMPLAINTS**

Record date and time the complaint was received.

Name of person receiving the complaint.

Identify the person making the complaint.

Identify the complainants address and phone number.

Identify nature of complaint.

Determine date and time of alleged damage or complaint occurred.

Review blasters log and seismic reports to determine if the blasting occurred on date and time the compliant or alleged problem occurred.

If blasting operations were conducted on date and time alleged problems occurred; inform the Blasting and Vibration Consultant of compliant.

Review preblast inspections reports to determine if structure in question was inspected.

Have the Blasting and Vibration Consultant schedule an appointment to meet as soon as convenient for complainant to determine nature of compliant and to determine the problem and or damages.

If the Blasting and Vibration Consultant investigation determines complaint is legitimate, correct the problems and or make restitution for any damages that are found to be a result of blasting operations.

GENERAL PLAN FOR PRE BLAST INSPECTIONS AND VIBRATION MONITORING

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**ATTACHMENT D** 

#### GENERAL PLAN FOR PRE-BLAST INSPECTIONS AND VIBRATION MONITORING

#### **Pre-Blast Inspections**

- 1. Examine blast or construction site.
- 2. Determine which structures lie within the 300' radius from the proposed blast site.
- 3. Make appointments with those owners/occupants for the inspection.
- 4. The inspection consists of photographic prints of representative crack conditions and a micro-cassette tape narrative that describes those conditions. The inspection shall be only for the purpose of determining the existence of any visible or reasonably recognizable preexisting defects or damages in any structure The inspection provides documentation of the existing condition on the interior and exterior of the structure before blasting or construction operations begin to conform with local jurisdictional agencies and regulations. The original tapes and negatives are filed in our office. Photographic prints and copies of the narrative will be given to the specified agent.
- 5. Documentation of all inspections performed and any refusals will be provided to the specified agent.
- 6. Post-blast inspections will be conducted in accordance with project specifications or as requested.

#### Vibration and Overpressure Monitoring

- 1. NOMIS 5300 and/or Mini Super Graph X2G will be used. The portable seismograph equipment is capable of recording peak particle velocity, frequency, acceleration, displacement, and overpressure (air blast). The machine printouts provide graphic and numerical values.
- 2. Examine blast site. Determine the distance from it to the nearest structure for each machine used for each blast. A minimum of two seismograph machines will be used to monitor and record data from each blast.
- 3. The transducer will be placed in the ground when practical. If not, it will be set on a concrete slab or nearest point on the structure.
- 4. A daily report will be written describing the blast location and monitoring locations. The daily report will also contain detailed information concerning the blast location and the blast design. Our office retains the original daily report and its attached seismographic record(s). A copy of each will be given to the specified representative.

# Jones Seismic Services

P. O. Box 2366 • Alpine, California 91903 (619) 659-3020 • FAX: (619) 659-1264

#### Recent Civil Projects 2000-2014

Project: Involvement:	San Vicente Dam Expansion, Improvements Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 100 feet from Bypass pipeline and pew Saddle Dam)
Contractor:	MJ Baxter Drilling Co., Glenn Inverso, 619-443-7800
Project: Involvement:	SDG&E – Los Coches Substation Rebuild Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 50 feet from new structures and improvements on site)
Contractor:	Tom Dyke Drilling & Blasting Co., Mike Burkett, 619-445-2270
Project: Involvement:	Scripps Ranch Pump Station Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 100 feet from SDCWA aqueduct and OMWD valve structure)
Contractor:	MJ Baxter Drilling Co., Glenn Inverso, 619-443-7800
Project: Involvement:	SDG&E – Suncrest Substation Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 100 feet from new structures and improvements on site)
Contractor:	Tom Dyke Drilling & Blasting Co., Mike Burkett, 619-445-2270
Project: Involvement:	Cal-Trans – Hwy 76 Expansion Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 50 feet from Hwy 76 and buried pipelines)
Contractor:	Tom Dyke Drilling & Blasting Co., Mike Burkett, 619-445-2270

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Project: Involvement:	San Vicente Dam Expansion, Access Road Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting
Contractor:	(blasting less than 100 feet from new dam foundation, dental concrete) ECM, Chuck Bean, 714-897-4326
Project: Involvement:	San Vicente Dam Expansion, Lower Pipeline Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 100 feet from existing dam and on site building)
Contractor:	Tom Dyke Drilling & Blasting Co., Mike Burkett, 619-445-2270
Project: Involvement:	Cal-Trans - I-8, Mercy Road On-Ramp Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting
Contractor:	Retaining Wall) Tom Dyke Drilling & Blasting Co., Mike Burkett, 619-445-2270
Project: Involvement:	Olivenhain Reservoir, Access Road Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 100 feet from new dam foundation, dental concrete)
Contractor:	ÈCM, Chuck Bean, 714-897-4326
Project: Involvement:	Black Mountain Pipeline 5E Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 50 feet from SDCWA aqueduct)
Contractor:	MJ Baxter Drilling Co., Glenn Inverso, 619-443-7800
Project: Involvement:	Mercy Road Tunnel Portal Pre-blast and Post-blast Inspections Seismic Monitoring On-site Blasting Inspector Blast Consulting (blasting less than 50 feet from SDCWA aqueduct)
Contractor:	MJ Baxter Drilling Co., Glenn Inverso, 619-443-7800

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#### Leland R. Jones P.O. Box 2366 Alpine, CA 91903 619.520.8085 Ljones58@cox.net

KEY SKILLS:Seismic monitoringBlasting consultant/inspectorVibration analysisStructural inspectionsBlast design and layoutDamage claim investigationsExpert testimonyPublic relationsTechnical reportsCommunity educationFluent in SpanishAuthor and Co-author of blasting specifications

#### **PROFESSIONAL EXPERIENCE:**

	Jones Seismic Services Owner/Operator Specializing in blasting cons education and public relation	Alpine, CA 1994 – Present ulting, seismic monitoring and ons.	analysis, community	
	<b>Oro Blanco Quarry</b> <b>Superintendent</b> Drilling and blasting superindrill pattern layout, and loa	QuarryLa Rumorosa, B. C., MEXICOent1990 – 1998blasting superintendent in charge of ordering product, blastlayout, and loading of the shots.		
	Jones Geo Services Field Specialist Duties included seismic mo	San Diego, CA 1987 – 1994 nitoring, pre/post blast inspec	tions, blasting crew.	
EDUCATION:	US Coast Guard Academy, Major: Marine Engineering	New London, CT 1982 - 1 S	1983	
	Northern Arizona Universit Major: Geology and Civil E	y, Flagstaff, AZ 1983-1987 ngineering		
<u>CREDENTIALS:</u>	Licensed blaster with abov fuse initiation qualification Trained in Electronic Initiat Training Certificates throug Registered for MSHA Instru	e ground, underground, electri s ion sh ISEE actor training program	c, non-electric, and	
Affiliations:	International Society of Ex	plosives Engineers, since 1989		

<u>REFERENCES:</u> Upon request

### **ATTACHMENT E**

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EXPLOSIVE MATERIALS TYPE & MATERIAL SAFETY DATA SHEETS

### NONEL<sup>®</sup> EZ DET<sup>®</sup> 1.4B

#### Nonelectric Blast Initiation System



#### oduct Description

DNEL® nonelectric delay detonator EZ DET\* 1.4B units consist of a length of orange shock tube with a surface detonator attached to one end and a Standard (#8) in-hole detonator on the other. The surface detonator is inside a color-coded plastic EZ\*\* Connector block to facilitate easy connections to shock tube leads. This block can hold up to 6 shock tube leads. Easy-to-read, color-coded delay tags display the delay number and nominal firing time prominently.

NONEL EZ DET units can be easily connected to one another to satisfy basic blast design requirements in construction, mining, and quarry operations. They can also be used in combination with NONEL MS, NONEL EZTL™ and/or NONEL TD detonators to satisfy complex blast design requirements and minimize inventory of initiation system components.

#### Application Recommendations

For detailed application recommendations, ALWAYS request a copy of Dyno Nobel's Product Manual: NONEL<sup>®</sup> and PRIMACORD<sup>®</sup> from your Dyno Nobel representative.
 ALWAYS select a NONEL EZ DET unit having more than enough tubing length to extend from the planned primer location in the borehole to the collar of the next hole.

#### 1-33-01-20-06 See Product Disclaimer on page 2.



# L. CIND ...

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#### Properties

Net Explosive Content per 100 units

0.0810 kg 0.1782 lbs

Nominal Time (msec)	Nominal Time (msec)	Nominal Time (msec)	Connector Block Color
17 / 350	17 / 500	17 / 700	Yellow
25 / 350	25 / 500	25 / 700	Red
42 / 350	42 / 500	42 / 700	White
25/375			Red

 Hazardous Shipping Description

 Detonator assemblies nonelectric,

 1.4B, UN 0360 PG II,

 3.5 - 18 m
 EX 2002010272

 24 - 37 m
 EX 2002090260



### NONEL<sup>®</sup> EZ DET<sup>®</sup> 1.4B

#### Application Recommendations (continued)

- ALWAYS protect the plastic EZ Connector block and all shock tube leads from impact
  or damage during the loading and stemming operations. Use care when placing
  blasting mats and cover material on top of the blasting circuit. The EZ Connector
  block contains a detonator and is subject to detonation caused by abuse such as
  impact. Shock tube which has been cut, ruptured or damaged may cause misfires.
- ALWAYS be sure that the shock tube(s) are securely inserted, one at a time, into the EZ Connector block. The head of the EZ Connector block should rise to accept the shock tube and return to a closed position with an audible click.
- ALWAYS ensure that individual shock tubes remain aligned side by side in the connector channel and do not cross one over the another on insertion.
- NEVER use NONEL EZ DET units with detonating cord. The low strength surface detonator will not initiate detonating cord and may cause misfires.
- NEVER attempt to disassemble the delay detonator from the plastic EZ Connector block or use the detonator without the connector.
- NEVER place more than 6 shock tube leads into the plastic EZ Connector block. Hisfires may result.
- EVER pull, stretch, kink or put tension on shock tube such that the tube could break.
- · NEVER splice NONEL EZ DET shock tube together to extend between holes.
- NEVER connect NONEL EZ DET units together until all holes have been primed, loaded and stemmed and the blast site has been cleared.

#### Transportation, Storage and Handling

- NONEL EZ DET must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- For maximum shelf life (3 years), NONEL EZ DET must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives

Length		C T	Quantity / Case		
m	ft	Case Type	case	subpack	
3.5	12	D	180	90	
4.5	16	D	120	60	
7	24	D	120	60	
9	30	D	80	40	
12	40	D	60	30	
15	50	D	60	30	
18	60	D	50	25	
24	80	DC	50	_	
30	100	DC	40		
37	120	DC	30		

Technical Information KION SY.

· Length rounded to nearest one-half meter.

· Case weight varies by length & delay; see case label for exact weight.

Note: This product is also available with a High Strength cap. For more information, please contact your local Dyno Nobel sales representative.

Case Dimensions		
Detpak Case (DC)	48 x 45 x 26 cm	18¾ x 17¾ x 10¼ in
Detpak (D)		
subpack	44 x 22 x 25 cm	17 ½ x 8 ¾ x 10 in
strapped case	44 x 45 x 25 cm	17 ½ x 17 ¾ x 10 in

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Packaging

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## NONEL® MS 1.4B

#### Nonelectric Millisecond Delay Detonator



#### oduct Description

DNEL® nonelectric delay detonator MS 1.4B units consist of a length of orange shock tube, with a Standard (#8) detonator attached to one end and the other end sealed. A white J-hook is affixed near the sealed end, providing easy means of connection to detonating cord. Easy-to-read, color-coded delay tags display the delay number and nominal firing time prominently.

Designed to provide in-hole delay time for underground (non-coal) and surface blast applications in the mining, quarry and construction industries, the NONEL MS can be used in combination with a detonating cord trunkline, NONEL EZTL, NONEL EZ DET and/or NONEL TD detonators for maximum timing flexibility.

#### Application Recommendations

See Product Disclaimer on page 2.

1-38-01-20-06

For detailed application recommendations, ALWAYS request a copy of Dyno Nobel's Product Manual: NONEL® and PRIMACORD® from your Dyno Nobel representative. • ALWAYS use the plastic J-hook when using a detonating cord trunkline to initiate a NONEL MS unit. A minimum 3 g/m (15 gr/ft) detonating cord qualified for surface use is required for use with the J-hook.

 ALWAYS make sure the shock tube is connected to the J-hook and leads back to the hole collar at right angles to the detonating cord trunkline.

## Technical



#### Propertiles

Net Explosive Content per 100 units

0.0570 kg 0.1254 lbs

This product is only available in the United States.

Delay Time (msec)	Delay Tag Color	Delay Time (msec)	Delay Tag Color	Delay Time (msec)	Delay Tag Color
0	Orange	225	White	450	Orange
25	Red	250	Red	475	White
50	Tan	275	White	500	Purple
75	Green	300	Tan	525	White
100	Blue	325	White	600	Gray
125	Orange	350	Green	700	Lt Blue
150	Purple	375	White	800	Red
175	Gray	400	Blue	900	Tan
200	Lt Blue	425	White	1000	Green

Hazardous Shipping Description Detonator assemblies, nonelectric, 1.4B, UN 0361 PG II, EX 1994040177



### NONEL<sup>®</sup> MS 1.4B

#### Transportation, Storage and Handling

- · NONEL MS must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- · For maximum shelf life (3 years), NONEL MS must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the institute of Makers of Explosives.

Note: This product is also available with a High Strength cap. For more information, please contact your local Dyno Nobel sales representative.

Technical Information



#### Packaging

: Leng	gth .	Case	Coil	Quantity	/ Case
m	ft	Туре	Туре	case	sub
3.5	12	D	Detpak	120	60
4.5	16	D	Detpak	120	60
6	20	D	Detpak	120	60
gt	30	ס	Detpak	80	40
12†	40	D	Detpak	60	30
15†	50	D	Detpak	60	30
18†	60	D	Detpak	50	25
241	80	DC	Detpak	50	-
30†	100	DC	Detpak	40	-
371	120	DC	Detpak	30	-
40**	130	L	Spoot	30	-
46**	150	L	Spool	30	
55**	180	L	Spool	30	-
6111	200	L	Spool	30	-

· Length rounded to nearest one-half meter.

· Case weight varies by length & delay; see case label for exact weight.

<sup>1</sup> Available in Super Tube <sup>1†</sup> Super Tube Only

Case Dimensions

e Dimensions		
L	56 x 27 x 32 cm	22 x 10 ½ x 12 ½ in
Detpak Case (DC)	48 x 45 x 26 cm	18 ¼ x 17 ¾ x 10 ¼ in
Detpak (D)		
subpack	44 x 22 x 25 cm	17 ½ x 8 ¾ x 10 in
strapped case	44 x 45 x 25 cm	17 ½ x 17 % x 10 in

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#### -roduct Description

NEL<sup>€</sup> nonelectric delay detonator EZTL ™ units consist of a length of yellow shock cube, with a Standard (#8) detonator attached to one end and the other end sealed. The detonator is housed in a plastic EZ Connector block which facilitates easy connection to shock tube. A white J-hook is affixed near the sealed end. Easy-to-read, colorcoded delay tags display the delay number and nominal firing time prominently.

EZTL detonators are designed for use with NONEL MS and EZ DET<sup>®</sup> units to provide effective and accurate surface timing between blastholes and/or rows of blastholes in surface and underground blasting designs.

#### Application Recommendations

See Product Disclaimer on page 2.

1-29-01-20-06

For detailed application recommendations, ALWAYS request a copy of Dyno Nobel's Product Manual: NONEL® and PRIMACORD® from your Dyno Nobel representative.

- ALWAYS be sure that the shock tube(s) are securely inserted, one at a time, into the plastic EZ connector. The head of the connector block should rise to accept the tube, and return to a closed position with an audible click.
- ALWAYS ensure that the individual shock tubes remain aligned side by side in the EZ connector channel and do not cross over one another during insertion.
- · ALWAYS protect the plastic EZ connector and all shock tube leads from impact or

### Technical Information



#### Properties

LT -

Net Explosive Content per 100 units

0.0240 kg 0.0529 lbs

Delay Time (msec)	Connector Block Color
9	Green
17	Yeilow
25	Red
33	Green
42	White
67	Blue
100	Black
109	Black

Hazardous Shipping Description Detonator assemblies nonelectric, 1.4B, UN 0361 PG II, EX 2005070130





## Technical Information



#### Application Recommendations (continued)

- damage. Use care when placing blasting mats and cover material on top of the blasting circuit. The EZ connector contains a detonator and is subject to detonation caused by abuse such as impact. Shock tube which has been cut, ruptured or damaged may cause misfires.
- NEVER use NONEL EZTL detonators with detonating cord. The low strength surface detonator will not initiate detonating cord.
- NEVER attempt to disassemble the delay detonator from the EZ connector block or use the detonator without the connector.
- NEVER place more than 6 shock tube leads into an EZ connector block. Misfires may result.
- NEVER tie-in NONEL EZTL units until all holes have been primed, loaded, stemmed and the blast site has been cleared.

#### Transportation, Storage and Handling

NONEL EZTL must be transported, stored, handled and used in conformity with all oderal, state, provincial and local laws and regulations.

For maximum shelf life (3 years), NONEL EZTL must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

#### Packaging

Ler	ngth .	Core Type	Quantity / Case	
m	. ft	Case type	case	subpack
2.5	10	D	180	90
3.5	12	Ď	180	90
6	20	D	150	75
9	30	D	120	60
12	40	D	100	50
15	50	D	90	45
18	60	D	70	35

Length rounded to nearest one-half meter.

· Case weight varies by length & delay; see case label for exact weight.

#### Case Dimensions

Detpak (D)				
subpack	44 x 22 x 25 cm	17½ x 8¾ x 10 in		
strapped case	44 x 45 x 25 cm	17½ x 17% x 10 in		

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Canut Constant Series Constant

SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):

NONEL<sup>®</sup> MS NONEL<sup>®</sup> LP NONEL<sup>®</sup> SL NONEL<sup>®</sup> TD NONEL<sup>®</sup> MS CONNECTOR NONEL<sup>®</sup> TWINPLEX<sup>™</sup> NONEL<sup>®</sup> STARTER NONEL<sup>®</sup> EZ DET<sup>®</sup> NONEL<sup>®</sup> EZTL™ NONEL<sup>®</sup> EZ DRIFTER <sup>®</sup> OPTIMIZER<sup>®</sup> OPTISLIDE<sup>®</sup> OPTIMIZER<sup>®</sup> OPTISURFACE<sup>®</sup> OPTIMIZER<sup>®</sup> OPTI-TL<sup>®</sup>

Product Class: NONEL® Non-electric Delay Detonators

**Product Appearance & Odor:** Aluminum cylindrical shell with varying length and diameter of attached colored plastic tubing. The detonator may be enclosed in a plastic housing, and an assembly may contain two detonators. Odorless.

DOT Hazard Shipping Description: -orDetonators, non-electric 1.1B UN0029 II Detonator assemblies, non-electric 1.1B UN0360 II

-or- Detonator assemblies, non-electric 1.4B UN0361 II

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

#### SECTION II - HAZARDOUS INGREDIENTS

		Occupational Expo	osure Limits
Ingredients	CAS#	OSHA PEL-TWA	ACGIH TLV-TWA
Pentaerythritol Tetranitrate (PETN)	78-11-5	None <sup>1</sup>	None <sup>2</sup>
Lead Azide	13424-46-9	0.05 mg (Pb)/m <sup>3</sup>	0.05 mg (Pb)/m <sup>3</sup>
Lead	7439-92-1	0.05 mg (Pb)/m <sup>3</sup>	0.05 mg (Pb)/m <sup>3</sup>
Silicon	7440-21-3	15 mg / m <sup>3</sup> (total dust)	$10 \text{ mg}/\text{m}^3$
		5 mg / m <sup>3</sup> (respirable fr	action)
Selenium	7782-49-2	0.2 mg/m <sup>3</sup>	$0.2 \text{ mg/m}^3$
Red Lead (Lead tetroxide)	1314-41-6	0.05 mg (Pb)/m <sup>3</sup>	0.05 mg (Pb)/m <sup>3</sup>
Titanium dioxide	13463-67-7	15 mg/m <sup>3</sup>	$10 \text{ mg/m}^3$
Barium Chromate	10294-40-3	1 mg (CrO <sub>3</sub> )/10m <sup>3</sup> (ceiling)	0.01 mg (Cr)/m <sup>3</sup>
		0.5  mg (Ba)/m <sup>3</sup>	0.5 mg (Ba)/m <sup>3</sup>
Lead Chromate	7758-97-6	$0.05 \text{ mg} (Pb)/m^3$	0.15 ma (Pb)/m <sup>3</sup>
		1 mg (ČrÒ <sub>3</sub> )/10m <sup>3</sup> (ceiling)	0.012 mg (Cr)/m <sup>3</sup>
Barium Sulfate	7727-43-7	$0.5 \text{ mg} (\text{Ba})/\text{m}^3$	10 ma/m <sup>3</sup>
Potassium Perchlorate <sup>3</sup>	7778-74-7	None	None <sup>2</sup>
Silica (crystalline)	61790-53-2	See Note Below	0.05 mg/m <sup>3</sup> (resp frac)
Molybdenum	7439-98-7	None <sup>1</sup>	None <sup>2</sup>

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Tungsten	7440-33-7	None <sup>1</sup>	5 mg/m <sup>3</sup> (TWA)
Aluminum	7429-90-5	15 mg/m <sup>3</sup> (total dust)	$5 \text{ mg/m}^3$
Antimony	7440-36-0	5 mg/m <sup>-</sup> (respirable frac	$0.5 \text{ mg/m}^3$
Cyclotetramethylene Tetranitramine (HMX)	2691-41-0	None'	None <sup>+</sup>

<sup>1</sup> Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m<sup>3</sup>; respirable fraction, 5 mg/m<sup>3</sup>.

<sup>2</sup> Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m<sup>3</sup>; respirable part., 3 mg/m<sup>3</sup>. Note: The OSHA PEL for crystalline silica is calculated as follows:

Quartz, respirable: 10 mg/m<sup> $3^{\circ}$ </sup> / % SiO<sub>2</sub> + 2 Quartz, total dust: 30 mg/m<sup>3</sup> / % SiO<sub>2</sub> + 2

<sup>3</sup> Not all delay periods contain perchlorate. Those that do contain between from about 4 to a maximum of about 60 mg perchlorate per detonator.

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

#### SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable Vapor Density: Not Applicable Percent Volatile by Volume: Not Applicable Evaporation Rate (Butyl Acetate = 1): Not Applicable Vapor Pressure: Not Applicable Density: Not Applicable Solubility in Water: Not Applicable

### O

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Extinguishing Media: (See Special Fire Fighting Procedures section.) Special Fire Fighting Procedures: Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe, distant location. Allow fire to burn unless it can be fought remotely or with fixed extinguishing systems (sprinklers).

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

#### SECTION V - HEALTH HAZARD DATA

#### Effects of Overexposure

This is a packaged product that will not result in exposure to the explosive material under normal conditions of use. Exposure concerns are primarily with post-detonation reaction products, particularly heavy metal compounds.

**Eyes:** No exposure to chemical hazards anticipated with normal handling procedures. Particulates in the eye may cause irritation, redness, swelling, itching, pain and tearing.

Skin: No exposure to chemical hazards anticipated with normal handling procedures. Exposure to post-detonation reaction products may cause irritation.

**Ingestion:** No exposure to chemical hazards anticipated with normal handling procedures. Post-detonation reaction product residue is toxic by ingestion. Symptoms may include gastroenteritis with abdominal pain, nausea, vomiting and diarrhea. See systemic effects below.

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Groundbreaking Performance

Inhalation: Not a likely route of exposure. See systemic effects below.

Systemic or Other Effects: None anticipated with normal handling procedures. Repeated inhalation or ingestion of postdetonation reaction products may lead to systemic effects such as respiratory tract irritation, ringing of the ears, dizziness, elevated blood pressure, blurred vision and tremors. Heavy metal (lead) poisoning can occur.

Carcinogenicity: ACGIH classifies Lead as a "Suspected Human Carcinogen" and insoluble Chromium VI as "Confirmed Human Carcinogen". NTP, OSHA, and IARC consider components contained in this detonator carcinogenic.

*Perchlorate*: Perchlorate can potentially inhibit iodide uptake by the thyroid and result in a decrease in thyroid hormone. The National Academy of Sciences (NAS) has reviewed the toxicity of perchlorate and has concluded that even the most sensitive populations could ingest up to 0.7 microgram perchlorate per kilogram of body weight per day without adversely affecting health. The USEPA must establish a maximum contaminant level (MCL) for perchlorate in drinking water by 2007, and this study by NAS may result in a recommendation of about 20 ppb for the MCL.

#### Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least fifteen minutes. If irritation persists, seek medical attention. Skin: Wash with soap and water. Ingestion: Seek medical attention. Inhalation: Not applicable. Special Considerations: None

#### SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy

ditions to Avoid: Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong snock. Do not attempt to disassemble.

Materials to Avoid (Incompatibility): Corrosives (acids and bases or alkalis).

Hazardous Decomposition Products: Carbon Monoxide (CO), Nitrous Oxides (NO<sub>x</sub>), Sulfides, Chromates, Lead (Pb), Antimony (Sb) and various oxides and complex oxides of metals.

Hazardous Polymerization: Will not occur.

#### SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate all personnel to a safe distant area and allow to burn or fight fire remotely. 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. If loose explosive powder is spilled, such as from a broken detonator, only properly qualified and authorized personnel should be involved with handling and clean-up activities. Spilled explosive powder is extremely sensitive to initiation and may detonate. Follow applicable Federal, State, and local spill reporting requirements.

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

#### SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: None required for normal handling. Provide enhanced ventilation after use if in underground mines or other enclosed areas.

Respiratory Protection: None required for normal handling.

Protective Clothing: Cotton gloves are recommended.

Eye Protection: Safety glasses are recommended.

Other Precautions Required: None.

#### SECTION IX - SPECIAL PRECAUTIONS

**Precautions to be taken in handling and storage:** Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Only properly qualified and authorized personnel should handle and use explosives. Keep away from heat, flame, ignition sources, impact, friction, electrostatic discharge and strong shock.

Precautions to be taken during use: Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death. Avoid breathing the fumes or gases from detonation of explosives. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of losives Safety Library Publications.

#### SECTION X - SPECIAL INFORMATION

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

Chemical Name	CAS Number	Max. ibs/1000 units
Lead	7439-92-1	39.4
	(Use Toxic Chemical Category Code)	
Lead Compounds	N420	2.0
Barium Compounds	N040	1.8
Chromium Compounds	N090	1.9

#### Range\* of Section 313 Chemicals in each product

Product	Ib Ph par 1000	Ih Phaampaunda	Ib Po compoundo	Ib Croompoundo
FIGULCE	in En her 1000	in Ph compounds	in pa componida	in ci componias
	detonators	per 1000	per 1000	per 1000 🛛 🚽
		detonators	detonators	detonators
NONEL <sup>®</sup> MS	0 - 27	0.3 – 1.5	0 – 0.9	0 – 0.9
	0 - 30	0.3 – 2.0	0 - 1.8	0 - 1.9
NONEL <sup>®</sup> SL	7 - 27	0.3 – 1.5	0	0
NONEL® TD	0 - 18	0.3 – 0.7	0	0
NONEL <sup>®</sup> MS Connector	5 - 16	0.3 - 0.4	0	0
NONEL <sup>®</sup> TWINPLEX™	5 - 15	0.3 - 0.7	0	0
NONEL <sup>®</sup> STARTER	0	0.3	0	0
NONEL <sup>®</sup> EZ DET <sup>®</sup>	22 - 36	2.0	0	0
<u>∧</u> 'ONEL <sup>®</sup> EZTL™	5 - 15	0.5 – 0.7	0	0
NEL <sup>®</sup> EZ DRIFTER	39.4	1.3	1.2	1.3
NEL <sup>®</sup> OPTISLIDE <sup>®</sup>	0	0	0	0
	0	0	0	0
NONEL <sup>®</sup> OPTI-TL <sup>®</sup>	0	0	0	0

\* The exact quantity and weight percent of Section 313 Chemicals in each delay period and tubing length for each product is available upon request.

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## **NONEL®** Lead Line

#### Nonelectric Shock Tube

#### roduct Description

DNEL LEAD LINE is NONEL shock tube spooled at the factory in 763 meter (2,500 bot) lengths for easy application and deployment. NONEL LEAD LINE shock tube is a small diameter, three-layer plastic tube coated on the innermost wall with a reactive explosive compound. When initiated, NONEL shock tube propagates a low energy signal, similar to a dust explosion, at approximately 2000 m/sec (6,500 ft/sec) along the tube's length with minimal disturbance to the outside of the tube. The signal is transmitted from one NONEL shock tube to another through field-assembled splices.

NONEL LEAD LINE provides maximum flexibility to the blaster in choosing a position of safety from which to iniliate nonelectric blast rounds in either underground or surface applications. NONEL LEAD LINE is the only NONEL product that can be cut and spliced into a NONEL detonator product to construct a custom length nonelectric starter assembly.

#### Application Recommendations

See Product Disclaimer on page 2.

1-28-01-18-06

 ALWAYS splice NONEL LEAD LINE to NONEL EZTL™ nonelectric trunkline delay detonators, NONEL EZ DET® nonelectric blast initiation system, NONEL TD or NONEL Starter detonators to make-up the nonelectric starter assembly when using

#### Technical Information



#### Properties

Net Explosive Content per 100 units

0.0795 kg 0.1752 lbs

Lei	ngth	Speels / Cose
m	ft	Spools / Gase
762	2500	2

 Length rounded to nearest one-half meter. · See case label for exact case weight.

Hazardous Shipping Description Articles, Explosives, N.O.S. (HMX, Aluminum), 1.4S, UN 0349, PG II, EX 1997010145



Groundbreaking Performance

### NONEL<sup>®</sup> Lead Line

#### Application Recommendations (continued)

- NONEL LEAD LINE as the primary initiator for NONEL blast rounds.
- · ALWAYS trim at least 3 m [10 fl] of tubing before inserting into a nonelectric shock tube starting device or whenever dirt and/or moisture may have compromised the open tube ends before making a splice connection.
- · ALWAYS replace the plastic tube closure over the open end of any NONEL LEAD LINE that remains on the spool and is intended to be used to make up another nonelectric starter assembly.
- · ALWAYS make the final hook-up of the nonelectric starter assembly to the blast round only after all equipment and non-essential personnel are clear of the blast area
- ALWAYS unspool NONEL LEAD LINE by hand if the starter assembly has been spliced to it and is attached to the blast round.
- · ALWAYS keep any NONEL LEAD LINE tube ends sealed and free from dirt and moisture since dirt or moisture in the shock tube may cause a misfire.
- NEVER use NONEL LEAD LINE for in-hole use. NONEL LEAD LINE is for use utside the borehole only.

REVER attempt to knot different lengths of shock tube together. Shock tube will not initiate itself through knot connections. It must be spliced.

- · NEVER remove the plastic tube closure from the NONEL LEAD LINE shock tube until just before splicing.
- · NEVER attach the starter assembly to the blast round until after the LEAD LINE deployment is complete whenever NONEL LEAD LINE is to be unspooled by any method other than by hand.
- · NEVER run over NONEL LEAD LINE with equipment. This may damage the shock tube and may cause a misfire. ALWAYS replace the NONEL LEAD LINE if it is damaged.
- · When making a nonelectric starter assembly using NONEL LEAD LINE, ALWAYS

#### Technical Information



#### Application Recommendations (continued)

remove the plastic tube closure and save for later use. Splice two freshly-cut ends of NONEL shock tube together (one from the NONEL LEAD LINE and the other from the NONEL detonator) by inserting them into opposite ends of the plastic connector sleeve and pushing them toward one another until they are both at least 1/2 cm (1/4 in) in the splice.

#### Transportation, Storage and Handling

- · NONEL LEAD LINE must be transported, stored, handled and used in conformity with all federal, state, provincial and local laws and regulations.
- . For maximum shelf life (3 years), NONEL LEAD LINE must be stored in a cool, dry, well ventilated magazine. Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

Case Dimensions

51 x 25 x 28 cm 20 x 9 ½ x 10 ½ in

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MSDS # 1124 Date 01/24/05

Supercedes MSDS # 1124 10/20/04

#### SECTION 1 - PRODUCT IDENTIFICATION

Trade Name(s): NONEL<sup>®</sup> LEAD LINE

Product Class: Shock Tube

Product Appearance & Odor: Hollow plastic tubing (normally yellow) with dusty inner coating of HMX and aluminum. No detectable odor.

DOT Hazard Shipping Description: Articles, explosive, n.o.s. (HMX) 1.4S UN0349 II. For 10,000 ft spools with Wire Lock Terminations only, Not regulated as an explosive, 0000

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

#### SECTION II - HAZARDOUS INGREDIENTS

G			Occupational Exposure Limits		
redients:	CAS#	% (Range)	OSHA PEL-TWA	ACGIH TLV-TWA	
Cyclotetramethylene	2691-41-0	0.35	None <sup>1</sup>	None <sup>2</sup>	
Aluminum (dust)	7429-90-5	0.04	15 mg/m <sup>3</sup> (total) 5 mg/m <sup>3</sup> (respirable)	10 mg/m <sup>3</sup>	

<sup>1</sup> Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m<sup>3</sup>; respirable fraction, 5 mg/m<sup>3</sup>. <sup>2</sup> Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m<sup>3</sup>; respirable part., 3 mg/m<sup>3</sup>. Note: The above hazardous dust mixture is present at approximately 15 mg per meter of tubing.

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

#### SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable Vapor Density: Not Applicable Melting Point: HMX decomposes violently at melting pt., about 278°C Evaporation Rate (Butyl Acetate = 1): Not Applicable Vapor Pressure: Not Applicable Density: Not Applicable Solubility in Water: Not Soluble Percent Volatile by Volume: Not Applicable

SDS# 1124 Date: 01/24/05 Page 1 of 3

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Extinguishing Media: Water, inert powder, CO2

Special Fire Fighting Procedures: For shock tube only, consider initial isolation of at least 15 meters (50 feet) in all directions. Fight fire with normal precautions and methods used for plastic fires from a reasonable distance. IF DETONATORS OR OTHER EXPLOSIVES ARE PRESENT, DO NOT FIGHT FIRE.

**Unusual Fire and Explosion Hazards:** May burn vigorously with localized detonations and projection of fragments, with effects usually confined to the immediate vicinity of packages. Toxic smoke from combustion of the plastic material may be emitted. If product functions, high heat and pressure are released from the end of the tube if not covered or enclosed, typically by a metal device.

#### SECTION V - HEALTH HAZARD DATA

#### Effects of Overexposure

This is a packaged product that will not result in exposure to hazardous ingredients (inner coating materials) under normal conditions of use.

Eyes: Not a likely route of exposure. Dust particles may be irritating.

Skin: Not a likely route of exposure. Dust particles may cause skin irritation.

Ingestion: Not a likely route of exposure. Ingestion of large amounts of the reactive powder (HMX) is poisonous and may cause cardiovascular collapse.

Inhalation: Not a likely route of exposure. Breathing dust can cause respiratory irritation. During manufacture and at processing temperatures, irritating fumes may evolve.

Systemic or Other Effects: None known.

cinogenicity: No constituents are listed by NTP, IARC or OSHA.

#### Emergency and First Aid Procedures

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

Skin: Wash with soap and water. Ingestion: Not Applicable Inhalation: Not Applicable

Special Considerations: None.

#### SECTION VI - REACTIVITY DATA

Stability: Stable

**Conditions to Avoid:** Keep away from heat, flame, impact, friction, ignition sources and strong shocks. Also avoid stretching to failure.

Materials to Avoid (Incompatibility): Incompatible with strong oxidizers and acids.

Hazardous Decomposition or Combustion Products: Hazardous carbon monoxide (CO), nitrogen oxide (NO<sub>X</sub>) gases and products of plastic decomposition produced.

Hazardous Polymerization: Will not occur.

#### SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: Protect from all ignition sources. In case of fire evacuate area not less than 50 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, repackage undamaged devices in original packaging, accounting for every device. If the ends or tube wall have been opened such that powder may have

been released from the tube, isolate the spill area. Contamination of the HMX/Aluminum powder with sand, grit or dirt will render the material more sensitive to detonation. Carefully wet down and clean "loose" powder spills using a damp sponge or rag, avoid applying friction or pressure to the explosive, and place in a (Velostat) electrically conductive bag. Follow applicable Federal, State, and local spill reporting requirements.

Waste Disposal Method: Disposal must comply with Federal, State and local regulations. If product becomes

a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR, part 261. Review disposal requirements with a person knowledgeable with applicable environmental law (RCRA) before disposing of any explosive material.

#### SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: None normally required. Provide enhanced ventilation if used in underground mines, indoors or other enclosed areas.

**Respiratory Protection:** None normally required. Extended testing of the product indoors or in enclosed areas may necessitate respiratory protection.

Protective Clothing: None normally required. Wear chemical-resistant gloves during post-detonation cleanup or spill cleanup operations.

Eye Protection: Safety glasses or goggles are recommended for handling, testing or cleanup.

Other Precautions Required: None

#### SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources and strong shock. Only properly qualified and authorized personnel should handle and use Shock Tube.

Precautions to be taken during use: Use accepted safe industry practices when using explosive materials. Unintended conation of explosives or explosive devices can cause serious injury or death. Avoid breathing the fumes or gases from nation of explosives. Detonation in confined or unventilated areas may result in exposure to hazardous fumes or oxygen deficiency.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

#### SECTION X - SPECIAL INFORMATION

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

Chemical Name None CAS Number

<u>% By Weight</u>

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SDS# 1124 Date: 01/24/05 Page 3 of 3

### DYNO<sup>®</sup> AP

#### Small Diameter Detonator Sensitive Emulsion



#### Product Description

DYNO AP and DYNO AP PLUS are detonator sensitive, all-purpose, water resistant, packaged emulsion explosives that are recommended for underground drifting, quarry and construction blasting applications in medium rock types.

(NO AP and AP PLUS are available in the following package types: bhub/PMP Film

Chub/Valeron Film Paper Convolute Shell Paper Tube Shell

P-08-01-23-06

See Product Disclaimer on page 2

#### Application Recommendations

- DYNO AP will perform in temperatures from -20° to +50° C (-4° to 122° F). At internal product temperatures higher than -18° C (0° F), ALWAYS use a Dyno Nobel high strength detonator or equivalent. At internal product temperatures below -18° C (0° F) and higher than -23° C (-10° F), ALWAYS use a 10 gram or larger cast booster. For internal product temperatures below -23° C (-10° F), consult your Dyno Nobel representative for the recommended cast booster size.
- Use with detonating cord is not recommended. Consult your Dyno Nobel representative for details.
- Emulsion explosives are susceptible to "dynamic shock" and may detonate at low
  order or fail completely when applied in very wet conditions where explosive charges
  or decks are closely spaced and/or where geological conditions promote this effect.
  Consult your Dyno Nobel representative for alternate product recommendations
  when these conditions exist.

#### Technical Information



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3 D.

#### Properties

		<u>DYNO AP</u>	<u>DYNO AP PLUS</u>	
Density	(g/cc) Avg	1.15	1.15	
Energy <sup>®</sup>	(cal/g)	775	860	
	(cal/cc)	890	990	
Relative	Weight Strength*	0.88	0.98	
Relative	Bulk Strength <sup>a,b</sup>	1.24	1.38	
Velocity	• (m/s)	4,700	4,600	
	(ft/s)	15,400	15,100	
Detonati	on Pressure <sup>®</sup> (Kbars)	63	61	
Gas Volu	ume² (moies/kg)	41	39	
Shelf Lif	e Maximum	1 year (from date of production)		
Maximum Water Depth		90 m (300 ft)		
Water Resistance		Excellent		
Fume Cl	ass	IME1º & NRCan1º		

- All Dyno Nobel Inc. energy and gas volume values are calculated using PRODET™ the computer code developed by Dyno Nobel Inc. for its exclusive use. Other computer codes may give different values.
- ANFO = 1.00 @ 0.82 g/cc
- Unconfined @ 32 mm (1 ¼ in) diameter
- Approved by Natural Resources Canada as Fume Class 1 in chub/PMP packaging only.
- DYNO\* AP is IME Fume Class 1.



Hazardous Shipping Description Explosive, Blasting, Type E, 1.1D, UN 0241 II


Transportation, Storage and Handling

- · DYNO AP and DYNO AP PLUS must be transported, stored, handled and used in conformity with all applicable federal, state, provincial and local laws and regulations.
- · Packaged emulsions have a shelf life of one (1) year when stored at temperatures between -18° C and 38° C (0° F and 100° F). Explosive inventory should be rotated. Avoid using new materials before the old. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

### Technical Information



#### Packaging

Dlameter x Length		Nominal Cartridge Count / 25 kg (55 lb) case		Case Type
៣៣	in	Chub	Paper	
25 x 300	1 x 12	160 - 170	N/A	A
32 x 200	1 1/4 x 8	142 - 152	141 - 148	A
32 x 300	1 ¼ x 12	92 - 102	97 - 102	A
32 x 400	1 1/4 x 16	69 - 77	70 - 79	В
40 x 300	1 1/2 x 12	65 - 71	68 - 69	A
40 x 400	1 ½ x 16	49 - 54	50 - 55	В
50 x 200	2 x 8	54 - 56	59 - 60	A
50 x 400	2 x 16	25 - 27	28 - 29	B
65 x 400	2 1/2 x 16	16 - 18	17 - 19	A
75 x 400	3 x 16	11 - 13	12 - 14	A

· Package diameter and type affect product density. Use cartridge count to determine actual explosive charge weight. Note: All weights are approximate.
 DYNO AP and DYNO AP PLUS are available in a wide variety of sizes. Custom sizes

are subject to surcharge and may require longer than usual lead times. • Check with your Dyno Nobel representative should you have any questions.

#### **Case Dimensions**

A	44 x 36 x 25 cm	17 % x 14 x 9 % in
в	44 x 38 x 21 cm	17 ½ x 15 x 8 ¼ in

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Supercedes MSDS # 1030 12/15/11

#### SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):

DYNO<sup>®</sup> AP DYNO<sup>®</sup> AP PLUS DYNO<sup>®</sup> AP PLUS LD DYNO<sup>®</sup> E5 DYNO<sup>®</sup> MC DYNO<sup>®</sup> MC PLUS DYNO<sup>®</sup> SL DYNO<sup>®</sup> SL DYNO<sup>®</sup> SL PLUS DYNO<sup>®</sup> TX DYNO<sup>®</sup> XTRA DYNOSPLIT<sup>®</sup> AP POWERMITE<sup>®</sup> POWERMITE<sup>®</sup> AP POWERMITE<sup>®</sup> LD POWERMITE<sup>®</sup> LD POWERMITE<sup>®</sup> LD PLUS POWERMITE<sup>®</sup> PLUS POWERMITE<sup>®</sup> SL POWERMITE<sup>®</sup> SL PLUS

roduct Class: Emulsion Explosives, Packaged

Product Appearance & Odor: White or pink opaque semi-solid, which will appear gray if product contains aluminum. Little or no odor. Typically paper or plastic chub packaging.

DOT Hazard Shipping Description: Explosive, Blasting, Type E 1.1D UN0241 II

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

#### SECTION II - HAZARDOUS INGREDIENTS

			Occupational Exposure Limits	
Ingredients:	<u>CAS#</u>	<u>% (Range)</u>	ACGIH TLV-TWA	OSHA PEL-TWA
Ammonium Nitrate	6484-52-2	60-80	None	None
Sodium Nitrate	7631-99-4	10-18	None	None
Aluminum	7429-90-5	0-15	10 mg/m <sup>3</sup> (dust)	15 mg/m <sup>3</sup> (total)
Mineral Oil	64742-35-4	0-3	5 mg/m <sup>3</sup> (mist)	None

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



#### SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable

Vapor Density: (Air = 1) Not Applicable

Percent Volatile by Volume: <20 (water)

Evaporation Rate (Butyl Acetate = 1): <1

Vapor Pressure: Not Applicable

Density: 0.95-1.25 g/cc

Solubility in Water: Product partially dissolves very slowly in water.

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >100°C

Flammable Limits: Not Applicable

**Extinguishing Media:** (See Special Fire Fighting Procedures section.) **Special Fire Fighting Procedures:** Do not attempt to fight fires involving explosive materials. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

#### SECTION V - HEALTH HAZARD DATA

#### Effects of Overexposure

Eyes: May cause irritation, redness and tearing.

Skin: Prolonged contact may cause irritation.

gestion: Large amounts may be harmful if swallowed.

inhalation: Not a likely route of exposure.

Systemic or Other Effects: None known.

#### **Emergency and First Aid Procedures**

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

#### SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions, may explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantity.
Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.
Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).
Hazardous Decomposition Products: Nitrogen Oxides (NO<sub>X</sub>), Carbon Monoxide (CO)
Hazardous Polymerization: Will not occur.

MSDS# 1030 Date: 12/2012 Page 2 of 3

Groundbreaking Performance

#### SECTION VII - SPILL OR LEAK PROCEDURES

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

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

#### SECTION VIII - SPECIAL PROTECTION INFORMATION

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

#### SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State and local regulations. Keep away from heat, flame, ignition sources and strong shock.

**Precautions to be taken during use:** Avoid breathing the fumes or gases from detonation of explosives. Use accepted afe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

#### SECTION X - SPECIAL INFORMATION

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

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MSDS# 1030 Date: 12/2012 Page 3 of 3

Dyno Nobel

Groundbreaking Performance

## UNIGEL®

### Semi-Gelatin Nitroglycerin Dynamite



#### Product Description

D-06-01-28-06

See Product Disclaimer on page 2

UNIGEL is a semi-gelatin dynamite designed to satisfy the vast majority of explosive applications in soft to medium rock types. It is particularly suited for application in vizontally bedded, laminated and/or fractured formations and where water conditions not excessive. In addition to use as the main charge in the borehole, UNIGEL is also an excellent primer for ANFO.

#### Application Recommendations

- UNIGEL is an excellent primer for Dynomix (ANFO), Dynomix-WR (WR ANFO) or other detonator sensitive packaged product and can be used as a secondary primer in hard seams or at the top of the explosive column.
- Minimum diameter is 29 mm (1 in).
- Minimum detonator is No. 8 strength.
- Depending on storage conditions, dynamites may become difficult to punch. This does not affect performance. Use softer cartridges to make up primers.
- Dynamites are susceptible to sympathetic detonation when applied in very wet conditions where boreholes are closely spaced and/or where geological conditions promote this effect. Consult your Dyno Nobel representative for recommendations where these conditions exist.

### Technical Information



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Density	(g/cc) Avg	1.30
Energy <sup>a</sup>	(cal/g) (cal/cc)	955 1,240
Relative Weight Strength <sup>a</sup>		1.09
Relative	Bulk Strength <sup>a,b</sup>	1.72
Velocity	<sup>-</sup> (m/s) (ft/s)	4,300 14,100
Detonation Pressure⁼ (Kbars)		60
Gas Volume* (moles/kg)		37
Water R	esistance	Good
Fume Cl	lass	IME1 & NRCan1 <sup>e</sup>

 All Dyno Nobel Inc. energy and gas volume values are calculated using PRODET<sup>™</sup> the computer code developed by Dyno Nobel Inc. for its exclusive use. Other computer codes may give different values.

- ANFO = 1.00 @ 0.82 g/cc
- \* Unconlined @ 32 mm (1¼ in) diameter.
- Approved by Natural Resources Canada as Fume Class 1.



Hazardous Shipping Description Explosive, Blasting, Type A, 1.1D, UN 0081 II

## **UNIGEL**<sup>®</sup>

### Technical Information



#### Transportation, Storage and Handling

- · UNIGEL must be transported, stored, handled and used in conformity with all applicable federal, state, provincial and local laws and regulations.
- · For maximum shelf-life, dynamite must be stored in cool, dry and well-ventilated magazines. Dynamite inventory should always be rotated by using the oldest materials first. For recommended good practices in transporting, storing, handling and using this product, see the booklet "Prevention of Accidents in the Use of Explosive Materials" packed inside each case and the Safety Library Publications of the Institute of Makers of Explosives.

#### Packaging

Diameter x Length		Nominal Cartridge Count /	Cons Turns
mm	in	25 kg (55 lb) case	Case Type
25 x 200	1 x 8	171 - 184	A
29 x 200	1 1/s x 8	147 - 156	А
32 x 200	1 1/4 x 8	120 - 127	A
40 x 200	1 1/2 x 8	84 - 90	В
50 x 200	2 x 8	45 - 50	В
50 x 400	2 x 16	22 - 24	A
60 x 400	2 ¹/₄ x 16	18 - 20	A
65 x 400	2 ½ x 16	14 - 15	A
70 x 400	2 ∛₄ x 16	13 - 14	A
75 x 400	3 x 16	10 - 12	В

· UNIGEL is available in a wide variety of sizes. Custom sizes are subject to surcharge and may require longer than usual lead times.

· Note: All weights are approximate.

· Check with your Dyno Nobel representative should you have any questions.

#### **Case Dimensions**

А	44 x 35 x 21 cm	17 ½ x 13 ½ x 8 ¼ in
в	44 x 38 x 21 cm	17 ½ x 15 x 8 ½ in

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Supercedes MSDS # 1019 12/15/11

#### SECTION I - PRODUCT IDENTIFICATION

Trade Name(s):

D-GEL<sup>™</sup> 1000 DYNOSPLIT<sup>®</sup> D DYNOSPLIT<sup>®</sup> : D-1 DYNOMAX PRO<sup>™</sup> EXTRA GELATIN: 40%, 75% GELAPRIME<sup>®</sup> F IP: 724, 738 Oil Well Explosive 80% RED H<sup>®</sup>A RED H<sup>®</sup>B STONECUTTER™ UNIGEL<sup>®</sup> UNIMAX<sup>®</sup> VIBROGEL<sup>®</sup>: 1, 3 Z POWDER™ 60% Hi-Pressure Gelatin

Product Class: Dynamites and Blasting Gelatins

Product Appearance & Odor: Powdery to gelatinous solid, light tan to dark brown color. Faint, waxy odor.
 OT Hazard Shipping Description: Explosive, blasting, type A 1.1D UN0081 II
 FPA Hazard Classification: Not Available (See Section IV - Special Fire Fighting Procedures)

#### SECTION II - HAZARDOUS INGREDIENTS

			Occupational Exposure Limits	
Ingredients:	<u>CAS#</u>	<u>% (Range)</u>	ACGIH TLV-TWA	OSHA PEL-TWA
Nitroglycerin (NG)	55-63-0	3-30	0.05 ppm	0.05 ppm
Ethylene Glycol Dinitrate	628-96-6	5-50	0.05 ppm	0.05 ppm
(EGDN)				
Nitrocellulose	9004-70-0	0-6	None	None
Ammonium Nitrate	6484-52-2	0-75	None	None
Sodium Nitrate	7631-99-4	0-50	None	None
Sulfur <sup>1</sup>	7704-34-9	0-4	None	None

<sup>1</sup> This ingredient is not found in most of the products listed above.

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

#### SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable

Vapor Pressure: Not Applicable

MSDS# 1019 Date:12/20/12 Page 1 of 3



Groundbreaking Performance

Vapor Density: Not Applicable Percent Volatile by Volume: Not Applicable

Evaporation Rate (Butyl Acetate = 1): Not Applicable

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not Applicable

Flammable Limits: Not Applicable

Solubility in Water: Ammonium and sodium nitrates are completely soluble. NG and EGDN

Density: 0.8-1.48 g/cc

are very slightly soluble.

Extinguishing Media: (See Special Fire Fighting Procedures section.) Special Fire Fighting Procedures: 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.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

#### SECTION V - HEALTH HAZARD DATA

#### Effects of Overexposure

Eyes: May cause irritation, redness and tearing. Skin: Contact may result in headache, nausea and blood vessel dilation. Ingestion: May result in headache, nausea, intestinal upset and blood vessel dilation. Inhalation: May result in headache, nausea and blood vessel dilation. Systemic or Other Effects: None known.

#### **Emergency and First Aid Procedures**

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

kin: Remove contaminated clothing. Wash with soap and water.

ingestion: Seek medical attention.

Inhalation: Remove to fresh air. If irritation persists, seek medical attention.

Special Considerations: None.

#### SECTION VI - REACTIVITY DATA

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

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

Materials to Avoid (Incompatibility): Corrosives (mineral acids, bases, strong acids).

Hazardous Decomposition Products: Carbon Monoxide (CO), Hydrogen Sulfide (H<sub>2</sub>S), Nitrous Oxides (NO<sub>x</sub>), and Sulfur Oxides (SO<sub>x</sub>).

Hazardous Polymerization: Will not occur.

#### SECTION VII - SPILL OR LEAK PROCEDURES

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

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

#### SECTION VIII - SPECIAL PROTECTION INFORMATION

**Ventilation:** Forced ventilation may be necessary where natural ventilation is limited. Magazines containing NG and/or EGDN based explosives must be ventilated before entry.

Respiratory Protection: None normally required.

Protective Clothing: Chemical resistant (nitrile) gloves are suggested.

Eye Protection: Safety glasses are recommended.

Other Precautions Required: Inhalation and skin contact should be minimized to avoid headaches, nausea, and blood vessel dilation. Protective clothing should be changed daily, more often if contaminated.

#### **SECTION IX - SPECIAL PRECAUTIONS**

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated location. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources, and strong shock.

Precautions to be taken during use: Avoid breathing the fumes or gases from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause serious injury or death.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library Publications.

#### SECTION X - SPECIAL INFORMATION

Chemical Name Nitroglycerin CAS Number 55-63-0 <u>% By Weight</u> 3-40

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

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DYNO Dyno Nobel

Groundbreaking Performance



## Technical Information

## **ALPHAMIX Blasting Agent**

#### Description<sup>-</sup>

ALPHAMIX is a premixed, prilled ammonium nitrate/fuel oil-type, 65% weight-strength blasting agent<sup>(1)</sup> suitable for use under dry borehole conditions. It can be used for quarry, open-pit and construction or underground blasting operations, and can be either blown into the borehole by pneumatic loading devices or poured.

This highly economical blasting agent has an average poured density of about 0.82 g/cm<sup>1</sup>, or 50 lbs./ft<sup>3</sup>. When holes are loaded pneumatically, average density is about 0.95 g/cm<sup>3</sup> or 60 lbs./ft<sup>1</sup>.

ALPHAMIX blasting agent, as packed and when used under dry borehole conditions, will produce Class 1 fumes.

(") Electing agent Any material or mixture consisting of a fuel and oxidizer, intended for blasting, not otherwise classified as an explosive, provided that the finished product, as mixed for use or shipment, cannot be defonated by means of a No. 8 test blasting cap when unconfined.

#### Typical Characteristics

Measured energy,	ft-lbs/lb X10*	 	1.10
Measured energy,	ft-lbs/ft=	 	. 54

#### APPROXIMATE LOADING DENSITY AND RATE OF DETONATION

		Approximate Weight per Foot		Approximate	Detonation	
Borehole Diameter,		, of Borehole V	of Borehole When Poured,		Velocity (confined),	
<u> </u>	<u> </u>	· ibs	kg	fps	mps	
2	51	1.1	0.50	10,700	3,261	
3	76	2.4	1.09	10,900	3,322*	
4	102	4.4	2.00	11,800	3,597	
. 5	127	6.8	3.08	12,400	3,780	
6	- 152	9.8	4.44	12,800	3,901	
7	179	13.3	6.02	13,100	3,993	
8	203	. 17.4	7.88	13,300	4,054	
9	229	22.0	9.97 .	13,400	4,084	
10	254	27.2	12.32	13,500	4,115	
11	279	32.9	14.90	13,600	4,145	
12	305	39.2	17.76	13,650	4,160	
13	330	46.0	20.80	13,700	4,176	
14 :	356	53.3	24.14	13,700	4,176	
15	381	61.2	27.72	13,750	4,191	
16	406	69.6	31.53	13,750	4,191	
17	432	78.6	36.61	13,750	4,191	
18	457	88.1	39.91	13,750	4,191	

(over)

We cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, may be used. We accept no responsibility for results obtained by the application of this information or the safety and suitability of our products, either alone or in combination with other products. Users are advised to make their own tests to determine the safety and suitability of each such product or product combination for their own purposes. Unless otherwise agreed in writing, we sell the

#### Priming Recommendations

For optimum results, we recommend that Alphamix blasting agent be initiated with either Cast Boosters or high-impulse, high-detonation-velocity, nitroglycerin-type explosive primers. Cast Boosters are high-impulse, relatively insensitive, cast (nonnitroglycerin) explosives designed for detonating either blasting agents or desensitized explosives in conjunction with detonating cord, electric blasting caps, or nonelectric delay devices. Suggested application is as follows:

mmondad That Two

Borahole Dian In. r	nater, am	Recommanded Type of Titan Booster	Recommended Nitroplycerin-Type Primers	Primers Be.Used per Hole When the Powder Column Exceeds the Following Lengths <sup>th</sup>
2-21/2 57-	-64	1/3 lb. Cast Booster	Unimex, Unigel, 2x12/2x16 in., or Gelaprime, 2 x 7% in.	10 řt. (3.05 m)
21-3 54	-76	1/3 lb. Cast Booster	Unimax, Unigel. 2 x 12/2 x 16 in., or Gelaprime, 2 x 7½ in.	15 īt. (4 <u>.</u> 5 m)
3-3½ 75-	-89	3/4 lb. Cast Booster	Unimax, Unigel, 2 x 12/2 x 16 in., or Gelaprime, 2 x 7½ in.	20 îL (â.1 m)
31⁄2-6 89-1	152	3/4 lb. Cast Booster	Unimax, Unigel. 2 x 12/2 x 16 in., or Gelaprime. 2 x 7% in.	25 it. (7.5 m)
6 in. (152 л алб ир	ាតា)	1 lb. Cast Booster		25 ft_ (7.5 m)

(a) When two boosters are necessary, place one near the bottom and one near the top of the main charge in the borehole. Additional boosters may be required if the bleater least that separations or blockages may occur as the borehole is being loaded. It is imparative that each booster be threaded on the defonding cord downline or be individually primed with a defonation.

#### Packaging

Alphamix blasting agent is furnished in 50-lb. (22.7-kg) net polyethylene-lined, multiwall paper bags, or 9½ x 50-lb. waterproof polyethylene bags for underground use.

#### Transportation, Storage, and Handling

This blasting agent is not initiation-sensitive to No. 8 blasting caps or rifle bullets, and thus need not be stored in bullet-resistant magazines unless so required by relevant laws or regulations. Storage magazines should be located to conform to the American Table of Distances and the Table of Separation Distances of Ammonium Nitrate and Blasting Agents From Explosives or Blasting Agents.

Alphamix is classified by the U.S. Department of Transportation as Blasting Agent, and must be transported, stored, handled, and used in conformity with all applicable Federal, state, and local laws and regulations. The proper shipping description and hazard classification for Alphamix as described in this bulletin is:

#### Ammonium Nitrate, Fuel Oil Mixture-Blasting Agent

This product should be kept dry, and stock should be rotated so that the oldest material is used first. Use only proper primers, and never load in wet holes or where there is not adequate confinement. If these restrictions are observed, the formation of toxic furnes will be minimized. This product, as manufactured, conforms to the Institute of Makers of Explosives Fume Class 1 rating.

For additional recommended good practices in transporting, storing, handling, and using this product, consult the Safety Library Publications of the Institute of Makers of Explosives.

## Alpha Explosives

P.O. Box 310, Lincoln, California 95648 (916) 645-3377

#### Alpha Dyno Nobel 3400 Nader Road P.O. Box 310 Lincoln, CA 95648

#### MATERIAL SAFETY DATA SHEET

#### FOR 24 HOUR EMERGENCY CALL (800)535-5053

MSDS# 0100 Date: 9/28/2006

#### SECTION I – PRODUCT IDENTIFICATION

Trade Name: ANFO (BULK), Fragmax Alpha Mix, Fragpak SD,

Product Class: Bulk or packaged ANFO

Product Appearance & Odor: Pale or pink, oil-covered prills with fuel oil odor.

DOT Hazard Shipping Description: Ammonium nitrate-fuel oil mixture 1.5D NA 0331

#### SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	<u>% (Range)</u>	TLV-ACGIH
Ammonium Nitrate	6484-52-2	92-95	No Value Established
Fuel Oil	68478-34-6	4-7	No Value Established

#### SECTION III - PHYSICAL DATA

Boiling Point: N/AVapor Pressure: <5mm Hg ~ 75°F</th>Vapor Density: >1Density: 0.8 to 1.0 g/cc bulkPercent Volatile by Volume: <8 (Fuel Oil)</td>Solubility in Water: Ammonium NitrateVery SolubleEvaporation Rate: (Butyl Acetate = 1): <1</td>

NFPA Hazard Classification: N/A (See Section IV – Special Fire Fighting Procedures) N/A = Not Applicable or Not Available

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >100°F Flammable Limits: N/A Extinguishing Media: (See Special Fire Fighting Procedures section.) Special Fire Fighting Procedures: Do not fight fires involving explosive materials. Evacuate personnel to a predetermined safe location, no less than 2,500 feet in all directions. Unusual Fire and Explosion Hazards: Can explode under fire conditions. Burning material may produce toxic vapors.

#### SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

Eyes: May cause irritation, redness, and tearing.

Skin: Prolonged contact may cause irritation.

Ingestion: Large amounts may be harmful if swallowed.

Inhalation: May cause dizziness, nausea, intestinal upset.

Systemic or Other Effects: None known.

Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least 15 minutes. If irritation persists, seek medical attention.

Skin: Wash with soap and water.

Ingestion: Seek medical attention.

Inhalation: Remove to fresh air.

Special Considerations: None.

#### SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions.

May explode when subjected to fire, supersonic, shock, or high energy projectile impact especially when confined or in large quantities.

Conditions to Avoid: Keep away from heat, flame, ignition sources, and strong shock. Materials to Avoid (Incompatibility): Strong acids and strong alkalis.

Hazardous Decomposition Products: Carbon Monoxide (CO) and Nitrogen Oxides (NO) Hazardous Polymerization: N/A

#### SECTION VII - SPILL OR LEAK PROCEDURES

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

Waste Disposal Method: Disposal must comply with Federal, State, and Local regulations. If product becomes a waste, it is potentially regulated as a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) Title II, Subtitle C.

#### SECTION VIII – SPECIAL PROTECTION INFORMATION

Ventilation: General room ventilation is normally adequate. Respiratory Protection: None normally required.

Alpha Dyno Nobel MSDS #0100 Date 9/28/2006 Page 3 of 3

Protective Clothing: Gloves and work clothing which reduce skin contact are suggested. Eye Protection: Safety glasses are suggested. Other Precautions Required: None.

#### SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated locations. Store in compliance with Federal, State, and Local regulations. Keep away from heat, flame, ignition sources, and strong shock.

Other Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library publications.

#### SECTION X - SPECIAL INFORMATION

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

#### ALPHA DYNO NOBEL INC Disclaimer

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

particular purpose, or of any nature with respect to the product, or to the information, is made herein).

\_yno Nobel Inc. 2650 Decker Lake Boulevard, Suite 300 Salt Lake City, Utah 84119 Phone: 801-364-4800 Fax: 801-321-6703 E-Mail: dnna.hse@am.dynonobel.com FOR 24 HOUR EMERGENCY, CALL CHEMTREC (USA) 800-424-9300 CANUTEC (CANADA) 613-996-6666 MSDS #1009 Date 04/26/07

Supercedes MSDS # 1009 01/31/05

#### **SECTION I - PRODUCT IDENTIFICATION**

Trade Name(s): ANFO DYNOMIX™, DYNOMIX™ (U.G.) DYNOMIX™ WR DYNOMIX™ HD FRAGMAX™

Product Class: ANFO, Bulk or Packaged

Product Appearance & Odor: White, free-flowing solid prills with fuel oil odor. May be tinged pink or other color to distinguish from solid prills without fuel.

Hazard Shipping Description (U.S. DOT and Canada TDGR) For ANFO, DYNOMIX<sup>™</sup>, DYNOMIX<sup>™</sup> (U.G.), FRAGMAX<sup>™</sup>: Ammonium nitrate-fuel oil mixture 1.5D NA0331 II Or Explosive, blasting, type B 1.5D UN0331 II Note: Either description is acceptable, but if already packaged, refer to packaging for which description to use.

For DYNOMIX<sup>™</sup> WR : For DYNOMIX<sup>™</sup> HD (Canada only):

Explosive blasting, type B 1.5D UN0331 II Explosive blasting, type B 1.1D UN0082 II

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

#### SECTION II - HAZARDOUS INGREDIENTS

Ingredients:	CAS#	% (Range)	Occupational Expo ACGIH TLV-TWA	sure Limits OSHA PEL-TWA
Ammonium Nitrate	6484-52-2	92-95	None <sup>1</sup>	None <sup>2</sup>
Fuel Oil	68476-34-6	4-7	100 ppm	None
Guar Gum*	9000-30-0	0-3	None <sup>1</sup>	None <sup>2</sup>

<sup>1</sup> Use limit for particulates not otherwise regulated (PNOR): Total dust, 15 mg/m<sup>3</sup>; respirable fraction, 5 mg/m<sup>3</sup>.

<sup>2</sup> Use limit for particulates not otherwise classified (PNOC): Inhalable particulate, 10 mg/m<sup>3</sup>; respirable part., 3 mg/m<sup>3</sup>.

\* DYNOMIX<sup>™</sup> WR is the only product containing guar gum.

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).

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#### SECTION III - PHYSICAL DATA

Boiling Point: Not Applicable Vapor Density: > 1 Percent Volatile by Volume: < 8 (Fuel oil) Vapor Pressure: <5 mm Hg @ 75<sup>°</sup> F Density: 0.8 to 1.1 g/cc bulk density Solubility in Water: Ammonium Nitrate component completely soluble

Evaporation Rate (Butyl Acetate = 1): < 1

#### SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: >120° F (49°C)

Flammable Limits: Not Available

Extinguishing Media: (See Special Fire Fighting Procedures section.) Special Fire Fighting Procedures: 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.

Unusual Fire and Explosion Hazards: Can explode or detonate under fire conditions. Burning material may produce toxic vapors.

#### SECTION V - HEALTH HAZARD DATA

Effects of Overexposure

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

#### Emergency and First Aid Procedures

Eyes: Irrigate with running water for at least 15 minutes. If irritation persists, seek medical attention. Skin: Wash with soap and water. Ingestion: Seek medical attention. Inhalation: Remove to fresh air. Special Considerations: None.

#### SECTION VI - REACTIVITY DATA

Stability: Stable under normal conditions. May explode when subjected to fire, supersonic shock or high-energy projectile impact, especially when confined or in large quantities.
Conditions to Avoid: Keep away from heat, flame, ignition sources and strong shock.
Materials to Avoid (Incompatibility): Corrosives (strong acids and strong bases or alkalis).
Hazardous Decomposition Products: Carbon Monoxide (CO) and Nitrogen Oxides (NO<sub>X</sub>)
Hazardous Polymerization: Will not occur.

#### SECTION VII - SPILL OR LEAK PROCEDURES

Steps to be taken in Case Material is Released or Spilled: In case of fire evacuate area not less than 2,500 feet in all directions. Protect from all ignition sources. 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. If possible, plug drains or dike channels to prevent either material or water runoff from entering storm drains or surface waters. Follow applicable Federal; State and local spill reporting requirements.

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

#### SECTION VIII - SPECIAL PROTECTION INFORMATION

Ventilation: Not required for normal handling. Forced ventilation may be necessary where natural ventilation is limited.

Respiratory Protection: None normally required. In a dusty environment, or in hot, enclosed areas, respiratory protection may be needed.

Protective Clothing: Gloves and work clothing that reduce skin contact are suggested.

Eye Protection: Safety glasses are recommended.

Other Precautions Required: None.

#### SECTION IX - SPECIAL PRECAUTIONS

Precautions to be taken in handling and storage: Store in cool, dry, well-ventilated locations. Store in compliance with Federal, State, and local regulations. Keep away from heat, flame, ignition sources and strong shock.

Precautions to be taken during use: Avoid breathing the fumes from detonation of explosives. Use accepted safe industry practices when using explosive materials. Unintended detonation of explosives or explosive devices can cause jous injury or death.

er Precautions: It is recommended that users of explosive materials be familiar with the Institute of Makers of Explosives Safety Library publications.

#### SECTION X - SPECIAL INFORMATION

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

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)S#1009 Date: 04/26/07 Page 3 of 3

**DEXPAN (Non-Explosive Demolition Agent)** 



### 1. Product and company identification

: DEXPAN (Non-Explosive Demolition Agent)
: For controlled demolition, reinforced concrete cutting, rock breaking, quarrying, stone dimension, mining, excavating
: Archer Co. USA, Inc. 1665 Futurity Dr. Sunland Park NM. 88063 Phone # 575-874-9188 Fax: # 575-874-9108 Toll Free: 866-272-4378
: KMK Regulatory Services inc.
: +1-575-874-9188
: Powder.

## 2. Hazards identification

C

Emergency overview		
Color	:	Gray.
Physical state	:	Solid. [Powder.]
Odor	:	Odorless.
Signal word	:	WARNING!
Hazard statements	:	CAUSES EYE AND SKIN IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION.
Precautions	:	Avoid breathing dust. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
OSHA/HCS status	:	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	:	Dermal contact. Eye contact. Inhalation. Ingestion.
Potential acute health effects		
Inhalation	:	Slightly irritating to the respiratory system.
Ingestion	:	No known significant effects or critical hazards.
Skin	:	Irritating to skin.
Eyes	:	Irritating to eyes.
Potential chronic health effect	: <u>ts</u>	
Chronic effects	:	Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation.
Carcinogenicity	:	No known significant effects or critical hazards.
Mutagenicity	:	No known significant effects or critical hazards.
Teratogenicity	:	No known significant effects or critical hazards.
Developmental effects	:	No known significant effects or critical hazards.
Fertility effects	:	No known significant effects or critical hazards.
<u>Target organs</u>	:	No known significant effects or critical hazards.
Over-exposure signs/sympt	on	<u>15</u>
Inhalation	:	Adverse symptoms may include the following: respiratory tract irritation coughing
Ingestion		No specific data.

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## Dexpan

## 2. Hazards identification

Skin	: Adverse symptoms may include the following: irritation redness
Eyes	: Adverse symptoms may include the following: pain or irritation watering redness
Medical conditions aggravated by over- exposure	: None known.

See toxicological information (section 11)

## 3. Composition/information on ingredients

#### **United States**

Name	CAS number	%
Calcium hydroxide	1305-62-0	60 - 100
Silica, vitreous	60676-86-0	5 - 10
Diiron trioxide	1309-37-1	1 - 5
Aluminum oxide	1344-28-1	1 - 5

#### Canada

Name	CAS number	%
Calcium hydroxide	1305-62-0	60 - 100
Silica, vitreous	60676-86-0	5 - 10
Diiron trioxide	1309-37-1	1 - 5
Aluminum oxide	1344-28-1	1 - 5

#### Mexico

Namo						C	lassifi	cation
Name	CAS number	UN number	%	IDLH	Н	F	R	Special
Calcium hydroxide Diiron trioxide Silica, vitreous Aluminum oxide	1305-62-0 1309-37-1 60676-86-0 1344-28-1	Not regulated. Not regulated. Not regulated. Not regulated.	60 - 100 1 - 5 5 - 10 1 - 5	- 2500 mg/m³ - -	1 1 0 0	0 0 0 0	0 0 0 0	

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

#### 4. First aid measures

Eye contact	: Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Get medical attention.
Skin contact	<ul> <li>In case of contact, immediately flush skin with plenty of water for at least 20 minutes. Get medical attention.</li> </ul>
Inhalation	<ul> <li>Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention.</li> </ul>
Ingestion	: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Protection of first-aiders	: No action shall be taken involving any personal risk or without suitable training.
Notes to physician	: No specific treatment. Treat symptomatically.



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#### 5. **Fire-fighting measures** Flammability of the product : No specific fire or explosion hazard.

Extinguishing media	
Suitable	Use an extinguishing agent suitable for the surrounding fire.
Not suitable	None known.
Hazardous decomposition products	No specific data.
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

#### Accidental release measures 6.

Personal precautions	: Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
Environmental precautions	<ul> <li>Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).</li> </ul>
Methods for cleaning up	
Small spill	<ul> <li>Vacuum or sweep up material and place in a designated, labeled waste container.</li> <li>Dispose of via a licensed waste disposal contractor.</li> </ul>
Large spill	: Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.
7. Handling and	storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and

processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. : Store in accordance with local regulations. Store in original container protected from

Storage direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

#### 8. Exposure controls/personal protection

#### **United States**

Ingredient	Exposure limits	
Calcium hydroxide	OSHA PEL (United States, 11/2006). TWA: 5 mg/m <sup>3</sup> 8 hour(s). Form: Respirable fraction TWA: 15 mg/m <sup>3</sup> 8 hour(s). Form: Total dust ACGIH TLV (United States, 1/2009). TWA: 5 mg/m <sup>3</sup> 8 hour(s). NIOSH REL (United States, 6/2009). TWA: 5 mg/m <sup>3</sup> 10 hour(s). OSHA PEL 1989 (United States, 3/1989). TWA: 5 mg/m <sup>3</sup> 8 hour(s).	<u>, , , , , , , , , , , , , , , , , , , </u>
Silica, vitreous	OSHA PEL 1989 (United States, 3/1989). TWA: 0.1 mg/m <sup>3</sup> 8 hour(s). Form: Respirable dust	
KMK Regulatory Service:	s Inc. Tel : +1-888-GHS-7769 (447-7769)/+1-450-GHS-7767 (447-7767); Services Réglementaires KMK Inc.	3/9

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#### 8. Exposure controls/personal protection

Diiron trioxide	NIOSH REL (United States 6/2009)
	TWA: 5 mg/m <sup>2</sup> , (as Fe) 10 hour(s). Form: Dust and fumes
	ACGIH TLV (United States, 1/2009).
	TWA: 5 mg/m <sup>3</sup> 8 hour(s). Form: Respirable fraction
	OSHA PEL 1989 (United States, 3/1989).
	TWA: 5 mg/m <sup>3</sup> 8 hour(s). Form: Respirable fraction
	TWA: 10 mg/m³ 8 hour(s). Form: Total dust
	STEL: 10 ppm, (as Fe) 15 minute(s). Form: Total particulates
	OSHA PEL (United States, 11/2006).
	TWA: 10 mg/m³ 8 hour(s).
Aluminum oxide	OSHA PEL 1989 (United States, 3/1989).
	TWA: 10 mg/m³ 8 hour(s). Form: Dust
	TWA: 5 mg/m <sup>3</sup> 8 hour(s). Form: Respirable fraction
	NOSH REL (United States, 6/2009).
	TWA: 5 mg/m <sup>3</sup> , (as Al) 10 hour(s). Form: PYRO POWDERS AND WELDING FUMES
	OSHA PEL (United States, 11/2006).
	TWA: 5 mg/m <sup>3</sup> 8 hour(s). Form: Respirable fraction
	1 WA: 15 mg/m <sup>3</sup> 8 hour(s). Form: Total dust
	AUGINTLY (United States).
	i vvA: i rug/m², (A) o nour(s). Form: Respirable traction

#### <u>Canada</u>

Occupational exposure limits		TWA (8 hours)		STEL (15 mins)			Ceiling				
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Calcium hydroxide	US ACGIH 1/2009	-	5	_	-	-	-	-	-	Ľ	
-	AB 4/2009	-	5	F	-	-	-	-	_		[3]
	BC 9/2009	-	5	Ļ	-	-	-	-	-		[0]
	ON 8/2008	-	5	F	-	-	-	-	-	Ļ	
	QC 6/2008	-	5	-	-	-	-	-	-	Ļ	
Silica, vitreous	ON 8/2008	-	0.1	F	-	-	-	]-	-	ŀ	fal
	QC 6/2008	-	0.1	+	] -	-	-	-	-	Ļ	[b]
Diiron trioxide	US ACGIH 1/2009	-	5	-		-	-	-	-	Ļ	ได้
Diiron trioxide, as Fe	AB 4/2009	-	5	-	-	-	-	-	-	ŀ	[d]
	BC 9/2009	-	5	}	-	-	-	-	-	ļ.	[e]
		-	5	-	-	10	-	-	1-	ŀ	[f]
		1-	3	-	-	-	-	-	-	ŀ	[9]
Directored		-	10	+	-	-	-	-	i -	ł	[ħ]
Ditron thoxide	ON 8/2008	-	5	-	-	-	-	Ì-	-	ł	[a]
Directification of Ca	0.0 0/0000	-	10	-	-	-	-	-	-	ł	[]
Aluminum exide Al		-	5	F	-	-	-	-	-	-	0
Aluminum oxide	AD ADOOD	-		F	-	-	-	<b>-</b>	-	ŀ	[c]
	AD 4/2009	1-	110	l"	1-	-	-	-	-	ł	
Aluminum oxide, ac At		-		Ť.	-	-	]-	-	-	ł	0
Aluminum Uxide, as Al	120 012008	-	1.0	r	-	-	-	-	-	ŀ	[K]

Form: [a]Respirable particulate [b]Respirable dust [c]Respirable fraction [d]Dust and fumes [e]Dust [f]Fume [g]Total dust [h]Al

#### Mexico

Ingredient	Exposure limits	
Calcium hydroxide	NOM-010-STPS (Mexico, 9/2000).	
Silica. vitreous	LMPE-PPT: 5 mg/m <sup>3</sup> 8 hour(s).	
	LMPE-PPT: 0.1 mg/m <sup>3</sup> 8 hour(s).	
Diiron trioxide	NOM-010-STPS (Mexico, 9/2000).	
	LMPE-PPT: 5 mg/m³, (as Fe) 8 hour(s).	
Aluminum oxide	NOM-010-STPS (Mexico, 9/2000).	

Consult local authorities for acceptable exposure limits.

**Recommended monitoring** : Personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use

respiratory protective equipment.

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procedures

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### Exposure controls/personal protection

Engineering measures :	Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or
	other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits.
Hygiene measures :	Ensure that eyewash stations and safety showers are close to the workstation location. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.
Respiratory :	<ul> <li>Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.</li> <li>Recommended: Use appropriate NIOSH approved dust respirator if PEL/TLV may be exceeded.</li> </ul>
Hands	: Use gloves appropriate for work or task being performed. Recommended: Impervious gloves.
Eyes	Safety eyewear should be used when there is a likelihood of exposure. If operating conditions cause high dust concentrations to be produced, use dust goggles. Recommended: Safety glasses with side shields.
Skin	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Cotton-blend coveralls.
Environmental exposure controls	: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## 9. Physical and chemical properties

-	• •
Physical state	: Solid. [Powder.]
Color	: Gray.
Odor	: Odorless.
Melting/freezing point	: 1000°C (1832°F)
Specific gravity	: 3.2 g/cm <sup>3</sup>
Relative density	: 3.2
VOC	: 0 % (w/w)
Solubility	: Very slightly soluble in the following materials: cold water.

## 10. Stability and reactivity

Chemical stability	:	The product is stable.
Conditions to avoid	:	No specific data.
Materials to avoid	:	Reactive or incompatible with the following materials: oxidizing materials, acids and moisture.
Hazardous decomposition products	:	No specific data.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous polymerization	:	Under normal conditions of storage and use, hazardous polymerization will not occur.

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## <u>11.</u> <u>1</u>

### 1. Toxicological information

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Calcium hydroxide	LD50 Oral	Rat	7340 mg/kg	-

#### Chronic toxicity

#### **Classification**

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Silica, vitreous	-	3	-	-	-	-
Duron trioxide	A4	3	-	-	-	-
Aluminum oxide	A4	-	-	-	-	-

## 12. Ecological information

#### Environmental effects

: Not established

#### Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Calcium hydroxide	Acute LC50 33884.4 ug/L Fresh water Chronic NOEC 56 mg/L Marine water	Fish - Clarias garlepinus - Fingerling Fish - Poecilia reticulata - Young - 3 weeks	96 hours 96 hours
Other adverse effects	: No known significant effects or cr	itical hazards.	

### 13. Disposal considerations

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Waste disposal
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: The generation of waste should be avoided or minimized wherever possible. This material and its container must be disposed of in a safe way. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Empty containers or liners may retain some product residues. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

## 14. Transport information

DOT/TDG/MXT/IMDG/IATA : Not regulated.

## 15. Regulatory information

#### United States

HCS Classification	: Irritating material
U.S. Federal regulations	: United States inventory (TSCA 8b): All components are listed or exempted.
	<ul> <li>SARA 302/304/311/312 extremely hazardous substances: No products were found.</li> <li>SARA 302/304 emergency planning and notification: No products were found.</li> <li>SARA 302/304/311/312 hazardous chemicals: Silica, vitreous; Diiron trioxide;</li> <li>Aluminum oxide; Calcium hydroxide</li> <li>SARA 311/312 MSDS distribution - chemical inventory - hazard identification:</li> <li>Silica, vitreous: Immediate (acute) health hazard; Diiron trioxide: Delayed (chronic) health hazard; Aluminum oxide: Immediate (acute) health hazard; Calcium hydroxide:</li> </ul>
	Clean Water Act (CWA) 307: No products were found.
	Clean Water Act (CWA) 311: No products were found.
	Clean Air Act (CAA) 112 accidental release prevention: No products were found.
	Clean Air Act (CAA) 112 regulated flammable substances: No products were found
	Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

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## Glean Air Act. Service

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs)	: Not listed
Clean Air Act Section 602 Class I Substances	: Not listed
Clean Air Act Section 602 Class II Substances	: Not listed
DEA List I Chemicals (Precursor Chemicals)	: Not listed
DEA List II Chemicals	: Not listed

#### <u>SARA 313</u>

(Essential Chemicals)

	Product name	CAS number	Concentration
Form R - Reporting requirements	Aluminum oxide	1344-28-1	1-5
Supplier notification	Aluminum oxide	1344-28-1	1-5

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

	State regulations	: Connecticut Carcinogen Reporting: None of the components are listed.
		Connecticut Hazardous Material Survey: None of the components are listed.
<u> </u>		Florida substances: None of the components are listed.
62		Illinois Chemical Safety Act: None of the components are listed.
<b>N</b>		Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
		Louisiana Reporting: None of the components are listed.
		Louisiana Spill: None of the components are listed.
		Massachusetts Spill: None of the components are listed.
		Massachusetts Substances: The following components are listed: Calcium hydroxide; Silica, vitreous; Diiron trioxide: Aluminum oxide
		Michigan Critical Material: None of the components are listed.
		Minnesota Hazardous Substances: None of the components are listed.
		New Jersey Hazardous Substances: The following components are listed: Calcium
		hydroxide; Silica, vitreous; Diiron trioxide; Aluminum oxide
		New Jersey Spill: None of the components are listed.
		New Jersey Toxic Catastrophe Prevention Act: None of the components are listed. New York Acutely Hazardous Substances: None of the components are listed. New York Toxic Chemical Release Reporting: None of the components are listed. Pennsylvania RTK Hazardous Substances: The following components are listed: Calcium hydroxide; Diiron trioxide; Aluminum oxide Rhode Island Hazardous Substances: None of the components are listed.
	<u>Canada</u>	
	WHMIS (Canada)	: Class D-2B: Material causing other toxic effects (Toxic).
6	Canadian lists	: CEPA Toxic substances: None of the components are listed. Canadian ARET: None of the components are listed. Canadian NPRI: The following components are listed: Aluminum oxide Alberta Designated Substances: None of the components are listed. Ontario Designated Substances: None of the components are listed. Quebec Designated Substances: None of the components are listed.
K	Canada inventory	: All components are listed or exempted.

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

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Bexnan	DEXPAN (Non-Explosive Demolition Agent)
15 . Regulatory in	nformation
Mexico	
Classification	:
	Flammability
	Health 🔨 💙 Instability
	Special
International regulations	
International lists	: Australia inventory (AICS): All components are listed or exempted.
	Japan inventory: All components are listed or exempted.
	Korea inventory: All components are listed or exempted.
	New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted
	Philippines inventory (PICCS): All components are listed or exempted.
16. Other inform	ation
United States	
Label requirements	: CAUSES EYE AND SKIN IRRITATION. MAY CAUSE RESPIRATORY TRACT IRRITATION.
Hazardous Material Information System (U.S.A.	: Health:  1   Flammability:  0  Physical hazards:  0 )
Caution: HMIS® ratings are based risks Although HMIS® ratings are to be used with a fully implemente materials may be purchased exclu	on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings an d HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® sively from J. J. Keller (800) 327-6868.
The customer is responsible for d	etermining the PPE code for this material.
National Fire Protection Association (U.S.A.)	: Health : 1 Flammability : 0 Instability : 0
<u>Canada</u>	
WHMIS (Canada)	
References	: ANSI Z400.1, MSDS Standard, 2004 Manufacturer's Material Safety Data Sheet 29CFR Part1910.1200 OSHA MSDS Requirements 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG Canada Gazette Part II, Vol. 122, No. 2 Registration SOR/88-64, 31 December 1987. Hazardous Products Act "Ingredient Disclosure List" - Canadian Transport of Dangerous Goods, Regulations and Schedule Clear Language version 2005 Official Mexican Standards NOM-018-STPS-2000 and NOM-004-SCT2-1994.
Date of issue	: 03/01/2010
Date of previous issue	: 05/20/2009
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Version	: 3

supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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