Chapter ILHR 7

APPENDIX B
SAFETY RECOMMENDATIONS

These "Do's and Don'ts" are from publication number 4 adopted by the Institute of Makers of Explosives, December, 1983. These instructions and warnings can also be found on "Case Inserts" in every case of explosives.

GENERAL

- DO control explosive materials, which have been removed from a magazine, to prevent possession by children or other unauthorized persons.
- DON'T allow any source of ignition within 100 feet of a blast area (except approved means for lighting safety fuse) or within 50 feet of a magazine or vehicle containing explosive materials.
- DON'T expose explosive materials to excessive impact, friction, electrical impulse or heat from any source, including flame-producing devices.
- DON'T fight fires in explosive materials. Remove all personnel to a safe location immediately and guard the area against intruders.
- DON'T shoot into explosive materials, magazines, or vehicles loaded with explosive materials.
- DON'T allow children or unauthorized persons near explosive materials.
- DON'T use explosive materials that appear to be deteriorated or damaged.

WHEN TRANSPORTING EXPLOSIVE MATERIALS

- DON'T park vehicles containing explosive materials in areas which are congested or where people congregate.
- DO load and unload explosive materials carefully.
- DO transport explosive materials in accordance with federal, state and local laws and regulations.

WHEN STORING EXPLOSIVE MATERIALS

- DO locate magazines in the most isolated places available. They should be separated from each other, and from inhabited buildings, highways, and passenger railways by distances not less than those recommended in the Institute of Makers of Explosives Safety Library Publication No. 2, entitled "American Table of Distances".
- DO post "EXPLOSIVES - KEEP OFF" signs conspicuously near magazines. These signs should be located so that a bullet passing through them at right angles cannot strike a magazine.
- DO store explosive materials only in a magazine which is clean, dry, well-ventilated, reasonably cool, properly located, substantially constructed, securely locked, weather-resistant, fire-resistant, and theft-resistant and, when required by the nature of the material, bullet- and missile-resistant.
- DON'T store explosive materials in wet or damp places, with flammable or other hazardous materials, or near sources of excessive heat.
- DON'T store detonators in the same package or magazine with other explosive materials.
- DO store only explosive materials and blasting accessories in magazines.
- DO consult your supervisor, or the manufacturer if you have no supervisor, if explosive materials appear to be deteriorated or have stained the floor of a magazine.
- DON'T allow combustible material to accumulate within 25 feet of a magazine.

WHEN USING EXPLOSIVE MATERIALS

- DON'T use any explosive materials unless completely familiar with safe procedures for their use, or under the direction of competent, experienced persons.
- DO design each blast to avoid excessive air blast, ground vibration and fly rock in accordance with applicable federal, state and local laws and regulations.
- DON'T allow metallic slitters to come in contact with any metallic fasteners when opening packages of explosive materials.
- DO close partially used packages of explosive materials.
- DON'T carry explosive materials on your person.
- DON'T insert anything except safety fuse in a blasting cap.
- DON'T use any explosive materials that have been water-soaked even if they appear to be dried out.
- DO consult your supervisor for instructions when handling explosive materials during the approach of an electrical storm. This applies to both surface and underground operations.
- DON'T handle explosive materials during an electrical storm. All persons should retire to a place of safety.
- DON'T attempt to investigate the contents of a detonator or try to pull the wires, fuse, or detonating cord out of any detonator or delay device.

WHEN PREPARING THE PRIMER

- DO make up primers in accordance with established methods. Make sure that the detonator is completely

encased in the explosive and so secured that in loading no tension will be placed on the wires, safety fuse or detonating cord at the point of entry into the detonator.

- DON'T force a detonator into an explosive material. Insert the detonator completely into a hole made with a punch designed for that purpose. The detonator should point toward the desired direction of detonation.
- DON'T attempt to punch any explosive material that has become very hard or frozen.
- DO use the first cartridge in the borehole as the primer cartridge where 2-inch or less diameter cartridges are being used.
- DON'T use a primer or booster if the hole is too small for the detonator. Never attempt to enlarge the hole.
- DON'T make up primers in a magazine or near other large quantities of explosive materials and DON'T make more than are necessary for immediate needs.

WHEN DRILLING AND LOADING

- DO carefully examine the surface or face before drilling to determine the possible presence of unfired explosive materials. Never drill into explosive materials or into any hole that has contained explosive materials.
- DO check each borehole carefully to assure it is in safe condition for loading.
- DON'T force explosive materials into a borehole.
- DO avoid placing any unnecessary part of the body over or in front of the borehole when loading, tamping and stemming.
- DON'T slit, drop, deform, tamp or abuse the primer and DON'T drop another cartridge directly on the primer.
- DON'T load a borehole that contains any hot or burning materials. Temperatures in excess of 150° F. (66° C.) are dangerous.
- DON'T spring a borehole near holes loaded with explosive materials.
- DON'T stack more explosive materials than are needed near working areas during loading.
- DO recognize the possibility of static electrical hazards from pneumatic loading and take adequate precautionary measures.

WHEN TAMPING

- DON'T tamp the primer. DON'T tamp explosive materials with metallic devices except for jointed poles with nonferrous metal connectors. Avoid violent tamping.
- DON'T kink or damage safety fuse, detonating cord, plastic tubing or wires of detonators when tamping.
- DON'T tamp any explosive material that has been removed from its cartridge.

WHEN BLASTING ELECTRICALLY

- DO test all electric blasting cap circuits for continuity and proper resistance, using only a blasting circuit test instrument designed for that purpose.
- DON'T attempt to fire electric blasting caps with more or less current than recommended by the manufacturer.
- DO keep the electric cap wires or lead wires disconnected from the power source and short-circuited until ready to fire.
- DON'T use electric blasting caps made by different manufacturers in the same circuit, or caps of different style or function even if made by the same manufacturer, unless such use is approved by the manufacturer.
- DO be sure that all wire ends are clean before connecting.
- DON'T load any boreholes near electric power lines, unless the firing line, including the electric blasting cap wires, is anchored or so short that it cannot reach the power lines.
- DON'T have electric wires or cables near electric blasting caps or other explosive materials except at the time and for the purpose of firing the blast.
- DO keep the firing circuit completely insulated from ground or other conductors.
- DON'T uncoil the wires or use electric blasting caps in the vicinity of radio-frequency transmitters. Consult the manufacturer or the Institute of Makers of Explosives Safety Library Publication No. 20, "Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Electric Blasting Caps."
- DON'T use or uncoil the wires of electric blasting caps during electric or dust storms or near any other source of large charges of static electricity.

WHEN BLASTING WITH DETONATING CORD

- DO select detonating cord that has the characteristics consistent with correct blasting methods and the type of explosive materials being used.
- DO handle detonating cord with the same respect given other explosive materials.
- DO avoid damaging detonating cord prior to firing.
- DO cut the line of detonating cord from the spool before loading the remainder of the explosive materials.
- DO make tight connections in accordance with established methods. Cord-to-cord connections should be made only where the detonating cord is dry.
- DO avoid loops, sharp kinks or angles that direct the cord back toward the oncoming line of detonation.
- DON'T attach detonators to detonating cord until everything is in readiness for the blast.
- DO attach detonators to detonating cord with tape or by methods recommended by the manufacturer. The deto-

nators should always be pointed toward the desired direction of detonation.

WHEN BLASTING WITH NONELECTRIC BLASTING CAPS

General

- DO follow manufacturer's instructions and warnings. Emphasize proper hook-up procedures and safety precautions.
- DO discontinue operations in surface blast areas during electric storms.
- DON'T hold nonelectric leads during firing; personal injury or death may result.
- DON'T use the tubing leads or detonating cord leads for any purpose other than that intended by the manufacturer.

Miniaturized Detonating Cord System

- DO use explosives that are insensitive to initiation by the miniaturized detonating cord lead.
- DON'T join 2 lengths of miniaturized detonating cord. It will not propagate through such connections.

Gas Initiated System

- DON'T smoke or allow open flame within 25 feet of blasting machines designed for gas initiated nonelectric blasting caps.
- DO stay away from the blast area after connections are made ready for firing, unless the entire system has been properly purged and disconnected from the primary source of ignition.
- DON'T kink tubing. Use tube protectors or special boosters designed for this system.

Shock Tube System

- DON'T trim heat seals from the shock tube ends. Moisture entry will cause failure.
- DON'T join lengths of shock tube. It will not propagate through such connections.

WHEN BLASTING WITH SAFETY FUSE

- DON'T use lengths of safety fuse less than 3 feet. Know the burning speed of the safety fuse by conducting a test burn and make sure you have time to reach safety after lighting.
- DO handle safety fuse carefully to avoid damaging the covering. In cold weather, warm before using to avoid cracking the waterproofing.
- DON'T cut safety fuse until you are ready to insert it into a blasting cap. Cut off an inch or 2 to insure a dry end. Cut safety fuse squarely across with a clean sharp blade. Seat the safety fuse lightly against the cap charge and avoid twisting after it is in place.
- DO crimp blasting caps only with a cap crimper designed for the purpose.
- DON'T light safety fuse until sufficient stemming has been placed over the explosive material to prevent excessive heat or sparks from coming into contact with the explosive material.
- DON'T hold other explosive materials in the hands when lighting safety fuse.
- DON'T drop primer with lighted safety fuse down borehole.
- DON'T use safety fuse in agricultural blasting.
- DON'T use matches, cigarette lighters, cigarettes, pipes, cigars, carbide lamps or other unsafe methods to ignite safety fuse.
- DO use only equipment or devices especially designed to light safety fuse.
- DO use only ignitercord with thermalite connectors for multiple-fuse ignition.
- DO use only hot-wire lighters, pull-wire lighters or thermalite connectors for single-fuse ignition.
- DO use the "buddy system" when lighting safety fuse - one lights the fuse, the other times and monitors.

IN UNDERGROUND WORK

- DO use permissible explosive materials in flammable, gassy or dusty atmospheres when required by applicable federal, state and local laws and regulations.
- DON'T store excessive supplies of explosive materials in an underground mine.

BEFORE AND AFTER FIRING

- DON'T fire a blast without a positive signal from the one in charge.
- DO make certain that all persons, vehicles, equipment and surplus explosive materials are in a safe place, that all access routes into the blast area have been posted with guards, and that adequate warning has been sounded.
- DON'T fire (the shot) from a position in front of the blast.
- DO comply with existing federal, state and local laws and regulations for safe fume levels before returning to blast area.
- DON'T attempt to investigate a misfire too soon. Follow federal, state and local laws and regulations.
- DON'T drill, bore, or pick out any explosive material that has misfired. Misfires should be handled only by or under the direction of a competent and experienced person, and then only in compliance with any applicable federal, state and local laws and regulations.

EXPLOSIVE MATERIALS DISPOSAL

- DO dispose of or destroy explosive materials in accordance with approved methods. Consult your supervisor, or the manufacturer if you have no supervisor.

- DON'T leave explosive materials or their packaging where children, unauthorized persons or livestock can get them.
- DON'T allow any explosive materials packaging to be burned in a confined space or to be reused.

WHEN SEISMIC PROSPECTING

- DO place the detonator and/or primer near the top of the explosive column. If dynamite is used, punch a hole for and insert the detonator midway in the side of the top cartridge or in the top of the second cartridge. When side-priming, wrap suitable tape around the cartridge so the cap cannot come out. Use the capwell on cartridges having this feature.
- DO make certain that the explosive material is secured at a safe depth in the hole. Use shot hole anchors if needed.
- DO securely anchor any casing if there is a possibility it might blow out of the borehole.
- DON'T approach any explosive materials that have been thrown out of the borehole until it is determined that they are not burning.

RECOMMENDATIONS FOR MINIMIZING THE HAZARDOUS GAS PRODUCTS FROM USE OF EXPLOSIVE MATERIALS

- DO use the largest-diameter cartridge that is compatible with the job.
- DON'T use explosive materials that appear to be deteriorated or damaged.
- DON'T load more explosive material than is necessary to do the job properly.
- DON'T add combustible materials to the explosive load.
- DO avoid all conditions that may cause the explosive material to burn rather than detonate.
- DO always use water-resistant explosive materials in wet work and fire the blast as soon as practicable after loading.
- DO use noncombustible materials where stemming is required.
- DO spray the muckpile with water in accordance with federal, state and local laws and regulations.

HEALTH AND SAFETY RECOMMENDATIONS

Handling and Use

- DON'T allow ingestion, food contamination, prolonged skin exposure, contact with eyes, or prolonged inhalation of dust or vapors from explosive materials. DO flush areas of contact with large quantities of water.
- DON'T reuse packaging from explosive materials.
- DON'T attempt to produce "home-made" explosive materials or alter the composition of explosive materials.
- DON'T remove the explosive materials from the package unless it is designed for use in that manner.
- DON'T strike or attempt to take apart detonators, primers, boosters or any explosive material.
- DO avoid exposure to excessive noise from blasting in accordance with applicable federal, state or local laws and regulations.

Storage and Transportation

- DO provide adequate magazine ventilation in accordance with applicable federal, state or local laws and regulations.
- DON'T exceed instructions of your supervisor or, if you have no supervisor, with manufacturer's recommendations for storage time and temperature.
- DO clean up spills promptly in accordance with manufacturer's recommendations.

After Blast

- DO assume toxic fumes are present from all blasts or burning explosive materials.
- DO comply with applicable federal, state and local laws and regulations for safe fume levels before returning to blast area.