

**COLORADO DEPARTMENT OF
LABOR AND EMPLOYMENT**

DIVISION OF OIL AND PUBLIC SAFETY

EXPLOSIVES REGULATIONS

7 C.C.R. 1101-9

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ARTICLE 1 GENERAL PROVISIONS

Section 1-1 Basis and Purpose

These regulations are promulgated to establish rules for the use, manufacture, possession, sale, storage, transport, or disposal of explosives materials or blasting agents in the interest of the life, health, and safety of employees and the general public, as well as the protection of property.

To this end, a procedure for the granting of explosives permits is contained herein whereby the opportunity to use, manufacture, possess, sell, store, transport, or dispose of explosives materials is restricted to such permittees and conditioned upon satisfactory continued compliance with these rules and regulations. Failure to comply with these rules and regulations subjects the permittee to suspension, denial, or revocation of the permit.

Adoption of these rules and regulations is intended to greatly clarify the Division of Oil and Public Safety requirements pertaining to the use of explosive materials, to ease the burden on the permittee where interpretation has been necessary, and to better incorporate the numerous requirements from other governmental agencies. These rules and regulations provide for uniformity of compliance and elimination of numerous areas of confusion and duplication in an effort to better serve and protect the public.

Section 1-2 Statutory Authority

The amendments to these regulations are created pursuant to Section 9-7-105, C.R.S. (2004) of the Colorado Revised Statutes. All prior rules for explosive materials are hereby repealed.

Section 1-3 Effective Date

These amended regulations shall be effective on December 1, 2018. The previous versions of these regulations were effective on March 10, 2015, and January 1, 2009.

Section 1-4 Scope

These rules and regulations shall apply to the use, manufacture, purchase, possession, sale, storage, transportation, and disposal of explosive materials in the State of Colorado by any individual, corporation, company, firm, partnership, association, or state or local government agency.

These rules and regulations shall not apply to:

- (A) The shipment, transportation, and handling of military explosives by the Armed Forces of the United States or the State Militia.
- (B) The normal and emergency operations of any government law enforcement agency including all departments, and divisions thereof, provided they are acting in their official capacity and in the proper performance of their duties and functions.
- (C) Explosives in the forms prescribed by the official United States Pharmacopoeia or the National Formulary and used in medicines and medicinal agents.
- (D) Explosive materials while in the course of transportation by for-hire commercial carriers via railroad, water, highway, or air when the explosive materials are moving under the jurisdiction of, and in conformity with, regulations adopted by any Federal Department or Agency.
- (E) The components for hand loading rifle, pistol, and shotgun ammunition and/or rifle, pistol, and shotgun ammunition.

- (F) The manufacture, sale and use (public display) of pyrotechnics commonly known as fireworks, including signaling devices such as flares, fuses, and torpedoes.
- (G) Gasoline, fertilizers, installed propellant/powder-actuated safety devices or propellant/powder-actuated power tools.
- (H) The use and storage of model rocket motors containing a propellant weight of 62.5 grams or less and which produce less than 17.92 pound seconds of total impulse.

No permit shall be required for the occasional purchase of explosives by a person for normal agricultural purposes where such person is known by the seller of such explosives, and a record is kept of such transactions by the seller, including the specific purpose for which such explosives will be used, the location of the purposed use, the signature of the purchaser, and the certification of the seller as to his personal knowledge of the purchaser. Violation of this record requirement shall cause the seller's permit to be canceled. A permit is required for any manufacturing, storage, dealing, or non-agricultural use of explosives as outlined in Article 3 of this regulation.

No person, firm, partnership, or corporation whose possession of explosive materials is for the purpose of underground mining, surface or underground metal mining, or surface or underground coal mining and whose use and storage is subject to regulation by the provisions of 30 Code of Federal Regulations (CFR) - Parts 56, 57, 75 or 77 shall be subject to the provisions of the Explosives Act, Sections 9-7-101, et seq., Colorado Revised Statutes (C.R.S.).

No person, firm, partnership, or corporation whose possession, use, or storage of explosive materials is subject to regulation by the provisions of Colorado Mining Law, Sections 34-21-104 and 34-21-110, C.R.S. shall be subject to the provisions of the Explosives Act, Sections 9-7-101, et seq., C.R.S.

A permit issued by the Division of Oil and Public Safety shall be required for the possession, use, or storage of explosives in mining operations whose use and storage is not subject to the provisions of 30 CFR - Parts 56, 57, 75 or 77 or Colorado Mining Law, Sections 34-21-104 and 34-21-110, C.R.S.

Except as noted in the foregoing, the Division of Oil and Public Safety may approve or disapprove the location for, and limit the quantity of, explosives or blasting agents which may be loaded, unloaded, reloaded, stored, or temporarily retained at any facility within the State of Colorado.

The Division of Oil and Public Safety may issue an explosive permit for continued use for a period of time not to exceed 36 months.

Section 1-5 Definitions

The following publications and codes are hereby incorporated by this reference:

- Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), U.S. Department of Justice, Publication ATF P 5400.7, ATF- Explosives Law and Regulations (2012)
- Title 49 CFR - Parts 100-177 (inclusive) Parts 390-397 U.S. Department of Transportation (Revised September 27, 2012)
- National Electric Code (NEC), 2017 Edition, National Fire Protection Association (NFPA)
- Institute of Makers of Explosives (IME) Safety Library Publication No. 22 (February 2007)
- Institute Of Makers Of Explosives (IME) Safety Library Publication No. 20 (December 2011)
- The Avalanche Artillery Users of North America Committee (AAUNAC) Training Standard (Revised May 16, 2012)

These rules incorporate the editions and revisions specified. Subsequent editions and revisions have not been incorporated by this reference. The publications incorporated by this reference may be examined and a copy of them may be obtained upon request and payment of the cost of reproduction during regular business hours from the Colorado Department of Labor and Employment, Division of Oil and Public Safety, 633 17th Street, Suite 500, Denver, CO 80202, and may also be inspected at the state depository libraries.

The following words when used in these rules and regulations shall mean:

AIR OVERPRESSURE, OVERPRESSURE: The airborne shock wave or acoustic transient generated by an explosive.

AMERICAN TABLE OF DISTANCES: A quantity-distance table prepared and approved by the Institute of the Makers of Explosives, for storage of explosive materials to determine safe distances from inhabited buildings, public highways, passenger railways, and other stored explosive materials. See Section 4.6 of these regulations.

AMMONIUM NITRATE: The ammonium salt of nitric acid represented by the formula NH_4NO_3 .

APPROVED STORAGE FACILITY (APPROVED MAGAZINE): A facility for the storage of explosives materials conforming to the requirements of these rules and regulations.

ATTEND(ED): The physical presence of an authorized person within the field of vision of explosives or the use of explosives.

AUTHORIZED, APPROVED, OR APPROVAL: Terms which mean approved, approval, or authorized by the Division.

AUTHORIZED PERSON: A person approved or assigned by the management to perform a specific type of duty or duties or to be at a specific location or locations at the job site.

ARMED CHARGE: An explosive cartridge that contains a detonator.

ARTIFICIAL BARRICADE: An artificial mound, berm, or wall of earth of a minimum thickness of 3 feet, or any other approved barricade that offers equivalent protection.

AVALAUNCHER: A compressed gas explosives delivery system designed for avalanche hazard mitigation.

BARRICADED: The effective screening of a building or magazine containing explosive materials from another magazine or building, railway, or highway by a natural or artificial barrier. A straight line from the top of any sidewall of the building or magazine containing explosives materials to the eave line of any magazine or building or to a point 12 feet above the center of a railway or highway shall pass through the barrier.

BINARY (TWO-COMPONENT) EXPLOSIVE: A blasting explosive formed by the mixing or combining of two precursor chemicals, (e.g., ammonium nitrate and nitromethane).

BLACK POWDER: A deflagrating or low explosive compound of an intimate mixture of sulfur, charcoal and an alkali nitrate (usually potassium or sodium nitrate).

BLAST AREA: Area of the blast within the influence of flying rock missiles, gases, vibration, and concussion.

BLASTER: A Type I permitted individual who is permitted by the Division to possess and control the use of explosives.

BLASTER IN CHARGE: A Type I permittee who is in charge of and responsible for the loading or preparing of the explosives charges, and either physically initiates the charge or is physically present when the charge is initiated at a specific job site. This individual is in charge of the planning of the blast at a specific job site, the supervision of all persons assisting on the blast and all persons in training, and is responsible for the inventory, inventory records, and blast records for the blast.

BLASTING AGENT: An explosive material which meets prescribed criteria for insensitivity to initiation.

For storage, Title 27, CFR, Section 55.11, defines a blasting agent as any material or mixture consisting of fuel and oxidizer intended for blasting, not otherwise defined as an explosive provided that the finished product, as mixed for use or shipment, cannot be detonated by means of a No. 8 Blasting Cap when unconfined (Bureau of Alcohol, Tobacco, Firearms, and Explosives Regulation).

For transportation, Title 49 CFR defines a blasting agent as a material designed for blasting which has been tested and found to be so insensitive that there is very little probability of accidental initiation to explosion or transition from deflagration to detonation (US Department of Transportation Regulation).

BLASTING MAT: A mat of woven steel, wire, rope, scrap tires, or other suitable material or construction to cover blast holes for the purpose of preventing flying rock missiles.

BLAST PATTERN, DRILL PATTERN: The plan of the drill holes laid out for blasting; an expression of the burden distance, the spacing distance and their relationship to each other.

BLAST SITE: Area where explosive material is handled during blasting operations, including the perimeter of blast holes and a distance of 50 feet in all directions from explosive charges, loaded boreholes or boreholes to be loaded.

BOOSTER: An explosive charge, usually of high detonation velocity and detonation pressure, designed to be used in the initiation sequence between an initiator or primer and the main charge.

BOREHOLE, BLAST HOLE, DRILL HOLE: A hole drilled in the material to be blasted, for the purpose of containing an explosive charge.

BULK MIX: A mass of explosive material prepared for use in bulk form without packaging.

BULK MIX DELIVERY EQUIPMENT: Equipment (usually a motor vehicle with or without a mechanical delivery device) which transports explosive material in bulk form for mixing and/or loading directly into blast holes.

BULLET-RESISTANT: Magazine walls or doors of construction resistant to penetration of a bullet of 150-grain M2 ball ammunition having a nominal muzzle velocity of 2,700 feet per second fired from a .30 caliber rifle from a distance of 100 feet perpendicular to the wall or door.

When a magazine ceiling or roof is required to be bullet-resistant, the ceiling or roof shall be constructed of materials comparable to the side walls or of other materials which will withstand penetration of the bullet described above when fired at an angle of 45 degrees from perpendicular.

Tests to determine bullet resistance shall be conducted on test panels or empty magazines which shall resist penetration of 5 out of 5 shots placed independently of each other in an area of at least 3 feet by 3 feet. Examples of construction that meet this definition are given in Article 4 as alternate construction standards for Type 1 and Type 2 magazines.

BULLET-SENSITIVE EXPLOSIVE MATERIAL: Explosive material that can be detonated by 150 grain M2 ball ammunition having a nominal muzzle velocity of 2,700 feet per second when the bullet is fired from a .30 caliber rifle at a distance of not more than 100 feet and the test material, at a temperature of 70-75 degrees Fahrenheit, is placed against a backing material of 2 inch steel plate.

BURDEN: The distance from the borehole and the nearest free face, or the distance between boreholes measured perpendicular to the spacing. Also, the total amount to be blasted by a given hole, which is usually measured in cubic yards or tons.

BUS WIRE: Expendable heavy gauge bare copper wire used to connect detonators or series of detonators in parallel.

CHARGE-PER-DELAY: Any charges firing within any 8-millisecond time period are considered to have a cumulative effect on vibration and air over-pressure effects. Therefore, the maximum charge-per-delay (w) is the maximum weight of all charges firing within any 8-millisecond time period from the time a blast starts until the time it ends. For example, if two 10-lb charges fire at 100 ms and one 15-lb charge fires at 105 ms, the maximum charge-per-delay (w) for this time period would be 35 lbs.

COLLAR: The mouth or opening of a borehole.

CONNECTING WIRE: Wire used to extend the firing line or leg wires in the electric blasting circuit.

CONTROL: To directly exercise authority or dominating influence over the use, manufacture, acquisition, purchase, sale, distribution, storage, transportation, or disposal of explosive materials.

CORNICE: An overhanging mass of windblown snow or ice, usually located near a sharp terrain break.

DATE-SHIFT CODE: A code, required by federal regulation (ATF), applied by manufacturers to the outside shipping containers, and, in many instances, to the immediate containers of explosive materials to aid in their identification and tracing. The code indicates the date, work shift and plant of manufacture.

DAY BOX: A portable magazine for the temporary and attended storage of explosives. Day boxes shall meet construction requirements of a Type 3 magazine.

DEALER: Any person engaged in the business of distributing explosive material at wholesale or retail.

DECK: An explosive charge that is separated from other charges in the blast hole by stemming or an air cushion.

DEFLAGRATION: An explosive reaction, such as rapid combustion, that moves through an explosive material at a velocity less than the speed of sound in the material.

DENSITY: The mass of an explosive per unit volume, usually expressed in grams per cubic centimeter or pounds per cubic foot.

DETONATING CORD: A flexible cord containing a center core of high explosives, which may be used to initiate other high explosives.

DETONATION: An explosive reaction that moves through an explosive material at a velocity greater than the speed of sound in the material.

DETONATOR: Any device containing any initiating or primary explosive that is used for initiating detonation. A detonator may not contain more than 10 grams of total explosives by weight,

excluding ignition or delay charges. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, electronic detonators, blasting caps for use with safety fuses, detonating cord delay connectors, and non-electric instantaneous and delay blasting caps which use detonating cord, shock tube, or any other replacement for electric leg wires.

DIVISION: The Director of the Division of Oil and Public Safety of the Department of Labor and Employment or any designees thereof which may include certain employees of the Division of Oil and Public Safety or other persons.

DOWN LINE: A line of detonating cord or plastic tubing in a blast hole which transmits detonation from the trunkline or surface delay system down the hole to the primer.

ELECTRIC DETONATOR: A detonator designed for and capable of initiation by means of an electric current.

ELECTRONIC DETONATORS: A detonator that utilizes stored electrical energy as a means of powering an electronic timing delay element/module and that provides initiation energy for firing the base charge.

EMULSION: An explosive material containing substantial amounts of oxidizers dissolved in water droplets surrounded by an immiscible fuel, or droplets of an immiscible fuel surrounded by water containing substantial amounts of oxidizer.

EXPLOSIVE: Any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion; the term includes, but is not limited to, dynamite and other high explosives, black powder, pellet powder, initiating explosives, detonators, safety fuses, squibs, detonating cord, igniter cord and igniters.

EXPLOSIVE MATERIALS: These include explosives, blasting agents, and detonators. The term includes but is not limited to dynamite and other high explosives; slurries, emulsions, and water gels, black powder, initiating explosives, propellant rockbreaking cartridges (such as Rockcrackers™), detonators (blasting caps), safety fuses, squibs, detonating cord, igniter cord, and igniters. Binary explosives (such as Kinepak™ or Execon™), sold in two or more components, are considered an explosive material requiring a Division explosives permit.

EXPLOSIVE OILS: Liquid explosive sensitizers for explosive materials (.e.g., nitroglycerin, ethylene glycol dinitrate and metriol trinitrate).

EXTRANEOUS ELECTRICITY: Electrical energy, other than actual firing current or the test current from a blasting galvanometer, that is present at a blast site and that could enter a blasting circuit. It includes stray current, static electricity, electromagnetic waves, and time varying electric and magnetic fields.

FIRE EXTINGUISHER RATING: A rating set forth in the National Fire Code which may be identified on an extinguisher by a number (5, 20, 70, etc.) indicating the extinguisher's relative effectiveness, followed by a letter (A, B, C, etc.) indicating the class or classes of fires for which the extinguisher has been found to be effective.

FIRE-RESISTANT: Construction designed to provide reasonable protection against fire. For exterior walls or magazine constructed of wood, this shall mean fire resistance equivalency provided by sheet metal of not less than #26 gauge.

FIRING LINE: The wire(s) connecting the electrical power source with the electric or electronic blasting circuit.

FLYROCK: Dirt, mud, stone, fragmented rock or other material that is propelled from the blast site by the force of an explosion.

FREE FACE: A rock surface exposed to air or water which provides room for expansion upon fragmentation.

FUSE (SAFETY): A flexible cord containing an internal burning medium by which fire or flame is conveyed at a continuous and uniform rate from the point of ignition to a cut end. A fuse detonator is usually attached to that end, although safety fuse may be used without a detonator to ignite material such as deflagrating explosives.

FUSE DETONATOR, BLASTING CAP: A detonator which is initiated by a safety fuse or used in an avalauncher round; also referred to as an ordinary blasting cap. Also see detonator.

FUSE LIGHTERS: Pyrotechnic devices for the rapid and certain lighting of safety fuse.

FUEL: A substance which may react with oxygen to produce combustion.

GRAINS: In the avoirdupois system of weight measurement, 7,000 grains are equivalent to one standard, 16-ounce pound (0.45 kg). A grain is 0.0648 grams in both the avoirdupois and troy systems.

GROUND VIBRATION: Shaking the ground by elastic waves emanating from a blast; usually measured in inches per second of particle velocity.

HARDWOOD: Red Oak, White Oak, Hard Maple, Ash, or Hickory, free from loose knots, wind shakes, or similar defects.

HIGH EXPLOSIVES: Explosives which are characterized by a very high rate of reaction, high pressure development and the presence of a detonation wave, including, but not limited to, dynamite, detonating cord, cast boosters, detonators, cap-sensitive slurry, emulsion, or water gels, and mixed binaries.

HOWITZER: A military cannon that delivers projectiles at medium muzzle velocity at low or high trajectories.

INHABITED AREA OR BUILDING: A building regularly occupied in whole or in part as a habitation for human beings, or any church, schoolhouse, railroad station, store, or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage, and use of explosive materials.

INSPECTOR: An Inspector of the Division.

INITIATION: The start of deflagration or detonation in an explosive material.

INITIATION SYSTEM: Combination of explosive devices and accessories (detonators, wire, cord, etc.) designed to convey a signal and initiate an explosive charge.

LAWFUL POSSESSOR: A Type II permittee who has legally purchased or acquired explosive materials.

LOADING DENSITY: The weight of explosive, expressed as pounds per foot or kilograms per meter of borehole.

LOW EXPLOSIVES: Explosives which are characterized by deflagration or a low rate of reaction and the development of low pressure.

MAGAZINE: Any building, structure, or container, other than an explosives manufacturing building, approved for the storage of explosive materials.

MAGAZINE DISTANCE: Shall mean the minimum distance permitted between any two storage magazines which is expected to prevent propagation of an explosion from one magazine to another from a blast.

MAKE-UP ROOM: A room located inside an uninhabited building which shall be used for the assembly of cap and fuse or for the arming of explosive charges used in avalanche mitigation work.

MANUFACTURER: Any individual, corporation, company, firm, partnership, association, or state or local government agency engaged in the business of manufacturing explosive materials for the purpose of sale, distribution or for his own use.

MASS DETONATION: When a unit or any part or quantity of explosive material detonates and causes all or a substantial part of the remaining material to detonate.

MISFIRE: A blast that fails to detonate completely after an attempt at initiation. This term is also used to describe the explosive material itself that has failed to detonate as planned.

MOTOR VEHICLE: A vehicle, machine, tractor, semi-trailer or other conveyance propelled or drawn by mechanical power. Does not include vehicles operated exclusively on rail.

NATURAL BARRICADE: Natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the magazine when the trees are bare of leaves.

NON-ELECTRIC DETONATOR: A detonator that does not require the use of electric energy to function.

OXIDIZER OR OXIDIZING MATERIAL: A substance, such as nitrite, that readily yields oxygen or other oxidizing substances to promote the combustion of organic matter or other fuel.

PERMANENT STORAGE MAGAZINE: Type 1 magazines or Type 2, Type 4, or Type 5 magazines that have been at the same location for longer than 90 days.

PARTICLE BOARD: A composition board made of small pieces of wood that have been bonded together.

PARTICLE VELOCITY: A measure of the intensity of ground vibration, specifically the velocity of motion of the ground particles as they are excited by the wave energy.

PERMITTEE: Any user, purchaser, manufacturer, dealer, storer, disposer, or transporter of explosives for a lawful purpose, who has obtained a permit from the Division.

PERSON: Any individual, corporation, company, firm, partnership, association, or state or local government agency.

PETN: Pentaerythritol tetranitrate.

PLACARDS: Division of Transportation Approved Title 49 CFR signs placed on vehicles transporting hazardous materials (including explosive materials) indicating the nature of the cargo.

PLYWOOD: Exterior construction-grade plywood.

POSSESS: The physical possession of explosives on one's person, or in the person's vehicle, magazine or building.

POWDER: A common synonym for explosive materials.

POWDER FACTOR: The amount of explosives used per unit of blasted material (see Loading Density).

PRIMER: A unit, package, or cartridge of explosives used to initiate other explosives or blasting agents, which contains either a detonator or a detonating cord to which a detonator designed to initiate the detonating cord is attached.

PROPELLANT/POWDER-ACTUATED POWER DEVICE: Any tool or special mechanized device or gas generator system which is actuated by a propellant or which releases and directs work through a propellant charge.

PUBLIC CONVEYANCE: Any railroad car, streetcar, ferry, cab, bus, aircraft, or other vehicle carrying passengers for hire.

PUBLIC HIGHWAY: Shall mean any public street, alley, or road.

PUBLIC HIGHWAY DISTANCE: Shall mean the minimum distance permitted between a public highway and an explosives magazine.

PUBLIC PLACE: A place which the public or a substantial number of the public has access, and includes but is not limited to, highways, transportation facilities, schools, places of amusement, parks, playgrounds, and the common areas of public and private buildings and facilities.

PURCHASER: A Type II permittee who acquires explosives.

PYROTECHNICS, FIREWORKS: Any combustible or explosive compositions or manufactured articles designed and prepared for the purpose of producing audible or visible effects.

RAILWAY: Any steam, electric, or other type of railroad or railway.

RESPONSIBLE PERSON: A Type I permitted individual who is directly responsible for a Type II permittee's compliance with the provisions of the Explosives Act, 9-7, C.R.S., and any rules and regulations promulgated thereunder.

SAFETY FUSE: A flexible cord containing an internal burning medium by which fire or flame is conveyed at a continuous and uniform rate from the point of ignition to a cut end. A fuse detonator is usually attached to that end, although safety fuse may be used without a detonator to ignite material such as deflagrating explosives.

SCALED DISTANCE (D_s): A factor relating similar blast effects from various weight charges of explosive material at various distances. Scaled Distances referring to blasting effects are obtained by dividing the distance of concern by a fractional power of the charge weight per delay of the explosive materials.

SECURED STORAGE: An area which is protected from weather and is theft-resistant and in compliance with the uniform fire code.

SEISMOGRAPH: An instrument that is useful in monitoring blasting operations for recording ground vibration. Particle velocity, displacement or acceleration is generally measured and recorded in three mutually-perpendicular directions.

SEMI-CONDUCTIVE HOSE: A hose used for pneumatic conveying of explosive materials, having an electrical resistance high enough to limit flow of stray electric currents to safe levels yet not so high as to prevent drainage of static electric charges to ground. A hose of not more than 2 megohms resistance over its entire length and of not less than 1,000 ohms per foot (3280 ohms

per meter) meets this requirement.

SENSITIVITY: A physical characteristic of an explosive material classifying its ability to be initiated upon receiving an external impulse, such as heat, shock, friction, static electricity, stray current or other influence which can cause explosive decomposition.

SHALL: Means that the rule establishes a minimum standard which is mandatory.

SHOCK TUBE: A small diameter plastic tube containing reactive material used for initiating detonators. It contains only a limited amount of reactive material such that the energy that is transmitted through the tube by means of a detonation wave is guided through and confined within the walls of the tube.

SITE: Area where active blasting is taking place or the location of explosives storage magazines.

SLURRY/WATER GEL: An explosive material containing substantial portions of a liquid, oxidizers, and fuel, plus a thickener.

SMALL ARMS AMMUNITION: Any cartridge for a shotgun, rifle, pistol, or revolver, and cartridges for propellant-actuated power device and industrial guns. Military-type ammunition containing explosive bursting charges, or any incendiary, tracer, spotting, or pyrotechnic projectile is excluded from this definition.

SOFTWOOD: Douglas Fir, or other wood of equal bullet-resistance, free of loose knots, wind shakes, or similar defects.

SPACING: The distance between boreholes. In bench blasting, the distance is measured parallel to the free face and perpendicular to the burden.

STATIC ELECTRICITY: Electric charge at rest on a person or object. It is most often produced by the contact and separation of dissimilar insulating materials.

STEMMING: Inert material placed in a borehole on top of or between separate charges of explosive material, used for the purpose of confining explosive materials or to separate charges of explosive material in the same borehole.

STEEL: General purpose (hot or cold rolled) low carbon steel, such as specification ASTM A366 or equivalent.

STORAGE: The safekeeping of explosives in unattended magazines.

TEMPORARY STORAGE MAGAZINE: A Type 1, Type 2, Type 4, or Type 5 magazine that is at a location for a period not to exceed 90 days.

THEFT-RESISTANT: Construction designed to deter illegal entry into facilities used for the storage of explosive material.

TWO-COMPONENT: See binary explosive.

TRANSPORTATION: The conveyance or carrying of explosives from one place to another by means of a motorized vehicle or device.

TYPE I EXPLOSIVES PERMIT: A permit issued by the Division to individuals who possess and control explosive materials during the use, manufacture, acquisition, purchase, sale, distribution, storage, transportation, or disposal of explosives materials.

TYPE II EXPLOSIVES PERMIT: A permit issued by the Division to corporations, companies, partnerships, firms, individuals operating a business, associations, or state or local government agencies involved in the use, purchase, sale, manufacture, transportation, acquisition, distribution or disposal of explosives materials.

TYPE III EXPLOSIVES PERMIT: A permit issued by the Division to corporations, companies, partnerships, firms, individuals operating a business, associations, or state or local government agencies for the storage of explosives in approved magazines.

WEATHER-RESISTANT: Construction designed to offer reasonable protection against weather.

**U.S. DEPARTMENT OF TRANSPORTATION EXPLOSIVE CLASSIFICATIONS FOR THE
TRANSPORTATION OF EXPLOSIVES:**

Division 1.1: Explosives that have a mass explosion hazard

Division 1.2: Explosives that have a projection hazard but not a mass explosion hazard

Division 1.3: Explosives that have a fire hazard and either a minor blast hazard or minor projection hazard or both, but not a mass explosion hazard

Division 1.4: Explosives that present minor explosion hazard

Division 1.5: Very insensitive explosives that have a mass explosion hazard, but are so insensitive that there is little probability of initiation or of transition from burning to detonation under normal conditions of transport (Blasting Agents)

ARTICLE 2 GENERAL REQUIREMENTS

Section 2-1 Miscellaneous Requirements

- (A) No person shall sell, display, or expose for sale an explosive or blasting agent on any public way or public place.
- (B) No person shall sell, deliver, or give possession and control of explosives materials to any person not in possession of a valid permit except an authorized for-hire commercial carrier transporting between two valid permittees.
- (C) No person shall sell, purchase, store, transport, use or otherwise possess or control any explosive material without the authorization of the lawful possessor of the explosive material. The lawful possessor shall file a written list of authorized Type I permittees with the Division and shall notify the Division of any changes in writing.
- (D) Any theft or loss of explosives or blasting agents, whether from a storage magazine or area, a vehicle in which they are being transported, or from a site where they are being used, or from any other location, shall immediately (but in no event later than 24 hours) be reported by the person having control of such explosives or blasting agents to the local sheriff or local police, the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), and the Division.
- (E) All individuals, corporations, companies, firms, partnerships, associations, or state or local government agencies conducting an operation or activity requiring the use, possession, purchase, sale, manufacturing, storage, acquisition, distribution, transportation or disposal of any explosive materials shall:
 - (1) Obtain a permit from the Division prior to conducting such operation or activity and shall be responsible for the results and any other consequences of any loading and firing of the explosive materials; and
 - (2) NOT delegate either performance of the blast or accountability for such performance to another person(s).
- (F) The Division, Public Safety Section and local law enforcement authority shall be notified immediately by the permittee of any accident, explosion, fire, or misuse of explosives which occurs in connection with the use, manufacture, possession, sale, transportation, storage or disposal of explosives that results in the loss of life, personal injury, or damage to any property.
- (G) The Division may inspect the site where any accident, explosion, fire, misuse, theft or loss of explosives occurred.
- (H) A Division representative may enter during normal business hours, without advance notice, the premises of any permittee, including places of storage or use, for the purpose of inspecting or examining any records or documents required under these regulations and any explosives material used or stored at the premises.
- (I) All corporations, companies, partnerships, firms, individuals operating a business, associations, or state or local government agencies conducting blasting operations shall have a certificate of liability insurance, be named as an also insured on another liability insurance policy, or shall have obtained a signed release of liability for damages from blasting operations from all parties who may be potentially affected by blasting operations. The U.S. Forest Service (USFS) has requested to be named as additionally insured for all blasting activities that occur on USFS land.

ARTICLE 3 EXPLOSIVES PERMIT

Section 3-1 Basic Legal Obligations

- (A) Except as specifically allowed by these regulations, it is unlawful for any person to use, possess and control, manufacture, purchase, sell, store, transport, or dispose of any explosive material without possessing a valid permit from the Division (18-12-109 (2) and 9-7-101, et seq., C.R.S.).

Section 3-2 General Requirements

- (A) Permits issued under these rules and regulations shall be dated and numbered. Each permit will indicate class of permit, and shall be valid for up to 36 months after the date of issue unless revoked or suspended by the Division, and shall be renewed on or before the expiration date. The application for renewal of permits shall be made to the Division prior to the renewal date to avoid possible lapse of said permit. The Division shall send a notice a minimum of 60 days prior to the expiration date. The failure of the permittee to receive timely notice from the Division shall not excuse the permittee's requirement to submit a renewal application not less than 30 days prior to the expiration date.
- (B) Upon notice from the Division or any law enforcement agency having jurisdiction, a person using, manufacturing, purchasing, selling, storing, transporting, disposing, or otherwise in possession and control of any explosives without a permit shall immediately surrender any and all such explosives to the Division or to the law enforcement agency designated by the Division.
- (C) The Division shall require, as a condition precedent to the original issuance of any explosives permit, fingerprinting and criminal history record checks for every individual applicant. Fingerprints shall be submitted on forms provided to the applicant by the Division. If a Type I permit holder submits a complete application for renewal, fingerprint cards are not required unless requested by the Division. As a condition precedent to renewal of any explosives permit for an individual, a criminal background check is required.
- (D) No person shall withhold information or make any false statement or fictitious oral or written statement or furnish or exhibit any false, fictitious, or misrepresented identification, intended or likely to deceive for the purpose of obtaining or retaining an explosives permit.
- (E) No person shall knowingly make any false entry in any record that a permittee is required to keep pursuant to these regulations.
- (F) When a permit has expired and has not been renewed, the applicable County Sheriff's Department shall be notified by the Division, and the Type II permittee must turn over any remaining explosives which the permittee is in possession of directly to the Division or the law enforcement agency designated by the Division, or in the presence of the Division or the law enforcement agency designated by the Division, surrender control of all remaining explosives which the permittee is in possession of to a valid Type II permittee.
- (G) All permittees shall take every reasonable precaution to protect their permits from loss, theft, defacement, destruction, or unauthorized duplication. The loss or theft of any permit shall be reported immediately to the local law enforcement agency and to the Division.

Section 3-3 Revocation, Suspension, or Denial of Explosives Permits

- (A) The Division shall not issue a permit to any person who:
 - (1) Is under 21 years of age;

- (2) Has been convicted in any court of a crime punishable by imprisonment for a term exceeding 1 year;
 - (3) Is currently charged with, or has a charge pending for a crime punishable by imprisonment for a term exceeding 1 year;
 - (4) Is a fugitive from justice;
 - (5) Has been convicted of a crime involving the illegal distribution of marijuana, any depressant or stimulant drug, or narcotic drug, perjury, fraud, false swearing, or bomb threats;
 - (6) Has been adjudicated developmentally disabled, mentally unstable, mentally ill or insane, or to be incompetent due to any mental disability or disease;
 - (7) Has been discharged from the armed forces under dishonorable conditions;
 - (8) Is an alien, other than an alien who is lawfully admitted for permanent residence or an alien who has obtained either a letter of clearance or letter of restoration of explosives privileges from the ATF; or
 - (9) Having been a citizen of the United States, has renounced citizenship.
- (B) The Division shall deny or revoke and not renew the permit of any person who is currently charged with, has a charge pending or has been convicted of any of the following offenses:
- (1) A crime punishable by imprisonment for a term exceeding 1 year;
 - (2) A crime involving the illegal distribution of marijuana, any depressant or stimulant drug, or narcotic drug, bomb threats, perjury, fraud, or false swearing, including making a false affidavit or statement under oath to the Division in an application or report; or
 - (3) A crime relating to use, manufacturing, sale, transportation, possession, or disposal of explosives.
- (C) The Division may revoke and not renew the permit of any person when the violation of any law or regulation relating to explosive material or the misuse of explosive materials results in loss of life or serious injury to any person.
- (D) A permit may be denied, suspended, or revoked by the Division because of, but not limited to the following:
- (1) Unlawful use of, or addiction to, alcohol, narcotics or illegal drugs;
 - (2) Failure to exercise reasonable safeguards resulting in hazard to life, health, or property;
 - (3) Failure to show legitimate use for a permit;
 - (4) Failure to show sufficient proof of training or prior experience with explosives;
 - (5) Non-compliance with an order issued by the Division within the time specified in such order;
 - (6) Proof that the permittee or applicant advocates, or knowingly belongs to any organization or group that advocates the violent overthrow of, or violent action against any federal, state, or local government or institution;
 - (7) Failure to comply with the Colorado Explosives Act, these regulations, federal, state and/or

local explosives laws and regulations;

- (8) Giving false information or a misrepresentation being willfully made to the Division and its investigators or inspectors to obtain or maintain a permit;
 - (9) Making a false affidavit or statement under oath to the Division in an application or report; or
 - (10) Other factors which, at the discretion of the Division, indicate an unfitness to hold an explosive permit in compliance with state and federal law and these regulations.
- (E) The Division shall revoke the permit of any person adjudicated to be mentally unstable, mentally ill or insane, or to be incompetent due to any mental disability or disease. The Division shall not renew the permit until the person has been legally restored to competency.

Section 3-4 Procedure on Revocation, Suspension, or Denial of Explosives Permit

- (A) In any case where the Division denies, suspends, or revokes a permit, the Division shall notify the applicant or permittee in writing. Said notice shall state the reason for denial, suspension, or revocation and state that, upon receiving a written request, a hearing shall be scheduled.
- (B) Upon notice of the revocation or suspension of any permit, the former permittee shall immediately surrender to the Division the permit and all copies thereof. In addition, the former permittee must surrender control of all explosive material in his/her possession to the Division or the law enforcement agency designated by the Division, or in the presence of the Division or the law enforcement agency designated by the Division surrender control of all explosive material in his/her possession to a valid Type II permittee until a final determination on the charges is made.
- (C) The period of denial, suspension, or revocation shall be within the sound discretion of the Division.
- (D) Any person whose permit has been denied, suspended, or revoked under Section 3.3 may apply to the Division for a hearing in order to seek relief.
 - (1) The hearing shall be conducted by the Division or an Administrative Law Judge with the Division of Administrative Hearings on behalf of the Division in accordance with the procedures of 24-4-105 C.R.S.
 - (2) The Division may grant the relief requested in the hearing if the Division determines that
 - i. The applicant is in compliance with all federal regulations; and
 - ii. The circumstances regarding the denial, suspension, or revocation, and the applicant's record and reputation are such that the granting of such relief is not contrary to public safety.
- (E) Any person aggrieved by a decision or order of the Division may seek judicial review pursuant to the provisions of 24-4-106 C.R.S.
- (F) Any person who has been denied a permit may not reapply to the Division for an explosives permit within one year of the decision, unless exception is made by the Division and the applicant establishes a substantial change in circumstances to indicate fitness to hold an explosive permit in accordance with the requirements of these regulations, State and Federal law.
- (G) In case of revocation or suspension of a permit, the Division shall notify all vendors of explosives of such revocation or suspension (24-4-104 C.R.S.).

Section 3-5 Permit Types and Classifications

Permits are separated according to type. A permit may have more than one designated classification; however, for each and every classification requested, the applicant must show legitimate use and qualifications.

3-5-1 Type I Explosives Permit

- (A) All individuals who possess and control explosive materials shall have a valid Type I Explosives Permit issued by the Division.
- (B) The requirements of permitting a Type I permittee shall be:
 - (1) An individual who possesses and controls explosive materials during the use, transportation, storage, distribution, manufacturing, sale, acquisition, or purchase of explosive materials.
 - (2) An individual who makes any or all of the following decisions:
 - (i) Decides total quantity of explosives used;
 - (ii) Decides borehole size, spacing, or depth;
 - (iii) Decides quantity of explosives in each borehole or charge;
 - (iv) Decides initiation system to be used;
 - (v) Decides timing delays to be used.
 - (3) An individual who directly supervises all personnel assisting in the use of explosives and supervises all personnel in training.
 - (4) An individual who shall also be physically present during the use of explosives, at the point of initiation when a charge is detonated and either initiates the detonation or gives the order to initiate the detonation of the charge.
- (C) The classification of permits the applicant may apply for shall be:
 - (1) Construction
 - (i) Applicant must also apply for a Type I transporter permit, or provide to the Division a written plan documenting the manner in which explosives shall be legally transported to and from construction sites.
 - (2) Construction Limited
 - (i) Applicant may use or possess class 1.4 or 1.5 explosives or binary products only.
 - (3) Possession
 - (i) Required for an applicant who possesses explosive materials during the storage, distribution, component assembly, manufacturing, sale, acquisition or purchase of explosive materials. This endorsement does not allow an individual to exercise responsibilities as described in 3-5-1 (B) (2) through (4).
 - (ii) The requirement listed in 3-5-1(D)(3) does not apply to this classification.

- (4) Quarry Operations
 - (5) Avalanche Mitigation
 - (6) Geophysical Research
 - (7) Transporter
 - (i) Applicant must submit a copy of his/her Commercial Driver's License with the Hazardous Material Endorsement included on it.
 - (ii) Required for the transportation of explosive materials and blasting agents in quantities required to be placarded across or over roads within the state.
 - (8) Well Perforation
 - (9) Manufacturer
 - (10) Special (special use or possession and control as described on the permit, including but not limited to fabrication, research and development, rock-breaker cartridges, demolition, law enforcement, unexploded ordnance disposal, purchasing agent, sales agent, etc.)
- (D) Type I permittee qualifications
- (1) The Type I permittee shall be able to understand and give written and oral orders.
 - (2) The Type I permittee shall be qualified by reason of training, knowledge, and experience in the field of using, transporting, possessing, storing and handling of explosives, and have a working knowledge of state, federal and local laws and regulations which pertain to explosives.
 - (3) The Type I permit applicant shall be required to submit proof of not less than one year of explosives experience or on the job training in explosives specific to at least one classification of permit. Avalanche mitigation applicants must meet training requirements as defined in Section 7-2.
 - (4) The Type I permit applicant shall be required to submit proof of not less than six months of explosive experience or on-the-job training in explosives specific to each additional classification of permit applied for.
 - (5) The Type I permittee shall be knowledgeable and competent in the use of each type of blasting method and initiation system used.
 - (6) A Type I permit applicant for a transportation classification permit only shall have a valid commercial driver's license with a hazardous materials endorsement and experience in the transportation of explosive materials for a period of not less than ninety days.
- (E) Type I permit limitations
- (1) A Type I permit shall be limited to possession and control of explosives while authorized by the Type II permittee(s) for whom the Type I permittee is employed or otherwise associated.
 - (2) The Type I permit shall be placed on inactive status by the Division upon notification in accordance with Section 3-9(D) that the Type I permittee is no longer authorized to possess and control explosives for a Type II permittee.

- (3) Upon receipt of written notification by a Type II permittee of authorization and the return of the original Type I permit card, the Division shall return the Type I permit to active status and issue an updated permit card reflecting the change in employment or association.
- (4) An active status Type I permit card shall be carried by the Type I permittee at all times when using, transporting, or possessing explosives.

3-5-2 Type II Explosives Permit

- (A) Corporations, companies, partnerships, firms, individuals operating a business, associations, or state or local government agencies involved in the use, purchase, sale, manufacture, transportation, or disposal of explosives shall have a valid Type II Explosives Permit.
- (B) Only one Type II permit shall be required of any corporation, company, partnership, firm, individual operating a business, association, or state or local government agency, and may be issued for all or any of the following classifications:
 - (1) CLASSIFICATION AS A MANUFACTURER OF EXPLOSIVES authorizes the possession, manufacture, and purchase of materials required in the process of manufacturing the finished product. A corporation, company, partnership, firm, individual operating a business, association, or state or local government agency that combines compounds to manufacture an explosive is engaged in the business of manufacturing explosives and shall be responsible for compliance with the provisions of 9-6-105 C.R.S., the Explosives Act, 9-7-101, et seq. C.R.S., and any rules and regulations promulgated thereunder.
 - (2) CLASSIFICATION AS A DEALER OF EXPLOSIVES authorizes the purchase, possession, and resale of explosives or blasting agents. A dealer permit is required of jobbers, wholesalers, distributors, dealers, and retailers, whether or not they physically handle, store, or have possession of the explosives or blasting agents. This permit is also required for all nonresidents who desire to sell explosives within the State of Colorado.
 - (3) CLASSIFICATION AS A PURCHASER OF EXPLOSIVES authorizes the purchase or acquisition and possession of explosives and blasting agents.
 - (4) CLASSIFICATION AS A PURCHASER LIMITED authorizes the purchase or acquisition and possession of 1.4 and 1.5 classes of explosives and binary products.
 - (5) CLASSIFICATION AS A USER OF EXPLOSIVES authorizes the possession and use of explosives and blasting agents by a corporation, company, partnership, firm, individual operating a business, association, or state or local government agency conducting an operation or activity which requires the use of such materials. User permits shall be issued for the following types of operations:
 - (i) Construction
 - (a) Applicant must also apply for a Type II transportation permit, or provide to the Division a written plan documenting the manner in which explosives shall be legally transported to and from construction sites.
 - (ii) Construction Limited
 - (a) Applicant's use and possession of explosives is limited to 1.4 and 1.5 classes of explosives and binary products.
 - (iii) Quarry Operations

- (iv) Avalanche Mitigation
 - (v) Geophysical Research
 - (vi) Well Perforation
 - (vii) Manufacturer
 - (viii) Special (special use or possession and control as described on the permit, including but not limited to fabrication, research and development, rock-breaker cartridges, demolition, law enforcement, unexploded ordnance disposal, purchasing agent, , sales agent, etc.)
- (6) A TRANSPORTATION permit authorizes the transportation of explosive materials and blasting agents in quantities that are required to be placarded across or over roads within the state when such transportation is in compliance with federal, state and local transportation laws and regulations.
- (i) A copy of a Hazardous Materials Transport Permit issued by the Public Utilities Commission (PUC) shall be submitted with the application.

3-5-3 Type III Storage Permit

- (A) Corporations, companies, partnerships, firms, individuals operating a business, associations, or state or local government agencies that store explosives shall have a valid Type III permit.
- (B) Storage permits shall be issued to those persons who have approved storage magazine sites.
- (C) Approval by the Division of a permanent storage magazine site shall include a site inspection by a Division representative. Written notification of the location of the permanent storage magazine site shall be made to the applicable fire district or department.
- (D) Approval by the Division of temporary magazine sites shall be made for a period not to exceed 90 days upon written notification to the Division as to the location of the magazine site, the type(s) and supplier of the magazines being utilized, the type and quantity of explosives being stored and proof of written notification of the location of the storage magazine to the applicable fire district or department and county sheriff.
- (E) An inspection shall be required at each permanent storage magazine site, including any added permanent storage magazine sites, prior to the renewal of the Type III permit.

Section 3-6 Permit Application

- (A) Application for each type of original permit or renewal shall be made on forms available from the Division and shall provide the following information:
 - (1) The name and address of the applicant
 - (2) Front and reverse side copies of applicant's driver's license
 - (3) The reason for desiring to use, purchase, sell, store, manufacture, transport or dispose of explosives
 - (4) The applicant's citizenship, if the applicant is an individual

- (5) If the Type II applicant is a partnership, the names and addresses of the Type I permitted partners and their citizenship
 - (6) If the Type II or Type III permit applicant is a corporation, company, firm, association or state or local government agency, the names and addresses of the Type I permitted owner(s), manager(s) or other designated individual thereof, and their citizenship
 - (7) Where application for a Type II explosives permit is made in the name of a corporation, company, partnership, association, state or local government agency or firm, the application shall be signed by the permitted owner(s), partner(s), manager(s) or other designated individual(s) who will have access to explosive materials and be directly responsible for compliance with the provisions of the Explosives Act, 9-7-101, et seq. C.R.S., and any rules and regulations promulgated thereunder
 - (8) The name(s) of the valid Type II permittee the Type I permit applicant is employed by or associated with, and for whom the applicant will possess and control explosive materials
 - (9) Evidence that the Type I applicant is sufficiently trained and experienced in the use, transportation, storage, purchase, sale, disposal or manufacturing of explosives
 - (10) Such other pertinent information as the Division shall require to effectuate the purpose of these regulations
- (B) Application forms may be obtained from the Division.
- (C) The submission of an application shall be a certification by the Type I permit applicant that the applicant, or Type I permittee acting as the responsible person for the Type II or Type III permit applicant, has read, understands and accepts these regulations and shall comply with all requirements of these regulations.
- (D) Payment of the application fee for a period of 36 months, according to the following list, must accompany each application for a permit.
- | | |
|-----------------------------|----------|
| Type I Explosives Permit: | \$110.00 |
| Type II Explosives Permit: | \$225.00 |
| Type III Explosives Permit: | \$375.00 |
- (E) A check or money order for the fee shall be made payable to the Division and submitted to the address provided on the application.
- (F) The applicant may be asked to supply additional information requested by the Division in order to verify statements in an application or in order to facilitate a Division inquiry prior to the issuance or renewal of a permit.
- (G) Each Type II application for a manufacturer or dealer permit shall be accompanied by a copy of the applicant's current federal license issued by The Bureau of Alcohol, Tobacco, Firearms and Explosives.
- (H) The Type II application for a manufacturer or dealer permit shall list the location(s) in Colorado where explosives will be manufactured or from where explosives will be sold. This shall not be required for the manufacturers of binary explosives.
- (I) A valid Type I permit shall be held by at least one of the individual owners, partners, managers or other designated individual for each classification of use requested on the Type II Explosives Permit application.

- (J) Each application for an original Type II permit or a renewal permit shall be accompanied by a list of valid Type I permittees authorized to possess and control explosives on behalf of the Type II permittee. The Division shall be notified of any changes of such Type I permittees.
- (K) An application for a Type III storage permit shall include the location of all storage facilities and types of magazines to be utilized.
- (L) Each application for a Type II permit to purchase shall have a list of Type I permittees authorized to order and receive explosives on behalf of the purchaser. The list of Type I permittees authorized to order and receive explosives on behalf of the purchaser shall be provided to dealers prior to the purchase of explosives.
- (M) In addition to the application form, all new Type I applicants, all Type I applicants requesting a change in classification of their permit, and all Type I applicants who have not renewed their permit within 60 days after expiration will be required to obtain a score of not less than 90% on a written examination prepared and administered by the Division. A Type I applicant failing the examination may retake the examination at any time. A Type I applicant failing the examination a second time must wait for a period of at least 14 days before retaking the exam.
- (N) All Type I applicants renewing their permits are required to obtain a score of not less than 90% on a written examination prepared and administered by the Division every 3 years or provide proof of 16 hours attendance during the previous 3 years in a training course approved by the Division.
- (O) The Division shall obtain a photograph of Type I permit applicants.
- (P) Upon receipt of an incomplete application or an application requiring additional information, the applicant will be notified of the deficiency or additional requirements. If the deficiency is not corrected or if the Division does not receive the additional information within 180 days following the date of notification, the application shall be considered abandoned and the Division shall not retain the application.
- (Q) Upon receipt of a completed Type I application the applicant will be sent an exam notification. If the Type I permit applicant fails to complete the exam within 180 days of the exam notification, the application shall be considered abandoned and the Division shall not retain the application.
- (R) A Type I renewal applicant must complete the exam, if required, within 180 days of the date of the renewal notification letter sent by the Division. Should the renewal applicant fail to complete the exam within 180 days of the date of the renewal letter, the application shall be considered abandoned and the Division shall not retain the application.

Section 3-7 Protection and Exhibition of Permits

Permittees shall take every reasonable precaution to protect their permits from loss, theft, defacement, destruction or unauthorized duplication.

The loss or theft of any permit shall be reported immediately to the local law enforcement agency and to the Division.

Permits, or copies thereof, shall be exhibited in conformity with the following provisions:

- (A) Manufacturer - the permit shall be posted at the facility where explosives or blasting agents are manufactured. Manufacturing permits for bulk mix trucks shall be posted in the office of the permittee.
- (B) Dealer- the permit shall be posted in the office at the location where explosives or blasting agents are sold.

- (C) Purchaser - the permit or a copy of the permit must be displayed at magazine/warehouse where explosives or blasting agents are received and stored.
- (D) User - the permit shall be posted in the main office of explosives operations.
- (E) Storage - a copy of the permit must be displayed at the office, warehouse, or in at least one magazine where explosives or blasting agents are received for storage.
- (F) A Type I permit card shall be carried by the Type I permittee at all times when using, transporting, or possessing explosives and presented to representatives of the Division and law enforcement officials, upon request, along with valid personal identification.

Section 3-8 Records of Transactions

All permittees shall keep a complete record of all transactions in, or operations involving explosives for five years following the year in which the transactions or operations involving explosives or blasting agents occurred. The permittees must retain copies thereof and furnish such copies to the Division during normal business hours upon request. When the permittee is employed by another person who holds a valid permit, the records of the employer shall be deemed to satisfy these record-keeping requirements.

3-8-1 Manufacturer

The records of a person having a permit to manufacture explosives or blasting agents shall include the following information:

- (A) Amount and kinds manufactured.
- (B) Amounts and kinds acquired for manufacture.
- (C) Names and addresses of the persons from whom acquired and dates on which acquired.
- (D) Amount and kinds sold or otherwise disposed of.
- (E) Names, addresses and permit numbers of persons to whom sold or otherwise disposed of and dates of the sales or other dispositions.
- (F) Amounts and kinds on hand at each location at the end of each day on which there are transactions or operations.
- (G) The records kept in accordance with Section 6-1(U) shall meet the record requirements for the manufacture of binary products.

3-8-2 Dealer

The records of a person having a permit for dealer shall include the following information:

- (A) Amounts and kinds acquired.
- (B) Names and addresses of persons from whom acquired and dates on which acquired.
- (C) Amounts and kinds sold or otherwise disposed of.
- (D) Names, addresses, and permit numbers of persons to whom sold or otherwise disposed of and the dates of sales or other dispositions. This requirement shall not apply to the sale of smokeless powder.

3-8-3 Type II Permit

A person holding a Type II permit to use explosives or blasting agents shall maintain a record of all explosive material transactions including a daily inventory record of all explosives received, removed from, or returned to each storage magazine in accordance with Section 4-1(F)(6) of these regulations, and records completed by Type I permittees in accordance with Section 6-1(U) and Section 7-4(B)(11).

3-8-4 Type I Permit

Type I permittees shall complete and sign records of explosives used in accordance with Section 6-1(U) or Section 7-4(B)(11) of these regulations.

Section 3-9 Permit Changes

The Division shall be notified immediately when:

- (A) There is a change in the permittee's permanent address.
- (B) There is a change in the name of a permittee, or a change in the Type I permitted owner(s), manager(s), or other designated individual(s) acting as the responsible person of any Type II or Type III permittee.
- (C) The location of an explosives storage facility is changed or added and the address of the new location shall be provided.
- (D) There is a change in the Type II permitted employer or association for whom the Type I permittee will possess and control explosive materials.
- (E) There is a change in the Type I permitted individuals authorized to possess and control explosives on behalf of a Type II permittee.
- (F) A Type I Permit holder is currently charged with, has a pending charge of or has been convicted of any of the offenses listed in 3-3 (B) 1-3.

Section 3-10 Explosives Sales to Permittees

- (A) When an order for explosives is placed by a purchaser, the dealer shall request proper authorization and identification from the purchaser and shall record the purchaser's permit number on the sales record.
- (B) The purchaser shall provide to the dealer a list of Type I permittees authorized to order and receive explosives on behalf of the purchaser. A dealer shall not distribute explosive materials to a company or individual on the order of a person who does not appear on the most current list of authorized Type I permittees, and if the person does appear on the list, the dealer shall verify the identity of such person.
- (C) The authorized Type I permittee who physically receives the purchased explosives shall present his permit and proper identification to the dealer. The receiver of the explosives shall sign a receipt documenting the explosives received with his legal signature and permit number.
- (D) All such receipts shall be retained by the dealer for not less than 5 years from the date of purchase.
- (E) The dealer shall keep a record of all explosives purchased and sold as required by federal

regulations.

- (F) Any package containing any explosive or blasting agent that is sold or is delivered for shipment by a dealer shall be properly labeled in accordance with 9-6-105 C.R.S. to indicate its explosive classification.

ARTICLE 4 STORAGE OF EXPLOSIVE MATERIALS

Section 4-1 General Requirements

- (A) All explosive materials, special industrial explosive materials, and any newly developed and unclassified explosive materials shall be kept in magazines which meet the requirements as defined in these regulations, unless they are in the process of manufacture, being physically handled in the operating process, being used, or being transported to a place of storage or use. Refer to Section 4-3 for a summary of storage requirements.
- (B) High explosives shall not be stored unattended outdoors, or in any building or structure, except in a Type 1 or Type 2 magazine.
- (C) Detonators that will not mass detonate (1.4s and 1.4b classification) and are in the original and closed shipping container may also be stored in a Type 4 magazine.
- (D) The requirements for the storage of binary explosives shall be:
 - (1) Storage of the flammable liquid component of a binary explosive shall be in secure storage that complies with the uniform fire code.
 - (2) Storage of the powder component of a binary explosive shall be in secure storage.
 - (3) Liquid and powder components shall not be stored together.
- (E) Detonators shall not be stored in the same magazine in which other explosives are kept or stored except under the following circumstances:
 - (1) In a Type 1 or Type 2 magazine, detonators may be stored with delay devices, electric squibs, safety fuse, igniters, and igniter cord.
 - (2) In a Type 4 magazine, detonators that will not mass detonate (1.4s and 1.4b classification) may be stored with electric squibs, safety fuse, igniters, and igniter cord.
- (F) Inventory and Responsibility
 - (1) Magazines shall be in the charge of a valid permittee at all times who shall be held responsible for the enforcement of all safety precautions.
 - (2) All explosives shall be accounted for at all times.
 - (3) Explosives not being used shall be kept in a locked magazine and the keys or combinations to the locks shall be unavailable to persons not holding a valid Type I permit.
 - (4) The Type II permittee shall maintain an inventory and use record of all explosive materials.
 - (5) Type I permittees shall record any receipt, removal, or return of explosives materials on inventory records within the magazine.
 - (6) The inventory records shall be maintained on forms approved by the Division and shall include:
 - (i) Type of explosive material product
 - (ii) Manufacturer's name or brand name,

- (iii) Identifying or date shift code
 - (iv) Amounts received, removed from or returned to the magazine
 - (v) The signature of the permittee receiving, removing or returning explosive materials
 - (vi) Total quantity remaining on hand
- (7) Explosive materials shall be physically counted at least monthly.
- (8) Explosive materials sold and received in individual unit quantities shall be inventoried as individual units.
- (9) Explosive materials sold and received as pounds shall be inventoried as pounds when in unopened cases, and as individual cartridges or units when in opened cases.
- (10) The Federal Bureau of Alcohol, Tobacco, Firearms and Explosives, the Division, and local law enforcement agencies shall be notified immediately of any loss, theft, or unauthorized entry into a magazine.
- (G) Surrounding Area
- (1) The land surrounding a magazine shall be kept clear of trash, dried grass, leaves or trees (except for live trees more than 10 feet tall) for a distance of at least 25 feet. Living foliage used to stabilize the earthen coverings of a magazine need not be removed.
- (2) Any other combustible materials shall not be stored within 50 feet of magazines.
- (3) Smoking, matches or an open flame shall not be permitted:
- (i) In any magazine;
 - (ii) Within 50 feet of any outdoor magazine; or
 - (iii) Within any room containing an indoor magazine.
- (4) Firearms shall not be permitted inside of, or within 50 feet of magazines.
- (5) The premises on which all outdoor magazines are located shall be posted with signs with the words "DANGER—KEEP OUT" in letters at least 3 inches high. Signs shall be posted to warn any person approaching the magazine of the hazard, but shall be located so that a bullet passing through the sign will not strike the magazines.
- (6) All normal access routes to outdoor explosives storage sites shall be posted with a sign with the words "DANGER- NEVER FIGHT FIRES ON THIS SITE. CALL _____" in letters at least 2 inches high. An emergency contact number shall be written on the sign.
- (7) Indoor magazines shall be visibly marked with the words "DANGER – KEEP FIRE AWAY."
- (H) Temporary storage at a site for blasting operations shall be located away from neighboring inhabited buildings, railways, highways, and other magazines in accordance with the American Table of Distances (see Section 4-5).
- (I) Storage Within Magazines
- (1) Packages of explosive materials shall be laid flat with top side up. Corresponding grades

and brands shall be stored together in such a manner that brands and grade marks show. All stocks shall be stored so as to be easily counted and checked. Packages of explosives shall be stacked in a stable manner. When any kind of explosive is removed from a magazine for use, the oldest of that particular kind shall always be taken first.

- (2) Packages of explosives requiring impact or potentially spark producing methods to open or to close shall not be opened or closed in a magazine, nor within 50 feet of a magazine or in close proximity to other explosive materials.
- (3) Tools used for opening packages of explosives shall be constructed of non-sparking materials.
- (4) Opened packages of explosives shall be securely closed before being returned to a magazine.
- (5) Magazines shall not be used for the storage of any metal tools nor any commodity except explosives; however, this restriction shall not apply to the storage of blasting agents and non-metal blasting supplies.
- (6) Magazine floors shall be regularly swept, kept clean, dry, and free of grit, paper, empty used packages, and rubbish. Brooms and other cleaning utensils shall not have any spark-producing metal parts. Sweepings from floors of magazines shall be properly disposed of. Magazine floors stained with nitroglycerin shall be cleaned according to instructions of the manufacturer.
- (7) When any explosive has deteriorated to an extent that it is in an unstable or dangerous condition, or if nitroglycerin leaks from any explosives, then the person in possession of such explosives shall immediately proceed to destroy such explosives in accordance with the instructions of the manufacturer. Only Type I permittees experienced in the destruction of explosive materials shall be allowed to do the work of destroying explosives.
- (8) When magazines need inside repairs, all explosives shall be removed and the floors cleaned. In making outside repairs, if there is a possibility of causing sparks or fire the explosives shall be removed from the magazine. Explosives removed from a magazine in order for repair shall either be placed in another class appropriate magazine, or placed a safe distance from the magazine where they shall be properly guarded and protected until repairs have been completed, at which time they shall be returned to the magazine.
- (9) Explosive materials within a magazine are not to be placed against the interior walls and must be stored so as not to interfere with ventilation when required.
- (10) Any person storing explosive materials shall open and inspect the magazine at least every 7 days. This inspection need not be an inventory, but must be sufficient to determine whether there has been unauthorized entry or attempted entry into the magazine, or unauthorized removal of the contents.
- (11) Flammables, such as the liquid components of binary products, shall not be stored with other explosives.

(J) Lighting Within Magazines

- (1) Battery-activated safety lights or battery-activated safety lanterns may be used in explosives storage magazines.
- (2) Electric lighting, including wiring and fixtures, used in any explosives storage magazine must meet the standards prescribed by the National Electrical Code for the conditions present in the magazine at any time. All electrical switches are to be located outside of the magazine

and also meet the standards prescribed by the National Electrical Code.

- (3) Light fixtures shall be enclosed to prevent sparks or hot metal from falling on the floor or on materials stored in the magazine.
- (4) Interior magazine lights shall be turned off when the magazine is unattended.
- (5) Copies of invoices, work orders or similar documents which indicate that the lighting complies with the National Electrical Code must be available for inspection by the Division.

Section 4-2 Classes of Explosive Materials and Examples

For the purposes of this article, there are three classes of explosive materials. These classes, together with the description of explosive materials comprising each class, are as follows:

- (A) High Explosives - Explosive materials which can be caused to detonate by means of a detonator when unconfined. Examples include:
 - (1) Dynamite and detonators;
 - (2) Detonator-sensitive slurry/water gels and emulsions; and
 - (3) Mixed binaries.
- (B) Low Explosives - Explosive materials which can be caused to deflagrate when confined. Examples include:
 - (1) Black powder;
 - (2) Pull wire igniters; and
 - (3) Safety fuse.
- (C) Blasting Agents - Explosives materials consisting of fuel and oxidizer which cannot be detonated by means of a number 8 test detonator when unconfined. Examples include:
 - (1) Ammonium Nitrate/Fuel Oil mixture (ANFO); and
 - (2) Non detonator-sensitive slurry/water gels and emulsion products.

Section 4-3 Summary of Storage Requirements

Table 4-3	Summary of Storage Requirements	
Storage Type	Classes of Explosive Materials Which May Be Stored Therein	
Type 1 (Permanent)	High Explosives, Low Explosives, Blasting Agents	
Type 2 (Portable, Mobile or Fixed)	High Explosives, Low Explosives, Blasting Agents	
Type 3 ("Day Box" for Temporary Storage)	High Explosives, Low Explosives, Blasting Agents	
Type 4 (Portable, Mobile or Fixed)	Blasting Agents, Low Explosives, Detonators (Original, Closed Cartons of 1.4b, 1.4c And 1.4s)	
Type 5 (Portable, Mobile or Fixed)	Blasting Agents	

Section 4-4 Storage Magazine Construction by Type

Table 4-4	Storage Magazine Construction By Type				
Construction Features	Type 1	Type 2	Type 3	Type 4	Type 5
Permanent	X			X	X
Portable or Mobile		X	X	X	X
Bullet-Resistant	X	X			
Fire-Resistant	X	X	X	X	X ⁽¹⁾
Theft- Resistant	X	X	X	X	X
Weather- Resistant	X	X	X	X	X
Ventilated	X	X		X	

⁽¹⁾ Over the road trucks or semi-trailers used as Type 5 magazines for temporary storage need not be fire resistant.

4-4-1 Type 1 Storage

A Type 1 magazine shall be a permanent structure, e.g., a building, an igloo or Army-type structure, a tunnel, or a dugout. It shall be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated.

- (A) **Buildings:** All building-type magazines shall be constructed of masonry, wood, metal, or a combination of these materials and shall have no openings except for entrances and ventilation. The ground around building magazines shall slope away for drainage or other adequate drainage shall be provided.
- (B) **Masonry Wall Construction:** Masonry wall construction shall consist of brick, concrete, tile, cement block, or cinder block and shall be not less than 8 inches in thickness. Hollow masonry units used in construction shall have all hollow spaces filled with well-tamped, coarse, dry sand or weak concrete (at least 1 part cement + 8 parts of sand with enough water to dampen the mixture while tamping in place). Interior walls shall be constructed of, or covered with, a non-sparking material.
- (C) **Fabricated Metal Wall Construction:** Metal wall construction shall consist of sectional sheets of steel or aluminum, not less than #14 gauge, securely fastened to a metal framework. Metal wall construction shall be either lined inside with brick, solid cement blocks, hardwood not less than 4 inches thick, or shall have at least a 6-inch sand-fill between interior and exterior walls. Interior walls shall be constructed of, or covered with, a non-sparking material.
- (D) **Wood Frame Wall Construction:** The exterior of outer wood walls shall be covered with steel or aluminum not less than #26 gauge. An inner wall of, or covered with, non-sparking material shall be constructed so as to provide a space of not less than 6 inches between the outer and inner walls. The space shall be filled with coarse, dry sand or weak concrete.
- (E) **Floors:** Floors shall be constructed of, or covered with, a non-sparking material and shall be strong enough to bear the weight of the maximum quantity materials to be stored. Use of pallets covered with a non-sparking material is considered equivalent to a floor constructed of, or covered with, a non-sparking material.
- (F) **Foundations:** Foundations shall be constructed of brick, concrete, cement block, stone, or wood posts. If piers or posts are used in lieu of a continuous foundation, the space under the buildings shall be enclosed with metal.
- (G) **Roof:** Except for buildings with fabricated metal roofs, the outer roof shall be covered with no less

than #26 gauge steel or aluminum fastened to 7/8-inch sheathing.

- (H) Bullet-Resistant Ceilings on Roofs: Where it is possible for a bullet to be fired directly through the roof and into the magazine at such an angle that the bullet would strike the explosives within, the magazine shall be protected by one of following methods:
- (1) A sand tray with a layer of building paper, plastic, or other nonporous material filled with not less than 4 inches of coarse, dry sand, shall be located at the tops of inner walls covering the entire ceiling area, except that portion necessary for ventilation.
 - (2) A fabricated metal roof shall be constructed of 3/16-inch thick plate steel lined with 4 inches of hardwood. For each additional 1/16-inch of plate steel, the hardwood lining may be decreased by 1 inch.
- (I) Doors: All doors shall be constructed of 1/4-inch plate steel and lined with 3 inches of hardwood. Hinges and hasps shall be attached to the doors by welding, riveting, or bolting (with nuts on the inside of the door). They shall be installed in such a manner that the hinges and hasps cannot be removed when the doors are closed and locked.
- (J) Locks: Each door shall be equipped with at least one of the following types of locks:
- (1) Two mortise locks
 - (2) Two padlocks fastened in separate hasps and staples
 - (3) A combination of a mortise lock and a padlock
 - (4) A mortise lock that requires two keys to open
 - (5) A three-point lock.
- Padlocks shall have at least 5 tumblers and a case-hardened shackle of at least 3/8-inch in diameter. Padlocks shall be protected with 1/4-inch sheet hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements shall not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.
- (K) Ventilation: Ventilation shall be provided to prevent dampness and heating of stored explosive materials. Ventilation openings shall be screened to prevent the entrance of sparks. Ventilation openings in sidewalls and foundations shall be offset or shielded for bullet-resistance purposes. Magazines having foundation and roof ventilators with the air circulating between the side walls and the floors and between the side walls and the ceiling shall have a wooden lattice lining or equivalent to prevent the packages of explosive materials from being stacked against the side walls and blocking the air circulation.
- (L) Exposed Metal: No sparking material shall be exposed to contact with the stored explosive materials. All ferrous metal nails in the floor and sidewalls which might be exposed to contact with explosive materials shall be blind-nailed, countersunk, or covered with a non-sparking latticework or other non-sparking material.
- (M) Igloos, Army-Type Structures, Tunnels, & Dugouts: Igloo, army-type structure, tunnel, and dugout magazines shall be constructed of reinforced concrete, masonry, metal, or a combination of these materials. They shall have an earth mound covering of not less than 24 inches on the top, sides, and rear unless the ceiling or roof meets the bullet-resistant ceiling or roof requirements of this section. Interior walls shall be constructed of, or covered with, a non-sparking material. Magazines of this type shall also be constructed in conformity with the requirements of the floors,

doors, locks, ventilation, and exposed metal portions outlined in this section.

4-4-2 Type 2 Storage

A Type 2 magazine shall be a portable or mobile structure such as a box, skid-magazine, trailer, or semi-trailer.

4-4-2-1 Outdoor Type 2 Magazines

Outdoor Type 2 magazines shall be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated. They shall be supported to prevent direct contact with the ground and, if less than 1 cubic yard in size, shall be securely fastened to a fixed object. The ground around outdoor magazines shall slope away for drainage or other adequate drainage shall be provided. When unattended, vehicular magazines shall have wheels removed or shall otherwise be effectively immobilized by methods approved by the Division.

- (A) Exterior Construction: The exterior and covers or doors shall be constructed of 1/4-inch steel and shall be lined with 2 inches of hardwood. Magazines with top openings shall have lids with water-resistant seals or which overlap the sides by at least 1 inch when in a closed position.
- (B) Hinges & Hasps: Hinges and hasps shall be attached to the covers or doors by welding, riveting, or bolting (with nuts on the inside of the door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.
- (C) Locks: Each door shall be equipped with at least one of the following types of locks:
 - (1) Two mortise locks
 - (2) Two padlocks fastened in separate hasps and staples
 - (3) A combination of a mortise lock and a padlock
 - (4) A mortise lock that requires two keys to open
 - (5) A three-point lock.

Padlocks shall have at least 5 tumblers and a case-hardened shackle of at least 3/8-inch diameter. Padlocks shall be protected with 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

- (D) Ventilation: Ventilation shall be provided to prevent dampness and heating of stored explosive materials. Ventilation openings shall be screened to prevent the entrance of sparks. Ventilation openings in sidewalls shall be offset or shielded for bullet-resistance purposes. Packages of explosive materials shall not be stacked against the side walls and block the air circulation.

4-4-2-2 Indoor Type 2 Magazines

Indoor Type 2 magazines shall be fire-resistant and theft-resistant if the buildings in which they are stored provide protection from the weather and from bullet penetration. No indoor magazine may be located in a residence or dwelling. The indoor storage of high explosives may not exceed a quantity of 50 pounds. More than one indoor magazine may be located in the same building if the total quantity of all explosive materials stored does not exceed 50 pounds. Detonators shall be stored in separate magazines.

- (A) Exterior Construction: Indoor magazines shall be constructed of wood or metal according to one of the following specifications:
- (1) Indoor magazines constructed of wood shall have sides, bottoms, and lids or doors constructed of two-inch wood and shall be well-braced at the corners. The magazines shall be covered on the exterior with sheet metal of not less than #26-gauge. Nails exposed to the interior of magazines shall be countersunk.
 - (2) Indoor magazines constructed of metal shall have sides, bottom, and lids or doors constructed of at least #12-gauge metal and shall be lined inside with a non-sparking material. Edges of metal covers shall overlap sides at least 1 inch.
- (B) Hinges & Hasps: Hinges and hasps shall be attached to the covers or doors by welding, riveting, or bolting (with nuts on the inside of the door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.
- (C) Locks: Each door shall be equipped with at least one of the following types of locks:
- (1) Two mortise locks
 - (2) Two padlocks fastened in separate hasps and staples
 - (3) A combination of a mortise lock and a padlock
 - (4) A mortise lock that requires two keys to open
 - (5) A three-point lock.

Padlocks shall have at least 5 tumblers and a case-hardened shackle of at least 3/8-inch diameter. Padlocks shall be protected with 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. Indoor magazines located in secure rooms, that are locked as provided in this paragraph, may have each door or opening locked with 1 steel padlock (which need not be protected by a steel hood) having at least 5 tumblers and a case-hardened shackle of at least 3/8-inch diameter, if the lock hinges and hasps are securely fastened to the magazine and to the door frame. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

4-4-3 Alternate Construction Standards for Storage Facilities

It has been determined that a wide range of construction criteria meet the bullet-resistant requirements of ATF Rule 76-18 as published in Bureau Of Alcohol, Tobacco, Firearms, and Explosives, Department Of The Treasury, Publication ATF p 5400.7 (2012) for the construction of storage facilities for explosive materials.

In order to promote standards of safety and security in the storage of explosive materials while allowing the industry a wide latitude in the selection of construction materials, it is held that storage facilities (magazines) that are constructed according to the following minimum specifications are bullet-resistant and meet the requirements of the regulations as set forth in 27 CFR Part 55 (all steel and wood dimensions are actual thicknesses. To meet the concrete block and brick dimensions indicated, the manufacturers' represented thicknesses may be used).

- (A) Exterior of 5/8-inch steel, lined with an interior of any type of non-sparking material.
- (B) Exterior of 1/2-inch steel, lined with an interior of not less than 3/8-inch plywood.

- (C) Exterior of 3/8-inch steel, lined with an interior of 2 inches of hardwood.
- (D) Exterior of 3/8-inch steel, lined with an interior of 3 inches of softwood or 2¼ inches of plywood.
- (E) Exterior of 1/4-inch steel, lined with an interior of 3 inches of hardwood.
- (F) Exterior of 1/4-inch steel, lined with an interior of 5 inches of softwood or 5¼ inches of plywood.
- (G) Exterior of 1/4-inch steel, lined with an intermediate layer of 2 inches of hardwood and an interior lining of 1½ inches of plywood.
- (H) Exterior of 3/16-inch steel, lined with an interior of 4 inches of hardwood.
- (I) Exterior of 3/16-inch steel, lined with an interior of 7 inches of softwood or 6¾ inches of plywood.
- (J) Exterior of 3/16-inch steel, lined with an intermediate layer of 3 inches of hardwood and an interior lining of 3/4-inch of plywood.
- (K) Exterior of 1/8-inch steel, lined with an interior of 5 inches of hardwood.
- (L) Exterior of 1/8-inch steel, lined with an interior of 9 inches of softwood.
- (M) Exterior of 1/8-inch steel, lined with an intermediate layer of 4 inches of hardwood and an interior lining of 3/4-inch plywood.
- (N) Exterior of any type of fire-resistant material which is structurally sound, lined with an intermediate layer of 4 inches of solid concrete block, or 4 inches of solid brick or 4 inches of solid concrete; and, an interior lining of 1/2-inch plywood placed securely against the masonry lining.
- (O) Standard 8-inch concrete block with voids filled with well-tamped sand/cement mixture.
- (P) Standard 8-inch solid brick.
- (Q) Exterior of any type of fire-resistant material which is structurally sound, lined with an intermediate 6-inch space filled with well-tamped dry sand or well-tamped sand/cement mixture.
- (R) Exterior of 1/8-inch steel, lined with a first intermediate layer of 3/4-inch plywood, a second intermediate layer of 3⅝ inches of well-tamped dry sand or sand/cement mixture and an interior lining of 3/4-inch plywood.
- (S) Second intermediate layer of 3⅝ inches well tamped dry sand or sand/cement mixture, a third intermediate layer of 3/4-inch plywood, and a fourth intermediate layer of two inches of hardwood or #14 gauge steel and an interior lining of 3/4-inch plywood.
- (T) 8-inch thick solid concrete.

4-4-4 Type 3 Storage

A Type 3 magazine shall be a "day-box" or other portable magazine. It shall be fire-resistant, weather-resistant, and theft-resistant. A Type 3 magazine shall be constructed of #12-gauge metal lined with either 1/2-inch plywood or 1/2-inch Masonite-type hardboard. Doors shall overlap sides by at least 1 inch. Hinges and hasps shall be attached by welding, riveting or bolting (with nuts on the inside of the door). A single lock having at least 5 tumblers and a case-hardened shackle of at least 3/8-inch diameter shall be sufficient for locking purposes. Explosive materials may not be left unattended in Type 3 magazines, but must be removed to either a Type 1 or 2 magazine for unattended storage.

4-4-5 Type 4 Storage

A Type 4 magazine shall be a building, igloo or army-type structure, tunnel, dugout, box, trailer, or a semi-trailer or other mobile magazine.

4-4-5-1 Outdoor Type 4 Magazines

Outdoor Type 4 magazines shall be fire-resistant, weather-resistant, theft-resistant, ventilated and shall be at least 1 cubic yard in size, or securely fasted to a fixed object. The ground around outdoor magazines shall slope away for drainage or other adequate drainage shall be provided. When unattended, vehicular magazines shall have wheels removed or shall otherwise be effectively immobilized by other methods approved by the Division.

- (A) Construction: Outdoor magazines shall be constructed of masonry, metal-covered wood, fabricated metal, or a combination of these materials. Foundation shall be constructed of brick, concrete, cement block, stone, or metal or wood posts. If piers or posts are used in lieu of a continuous foundation, the space under the buildings shall be enclosed with fire-resistant material. The walls and floors shall be constructed of, or covered with, a non-sparking material or lattice work. The doors or covers shall be metal or solid wood covered with metal.
- (B) Hinges and Hasps: Hinges and hasps shall be attached to the covers or doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.
- (C) Locks: Each door shall be equipped with at least one of the following types of locks:
 - (1) 2 mortise locks
 - (2) 2 padlocks fastened in separate hasps and staples
 - (3) A combination of a mortise lock and a padlock
 - (4) A mortise lock that requires two keys to open
 - (5) A three-point lock.

Padlocks shall have at least 5 tumblers and a case-hardened shackle of at least 3/8-inch diameter. Padlocks shall be protected with 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or a bar that cannot be actuated from the outside.

- (D) Ventilation: Ventilation shall be provided to prevent dampness and heating of stored explosive materials. Ventilation openings shall be offset or shielded and screened to prevent the entrance of sparks. The packages of explosive materials shall not be stacked against the side walls and block the air circulation.

4-4-5-2 Indoor Type 4 Magazines

Indoor magazines shall be fire-resistant and theft-resistant. They need not be weather-resistant if the buildings in which they are stored provide protection from the weather. No indoor magazine may be located in a residence or dwelling. The indoor storage of low explosives may not exceed a quantity of 50 pounds. More than one indoor magazine may be located in the same building if the total quantity of all explosive materials stored does not exceed 50 pounds. Detonators that will not mass detonate shall be stored in separate magazines and the total number of detonators may not exceed 5,000.

- (A) Construction: Indoor magazines shall be constructed of masonry, metal-covered wood, fabricated metal, or a combination of these materials. The walls and floors shall be constructed of, or covered with, a non-sparking material. The doors or covers shall be metal or solid wood covered with metal.
- (B) Hinges & Hasps: Hinges and hasps shall be attached to the covers or doors by welding, riveting, or bolting (with nuts on the inside of the door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.
- (C) Locks: Each door shall be equipped with at least one of the following types of locks:
 - (1) 2 mortise locks
 - (2) 2 padlocks fastened in separate hasps and staples
 - (3) A combination of a mortise lock and a padlock
 - (4) A mortise lock that requires two keys to open
 - (5) A three-point lock.

Padlocks shall have at least 5 tumblers and a case-hardened shackle of at least 3/8-inch diameter. Padlocks shall be protected with 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. Indoor magazines located in secure rooms, that are locked as provided in this paragraph, may have each door or opening locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least 3/8-inch diameter, if the lock hinges and hasps are securely fastened to the magazine and to the door frame. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

4-4-6 Type 5 Storage

A Type 5 magazine shall be a building, igloo or army-type structure, tunnel, dugout, bin, box, trailer, or a semitrailer or other mobile facility.

4-4-6-1 Outdoor Type 5 Magazines

Outdoor Type 5 magazines shall be weather-resistant, fire-resistant and theft-resistant. Over-the-road trucks or semi-trailers used as Type 5 magazines for temporary storage need not be fire-resistant. The ground around magazines shall slope away for drainage or other adequate drainage shall be provided. When unattended, vehicular magazines shall have wheels removed or shall otherwise be effectively immobilized by kingpin locking devices or other methods approved by the Division.

- (A) Construction: The doors or covers shall be constructed of solid wood or metal.
- (B) Hinges & Hasps: Hinges and hasps shall be attached to the covers or doors by welding, riveting, or bolting (with nuts on the inside of the door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.
- (C) Locks: Each door shall be equipped with one padlock having at least five tumblers and a case-hardened shackle of at least 3/8-inch diameter. Indoor magazines located in secure rooms, that are locked as provided in this paragraph, may have each door or opening locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least 3/8-inch diameter, if the lock hinges and hasps are securely

fastened to the magazine and to the door frame. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock or bar that cannot be actuated from the outside.

4-4-6-2 Indoor Type 5 Magazines

Indoor Type 5 magazines shall be theft-resistant. They need not be weather-resistant if the buildings in which they are stored provide protection from the weather. No indoor magazine may be located in a residence or dwelling. Indoor magazines containing quantities of blasting agents in excess of 50 pounds shall be subject to the American Table of Distances in Section 4-5-1 of this subpart.

- (A) Construction: The doors or covers shall be constructed of wood or metal.
- (B) Hinges and Hasps: Hinges and hasps shall be attached to the covers or doors by welding, riveting, or bolting (with nuts on the inside of the door). Hinges and hasps shall be installed so that they cannot be removed when the doors are closed and locked.
- (C) Locks: Each door shall be equipped with one padlock having at least five tumblers and a case-hardened shackle of at least 3/8-inch diameter.

Indoor magazines located in secure rooms that are locked as provided in this paragraph may have each door or opening locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least 3/8-inch diameter if the lock hinges and hasps are securely fastened to the magazine and to the door frame. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock or bar that cannot be actuated from the outside.

Section 4-5 Location of Magazines

- (A) Outdoor magazines in which high explosives are stored shall be located no closer to inhabited buildings, passenger railways, public highways or other magazines in which high explosives are stored than the minimum distances specified in the American Table of Distances for Storage of Explosive Materials in Table 4-5-1.
- (B) Outdoor magazines in which low explosives are stored shall be located no closer to inhabited buildings, passenger railways, public highways or other magazines in which explosives are stored than the minimum distances specified in the American Table of Distances for Storage of Low Explosives in Table 4-5-2. The distances shown therein may not be reduced by the presence of barricades.
- (C) Outdoor magazines in which blasting agents are stored shall be located no closer to inhabited buildings, passenger railways or public highways than the minimum distances specified in the American Table of Distances for Storage of Explosive Materials in Table 4-5-1.
- (D) Ammonium nitrate and magazines in which blasting agents are stored shall be located no closer to magazines in which high explosives or other blasting agents are stored than the minimum distances specified in the American Table of Distances for the Separation of Ammonium Nitrate and Blasting Agents in Table 4-5-3. However, the minimum distances for magazines in which explosives and blasting agents are stored from inhabited buildings, passenger railways or public highways may not be less than the distances specified in the American Table of Distances for Storage of Explosive Materials in Table 4-5-1.

Table 4-5-1		American Table of Distances for Storage of Explosive Materials							
Quantity of Explosive Materials ^(1,2,3,4)		Distances in Feet							
		Inhabited Buildings ⁽⁹⁾		Public Highways with Traffic Volume of less than 3,000 Vehicles/Day ⁽¹¹⁾		Passenger Railways-Public Highways with Traffic Volume of more than 3,000 Vehicles/Day ^(10,11)		Separation of Magazines ⁽¹²⁾	
Pounds Over	Pounds Not Over	Barricaded ^(6,7,8)	Unbarricaded	Barricaded ^(6,7,8)	Unbarricaded	Barricaded ^(6,7,8)	Unbarricaded	Barricaded ^(6,7,8)	Unbarricaded
0	5	70	140	30	60	51	102	6	12
5	10	90	180	35	70	64	128	8	16
10	20	110	220	45	90	81	162	10	20
20	30	125	250	50	100	93	186	11	22
30	40	140	280	55	110	103	206	12	24
40	50	150	300	60	120	110	220	14	28
50	75	170	340	70	140	127	254	15	30
75	100	190	380	75	150	139	278	16	32
100	125	200	400	80	160	150	300	18	36
125	150	215	430	85	170	159	318	19	38
150	200	235	470	95	190	175	350	21	42
200	250	255	510	105	210	189	378	23	46
250	300	270	540	110	220	201	402	24	48
300	400	295	590	120	240	221	442	27	54
400	500	320	640	130	260	238	476	29	58
500	600	340	680	135	270	253	506	31	62
600	700	355	710	145	290	266	532	32	64
700	800	375	750	150	300	278	556	33	66
800	900	390	780	155	310	289	578	35	70
900	1,000	400	800	160	320	300	600	36	72
1,000	1,200	425	850	165	330	318	636	39	78
1,200	1,400	450	900	170	340	336	672	41	82
1,400	1,600	470	940	175	350	351	702	43	86
1,600	1,800	490	980	180	360	366	732	44	88
1,800	2,000	505	1,010	185	370	378	756	45	90
2,000	2,500	545	1,090	190	380	408	816	49	98
2,500	3,000	580	1,160	195	390	432	864	52	104
3,000	4,000	635	1,270	210	420	474	948	58	116
4,000	5,000	685	1,370	225	450	513	1,026	61	122
5,000	6,000	730	1,460	235	470	546	1,092	65	130
6,000	7,000	770	1,540	245	490	573	1,146	68	136
7,000	8,000	800	1,600	250	500	600	1,200	72	144
8,000	9,000	835	1,670	255	510	624	1,248	75	150
9,000	10,000	865	1,730	260	520	645	1,290	78	156
10,000	12,000	875	1,750	270	540	687	1,374	82	164
12,000	14,000	885	1,770	275	550	723	1,446	87	174
14,000	16,000	900	1,800	280	560	756	1,512	90	180
16,000	18,000	940	1,880	285	570	786	1,572	94	188
18,000	20,000	975	1,950	290	580	813	1,626	98	196
20,000	25,000	1,055	2,000	315	630	876	1,752	105	210
25,000	30,000	1,130	2,000	340	680	933	1,866	112	224
30,000	35,000	1,205	2,000	360	720	981	1,962	119	238
35,000	40,000	1,275	2,000	380	760	1,026	2,000	124	248
40,000	45,000	1,340	2,000	400	800	1,068	2,000	129	258
45,000	50,000	1,400	2,000	420	840	1,104	2,000	135	270
50,000	55,000	1,460	2,000	440	880	1,140	2,000	140	280
55,000	60,000	1,515	2,000	455	910	1,173	2,000	145	290
60,000	65,000	1,565	2,000	470	940	1,206	2,000	150	300
65,000	70,000	1,610	2,000	485	970	1,236	2,000	155	310
70,000	75,000	1,655	2,000	500	1,000	1,263	2,000	160	320
75,000	80,000	1,695	2,000	510	1,020	1,293	2,000	165	330
80,000	85,000	1,730	2,000	520	1,040	1,317	2,000	170	340
85,000	90,000	1,760	2,000	530	1,060	1,344	2,000	175	350
90,000	95,000	1,790	2,000	540	1,080	1,368	2,000	180	360
95,000	100,000	1,815	2,000	545	1,090	1,392	2,000	185	370
100,000	110,000	1,835	2,000	550	1,100	1,437	2,000	195	390
110,000	120,000	1,855	2,000	555	1,110	1,479	2,000	205	410
120,000	130,000	1,875	2,000	560	1,120	1,521	2,000	215	430
130,000	140,000	1,890	2,000	565	1,130	1,557	2,000	225	450
140,000	150,000	1,900	2,000	570	1,140	1,593	2,000	235	470
150,000	160,000	1,935	2,000	580	1,160	1,629	2,000	245	490
160,000	170,000	1,965	2,000	590	1,180	1,662	2,000	255	510
170,000	180,000	1,990	2,000	600	1,200	1,695	2,000	265	530
180,000	190,000	2,010	2,010	605	1,210	1,725	2,000	275	550
190,000	200,000	2,030	2,030	610	1,220	1,755	2,000	285	570
200,000	210,000	2,055	2,055	620	1,240	1,782	2,000	295	590
210,000	230,000	2,100	2,100	635	1,270	1,836	2,000	315	630
230,000	250,000	2,155	2,155	650	1,300	1,890	2,000	335	670
250,000	275,000	2,215	2,215	670	1,340	1,950	2,000	360	720
275,000	300,000	2,275	2,275	690	1,380	2,000	2,000	385	770

Table: American Table of Distances for Storage of Explosive Materials as Revised and Approved by the Institute of Makers of Explosives – June 1991

Table 4-5-2		Table of Distance for the Storage of Low Explosives		
Quantity of Explosives (In Pounds)		Distance in Feet		
Over	Not Over	From Inhabited Buildings	From Public Railways and Highways	From Above Ground Magazine
0	1,000	75	75	50
1,000	5,000	115	115	75
5,000	10,000	150	150	100
10,000	20,000	190	190	125
20,000	30,000	215	215	145
30,000	40,000	235	235	155
40,000	50,000	250	250	165
50,000	60,000	260	260	175
60,000	70,000	270	270	185
70,000	80,000	280	280	190
80,000	90,000	295	295	195
90,000	100,000	300	300	200
100,000	200,000	375	375	250
200,000	300,000	450	450	300

Table: Department of Defense Ammunition and Explosives Standards, Table 5-4.1 Extract; 4145.27 M, March 1969

Table 4-5-3		Table of Separation Distances of Ammonium Nitrate and Blasting Agents from Explosives or Blasting Agents ^{1,6}		
Donor Weight		Minimum Separation Distance of Acceptor when Barricaded ² (ft.)		
Pounds Over	Pounds Not Over	Ammonium Nitrate ³	Blasting Agent ⁴	Minimum Thickness of Artificial Barricades ⁵ (in.)
	100	3	11	12
100	300	4	14	12
300	600	5	18	12
600	1,000	6	22	12
1,000	1,600	7	25	12
1,600	2,000	8	29	12
2,000	3,000	9	32	15
3,000	4,000	10	36	15
4,000	6,000	11	40	15
6,000	8,000	12	43	20
8,000	10,000	13	47	20
10,000	12,000	14	50	20
12,000	16,000	15	54	25
16,000	20,000	16	58	25
20,000	25,000	18	65	25
25,000	30,000	19	68	30
30,000	35,000	20	72	30
35,000	40,000	21	76	30
40,000	45,000	22	79	35
45,000	50,000	23	83	35
50,000	55,000	24	86	35
55,000	60,000	25	90	35
60,000	70,000	26	94	40
70,000	80,000	28	101	40
80,000	90,000	30	108	40
90,000	100,000	32	115	40
100,000	120,000	34	122	50
120,000	140,000	37	133	50
140,000	160,000	40	144	50
160,000	180,000	44	158	50
180,000	200,000	48	173	50
200,000	220,000	52	187	60
220,000	250,000	56	202	60
250,000	275,000	60	216	60
275,000	300,000	64	230	60

Table: National Fire Protection Association (NFPA) Official Standard No. 492, 1968

**Explanatory Notes Essential to the Application of the American Table of Distances
for Storage of Explosive Materials**

- NOTE 1 "Explosive materials" means explosives, blasting agents and detonators.
- NOTE 2 "Explosives" means any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion. For quantity and distance purposes, detonating cord of 50 grains per foot should be calculated as equivalent to 8 lbs. of high explosives per 1,000 feet. Heavier or lighter core loads should be rated proportionately.
- NOTE 3 "Blasting agents" means any material or mixture, consisting of fuel and oxidizer, intended for blasting, not otherwise defined as an explosive provided that the finished product as mixed for use or shipment, cannot be detonated by means of a No.8 test blasting cap when unconfined.
- NOTE 4 "Detonator" means any device containing any initiating or primary explosive that is used for initiating detonation. A detonator may not contain more than 10 grams of total explosives by weight, excluding ignition or delay charges. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, electronic detonators, blasting caps for use with safety fuses, detonating cord delay connectors, and non-electric instantaneous and delay blasting caps which use detonating cord, shock tube, or any other replacement for electric leg wires. All types of detonators in strengths through No.8 cap should be rated at 1 1/2 lbs. of explosives per 1,000 caps. For strengths higher than No.8 cap consult the manufacturer.
- NOTE 5 "Magazine" means any building, structure, or container, other than an explosives manufacturing building, approved for the storage of explosive materials.
- NOTE 6 "Natural Barricade" means natural features of the ground such as hills, or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the magazine when the trees are bare of leaves.
- NOTE 7 "Artificial Barricade" means an artificial mound or wall of earth of a minimum thickness of three feet.
- NOTE 8 "Barricaded" means the effective screening of a building containing explosive materials from the magazine or other building, railway, or highway by a natural or an artificial barrier. A straight line from the top of any sidewall of the building containing explosive materials to the eave line of any magazine or other building or to a point twelve feet above the center of a railway or highway shall pass through such barrier.
- NOTE 9 "Inhabited Building" means a building regularly occupied in whole or part as a habitation for human beings, or any church, schoolhouse, railroad station, store, or other structure where people are accustomed to assemble, except any building or structure occupied in connection with the manufacture, transportation, storage or use of explosive materials.
- NOTE 10 "Railway" means any steam, electric, or other railroad or railway which carries passengers for hire.
- NOTE 11 "Highway" means any public street, public alley, or public road.

- NOTE 12 When two or more storage magazines are located on the same property, each magazine must comply with the minimum distances specified from inhabited buildings, railways and highways, and, in addition, they should be separated from each other by not less than the distances shown for "Separation of Magazines," except that the quantity of explosive materials contained in detonator magazines shall govern in regard to the spacing of said detonator magazines from magazines containing other explosive materials. If any two or more magazines are separated from each other by less than the specified "Separation of Magazines" distances, then such two or more magazines, as a group, must be considered as one magazine, and the total quantity of explosive materials stored in such group must be treated as if stored in a single magazine located on the site of any magazine of the group, and must comply with the minimum of distances specified from other magazines, inhabited buildings, railways, and highways.
- NOTE 13 Storage in excess of 300,000 lbs. of explosive materials, in one magazine is generally not required for commercial enterprises.
- NOTE 14 This Table applies only to the manufacture and permanent storage of commercial explosive materials. It is not applicable to transportation of explosives or any handling or temporary storage necessary or incident thereto. It is not intended to apply to bombs, projectiles, or other heavily encased explosives.
- NOTE 15 When a manufacturing building on an explosive materials plant site is designed to contain explosive materials, such building shall be located from inhabited buildings, public highways and passenger railways in accordance with the American Table of Distances based on the maximum quantity of explosive materials permitted to be in the building at one time.

American Table of Distances

The American Table of Distances applies to the manufacture and permanent storage of commercial explosive materials. The distances specified are those measured from the explosive materials storage facility to the inhabited building, highway or passenger railway, irrespective of property lines.

The American Table of Distances covers all commercial explosive materials, including, but not limited to, high explosives, blasting agents, detonators, initiating systems and explosives materials in process. The Table is not designed to be altered or adjusted to accommodate varying explosive characteristics such as blast effect, weight strength, density, bulk strength, detonation velocity, etc.

The American Table of Distances should not be used to determine safe distances for blasting work, the firing of explosive charges for testing or quality control work, or the open detonation of waste explosive materials. The American Table of Distances may be utilized as a guide for developing distances for the unconfined, open burning of waste explosive materials where the probability of transition from burning to high order detonation is improbable.

Notes to Table of Recommended Separation Distances of Ammonium Nitrate and Blasting Agents from Explosives or Blasting Agents

- NOTE 1 Recommended separation distances to prevent explosion of ammonium nitrate and ammonium nitrate-based blasting agents by propagation from nearby stores of high explosives or blasting agents referred to in the Table as the "donor." Ammonium nitrate, by itself, is not considered to be a donor when applying this Table. Ammonium nitrate, ammonium nitrate-fuel oil or combinations thereof are acceptors. If Stores of ammonium nitrate are located within the sympathetic detonation distance of explosives or blasting agents, one-half the mass of the ammonium nitrate should be included in the mass of the donor.
- NOTE 2 When the ammonium nitrate and/or blasting agent is not barricaded, the distances shown in the Table shall be multiplied by six. These distances allow for the possibility of high velocity metal fragments from mixers, hoppers, truck bodies, sheet metal structures, metal containers, and the like which may enclose the "donor." Where storage is in bullet-resistant magazines is recommended for explosives or where the storage is protected by a bullet-resistant wall, distances and barricade thicknesses in excess of those prescribed in the American Table of Distances are not required.
- NOTE 3 The distances in the Table apply to ammonium nitrate and ammonium nitrate based materials that show "negative" (-) result in the UN Test Series 2 Gap Test and show "positive" (+) result in the UN Test Series 1 Gap Test. Ammonium nitrate and ammonium nitrate based materials that are DOT hazard Class 1 sensitive shall be stored at separation distances determined by the American Table of Distances.
- NOTE 4 These distances apply to blasting agents which pass the insensitivity test prescribed in regulations of the U.S. Department of Transportation and the U.S. Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms.
- NOTE 5 Earth, or sand dikes, or enclosures filled with the prescribed minimum thickness of earth or sand are acceptable artificial barricades. Natural barricades, such as hills or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the "donor" when the trees are bare of leaves, are also acceptable.
- NOTE 6 For determining the distances to be maintained from inhabited buildings, passenger railways, and public highways, use the American Table of Distances for Storage of Explosives Materials on pages 58 and 59.

*For construction of bullet-resistant magazines see Bureau of Alcohol, Tobacco and Firearms, Department of the Treasury, Publication ATF P 5400.7 (9/00), *ATF-Explosives Law and Regulations*.

ARTICLE 5 TRANSPORTATION OF EXPLOSIVES

Section 5-1 General Requirements

- (A) Transportation of explosives, blasting agents, and blasting supplies on public highways, railways, and airways shall be in accordance with the provisions of Title 42 Article 20 C.R.S. and any regulations promulgated pursuant thereto and Title 49 CFR Parts 171-179 and Parts 390-397, Motor Carriers.
- (B) Requirements for the transportation of explosives, blasting agents and blasting supplies by motorized vehicle or conveyance on job sites shall be:
- (1) No person shall smoke, carry matches or any other flame-producing device or carry firearms or loaded cartridges while in or near a motor vehicle or conveyance transporting explosives.
 - (2) No person shall drive, load or unload a vehicle or conveyance transporting explosives in a careless or reckless manner.
 - (3) Vehicles or conveyances transporting explosives, blasting agents or blasting supplies shall not be taken inside a garage or shop for repairs or servicing.
 - (4) Vehicles or conveyances used for transporting explosives shall be equipped to carry the load without difficulty and shall be in good mechanical condition.
 - (5) A motor vehicle or conveyance used for transporting explosives shall be given the following inspection prior to the transportation to determine that it is in proper condition for the safe transportation of explosives:
 - (i) Fire extinguishers shall be filled and in proper working order;
 - (ii) All electrical wiring shall be completely protected and securely fastened to prevent short-circuiting;
 - (iii) Chassis, motor, pan and underside of body shall be completely free of excess oil and grease;
 - (iv) Fuel tank and fuel line shall be secure and have no leaks;
 - (v) Brakes, lights, horn, windshield wipers and steering apparatus shall function properly;
 - (vi) Tires shall be checked for proper inflation and defects; and
 - (vii) The vehicle shall be in proper condition in every other respect and acceptable for handling explosives.
 - (6) All vehicles or conveyances used for transporting explosives shall have tight floors, and any exposed spark-producing metal on the inside of the body shall be covered with wood or other non-sparking materials to prevent contact with packages of explosives.
 - (7) Packages of explosives or blasting agents shall not be loaded above the sides of an open-body vehicle or conveyance.
 - (8) Explosives shall not be transported with other materials or cargoes in the same compartment. In no case shall flammable materials be carried on the same vehicle as explosives, with the exception of desensitizing agents.

- (9) Each vehicle or conveyance used for transportation of explosives shall be equipped with at least one charged fire extinguisher each with an extinguisher rating of at least 4-A:10B:C. Extinguishers shall be located where they will be accessible for immediate use.
- (10) Explosives shall be transferred from a disabled vehicle or conveyance to another vehicle or conveyance only when proper and qualified supervision is provided. Local fire departments and police departments shall be notified if a transfer occurs in a congested area. In remote areas, they shall be notified if appropriate.
- (11) A motorized vehicle or conveyance which contains explosives or detonators shall not be parked under any of the following circumstances:
 - (i) On or within 5 feet of the traveled portion of a public street or highway; or
 - (ii) Within 300 feet of a bridge, tunnel, building, or place where people work, assemble, or congregate, except for brief periods when the necessities of operation require the vehicle or conveyance to be parked and make it impracticable to park the vehicle or conveyance in any other place.
- (12) A motorized vehicle or conveyance transporting explosives, detonators, or blasting agents shall not be left unattended.
- (13) A motorized vehicle or conveyance shall be deemed attended only when the driver or other attendant is physically on or in the vehicle or conveyance, or has the vehicle or conveyance within the driver or attendant's field of vision and can reach the vehicle or conveyance quickly and without any kind of interference; attended also means the driver or attendant is awake, alert, and not engaged in any other duties or activities which may divert his/her attention from the vehicle or conveyance.
- (14) Detonators may not be transported in the same vehicle or conveyance with other explosives unless:
 - (i) The detonators and explosives are placed in separate locked Type 2 magazines secured within the body of the vehicle or conveyance;
 - (ii) The detonators and explosives are placed in a suitable locked container and separated by 4 inches of hardwood and the detonators are totally enclosed or confined by the hardwood construction;
 - (iii) The detonators and explosives are placed in separate locked containers or container compartments constructed in accordance with the Institute of Makers of Explosives Safety Library Publication No. 22, "IME Standard for the Safe Transportation of Detonators in a Vehicle with Other Explosives"; or
 - (iv) The detonators and explosives are placed in separate locked Type 3 magazines.
- (C) Requirements for the transportation of explosives, blasting agents and blasting supplies to blasting areas by non-motorized means shall be:
 - (1) Explosives and blasting agents shall be carried in day boxes, original containers or shall be placed in bags or containers that are water-resistant and constructed of non-sparking and nonconductive material.
 - (2) Detonators shall be wrapped in suitable padding and carried in separate bags or containers from other explosives.

ARTICLE 6 USE OF EXPLOSIVE MATERIALS

Section 6-1 General Requirements

- (A) While explosives are being handled or used, smoking, matches or any other source of fire or flame shall not be within 50 feet of the blast site.
- (B) No person shall handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs. This rule does not apply to persons taking prescription drugs and/or narcotics as directed by a physician providing such use shall not endanger the worker or others.
- (C) When blasting is done in populated or residential areas or in close proximity to a structure, railway, or highway or any other installation that may be damaged, the following precautions shall be taken:
 - (1) The blast shall be covered, before firing, with a mat or material that is capable of preventing fragments from being thrown;
 - (2) The blast shall be loaded in compliance with the Table of Scaled Distance (Table 6-10) or be monitored by a seismograph; and
 - (3) All persons within the blast area shall be given reasonable notification prior to blasting operations and informed as to the type of warning signal that will be given prior to the blast.
- (D) Blasters conducting blasting operations shall take every reasonable precaution, including but not limited to warning signals, flags and barricades to insure the safety of the general public and workers.
- (E) Surface blasting operations shall be conducted during periods of daylight, when the blast area is clearly visible. Blasting operations conducted after periods of daylight shall be approved by the Division and local law enforcement agency prior to each blast. Approval shall only be granted if such approval serves the safety of the general public.
- (F) The blaster shall perform all required notification to and obtain all required permits from local jurisdictions or authorities, including, but not limited to, the County Sheriff, local fire districts and fire departments before beginning blasting operations.
- (G) Whenever blasting operations are subject to federal, state and local rules, the higher standard shall apply.
- (H) Whenever blasting is being conducted in the vicinity of gas, electric, water, fire alarm, telephone, telegraph, steam utilities or transportation corridors, the blaster shall notify the appropriate transportation or utility representatives at least 24 hours in advance of blasting, specifying the location and intended time of such blasting.
- (I) The blaster shall suspend all blasting operations and remove all persons from the blast site during the approach and progress of an electrical storm.
- (J) No fire shall be fought where the fire is in imminent danger of contact with explosives. All employees shall be removed to a safe area and the fire area guarded against intruders.
- (K) Detonators or other explosives shall never be carried in pockets of clothing.
- (L) Detonators shall not be inserted in explosive materials that do not have a cap well without first making a hole in the cartridge with a non-sparking punch of proper size, or the appropriate pointed handle of a cap crimper.

- (M) The detonator shall be secured within the primer so that no tension is placed on the leg wires, safety fuse, shock tube, plastic tubing or detonating cord at the point of entry into the detonator.
- (N) The detonator shall be fully inserted into the primer cartridge or booster and shall not protrude from the cartridge.
- (O) Cast primers and boosters shall not be used if the hole is too small for the detonator, and attempting to enlarge the hole in a cast primer or booster shall not be permissible.
- (P) Primers are not to be prepared in a magazine or near large quantities of explosive materials.
- (Q) Explosives and blasting agents shall be kept separated from detonators until the charge is placed.
- (R) Only non-sparking metallic slitters may be used for opening fiberboard cases.
- (S) Cartridges or packages of explosives showing signs of discoloration or deterioration must be carefully set aside and properly disposed of in accordance with manufacturer's recommendations.
- (T) No explosive material shall be abandoned or left in any location for any reason, nor left in such a manner that they may easily be obtained by children or other unauthorized persons. All unused explosives shall be returned to proper storage facilities.
- (U) A record of each blast shall be kept. All records, including seismograph reports, shall be retained at least five years, be available for inspection by the Division, and contain at least the following minimum data, as applicable:
 - (1) Person for whom blasting operations are conducted
 - (2) Name, permit number, and signature of the blaster
 - (3) Exact location or address of the blast, date and time of detonation
 - (4) Type of material blasted
 - (5) Number of holes, burden and spacing
 - (6) Diameter and depth of holes
 - (7) Types of explosives used
 - (8) Amount and type of explosive loaded in each borehole or used in each charge
 - (9) Total amount of each explosive used
 - (10) Maximum amount of explosives and holes detonated within 8 milliseconds
 - (11) Method of firing and type of circuit
 - (12) Direction, distance in feet, and identification of the nearest dwelling, house, public building, school, church, commercial or institutional building neither owned nor leased by the person or company conducting the blasting
 - (13) Weather conditions
 - (14) Type and height or length of stemming

- (15) A statement as to whether mats or protection against flyrock were used
- (16) Type of delay caps used and delay periods used
- (17) The person taking the seismograph reading shall accurately indicate exact location of the seismograph if used and shall show the distance of the seismograph from the blast
- (18) Seismograph records, where required, which shall include:
 - (i) Name of person and firm analyzing the seismograph record; and
 - (ii) Seismograph reading.
- (19) Sketch of blast pattern including number of holes, burden and spacing distance, delay pattern, and if decking is used, a hole profile.

Section 6-2 Drilling and Loading

- (A) Procedures that permit safe and efficient loading shall be established before the loading of explosive materials is started.
- (B) All boreholes shall be sufficiently large to admit freely the insertion of the cartridges of explosives.
- (C) Tamping shall be done only with wooden rods or with approved plastic tamping poles without exposed metal parts, but non-sparking metal connectors may be used for jointed poles. Violent tamping shall be avoided. The primer shall never be tamped.
- (D) No boreholes shall be loaded except those to be fired in the next round of blasting. After loading, all remaining explosive materials shall be immediately returned to magazines or day boxes.
- (E) No explosives or blasting agents shall be left unattended on a blast site.
- (F) Drilling shall not be started until all remaining butts of old boreholes are examined for unexploded charges, and if any are found, they shall be refired or removed before work proceeds.
- (G) No person shall be allowed to deepen boreholes that have contained explosives or blasting agents.
- (H) Drilling shall not be conducted where there is a danger of intersecting a loaded borehole or misfired explosive material.
- (I) Equipment, machines and all tools not used for loading explosives into boreholes shall be removed from the immediate location of boreholes being loaded with explosives. Equipment shall not be operated within 50 feet of loaded boreholes except when equipment is needed to add cover or mats.
- (J) Loaded boreholes shall not be left unattended.
- (K) The Type I permittee shall maintain an accurate, up-to-date record of explosives, blasting agents and all blasting supplies used in a blast and shall keep an accurate running inventory of all explosives and blasting agents stored on the operation.
- (L) Pneumatic loading of blasting agents into blast holes primed with electric detonators or other static-sensitive initiation systems shall conform to the following requirements:

- (1) A positive grounding device for the equipment shall be used to prevent the accumulation of static electricity.
 - (2) A semi-conductive hose shall be used.
 - (3) A qualified person shall evaluate all systems to assure that they will adequately dissipate static under potential field conditions.
- (M) Primers shall be made up immediately prior to placing the primer in the borehole.
 - (N) Dropping or pushing a primer or any explosive with a lighted fuse attached into a borehole is prohibited.
 - (O) Detonators shall not be loaded into a hot hole or exposed to temperatures above 150° F unless specifically designed and approved by the manufacturer for higher temperatures.

Section 6-3 Electric Initiation of Blasts

- (A) Electric detonators may be used for blasting operations in congested districts, or on highways, or adjacent to highways open to traffic, except where sources of extraneous electricity make such use dangerous.
- (B) Electric detonator wires shall be kept short-circuited (shunted) until they are connected into the circuit for firing.
- (C) Signs shall be posted warning against the use of mobile radio transmitters on all adjacent highways and roads.
- (D) Mobile radio transmitters that are less than 100 feet away from electric detonators shall be de-energized and effectively locked when the detonators are not in the original containers.
- (E) Electric detonators shall be used in compliance with the recommendations of IME with regard to blasting in the vicinity of radio transmitters as stipulated in Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Electric Detonators (Blasting Caps), IME Safety Library Publication No. 20, December 2011.
- (F) Precautions in accordance with the recommendations of IME with regard to blasting in the vicinity of radio transmitters as stipulated in Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Electric Detonators (Blasting Caps), IME Safety Library Publication No. 20, December 2011 shall be taken to prevent accidental discharge of electric detonators from current induced by radar, cellular telephones, radio transmitters, battery contact, lightning, adjacent power lines, static electricity, dust storms, blowing snow or other sources of extraneous electricity.
- (G) Before adopting any system of electrical firing, the blaster shall conduct a thorough survey for extraneous currents, and all dangerous currents shall be eliminated before any holes are loaded.
- (H) In any single blast using electric detonators, all detonators shall be of the same style or function and be of the same manufacture.
- (I) Electric blasting shall be carried out by using blasting circuits or power circuits, in accordance with the electric detonator manufacturer's recommendations.
- (J) The firing line shall be checked with an approved testing device at the terminals before being connected to the blasting machine or other power source.

- (K) The circuit, including all detonators, shall be tested with an approved testing device before being connected to the firing line.
- (L) When firing a circuit of electric detonators, care shall be exercised to ensure that an adequate quantity of delivered current is available, in accordance with the manufacturer's recommendation.
- (M) Connecting wires and lead wires shall be insulated single solid wires of sufficient current- carrying capacity and shall not be less than #20 gauge (American wire gauge) solid core insulated wire.
- (N) Firing line or leading wires shall be solid single wires of sufficient current carrying capacity, and shall be not less than #14 gauge (American wire gauge) solid core insulated wire. Bus wires depend on the size of the blast, but #14 gauge (American wire gauge) copper is recommended.
- (O) The ends of lead wires which are to be connected to a firing device shall be shorted by twisting them together or otherwise connecting them before they are connected to the leg wires or connecting wires, and they shall be kept in the possession of the person who is doing the loading until loading is completed and the leg wires attached. Lead wires shall not be attached to the firing device until the blaster is ready to fire the shot and must be attached by the blaster.
- (P) The ends of the leg wires on electric detonators shall be shorted in a similar manner and not separated until all holes are loaded and the loader is ready to connect the leg wires to the connecting wires or lead wires.
- (Q) When firing electrically, the insulation on all firing lines shall be adequate and in good condition.
- (R) A power circuit used for firing electric detonators shall not be grounded.
- (S) When firing from a power circuit, the firing switch shall be locked in the open or "off" position at all times, except when firing. It shall be so designed that the firing lines to the cap circuit are automatically short-circuited when the switch is in the 'off' position. Keys to this switch shall be entrusted only to the blaster.
- (T) Blasting machines shall be in good condition and the efficiency of the machine shall be tested periodically to make certain that it can deliver power at its rated capacity.
- (U) When firing with blasting machines, the connections shall be made as recommended by the manufacturer of the electric detonators used.
- (V) The number of electric detonators connected to a blasting machine shall not be in excess of its rated capacity. A series or circuit shall contain no more detonators than the limits recommended by the manufacturer of the electric detonators in use.
- (W) The blaster shall be in charge of the blasting machines, and no other person shall connect the leading wires to the machine.
- (X) Blasters, when testing circuits to charged holes, shall use only blasting testers especially designed for this purpose.
- (Y) In electrical firing, only the person making leading wire connections shall fire the shot. All connections shall be made from the borehole back to the source of firing current, and the lead line wires shall remain shorted and not be connected to the blasting machine or other source of current until the charge is to be fired.
- (Z) After firing an electric blast from a blasting machine, the leading wires shall be immediately disconnected from the machine and short-circuited.

- (AA) When electric detonators have been used, workers shall not return to misfired holes for at least thirty minutes.

Section 6-4 Safety Fuse Initiation of Blasts

- (A) A safety fuse that is deteriorated or damaged in any way shall not be used.
- (B) The hanging of safety fuse on nails or other projections which will cause a sharp bend to be formed in the fuse is prohibited.
- (C) Before assembling fuse detonators and safety fuse, a short length shall be cut from the end of the supply reel so as to assure a fresh cut end in each fuse detonator.
- (D) Only cap crimpers specifically designed for the purpose of crimping caps shall be used for attaching fuse detonators to safety fuse. Crimpers shall be kept in good repair and accessible for use.
- (E) No fuse detonators and safety fuse shall be assembled, or primers made up, in any magazine or near any possible source of ignition or initiation.
- (F) The assembly of fuse detonators, safety fuse and making of primers shall only be done in a place selected for this purpose and at least 100 feet away from any storage magazine.
- (G) The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all workers concerned with blasting.
- (H) New rolls of fuse shall be tested for burn rate prior to use and all partial rolls shall be tested at least every 30 days. A record of the burn rate shall be kept by the permittee.
- (I) The length of safety fuse shall be in accordance with the manufacturer's recommendations. In no case shall the length of fuse be less than 3 feet and shall not have a burn time of less than 120 seconds at the time of initiation.
- (J) Lighting of safety fuse shall be done with hot wire lighters, pull-wire lighters, thermalite connectors, or igniter cord and thermalite connectors.
- (K) Matches, cigarette lighters, cigarettes, pipes, cigars or other unsafe means shall not be used to ignite safety fuse.
- (L) Igniters shall be used in accordance with the manufacturer's recommendations and shall not be attached to a safety fuse until the charge is at the blast site and the crew is fully prepared to light the charge.
- (M) At least two persons shall be present when fuse detonator and safety fuse blasting is done by hand-lighting methods.
- (N) When blasting with safety fuses, consideration shall be given to the length and burning rate of the safety fuse and shall be used in accordance with the manufacturer's recommendations. A sufficient time of not less than 120 seconds, with a margin of safety, shall always be provided for the blaster to reach a place of safety.
- (O) No more than 12 safety fuses shall be lit by each blaster when hand lighting devices are used. However, when two or more safety fuses in a group are lit as one by means of igniter cord or other similar fuse-lighting devices, they may be considered as one fuse.

- (P) Fuse detonators and safety fuse shall not be used for firing mud cap charges unless charges are separated sufficiently to prevent one charge from dislodging other shots in the blast.
- (Q) Only sufficient primers for one day's use shall be made up at a time.
- (R) Any loose cartridges of explosives, detonators, primers and assembled fuse detonators and safety fuse unused at the end of the shift shall be returned to their respective and separate magazines and locked up.
- (S) Safety fuse shall not be used in blasting operations in populated areas, public areas, on highways or adjacent to roads open to traffic.
- (T) When the fuse lighter has been ignited, the blaster shall assume initiation of the safety fuse has occurred.
- (U) If the safety fuse does not show evidence of initiation, the blaster shall not attempt any further initiation and retreat to a safe location for at least one hour.
- (V) When safety fuse is used, workers shall not return to a misfire for at least one hour.
- (W) If explosives are suspected of burning, all persons in the endangered area shall move to a safe location and no one shall return to the area for at least one hour after signs of burning have ceased.

Section 6-5 Non-electric Initiation of Blasts

- (A) Blasters shall be familiar with and follow the manufacturer's warnings and instructions, especially hook-up and safety precautions.
- (B) Operations shall be discontinued during the approach and progress of electrical storms.
- (C) Non-electric leads shall not be held during firing.
- (D) Primary initiators shall not be attached to the round or shot until after all the connections have been made and the blasting area has been cleared.
- (E) Non-electric delay connectors shall not be exposed to excessive impact, friction, flame, electrical discharge, static electricity or lightning.
- (F) Delay detonators shall not be disassembled from the plastic connector block, nor shall the delay detonators be used without the block.
- (G) Shock tube connections shall be at right angles to detonating cord.
- (H) Connections with other initiation devices shall be secured in a manner that provides for uninterrupted propagation.
- (I) Factory made units shall be used as assembled and shall not be cut except that a single splice is permitted on the lead-in trunkline during dry conditions.
- (J) No tool shall be used to pry on any component containing a detonator, nor shall any tool be used to open, fasten or clean out any connector containing a detonating device.
- (K) Care shall be taken to ensure that a vehicle is not driven over the tubing, connectors or any surface delay component.

- (L) In multiple row blasts, the initiation system shall not be connected from row to row until all drilling and loading has been completed. In single row blasts, the components shall not be connected from hole to hole until all drilling and loading has been completed.
- (M) A safety line consisting of trunk-line or other non-electric tubing shall be connected to the last hole in each row and shall extend beyond the area of cover in a covered or matted blast and shall be used to check for complete detonation of each row.
- (N) Before firing the shot, the blaster shall visually inspect and verify that all connections in the initiation system are made in accordance with the manufacturer's recommendations.

Section 6-6 Use of Detonating Cord

- (A) Care shall be taken to select a detonating cord consistent with the type and physical condition of the borehole and stemming and the type of explosives used.
- (B) Detonating cord shall be handled and used with the same respect and care given other explosives.
- (C) If using a detonating type cord for blasting, the double-trunkline or loop systems shall be used.
- (D) In multiple-row blasts, the trunkline layout shall be designed so that the detonation can reach each blast hole from at least two directions.
- (E) All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunklines.
- (F) The line of detonating cord extending out of a borehole or from a charge shall be cut from the supply spool before loading the remainder of the bore hole or placing additional charges.
- (G) Detonating cord shall be handled and used with care to avoid damaging or severing the cord during and after loading and hooking-up.
- (H) Detonating cord connections shall be made in accordance with the manufacturer's recommended methods. Knot-type or other cord-to-cord connections shall be made only with detonating cord in which the explosive core is dry.
- (I) Detonating cord shall be cut with a sharp knife, razor blade or cutters designed for use with detonating cord. Scissors or plier type cutters shall not be used.
- (J) All detonating cord trunklines and branch lines shall be free of loops, sharp kinks, or angles that direct the cord back toward the oncoming line of detonation.
- (K) All detonating cord connections shall be inspected before firing the blast.
- (L) When detonating cord millisecond-delay connectors or short-interval-delay electric detonators are used with detonating cord, the practice shall conform strictly to the manufacturer's recommendations.
- (M) When connecting a detonator to detonating cord, the detonator shall be taped or otherwise attached securely along the side or the end of the detonating cord, with the end of the detonator containing the explosive charge pointed in the direction in which the detonation is to proceed.
- (N) When initiating detonating cord with fuse detonators and safety fuse, two fuse detonators shall be required.

- (O) Detonators for firing the trunkline shall not be brought to the loading area nor attached to the detonating cord until the area has been cleared for the blast.

Section 6-7 Electronic Initiation of Blasts

- (A) Permittees shall be trained in the manufacturer's procedures for use of electronic detonators and shall follow the manufacturer's warnings and instructions, especially hook-up and safety precautions.
- (B) Test equipment and blasting machines designed for use with electric detonators shall not be used with electronic detonators.
- (C) Manufacturer's recommended practices shall be followed to protect electronic detonators from electromagnetic, radio frequency or other electrical interference sources.
- (D) Electronic detonators shall only be fired with the equipment and procedures recommended by the manufacturer.
- (E) Electric detonators and electronic detonators shall not be used in the same blast, even when made by the same manufacturer, unless the manufacturer approves such use.
- (F) Test equipment and blasting machines that are designed for electronic detonators shall not be used with electric detonators.
- (G) Electronic detonator wires, connectors, coupling devices, shock tube or other components shall be protected from mechanical abuse and damage.
- (H) Electronic detonators of different types and/or versions shall not be used in the same blast, even if made by the same manufacturer, unless such use is approved by the manufacturer.
- (I) Equipment or electronic detonators that appear to be damaged or poorly maintained shall not be used.
- (J) Only blasting machines, testers, or instruments that are specifically designed for the electronic detonator system shall be used.
- (K) Never mix or use electronic detonators and equipment made by different manufacturers.
- (L) The handling or use of electronic detonators shall be discontinued during the approach and progress of an electrical storm. Personnel must be withdrawn from the blast area and moved to a safe location.
- (M) Electronic detonator systems shall not be exposed to or used in operational temperature and pressure ranges outside those specified by the manufacturer.
- (N) Electronic detonators shall never be tested or programmed in a booster, cartridge or other explosive component (primer assembly) before it has been deployed in the borehole or otherwise loaded for final use.
- (O) An electronic detonator shall not be held while it is being tested or programmed.

Section 6-8 Firing the Blast

- (A) It shall be the duty of the blaster to determine the time of blasting. The blaster shall conduct all blasting operations and no shot shall be fired without the blaster's presence and approval.

- (B) All blasting in congested areas or in close proximity to a structure, railway, highway or any other installation where the blasting may cause injury or damage by flying rock shall be covered with blasting mats or other protective material before firing.
- (C) All persons within the blasting area shall be notified of the time of the blast and moved to a safe distance or under sufficient cover. Guards shall be posted to prevent entry into the blast area.
- (D) All surplus explosive materials shall be removed to a safe location before blasting.
- (E) Flaggers shall be safely posted on highways that pass through the danger zone so as to stop traffic during blasting operations.
- (F) Guards shall be posted around the perimeter of the blasting area to prevent unauthorized entry into the blast area. Either visual or verbal communication must be possible between guards.
- (G) Before the blast is fired, the warning signal shall be given by the blaster in charge or the individual designated by the blaster in charge.
- (H) An inspection of the blast area to determine if all charges have detonated shall be done by the blaster before guards and flaggers are cleared by the blaster to leave their posts.

Section 6-9 Misfires

- (A) The blaster shall provide proper safeguards for excluding all unauthorized persons from the danger zone if a misfire is found.
- (B) No other work shall be done except that necessary to remove the hazard of the misfire and only those employees necessary to do the work shall remain in the danger zone.
- (C) Explosives shall not be extracted from a hole that has misfired unless it is impossible or hazardous to detonate any unexploded explosive materials by insertion of an additional primer.
- (D) If there are any misfires while using fuse detonators and safety fuse, all employees shall remain away from the charge for at least one hour. Misfires shall be handled under the direction of the person in charge of the blasting. All fuses shall be carefully traced and a search made for the unexploded charges.
- (E) When electric detonators have been used, workers shall not return to the blast area for at least 30 minutes unless the manufacturer recommends additional time before returning to the blast area. All wires shall be carefully traced and a search made for unexploded charges.
- (F) When a completely non-electric initiation system, other than safety fuse, has been used, all employees shall remain away from the blast area for at least 15 minutes. All shock tubes shall be traced and a search made for unexploded charges.
- (G) When electronic detonators have been used, workers shall not return to the blast area for at least 30 minutes unless the manufacturer recommends additional time before returning to the blast area.
- (H) If explosives are suspected of burning in a hole, all persons in the endangered area shall move to a safe location and no one shall return to the hole for at least one hour after evidence of combustion ceases.
- (I) No drilling, digging or picking shall be permitted until all missed holes have been detonated or the blaster in charge has approved that work can proceed.

- (J) Explosive materials recovered from misfires shall not be reused and shall be disposed of in the manner recommended by the manufacturer.

Section 6-10 Blasting Vibration and Air Over-Pressure Standards

- (A) In all blasting operations, blasters shall use one of the following methods to monitor or control the intensity of motion in the ground at the nearest dwelling, house, school, church, commercial or occupied building. These limits do not apply to property owned, leased or contracted by the blaster's company or property on which the owner provides a voluntary written waiver from these restrictions.

- (1) Option 1 - Frequency Versus Particle Velocity graph. A blasting operation shall have the option to use the graph shown in Figure 6-10 to limit peak particle velocity based upon the frequency of the blast vibration. Allowable vibrations fall below the limits indicated by the central lines; non-allowable vibrations lie above the lines. Seismographs shall meet the following requirements:

- (i) Monitoring instruments shall have a flat frequency response between 2 and 250Hz for particle velocity.
- (ii) The digitizing sampling rate for peak particle measurements shall be at least 1,024 samples per second.
- (iii) Seismographs shall be capable of performing a self-test of velocity transducers and printed event records shall indicate whether or not the sensor test was successful.
- (iv) Monitoring instruments shall be capable of recording particle velocities with intensities ranging from 0.02 to 5.0 inches per second.
- (v) Monitoring systems shall be calibrated by a service center approved by the manufacturer within at least two years of the time of use. Certificates documenting date of calibration, issued by the approved service center, shall be kept by the user.
- (vi) Monitoring systems shall be capable of printing hard-copy reports showing the date and time of monitoring, the maximum peak particle velocity (PPV) measurements, and plotted PPV-time waveform plots.
- (vii) For all blasts with a scaled distance less than 100 ft/lb^{0.5}, seismographs monitoring motion shall be set to trigger at a level of 0.05 in/s.

The following equation shall be applied when calculating the scaled distance.

$$D_s = \frac{D}{\sqrt{W}}$$

- Where:
- Ds = Scaled distance (ft/lb^{0.5})
 - D = Distance to the nearest structure (ft)
 - W = Maximum weight of explosive detonated within any 8 millisecond window (lb)

- (viii) Vibration analysis results must be presented in comparison with the RI 8507, adopted by United States Bureau of Mines (USBM) and as shown in Figure 6-10.

- (ix) If a valid vibration record showing compliance with the MAPV limits shown in figure 6-10 is not available for inspection, the maximum charge weight per delay (W) must conform to the scaled distance limitations as prescribed in Option 2.

FIGURE 6-10

Option 1: Particle Velocity Versus Frequency

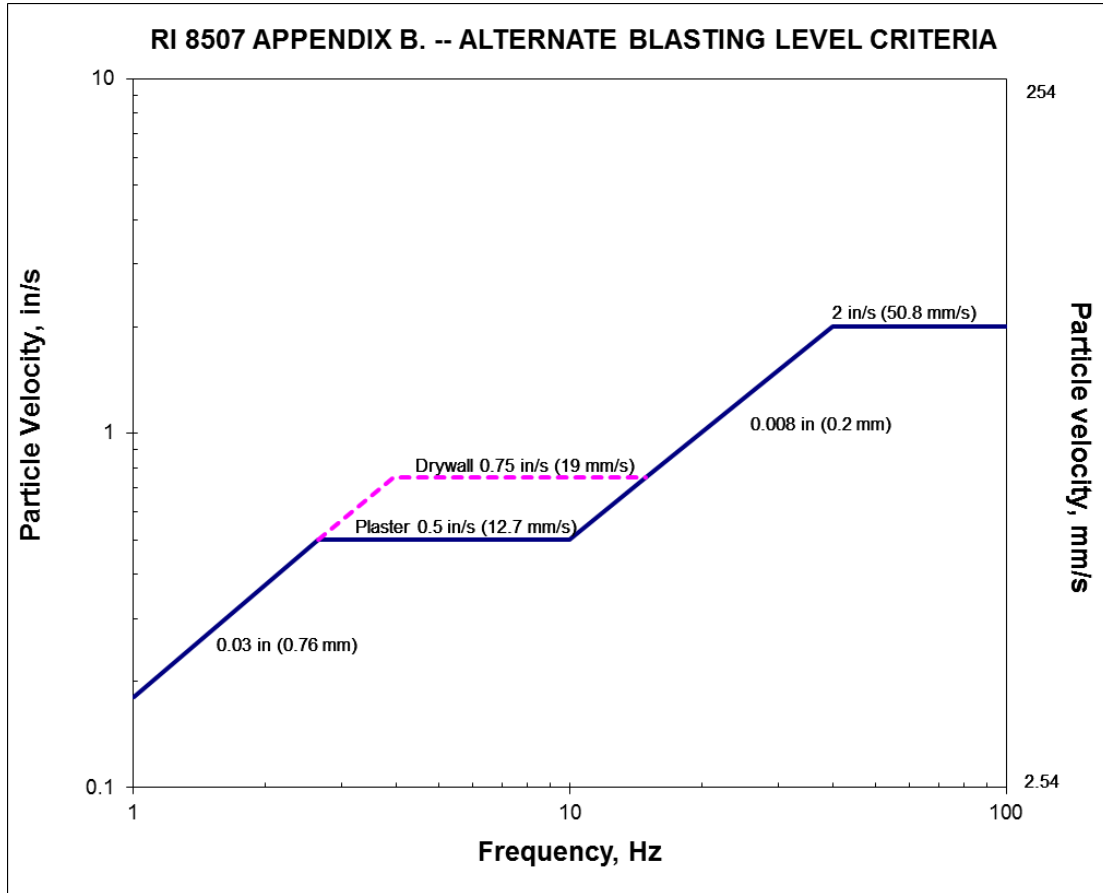


Table: U.S. Bureau of Mines RI 8507, 2009

- (2) Option 2 Scaled Distance – when seismic monitoring is not performed, the maximum weight of the explosive detonating within any 8-millisecond time period shall not exceed the amount allowed by a calculation using the scaled distance factors given in Scaled Distance column of Table 6-10.

The following equation shall be applied when utilizing the scaled distance calculations to control blast-induced vibration.

$$W = \left(\frac{D}{D_s} \right)^2$$

Where: D_s = Scaled distance (ft/lb^{0.5})
 D = Distance to the nearest structure (ft)
 W = Weight of explosive detonated within any 8 millisecond window (lb)

Example Maximum Charge Weight per Delay (W) Calculation:

Given: $D_s = 55$ (ft/lb^{0.5})
 D = 500 ft.
therefore
 $W = (500 / 55)^2 = 82.6$ lb

Table 6-10	
Blasting Vibration and Air Over-Pressure Standards	
Distance From Blast (Ft)	Option 2 Scaled Distance Factor Units Are Ft/Lb^{0.5}
0 to 300	50
301 to 5000	55
5001 and Greater	65

- (B) Air over-pressure (air blast) limitation: Air over-pressure at the nearest dwelling house, school, church, or otherwise occupied buildings shall not exceed 133 dB (0.0129 psi). Measuring air over-pressure is not required for all blasting operations. However, due to complaints or other circumstances, the Division may require blasters to monitor air over-pressure. All instruments used to measure air over-pressure compliance shall:
- (1) Employ linear microphones with a flat frequency response between 2 and 200 Hz
 - (2) Have a digital sampling rate of at least 1024 samples per second; and
 - (3) Be capable of measuring air over-pressure from 120 to 140 dB-Linear (0.0029 to 0.029 psi).

ARTICLE 7 AVALANCHE MITIGATION

Section 7-1 General Requirements

- (A) The use of explosives and blasting agents for avalanche mitigation shall comply with this article unless explosives are used in compliance with Article 6.
- (B) The requirements of this article shall only be applicable to the use of explosives for avalanche mitigation. The use of explosives for other purposes, such as, but not limited to, demolition, site clearing or construction shall be in compliance with Article 6.
- (C) Explosives and blasting agents shall not be stored, kept, assembled, combined to form armed charges, or had in any inhabited areas, structures or buildings except in compliance with this Article or Article 4.
- (D) Only blasters shall supervise the assembly, arming of explosive components, and detonation of explosive charges.
- (E) Each avalanche mitigation blasting crew or team shall consist of a blaster and at least one trained assistant. The crew may consist of two blasters, but only one shall act as the blaster in charge.
- (F) Untrained personnel may accompany the blasting crew for training purposes but shall only participate in actual firing of charges for completion of training in accordance with Section 7-2(B)(1)(iii)(a)(3).
- (G) The blaster in charge of each crew or team shall be responsible for all decisions made regarding preparation and placement of charges.
- (H) Blasting operations shall be conducted during periods of daylight with personnel guarding the area, or when the area has been closed. Nighttime blasting operations shall be approved by the Division, and approval shall only be granted if such approval serves the safety of the general public.
- (I) The blaster in charge shall pre-plan the escape route and all crew members shall understand the plan before initiating the charge.
- (J) No person shall accept or be given a job assignment that is beyond the individual's ability, training, or qualifications.
- (K) Cold temperatures, high winds, and heavy snowfall are conditions that should be anticipated in avalanche mitigation blasting. These conditions shall be considered in determining a person's physical ability, training, and qualifications for conducting safe blasting operations and in the management of safe blasting operations.
- (L) Operations utilizing hanging or dangling charges must have a hang cord entanglement safety procedure.

Section 7-2 Training Requirements

- (A) Type II Avalanche Mitigation permit applicants shall submit a training program for personnel involved in the use, storage and transportation of explosives to the Division. The Division shall approve the training program prior to issuance of the permit.
- (B) The training program shall include at least the following for each personnel type:
 - (1) Blaster in Training:

- (i) A minimum of 8 hours of classroom education and a written examination to include the following:
 - (a) Explosives Regulations of the Division
 - (b) Explosives Regulations of the Division and federal requirements for the storage of explosives and magazine locations, inventory procedures, and magazine access
 - (c) Safety procedures for explosives and blasting agents used within the company, including the properties and classification of each type of explosive, and consequences of the unsafe use of explosives
 - (d) Explosives Regulations of the Division for preparing, handling, and using hand charges to include:
 - (1) Hand charge assembly procedures for both field arming and make-up room arming;
 - (2) Crimping procedures;
 - (3) Transportation to blast site by skiing or aerial tramways for both field armed charges and make-up room armed charges;
 - (4) Use of igniters and determining successful initiation of fuse;
 - (5) Misfire procedures;
 - (6) Procedures for clearing and guarding the blasting area; and
 - (7) Deployment of initiated hand charges.
 - (e) Hazard training for cornice control operations
 - (f) Hang cord entanglement safety procedures
 - (g) Hazard training for avalauncher operations
 - (h) Record keeping procedures, including:
 - (1) Records of transactions;
 - (2) Explosive inventory record keeping;
 - (3) Explosive use and route log record keeping; and
 - (4) Misfire documentation.
- (ii) Simulated Field Training for Hand Charges
 - (a) During weather conditions typical to avalanche mitigation and under the supervision of a blaster, the trainee shall:
 - (1) Attend demonstration with simulated components;
 - (2) Attach igniters to fuse without a detonator and successfully ignite fuse not

less than five times;

- (3) Attach igniters to fuse without a detonator and twice simulate an unsuccessful attempt to light the fuse and follow the procedures for a misfire;
- (4) Attach igniters to fuse with a detonator and successfully ignite and deploy the detonator and fuse assembly not less than five times; and
- (5) When training occurs at operations not utilizing a pre-manufactured detonator and safety fuse assembly, assemble detonator and fuse, attach igniters to fuse with detonator and successfully initiate and deploy the detonator and fuse assembly not less than five times.

(iii) Field Experience Training for Hand Charges

(a) Under the supervision of a blaster, the trainee shall:

- (1) Accompany a blasting crew on five routes or the deployment of not less than 20 charges as an observer;
- (2) Accompany a blaster, as an assistant only, for the initiation and deployment of not less than 20 charges; and
- (3) Accompany a blaster and initiate and deploy not less than 20 charges under the direct supervision of the blaster.

(iv) Avalauncher Operator

(a) Trainee shall complete 8 hours classroom and field training before becoming an avalauncher operator. This training shall include:

- (1) Operating instructions for each type of avalauncher used;
- (2) Procedures on performing preventive maintenance inspections;
- (3) Procedures on assembly of charges;
- (4) Procedures for checking the elevation, aiming, and pressure settings of the avalauncher;
- (5) Procedures for test firing the avalauncher;
- (6) Procedures for loading charges in the avalauncher;
- (7) Procedures for clearing and guarding the target area;
- (8) Emergency procedures; and
- (9) Requirements for securing the equipment.

(b) Qualifications for avalauncher operator shall be:

- (1) One year experience as a blaster in charge;
- (2) Must have assisted on the avalauncher crew not less than five times; and

- (3) Must load and fire the avalauncher under the supervision of a qualified operator not less than 10 times.
- (2) Howitzer Operator
 - (i) All Howitzer operations shall be conducted in accordance with the provisions of The Avalanche Artillery Users of North America Committee (AAUNAC) Standard (Revised May 16, 2012).
- (3) Requirements for Annual Refresher Training
 - (i) All blasters shall attend a minimum of 4 hours of refresher training at the beginning of each season.
 - (a) Classroom training shall include:
 - (1) Review of operation techniques such as throwing techniques, air blasting, dangling charges, hang cord entanglement safety procedures, cornice blasting, avalauncher and howitzer procedures;
 - (2) Review of assembly and transportation procedures; and
 - (3) Review of snow safety program.
 - (b) Field training shall include:
 - (1) Review of initiation techniques;
 - (2) Review of misfire procedures; and
 - (3) A walk through of storage and make-up facilities.
 - (ii) Annual refresher training may count towards the 16-hour requirement of Section 3.6(N) of these rules when the refresher training program is specifically approved by the Division.

Section 7-3 Make-up Room Requirements

- (A) Location of Make-up Rooms
 - (1) Make-up rooms shall be located in accordance with the American Table of Distances for the Storage of Explosives (Table 4-5-1), and the quantity of explosives used to determine the distance shall be the maximum amount that will be allowed in the make-up room at any one time.
 - (2) Make-up rooms shall not be located in buildings or structures that are at any time open to the public.
- (B) Construction of Make-up Rooms
 - (1) The interior of the make-up room shall be finished and equipped to the following minimum standards:
 - (i) Walls shall be constructed of, or covered with, a non-sparking material. Nails or screws shall be countersunk, blind nailed or covered;

- (ii) Floors shall be constructed of, or covered with, a non-sparking material;
 - (iii) The building and make-up room shall be well ventilated, and the ventilation system shall discharge to the outside from the make-up room;
 - (iv) The make-up table shall be constructed of non-sparking, nonconductive material; and
 - (v) The make-up table shall be located away from the area where explosives are kept before and after assembly.
- (2) The building in which the make-up room is located shall be theft-resistant and secured by at least one steel padlock having at least five tumblers and a case hardened shackle at least 3/8-inch in diameter. The door shall have hinges and hasps attached so that they cannot be removed from the outside when in the closed position with the lock in place.

(C) Make-up Room Restrictions

- (1) Heating units shall be explosion proof, dust-proof and not depend on a combustion process when properly designed and located. National Electric Code-rated explosion-proof and dust-proof heating units may be located inside make-up rooms.
- (2) Temperature control devices must be sufficiently designed to prevent overheating of make-up rooms where explosives are stored.
- (3) Lighting fixtures shall be National Electric Code explosion-proof rated fixtures and all wiring shall be in sealed conduit.
- (4) Electric control switches shall be located outside the make-up room.
- (5) Electrical outlet boxes are not permissible inside the make-up room.
- (6) Smoking, matches, open flames or flame or spark producing devices shall not be permitted inside the make-up room.
- (7) Flammable liquids or flammable compressed gases shall not be stored or had in the make-up room.
- (8) Occupancy of the make-up room shall be restricted to authorized and trained personnel when explosives are present.
- (9) A make-up room shall not be used for the unattended storage of armed charges.
- (10) Explosives stored inside the make-up room must be stored in at least a Type 2 storage magazine suitable for indoor storage.

(D) Make-up Room Housekeeping

- (1) The make-up room shall be kept clean and orderly.
- (2) Metal tools shall not be used or stored in the make-up room.
- (3) Brooms used in the make-up room shall be made of non-sparking materials.
- (4) Sweepings and empty explosive material containers shall be disposed of as recommended by the manufacturer.

- (5) The make-up room shall be cleaned and all explosives materials shall be removed before any repairs are made to the make-up room.
- (6) The make-up table or bench shall be cleaned regularly and shall be kept free of any materials or tools not used in the assembly of the charges.

Section 7-4 Use of Explosives

(A) General Requirements

- (1) While explosives are being handled or used, smoking, matches, or any other source of fire or flame shall not be within 50 feet of the blast site.
- (2) No person shall handle explosives while under the influence of intoxicating liquors, narcotics or other controlled substances. This rule does not apply to persons taking prescription drugs and/or narcotics as directed by a physician, providing such use shall not influence the blaster's ability to conduct safe blasting operations.
- (3) Blasters conducting blasting operations shall take every reasonable precaution, including but not limited to warning signals, flags and barricades to insure the safety of the general public and workers.
- (4) The blaster shall suspend all blasting operations and remove all persons from the blast site during the approach and progress of an electrical storm.
- (5) No fire shall be fought where the fire is in imminent danger of contact with explosives. All employees shall be removed to a safe area and the fire area guarded against intruders.

(B) Explosives

- (1) Explosives shall have a shelf life of at least one operating season in the storage facilities in which they will be stored.
- (2) Blasting caps must be at least a No. 6 cap and no larger than a No. 8 cap except when recommended by the explosives manufacturer for a particular explosive used within a specific application.
- (3) Detonator and safety fuse assemblies manufactured with thermalite connectors shall not be used for avalanche mitigation operations.
- (4) Detonating cord used for initiating primers must be at least a 25-grain cord.
- (5) Explosive materials chosen must have excellent water resistance and be capable of detonation in cold temperatures.
- (6) Explosive materials that are damaged, show signs of deterioration, or have misfired shall not be used.
- (7) Detonators and other explosive materials, with the exception of fuse igniters, shall never be carried in pockets of clothing.
- (8) Should cartridges or packages of explosive materials show signs of discoloration or deterioration, such explosive materials must be carefully set aside and properly disposed of according to the manufacturer's recommendations.
- (9) Only non-sparking metallic slitters may be used for opening fiberboard cases.

- (10) No explosive material shall be abandoned or left in any location for any reason, nor left in such a manner that they may easily be obtained by children or other unauthorized persons. All unused explosives shall be returned to the proper storage facilities.
- (11) A record of each blast shall be completed and signed by the Type I permittee acting as the blaster in charge. All records shall be retained at least five years, shall be available for inspection by the Division, and shall contain at least the following data:
 - (i) Name of company or contractor;
 - (ii) Date, time and location of route;
 - (iii) Name, permit number and signature of blaster-in-charge of the route;
 - (iv) Number of charges used on each route;
 - (v) Names of employees on each route;
 - (vi) Types of explosives used;
 - (vii) Total amount of each explosive received and used;
 - (viii) Method of initiation;
 - (ix) Type of blasting (hand charge, cornice control, avalauncher);
 - (x) Weather conditions; and
 - (xi) Statement noting any misfires, the location of misfires, steps taken to recover or refire any misfires, and the date the misfire was found and disposed of.

(C) Hand Charges

(1) Safety Fuse

- (i) Safety fuse that is deteriorated or damaged in any way shall not be used.
- (ii) The hanging of safety fuse on nails or other projections which will cause a sharp bend to be formed in the fuse is prohibited.
- (iii) Pre-manufactured detonator and fuse assemblies shall be used in accordance with the manufacturer's requirements.
- (iv) Before assembling fuse detonators and safety fuse, a minimum of 1 inch shall be cut from the end of the supply reel so as to assure a fresh cut end in each fuse detonator.
- (v) The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all workers concerned with blasting.
- (vi) New rolls of safety fuse shall be tested for burn rate prior to use and all partial rolls shall be tested at least every 30 days. A record of the burn rate shall be kept by the Type II permittee.
- (vii) Only a bench or hand-held cap crimpers designed for the purpose of crimping fuse detonators shall be used for attaching fuse detonators to safety fuse. Crimpers shall

be kept in good repair and accessible for use.

- (viii) No fuse detonators and fuse shall be assembled, or primers made up, in any magazine or near any possible source of initiation.
- (ix) Assembly of fuse detonators and safety fuse and pre-arming of charges shall only be done in a warm, dry, well-lit make-up room.
- (x) Any loose cartridges of explosives, detonators, and assembled fuse detonators and safety fuse unused at the end of the shift shall be returned to their respective and separate magazines and locked up.
- (xi) Detonators, fuse detonator and fuse assemblies, armed charges or safety fuse igniters shall not be carried into nor stored in any magazine containing cartridge high explosives.
- (xii) Detonators shall not be inserted in the explosives without first making a hole in the cartridge of proper size using a tool designed for that purpose.

(2) Arming of Charges With Detonators

- (i) Cast primers and boosters shall not be used if the hole is too small for the detonator, and attempting to enlarge the hole in a cast primer or booster shall not be permissible.
- (ii) The detonator shall be secured within the primer so that no tension is placed on the safety fuse at the point of entry into the detonator.
- (iii) The detonator shall be fully inserted into the primer cartridge or booster and shall not protrude from the cartridge.
- (iv) After the fuse detonator and safety fuse assembly is inserted, the explosive contains a sensitive detonator and is then vulnerable to premature detonation, therefore delaying the arming of a charge until just before tossing the charge should be standard procedure when wind and/or temperatures are not severe.
- (v) When arming the charge at the blast site the blaster shall:
 - (a) Insure that the fuse detonator is installed on the correct length of fuse prior to transporting to blast sites;
 - (b) Place detonators in adequate protective padding or shields before placing in approved avalanche mitigation packs;
 - (c) Place detonators and explosives in separate approved avalanche mitigation packs while transporting to the blast site;
 - (d) Safety fuse igniters shall not be placed inside the pack when it contains explosives or detonators, but shall be carried in a separate pack;
 - (e) Insure that the detonator is secured to the charge before attaching fuse igniter.
- (vi) Depending on weather condition, the charges may be armed in a make-up room as follows:
 - (a) All fuse detonators shall be installed on the required length of safety fuse before the explosive cartridges or primers are brought to the make-up area;

- (b) Fuse detonator and safety fuse assemblies shall be secured correctly to each type of explosive charge being used;
- (c) Fuse detonator and safety fuse assemblies shall not be attached to explosive charges until just before the time of distribution to patrol personnel;
- (d) Each hand charge shall be placed in an area separate from the assembly area immediately after assembly is completed; and
- (e) Distribution of hand charges into approved mitigation packs shall take place away from the assembly area.

(3) Initiation of Hand Charges

- (i) The length of safety fuse shall be in accordance with manufacturer's recommendations, and shall be 3 feet in length or have a burn time of not less 120 seconds at the time of initiation.
- (ii) The lighting of fuse shall be done with hot-wire lighters or pull-wire lighters.
- (iii) Matches, cigarette lighters, cigarettes, pipes, cigars or other unsafe means shall not be used to ignite fuse.
- (iv) Igniters shall be used in accordance with manufacturer's recommendations and shall not be attached to a safety fuse until the charge is at the blast site and the crew is fully prepared to initiate the charge.
- (v) At least two persons shall be present when fuse detonators and safety fuse blasting is done by hand lighting methods.
- (vi) When blasting with safety fuses, consideration shall be given to the length and burning rate of the safety fuse, and safety fuse shall be used in accordance with manufacturer's recommendations. A sufficient time of not less than 120 seconds, with a margin of safety, shall always be provided for the blaster to reach a place of safety.
- (vii) When the fuse lighter has been placed on the fuse, the blaster shall assume initiation of the safety fuse has occurred.
- (viii) If the safety fuse does not show evidence of initiation after the fuse lighter has been ignited, the blaster shall not attempt any further initiation of the charge but adequately mark the charge and retreat with the blasting crew to a safe distance for not less than 1 hour.
- (ix) After waiting at least 1 hour, the blaster shall:
 - (a) Determine that initiation failed and ignite the uninitiated charge; or
 - (b) Determine that the initiation was successful and dispose of the misfired explosive charge with a secondary charge.

(4) Use of Detonating Cord

- (i) Detonating cord shall be handled and used with the same respect and care given other explosives.
- (ii) All detonating cord knots shall be tight and all connections shall be kept at right

angles.

- (iii) Detonating cord shall be handled and used with care to avoid damaging or severing the cord.
- (iv) Detonating cord connections shall be made in accordance with approved and recommended methods. Knot-type or other cord-to-cord connections shall be made only with detonating cord in which the explosive core is dry.
- (v) Detonating cord shall be cut with a sharp knife, razor blade, or cutters designed for use with detonating cord. Scissors or plier type cutters shall not be used.
- (vi) All detonating cord connections shall be inspected before firing the blast.
- (vii) When connecting a detonator to detonating cord, the detonator shall be taped or otherwise attached securely along the side of the end of the detonating cord with the end of the detonator containing the explosive charge pointed in the direction in which the detonation is to proceed.
- (viii) Two fuse detonators shall be required for the initiation of detonating cord with fuse detonator and safety fuse.
- (ix) Detonators shall not be attached to the detonating cord until the area has been cleared for the blast.

(5) Avalanche Mitigation Packs

- (i) Mitigation packs shall be constructed of material that is water-resistant, non-sparking and non-conductive.
- (ii) Mitigation packs shall have sufficient individual compartments to separate hand charges or explosive components from tools or other equipment or supplies that may be carried in the pack.
- (iii) Tools or other equipment shall not be placed in compartments containing explosives.
- (iv) Each compartment used for hand charges or explosive components shall have an independent means of closure.
- (v) Mitigation packs shall be inspected daily for holes, faulty compartments or closures and explosive residue. Packs shall not be used until adequately repaired or cleaned.
- (vi) Mitigation packs shall not be left unattended, or used for storing explosives. All explosive material shall be returned to the approved storage facility at the end of individual mitigation routes.
- (vii) Individual mitigation team members shall not carry more than 35 pounds of explosives material in avalanche mitigation packs.

(D) Avalauncher and Launcher

- (1) All personnel assigned to work on an avalauncher or launcher crew shall be trained in the following:
 - (i) All operating instructions;

- (ii) Safety precautions;
 - (iii) Emergency procedures; and
 - (iv) Securing requirements for equipment.
- (2) All equipment shall be in good working condition and maintained as recommended by the manufacturer.
 - (3) The components of projectile assemblies shall not be interchanged and shall be assembled and used in accordance with the manufacturer's instructions.
 - (4) All projectiles shall be inspected before transporting them to the firing location. Such inspection shall include:
 - (i) Cast explosives for cracks, dents, fractures and smooth nose surface;
 - (ii) Cap wells should be clear of obstructions and debris and centered and straight for proper alignment of the cap; and
 - (iii) Fin assembly should be inspected for properly-functioning components and safety items, including pressures plate, pressure plate arming wire, bore rider pin, safety pin, magnet and firing pin.
 - (5) Defective projectiles shall not be used and shall be disposed of or returned to the manufacturer.
 - (6) Safety devices or components shall not be removed.
 - (7) If explosives are not at least 20 feet from the avalauncher/launcher during firing procedures, they shall be kept in a closed Type 3 magazine.
 - (8) The transport safety pin shall not be removed until just prior to inserting the projectile into the barrel.
 - (9) Avalaunchers/Launchers must be fired with compressed nitrogen gas only.
 - (10) Avalaunchers/Launchers shall be connected to the compressed nitrogen source through a satisfactory pressure regulator.
 - (11) The pressure regulator shall be set to limit the launch pressure to the maximum recommended by the manufacturer.
 - (12) The first round fired in a mitigation mission shall be a test fire to test the proper functioning of the launcher without a projectile.
 - (13) The blaster in charge, trained assistants, and blasters in training shall be the only personnel within 100 feet of the avalauncher/launcher during loading and firing.

(E) Misfires

- (1) An explosive charge or any part of an explosive charge that fails to detonate after initiation shall be considered a misfire.
- (2) If a misfire occurs, the blaster shall note the location of the misfired explosive and shall not approach the misfired explosive for at least 1 hour.

- (3) Explosives which are aflame or emitting smoke shall not be approached for at least 1 hour after evidence of combustion ceases.
- (4) The area shall remain guarded or closed until a search of the area has been done and the misfire hazard is removed or the blaster-in-charge pronounces the area safe.
- (5) Misfires shall be handled by the blaster-in-charge and only those employees necessary to remove the hazard and the area shall remain guarded.
- (6) Impact to explosive materials shall be avoided when searching for nonvisible misfired charges.
- (7) A misfired armed charge shall be disposed of where it is found with a secondary charge.

Section 7-5 Transportation

- (A) Transportation of explosives, blasting agents, and blasting supplies on public highways, railways, and airways shall be in accordance with the provisions of title 42 Article 20 C.R.S., any regulations promulgated pursuant thereto and Title 49 CFR Parts 171-179 and Parts 390-397, Motor Carriers.
- (B) Requirements for the transportation of explosives, blasting agents and blasting supplies by motorized vehicles on job sites shall be:
 - (1) No person shall smoke, carry matches or any other flame-producing device or carry firearms or loaded cartridges while in or near a motor vehicle transporting explosives.
 - (2) No person shall drive, load or unload a vehicle transporting explosives in a careless or reckless manner.
 - (3) Vehicles transporting explosives, blasting agents or blasting supplies shall not be taken inside a garage or shop for repairs or servicing.
 - (4) Vehicles used for transporting explosives shall be equipped to carry the load without difficulty and shall be in good mechanical condition.
 - (5) A motor vehicle used for transporting explosive materials shall be inspected prior to loading to determine that it is in proper condition for the safe transportation of explosive materials.
 - (6) All cargo areas of vehicles used for transporting explosive materials shall have tight floors and any exposed spark-producing metal on the inside of the cargo area shall be covered with wood or other non-sparking materials to prevent contact with packages of explosive materials.
 - (7) Packages of explosive materials shall not be loaded above the sides of an open-body vehicle.
 - (8) Explosive materials shall not be transported with other materials or cargoes in the same compartment. In no case shall flammable materials be carried on the same vehicle as explosive materials.
 - (9) A motorized vehicle which contains explosive materials shall not be parked under any of the following circumstances:
 - (i) On or within 5 feet of the traveled portion of a public street or highway;

- (ii) On private property; or
 - (iii) Within 300 feet of a bridge, tunnel, building, or place where people work, assemble, or congregate.
- (10) A motorized vehicle transporting explosive materials shall not be left unattended.
- (11) A motorized vehicle shall be deemed attended only when the driver or other attendant is physically on or in the vehicle or conveyance or has the vehicle within the driver's or attendant's field of vision and can reach the vehicle or conveyance quickly and without any kind of interference; attended also means the driver or attendant is awake, alert and not engaged in any other duties or activities which may divert his/her attention from the vehicle.
- (12) Detonators may not be transported in the same vehicle with other explosives unless:
- (i) The detonators and explosives are placed in separate locked Type 2 magazines secured within the body of the vehicle or conveyance;
 - (ii) The detonators and explosives are placed in suitable locked containers and separated by 4 inches of hardwood, and the detonators are totally enclosed or confined by the hardwood construction; or
 - (iii) The detonators and explosives are placed in separate locked containers or container compartments constructed in accordance with the IME Safety Library Publication No. 22, "IME Standard for the Safe Transportation of Detonators in a Vehicle with Other Explosives"; or
 - (iv) The detonators and explosives are placed in separate locked Type 3 magazines.
- (C) Requirements for the transportation of explosives on passenger tramways when the public is present shall be:
- (1) Explosives shall not be transported in the same enclosed passenger tramway carrier with the public.
 - (2) Transportation of explosives on non-enclosed passenger tramways shall require the following:
 - (i) Explosives shall be attended at all times;
 - (ii) Warning signs indicating that explosives are currently being transported on the tramway and passengers may ride the tramway at their own discretion shall be clearly posted at the tramway entrance;
 - (iii) Passengers shall not be allowed to ride the passenger tramway in the opposing direction of the explosives;
 - (iv) A minimum distance of 200 feet shall be maintained in front of and behind the chair transporting explosives and chairs transporting the public;
 - (v) The amount of explosives being transported shall not exceed 50 pounds per carrier; and
 - (vi) Nothing in Section 7-5(C)(2) is intended to limit liabilities as set forth in the Colorado Ski Safety Act (C.R.S. 33-44-101 thru 114).

ARTICLE 8 GEOPHYSICAL RESEARCH

Section 8-1 General Requirements

- (A) Seismic Blasting shall conform to the requirements of Articles 4, 5 and 6 of these regulations for the storage and transportation of all explosive materials, for the preparation of charges, for the loading of charges and for the detonation of charges.
- (B) Surface charges, above-surface charges, and armed charges loaded in seismic drill holes less than 20 feet in depth shall not be left unattended.
- (C) Charges which have not been armed may be left unattended in holes less than 20 feet deep provided that:
 - (1) The hole has been loaded such that the charge has been anchored, cannot be removed and is capped with a hole plug;
 - (2) The charge does not exceed an amount that would cause damage to persons or property on the surface if accidentally detonated; and
 - (3) The backfill material in the loaded hole is a continuous column from the charge to the collar of the drill hole. Any drill holes in which the backfill material has bridged and the hole has not been fully backfilled shall not be left unattended.
- (D) Armed or unarmed charges loaded in seismic drill holes greater than 20 feet deep may be left unattended provided that:
 - (1) The hole has been loaded such that the charge has been anchored, cannot be removed and legwires have been made inaccessible and capped with a hole plug;
 - (2) The charge does not exceed an amount that would cause damage to persons or property on the surface if accidentally detonated; and
 - (3) The backfill material in the loaded hole is a continuous column from the charge to the collar of the drill hole. Any drill holes in which the backfill material has bridged and the hole has not been fully backfilled shall not be left unattended.
- (E) Armed and unarmed charges that are loaded in inhabited areas shall not be left unattended.
- (F) Blasting signs shall be posted on roads and trails leading to the blast site.

ARTICLE 9 BLACK POWDER EXPLOSIVES

Section 9-1 General Requirements

- (A) Black powder shall be stored in shipping containers as required by regulations of the U.S. Department of Transportation, 49 CFR, Section 173.60, as currently published.

- (B) Black powder intended for personal use shall be sold and stored according to the Uniform Fire Code (sections 77.202, 77.203, and 77.203a).

ARTICLE 10 ALTERNATE METHODS AND EMERGENCY VARIANCES

Section 10-1 Alternate Methods or Procedures

- (A) The permittee, on specific approval by the Division as provided by this paragraph, may use an alternate method or procedure in lieu of a method or procedure specifically prescribed in these regulations.
- (B) The Division may approve an alternate method or procedure, subject to stated conditions, when found that:
 - (1) Good cause is shown for the use of the alternate method or procedure;
 - (2) The alternate method or procedure is within the purpose of, and consistent with the effect intended by, the specifically prescribed method or procedure and is substantially equivalent to that specifically prescribed method or procedure; and
 - (3) The alternate method or procedure will not be contrary to any provision of law and will not result in an increase in cost to the Division or hinder the effective administration of these regulations.
- (C) Where the permittee desires to employ an alternate method or procedure, the permittee shall submit a written application to the Division. The application shall specifically describe the proposed alternate method or procedure and shall set forth the reasons for it.
- (D) Alternate methods or procedures may not be employed until the application is approved by the Division.
- (E) The permittee shall, during the period of authorization of an alternate method or procedure, comply with the terms of the approved application.
- (F) Authorization of any alternate method or procedure may be withdrawn whenever, in the judgment of the Division, the effective administration of this article is hindered by the continuation of the authorization.
- (G) As used in this paragraph, alternate methods or procedures include alternate construction or equipment.

Section 10-2 Emergency Variances from Requirements

- (A) The Division may approve construction, equipment, and methods of operation other than as specified in this part, where it is found that an emergency exists and the proposed variations from the specified requirements are necessary and the proposed variations:
 - (1) Will afford security and protection that are substantially equivalent to those prescribed in these regulations;
 - (2) Will not hinder the effective administration of these regulations; and
 - (3) Will not be contrary to any provisions of law.
- (B) Variations from requirements granted under this paragraph are conditioned on compliance with the procedures, conditions and limitations set forth in the approval of the application.

- (C) Failure to comply in good faith with the procedures, conditions and limitations shall automatically terminate the authority for the variations and the permittee shall fully comply with the prescribed requirements of regulations from which the variations were authorized.
- (D) Authority for any variation may be withdrawn when, in the judgment of the Division, the effective administration of these regulations is hindered by the continuation of the variation.
- (E) Where the permittee desires to employ an emergency variation, the permittee shall submit a written application to the Division.
- (F) The application shall describe the proposed variation and set forth the reasons for it. Variations may not be employed until the application is approved, except when the emergency requires immediate action to correct a situation that is threatening to life or property. Corrective action may then be taken concurrent with the filing of the application and notification of the Division via telephone.

Section 10-3 Retention of Approved Variations

- (A) The permittee shall retain, as part of his records available for examination by the Division, any application approved by the Division under this section.

ARTICLE 11 ENFORCEMENT

Section 11-1 Enforcement Program

The Division provides these regulations to assist operators with maintaining safe use, manufacture, possession, sale, storage, transport, or disposal of explosives materials or blasting agents. When circumstances regarding regulated explosives materials or blasting agents are found to be not in compliance with these regulations, the Division will pursue enforcement actions against the operator.

The enforcement process will include requiring the permittee to make repairs and/or upgrades, provide records, and complete other actions necessary to come back into compliance. During and following the enforcement process, the Director will continue to assist the operator to remain in compliance. The enforcement process may include monetary penalties up to \$1,000 per violation per day according to statute (C.R.S. 8-20-104) if the enforcement obligations are not implemented according to the required schedule.

Section 11-1-1 Notice of Violation

- (A) A notice of violation (NOV) may be issued when a regulated party is found to be out of compliance with these regulations (7 C.C.R. 1101-9) and/or statutes (C.R.S. 8-20, 9-6 and 9-7). The notice of violation may include fines and/or an order to cease explosives-related operations until all violations are satisfactorily corrected.
- (B) Within 10 working days after an NOV has been issued, the person issued the NOV may file a written request with the Division for an informal conference regarding the NOV. Upon receipt of the request, the Division shall provide the alleged violator with notice of the date, time and place of the informal conference. During the conference, the alleged violator and Division personnel may present information and arguments regarding the allegations and requirements of the NOV.
- (C) Within twenty days after the informal conference, the Division shall uphold, modify, or strike the allegations within the NOV in the form of a settlement agreement or an enforcement order.
- (D) If the alleged violator fails to timely request an informal conference, the terms of the NOV become a binding enforcement order not subject to further review.

Section 11-1-2 Enforcement Order

- (A) An enforcement order may be issued when the violations included within an NOV are not resolved within the prescribed time frame or the schedule set forth in a settlement agreement is not met.
- (B) An enforcement order may include increased fines up to \$1,000 per violation for each day of violation. In addition, the enforcement order may include shut-down of the explosives operation, suspension and/or revocation of an explosives permit.
- (C) An alleged violator may appeal the enforcement order to the Division for a hearing under C.R.S. 24-4-105. The Division shall then issue a final decision which is subject to judicial review under C.R.S. 24-4-106.
- (A)