

**CONSTITUTION**  
**OF THE STATE OF ARIZONA**  
**ARTICLE XIX**  
**MINES**

The office of Mine Inspector is hereby established. The Legislature, at its first session, shall enact laws so regulating the operation and equipment of all mines in the State as to provide for the health and safety of workers therein and in connection therewith, and fixing the duties of said office. Upon approval of such laws by the Governor, the Governor, with the advice and consent of the Senate, shall forthwith appoint a Mine Inspector, who shall serve until his successor shall have been elected at the first general election thereafter and shall qualify. Said successor and all subsequent incumbents of said office shall be elected at general elections, and shall serve for two years.

**TITLE 27. MINERALS, OIL AND GAS**  
**CHAPTER 1. STATE AGENCIES AND OFFICERS**  
**ARTICLE 2. STATE MINE INSPECTOR**

**27-121. Qualifications of mine inspector; duties; deputies; salary**

**A.** The state mine inspector shall be a resident of this state at least two years prior to his election, not under thirty years of age, and shall have been practically engaged in , and acquainted with, mines and mining in this state, and shall have had at least four years experience in underground mining and three additional years in either underground mining, smelting, open pit mining, or experience in any industry under the jurisdiction of the state mine inspector.

**B.** No person may be an inspector or deputy inspector while an employee, director, or officer of a mining, milling or smelting company.

**C.** The inspector, and each deputy, shall devote full time to the duties of his office.

**D.** The inspector shall receive an annual salary pursuant to § 41-1904 and necessary traveling expenses when traveling in discharge of official duties.

**E.** The mine inspector shall have a seal bearing the words “Mine Inspector, State of Arizona” which shall be affixed to official documents.

**27-122. Deputy Inspectors**

The state mine inspector may appoint and assign such deputy inspectors to perform the duties of the state mine inspector as prescribed by law. All deputies shall receive compensation as determined pursuant to § 38-611.

**27-124. Mine inspections required; powers of inspector**

**A.** The mine inspector shall inspect, at least once every three months, every active underground mine in the state employing fifty or more persons, and at least once each year, every other mine. The inspector shall inspect the operation, conditions, safety appliances, machinery, equipment, sanitation and ventilation, the means of ingress and egress, the means taken to protect the lives, health and safety of the miners, the cause of accidents and deaths occurring at the mine, and the means taken to comply with provisions of this title.

**B.** The mine inspector may enter and inspect any abandoned or inactive mine to determine whether any dangerous condition exists which may affect the health and safety of the general public.

**C.** The inspector at any time may enter, examine and inspect any mine or part of any mine and inspect any connected plant or equipment or any part of the workings of the mine.

**D.** The mine operator or designated representative shall accompany the inspector, without unreasonable delay, while conducting inspections.

**27- 125. Inspection report**

After every inspection the inspector shall fill out and leave with the operator a preliminary inspection report that lists the inspection party, the part of the operation inspected, the type of inspection and every violation of the state mining code observed during the inspection, but nothing contained in or omitted from the entry shall limit or affect the duty and obligation of the owner or operator of the property under this title. Within a reasonable length of time a typed copy of the inspection report shall be sent to the operator which shall be filed at the office of the operations. The report shall be available at all reasonable times.

**27-126. Annual report to governor**

**A.** The mine inspector on March 31 each year shall make and file with the governor a statistical summary and report of the work during the year ending December 31. The report shall contain a statement showing the number of persons employed in each mine, and, separately, the number of persons employed above ground and under ground, the number and nature of fatal and serious

accidents occurring in each mine, the number of inspections made, complaints filed, inquests attended, mines or mine workings ordered to be vacated, violations found, and other information deemed important, together with necessary or desirable recommendations.

**B.** Copies of the report shall be published and distributed at the expense of the state.

**27-127. Restrictions on divulging information by inspectors and employees; dismissal for violation**

**A.** No inspector, deputy or employee shall make a report with respect to a mining property or prospect, except an official report to his superior officer or to the governor, nor shall he make public or reveal to any other person knowledge or information obtained by him in the exercise of his official duties concerning ore, ore bodies or values, of any mine or part thereof.

**B.** An inspector or deputy violating this section shall be dismissed from office.

**27-128. Inspection of mines; violation; classification**

**A.** The state mine inspector or a deputy inspector shall inspect each mine in the state as frequently as necessary to determine whether any hazardous dust condition exists therein. There shall be a prompt inspection of any mine in which he or a deputy inspector has reason to believe a hazardous dust condition

exists or with respect to which complaint of a hazardous dust condition has been made as provided in § 27-308. The mine inspector or a deputy inspector shall make recommendations to mine operators as to methods of reducing dust and whenever he finds a hazardous dust condition he shall notify the mine operator thereof. The notice shall be in writing and shall specify a reasonable time within which the dust condition must be remedied. The mine operator shall install within the time specified, and thereafter maintain and operate, dust prevention practices which remedy the hazardous dust condition.

**B.** If the dust prevention practices are not installed within the time specified in the notice or are not thereafter maintained, the state mine inspector or a deputy inspector shall forthwith order cessation of operations, except for necessary maintenance and repair work, in all parts of the mine in which hazardous dust conditions exist or are produced by operations until the condition is remedied. Written notice of the order shall be given the mine operator and any mine operator who thereafter knowingly fails to obey the order is guilty of a class 2 misdemeanor.

## **CHAPTER 3. OPERATION OF MINES**

### **ARTICLE 1. GENERAL PROVISIONS**

#### **27-301. Definitions**

In this chapter, unless the context otherwise requires:

- 1.** “Abandoned Mines” means a mine where mining operations have been permanently terminated or the operator has complied with section 27-303, subsection B or for which no owner, operator or other claimant of record can be located for a deserted mine site.

2. “Active Mine” means a mining operation conducting mining activities on any lands.
3. “Claim” means the portion of mining ground held under federal and local law by one claimant or association, by virtue of one location and record. It includes mining claims and sites deemed abandoned under the federal land policy and management act of 1976 (P.L. 94-579; 90 STAT. 2743).
4. “Excavations” or “workings” means any or all parts of a mine excavated or being excavated, including shafts, tunnels, drifts, crosscuts, adits, entries, winzes, raises, stopes, open cuts, and all working places, whether abandoned or in use.
5. “Inactive Mine” means a mining operation not conducting mining for more than six months or where mining operations have been temporarily suspended or the operator has complied with section 27-303, subsection B.
6. “Inspector” means the state mine inspector and except in article 7 of this chapter his deputies.
7. “Mill” means any ore mill, concentrator, sampling works, crushing, grinding or screening plant, appurtenant buildings, shops or storage or loading facility used at and in connection with any mine.
8. “Mine” means all lands containing excavations, underground passageways, shafts, tunnels and workings, structures, facilities, equipment, machines or other property including impoundments, retention dams, tailings and waste dumps, on the surface or underground, used in, to be used in or resulting from the work or extracting minerals or other materials, excluding hydrocarbons.

Mine includes that portion of an operation which mixes rock, sand, gravel or similar materials with water and cement or with asphalt, provided that the operation is either physically connected to the mine or is so interdependent with the mine as to form one integral enterprise.

**9.** “Miner” means a person who works in a mine.

**10.** “Mining” means those activities conducted to develop or extract materials from a mine including on-site transportation, concentrating, milling, leaching, smelting or other processing of ores or other materials.

**11.** “Open Pit” means any mine operated on the surface of the earth, including quarries, but excluding sand and gravel operations.

**12.** “Operation” means a mine, mill, smelter, sand and gravel plant or pyrometallurgical or hydrometallurgical operation.

**13.** “Operator” means a natural person, corporation, partnership association, agent, governmental entity or other public or private organization or representative owning, controlling or managing a mine.

**14.** “Sand and gravel operation” means any operation the principal product of which is sand, gravel, pumice or any other common variety of material.

**15.** “Smelter” means any establishment used for the purpose of pyrometallurgical operations and appurtenant buildings, shops, facilities for the production of steam or electrical power, or equipment used in conjunction with any of the above.

**16.** “Surface mining” means mining conducted on the surface of the land including open pit, strip, dredging, quarrying, leaching, surface evaporation operations, reworking abandoned tailings and dumps and related activities.

**17.** “Underground mine” means a mine in which minerals or other materials are extracted from beneath the surface by means of shafts, tunnels, or other openings.

**27-302. Operations subject to act; enforcement; duties of inspector; violation; classification**

**A.** All operations shall be subject to the provisions of this chapter unless specifically exempted from a particular provision by its terms.

**B.** The inspector shall enforce this chapter at all operations.

**C.** Any operator or other person violating any provision of this chapter is guilty of a petty offense unless other penalties are specifically prescribed in this chapter.

**27-303. Notification to inspector of beginning or suspending operations**

**A.** When mining operations are scheduled to begin at any mine, the operator, owner, agent, or other authorized representative shall give written notice to the inspector prior to commencement of mining.

**B.** In the case of temporary suspension of operations, excluding labor disputes, exceeding six months or in the case of permanent termination of mining operations, the operator shall notify the inspector, in writing, before the

suspension or termination date. All shafts, portals, adits or other openings shall be secured to prevent unauthorized entry and to protect public health and safety pursuant to section 27-318.

**C.** On notification of suspension or termination of mining operations, the inspector shall inspect the property to determine if adequate safety measures are being taken to protect the public.

#### **27-304. Operator responsibility**

**A.** The operator shall conduct his operation with due regard to health and safety. No operator shall fail to provide or use such safety devices and safeguards as are reasonably necessary to protect the life, health and safety of his employees.

**B.** The operator, or some responsible person with authority appointed by him, shall be on duty at all times when employees are working. He shall be responsible for the safe performance of all work under him and for the safety of all employees

**C.** The operator shall designate a person or persons to inspect as frequently as may be required by any rules or regulations for unsafe conditions and practices, defective equipment and materials, and where such conditions are found, to take appropriate corrective action.

**D.** The operator and his supervisory personnel shall enforce safety regulations and issue such orders as may be necessary to safeguard the life, health and safety of employees.

**27-305. Employee responsibility**

Each employee shall make full use of all safeguards provided for his protection.

Except for the purposes of repair, no employee or other person shall remove, displace, damage, destroy or carry off any safety device or safeguard furnished or provided, nor shall he interfere with the use thereof. No employee or other person shall interfere with the methods or processes adopted for the protection of employees, nor shall he fail or neglect to do anything reasonably necessary to protect the life, health and safety of himself and other employees.

**27-306. First aid; inspectors as qualified instructors**

**A.** Every operation shall have adequate and proper first aid material as approved by the inspector which shall be available to all employees.

**B.** No employee or other person shall remove material from first aid boxes or kits at any time except for replacement or use in case of injury.

C. The state mine inspector and the deputy mine inspectors shall be qualified first aid instructors, and shall provide instruction upon request.

**27-307. Notice to operator of dangerous condition; compliance; failure to comply as prima facie evidence of negligence; order to cease operations**

A. If upon inspection it appears to the inspector that an operation from any cause is in a dangerous condition or its condition fails to comply with the requirements of law, the inspector shall at once serve written notice on the operator or his agent in charge, stating in detail why the operation is dangerous or does not comply with law, and specifying necessary changes to be made and setting a reasonable time within which to make them.

B. The operator shall forthwith make the change and comply with the notice.

In an action against a party notified as provided in subsection A for loss life or bodily injuries by an employee subsequent to the notice and in consequence of the dangerous condition of the operation, a certified copy of the notice served by the inspector shall be prima facie evidence of the negligence of the operator.

C. If it appears to the inspector from a reexamination that the changes or compliances have not been made within the time specified in the notice, and that the operation is still in the condition dangerous to life or health, and in the opinion of the inspector it is necessary for the safety of the life or health of the employees that the operation be closed, he shall forthwith order cessation of the operation or part thereof, and order that the employees not be permitted therein

except to remedy the defects complained of until this chapter is complied with to the satisfaction of the inspector. The operator shall forthwith obey the order.

**D.** If the operator considers the order to be in excess of the inspector's authority or unreasonable, he may obtain a judicial review of its validity or reasonableness in accordance with the provisions of title 12, chapter 7, article 6.

**27-308. Complaint to inspector of dangerous conditions by employee; inspection**

When the inspector receives a complaint in writing signed by a person employed in an operation, stating that the operation in which he is working or part of it is being operated contrary to law or is dangerous to the health or lives of persons employed therein, and setting forth when the danger was first observed, the inspector shall examine the operation as soon as possible. The name of the person making the complaint shall not be disclosed by the inspector unless permission is expressly granted by the person. The complaint shall be indexed and filed by the inspector.

**27-309. Reports of fatal accidents to inspector; investigation**

**A.** When a fatal accident occurs in an operation, the operator shall give immediate notice thereof by telephone or telegraph, and after investigation report the facts in writing to the inspector. The inspector, upon receipt of such

notice shall instruct the operator as to preserving evidence of the accident. The inspector shall investigate and make a report which shall be filed in his office.

**B.** The inspector may appear at a coroner's inquest held respecting the fatal accident and examine the witness.

**C.** If the inspector concludes the facts warrant it, he shall cause a copy of his report or a copy of the testimony, together with the verdict of the coroner's jury if an inquest was held, and all papers in his possession relating thereto, to be forwarded to the county attorney of the county in which the fatal accident occurred, with an accompanying statement of the inspector, describing in what particular he believes the law has been violated.

#### **27-310. Copy of law available for inspection**

The operator or person in charge of an operation shall keep at all times in the office of the operation and in the timekeeper's office in an accessible place and subject to inspection by all workmen and other interested persons at least one printed copy of this chapter.

#### **27-311. Fire prevention and protection**

Every operation where there appears to be any possibility of fire or serious hazards from fire shall provide sufficient fire protection. This shall include water supply with adequate pressure, fireplugs, hose and nozzles, and chemical, automatic chemical or water extinguishers, which shall be properly located to provide for the safety of all employees. All underground mines shall be equipped

with adequate rescue equipment and the operators thereof shall provide proper training in its use to rescue crews.

**27-312. Safety equipment**

**A.** All persons working in operations shall wear approved type head, foot and eye protection when in the work area and such other safety equipment as is designated by the operator.

**B.** Equipment placed in an operation for the purpose of safety shall not be removed by anyone nor utilized except for the purpose intended.

**27-313. Machinery**

**A.** All moving parts of machinery to which workmen may be exposed shall be adequately guarded. Guards shall conform to the standards set forth in the rules.

**B.** A guard or safety device necessary for safe operation which has been removed from any machine shall be replaced before the machine is returned to productive operation.

**27-314. Electrical installations**

All electrical equipment shall be so maintained as to reduce the accident hazard so far as is reasonably possible. Such electrical equipment shall be installed, maintained and used according to standards set forth in the rules.

**27-315. Unauthorized persons**

No person whose entry has not been authorized by the operator shall be allowed in any operation.

**27-316. Intoxicating liquors and drugs**

No intoxicating liquors or beverages and no narcotic drugs shall be permitted on any operation. No employee or other person under the influence of or believed to be under the influence of intoxicating liquors or narcotic drugs shall enter or be permitted to enter on any operation.

**27-317. Waste dumps and tailings areas; signs; violation; classification**

In areas where waste dumps, subsidence areas or tailings areas border on inhabited or public places, the roads from such places leading into such areas shall be blocked off and danger signs shall be placed at intervals along the perimeter of the areas. Any person recklessly removing, destroying or defacing such signs or barriers is guilty of a petty offense as provided in § 27-302.

**27-318. Abandoned and inactive mines to be secured; inspector authority; violation; classification**

**A.** Every mine operator or former mine operator or claimant who owns a mine or mining claim or possesses a mine or mining claim under lease, contract, permit or otherwise, who knowingly permits the existence on the premises of an abandoned or inactive mining shaft, portal, pit or other excavation which is dangerous to persons legally on the premises, who fails to cover, fence, fill or otherwise secure it and post warning signs, within sixty days of notification by the inspector and who fails to keep it so protected is guilty of a class 2 misdemeanor. If it is impossible or impracticable to comply with this subsection within the required sixty days, the operator may submit a written plan of action to the inspector which specifically outlines the measures that will be taken and the number of additional days necessary to comply with this section. In no case may the time extension granted by the inspector exceed an additional one hundred eighty days.

**B.** The inspector may enter on such land to inspect for dangerous conditions which may present a health and safety hazard to the public. If hazards exists, the inspector may erect warning signs across or near the entrance of any mine shaft, portal, pit or other mine opening prohibiting the entry of unauthorized persons or erect other protective devices as necessary.

**C.** If the mine operator cannot be located through reasonable efforts, the owner of record is the responsible party for the purposes of this section. If neither the mine operator or owner of record can be located through reasonable

efforts, the inspector shall erect warning signs across or near the entrance of any mine shaft, portal, pit or other mine opening prohibiting entry of unauthorized persons or erect other protective devices as necessary.

**D.** A person who knowingly and without authority removes, destroys or tampers with any warning sign, covering, fencing or other protection placed on, around or over any shaft, portal or other excavation is guilty of a class 6 felony.

## **ARTICLE 2. EXPLOSIVES AND BLASTING**

### **27-321. Explosives; records; inspection**

**A.** Every person manufacturing, storing, selling, transferring or in any manner disposing of explosives or blasting agents, shall keep an accurate record of all such transactions and the date thereof, disclosing the amount of each explosive received, from whom received, when received, disposition made of the explosive with the amount thereof, and the name of the person to whom delivery was made, who shall receipt therefor.

**B.** The record shall at all times be open to inspection by the inspector or any peace officer engaged in investigating a crime.

### **27-322. Explosives; marking; utilization and storage**

**A.** All explosives or blasting agents sold in the state shall be marked with the date of manufacture in the manner prescribed by the inspector. The

inspector shall have authority to designate types of explosives or blasting agents which may not be sold or used after twelve months from the date of manufacture.

**B.** The inspector may regulate and limit the amount of explosives or blasting agents stored or kept in general supply stores in mining camps or mining towns where there is no law governing storage thereof.

**27-323. Explosives; rules and regulations; access to operations**

**A.** The inspector shall prescribe and promulgate rules in accordance with the provisions of this chapter pertaining to storing, transporting and using explosives and blasting agents in operations, including the character and location of magazines and other structures in which they are stored and the conditions under which they may be transported and designating types of explosives and blasting agents which shall not be stored or used in operations or portions of operations.

**B.** The inspector shall be accorded free access to any operation in or on which explosives or blasting agents are stored, for the purpose of determining whether magazines and storage facilities conform to law and the rules prescribed and to ascertain that life and property are not endangered by the storage thereof.

**27-324. Blasting**

Before firing blasting charges, the blasting crew shall clear the vicinity surrounding the blast site of all personnel, make provisions to guard all means of access to the area, and give warning in every direction from which access may be had to the place where blasting is being done. Misfire holes shall be reported to the mine foreman or the shift boss in charge at the locality of the holes.

**27-325. Use of tamping bar**

No person shall, whether working for himself or in the employ of another, while loading or charging a hole with explosives, use or employ a metal tamping

bar, nor shall any person allow or permit the use of a metal tamping bar while loading or charging a hole by employees under his management or direction.

### **ARTICLE 3. HOISTS, SHAFTS AND UNDERGROUND OPERATIONS**

#### **27-341. Escapement shafts**

**A.** Every operator maintaining in a mine a vertical or incline shaft or an adit to a distance greater than one hundred feet and who has drifted a distance of two hundred feet or more and commenced to stope, shall provide and maintain to the hoisting shaft or opening through which men are let into or out of the mine, and where the ore is extracted, a separate escapement shaft, raise or opening, or an underground opening, or communication with another contiguous mine. If the contiguous mine is owned or operated by a different person, the right to use the outlet through the contiguous mine, in all cases when necessary, or in case of accident shall be secured and kept in use.

**B.** Where an escapement shaft or opening is not in existence at the time stoping is commenced, work upon an escapement shaft or opening shall be commenced as soon as stoping begins and diligently prosecuted until completed, and the escapement shaft, raise or opening shall be continued to and connected with the lowest workings in the mine in which mining operations are being conducted.

C. The escapement shaft or exit shall be of sufficient size to afford an easy passageway, and if it is a raise or shaft, shall be provided with substantial ladders from the deepest workings to the surface.

D. When the exit or outlet is not in a direct or contiguous course, signboards plainly marked showing the direction to be taken shall be placed at each departure from the continuous course.

**27-342. Mine outlets**

Every mine shall have at least two outlets to the surface except as otherwise provided in this article. The outlets shall not lead to the surface in the same house and shall not at any point be closer to one another than thirty feet. If two outlets of a mine or part of them do not belong to the same mine, the owners and the operators of the respective mines shall be responsible for the outlet or part of it in their respective mines, being kept in proper repair. Should any obstruction arise in an outlet, or anything occur in one of the mines to jeopardize the safety of the outlet, the occurrence shall be immediately reported to the operator of the other mine. If either of the two outlets or part of them is situated in an abandoned mine, the operators of the working mine shall be jointly and severally responsible for the proper maintenance and repair of the outlet.

**27-343. Structures over mine outlet**

A. No structure shall be erected over an outlet of a mine except the headframe necessary for hoisting from a shaft and the hatch or door necessary for

hoisting from a shaft and the hatch or door required to protect persons obligated to work at the top of a shaft from inclement weather, and if a house is required for this purpose the inspector may grant permission in writing for its construction. Such house shall be as small as possible and constructed of fire resistance material . Regular storage of flammable material inside, or within thirty feet of the house is prohibited.

**27-344. Timbering support**

**A.** Minimum standards for proper timbering or other ground support of any working place shall be suitable to the conditions of the mining system. When necessary such standards shall be set by the inspector after consultation with the operator involved.

**B.** When any working place has dangerous or hazardous ground no work shall be done there except as shall be necessary to make the place secure and safe.

If for any reason necessary timbers cannot be supplied immediately, all work done shall cease until such timbers can be supplied.

**C.** “Timber” as used in this section shall mean wood, steel, concrete, rock bolts, sand fill, rock fill or any other material or device used for bracing, supporting or restraining ground.

**27-345. Shelter areas**

On every level of an underground mine where mechanical haulage is employed and in which there is not sufficient clearance for employees, unobstructed shelter areas in which employees can find safety from moving trains shall be provided at intervals of not more than two hundred feet.

**27-346. Ladder-ways**

Every shaft, winze, raise or incline, of slope steeper than forty degrees from the horizontal, and deeper than forty feet, through which persons are obliged to travel, shall be equipped with a suitable ladder-way.

**27-347. Construction of ladder-ways**

**A.** Permanent ladder-ways shall be strong and firmly fastened, and shall be kept in good repair.

**B.** In a vertical shaft the inspector may, in his discretion, by an order in writing, direct that the ladder be inclined at the most convenient angle which the space where the ladder is fixed allows, and every ladder shall have substantial platforms at intervals of not more than twenty feet. The platform shall be closely covered, with exception of an opening large enough to permit the passage of a human, and shall be arranged so that a person cannot fall from a ladder through the opening to the next ladder.

**C.** Ladder-ways shall be provided in shafts in the course of sinking them to within a distance from the bottom as will secure them from damage by blasting.

From the end of the ladder-ways, portable ladders shall be extended to the bottom of the shaft.

**27-348. Shaft stations**

Stations or levels shall have a passageway around the working shaft so that crossing over the hoisting compartments may be avoided. Sumps shall be securely covered. At shaft stations a gate or guard rail shall be provided and kept in place across the shaft, except when a cage, skip or bucket is being loaded, but may be temporarily removed for repairs or other operations if proper precaution is taken to prevent danger to persons. The top of the shaft shall be protected by a substantial gate or guard rail.

**27-349. Tracks and roadbeds; maintenance underground**

When mechanical haulage is in an underground mine, the tracks, roadbeds, rails, joints, switches and frogs shall be constructed, installed, bonded and maintained in a manner consistent with the speed and type of haulage operation being conducted.

**27-350. Lights; trolley wires**

A. Stationary lights which are approved by the inspector shall be provided during working hours at all stations in shafts during the time such shafts

are in actual use, and at all stations in levels where hoisting or hauling is conducted by means of machinery, and at night at all working places on the surface

- B.** Electric trolley wires shall be at least seven feet above the floor.

**27-351. Hoists; operator; indicator**

- A.** No person addicted to intoxicating liquors or drugs, or under eighteen years of age shall be employed as a hoisting engineer.

- B.** All power hoisting machinery used in hoisting from or lowering employees and materials into mines, except for prospect shafts not exceeding three hundred feet in depth, shall be equipped with an indicator placed near and in clear view or hearing of the engineer. The indicator shall be in addition to marks on the rope, cable or drum.

- C.** It is unlawful to hoist or lower persons from or into a mine at a speed greater than fifteen hundred feet per minute, but the inspector may designate a lesser speed than fifteen hundred feet per minute in a shaft, if in his opinion a greater speed is unsafe, or a greater speed if in his opinion particular shafts and hoist conditions so warrant.

**27-352. Inspection and construction of hoists**

- A.** Hoisting machinery, cables and sheaves shall be inspected once every twenty-four hours by a competent person appointed by the operator for that

purpose, and the person making the inspection shall immediately report in writing to the operator all defects found.

**B.** Ropes or cable used for hoisting purposes shall be of approved quality and manufacture. In shafts and winzes over two hundred feet deep, wire ropes or cables only shall be used for hoisting purposes.

**C.** Head frames where persons are hoisted at a speed of over two hundred fifty feet per minute and where more than twenty-five persons are employed shall be constructed to allow at least twenty-five feet above the hoist landing stage in which the cage, skip or bucket can travel freely in case of an overwind.

### **27-353. Safety cage and catches**

**A.** It is unlawful for the operator of a mine to permit hoisting or lowering persons in a shaft deeper than three hundred feet except shafts in progress of sinking, unless an iron-bonnetted safety cage equipped with gates at least five feet in height is used for hoisting and lowering the persons. Every cage or skip used for hoisting persons shall be provided with a safety catch of sufficient strength to hold the cage or skip with its maximum load at any point in the shaft in the event the hoisting cable breaks. The inspector shall require that cages and skips be equipped as required by this section and that on all cages the safety catches are kept well oiled and in good working condition.

**B.** In a shaft less than three hundred feet deep where no safety cage is used, and where cross-heads are used, platforms for employees to ride upon equipped with safety catches as required for cages and skips shall be removed.

**C.** Skips, the capacity of which exceeds five tons, running on steel guides in shafts designed primarily for the hoisting of rock, need not be equipped with safety catches. Such skips, however, shall be equipped with a platform and bonnet for the protection of the persons, who, as provided in this article, may legally ride the skips. Only persons engaged in shaft maintenance, pumpmen, skiptenders, supervisors and inspectors shall be permitted to be hoisted or lowered in such skips. No person, including those specifically mentioned in this paragraph, shall be permitted to ride a loaded skip.

**27-354. Cross-heads; buckets**

**A.** Vertical shafts more than two hundred feet deep from which hoisting is done by a bucket shall be provided with suitable guides, and with the bucket a cross-head traveling upon the guides shall be provided. The height of the cross-head shall be at least one and one-half times its width. If the cross-head is a type not secured to the hoisting rope, a stopper of a design approved by the inspector shall be securely and rigidly fastened to the hoisting rope at a suitable point above the rim of the bucket. The number of persons permitted to ride on the deck of a cage, or, in or on a skip or bucket, shall be determined by the inspector and no more than that number shall be allowed to ride.

**B.** No persons shall ride upon a cage or in or on a skip or bucket when it is loaded with rock or ore, or when loaded with tools, timber, powder or other material, except for the purpose of assisting in passing it through the shaft.

**27-355. Hoisting tools and materials**

**A.** When tools, timber or other materials are loaded or hoisted in the shaft, the ends, if projecting above the top of the bucket, skip or other vehicle, shall be securely fastened to the hoisting rope or to the upper part of the vehicle, and tools, timber or other materials loaded erectly upon a cage shall be securely lashed before they are hoisted or carried.

**B.** No cage, skip, bucket or other vehicle shall be lowered directly to the bottom of a shaft fifty feet or more in depth where persons are working, but shall be stopped at least fifteen feet above the bottom until the signal to lower further has been given by one of the persons at the bottom of the shaft.

**27-356. Protection from falling materials**

**A.** Persons engaged in sinking a shaft in which regular hoisting from an upper level is going on, shall be protected from the danger of falling material by a suitable covering, with a sufficient opening left in the covering for the passage of the bucket or conveyance used in the sinking operation.

**B.** In shafts, winzes or raises where two or more crews are working, one crew above another, there shall be a bulkhead or other barrier between each two crews strong enough to stop tools or other material that may fall from the

persons working above, and only the cage, skip or bucket compartment shall be left open.

**C.** Shafts or winzes shall have a bulkhead over the persons working in the bottom of the shaft or winze built of timber not less than six inches in thickness, not more than fifty feet above the bottom of the shaft or winze , to provide ample protection for the persons working in the bottom of the shaft or winze, and so constructed as not to shut off the air circulation. The cage, skip or bucket compartment only shall be left open. Shafts or winzes shall be cleaned down below the bulkhead after each blasting.

**D.** Windlasses and winzes shall be provided with a suitable plug or some other reliable device to prevent the bucket or other conveyance running back.

**E.** No open hook shall be used with a bucket in hoisting, but only some approved form of safety hook or shackle hook.

**27-357. Hoist release signal**

**A.** At a mine where men are hoisted by mechanical means, a hoistman charged with the hoisting shall be kept on duty at the hoist at all times when men are underground, except as provided in subsection B.

**B.** The requirements of subsection A shall not apply to an automatic hoist equipped with the following devices:

1. A device which automatically cuts off the power to the hoist motor and sets the brakes when the hoist ropes of a winding-drum machine becomes

slack, and safety dogs or devices on the cage which will stop the cage in the event of slack rope or a broken hoisting cable.

2. A governor which will prevent unsafe speeds and a device to set the brakes and stop the cage if the safe speed is exceeded.

3. Devices which will reduce the speed of the cage before the approximate stopping points so that it can be stopped properly.

4. A manually operated safety switch and other device by means of which the cage may be stopped, started or directed to another level or stopping point.

5. A call button located at each stop which, when actuated, will cause the cage to move to that stop providing the gates and gate switches are closed on all stations.

6. A magnetic brake which will stop the hoist motor and hold the cage in fixed position whenever the power applied to the hoist motor is removed or fails.

7. An opening or escape hatch in the cage and a shaft manway with ladders which may be reached from the cage.

8. A means of signaling or communicating from the cage to a designated place in the mine or on surface where a responsible person on duty can be notified in the event of an emergency.

**C.** An automatic hoist is one that does not require the attendance of a hoist engineer and in which the hoist cage and shaft are equipped with operating

and safety devices which control the movement of the hoist from the cage and from all stations or levels.

**27-358. Signaling apparatus**

A. Every shaft and each compartment thereof used for hoisting which exceeds fifty feet in depth, and not exempted in writing by the inspector, shall be provided with an efficient means of interchanging distinct and definite signals between the top of the shaft and the lowest level from which hoisting is being done, and the various intermediate levels for the time they are in use.

B. The signaling apparatus shall be either wire or cable actuating a bell, whistle, speaking tube, telephone, electric or electronic system, or two or more of them.

C. Only those employees and supervisors authorized by the operator shall be permitted to ring any shaft or station bells.

**27-359. Signal Code**

A. The following signal code shall be used in all mines:

1 bell, stop immediately if in motion.

1 bell, hoist muck, after preliminary signal for hoisting muck.

2 bells, lower.

3 bells, raise

3-1 bells, hoist men

3-2 bells, lower men

4 bells, release cage, skip, or bucket to the hoistman.

5 bells, blasting or ready to shoot

(a) The signal for blasting or ready to shoot is a caution signal and if the engineer is prepared to accept it he shall acknowledge by raising the bucket or cage a few feet then lowering it again.

(b) After accepting the signal for blasting or ready to shoot, the engineer shall be prepared to hoist men away from the blast as soon as any signal is given and shall accept no other signal in the meantime.

6 bells, air on or off

7 bells, danger signal, followed by station signal, calls cage to that station, and such signal takes precedence over all other signals except an accepted blasting signal.

**B. The following shall be station signals:**

1-2 bells, collar of shaft

1-3 bells, 1st level

1-4 bells, 2nd level

1-5 bells, 3rd level

2-1 bells, 4th level

2-2 bells, 5th level

2-3 bells, 6th level

2-4 bells, 7th level

2-5 bells, 8th level

4-1 bells, 9th level  
4-2 bells, 10th level  
4-3 bells, 11th level  
4-4 bells, 12th level  
4-5 bells, 13th level  
5-1 bells, 14th level  
5-2 bells, 15th level  
5-3 bells, 16th level  
5-4 bells, 17th level  
5-5 bells, 18th level  
6-1 bells, 19th level  
2-1-2 bells, 20th level  
2-1-3 bells, 21st level  
2-1-4 bells, 22nd level  
2-1-5 bells, 23rd level  
2-2-1 bells, 24th level  
2-2-2 bells, 25th level  
2-2-3 bells, 26th level  
2-2-4 bells, 27th level  
2-2-5 bells, 28th level  
2-4-1 bells, 29th level  
2-4-2 bells, 30th level  
2-4-3 bells, 31st level

2-4-4 bells, 32nd level

2-4-5 bells, 33rd level

2-5-1 bells, 34th level

2-5-2 bells, 35th level

2-5-3 bells, 36th level

2-5-4 bells, 37th level

2-5-5 bells, 38th level

2-6-1 bells, 39th level

4-1-2 bells, 40th level

4-1-3 bells, 41st level

4-1-4 bells, 42nd level

4-1-5 bells, 43rd level

4-2-1 bells, 44th level

4-2-2 bells, 45th level

4-2-3 bells, 46th level

4-2-4 bells, 47th level

4-2-5 bells, 48th level

4-4-1 bells, 49th level

4-4-2 bells, 50th level

**C.** The station signal shall be given before the hoisting or lowering signal.

If bells run slowly, move slowly.

**D.** The engineer shall not move a cage, skip or bucket unless he understands the signal.

**E.** One copy of the signal code provided for by this section shall be posted on gallows frame on each mine, one at each station and one before the engineer.

**F.** Special signals may be used if they are easily distinguished by their sounds, or otherwise, from the code provided for by this section, and do not interfere with it in any manner.

**27-360. Precautions against flooding**

**A.** When advancing a drift, adit, level or incline toward a mine working that appears to be filled with water, a bore hole shall be kept at least twenty feet in advance of the breast of the drive and also, if necessary, in

directions laterally from the course of the drive. The working place shall not exceed ten feet in width and further measures shall be taken which are deemed necessary by the inspector to obviate the danger of a sudden breaking through of water. No raise shall be allowed to approach within ten feet of a portion of a winze or a stope in which there is a dangerous accumulation of water, unless the winze or stope is first unwatered by bailing or pumping, or by means of bore from the raise. When in the opinion of the inspector there is danger of a sudden inrush of water, additional raises, drifts or other workings shall be constructed as necessary to insure escape of persons from the lower workings. Places for the storage of water in mines shall be constructed to prevent leakage as far as possible and insure the safety of the persons working below them.

**B.** It is unlawful for an operator to impound water or keep water impounded within a mine in which persons are working below unless the water so impounded in a manner which endangers the safety of the persons unless the water is impounded by a dam or wall approved by the inspector. ????

**27-361. Common system of drainage; contribution of cost**

**A.** When adjacent or contiguous mines, opened, developed and worked upon the same or upon separate lodes have a common ingress of water, or, by reason of subterranean communication of water, have a common drainage, the operators of the mines shall provide for disposal of their proportionate share of the drainage, or to prevent the water in the mine from flowing in or upon neighboring mines.

**B.** If an operator of such mines fails or neglects to provide for drainage, and by reason of failure or neglect the operator of an adjacent or contiguous mine is compelled to pump, drain or otherwise provide for the water flowing in from the other mine, the operator of the mine in default shall be liable for the proportion of the actual and necessary cost and expense of pumping, draining or otherwise providing for such water.

**27-362. Order for inspection**

**A.** When an action is commenced to recover the costs and expenses of draining lodes or mines, the court shall grant an order allowing plaintiff to inspect the lodes or mines claimed to have been drained upon application and affidavit that the inspection is necessary for proper preparation of the action for trial.

**B.** The order shall designate the number of persons, not exceeding three besides plaintiff, to make the examination and they may cause the removal of rock, debris or other obstacles in a lode or vein when removal is shown necessary to a just determination of claim.

**27-363. Danger signals; visitors**

**A.** Owners or operators shall place warning signs or other warning notices at the entrance to working places deemed dangerous, and at the entrance to old or abandoned workings of active mines, and no person other than those authorized by the operator, shall remove or go beyond a caution-board, warning sign or danger signal so placed.

**B.** Visitors shall not be allowed underground unless accompanied by the operator or his agent.

**27-364. Interfering with equipment**

No person shall knowingly:

1. Injure or destroy any equipment or machinery of a mine, nor, unless authorized to do so, obstruct, open, close or change the position of a ventilation door, brattice or airway, or handle or disturb any part of the machinery of the hoisting engine of the mine.

2. Open the door of a mine and neglect to close it.

3. Endanger the mine or those working therein.

4. Disobey a lawful order, or do a willful act whereby the lives, safety or health of persons working in a mine, the security of a mine, or the machinery connected therewith, is endangered.

**27-365. Regulation of underground use of internal combustion engines**

The underground use of any internal combustion engine is declared unlawful, unless after application filed with the inspector he approves the equipment for safe use in the type of underground work for which the application is filed and finds that the atmospheric conditions in the underground workings where the equipment is to be used are such that the operation of such equipment will not endanger the health or safety of any employee. If the application is approved by the inspector, the operation of the designated equipment shall be

lawful only if and so long as it is operated and maintained in accordance with recommendations made public from time to time by the inspector, and only upon the condition that when air quality becomes unsafe operation of equipment shall be stopped by the operator until air quality again becomes safe either by increasing ventilation or by correcting mechanical imperfections in the equipment, whichever is found to be the cause of the unsafe quality of the air.

**27-366. Maps of underground workings**

When ordered by the inspector, the operator of every underground mine shall make and maintained a reasonably accurate map of the workings of the mine. At least once every six months or oftener if necessary, the operator shall make alterations or additions to the map showing excavations made since those last shown on the map. All parts of the mine which were worked or abandoned shall be clearly indicated and all underground workings shall be surveyed and mapped before they become inaccessible. The maps shall at all times be open to inspection by the inspector.

**27-367. Maintenance and use of loading equipment**

Mucking machines, sorters and other loading devices shall be maintained and operated in a safe manner.

**27-368. Ventilation; condition of airways; testing**

**A.** Every underground working place shall have a sufficient amount of ventilation for employees working in such place.

**B.** In any underground working place where there is danger of a serious fire, ventilation shall be controlled by mechanical means.

**C.** The air currents going into underground workings shall have sufficient volume and velocity to direct and carry away smoke and harmful gases from blasting and any other gases or dust which might contaminate the atmosphere.

**D.** Intake and exhaust airways in underground mines shall be maintained in good condition and free from obstruction.

**E.** When the atmosphere in any mine or part of a mine is known to contain or is suspected of containing any explosive or toxic gas, the operator shall test it before employees are allowed to work in such mine or part of such mine.

**27-369. Evacuation; procedure; routes**

Every operator shall have a plan for orderly evacuation in the event of an emergency. Every evacuation route shall be designated by signs and kept open at all times.

**27-370. Stench warning**

**A.** The operator shall maintain a suitable and sufficient stench warning that can be introduced into the compressed airlines in case of an emergency and reach all employees who might be working underground.

**B.** When the odor from a stench warning is detected by employees or other persons, they shall immediately leave their working place or other areas underground, give warning to other employees or persons in their vicinity, and follow the operator's evacuation procedure.

**27-371. Radon control**

Concentrations of radon gas shall not exceed such amounts as may be set by the inspector.

**27-372. Uranium operations; testing for radon daughters**

In all uranium operations the operator shall test regularly for radon daughter concentration and submit such records of testing as may be required to the inspector.

**27-373. Cap lamps**

Permissible cap lamps shall be required in all underground mines where there is a potential hazard from gas.

**ARTICLE 4. PREVENTION OF HAZARDOUS DUST AND GAS  
CONDITIONS**

**27-411. Definitions**

In this article, unless the context otherwise requires:

1. “Dust prevention practices” includes ventilation, suction or exhaust methods of removing dust, wet methods for settling dust, and the use of respirators when the condition or exposure is temporary or intermittent, and other means of removing or settling dust from mine air as approved by the state mine inspector.

2. A “hazardous dust or gas condition” shall exist when the breathing zone of an employee while engaged in the performance of his work contains higher concentration limits of toxic dust and fumes, mineral dusts, and gases than specified by the state mine inspector in the rules and regulations. Dust counts shall be determined in accordance with techniques prescribed by the inspector and shall be made when necessary.

3. “Respirators” means only those respirators approved by the United States bureau of mines or which may be approved hereafter by the United States bureau of mines and by the state mine inspector.

4. “Breathing Zone “, in the case of persons wearing respirators, is the air space created after the passage of air through the protective device.

**27-412. Dust control**

A. Every operator shall do everything reasonably within his power to encourage good practices in the use of any appliances for allaying dust. Each employee shall use such devices as are furnished by the operator. Employees shall not be allowed to work in hazardous dust or gas concentrations without approved respiratory and eye protection.

**B.** In every operation where employees are exposed to hazardous dust conditions, some mechanical or other means which will alleviate this condition shall be used whenever and wherever practical.

**C.** In dry places where the operation of a power drill produces dust, such dust shall be controlled either by wet drilling, spraying, or approved dust catching devices.

## **ARTICLE 5. OPEN PITS**

### **27-421. Ingress and egress**

The operator shall provide a safe means of ingress and egress at every open pit or any working place.

### **27-422. Banks**

**A.** Banks and benches shall be suitably trimmed in a manner consistent with the kind of rock or material, height of banks, and type of equipment being used.

**B.** The operator or a supervisor designated by him shall make a daily inspection of the faces and banks in the working area of any open pit and shall cause all dangerous material to be dislodged or otherwise made safe

**27-423. Tracks, roadbeds and roadways**

**A.** Tracks, roadbeds, rails, joints, switches and frogs on all haulageways shall be constructed, installed and maintained in a manner consistent with the speed and type of haulage operations being conducted.

**B.** Truck haulage roadways shall be constructed and maintained in a manner consistent with the speed and type of haulage operations being conducted. Berms shall be installed and maintained where necessary.

**27-424. Operation of heavy equipment**

**A.** The operator shall insure that employees operating any heavy duty equipment such as a locomotive, crane, power shovel, truck, bulldozer, front end loader or scraper are qualified to operate such equipment.

**B.** Mobile heavy duty equipment shall be inspected regularly and maintained in a safe operating condition.

**27-425. Open pits; fencing or blocking**

Those portions or places of open pits which border on inhabited places frequented by the public shall be fenced or otherwise blocked off.

## **ARTICLE 6. SAND AND GRAVEL OPERATIONS**

### **27-441. Safety; rules and regulations**

All sand and gravel operations shall be conducted with due regard to safety.

The inspector shall make rules and regulations to carry out the provisions of this section and shall designate those sections of article 5 of this chapter which shall be applicable to sand and gravel operations.

## **ARTICLE 7. RULES AND REGULATIONS**

### **27-461. Definitions**

In this article, unless the context otherwise requires:

1. “Inspector” means the state mine inspector.

2. “Interested parties” means all persons who have filed written notice with the inspector of their desire to receive the notices provided for in this article.

**27-462. Administration by inspector; rules and regulations**

The inspector shall administer this chapter and may adopt rules reasonably necessary to effectuate the provisions of this chapter.

**27-463. Procedure**

Except as provided in this article, in adopting rules, the inspector shall comply with the procedures set forth in title 41, chapter 6, article 1.

**27-464. Notice of proposed adoption of rule**

At least twenty days prior to the adoption of any rule, copies of the notice filed with the secretary of state pursuant to § 41-1002 shall be mailed to all interested parties.

**27-469. Exceptions to rules and regulations**

In cases where, in the opinion of the inspector, the enforcement of any order or rule would not materially increase the safety of employees and would cause undue hardship on an operator, exceptions may be made at the discretion of the inspector. To be effective such exceptions shall be in writing. Such exceptions

can only be revoked after reasonable notice is given in writing to the operator concerned.

## **TITLE 23. LABOR**

### **CHAPTER 2. EMPLOYMENT PRACTICES AND WORKING CONDITIONS**

#### **ARTICLE 5. HOURS OF LABOR**

##### **23-282. Underground mine employees and hoisting engineers, eight hour day; exceptions; violation; classification**

**A.** Employment in mining activities in underground mines and underground workings is declared injurious to health and dangerous to life and limb of those employed therein.

**B.** The period of employment for all persons employed or engaged in mining activities in underground mines or underground workings or as hoisting engineers at underground mines shall not exceed eight hours within any twenty-four hour period and the eight hours shall include the time used in descending to

and ascending from the point or place of work in an underground mine or underground workings place of work.

**C.** The period of employment prescribed in subsection B may be deviated from in the following instances:

1. In an emergency, where life or property is in imminent danger, the period of labor prescribed in subsection B may be prolonged during the continuance of the emergency.

2. The hours of employment may be changed from one part of the day to another at stated periods, the change not to occur more than once in any two weeks, and the employment may be for more than eight hours during the day in which the change is made.

**D.** Any person violating any provisions of this section, and any person who, as foreman, manager, superintendent, director, or officer of a corporation, or as employer or superior officer of any person, knowingly commands, persuades, or allows any person to violate any provisions of this section is guilty of a class 2 misdemeanor.

**E.** Each day this section is violated constitutes a separate offense.

## **ARTICLE 12. SAFETY CONDITIONS FOR ELEVATORS AND SIMILAR CONVEYANCES**

### **23-491. Definitions**

In this article, unless the context otherwise requires:

1. “Authorized representative” means the elevator chief and elevator inspector employed by the division.
2. “Board” means the elevator advisory board established to assist the commission in drafting standards and regulations.
3. “Commission” means the industrial commission of Arizona.
4. “Conveyance” means an elevator, dumbwaiter, escalator, moving walk, manlift, personnel hoist, material hoist, stage lift and special purpose personnel elevator, excluding conveyances located at mines and subject to the provisions of title 27, chapter 3.
5. “Director” means the director of the division of occupational safety and health.
6. “Division” means the division of occupational safety and health of the industrial commission.
7. “Dumbwaiter” means a hoisting and lowering mechanism with a car of limited capacity and size which moves in guides in a substantially vertical direction and is used exclusively for carrying material.
8. “Elevator” means a hoisting and lowering mechanism with a car or platform which moves in guides in a substantially vertical direction and which serves two or more floors of a building or structure.
9. “Escalator” means a power driven, inclined continuous stairway used for raising or lowering passengers.
10. “Interested party” means the commission and its agents and the owner or operator who has been issued a correction order.

11. “Manlift” means a device consisting of a power driven endless belt moving in one direction only and provided with steps or platforms and attached handholds for the transportation of personnel from floor to floor.

12. “Materials hoist” means a hoist for raising and lowering material only and prohibiting the hoisting of persons.

13. “Moving walk” means a type of passenger carrying device on which passengers stand or walk and in which the passenger carrying surface remains parallel to its direction of motion and is uninterrupted.

14. “Owner” or “operator” means an individual or organization including this state and all political subdivisions of this state who has title to, controls or has the duty to control the operation of one or more conveyances, but shall not include an individual or organization engaged in mining or metallurgical operations whose operation is subject to regulation and inspection by the state mine inspector pursuant to the provision of title 27, chapter 3.

15. “Personnel hoist” means a mechanism for use in connection with the construction, alteration, maintenance or demolition of a building, structure or other work, used for hoisting and lowering workers and materials and equipped with a car that moves on guide members during its vertical movement. The term includes a hoistway of a personnel hoist.

16. “Special purpose personnel elevator” means a passenger, hand powered, counterweighted device or an electric powered device which travels vertically in guides and serves two or more landings.

17. “Stage lift” means a hoisting and lowering mechanism equipped with a platform which moves in guides in a substantially vertical direction and which serves one or more landings.

## **TITLE 45. WATERS**

### **CHAPTER 3. DAMS AND RESERVOIRS**

#### **ARTICLE 1. SUPERVISION OF DAMS, RESERVOIRS AND PROJECTS.**

##### **45-701. Definitions**

In this article, unless the context otherwise requires:

1. “Dam” means any artificial barrier, including appurtenant works for the impounding or diversion of water except those barriers for the purpose of controlling liquid borne material, twenty-five feet or more in height or the storage capacity of which will be more than fifty acre feet, but does not include any such barrier which is or will be less than six feet in height, regardless of storage capacity, or which has or will have a storage capacity not in excess of fifteen acre feet, regardless of height.

2. “Height” means the vertical distance from the lowest elevation of the outside limit of the barrier at its intersection with the natural ground surface to the spillway crest elevation.

3. “Owner” includes any person or entity who owns, controls, operates, maintains, manages or proposes to construct or modify a dam, except the United States government and its agents or instrumentalities, if a safety program at least as stringent as the state program is applicable to and enforced against such agent or instrumentality.
4. “Person” means any person, firm, association, organization, partnership, business trust, corporation, company or district.
5. “Storage Capacity” means the means the maximum volume of water that can be impounded by the reservoir when there is no discharge of water.

## **TITLE 13. CRIMINAL CODE**

### **CHAPTER 15. CRIMINAL TRESPASS AND BURGLARY**

#### **13-1534. Criminal Trespass in the first degree; classification**

- A. A person commits criminal trespass in the first degree by knowingly:
  - 3. Entering unlawfully on real property subject to a valid mineral claim or lease with the intent to hold, work, take or explore for minerals on such claim or lease.

## **ARTICLE 1. GENERAL PROVISIONS**

**R11-1-001.**

Reserved

**R11-1-100.**

**R11-1-101. Mine inspector and deputies, qualifications and duties**

See A.R.S. §§ 27-121 through 27-127 inclusive, 27-141, and 27-461 through 27-464 inclusive.

**R11-1-102.**

Reserved

**R11-1-120.**

**R11-1-121. Definitions**

Definitions: In these rules, unless the context otherwise requires, the following definitions apply:

1. "Acid plant" means any operation that manufactures sulphuric acid.
2. "Adequate" means sufficient, safe, reasonable and feasible for intended use.
3. "American Conference of Governmental Industrial Hygienists" means the "Documentation of the Threshold Limit Values for Substances in Workroom Air", third edition, adopted by ACGIH for 1971, and Supplements for those Substances Added or Changed Year 1978(V), pages 453 through 476.
4. "American National Standard Specification for Sound Level Meters" means ANSI Standard 1.4-1971 (R1976), approved April 27, 1971.

5. “American National Standard Practices for Respiratory Protection” means ANSI Standard Z88.2-1969, approved August 11, 1969.

6. “American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks” means ANSI Standard A17.1-1978 and ANSI 17.1a-1979, approved February 15, 1979.

7. “American Table of Distances” means the April 1977 edition of “The American Table of Distances for Storage of Explosives” published by the Institute of Makers of Explosives.

8. “Approved” means tested and accepted for a specific purpose by a nationally recognized agency.

9. “Authorized person” means a person approved or assigned by mine management to perform a specific type of duty or duties or to be at specific location or locations in the mine.

10. “Competent person” means a person having abilities and experience to qualify him to perform the duty to which he is assigned.

11. “Compressed air receivers” means any vessels of 100 cubic foot capacity or more which are used for the purpose of receiving and holding compressed air.

12. “Conveyance” means an elevator, dumbwaiter, escalator, moving walk, manlift, personnel hoist, material hoist, stage lift, and special purpose personnel elevator located at mines.

13. “Dam” means any artificial barrier, including appurtenant works, for the purpose of controlling liquid borne material.

14. "Flammable" means capable of being easily ignited and of burning rapidly.

15. "Flammable liquid" means a liquid having a flash point below 100°F and having a vapor pressure not exceeding 40 P.S.I. (absolute) at 100°F.

16. "Imminent danger" means any conditions or practices in any place of employment which are such that a danger exists which could reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated through the enforcement procedures otherwise provided by this Article.

17. "Leaching" means vat leaching, dump leaching and leaching of ore in place.

18. "National Electrical Code" refers to the code as adopted by the National Fire Protection Association and the American National Standard Institute as NFPA 70-1978 (ANSI).

19. "National Electrical Safety Code" means ANSI Standard C2-1977 Edition.

20. "Powder chest" means a substantial, nonconductive portable container equipped with a lid and used at blasting sites for explosives other than blasting agents.

21. "Suitable" means that which fits, and has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

22. "Working level (WL)" means any combination of the short lived radon daughters in one liter of air that will result in ultimate emission of  $1.3 \times 10^5$  MeV

(million electron volts) of potential alpha energy, and exposure to these radon daughters over a period of time is expressed in terms of “working level months” (WLM). Inhalation of air containing a radon daughter concentration of 1WL for 173 hours results in an exposure of 1 WLM.

23. “Working places” means any place in or about a mine where work is being performed.

**R11-1-122**

Reserved

**R11-1-129**

**R11-1-130. Error or omission in these rules and regulations**

No error or omission in these rules and regulations shall be construed as permitting any unsafe, unhealthy or unsanitary condition to exist.

**R11-1-131. General provisions**

The provisions of Title 27, Chapter 3, Arizona Revised Statutes, are applicable to and will be enforced in all operations subject to the jurisdiction of the State Mine Inspector unless the type of operations specifically designated in a particular statute or is exempted from a particular statute by its terms, or unless a particular statute or statutes are inapplicable to certain types of operations.

**R11-1-132. Application of rules**

These rules are applicable to and will be enforced in all operations subject to the jurisdiction of the State Mine Inspector unless the terms of the rule or the heading of the section indicates that a rule or rules will apply only to certain types of operations.

**R11-1-133. Potable water**

Potable water shall be available to all employees during working hours.

**R11-1-134. Employee responsibility for equipment**

Employees operating equipment are responsible for the safe and proper operation of the equipment they use.

**R11-1-135. Report unsafe conditions**

It is the responsibility of each employee to report to his supervisor any unsafe condition he may see which can cause injury or damage property.

**R11-1-136. Reporting of accidents and injuries**

**A.** Where, in or about a mining operation, an accident occurs, it shall be reported promptly to supervisor in charge.

**B.** The State Mine Inspector's office shall be immediately notified of:

1. Any accident or injury to an individual resulting in death, or which has reasonable potential to cause death; and, or

2. An entrapment of an individual for more than thirty minutes; and,

or

3. An unplanned inundation of a mine by a liquid or gas; and, or

4. An unplanned ignition of a blasting agent or explosive.

**C.** The State Mine Inspector's office shall be notified within ten days of any accident or injury to an individual that, in the opinion of the attending physician, may result in the injured person being incapacitated for regular work for at least one day beyond the day of injury.

**R11-1-137.** Reserved

**R11-1-138. Warnings from unusual hazards**

Warning signs and/or lights, ropes and temporary guards shall be placed in order to give adequate warning from all unusual hazards.

**R11-1-139. Sufficient illumination**

Illumination sufficient to provide safe working conditions shall be provided in and on all working places. Individual electric lamps shall be carried for illumination by all persons underground.

**R11-1-140. Good housekeeping**

Passageways, work places, service rooms and storage areas shall be kept clean, orderly and in a safe condition.

**R11-1-141. New employees.**

New employees shall be indoctrinated in safety rules and safe work procedures.

**R11-1-142. Emergency telephone numbers**

Emergency telephone numbers shall be posted at appropriate telephones.

**R11-1-143. Conditions for employees working alone**

No employee shall be assigned or allowed or be required to perform work alone in any area where hazardous conditions exist that would endanger his safety unless he can communicate with others, can be heard, or can be seen.

**R11-1-144. Records of men working below surface**

Each operator of an underground mine shall establish a check-in and check-out system which shall provide an accurate record of persons in the mine.

These records shall be kept on the surface in a place chosen to minimize the danger of destruction by fire or other hazards. Every person underground shall carry a positive means of being identified.

**R11-1-145. Injured persons**

Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured persons.

**R11-1-146. Instruction of employees**

All employees shall be instructed at least once each calendar year on fire alarm signals and applicable procedures to be followed in case of fire or other emergency. Records of instructions shall be kept for two years.

**R11-1-147. Training in first aid**

All supervisors shall be trained in first aid. First aid training shall be made available to all interested employees.

**R11-1-148. Overcrowding facilities.**

Facilities used to transport persons to and from work areas shall not be overcrowded.

**R11-1-149. Safe means access**

Safe means of access shall be provided and maintained to all working places.

**R11-1-150. Toilet facilities**

**A.** Toilet facilities shall be provided at locations that are compatible with the mine operations and that are readily accessible to mine personnel.

**B.** The facilities shall be kept clean and sanitary. Separate toilet facilities shall be provided for each sex except where toilet rooms will be occupied by no more than one person at a time and can be locked from the inside.

**R11-1-151. Mine employment quarterly report**

**A.** Each mining operation shall submit a Mine Employment Quarterly Report to the State Mine Inspector's office with 15 days after the end of each calendar quarter.

**B.** Report will include the following information:

1. Operation name and county.
2. Operating company name and address.
3. Name and phone number of person submitting report
4. Number of reportable injuries or illnesses during the quarter.
5. For each operation sub-unit:
  - a. Average number of persons working
  - b. Total employee hours worked.

**R11-1-152. Rehearing or review of decision**

**A.** Except as provided in subsection G, any party in a contested case before the Office of State Mine Inspector who is aggrieved by a decision rendered in such case may file with the Office of State Mine Inspector, not later than ten (10) days after service of the decision, a written motion for rehearing or review of the decision specifying the particular grounds thereof. For purposes of this subsection a decision shall be deemed to have been served when personally delivered or mailed by certified mail to the party at his last known residence or place of business.

**B.** A motion for rehearing under this rule may be amended at any time before it is ruled upon by the Office of State Mine Inspector. A response may be filed within ten (10) days after service of such motion or amended motion by any other party. The Office of State Mine Inspector may require the filing of written briefs upon the issues raised in the motion and may provide for oral argument.

**C.** A rehearing or review of the decision may be granted for any of the following causes materially affecting the moving party's rights:

1. Irregularity in the administrative proceedings of the agency or its hearing officer or the prevailing party, or any order or abuse of discretion, whereby the moving party was deprived of a fair hearing;
2. Misconduct of the Office of State Mine Inspector or its hearing officer or the prevailing party;
3. Accident or surprise which could not have been prevented by ordinary prudence;

4. Newly discovered material evidence which could not with reasonable diligence have been discovered and produced at the original hearing;

5. Excessive or insufficient penalties;

6. Error in the admission or rejection of evidence or other errors of law occurring at the administrative hearing;

7. That the decision is not justified by the evidence or is contrary to law.

**D.** The office of the State Mine Inspector may affirm or modify the decision or grant a rehearing to all or any of the parties and on all or part of the issues for any of the reasons set forth in subsection C. An order granting a rehearing shall specify with particularity the ground or grounds on which the rehearing is granted, and the rehearing shall cover only those matters so specified.

**E.** Not later than ten (10) days after a decision is rendered, the Office of State Mine inspector may on its own initiative order a rehearing or review of its decision for any reason for which it might have granted a rehearing on motion of a party. After giving the parties or their counsel notice and an opportunity to be heard on the matter, the Office of State Mine Inspector may grant a motion for rehearing for a reason not stated in the motion. In either case the order granting such a rehearing shall specify the ground therefor.

**F.** When a motion for rehearing is based upon affidavits, they shall be served with the motion. An opposing party may within ten (10) days after such service serve opposing affidavits, which period may be extended for an additional period not exceeding twenty (20) days by the Office of State Mine

Inspector for good cause shown or by written stipulation of the parties. Reply affidavits may be permitted.

**G.** If in a particular decision the Office of State Mine Inspector makes specific findings that the immediate effectiveness of such decision is necessary for the immediate preservation of the public peace, health and safety and that a rehearing or review of the decision is impracticable, unnecessary or contrary to the public interest, the decision may be issued as a final decision without an opportunity for rehearing or review. If a decision is issued as final decision without an opportunity for rehearing, any application for judicial review of the decision shall be made within the time limits permitted for applications for judicial review of the Office of State Mine Inspector's final decision.

**H.** For purposes of this section the terms "contested case" and "party" shall be defined as provided in A.R.S. § 41-1001.

**I.** To the extent that the provisions of this rule are in conflict with the provisions of any statute providing for rehearing of decisions of the Office of State Mine Inspector, such statutory provisions shall govern.

**R11-1-153.**

Reserved

**R11-1-199.**

## **ARTICLE 2. EXPLOSIVES AND BLASTING**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305, 27-321, 27-322, 27-323, 27-324, and 27-325.

**R11-1-200.**

Reserved

**R11-1-210.**

**R11-1-211. Smoking, matches, open flames prohibited in specified areas**

Smoking, matches, open flames, spark-producing devices and carrying of firearms or ammunition shall be prohibited in or within 50 feet of the following areas:

1. Explosive and blasting supply magazines.
2. Blasting agent and oxidizer storage sites.
3. Blasting agent mixing plants (fixed or mobile).
4. Vehicles transporting explosives, blasting agents or oxidizers.
5. Blasting sites, except for approved means of firing blasts.

**R11-1-212. Transporting explosives**

No persons shall drive, load, or unload a vehicle transporting explosives, blasting agents, or oxidizers in a careless or reckless manner.

**R11-1-213. Precautions governing use, transportation and handling**

The precautions, rules and regulations governing the use, transportation and handling of explosives shall apply to all blasting agents except as otherwise expressly provided herein.

**R11-1-214. Repair of vehicles containing explosives**

Vehicles containing explosives or detonators shall not be taken to a repair garage or shop for any purpose.

**R11-1-215. Unattended vehicles containing detonators or other explosives**

Vehicles containing detonators or explosives, other than blasting agents, shall not be left unattended except in blasting areas where loading or charging is in progress.

**R11-1-216. Notification to men responsible for operating hoists and cages**

Men responsible for operating the hoist, and cages shall be notified whenever explosives or detonators are being transported in a shaft conveyance.

**R11-1-217. Hoisting stopped**

Hoisting in adjacent shaft compartments shall be stopped when explosives or detonators are being handled.

**R11-1-218.**

Reserved

**R11-1-220.**

**R11-1-221. Definitions - explosives**

**A. BLASTING AGENT:** Shall mean any material or mixture consisting of a fuel and oxidizer, intended for blasting, not otherwise classified as an explosive, and of which none of the ingredients are classified as an explosive, provided that the finished product, as mixed and packaged for use or shipment, can not be detonated when unconfined by means of a No. 8 test blasting cap. This test should be conducted at a temperature range between 70° and 75° F.

Note 1. A No. 8 test blasting cap is one containing 2 grams of a mixture of 80% mercury fulminate and 20% potassium chlorate, or a cap of equivalent strength.

Note 2. Nitro Carbo Nitrate. This term applies to any blasting agent which has been classified as nitro carbo nitrate under the Department of Transportation Regulations, and which is packaged and shipped in compliance with the regulations of the Department of Transportation.

**B. EXPLOSIVES:** The term “explosive” or “explosives” shall mean any chemical compound, mixture or device, the primary or common

purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat, unless such compound, mixture or device is otherwise specifically classified by the Department of Transportation. The term “explosives” shall include all material which is classified as Class A, Class B, and Class C explosives by the Department of Transportation.

Note 1. Classification of explosives by the United States Department of Transportation is as follows:

1. CLASS A EXPLOSIVES: Possessing detonating hazards; such as dynamite, nitroglycerin, TNT, black powder blasting caps and cast detonating primers and boosters.

2. CLASS B EXPLOSIVES: Possessing flammable hazard; such as propellant explosives, including some smokeless propellants.

3. CLASS C EXPLOSIVES: Includes certain types of manufactured articles which contain Class A or Class B explosives, or both, as components but in restricted quantities.

4. FUELS: A fuel is a substance which may react with the oxygen in the air or with the oxygen yield by an oxidizer to produce combustion.

5. MAGAZINE: Shall mean any building or structure, other than an explosives manufacturing building, approved for the storage of explosives.

6. OXIDIZER: An oxidizer is a substance such as a nitrate that yields oxygen readily to stimulate the combustion of organic matter or other fuel.

**R11-1-222.**

## **Revised**

### **R11-1-230**

#### **R11-1-231. Storage of explosives**

A. All Class A, Class B, Class C explosives shall be kept in magazines which meet the requirements of this section. This shall not be construed as applying to fuse lighters, fuse igniters, and safety fuses (slow-burning type containing a core of black powder).

B. Detonators shall not be stored in the same magazine with other explosive materials.

### **R11-1-232. Reserved**

#### **R11-1-233. Location of magazines**

Magazines shall be detached structures located away from power lines, fuel storage areas, possible sources of fire and from inhabited buildings, public highways, passenger railways and other magazines in conformity with the American Table of Distances for Storage of Explosives as Revised and Approved by The Institute of Makers of Explosives.

#### **R11-1-234. Construction of magazines**

A. Magazines shall be constructed in conformity with the provisions of this section, or may be of substantially equivalent construction. Magazines for

the storage of Class A. explosives, other than black powder, shall be reasonably bullet-resistant, weather-resistant, fire-resistant, theft-resistant and ventilated.

**B.** Magazines shall be posted with warning signs so located that a bullet passing through the face of the sign will not strike the magazine.

**C.** Ground around magazines shall slope away for drainage. The land surrounding magazines shall be kept clear of brush, dried grass, leaves and other combustible materials for a distance of at least 25 feet, and other unnecessary combustible materials for a distance of not less than 50 feet.

**D.** Field magazines shall not be provided with heat or artificial lights, except that if artificial lights are necessary, an electric safety flashlight or safety lantern shall be used.

**E.** Magazines shall not be grounded, but have an overhead lightning protective system that is in no way connected to the magazine.

**R11-1-235. Construction of Class I magazines**

**A.** Class I magazines shall be of masonry or wood covered with sheet metal, or of metal construction; or a combination of these types. Hollow masonry units used in construction required to be bullet-resistant shall have all hollow spaces filled with a dry sand/cement mix or well-tamped sand. Wood constructed walls required to be bullet resistant shall have at least a six-inch space between interior and exterior sheathing, and the space between sheathing shall be filled with well-tamped sand or sand/cement mix. Metal wall construction, when

required to be bullet-resistant, shall be lined with at least a four-inch thickness of brick, masonry, hardwood or sand.

**B.** Floors and roofs of masonry magazines may be of wood construction. Wood floors shall be tongue-and-grooved lumber having a minimum thickness of 3/4 inch. Roofs required to be bullet-resistant shall be protected by four inches of hardwood or by a sand tray located at line of eaves and covering the entire area except that necessary for ventilation. Sand in the sand tray shall be maintained at a depth of not less than four inches.

**C.** All wood at the exterior of magazines, excluding eaves, shall be protected by being covered with black or galvanized steel or aluminum metal of thickness of not less than No. 26 gauge. All nails exposed to the interior of magazines shall be well countersunk.

**D.** Foundations for permanent magazines shall be of substantial construction and arranged to provide good cross ventilation.

**E.** Magazines shall be ventilated sufficiently to minimize dampness and heating of stored explosives. Ventilation openings shall be screened to prevent the entrance of sparks.

**F.** Openings to magazines shall be restricted to that necessary for the placement and removal of stocks of explosives. Doors for magazines for Class A explosives shall be bullet-resistant.

**G.** Magazines shall be provided with two substantial locks, and magazine doors shall be kept locked except during the time of placement and removal of stocks of explosives.

**H.** Provisions shall be made to prevent the piling of stocks of explosives directly against the walls; such protection, however, shall not interfere with proper ventilation at interior of side and end walls.

**I.** Full and semi-trailers are acceptable for the storage of explosives when modified to comply with Class I magazine construction.

**R11-1-236. Construction of Class II magazines**

**A.** Class II magazines shall be of wood or metal construction, or a combination thereof.

**B.** Wood magazines of this class shall have sides, bottom and cover constructed of two-inch hardwood boards well braced at corners and protected by being entirely covered with sheet metal of not less than No. 20 gauge. All nails exposed to interior of magazine shall be well countersunk. All metal magazines of this class shall have sides, bottom and cover constructed of 12-gauge metal, and shall be lined with 3/8 inch plywood or the equivalent. Edges of metal covers shall overlap sides at least one inch.

**C.** Covers for both wood and metal constructed magazines of this class shall be provided with substantial strap hinges and shall be provided with substantial means of locking. Covers shall be kept locked except during the placement or removal of explosives. Second class magazines, containing explosives, left at locations where no one is in attendance, shall be adequately secured to prevent theft; or the explosives shall be removed from the magazine when unattended.

**D.** Magazines of this class shall be painted red and shall bear lettering in white, on all sides and top, at least three inches high, “Explosives-Keep Fire Away”. Where necessary due to climatic conditions, Class II magazines shall be ventilated.

**E.** Underground detonator-storage magazines shall be of the same construction as explosives-storage magazines and shall be separated by at least 25 feet from explosive-storage magazines.

**R11-1-237. Storage with magazines**

**A.** Containers of explosives shall be laid flat with top side up. Corresponding grades and brands shall be stored together in such a manner that brand and grade marks show. All stocks shall be stored so as to be easily counted and checked. Containers of explosives shall be piled in a stable manner. When any kind of explosive is removed from a magazine for use, the oldest explosive of that particular kind shall be removed first.

**B.** Only fiberboard containers of explosives may be opened in a magazine. Open containers of explosives shall be securely reclosed when stored in a magazine.

**C.** Tools used for opening containers or explosives shall be constructed of non-sparking materials, except that metal slitters may be used for opening fiberboard containers. A wood wedge and fiber, rubber, or wood mallet shall be used for opening or closing wood containers of explosives.

**D.** Magazines shall be used for the storage of explosives, blasting agents, and oxidizers, only. Metal tools, other than non-sparking transfer conveyors, shall not be stored in a magazine.

**E.** Magazine floors shall be regularly swept, kept clean, dry, free of grit, paper, empty used packages, and rubbish. Brooms and other cleaning equipment shall not have any spark-producing metal parts. Sweepings from floors of magazines shall be disposed of properly. Stained magazine floors shall be cleaned according to instruction obtained from the explosives manufacturer. When any explosive has deteriorated to an extent that is in a dangerous condition, or if liquid leaks from any explosive, then the person in possession of such explosive shall destroy such explosive in accordance with the instructions obtained from the manufacturer. Only experienced persons shall direct the work of destroying explosives.

**F.** When magazines need inside repairs, all explosives shall be removed therefrom and the floors cleaned. In making outside repairs, if there is a possibility of causing sparks or fire, the explosive shall be removed from the magazine. Explosives removed from a magazine under repair shall either be placed in another magazine or placed a safe distance from the magazine where they shall be properly guarded and protected until repairs have been completed, when they shall be returned to the magazine.

**G.** Ammonium nitrate fuel oil blasting agents shall be physically separated from other explosives, safety fuse, or detonating cord stored in the same

magazine, in such a manner that oil does not contaminate the other explosives, safety fuse or detonating cord.

**R11-1-238.**

**Reserved**

**R11-1-240.**

**R11-1-241. Transportation of explosives – transportation vehicles**

**A.** Vehicles used for transporting explosives shall be strong enough to carry the load without difficulty and be in good mechanical condition. All vehicles used for the transportation of 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 material to prevent contact with containers of explosives. Vehicles used to transport blasting agents shall have neither zinc nor copper exposed in the cargo space. Containers of explosives shall not be loaded above the sides of an open body vehicle.

**B.** Motor vehicles transporting explosives shall be marked with appropriate placards or lettering.

**C.** Motor vehicles transporting explosives must be equipped with not less than two suitable fire extinguishers, each having a rating of at least 10 B:C.

**D.** Vehicles transporting explosives shall only be driven by and be in charge of a duly-licensed driver who is physically fit, careful, capable, reliable and:

1. Able to read and write English.
2. Not addicted to or under the influence of intoxicants or narcotics.
3. Not less than twenty-one years of age.
4. Familiar with all applicable laws, rules, regulations and policies governing the transportation and handling of explosives.

**E.** When explosives and detonators are hauled by trolley locomotives, covered, electrically insulated cars shall be used.

**F.** Explosives and detonators shall be transported in separate vehicles unless separate by four inches of hardwood or the equivalent.

**G.** When vehicles containing explosives or detonators are parked, the brakes shall be set, the motive power shut off, and the vehicles shall be blocked securely against rolling.

**H.** Explosives or detonators shall not be transported on mantrips.

**I.** Substantial nonconductive containers shall be used to carry explosives to blasting sites.

**J.** Explosives or detonators shall not be transported on locomotives.

**R11-1-242. Transportation of explosives – miscellaneous**

**A.** No spark-producing metal tools, oils, matches, firearms, ammunition, electric storage batteries, flammable substances, acids, oxidizing materials, or corrosive compounds shall be carried in the body of any motor truck

or vehicle transporting explosives unless the loading of such dangerous articles and the explosives comply with Department of Transportation regulations.

**B.** Unauthorized persons or passengers must not ride on a motor vehicle transporting explosives.

**C.** Hoisting of ore, muck, or other material in adjacent shaft compartments shall be stopped while explosives are being handled unless the compartment in which the explosives are being handled is adequately separated.

**R11-1-243.**

**Reserved**

**R11-1-250.**

**R11-1-251. Water gels, or slurry explosives and blasting agents – general provisions**

Unless otherwise set forth in this section, water gels shall be transported, stored, and used in the same manner as explosives or blasting agents in accordance with the classification of the product.

**R11-1-252. Premixed water gels**

A. Premixed water gels containing a substance in itself classified as an explosive shall be classified as an explosive and manufactured, transported, stored, and used as specified for explosives in this Code.

B. Premixed water gels containing no substance in itself classified as an explosive and which are cap-sensitive as defined in R11-1-221 under Blasting Agent, shall be classified as an explosive and manufactured, transported, stored, and used as specified for explosives in this Code.

C. Premixed water gels containing no substance in itself classified as an explosive and which are not cap-sensitive as defined in R11-1-221 under Blasting Agent shall be classified as blasting agents and manufactured, transported, stored, and used as specified for blasting agents in this Code.

**R11-1-253. On-site mixed water gels**

A. Ingredients for on-site-mixed water gels shall be stored as set forth in this section.

1. Ingredients in themselves classified as Class A or Class B explosives shall be stored in conformity with this Code.

2. Prilled, grained, or granulated ammonium nitrate shall be stored in accordance with R11-1-262 of this Code. If ammonium nitrate is stored in the vicinity of explosives or blasting agents, the separation distances specified in R11-1-262 of this Code shall be observed.

3. Liquid ammonium nitrate or ammonium nitrate-sodium nitrate solutions shall be stored in tank cars, tank trucks, or permanent tanks. Spills or leaks which may contaminate combustible materials shall be cleaned up immediately.

**B.** If electric power is used, it may be furnished by cable from an outside source or by a self-contained motor generator. In the case of a self-contained power source, it shall be located at the end of the storage container opposite that at which the blasting agent is discharged. It shall have adequate capacity for the loads to be expected and be equipped with suitable overload protection devices.

**C.** Electric wiring carrying voltages greater than 12 volts shall be in armored cable or in conduit and, if dry ingredients are employed, the wiring shall conform to the requirements of Class II, Division 2 of the National Electrical Code. The materials protecting the electric wiring must be of such composition that they will not be chemically attacked by the ingredients being processed.

**D.** Mixing equipment for on-site-mixed water gels shall comply with the requirements of this section:

1. All electric motors, electrically operated proportioning devices, etc., shall be electrically bonded.

2. All electric motors, electrically operated proportioning devices, etc., used for dry ingredients shall conform to the requirements of Class II, Division 2 of the National Electrical Code.

3. The entire loading and mixing equipment shall be cleaned periodically to insure against accumulations of ingredients.

**R11-1-254**

**Reserved**

**R11-1-260**

**R11-1-261. Dry ammonium nitrate-fuel compositions, “mixing plant”**

“Mixing plant” refers to any fixed installation or mobile equipment used in conjunction with a mine, for the processing of various non-explosive materials to produce and/or package a blasting agent for use in a mine.

**R11-1-262. “Mixing plant”, located on mine property.**

**A.** At each mining operation where field-mixed ammonium nitrate-fuel oil blasting agents are being used, all mixing shall be done under the supervision of competent personnel, duly instructed in the proper mixing of the blasting agent involved.

**B.** Mixing plants shall conform to the requirements of this section unless otherwise specifically approved by the Inspector.

**C.** Mixing plants shall be located, with respect to the inhabited buildings, passenger railroads, and public highways, in accordance with the American Table of Distances. One-half the quantity of unmixed ammonium

nitrate shall be included with the quantity of finished product, the total of which shall be considered as explosive, for determining the proper distances.

**D.** A mixing plant building shall be of noncombustible construction or sheet metal on wood studs.

**E.** The layout of a mixing plant building shall be such as to provide physical separation between the finished product storage and the mixing and packaging operations.

**F.** Floors in a mixing plant building shall be of concrete. Concrete floors must have at least one inch of finished cement, Terra Cotta finish, or other material approved by the Inspector. Floors shall be constructed so as to eliminate open floor drains and piping into which molten materials could flow and be confined in case of fire. The floors and equipment of the mixing and packaging room shall be washed down or cleaned when necessary to prevent accumulations of oxidizers or fuels and other sensitizers.

**G.** Isolated fuel storage shall be provided at fixed plants to avoid contact between molten oxidizer and fuel in case of fire.

**H.** The mixing plant shall be well ventilated.

**I.** Heat, if needed, shall be provided exclusively from a unit outside the building.

**J.** All electric switches, controls, motors, and lights, if located in the mixing or blasting agent storage area, must conform to the requirements of Class II, Division 2, of the most recent edition of the National Electrical Code. The frame of the mixer and all other equipment that may be used must be electrically

bonded together and be provided with a continuous path to ground which is separate from the ground provided for power equipment.

**K.** The design of the mixer shall minimize the possibility of frictional heating, compaction, and especially confinement. All bearings and gears should be mounted outside the mixer and protected against the accumulation of product dust. All surfaces must be accessible for easy cleaning.

**L.** Mixing and packaging equipment shall be constructed of materials compatible with the ammonium nitrate composition.

**M.** All discarded empty ammonium nitrate bags and other trash must be disposed of daily by burning outdoors.

**N.** All sacks or containers used for storage of blasting agents must be properly marked and must show the mixing date.

**O.** Blasting agents used underground shall be mechanically mixed in order to insure a homogeneous mixture of the proper composition, but the mixing shall not be done underground.

**R11-1-263. Composition of blasting agents**

**A.** No hydrocarbon liquid fuel with a flash point lower than that of No. 2 diesel fuel oil (125° F. minimum or legal) shall be used.

**B.** Crude oil and crankcase oil shall not be used.

**C.** No unusual compositions of blasting agents or a composition containing an ingredient classed as high explosive shall be attempted in mixing operations. The finished product shall be tested regularly to determine that it falls

within the classification “Blasting Agent”. Peroxides, chlorates or perchlorates shall not be used under any conditions.

**D.** If a blasting agent is used underground, its fuel oil content shall range between 5.5% and 6.5% by weight, except where other carbonaceous material is added, in which case a proper oxygen balance shall be maintained.

**R11-1-264. Surface storage of materials**

**A.** Unmixed Materials:

1. Unmixed ammonium nitrate shall be kept in a clean, well-ventilated building or bin, using good warehouse practice. Floor drains into which molten nitrate could run during a fire should be eliminated. Bagged ammonium nitrate shall not be stacked close to any source of heat which might ignite the combustible material of the bags. Bulk ammonium nitrate shall be stored in clean, dry bins. When stored in warehouses, it shall be stored on dry, clean floors which are of noncombustible construction which is protected against impregnation with ammonium nitrate. Warehouses or other storage facilities shall have adequate ventilation or be of construction that will be self-ventilating to permit escape of products of decomposition and heat in the event of fire.

2. Ammonium nitrate shall not be stored with or near flammable liquids, corrosive acid, chlorates, nitrates, permanganates, sulphur, or finely divided metals.

3. When unmixed ammonium nitrate is stored with blasting agents or high explosives in a high-explosive magazine, one-half the quantity of

unmixed ammonium nitrate shall be taken into consideration in computing the total quantity in warehouse or magazine for compliance with the American Table of Distances.

4. Spilled ammonium nitrate shall be cleaned up promptly and removed safely.

5. Dynamite or other explosives shall not be used to break up caked ammonium nitrate.

6. Fuses and igniters shall be stored in a cool, dry place away from oils or grease.

B. Mixed Materials (Without Explosives):

1. Permanent storage of blasting agents shall be in a fire- and weather- resistant, well-ventilated, magazine or warehouse. Temporary storage may be in vans, truck trailers, railroad cars, etc.

2. The location of magazine or warehouse shall comply with the American Table of Distances.

3. Interior of storage buildings shall be kept clean and be maintained in good housekeeping order.

4. Blasting agents shall not be stored with flammable liquids, corrosive acids, chlorates, nitrates, permanganates, sulphur or finely divided metals.

C. Mixed Materials (With Explosives):

All rules and regulations that apply to the storage of explosives shall apply to the storage of blasting agents when stored with explosives.

## **R11-1-265. Loading of blasting agents**

General:

1. All fittings used in the construction of the hopper and pickup equipment and hose connections of loading equipment must be constructed of materials compatible with the ammonium nitrate composition.
2. Blasting agents shall not be blown into boreholes that contain electrically nonconductive liners, even if the primer is not inserted until after the blowing has been completed.
3. Primers which contain a blasting cap, electric blasting cap or delay electric blasting cap shall not be handled by persons who have previously been operating pneumatic loading devices unless that person has grounded himself to bleed off any static charges.
4. Loading in boreholes containing electric blasting caps, delay electric blasting caps, or blasting caps:
  - a. All pneumatic and air-pressure equipment used for loading blasting agents must be adequately grounded to dissipate static electric charges that may cause premature initiation of the detonator. The machine or hopper, discharge hose, fittings, discharge tube, and loading tube must form a continuous electrically conductive path to a ground. The system ground conductor and loading tube shall have a resistance high enough to prevent hazards from stray currents, yet low enough to adequately maintain static electricity energy below hazardous levels.

- b. Water lines, air lines, fan lines, rails, or the permanent grounding system shall not be used as a ground for pneumatic loading equipment.
- c. Loading equipment mounted on a car and rails must be thoroughly insulated from the car and rails and grounded by a separate, static-dissipating ground.
- d. When loading over electric blasting cap wires, contact between any metal parts of the loader and cap leg wires shall be avoided.
- e. Metal or other low electrical resistance loading tubes shall not be used.
- f. All loading equipment must be removed from the area before leg wire shunts are removed and the loaded holes are tied in for blasting.
- g. Ventilation - When ammonium nitrate blasting agents are used, Section 27-411 of the Arizona Mining Code shall apply.

**R11-1-266**

**Reserved**

**R11-1-270**

**R11-1-271. Use of explosives and blasting agents, general provisions**

**A.** The handling of explosives may be performed by the person designated to use explosives or by other employees under his direct supervision provided that such employees are at least 18 years of age. Persons who use or

handle explosives or detonators shall be experienced men who understand the hazards involved; trainees shall do such work only under the supervision of and in the immediate presence of experienced men. Blasting operations shall be under the direct control of authorized persons.

**B.** Containers of an approved type shall be used for taking detonators and other explosives from storage magazines to the blasting area.

**C.** Persons authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution, including but not limited to warning signals, flags, barricades or blasting mats to insure the safety of mine personnel.

**D.** Due precautions shall be taken to prevent accidental discharge of electric blasting caps from current induced by radio transmitters, lightning, dust storms, or other sources of extraneous electricity. All surface, shaft sinking, and tunneling blasting operations shall be suspended and persons removed from blasting area during the ominous approach and progress of an electrical storm, when electric detonators are used.

**E.** Empty containers and paper and fiber packing materials which have previously contained high explosives shall not be used again for any purpose, but shall be destroyed by burning out-of-doors, and no person shall be nearer than 100 feet after the burning has started.

**F.** Explosives, blasting supplies, or blasting accessories that are obviously deteriorated or damaged shall be destroyed in a safe manner under the

instructions of the explosives or blasting agent manufacturer or its designated agent.

**G.** Explosives or blasting supplies shall not be abandoned. While temporarily unattended, they shall be marked with red flags or some other suitable means of warning persons.

**H.** Capped primers shall be made up at the time of charging and as close to the blasting site as conditions allow.

**I.** Fuses shall be cut and capped in safe, dry locations posted with “No Smoking” signs.

**J.** Fuse shall not be ignited before the primer and the entire charge are securely in place.

**K.** If any part of a blast is connected in parallel and is to be initiated from powerlines or lighting circuits, the time of current flow shall be limited to a maximum of 25 milliseconds by incorporating a control device in the blasting circuit or by interrupting the circuit with an explosive charge attached to one or both lead lines and initiated by a zero-delay electric blasting cap.

**L.** Black blasting powder should not be used for blasting except when a desired result cannot be obtained with another type of explosive such as in quarrying certain types of dimension stone.

**M.** Explosives shall be kept separate from detonators until charging is started.

**N.** Electric circuits from the blasting switches to the blast area shall not be grounded.

**O.** Lead wires and blasting lines shall not be strung across power conductors, pipelines, railroad tracks, or within 20 feet of bare powerlines. They shall be protected from sources of static or other electrical contact.

**R11-1-272. Loading of explosives (blasting)**

**A.** All drill holes shall be sufficiently large to admit freely the insertion of the cartridges of explosives.

**B.** Drilling shall not be started until all butts (bootlegs) of old holes are examined. Wash down the face and wash out the butts (bootlegs). If any misfires are found they shall be handled only by, or under the direction of, a competent and experienced person.

**C.** No person shall be allowed to deepen drill holes which have contained explosives.

**D.** After loading for a blast is completed, all excess explosives and detonators shall be returned immediately to their separate storage magazines.

**E.** Double priming with fuse in a drill hole is prohibited.

**F.** No tamping shall be done directly on a capped primer.

**G.** Holes shall not be collared in bootlegs.

**H.** Holes to be blasted shall be charged as near to blasting time as practical and such holes shall be blasted as soon as possible after charging has been completed. In no case shall the time elapsing between completion of charging to the time of blasting exceed 72 hours unless prior approval has been obtained from the State Mine Inspector.

**R11-1-273. Initiating blasts**

- A.** When fuse is used, the blast cap shall be securely attached to the safety fuse with a standard ring-type (or other approved) cap crimper.
- B.** No primers shall be assembled or fuse capped closer than 50 feet from any magazine.
- C.** Only wooden or non-sparking tools shall be used for making holes in a cartridge of explosives.
- D.** Explosives shall not be extracted from a hole that has once been charged or has misfired unless it is impossible to detonate the unexploded charge by insertion of a fresh additional primer.
- E.** If there are any misfires while using cap and fuse, all persons shall remain away from the charge for at least 1 hour. On electrical misfires, all persons shall remain away from the charge for at least 15 minutes. Electrical misfires shall be handled under the direction of the person in charge of the blasting and all wires shall be carefully traced and search made for unexploded charges.
- F.** Blasters, when testing circuits to charged holes, shall use only blasting galvanometers designed for this purpose.
- G.** Only the man who makes the lead-in wire connections in electrical firing shall fire the shot. All connections should be made progressively from borehole back to the source of firing current, and the leading wires shall remain shorted and not be connected to the blasting machine or other source of current until the charge is to be fired.

**H.** Blasts in shafts or winzes shall be initiated from a safe location outside the shaft or winze.

**I.** When blasting electrically, the electric blasting cap leg wire shunt shall not be removed from the leg wires until loading operations have been completed.

**J.** When firing from 1 to 15 blastholes with safety fuse ignited individually using hand-held lighters, the fuses shall be of such lengths to provide the minimum burning time specified in the following table for a particular size round:

Number of Holes in a Round	Minimum Burning Time, Minutes
1.....	2
2-5.....	2-2/3
6-10.....	3-1/3
11-15.....	5

In no case shall any 40-second-per-foot safety fuse less than 36 inches long or any 30-second-per-foot safety fuse less than 48 inches long be used.

**K.** Not over 15 fuses shall be spit by each blaster if being individually ignited. At least two men shall be present when lighting fuses, and no man shall light more than 15 individual fuses. To avoid an unsafe delay in the operation, all men shall carry out the lighting of fuses simultaneously. If more than 15 holes per man are to be fired, igniter cord and connectors or electric blasting shall be used.

**L.** No fuse shall be used that burns faster than one (1) foot in thirty (30) seconds or slower than one (1) foot in fifty-five (55) seconds. The burning

rate of every shipment of fuse received at a mine shall be determined. If a shipment of fuse lasts more than sixty (60) days, the burning rate must be rechecked each sixty (60) days. 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 men concerned with blasting.

**M.** Fuse shall be ignited with hot wire lighters, lead spitters, igniter cord or other such approved type device as designed for this purpose. Carbide lights shall not be used to light fuses.

**N.** Where electric blasting is to be performed, electric circuits to equipment in the immediate area to be blasted shall be de-energized before electric detonators are connected to the blasting circuit; the power shall not be turned on until after the shots are fired or the blast is deactivated by removing or shunting each electric detonator.

**O.** Trunklines, in multiple-row blasts initiated by detonating cord, shall make one or more complete loops, with crossties between loops at intervals of not over 200 feet.

#### **R11-1-274. Explosives stored underground**

Explosives stored in a mine shall be so located that should they explode or burn, escape of the men will not be cut off.

**R11-1-275. Underground magazines, construction**

Underground magazines shall be well constructed but need not comply with the standards set by Class 1 or Class 11 magazines.

**R11-1-276. Warning required**

No blast shall be fired until the person in charge has made certain that all surplus explosives are in a safe place, all persons and equipment are at a safe distance or under sufficient cover, and that an adequate warning signal has been given.

**R11-1-277. Permanent blasting lines**

Permanent blasting lines shall be properly supported, insulated and kept in good repair.

**R11-1-278. Location of safety switches**

If branch circuits are used when blasts are fired from power circuits, safety switches located at safe distances from the blast area shall be provided in addition to the main blasting switch.

**R11-1-279. Blasting switches**

Blasting switches shall be locked in the open position except when closed to fire the blast. Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.

**R11-1-280. Detonating cord knots and connections**

All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunk lines. No trunk lines shall be tied in until all equipment is moved out of the area within 50' of the blast.

**R11-1-281. Misfires**

Misfires shall be disposed of by the following methods:

1. Reattempting to fire the holes if leg wires are exposed.
2. Washing the stemming and the charge from the borehole with water.
3. Inserting new primers after the stemming has been washed out.

**R11-1-282. Compressed air**

Compressed air shall not be used to remove explosives from misfires.

**R11-1-283. Electric detonators**

Electric detonators of different brands shall not be used in the same round.

**R11-1-284. Power sources**

Power sources shall be suitable for the number of electric detonators to be fired and for the type of circuits used.

**R11-1-285. Use of black blasting powder**

In the use of black blasting powder:

1. Containers shall not be opened in, or within 50 feet of any magazine; within any building in which a fuel-fired or exposed-element electric heater is in operation; where electrical or incandescent-particle sparks could result in power ignition; or within 50 feet of any open flame.
2. Granular powder shall be transferred from containers only by pouring. Spills of granular powder shall be cleaned up promptly with non-sparking equipment; contaminated powder shall be put into a container of water and its content disposed of promptly after the granules have disintegrated, or the spill area shall be flushed with a copious amount of water to completely disintegrate the granules.
3. Containers of powder shall be kept securely closed at all times other than when the powder is being transferred from or into a container.
4. Containers of powder transported by vehicles shall be in a wholly enclosed cargo space.
5. Misfires shall be disposed of by: (a) washing the stemming and powder charge from the borehole, and (b) removal and disposal of the initiator as a damaged explosive.

6. Boreholes of shots that fire but fail to break, or fail to break properly, shall not be recharged for at least 12 hours.

**R11-1-286. Explosives burning in hole, move from area**

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 until danger has passed, but in no case within 1 hour.

**R11-1-287.**

**Reserved**

**R11-1-299.**

**ARTICLE 3. FIRE PREVENTION AND CONTROL**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305 and 27-311.

**R11-1-300. Reserved**

**R11-1-301. Fire fighting equipment**

Fire fighting equipment shall not be tampered with or removed by any person except for its authorized use.

**R11-1-302. Smoking or use of open flame prohibited**

A. No person shall smoke or use an open flame where flammable solvents, liquids, fluids or other flammable materials are stored, transported, handled or used, nor within an unsafe distance of any area or place where such practices may cause a fire or explosion, or where the temperature of the air can be elevated to a temperature above a solvent's flash point.

B. Signs warning against such smoking and open flames shall be posted.

**R11-1-303. Use of carbon tetrachloride**

The use of carbon tetrachloride (CCl<sub>4</sub>) in fire extinguishers or for cleaning purposes is prohibited.

**R11-1-304. Fire extinguishers-maintenance**

Fire extinguishers and fire suppression devices shall be:

1. Of the appropriate type for the particular fire hazard involved.
2. Adequate in number and size for the particular fire hazard involved.
3. Recharged or replaced after any discharge is made from the extinguisher or device.

4. Inspected, tested, and maintained at regular intervals according to the manufacture's recommendations, and a record showing the date of same be kept by the operator for a period of one (1) year, and be made available for review by the Inspector.

5. Approved by the Underwriter's Laboratories, Inc.

**R11-1-305. Tanks, pipes, other containers-made safe before welding**

All tanks, pipes, or other containers which have held flammable, explosive or corrosive material shall be vented, cleaned, purged, and tested for safe and nonexplosive atmosphere before entering, burning, cutting, or welding on them is permitted.

**R11-1-306. Flammable liquids-storage**

Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association or other recognized agencies approved by the Inspector. Small quantities of flammable liquids drawn from storage shall be kept in appropriately labeled safety cans.

**R11-1-307. Fuel lines-valves**

Fuel lines shall be equipped with valves to cut off fuel at the source and shall be located and maintained to minimize fire hazards.

**R11-1-308. Insulation of power lines and cables**

Power wires and cables shall be adequately insulated where they pass through doors or walls or where they present a fire hazard.

**R11-1-309. Valves on oxygen and acetylene tanks**

Valves on oxygen and acetylene tanks shall be kept closed when the contents are not being used.

**R11-1-310. Flammable liquid's storage when not buried**

Gasoline, diesel fuel, liquified petroleum gases, and other flammable liquids when not buried, shall not be stored within 100 feet of the following:

1. Mine openings.
2. Buildings or snowsheds connected to mine openings.
3. Fan installations or housings.
4. Hoist houses.

**R11-1-311. Abandoned electrical circuits**

Abandoned electrical circuits shall be de-energized and isolated so that they cannot become energized inadvertently.

**R11-1-312. Solvents with flash points lower than 100° F.**

Solvents with flash points lower than 100° Fahrenheit (38°C) shall not be used for cleaning.

**R11-1-313. Oxygen cylinders-storage**

Oxygen cylinders shall not be stored near oil or grease.

**R11-1-314. Gauges and regulators used with oxygen or acetylene cylinders**

Gauges and regulators used with oxygen or acetylene cylinders shall be kept clean and free from oil and grease.

**R11-1-315. All heat sources capable of combustion, insulated or isolated**

All heat sources, including lighting equipment, capable of producing combustion shall be insulated or isolated from combustible materials.

**R11-1-316. Battery charging stations**

Battery charging stations shall be located in well ventilated areas.

**R11-1-317. When welding or cutting safety precautions**

When welding or cutting, suitable precautions shall be taken to ensure that smoldering metal or sparks do not result in a fire. Fire extinguishing equipment shall be immediately available at the site.

**R11-1-318. Internal combustion engines-refueling**

Internal combustion engines, except diesels above ground, shall be shut off and stopped before being fueled.

**R11-1-319. Drip pans, etc.**

Drip pans shall be provided to catch leakage or spillage when oil or flammable liquids are dispensed in a place or manner which may create a hazard.

**R11-1-320. Fire alarm systems**

Fire alarm systems shall be provided and maintained in operating condition or adequate fire alarm procedures shall be established to warn promptly all persons endangered by fire.

**R11-1-321. Fuel stored underground**

Fuel stored underground will be in a return air split provided with adequate fire-fighting equipment. No oil line shall be allowed to pass down the shaft.

**R11-1-322. Tightly sealed containers used for combustible materials**

Oil, grease or diesel fuel stored underground shall be kept in suitable tightly sealed containers in fire resistant areas at safe distances from explosives, magazines, electrical installations and shaft stations.

**R11-1-323. Fire control-underground diesel units**

A fire extinguisher of suitable type and size must be carried at all times with each diesel powered unit. In addition, a fire control system shall be installed in each piece of equipment operating underground regardless of make and model. The system shall be approved by the Inspector, for automatic, remote, pneumatic, push button or lever control.

**R11-1-324. Starting mechanism of the diesel engine**

The starting mechanism of the diesel engine shall be powered by electricity, air or some other source considered safe. The use of gasoline powered starters for underground diesel equipment is specifically prohibited.

**R11-1-325. Underground refueling stations**

Underground refueling stations must be well ventilated and separate from any underground equipment repair areas. Diesel fuel must be carried in tight containers.

**R11-1-326. Supply of diesel fuel allowed underground**

Only a day's supply of diesel fuel will be allowed underground at any time and this must be stored in tight containers in a cool, well ventilated place. The container will be set in a sufficient amount of suitable absorbent material to absorb all of the fuel being stored or shall be set in an area which is curbed or otherwise blocked off so that the fuel cannot spread beyond the storage area.

**R11-1-327. Fires prohibited underground**

Fires shall not be built underground; open-flame torches and candles shall not be left underground.

**R11-1-328. Approved mine rescue apparatus-maintenance**

Approved mine rescue apparatus shall be properly maintained for immediate use. The equipment shall be tested at least once a month and records kept of the tests.

**R11-1-329. Diesel fuel storage areas**

No smoking is permitted in or around diesel fuel storage areas. No open lights are permitted in diesel storage or refueling areas. There must be adequate firefighting equipment at all refueling stations and storage tanks for diesel fuel.

**R11-1-330. Gasoline storage or use in underground operations prohibited**

Gasoline shall not be taken, stored or used in underground operations.

**R11-1-331. Use of liquefied petroleum gases**

The use of liquefied petroleum gases shall be limited to maintenance work.

**R11-1-332. Fuel used in underground diesel equipment**

Fuel used in underground diesel equipment must conform to the manufacturer's specifications for viscosity pour point, cetane number, carbon residue and water. The flash point must not be less than 150° Fahrenheit and sulphur content must not be greater than 0.2% by weight.

**R11-1-333. Reserved**

**R11-1-334. Mine rescue station**

A mine rescue station equipped with at least 10 sets of suitable and properly maintained 2-hour minimum capacity self-contained breathing apparatus, adequate supplies, and spare parts shall be maintained at mines employing 75 or more persons underground or, in lieu thereof, the mine shall be affiliated with a central mine rescue station.

**R11-1-335. Mine rescue crews**

At mines employing 75 or more persons underground, at least two rescue crews (10 persons) shall be trained at least annually in the use, care, and limitations of self-contained breathing and firefighting apparatus and in mine-rescue procedures. Other mines shall have at least one person so trained for each 10 persons employed underground.

**R11-1-336. Reserved**

**R11-1-337. Reserved**

**R11-1-338. Fire protection for timbered mine entrances**

Timber in mine entrances shall be fire-retardant for at least 200 feet inside the mine portal or collar, or the mine entrance shall be provided with fire protection adequate to control a fire for at least 200 feet inside the mine portal or collar.

**R11-1-339. Reserved**

**R11-1-340. Reserved**

**R11-1-341. Fire extinguisher-mobile equipment**

Suitable fire extinguishers shall be provided on self-propelled mobile equipment with enclosed cabs, used in surface operations.

**R11-1-342. Reserved**

**R11-1-350.**

**R11-1-351. Accumulation of flammable materials**

Flammable and combustible waste materials, grease, lubricants or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

**R11-1-352. Reserved**

**R11-1-353. Fire protection sensor for underground stationary diesel equipment**

Where there is a potential for exposure of workers to a fire hazard, unattended stationary diesel equipment used in underground operations shall be provided with a thermal sensor which automatically stops the diesel engine should overheating occur.

**R11-1-354. Fire protection sensor for belt conveyors**

Where there is a potential for exposure of workers to a fire hazard, unattended belt conveyors shall be provided with a thermal sensor which automatically stops the drive pulley should excessive slippage create an ignition of the belt.

**R11-1-355. Reserved**

**R11-1-399**

**ARTICLE 4. AIR QUALITY, VENTILATION AND RADIATION,  
AND PHYSICAL AGENTS**

**The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S §§ 27-304, 27-305, 27-365, 27-368, 27-371, 27-372, 27-373, 27-411, and 27-412.**

**R11-1-400. Reserved**

**R11-1-401. Discharge of exhaust pipe**

The discharge of any exhaust pipe for an internal combustion engine used for fans, power plant or engine driven compressor shall be located and so arranged that the exhaust fumes from this engine cannot under any conditions get into the intake air of the mine or the intake air of the compressors.

**R11-1-402. Dust suspected of being explosive**

Dust suspected of being explosives shall be tested for explosability. If tests prove positive, appropriate control measures shall be taken.

**R11-1-403. Air intake of compressors.**

The air intake of all compressors must be located so that no hazardous fumes or smoke can get into the air intake. The use of compressors that have a common crankcase with the internal combustion engine used to drive it is

prohibited except for modern machines specifically designed to eliminate the hazard.

**R11-1-404. Airborne contaminants.**

Except as permitted by R11-1-406:

1. Except as provided in Paragraph 2, the exposure to airborne contaminants shall not exceed, on the basis of a time weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienist. Excursions above the listed thresholds shall not be of a greater magnitude than is characterized as permissible by the conference.
2. Employees shall be withdrawn from areas where there is present an airborne contaminant given a "C" designation by the conference and the concentration exceeds the threshold limit value listed for that contaminant.
3. The 8-hour time weighted average airborne concentration of asbestos dust to which employees are exposed shall not exceed 2 fibers per millimeter greater than 5 microns in length, as determined by the membrane filter method at 400-450 magnification (4 millimeter objective) phase contrast illumination. No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers longer than 5 micrometers, per milliliter of air as determined by the membrane

filter method over a minimum sampling time of 15 minutes.

“Asbestos” is a generic term for a number of hydrated silicates that, when crushed or processed, separate into flexible fibers made of fibrils. Although there are many asbestos minerals, the term “Asbestos” as used herein is limited to the following minerals; Chrysotile, Amosite, Crocidolite, Anthophyllite, Tremolite, and Actinolite.

**R11-1-405. Dust, gas, mist, and fume surveys**

Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures.

**R11-1-406. Control of employees exposure to harmful airborne contaminants**

Control of employees exposure to harmful airborne contaminants shall be, insofar as feasible, by prevention of contamination, removal by exhaust ventilation, or by dilution with uncontaminated air. However, where accepted engineering control measures have not been developed or when necessary by the nature of the work involved (for example, while establishing controls or occasional entry into hazardous atmospheres to perform maintenance or investigation), employees may work for reasonable periods of time in concentrations of airborne contaminants exceeding permissible levels if they are protected by appropriate respiratory protective equipment. Whenever respiratory

protective equipment is used a program for selection, maintenance, training, fitting, supervision, cleaning, and use shall meet the following minimum requirements:

1. Respirators which are applicable and suitable for the purpose intended shall be furnished, and employees shall use the protective equipment in accordance with training and instruction.
2. A respirator program consistent with the requirements of “American National Standard Practices for Respiratory Protection”, which is hereby incorporated by reference and made a part thereof. This publication may be examined in the Arizona State Mine Inspector’s Office.
3. When respiratory protection is used in atmospheres immediately harmful to life, the presence of at least one other person, with backup equipment and rescue capability shall be required in the event of failure of the respiratory equipment.

**R11-1-407. Air quality at underground working places**

Air at all active underground working places shall contain at least 19.5 volume percent oxygen.

**R11-1-408. Construction of underground ventilation doors**

Ventilation doors shall be:

1. Substantially constructed.

2. Covered with fire-retardant materials, if constructed of wood.
3. Maintained in good condition.
4. Self-closing, manually operated.
5. Equipped with audible or visual warning devices, if mechanically operated.

**R11-1-409. Keeping ventilation doors closed**

When ventilation control doors are opened as a part of the normal mining cycle they shall be closed as soon as possible to re-establish normal ventilation to working places.

**R11-1-410. Reserved**

**R11-1-411. Reserved**

**R11-1-412. Fan housings and air ducts**

Fan housings and air ducts connecting main fans to underground openings shall be fire resistant.

**R11-1-413. Reserved**

**R11-1-420.**

**R11-1-421. Use of underground diesel equipment**

Pursuant to A.R.S. § 27-365, the underground use of any internal combustion engine is unlawful unless the Inspector has approved the equipment. In addition to the approval of the Inspector for use of the equipment, the equipment shall conform in all respects to the requirements of the rules set forth in this Article.

**R11-1-422. Underground diesel-powered equipment-toxic gas diluting device**

Underground diesel-powered equipment shall be equipped with a stainless steel exhaust system including conditioner and satisfactory diluting device, which will reduce toxic gases to a minimum, before they are released into the mine atmosphere. (Except if limestone and water are used, scrubbers may be carbon steel.)

**R11-1-423. The conditioner specifications**

The conditioner must not increase the engine back pressure above eighteen (18) inches of water or one and one half (1½) inches of mercury when the diesel equipment is developing its rated horsepower. The conditioner must hold sufficient water for four (4) hours of operation without replenishing and at the end of four (4) hours of operation, the exhaust temperature again must not exceed one hundred and eighty (180°) Fahrenheit. Water to be completely drained and replenished once each shift. The conditioner must be checked, serviced, and

cleaned once each week. Any other conditioner approved by the Arizona State Mine Inspector may be used.

**R11-1-424. Inspection of diesel engine and gas conditioner**

At least once each week an inspection of the diesel engine and the gas conditioner, MUST be made and a written report of its condition be put on file for examination by the Mine Inspector or his deputies.

**R11-1-425. Use of flexible tubing**

When flexible tubing is used on exhaust from diesel motor to the air conditioner, or scrubber, it must be the type that will withstand back pressure and not leak.

**R11-1-426. Use of diesel-powered equipment shall be restricted**

The use of diesel powered equipment shall be restricted to haulageway or other working places, where positive ventilation is maintained by mechanical means. If possible, the ventilation in places where diesel equipment is used shall be arranged so that the air carrying exhaust gases from the engine are returned to the main air exhaust ways so as not to traverse working places.

**R11-1-427. Operation of diesel engines-toxic gases**

Diesel engines must not be operated when the atmosphere adjacent to its engine contains toxic gases above the tolerance set by the U.S. Bureau of Mines as listed below:

Carbon Dioxide	0.5%	by volume
Carbon Monoxide	0.01%	by volume
Nitrogen Dioxide	0.0005%	by volume
Oxygen must be at least	19.5%	by volume

**R11-1-428. Diesel engine in underground mine operations-ventilation**

When a diesel engine is used in underground mine operations, all dead-end headings shall be separately ventilated by auxiliary ventilation with a minimum air velocity of not less than fifty (50) linear feet per minute in the working face itself. The intake of the auxiliary system must be so located that air entering it will not be contaminated by exhaust gases from the diesel engine when operating between the intake and the face of the working area. When any portion of the primary or auxiliary exhaust system is not functioning, no diesel engine shall be allowed to operate in the area of no ventilation.

**R11-1-429. Diesel equipment other than approved by U.S. Bureau of Mines**

If diesel equipment other than that approved by U.S. Bureau of Mines is utilized, 150 C.F.M per brake horsepower is the required ventilating air for safe operation.

**R11-1-430. Reserved**

**R11-1-431. Suitable lights and audible warning devices, installation, maintenance**

Suitable lights and audible warning devices shall be installed and maintained in good working condition on all mobile diesel equipment operated underground.

**R11-1-432. Reserved**

**R11-1-433. Fuel leaks-diesel equipment**

All diesel equipment must be checked for fuel leaks and any leaks found must be noted and reported.

**R11-1-434. Diesel engine air cleaners**

All connections and tubing from air cleaner to the intake manifold must be closely checked for cracks, breaks, or loose connections. The intake manifold

must be secure and properly gasketed to cylinder heads, and be free of holes and cracks.

**R11-1-435. Reserved**

**R11-1-469.**

**R11-1-470. Sampling for radon daughters**

- A. In all underground mines at least one sample shall be taken each year in exhaust mine air by a competent person to determine if concentrations of radon daughters are present. If concentrations of less than 0.1 WL are found:
1. Where uranium is not mined no further exhaust mine air sampling is required during that year.
  2. Where uranium is mined at least one sample shall be taken in the exhaust air each month.
  3. Results of these tests shall be recorded and retained at the operation and be made available for inspection.

**R11-1-471. Exposure of radon daughters**

No employee shall be permitted to receive an exposure of radon daughters in excess of 4 WLM in any calendar year.

**R11-1-472. Concentration of radon daughters**

A. When radon daughters concentrations between 0.1 and 0.3 WL are found in an active working area, measurements representative of worker's breathing zone shall be determined as follows:

1. Where uranium is not mined-at least every 3 months at random times until concentrations are below 0.1 WL and annually thereafter.

2. Where uranium is mined-at least every two weeks at random times at all areas where persons work, travel or congregate. If concentrations are found in excess of 0.3 WL in an active working area, radon daughters concentrations shall be determined weekly until such time as the weekly determinations have been 0.3 WL or less for 5 consecutive weeks.

3. Sample date, locations and results obtained shall be recorded and retained at the mine office for at least two (2) years and shall be made available for inspection.

**R11-1-473. Smoking prohibited**

Smoking is prohibited where uranium is mined.

**R11-1-474. Reserved**

**R11-1-475. Noise control**

- A. No employee shall be permitted an exposure to noise in excess of that specified in the table below. Noise level measurements shall be made using a sound level meter meeting specifications contained in “American National Standard Specification for Sound Level Meters”, which is hereby incorporated by reference and made a part hereof, or by a dosimeter with similar accuracy. This publication may be examined in the Arizona State Mine Inspector’s Office.

PERMISSIBLE NOISE EXPOSURES

DURATION PER DAY HOURS OF EXPOSURE	SOUND LEVEL Dba SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ OR LESS	115

No exposure shall exceed 115 dBA. Impact or impulsive noises shall not exceed 140 dBA, peak sound pressure level.

Note: When the daily exposure is composed of two or more periods of noise exposure at different levels, their combined effect shall be considered rather than the individual effect of each.

If the sum  $(C1/T1) + (C2/T2) + \dots (Cn/Tn)$  exceeds unity, then the mixed exposure shall be considered to exceed the permissible exposure.  $Cn$  indicates the total time of exposure at a specified noise level, and  $Tn$  indicates the total time of exposure permitted at that level. Interpolation between tabulated values may be determined by the following formula:

$$\log T = 6.322 - 0.0602 SL$$

where  $T$  is the time in hours and  $SL$  is the sound level dBA.

- B.** When employees' exposure exceeds that listed in the above table, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce exposure to within permissible levels, personal protective equipment shall be provided and used to reduce sound levels to within the levels of the table.

**R11-1-476. Heat stress control**

- A.** Persons repeatedly exposed to hot environments will be suitably trained to recognize heat disorders and to render first-aid for heat disorders.

- B. Work requirements will be adjusted to reduce the risk of heat disorders.

**R11-1-477. Reserved**

**R11-1-499.**

## **ARTICLE 5. MAINTENANCE AND USE OF EQUIPMENT**

( COMPRESSORS, MUCKING MACHINES, BELTS & GUARDS, MOBILE EQUIPMENT)

**The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S §§ 27-304, 27-305, 27-313, 27-367, and 27-424.**

**R11-1-500 Reserved.**

**R11-1-501. Employees operating mobile equipment-unauthorized personnel**

Employees operating equipment shall not allow unauthorized personnel to operate or ride on equipment to which they have been assigned.

**R11-1-502. Mounting and dismounting mobile equipment**

All employees shall use steps, handrails and/or grab irons when mounting and dismounting mobile equipment.

**R11-1-503. Precautions before starting machinery**

Employees operating equipment shall take appropriate precautions to insure that everyone is in the clear before starting machinery or moving equipment.

**R11-1-504. Starting and stopping devices**

Starting and stopping devices on all machinery and equipment shall be clearly marked and readily accessible.

**R11-1-505. Design of guards**

Guards shall be properly designed and sufficiently strong to provide the required protection and withstand the wear of normal operation.

**R11-1-506. Speed of mobile equipment**

Mobile equipment shall be operated at a speed which will not endanger any person or property.

**R11-1-507. Mobile equipment shall be secured when without operator**

Mobile equipment shall be secured against accidental movement whenever equipment operator leaves the equipment.

**R11-1-508. Mobile equipment shall be secured while repair work is being performed**

All equipment and parts of equipment shall be blocked or otherwise secured so that it cannot be accidentally moved while repair work is being performed.

**R11-1-509. Cabs of mobile equipment-housekeeping**

Cabs of mobile shall be kept free of extraneous materials.

**R11-1-510. Compressed-air receivers**

- A.** Compressed-air receivers and other unfired pressure vessels shall be constructed, installed and maintained according to manufacturers recommendations; and
- B.** Shall be inspected at regular intervals by a competent person, and a record of such inspection shall be made available to the Inspector for examination.

**R11-1-511. Reserved**

**R11-1-512. Mobile equipment utilizing air brakes**

All mobile equipment utilizing air brakes shall have an operating air pressure gauge.

**R11-1-513. Reserved**

**R11-1-514. Compressed air receivers-safety devices**

Each compressed air receiver shall be equipped with a pressure gauge, a pop-off valve and a blow-off valve at its lowest point.

**R11-1-515. Pipe lines from air receivers**

All pipelines from air receivers shall be adequately supported.

**R11-1-516. Quick-close type air valve provided on pneumatic powered equipment**

A quick-close type air valve shall be provided on each piece of pneumatic powered loading, hauling, and dumping equipment. The valve shall be closed except when the equipment is being operated.

**R11-1-517. Air valves on mucking machines**

The air valves on the mucking machines must be kept in a closed position when the machine is not being used.

**R11-1-518. Reserved**

**R11-1-520.**

**R11-1-521. Welding operations shielded and properly ventilated**

Welding operations shall be shielded and properly ventilated.

**R11-1-522. Guarding of moving parts**

A. Moving parts such as gears, sprockets, or chain drive, head, tail and take-up pulleys, flywheels, couplings, shafts, fan inlets, and similar exposed moving machine parts which may be contacted by persons and which may cause injury to persons must be guarded.

B. Guards at conveyor-drive, conveyor-head and conveyor-tail pulleys shall extend a distance sufficient to prevent a person from reaching behind the guard and becoming caught between the belt and pulley.

**R11-1-523. Safety devices for air hoses**

All air hoses with an inside diameter of  $\frac{3}{4}$  inch or larger shall have suitable safety devices set inside or attached to those hoses such that accidental disconnection will not flail hose ends.

**R11-1-524. Men working on a piece of mobile equipment**

Men shall not work from or on a piece of mobile equipment in a raised position until it is blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

**R11-1-525. Drive belts**

Drive belts shall not be shifted while in motion unless the machines are provided with mechanical shifters.

**R11-1-526. Guiding belts, chains, ropes on moving pulleys**

Belts, chains, ropes will not be guided on power driven moving pulleys, sprockets or drums with the hands except on slow moving equipment especially designed for hand feeding.

**R11-1-527. Power off when working on machinery**

No work shall be performed on machinery until the power is off and the machinery is blocked against motion, except where machinery motion is necessary to make adjustments.

**R11-1-528. Belt dressings**

Belt dressings shall not be applied manually where belts are in motion unless an aerosol type dressing is used.

**R11-1-529. Lubricating machinery while in motion**

Machinery shall not be lubricated while in motion or when hazard exists unless equipped with standard fitting or cups.

**R11-1-530. Guarding protruding set screw keys**

Protruding set screw keys on revolving parts shall be guarded.

**R11-1-531. Unsafe equipment or machinery**

Unsafe equipment or machinery presenting an immediate danger must either be repaired immediately or be otherwise rendered not subject to further use until repaired.

**R11-1-532. Reserved**

**R11-1-533. Directing compressed air**

At no time shall compressed air be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

**R11-1-534. Overhead belts guarded**

Overhead belts shall be guarded if the whipping action from a broken line would be hazardous to persons below.

**R11-1-535. Reserved**

**R11-1-536. Welding, cutting or soldering performed by a competent person**

Welding, cutting, or soldering shall be performed by a competent person.

**R11-1-537. Reserved**

**R11-1-550.**

**R11-1-551. Safety devices on stationary grinding machines other than special bit grinders**

Stationary grinding machines other than special bit grinders shall be equipped with:

1. Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel.
2. Adjustable tool rests set as close as practical to the wheel.
3. Safety washers.

**R11-1-552. Operation of grinding wheels**

Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

**R11-1-553.**

**Reserved**

**R11-1-599.**

**ARTICLE 6. LOADING, HAULING AND DUMPING**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305, 27-345, 27-367, and 27-423.

**R11-1-600. Reserved**

**R11-1-601. Flying switches prohibited**

Flying switches are prohibited on all rail equipment.

**R11-1-602. Operator of a crane**

Only one designated employee shall direct the operator of a crane at a given time.

**R11-1-603. Roll-over protection for surface mobile equipment**

A. Self-propelled scrapers, front-end loaders, dozers, and tractors, manufactured after June 30, 1969, used in surface mining operations shall be equipped with suitable roll-over protection structures (ROPS).

B. Each ROPS shall have the following information permanently affixed to the structure:

1. Manufacturer's or fabricator's name and address; and
2. ROPS model number, if any; and

3. Make and model numbers of the equipment on which the ROPS is designed to fit.
4. For equipment already in use as of February 4, 1977, a satisfactory substitute for the above-required information will be a certificate from either the manufacturer of the ROPS or a registered professional engineer to the effect that the ROPS does meet the performance standards and is appropriate for the piece of equipment upon which it is installed.

C. Any alteration, repair, or welding of the ROPS and ROPS-to-vehicle frame mounts shall be performed only with prior approval and with instructions from the ROPS manufacturer or under the instructions of a registered professional engineer; and the manufacturer, or engineer as the case may be, shall decide what qualifications the welders involved in this operation must have.

D. Nothing in this rule shall preclude the issuance of an order because of imminent danger.

E. Fork-lift trucks, front-end loaders, and dozers shall be provided with substantial canopies when necessary to protect the operator.

#### **R11-1-604. Protection of truck cabs by substantial shields**

The top and backs of all haulage truck cabs working under shovels or under similar hazardous conditions shall be protected by substantial shields.

**R11-1-605. Haulage equipment shall be kept in gear when moving**

Haulage equipment shall be kept in gear or appropriate drive range at all times when moving and shall be put in the proper designated gear or range before starting down grade.

**R11-1-606. Dust control of roadways and banks**

Haulage roadways and banks where equipment is working shall be properly maintained and adequate provisions shall be taken to control dust.

**R11-1-607. Demounting vehicle tires**

Haulage vehicle tires shall be deflated to a safe pressure before they are demounted from the vehicle.

**R11-1-608. Inflating tires**

Adequate safety devices and/or procedures appropriate to the vehicle shall be used when inflating tires.

**R11-1-609. Lights on both ends of vehicles operating at night**

All trucks, front-end loaders, graders and dozers, that are operated at night must have lights on both ends as required for safe operations.

**R11-1-610. Lower moving parts of machinery when not in use**

Dippers, buckets, scrapper blades and similar movable parts shall be lowered to the ground when not in use.

**R11-1-611. Stop cords on unguarded conveyors with walkway**

Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.

**R11-1-612. Operators shall sound warning before starting trains**

Operators shall sound warning before starting trains, when trains approach crossings, persons, or other trains on adjacent tracks and where vision is obscured.

**R11-1-613. Cab windows**

Cab windows shall be of safety glass or equivalent in good condition and shall be kept clean.

**R11-1-614. Adequate back stops or brakes on inclined conveyor drive units**

Adequate backstops or brakes shall be installed on inclined conveyor drive units to prevent conveyors from running in reverse if a hazard to personnel would be caused.

**R11-1-615. Getting on or off equipment, notification to operator**

When an operator is present, men shall notify him before getting on or off equipment.

**R11-1-616. Switch throws**

Switch throws shall be installed so as to provide adequate clearance for switchman.

**R11-1-617. Equipment traveling between work areas**

When traveling between work areas, the equipment shall be secured in the travel position.

**R11-1-618. Persons riding mobile equipment for transportation**

Persons shall not be transported:

1. In or on buckets (except shaft buckets), clamshells, dippers, forks, beds of ore haulage trucks, beds of dump trucks.
2. On top of loaded haulage equipment.
3. Outside the cabs and beds of mobile equipment, except trains.
4. Between cars of trains.

5. In conveyances equipped with unloading devices unless means are provided to prevent accidental starting of the unloading mechanism.
6. On loads being moved by cranes or derricks, nor shall they ride the hoisting hooks unless such method eliminates a greater hazard.
7. On locomotives or trains unless unauthorized.
8. On flat cars except when the flat cars contain special equipment requiring attention; in this case the motor shall proceed very slowly.
9. On the front platform of a motor moving forward.
10. On the draw-head of a car when it is backing.
11. In rail cars or other vehicles or conveyances with tools, materials, and equipment unless means have been provided to make such transportation safe.

**R11-1-619. Electrically powered mobile equipment left unattended**

Electrically powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in neutral position, and the brakes are set or equivalent precautions are taken against rolling.

**R11-1-620. Getting on or off moving equipment**

Persons shall not get on or off moving equipment, except trainmen, may get on or off slowly moving trains.

**R11-1-621. Equipment to be hauled prevented from sliding or spillage**

Equipment which is to be hauled should be loaded and protected so as to prevent sliding or spillage.

**R11-1-622. Rail cars on side tracks**

Rail cars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

**R11-1-623. Motorman recognizing brakeman's signals**

The inability of a motorman to clearly recognize his brakeman's signals when the train is under the direction of the brakeman shall be construed by the motorman as a stop signal.

**R11-1-624. Preventing overtravel and overturning at dumping locations**

Berms, bumper blocks, and safety hooks or similar means shall be provided to prevent overtravel and overturning at dumping locations.

**R11-1-625. Location of spotters, when used**

If spotters are used, they shall be well in the clear when trucks are backing into dumping position and dumping. Lights should be used at night to direct trucks.

**R11-1-626. Public and permanent railroad crossings, posted or guarded**

Public and permanent railroad crossings shall be posted with warning signs or signals or shall be guarded when trains are passing and shall be planked or otherwise filled between the rails.

**R11-1-627. At least 30 inches continuous clearance for moving railroad equipment**

When possible, at least 30 inches continuous clearance from the widest projection of moving railroad equipment shall be provided on at least one side of the track. At all places where it is not possible to provide 30-inch clearance, it shall be marked conspicuously.

**R11-1-628. Makeshift couplings**

Makeshift couplings shall not be used.

**R11-1-629. Protection from runaway or moving railroad equipment**

Positive-acting stopblocks, derail devices, track skates, or other adequate means shall be installed wherever necessary to protect persons from runaway or moving railroad equipment.

**R11-1-630. Parked railcars securely blocked**

Parked railcars, unless held effectively by brakes, shall be blocked securely.

**R11-1-631. Effective brake shoes for railroad cars**

Railroad cars with braking systems, when in use, shall be equipped with effective brake shoes.

**R11-1-632. Warning devices posted for parked equipment**

Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

**R11-1-633. Rocks too large to be handled safely**

Rocks too large to be handled safely shall be broken before loading.

**R11-1-634. Reserved**

**R11-1-635. Reserved**

**R11-1-636. Ground conditions at dumpsite**

Where there is evidence that the ground at a dumping place may fail to support the weight of a vehicle, loads shall be dumped back from the edge of the bank.

**R11-1-637. Loading haulage equipment**

Haulage equipment shall be loaded in a manner to minimize spillage during haulage.

**R11-1-638. Posting traffic rules**

Traffic rules including speed, signals, and warning signs shall be posted.

**R11-1-639. Reserved**

**R11-1-650.**

**R11-1-651. Supplies, materials, etc., not transported with men**

Supplies, materials and tools other than small hand tools shall not be transported with men on mantrip cars. Mantrips shall be operated independently of ore and supply trips.

**R11-1-652. Warning from chute pulling operations**

Ample warning shall be given to men who may be affected by a draw or otherwise exposed to danger from chute pulling operations.

**R11-1-653. Danger from chute being pulled**

Workers shall not stand on broken rock or ore over draw points if there is danger that the chute will be pulled. Suitable platforms or safety lines shall be provided when work must be done in such areas.

**R11-1-654. Boarding and leaving moving man trips**

Where mantrips are used, discharge and boarding points shall be designated. Men shall not board or leave moving mantrip cars.

**R11-1-655. Movement of rock or material trains during shift change**

In underground mines during shift changes, the movement of rock or material trains shall be limited to areas where such trains could not present a hazard to men coming on or going off shift.

**R11-1-656. Reserved.**

**R11-1-657. Warning where overhead clearance restricted**

Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

**R11-1-658. Stockpile and muckpile faces trimmed**

Stockpile and muckpile faces shall be trimmed to prevent hazards to personnel.

**R11-1-659. Position of signalman during slushing operations**

When a signalman is used during slushing operations he shall be positioned in a safe place.

**R11-1-660. Slushers in excess of 10 horsepower**

Unless the operator is otherwise protected, slushers in excess of 10 horsepower shall be provided with backlash guards. All slushers shall be equipped with rollers, and drum covers, and anchored securely before slushing operations are started.

**R11-1-661. Walking or riding on a moving conveyor prohibited**

Walking or riding on a moving conveyor is prohibited unless it is designed for the transportation of persons. Suitable crossovers shall be provided where it is necessary to cross conveyors.

**R11-1-662. Reserved.**

**R11-1-663. Crossovers-substantial, provided with handrails, well maintained**

Crossovers, elevated walkways, elevated ramps, and stairways shall be of substantial construction, provided with handrails, and maintained in good condition. Where necessary, toeboards shall be provided.

**R11-1-664. Railed walkways where persons walk along conveyors**

Walkways with outboard railings shall be provided wherever persons are required to walk alongside elevated conveyor belts. Inclined railed walkways shall be nonskid or provided with cleats.

**R11-1-665. Cleaning pulleys of conveyors**

Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

**R11-1-666. Before starting conveyor**

When the entire length of a conveyor is visible from the starting switch, the conveyor operator shall visually check to make certain that all persons are in the clear before starting conveyor. When the entire length of a conveyor is not visible from the starting switch, a positive audible or visible warning system shall be installed and operated to warn persons that the conveyor will be started.

**R11-1-667. Reserved.**

**R11-1-699.**

## **ARTICLE 7. TRAVELWAYS AND ESCAPEWAYS**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S §§ 27-304, 27-305, 27-341, 27-342, and 27-343.

**R11-1-700. Reserved**

**R11-1-710.**

**R11-1-711. Fire and evacuation procedures**

All employees involved in the escape and evacuation plan for an underground operation shall be instructed at least once each calendar year on current escape and evacuation plans, fire alarm signals, and applicable procedures to be followed in case of fire or other emergency. New employees shall receive such instructions before going underground. Whenever an employee is assigned to work in another area of the mine he shall be instructed on the escapeway for that area at the time of such assignment.

However, employees who normally work in more than one area of the mine shall be instructed at least once each calendar year in the locations of escapeways for all areas of

the mine in which they normally work or travel. Whenever a change is made in escape and evacuation plans and procedures for any area of the mine, all affected employees shall be instructed of such changes. Records of instruction shall be kept for 2 years.

**R11-1-712. Refuge areas**

Any refuge area shall be:

1. Of fire resistant construction, preferably in untimbered areas of the mine.
2. Large enough to accommodate readily the normal number of men in the particular area of the mine.
3. Constructed so they can be made gas tight.
4. Provided with compressed air lines, water lines, suitable hand tools and stopping materials.

**R11-1-713.** In underground mines, information shall be posted and made available showing escape routes, directions of principal air flow, locations of telephones, fire doors and ventilation doors.

**R11-1-714. Telephone or other voice communications provided underground**

Telephone or other voice communications shall be provided between the surface in any underground refuge chambers and such systems shall be independent of the mine power supply.

**R11-1-715. Designated escapeways included more than 30° shall be equipped with stairways, etc.**

Designated escapeways inclined more than 30 degrees horizontal shall be equipped with stairways, ladders, cleared walkways or emergency hoisting facilities,

**R11-1-716. Underground mine evacuation drills**

Underground mine evacuation drills shall be held for each shift once every 6 months. These evacuation drills shall involve all employees on each shift and shall include:

1. Activation of fire alarm system.
2. Evacuation of all men from their work areas to the surface or designated central evacuation points at some time other than shift change. Records of such drills, showing the time and date, shall be kept for at least 2 years after each drill.

**R11-1-717. Underground escape and evacuation plan**

A specific escape and evacuation plan and revisions thereof suitable to the conditions and mining system of the mine and showing assigned responsibilities of all key personnel in the event of an emergency shall be developed by the operator and set out in written form. Within 45 calendar days after promulgation of this standard a copy of the plan and revisions thereof shall be available to the Mine Inspector, or his authorized representative. Also, copies of the plans and revisions thereof shall be posted at locations convenient to all persons on the surface and underground. Such a plan shall be updated as necessary and shall be reviewed jointly by the operator and the Inspector or his authorized representative at least once every six months from the date of the last review. The plan shall include:

1. Mine maps or diagrams showing directions of principal air flow, location of escape routes and locations of existing telephones, primary fans, primary fan controls, fire doors, ventilation doors, and refuge chambers. Appropriate portions of such maps or diagrams shall be posted at all shaft stations and in underground shops, lunchrooms, and elsewhere in working areas where men congregate.
2. Procedures to show how the miners will be notified of emergency.
3. An escape plan for each working area in the mine to include instructions showing how each working area should be evacuated. Each such plan shall be posted at appropriate shaft stations and elsewhere in working areas where men congregate.
4. A fire fighting plan.
5. Surface procedure to follow in an emergency, including the notification of proper authorities, preparing rescue equipment, and other equipment which may be used in rescue and recovery operations.
6. A statement of the availability of emergency communication and transportation facilities, emergency power and ventilation and location of rescue personnel and equipment.
7. Evacuation routes shall be posted with conspicuous signs.

**R11-1-718. Self-rescue devices made available**

A suitable and properly maintained 1-hour minimum capacity self-rescue device shall be made available by the operator to all personnel underground.

**R11-1-719. Self-rescue devices to be worn underground**

- A. Except as provided in Subsection B and C of this section, self-rescue devices meeting the requirements of standard R11-1-718 shall be worn or carried by all persons underground.
- B. Where the wearing or carrying of self-rescue devices meeting the requirements of standard R11-1-718 is hazardous to a person, such self-rescue devices shall be located at a distance no greater than 25 feet from such person.
- C. Where a person works on or around mobile equipment, self-rescue devices may be placed in a readily accessible location on such equipment.

**R11-1-720. Emergency training**

- A. All persons who are required to perform services underground shall be instructed on an annual basis in the Mine Safety and Health Administrative approved course in Mine Emergency Training. The instruction to be given by persons who are certified by the Mine Safety and Health Administration Division of Education and Training Operations, to give such instruction.
- B. Records of all instruction shall be available for review by the inspector.

**R11-1-721. Nonslip safety shoes for portable ladders**

Portable ladders other than stepladders shall be equipped with nonslip safety shoes. Whenever practical, ladders should be secured against tipping or falling.

**R11-1-722. Scaffolding, staging or temporary work platforms**

All scaffolding, staging or temporary work platforms shall be adequate in strength and design and shall be secured against tipping or falling.

**R11-1-723. Adequate ladders provided**

Adequate ladders and ladderways shall be provided wherever necessary. All fixed ladders shall be securely fastened and shall provide at least 3 inches of toe clearance. Ladders shall extend at least 3 feet above the top landings or substantial handholds shall be provided above the landings.

**R11-1-724. Tops of manways and open holes covered**

Tops of manways and open holes shall be adequately covered or guarded.

**R11-1-725. Regularly used walkways and travelways**

Regularly used walkways and travelways should be sanded, salted or cleared of snow and ice as soon as practical.

**R11-1-726. Trap doors or adequate guarding for ladderways**

Trap doors or adequate guarding shall be provided in ladderways at each level. Doors shall be kept operable.

**R11-1-727. Adequate protection for surface ladders**

Fixed ladders 70 degrees to 90 degrees from the horizontal and 30 feet or more in length shall have backguards, cages or equivalent protection, starting at a point not more than seven (7) feet from the bottom of the ladders.

**R11-1-728. Reserved.**

**R11-1-799.**

## **ARTICLE 8. ELECTRICITY**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305 and 27-314.

### **R11-1-800. Reserved**

### **R11-1-801. New electrical equipment**

New electrical equipment shall be installed, maintained and used in accordance with the National Electrical Code.

### **R11-1-802. Electrical equipment maintenance**

All electrical equipment shall be maintained so as to reduce the accident hazard so far as is reasonably possible.

### **R11-1-803. Performing electrical work**

Electrical work shall be performed or supervised by qualified persons.

### **R11-1-804. Removal of “lock on switch” from electric drills or other electrically operated hand rotating tools**

Electric drills or other electrically operated hand rotating tools shall have the electric switch constructed so as to break the circuit when the hand releases the switch, or shall be equipped with friction or safety devices, and shall be properly grounded.

**R11-1-805. Reserved**

**R11-1-806. “Tag out” necessary prior to work on lines or equipment**

Switches which are open to permit work on lines or equipment must be tagged with warning signs and no persons, other than the person placing these signs or his supervisor may remove them. These warning signs must be signed and dated (including the time of day) by the person placing them.

**R11-1-807. Electrical equipment properly grounded**

- A.** All electrical equipment, motors, switch boxes, controllers, cable castings, both underground and surface, must be properly grounded.
- B.** Equipment operating off portable A.C. power supply shall be frame grounded back to the generator.

**R11-1-808. Switches and electric controls on electrical equipment**

Electrical equipment and circuits shall be provided with switches or other controls. Said switches or controls shall be of approved design and construction and shall be properly installed.

**R11-1-809. Trailing cables of mobile equipment**

Individual overload protection or short circuit detection shall be provided for the trailing cables of mobile equipment.

**R11-1-810. Trailing cables and power cable connections**

Trailing cable and power cable connections to junction boxes shall not be made or broken under load.

**R11-1-811. Installation of high potential transmission cables**

High potential transmission cables shall be covered, insulated, or placed according to acceptable electrical codes to prevent contact with low potential circuits.

**R11-1-812. Moving shovel trailing cables**

Shovel trailing cables shall not be moved with the shovel dipper unless cable slings or sleds are used.

**R11-1-813. Reserved**

**R11-1-814. Transformer enclosures kept locked**

Transformer enclosures shall be kept locked against unauthorized entry.

**R11-1-815. Principal power switches shall be labeled**

Principal power switches shall be labeled to show which units they control unless identification can be made readily by location.

**R11-1-816. Provisions for shock hazards at switchboards and power control switches**

Dry wooden platforms, insulating mat or other electrical nonconductive material shall be kept in place at all switchboards and power control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded metal, concurrent carrying parts of the power switches to be operated may be used.

**R11-1-817. Posting danger signs**

Suitable danger signs shall be posted at all major electrical installations.

**R11-1-818. Grounding metal buildings, metal fencing and switch gear**

Metal fencing and metal buildings enclosing transformers and switch gear shall be grounded.

**R11-1-819. Circuits de-energized**

Circuits shall be de-energized before fuses are removed or replaced. Fuse tongs or hot-line tools shall be used when fuses are removed or replaced in high potential circuits.

**R11-1-820. Switches and starting boxes**

Switches and starting boxes shall be of safe design and capacity

**R11-1-821. Precautions taken for moving equipment under energized power lines**

When equipment must be moved under energized power lines and the clearance is less than 10 feet, the power lines shall be de-energized or other precautions shall be taken.

**R11-1-822. Power circuits de-energized, switches “locked out”**

Power circuits shall be de-energized before work is done on such circuits unless hot-line equipment is used. Switches shall be locked out or other measures taken which shall prevent the power circuits from being energized without the knowledge of the individuals working on them. Such locks, signs, or preventive

devices shall be removed only by the person who installed them or by authorized personnel.

**R11-1-823. Hand-held electric tools**

Hand-held electric tools shall not be operated at high potential voltages.

**R11-1-824. Guy wires of poles**

Guy wires of poles supporting high-voltage transmission lines shall meet the requirements for grounding or insulator protection of the National Electrical Safety Code.

**R11-1-825. Telegraph, telephone or signal wires installed**

Telegraph, telephone, or signal wires shall not be installed on the same crossarm with power conductors. When carried on poles supporting powerlines, they shall be installed as specified by the National Electrical Safety Code.

**R11-1-826. Electrical connections and resistor grids guarded**

Electrical connections and resistor grids that are difficult or impractical to insulate shall be guarded unless protection is provided by location.

**R11-1-827. Continuity and resistance of grounding systems tested**

Continuity and resistance of grounding systems shall be tested by a competent person after installation, repair and modification; and annually

thereafter, and records of the resistance measured during the most recent tests shall be made available for examination by the Inspector.

**R11-1-828. Inspection and cover plates**

Inspection and cover plates on electrical equipment and junction boxes shall be kept in place at all times except during testing and repairs.

**R11-1-829. Reserved**

**R11-1-830. Reserved**

**R11-1-831. Protection against short circuits and lightning**

Power lines, including trolley wires and telephone circuits shall be protected against short circuits and lightning.

**R11-1-832. Guarding and de-energizing lines from metallic tools or equipment**

Where metallic tools or equipment can come in contact with trolley wires or bare power lines, the lines shall be guarded or de-energized.

**R11-1-833. Separating and insulating power lines from water lines, etc.**

Power lines shall be well separated or insulated from water lines, telephone lines, and air lines.

**R11-1-834. Transformers-enclosed, 8 ft. above ground, or otherwise protected**

Transformers shall be totally enclosed or shall be placed at least 8 feet above the ground, or installed in a transformer house, or surrounded by a substantial fence at least 6 feet high and at least 3 feet from any energized parts, casings, or wiring.

**R11-1-835. Handling energized shovel or drill power cable**

No employee shall take hold of energized shovel or energized drill power cable without suitable equipment designed for such a job.

**R11-1-836. Reserved**

**R11-1-899.**

**ARTICLE 9. PERSONAL PROTECTION**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305, and 27-312.

**R11-1-900. Reserved**

**R11-1-901. Suitable protection against falling**

Suitable protection against falling shall be provided for any work required above ground or floor level.

**R11-1-902. Safety belts and lines shall be worn**

Safety belts and lines shall be worn when men work where there is danger of falling. A second person shall tend the lifeline when bins, tanks or other dangerous areas are entered. Life jackets or belts shall be worn where there is danger from falling into water.

**R11-1-903. Reserved**

**R11-1-999.**

## **ARTICLE 10. MATERIALS STORAGE AND HANDLING**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, and 27-305.

**R11-1-1000. Reserved**

**R11-1-1001. Storage of materials that can create hazards**

Materials that can create hazards if accidentally liberated from their container shall be stored in a manner that minimizes the dangers.

**R11-1-1002. Storage of hazardous materials, labeling of containers.**

Hazardous materials shall be stored in containers of the type approved for such use by recognized agencies. Such containers shall be labeled appropriately.

**R11-1-1003. Securing compressed and liquid gas cylinders**

Compressed and liquid gas cylinders shall be secured in a safe manner.

**R11-1-1004. Valves on compressed gas cylinders**

Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

**R11-1-1005. Suspended loads**

Men shall stay clear of suspended loads.

**R11-1-1006. Operator-carrying overhead cranes**

Operator-carrying overhead cranes shall be provided with:

1. Bumpers at the end of each rail.

2. Automatic switches to halt uptravel of the blocks before they strike the hoist.
3. Effective audible warning signals within easy reach of the operator.
4. A means to lock out the disconnect switch.

**R11-1-1007. Reserved**

**R11-1-1099.**

## **ARTICLE 11. HOISTS AND SHAFTS**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305, 27-348, 27-351, 27-352, 27-353, 27-354, 27-356, 27-357, and 27-359.

**R11-1-1100. Reserved**

**R11-1-1101. Construction of headframes and material used**

The construction of any headframes and the material used therein shall be sufficiently strong and durable to assure its withstanding any working stress put upon it.

**R11-1-1102. Design of headframes**

All headframes shall be so designed that they will withstand a greater load than the calculated breaking strength of all hoisting attachments.

**R11-1-1103. Headframes constructed of flammable material**

Any headframes which are constructed of flammable material must be provided with adequate fire protection.

**R11-1-1104. The sheave wheel platform and stairway**

The ladder or stairway leading to the sheave wheel platform shall have a handrail or other guarding as needed and the platform at the sheave wheel shall be protected with guard rails and toe boards.

**R11-1-1105. Reserved**

**R11-1-1106. Maintenance of information contained in rope record book for friction hoists**

- A. The manager shall keep, or cause to be kept at the mine, a book called the rope record book in which shall be recorded the following information on friction hoist ropes:
1. A history of the rope, giving the date on which the rope was first put on.
  2. Dates of shortening.

3. Dates and results of inspection and tests.
  4. Date and reason for taking out of service for each occasion the rope is put into and taken out of service.
- B. When a rope is put into service, the following information shall be entered into the rope record book:
1. Name of person from whom purchased.
  2. Date of purchase.
  3. Date put on in present location.
  4. Identification number of rope.
  5. Name of shaft or winze and compartment in which rope is used.
  6. Weight of shaft conveyance.
  7. Weight of material carried, or weight or tension applied to guide or rubbing rope.
  8. Maximum length of rope in service below sheave, or total length of guide or rubbing rope.
  9. Maximum length of rope in service below sheave, or total weight of guide or rubbing rope.
  10. Static factors of safety at conveyance suspension and on head sheave with rope fully let out, or at guide or rubbing rope suspension.
  11. Date put in and removed from previous location, if any.

A copy of such entries shall be made available to the Mine Inspector at the hoisthouse.

C. No hoisting rope, tail rope, guide rope, or rubbing rope shall be used that is not accompanied by a certificate from the manufacturer giving the following information which shall be entered in the rope record book:

1. Name and address of manufacturer.
2. Manufacturer's rope number.
3. Date of manufacture.
4. Diameter of rope in inches.
5. Weight per foot in pounds.
6. Rope construction.
7. Class of core.
8. Trade name of interior rope lubricant.
9. Number of wires in strands.
10. Grade of steel.
11. Diameter of wires in decimals of an inch.
12. Breaking stress of steel of which the wire is made in pounds per square inch.
13. Standard torsion test of wires.
14. Actual breaking load of rope, as provided by certificate by a recognized testing laboratory.
15. Length of rope.

**R11-1-1107. Safety factors for friction hoist ropes, tail ropes, and guide and rubbing ropes.**

- A. Hoisting rope installed on a friction hoist shall have a factor of safety of not less than that determined from the following formula:  
$$F. \text{ of } S. = 8.0 - .0005d$$
where “d” is the maximum length of rope suspended below the head sheave in feet.
- B. For friction hoists, the factor of safety in the hoisting ropes shall be not less than 5.5 for any depth of shaft when the ropes are installed.
- C. The factor of safety of tail ropes shall be not less than 7 when installed.
- D. The factor of safety of guide and rubbing ropes shall be not less than 5 when installed.

**R11-1-1108. Use of hoisting rope, tail rope, guide or rubbing rope on friction hoist**

- A. No hoisting rope on a friction hoist shall be used in a shaft or winze of a mine where, in any part of the rope:
  - 1. The existing strength has decreased to less than 90 percent of the original strength of the rope.
  - 2. The extension of a test piece has decreased to less than 60 percent of its original extension when tested to destruction.

3. The number of broken wires in any section of the rope equaling the length of one lay of the rope, exceeds six.
4. Marked corrosion occurs.
5. The rate of stretch in a friction hoisting rope begins to show a rapid increase over the normal stretch noted during its service.

B. No tail rope, guide or rubbing rope shall be used in shaft where, in any part of the rope:

1. The existing strength has decreased to less than 75 percent of the original strength of the rope.
2. The extension of a test piece has decreased to less than 60 percent of its original extension when tested to destruction.
3. The number of broken wires in any section of the rope equaling the length of one lay exceeds six.
4. Marked corrosion occurs.

**R11-1-1109. Drum diameter of friction hoist**

The drum diameter of every friction hoist shall not be less than 80 times the diameter of the rope in use.

**R11-1-1110. Design of friction hoist drives, controls, and brakes**

Friction hoist drives, controls, and brakes, shall be so designed and maintained that slippage of the rope on the drum will not occur under normal operating conditions.

**R11-1-1111. Inspection of friction hoist rope treads.**

Friction rope treads shall be inspected regularly and maintained in good condition.

**R11-1-1112. Installation of tapered guides or other approved installations on friction hoists**

Friction hoist installations shall be equipped with tapered guides or other approved devices which shall be installed above and below the limits or regular travel of the conveyance and arranged so as to brake and stop an overwind or overtravel occurring in the event of failure of the device.

**R11-1-1113. Emergency stopping device for friction hoists**

A device shall be provided which will initiate emergency stopping to bring the drum to rest in the event of occurrence of slip between the hoisting rope or ropes and the hoist drum, such as might occur with a conveyance or counterweight jammed in the shaft or caught at the end of the travel.

**R11-1-1114. Emergency stopping device provided for friction hoists when tail rope is used.**

A device shall be provided which will initiate emergency stopping action in the event of abnormal movement of the tail rope loop when a tail rope is used.

**R11-1-1115. Means provided to adjust depth indicator on friction hoist**

Means shall be provided on a friction hoist to adjust the depth indicator and protective device on the hoist to the position of the conveyance in the shaft.

**R11-1-1116. Level of water and spillage in shaft sump when friction hoist used**

Water and spillage in a shaft sump in mine shall be kept at such a level at all times that:

1. Tail Ropes have clear passage.
2. Guide and rubbing rope connections and tension devices are clear.

**R11-1-1117. Positions of hoisting ropes within clamps, for friction hoists, examined**

On friction hoist installations, after every six months of service, the positions of the hoisting rope within the clamps shall be changed, if practicable, or that portion of the rope within the clamps shall be thoroughly cleaned and examined.

**R11-1-1118. Manufacturer shall provide certificate giving maximum rated unbalanced load and maximum rated suspended load for friction hoist**

Every friction hoist shall be accompanied by a certificate from the manufacturer, or an independent person approved by the Mine Inspector, giving the maximum rated unbalanced load and the maximum rated suspended load of the hoist, and the hoist shall not be loaded beyond the maximum loads so specified.

**R11-1-1119. Alterations of friction hoist capacity prohibited**

No alterations designed to increase the hoisting capacity shall be made to a friction hoist unless approval is given by its manufacturers or an independent person approved by the Mine Inspector.

**R11-1-1120. Determination of maximum material load allowed on conveyance of friction hoist.**

The maximum material allowed on the conveyance of a friction hoist shall be determined from the lesser of the following calculations:

1. Maximum allowable suspended load on the hoist, less the weight of the hoisting ropes, less the weight of tail ropes, less the weight of the conveyances and attachments.
2. The breaking strength of the rope, divided by the required factor of safety, minus the maximum weight of rope suspended in one compartment, minus the weight of the conveyance and attachments

in that compartment; and where multiple ropes are used, the lowest breaking strength at any rope shall be used for all ropes in load calculations.

3. The unbalanced load on the hoist as rated by the manufacturer, which shall not be exceeded.
4. The maximum allowable load on any conveyance, which shall not be greater than that for which the conveyance was rated by the manufacturer.

**R11-1-1121. Inspection of shafts used for hoisting or lowering men**

All compartments of shafts used for hoisting or lowering men shall be inspected at least once every two weeks and a record of such inspection shall be kept.

**R11-1-1122. Protection from falling ground**

In shaft sinking, adequate protection from falling ground must be provided. The timber, steel, roof bolts, concrete or any device used for restraining ground must be kept a reasonable distance from the bottom of the shaft.

**R11-1-1123. Reserved**

**R11-1-1124. Platform suspended by wire ropes in shaft sinking**

In shaft sinking where a platform is suspended by wire ropes, such ropes shall have an approved rate for the suspended load.

**R11-1-1125. Rope guides**

Where rope guides are used in shafts they shall be locked coil construction.

**R11-1-1126. Substantial platforms required for shaft inspection and repair work**

Shaft inspection and repair work in vertical shafts shall be performed from substantial platforms equipped with bonnets or equivalent over-head protection.

**R11-1-1127. Use of crane in shaft sinking operations**

In shaft sinking operations where a crane is used the allowable depth shall be 125 feet from shaft collar.

**R11-1-1128. Reserved**

**R11-1-1130.**

**R11-1-1131. Mine hoist drives**

All mine hoists shall consist of one of the following drives:

1. V-Belt driven and not less than four V-belts with a designed safety factor of 10.
2. Gear driven. Fiber gears shall not be used.
3. Friction driven.
4. Direct drive.

There shall be no chain-driven hoists used for underground operations. All hoists other than automatic hoists must have hand-operated brakes and the brakes must be on the drum.

**R11-1-1132. Rated capacities of hoists**

Hoists shall have rated capacities consistent with the loads handled and the recommended safety factor of the ropes used.

**R11-1-1133. Automatic hoists**

Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

**R11-1-1134. Flanges on drums**

Flanges on drums should extend radially a minimum of 3 rope diameters beyond the last wrap.

**R11-1-1135. Maximum fleet angle**

The maximum fleet angle shall not exceed one and one-half degrees for smooth drums and two degrees for grooved drums.

**R11-1-1136. Brakes on man hoists**

Any hoist used to hoist men shall be equipped with a brake or brakes fully capable of holding a fully-loaded cage, skip or bucket at any point in the shaft.

**R11-1-1137. Lock mechanism on hoists to prevent accidental clutch withdrawal**

The operating mechanism of the clutch of every man hoist's drum shall be provided with a lock mechanism, or be interlocked electrically or mechanically with the brake to prevent accidental withdrawal of the clutch.

**R11-1-1138. Devices for man hoists to prevent overtravel**

Man hoists shall be provided with devices to prevent overtravel and overspeed and shall be anchored securely.

**R11-1-1139. Indicator of cage, skip bucket or cars**

An accurate and reliable indicator of the position of the cage, skip bucket or cars in the shaft shall be provided.

**R11-1-1140. Placement of hoist controls.**

Hoist controls shall be placed or housed so that the noise from machinery or other sources will not prevent hoistmen from hearing signals.

**R11-1-1141. Physical examination for hoisting engineers and trainees**

The hoisting engineers and hoistmen trainees, at the beginning of employment, and annually thereafter, shall be given a physical examination by a competent physician, to determine their physical ability to safely operate such hoists. A certificate or letter, attesting to the currency of such examinations shall be posted in the hoist house for examination by the State Mine Inspector.

**R11-1-1142. Hoisting engineer's duties while hoist in motion**

Only authorized persons shall be in hoist rooms. The hoisting engineer shall hold no conversation with anyone while the hoist is in motion or while attending to signals.

**R11-1-1143. Due caution while hoist in motion**

The hoisting engineer shall familiarize himself with all signals and use due caution at all times especially when men are being hoisted or lowered.

**R11-1-1144. Hoisting engineer report all defects.**

The hoisting engineer shall report all defects in the shaft, hoist or bell cord to his supervisor as soon as possible.

**R11-1-1145. Hoisting engineer must understand signal**

The hoisting engineer shall not move the cage, skip or bucket until a signal is received and he completely understands the signal.

**R11-1-1146. If hoist down for eight hours**

If for any reason the hoist has been down for eight (8) hours or more, the engineer shall run his cage through the shaft before hoisting or lowering men.

**R11-1-1147. Hoisting engineer qualifications**

The hoisting engineer must be able to read, write and speak the English language.

**R11-1-1148. Experienced hoistmen shall operate hoist**

Only experienced hoistmen shall operate the hoist except in cases of emergency and in the training of new hoistmen.

**R11-1-1149. Hoisting engineer shall familiarize himself with all signals**

The hoisting engineer shall familiarize himself with all signals and use due caution at all times, especially when men are being hoisted or lowered.

**R11-1-1150. Notification to hoisting engineer when men are working in compartment**

Hoistmen shall be informed when men are working in a compartment affected by the hoisting operation and a “Men Working in Shaft” sign shall be posted at the hoist, at the shaft collar and at all devices controlling hoisting operations that may endanger such men.

**R11-1-1151. Reserved**

**R11-1-1152. Hoist ropes inspected**

Hoist ropes must be inspected regularly and a record of these inspections kept.

**R11-1-1153. Discarding of wire cable or rope used for hoisting**

All wire cable or rope which is used for hoisting or lowering employees or other persons shall be discarded for such use when:

1. There are six (6) broken wires in pitch length of cable or rope.
2. The wires on the crown are worn 65% or more of their original diameter.
3. More than three (3) wires which have been reduced by wear more than 30% in cross section are broken in one strand of the cable or rope lay.

4. Marked corrosion appears.
5. The minimum safety factor falls below approved specifications.

**R11-1-1154. Splicing wire cable or hoisting rope**

It is strictly forbidden to splice any wire cable or rope which is used in hoisting or lowering employees.

**R11-1-1155. Static-load safety factors for selecting ropes for hoisting men**

The following static-load safety factors shall be used for selecting ropes to be used for hoisting men and for determining when such ropes shall be removed from man hoists:

Length of rope in shaft (feet)	Minimum factor of safety (new rope)	Minimum factor of safety (remove)
500 or less	8	6.4
501 – 1,000	7	5.8
1,001 - 2,000	6	5.0
2,001 – 3,000	5	4.3
3,001 – or more	4	3.6

**R11-1-1156. Attaching the rope to the load**

The rope shall be attached to the load by the thimble-and-clip method, the socketing method, or other approved method. If the socketing method is employed, zinc or its equivalent shall be used. The use of Babbit metal or lead for

socketing wire ropes is prohibited. If the thimble-and-clip method is used, the following shall be observed;

1. The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load bending the end back so that it is parallel to the long or “live” end of the rope and fastening the two parts of the rope together with clips.
2. The U-bolt of each clip shall encircle the short or “dead” end of the rope and the distance between clips shall not be less than the figures given in the accompanying table.
3. As a minimum the following number of clips or equivalent shall be used for various diameters of six-strand 19-wire plow steel ropes (follow manufacturer’s recommendations for other kinds of wire rope and clips):

Diameter of rope, inches	Number of clips	Center-to center spacing of clips, inches
$\frac{3}{4}$	4	$4\frac{1}{2}$
$\frac{7}{8}$	4	$5\frac{1}{4}$
1	4	6
$1\frac{1}{8}$	5	$6\frac{3}{4}$
$1\frac{1}{4}$	5	$7\frac{1}{2}$
$1\frac{3}{8}$	6	$8\frac{1}{4}$
$1\frac{1}{2}$	6	9

1 <sup>5</sup> / <sub>8</sub>	6	9 <sup>3</sup> / <sub>4</sub>
1 <sup>3</sup> / <sub>4</sub>	7	10 <sup>1</sup> / <sub>2</sub>
1 <sup>7</sup> / <sub>8</sub>	8	11 <sup>1</sup> / <sub>4</sub>
2	8	12
2 <sup>1</sup> / <sub>8</sub>	8	13
2 <sup>1</sup> / <sub>4</sub>	8	14

4. For all ropes less than three-quarter inch in diameter, at least four clips or equivalent shall be used.
5. When special conditions require the attachment of a sling to the hoisting cable to handle equipment in the shaft, the sling shall be attached by clips or equivalent in accordance with the table in Paragraph 3 of this standard.

**R11-1-1157. Inspection of materials**

Hoist and rigging materials, cables, slings and hooks shall be inspected for defects as often as is necessary to insure adequate safety for the operation and personnel involved.

**R11-1-1158. Use of emergency chains**

Emergency chains shall be used from the cable to the cage in case of a breakage in the king bolt or clevis pin; and also between the upper and lower decks in case of a breakage of the connecting pins for these decks.

**R11-1-1159. Signal by the cager**

The cager shall, when men are being hoisted and lowered, see that the gates are closed before giving the signal to move the cage, and shall be responsible for their closing.

**R11-1-1160. Cagers shall report all defects**

The cagers shall keep a careful watch over the cage during their shift's work and immediately report all defects for repair.

**R11-1-1161. Getting on cages**

Employees shall not crowd or rush while getting on cages.

**R11-1-1162. After signal given to move cage**

No person shall attempt to enter or leave the cage after signal to move the cage has been given.

**R11-1-1163. Signal to move cage**

To release the cage the signal shall be given while standing upon the station and not upon the cage.

**R11-1-1164. Use of metal bonnet**

Man cages and skips used for hoisting or lowering employees or other persons in any vertical shaft or any inclined shaft with an angle or inclination of 45° from the horizontal shall be covered with a metal bonnet.

**R11-1-1165. Providing means for blocking cars when hoisted**

Where mine cars are hoisted by cage or skip, means for blocking cars shall be provided at all landings and also on the cage.

**R11-1-1166. Reporting materials or tools dropped in shaft**

If an employee drops any materials or tool down the shaft he shall immediately report the same to the hoisting engineer, who will have the shaft inspected before continuing regular work.

**R11-1-1167. Hoisting materials or tools**

When hoisting or lowering tools, timber or other material in the shaft, the ends, if projecting above the top of the cage or the bucket, shall be securely lashed to the cable or to the upper part of the cage; and tools, timbers or other materials loaded erectly upon a cage shall be securely lashed before being hoisted or lowered.

**R11-1-1168. Testing of safety devices**

- A. The safety dogs on any conveyance used to lower or hoist men must be tested at least once every 24 hours during regular operations. If the mine is shut down for more than eight (8) hours, the safety dogs must be tested before lowering men. A record of such inspection shall be kept and signed by the person making the test.
- B. Hoistmen shall examine their hoists and shall test overtravel, position indicators, and braking mechanisms at the beginning of each shift. A record of such inspection shall be kept in the hoisthouse and must be signed by the person making the test.

**R11-1-1169. Smoking on conveyance used to lower or hoist men, ore or equipment**

No person shall smoke on any conveyance used to lower or hoist men, ore or equipment.

**R11-1-1170. No open hooks used to hoist**

No open hooks shall be used to hoist equipment or materials in any shaft.

**R11-1-1171. Use of buckets to hoist men**

Buckets shall not be used to hoist men except during the shaft sinking operations, inspection, maintenance and repair.

**R11-1-1172. Buckets to hoist men during shaft sinking**

Buckets used to hoist men during vertical shaft sinking operations shall have:

1. Crossheads equipped with safety devices and protective bonnets when the shaft depth exceeds 50 feet.
2. Devices to prevent accidental dumping.
3. Sufficient depth to transport men safely in a standing position.

**R11-1-1173. Lowering of conveyances**

Conveyances shall not be lowered by the brakes alone except in emergencies.

**R11-1-1174. Hoisting materials and men in same shaft**

Rocks or supplies shall not be hoisted in the same shaft as men during shift changes unless the compartments and dumping bins are partitioned to prevent spillage into the cage compartments.

**R11-1-1175. Lowering and hoisting buckets**

- A. Buckets shall be stopped about 15 feet from the bottom to await a signal from one of the crew on the bottom for further lowering.

After the bucket is loaded, it shall be raised about 3 feet from the bottom of the shaft and stabilized before the second signal is given.

- B. After hoisting signal is given, hoisting to the crosshead shall be at a slow or minimum speed. The signaling device shall be attended constantly until a bucket reaches the guides. When persons are hoisted, the signaling devices shall be attended until the crosshead has been reached

**R11-1-1176. Approved methods of signaling**

There shall be at least two effective approved methods of signaling between each of the shaft stations and hoist room, one of which shall be a telephone or speaking tube.

**R11-1-1177. Gates for shaft landings**

Shaft landing shall be equipped with substantial safety gates, so constructed that materials will not go through or under them. Gates shall be closed except when loading or unloading shaft conveyances.

**R11-1-1178. Stop blocks**

Positive stop blocks or a derail switch shall be installed on all tracks leading to a shaft collar or landing.

**R11-1-1179. Getting on or off moving cage**

No employee shall get on or off a moving cage, bucket or crosshead, nor shall he open cage doors while the cage is moving.

**R11-1-1180. Method provided to signal hoist operator from cage**

A method shall be provided to signal the hoist operator from cages or other conveyances at any point in the shaft.

**R11-1-1181. Reserved**

**R11-1-1182. Diesel or fuel-injection engine used to power hoist**

Where any diesel or similar fuel-injection engine is used to power a hoist, the engine shall be equipped with a damper or other cutoff in its air intake system. The control handle shall be clearly labeled to indicate that its intended function is for emergency stopping only.

**R11-1-1183. Reserved**

**R11-1-1184. Cable secured to hoist drum**

The end of the rope at the drum shall make at least one full turn on the drum shaft, or a spoke of the drum in the case of a free drum, and shall be fastened securely by means of rope clips or clamps. There shall be three full turns

of cable or rope on the hoisting drum when the cable or rope is extended to its maximum working length. This rule does not apply to friction hoists.

**R11-1-1185. Location of hoisting signal devices during shaft sinking**

Hoisting signal devices shall be positioned within easy reach of persons on the shaft bottom or constantly attended by a person stationed on the lower deck of the sinking platform.

**R11-1-1186. Construction of loading pockets**

Dumping facilities and loading pockets shall be constructed so as to minimize spillage into the shaft.

**R11-1-1187. Reserved**

**R11-1-1189.**

**R11-1-1190. Elevator inspection**

- A. Every elevator located at mining operations shall be installed and maintained under the provisions of the “American National Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks”.

- B. Every elevator shall have an identification number for record keeping purposes. Such number shall be on a tag so located as to be available for inspection.
- C. Every elevator shall be inspected at time of installation and then at least once each year.
- D. A Certificate of Inspection shall be issued at such time elevator has been inspected and approved and shall be posted in a place determined by the Inspector.
- E. The Inspector shall be notified prior to any installation, relocation or alteration of any elevator under his jurisdiction.

**R11-1-1191. Reserved**

**R11-1-1199.**

## **ARTICLE 12. UNDERGROUND OPERATIONS**

The rules in this Article are adopted in accordance with the provision of Article VII, Chapter 3, title 27, Arizona Revised Statutes, and A.R. S. §§ 27-304, 37-305, 27-344, 27-345, 27-349, 27-350 and 27-366.

**R11-1-1200. Reserved**

**R11-1-1201. Grizzlies kept in good repair**

Grizzlies shall be kept in good repair.

**R11-1-1202. Upon entering work area check for hazards**

Upon entering working place employees shall check carefully for hazards such as loose ground and loose timber, bootlegs and missed holes, shall check muck piles for unexploded powder and caps and shall wet down the working area if the ground conditions permit.

**R11-1-1203. Transformer stations to be enclosed**

Transformer stations shall be enclosed to prevent persons from unintentionally or inadvertently contacting energized parts.

**R11-1-1204. Use of grizzlies**

Grizzlies shall be used, or adequate guards provided, where muck is dumped or slushed into a raise.

**R11-1-1205. Carrying material on shoulder**

No employee shall carry any material on his shoulder while walking under trolley wires.

**R11-1-1206. Ventilation procedures in case of mine fire**

In the event of a mine fire, no employee shall attempt any change in ventilation procedures unless so authorized.

**R11-1-1207. Roof bolting in unstable ground**

Employees engaged in roof bolting in unstable ground shall use stulls and headboards to protect themselves until such time as the bolts are installed and properly tightened.

**R11-1-1208. Winze or raise in direct line with haulage drift**

No winze or raise shall be in a direct line with a haulage drift unless such a location is essential to the usage to which the winze or raise is to be put. In such exceptions, guards and protective covering must be provided so that hazards of personnel are no greater than would exist if the winze or raise was not in a direct line with haulage drift.

**R11-1-1209. Access to unattended underground mine openings**

Access to unattended underground mine openings shall be restricted by gates or doors and the openings shall be fenced and posted

**R11-1-1210. Loading and drilling at same time**

Loading and drilling at the same time in the same working place is prohibited.

**R11-1-1211. Chute tapping**

A bar used in chute tapping must be blunt on one end.

**R11-1-1212. Reserved**

**R11-1-1213. Taking “short cuts”**

All workmen shall be forbidden to take “short cuts” across or through dangerous places, and shall travel the regular passageway provided for such purpose.

**R11-1-1214. Throwing tools or material down a manway**

No workmen shall throw tools or material down a manway or raises unless there is a person at the bottom instructed to warn other employees.

**R11-1-1215. Scaling or barring-down**

Where manual scaling may be required at a work place, a scaling bar of sufficient length to place the user out of danger of falling material shall be provided. The scaling bar shall be blunt on the end held by the user. Picks or other short tools shall not be used for scaling when their use places the user in danger of falling material.

**R11-1-1216. Removing bits from drill steel**

Only a tool constructed for this purpose shall be used to remove bits from drill steel.

**R11-1-1217. Dangerous places fenced**

All dangerous places shall be properly fenced off and proper danger signals shall be so hung on such fencings that they may be plainly seen.

**R11-1-1218. Collars of open draw holes kept free**

Collars of open draw holes shall be kept free of muck and material.

**R11-1-1219. Removing men to safe places before blasting**

In areas where dangerous accumulations of water, gas, mud, or fire atmosphere could be encountered, men shall be removed to safe places before blasting.

**R11-1-1220. Reserved**

**R11-1-1221. Reserved**

**R11-1-1222. Headlight, reflector or tail light on trains**

The headlight on the front end of the motor shall be kept lighted at all times when the motor is in use. A reflector or tail light must be on the last car of the train.

**R11-1-1223. Workmen shall never walk alongside any moving train**

Workmen shall never walk alongside any train or motor while same is in motion; workmen stationing themselves alongside a drift when a train is passing, should do so in such a manner that they are protected in case of derailments.

**R11-1-1224. Train speed when passing men in drifts**

Train speed shall be reduced when train is passing men in drifts.

**R11-1-1225. Reserved**

**R11-1-1226. Impaired overhead clearance**

Where impaired overhead clearance exists, no person may ride or be placed on top of a motor.

**R11-1-1227. Train shall be pulled**

Train shall be pulled when practical rather than pushed.

**R11-1-1228. Plugging of the trolley locomotives or battery motors**

Plugging of the trolley locomotives or battery motors not designed for this method of operation shall be permissible IN CASE OF EMERGENCY ONLY.

**R11-1-1229. While car is in motion**

No one shall sit or stand on the car edge while it is in motion.

**R11-1-1230. No one shall climb over cars while moving**

No one shall climb over cars without first making sure the train isn't going to move. No one shall climb over trains where there is a live trolley wire.

**R11-1-1231. Pulling plugs on Mancha battery motors**

Plugs must be pulled on Mancha battery motors when operator leaves cab.

**R11-1-1232. Men working in haulage drifts**

Men working in haulage drifts must keep the drifts clear of obstruction.

**R11-1-1233. Operating a motor while out of the cab**

No one shall attempt to operate a motor while out of the cab.

**R11-1-1234. Men pulling chutes in safe location**

Chute loading installations shall be designed so that men pulling chutes are not required to assume hazardous positions while loading cars.

**R11-1-1235. A motor man shall receive a signal from his swamper or loader before moving train**

When coupling, uncoupling, re-railing cars, backing into a drift where men are working, or when spotting cars under chutes, a motor man shall not move his train or motor without first receiving a signal from his swamper or loader.

**R11-1-1236. Cars shall not be coupled or uncoupled by hand**

Cars shall not be coupled or uncoupled by hand where there is not ample room for a person to stand between sides of cars and side of drift. Cars shall not be coupled or uncoupled by hand while a train is in motion.

**R11-1-1237. Transportation of tools, materials and equipment on top of motors and locomotives**

Tools, materials and equipment, except properly secured rerailing devices, shall not be carried on top of locomotives or motors unless permanently installed boxes have been provided for that purpose.

**R11-1-1238. Speed of man trips**

Man trips shall be operated at speeds consistent with the condition of tracks and equipment used.

**R11-1-1239. Reserved**

**R11-1-1299.**

### **ARTICLE 13. OPEN PITS**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305, 27-421, 27-422, 27-424 and 27-425.

**R11-1-1300. Reserved**

**R11-1-1301. Warning devices on mobile equipment**

Mobile equipment assigned to a working place shall be provided with:

- A. Suitable warning devices visible at all times to the operator of the highest mobile equipment.
- B. When the operator of heavy duty mobile equipment has an obstructed view to the rear, the equipment shall have either an automatic reverse signal alarm which is audible above the surrounding noise level, or an observer to signal when it is safe to back up.

**R11-1-1302. Dumping over edge not permitted**

Dumping over the edge of an undercut stockpile or undercut dumps shall not be permitted.

**R11-1-1303. Berms or guards shall be provided**

Berms or guards shall be provided on the outer banks of elevated roadways. A higher berm must be built from beginning of curve to end of curve, where applicable.

**R11-1-1304. Men shall not work between equipment and pit wall**

Men shall not work between equipment and the pit wall or bank where the equipment may hinder escape from falls or slide of the bank.

**R11-1-1305. Drill holes covered and guarded**

Drill holes large enough to constitute a hazard shall be covered and guarded.

**R11-1-1306. Drilling near loaded blast holes**

No drilling shall be done within 50 feet of loaded blast holes.

**R11-1-1307. Emergency signaling device on drill rigs**

An emergency signaling device shall be available on rotary drill rigs.

**R11-1-1308. Repair of heavy truck tires (1300 x 24 in size and over)**

- A. All persons who work with tires and rims must fully understand the primary hazards of “Blow-Out” and “Blow-Off”.
- B. Tire roll-in cages to restrain possible blow-outs and blow-offs while inflating tires shall not be used on tires over 1300 x 24 in size.
- C. When tire mounting, lock rings, flanges, and ring gutter shall be cleaned with a wire brush or buffer and inspected for the following defects: distorted rims, distorted and twisted rings, rim or ring bent out of round, bent rims or ring bead, hair cracks in wheel at ring gutter area.
- D. Deflate tires to 20 PSI before loosening wheel nuts.
- E. Lock ring must be properly seated before tire is inflated to 20 PSI.
- F. The air control valve shall be located some distance from the tire.
- G. All personnel shall stand away from restraining device during inflation.
- H. Tires, rims, and lock rings shall visually be inspected daily while in service. Any suspected part should be checked by magnetic-particle or dye-check methods.
- I. A tire that has run flat shall never be inflated until it has been unmounted first.
- J. Tire pressure shall be released by removing the valve core before making adjustments to ring and flange.

**R11-1-1309. Loose material stripped from top of pit walls**

Loose, unconsolidated material shall be stripped for a safe distance, but in no case less than 10 feet, from the top of pit or quarry walls.

**R11-1-1310. Moving a drill**

When a drill is being moved from one drilling area to another, drill steel, tools and other equipment shall be secured and the mast placed in a safe position.

**R11-1-1311. Drill controls during a power failure**

In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

**R11-1-1312. Straightening a crossed cable on a reel**

The drill stem shall be resting on the bottom of the hole or on the platform with the stem secured to the mast before attempts are made to straighten a crossed cable on a reel.

**R11-1-1313. Drills in operation**

While in operation, drills shall be attended at all times.

**R11-1-1314. Holding drill steel while collaring hole**

Persons other than the operator shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

**R11-1-1315. Drill bit in operation**

Persons shall not be on a mast while the drill-bit is in operation. Drill crews and others shall stay clear of augers or drill stems that are in motion. A person shall not pass under or step over a moving stem or auger.

**R11-1-1316. Reserved**

**R11-1-1399.**

**ARTICLE 14. SAND AND GRAVEL OPERATIONS**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304, 27-305, and 27-441.

**R11-1-1400. Reserved**

**R11-1-1401. Sand and gravel operations subject to statutes and rules**

All sand and gravel operations shall be subjected to all statutes and rules generally applicable to operations subject to the jurisdiction of the Mine Inspector, together with all statutes and rules applicable to open pit.

**R11-1-1402. Reserved**

**R11-1-1499.**

## **ARTICLE 15. ACID PLANTS AND LEACHING**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304 and 27-305.

**R11-1-1500. Reserved**

**R11-1-1501. Instruction on use of personal protective equipment to employees**

All employees who work with sulphuric acid or other strong chemicals shall be taught the correct use of personal protective equipment available and be required to wear this equipment when handling sulphuric acid or other strong chemicals.

**R11-1-1502. Storage and distribution of acid**

Acid shall be stored in properly vented steel tanks, drums or other approved containers. All distribution lines shall be of recommended size and approved material. (See REFERENCES at end of Article.)

**R11-1-1503. Persons working on or with acid storage or distribution shall wear approved eye and body protectors**

Approved eye protection, such as chemical safety goggles (dust tight), shall be worn by employees working on or with acid storage or distribution and shall be required for normal repair work. For a very hazardous job, additional approved type protection shall be provided such as full length face shield, boots, gloves and up to complete protective suits and hoods for maximum exposure.

**R11-1-1504. Open lights, flames, etc., forbidden near acid storage**

Open lights, flames and spark producing tools and equipment are forbidden in the vicinity of acid storage vessels and distribution lines where their use might cause an explosion.

**R11-1-1505. Welding, burning or cutting restrictions on acid storage tanks, etc.**

All acid storage tanks, drying towers, absorption towers, and lines shall be vented, cleaned, purged and tested for explosive mixture before welding, burning or cutting on them is permitted.

**R11-1-1506. Acid spillage shall be removed immediately**

Acid spillage shall be removed immediately by flushing the contaminated area with water or by neutralizing the chemical with soda ash, limestone, quicklime or some other absorbent material.

**R11-1-1507. Authorized personnel**

Only authorized personnel will be permitted to operate any equipment in an acid plant.

**R11-1-1508. Personal protective clothing cleaned up after each use**

Personal protective clothing (except disposable clothing which must be discarded), tools and equipment must be thoroughly cleaned up and cared for after each use.

**R11-1-1509. Before work started on acid storage tanks, inspection procedure approved**

The hazardous nature of inspection, cleaning or repair of large acid storage tanks requires that specific procedures be formulated in advance and approved by the responsible supervisor before work is started.

**R11-1-1510. Potable water immediately available**

Potable water shall be immediately available at the site where acid handling or work on the acid system is being carried on. This will require hauling water where showers and hoses are not conveniently located.

**R11-1-1511. Safety showers and eye wash fountains; emergency water**

- A. Readily accessible, well-marked, rapid action safety showers and eye wash fountains must be available in the areas where acid is being handled. Showers shall have deluge type heads, easily accessible, plainly marked and controlled by quick opening valves of the type that stay open. They should be capable of supplying large quantities of water. Eye wash fountains shall be immediately available for eye irrigation. This equipment shall be inspected and tested at regular intervals, preferably daily during freezing weather, to make sure it is in good working condition at all times.
- B. When safety showers and water hoses are not conveniently located, emergency water shall be immediately available at the site where acid handling or work on acid systems is being carried on.

**R11-1-1512. First aid procedures must be posted**

First aid must be started immediately in all cases of contact with sulphuric acid. First aid procedures must be posted at each unloading or loading site.

**R11-1-1513. Flush acid from eyes**

Flush acid from eyes by irrigating for at least 15 minutes with a slow stream of water. This is mandatory. There is no alternative.

**R11-1-1514. Medical aid**

Medical attention shall be obtained as soon as possible after first aid measures have been carried out. Ambulances should contain first aid kits for the treatment of acid burns.

**R11-1-1515. Maintenance of plant equipment used in any acid service**

The maintenance of plant equipment used in any acid service shall be the responsibility of designated supervisors who shall make periodic inspections of acid facilities.

**R11-1-1516. Reporting suspected leaks or equipment failure**

Each employee is responsible for reporting to his immediate supervisor all suspected leaks or equipment failure.

**R11-1-1517. Tank trucks, general**

DOT Regulations (Section 177.834) require that tank motor vehicles be attended during loading and unloading. If it becomes necessary for the attendants to leave the operation, transfer of the acid must be stopped. There must be a signaling device which is easily activated in case of emergency.

**R11-1-1518. Fittings and other equipment (See REFERENCES at end of Article)**

- A. The packing and lubricant for pumps, glands, etc., must be of a material recommended for acid handling.
- B. The pump glands, flanged fittings, and valve stems will be provided with splash shields or collared in cases where personnel would be exposed to acid leaks or sprays if acid should escape. The use of colored shields will assist personnel in detecting insipient leaks before they become serious.
- C. Where access to the top of the tank truck is needed, the spot will be provided with stairs and platform. Non-combustible construction is preferred. Overhead loading lines will be counterweighted with a pulley and weight system or equivalent.
- D. Storage tanks shall be clearly marked with the wording "Sulphuric Acid" or "Hydrochloric Acid", etc. (preferably painted yellow).
- E. Approved volume gauges shall be provided for storage tanks.
- F. Hose being used to convey acid in loading and unloading, will be inspected regularly and replaced or repaired immediately if it becomes worn or a leak appears.

**R11-1-1519. Unloading**

- A. Tank trucks will be visually inspected for leaks before they are allowed to enter the plant.
- B. Unloading should be performed only during daylight hours. When it is necessary to unload at night, proper and adequate lighting should be provided around the tank truck and the working areas involved in the operation.
- C. It is mandatory that the truck pad be arranged so liquid spillage will drain away from the truck and exposed structures. The pad will be of sufficient length to allow the truck and trailer a minimum of 4-foot clearance at each end of 2-foot clearance on each side. Because of the hazard of backing equipment into roadways and the possible need to move a truck quickly from the unloading place, it will be so arranged that the truck can be driven away in a forward direction.
- D. Only qualified and properly instructed employees will operate the truck and make the hook-up of the hose from the tank truck to the receiving tank.
- E. Before connecting for unloading, the truck engine will be stopped and not started again during the entire unloading operation unless it is necessary to operate the pump by power take-off or to use the

truck engine to operate compressors as a source of air for air pressure unloading.

- F. Truck parking brakes will be set and, where necessary, the wheels blocked.
- G. A sign will be placed at all areas where acid is loaded and unloaded, calling attention to the hazard.
- H. Whether unloading by pump or air, the piping will, if possible, be arranged so the acid will drain toward the storage tank when the pump is shut down or when the discharge valve is closed.
- I. When unloading line must be run across a walkway, suitable warning signs will be provided to denote the hazard.
- J. Before starting to vent or connect, a water hose will be connected and ready for emergency use and the emergency shower and eye bath will be tested.
- K. Wherever practicable, unloading will be accomplished by pumping. Whether pumping or unloading by air pressure, observe the following procedure:
  - 1. Operate the relief valve to vent the tank.
  - 2. Remove blind flange from air inlet line.
  - 3. Leave this line open during pumping.
  - 4. After making certain there is no air pressure, remove blind flange from standpipe and connect unloading line to standpipe.

- L. If transfer is by means of air pressure, connect air line and apply air slowly until there is a normal flow of acid into the storage tank. Between the reducing valve and tank truck there shall be a safety valve set at not to exceed 25 lbs. pressure. If unloading by gravity, the reducing valve will be set at 10 lbs. pressure and at 20 lbs. pressure if not unloading by gravity. When the tank truck is empty, shut off the air and operate the relief valve to vent off the pressure. After pressure has been vented, disconnect the air line. Do not disconnect the acid unloading line until the tank truck is at atmospheric pressure and the tank truck standpipe drained. After disconnecting the acid unloading line, replace blind flanges on standpipe and air line.
- M. Safety chains shall be used at all acid hose connections where the hose would whip if it came loose.

**R11-1-1520. Apply air to a tank truck**

The applying of air to a tank truck and then moving the truck to another location for unloading will not be permitted.

**R11-1-1521. Storage tanks lower than unloading site**

Where practical, storage tanks shall be slower than the unloading site.

**R11-1-1522. Reserved**

**R11-1-1599.**

**REFERENCES ON H<sub>2</sub>SO<sub>4</sub>:**

“Handling and Storage of Hazardous Materials – Sulphuric Acid”,  
Accident Prevention Manual for Industrial Operations (4<sup>th</sup> Edition), Chapter 18,  
Section 18-15.

“Dangerous Properties – Storage & Handling of H<sub>2</sub>SO<sub>4</sub>”, Erving Sax  
Handbook of Dangerous Materials (3<sup>rd</sup> Edition), Section 7, Page 208.

Dangerous Chemical Code (Fire Department, Los Angeles, California,  
Parker & Company).

Manufacturing Chemists Association (1625 1 Street, N.W., Washington,  
D.C.), No. 2 “T.C.I. Tank Cars, D.O.T. Specifications” No. 103-A, “Unloading  
Cars Filled with H<sub>2</sub>SO<sub>4</sub>”; No. 3, “SD-20 Sulphuric Acid Revised Sheet.”

Manufacturing Chemists Association, “Guide for Safety in Laboratories”;  
Manual FD-20, Sheets T-7, T-7A, T-8.

National Safety Council, “Storage & Shipping (corrosive materials)”,  
Vol.1, Data Sheets No. 325.

**ARTICLE 16. SMELTERS**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§27-304 and 27-305.

**R11-1-1600. Reserved**

**R11-1-1601. Walking or standing directly on reverb arch**

No one shall walk or stand directly on the reverb arch or any part of the flue system, while in operation, except in an emergency situation. In such event, adequate safeguards and supervision will be provided to assure safety.

**R11-1-1602. Avoid splashing or exploding of molten material**

Avoid anything that will cause molten material to splash or explode; keep water away from molten material except where water is required by the process.

**R11-1-1603. Employees shall be adequately protected**

Employees engaged in tapping, charging, or skimming operations or any similar procedure shall be adequately protected from the hazards of the work by proper shielding if practical or, in its absence, by adequate individual protective covering. It is the duty of all such persons to use the shields and appliances provided.

**R11-1-1604. Employees shall stand clear of furnace operations**

Employees shall stand clear of furnace operations such as skimming, tapping, charging, refining, and casting, unless actually engaged in the work or suitably protected.

**R11-1-1605. Employees shall not enter area unless authorized**

Employees shall not enter any flue, dust chamber, furnace, tank, or tunnel unless authorized and properly equipped.

**R11-1-1606. Transporting material with a crane, audible signal sounded**

Separate and distinctive signals shall be sounded when rolling converters and when transporting hot metal.

**R11-1-1607. Dumping slag in a new place**

Before dumping slag in a new place, care shall be taken to see that no employee, person, or persons will be endangered by the hot slag and that no explosion hazard exists at the dumping place.

**R11-1-1608. Wet bars**

Wet bars shall not be put into molten matte.

**R11-1-1609. Newly cleaned and mudded matte launders**

Extreme caution should be used around newly cleaned and mudded matte launders when matte first starts to flow. Verbal notice shall be given person or persons when tapping newly cleaned launders.

**R11-1-1610. Employees working at the burner end of the reverb furnace**

Employees working at the burner end of the reverb furnace should be on the alert for returning converter slag.

**R11-1-1611. Employees alert of crane movement**

Employees should be on the alert and observe direction of crane movement at all times.

**R11-1-1612. Employees should stay out of converter aisle**

Employees should stay out of converter aisle while loads are being hauled by the crane, unless their work requires that they be there. Supervisors shall take proper measures to assure safety of persons required to stay working in converter aisle.

**R11-1-1613. When in converter aisles, avoid slag spouts**

When in converter aisles, employees should not stand under or near slag spouts, or in any location where there is danger of dripping metal or falling objects.

**R11-1-1614. Employees shall not overfill ladles**

Employees shall not overfill slag, matte, or molten copper ladles. Supervisors shall take precautions for the safety of employees in the area for all overfills caused by runways beyond the control of employees.

**R11-1-1615. Authorized persons in crane cab**

Only authorized persons shall be allowed in the crane cab.

**R11-1-1616. Ladles carefully poured**

Ladles should be carefully poured to minimize spills. Every ladle or slag pot shall be examined before molten material is placed therein.

**R11-1-1617. Breaking material on skull breaker and trimming bullion bars**

Appropriate goggles or face shields shall be provided and used when breaking material on the skull breaker and when trimming bullion bars.

**R11-1-1618. Coupling and uncoupling cars**

Cars should be coupled and uncoupled carefully. Feet shall not be used to align the couplings.

**R11-1-1619. Trains stopped before uncoupling**

Trains should be stopped before they are uncoupled. The wheels of slag pot cars left behind should be blocked to prevent runaways.

**R11-1-1620. During electrical storms, slag trains kept inside**

Trolley operated slag trains should be kept in the smelter building during electrical storms and trolley pole removed from trolley wire.

**R11-1-1621. Access to converter aisle limited**

Access to the converter aisle must be limited to people authorized by the company.

**R11-1-1622. Equipment in converter aisle**

Equipment shall not enter the converter aisle or slag tap area unless authorization has been secured from the supervisor in charge of the area.

**R11-1-1623. Reserved**

**R11-1-1624. Hoist cable on cranes**

Hoist cable on all cranes shall conform to the American National Standards, ANSI-30.9-1971.

**R11-1-1625. Detection equipment, breathing apparatus and portable resuscitating apparatus made available**

There shall be maintained in all plants, at designated places, N.I.O.S.H. approved breathing apparatus, detection equipment, and resuscitating equipment, all readily available to trained personnel for use where the atmosphere may contain dangerous concentrations of gases or vapors which may be hazardous to life.

**R11-1-1626. Reserved**

**R11-1-1627. Shielding and protective clothing shall be provided**

Where required, proper shielding and protective clothing shall be used, particularly when working in extreme heat conditions, flue dust, or open fires.

**R11-1-1628. Signalmen shall be assigned when mechanical signals fail**

Alternate signaling procedures shall be established to cover mechanical failures where needed.

**R11-1-1629. Cabs pressurized and ventilated**

All cabs on hot metal crane shall be pressurized or have suitable ventilating air meeting the requirements of R11-1-404.

**R11-1-1630. Converter cranes equipped with safety glass**

All converter cranes shall be equipped with safety glass or equivalent.

**R11-1-1631. Reserved**

**R11-1-1632. Entry into hot vessels, precautions.**

When extreme heat conditions exist, sufficient cooling time shall be allowed before persons are allowed to enter converters, roasters, and reactors. Protective clothing shall be used when applicable. A supervisor shall be present when workers are in the vessel, and determine when the vessel has cooled sufficiently to allow safe access.

**R11-1-1633. When gassy conditions exist**

When heavy dust, smoke, or greasy conditions exist in any area, only those workers who are properly equipped with personal protective devices will be allowed into the area.

**R11-1-1634. Spout doors**

Spout doors must be maintained in an operable condition.

**R11-1-1635. Environmental hazards monitoring**

- A. Where there is a potential for exposure of workers to specific environmental hazards which may adversely effect safety or health, those hazards shall be periodically monitored by the mine operator. The operator shall promptly initiate appropriate action to correct unfavorable conditions.
- B. A record that hazard monitoring was conducted shall be kept by the operator for a period of one (1) year, and shall be made available for review by the Inspector.

**R11-1-1636. Reserved**

**R11-1-1699.**

**ARTICLE 17. AERIAL TRAMWAYS**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304 and 27-305.

**R11-1-1700. Reserved**

**R11-1-1701. Guard nets or other suitable protection**

Guard nets or other suitable protection shall be provided where aerial tramways pass over roadways, walkways or buildings.

**R11-1-1702. Riding aerial tramways**

Person other than maintenance men shall not ride aerial tramways unless the following features are provided:

1. Two independent brake feet capable of holding the maximum load.
2. Power drives with emergency power available in case of primary power failure.
3. Men shall not ride loaded buckets or aerial tramways.
4. Direct communication between terminals.
5. Buckets equipped with positive locks to prevent accidental tripping or dumping.

**R11-1-1703. Starting aerial tramways**

Where possible, aerial tramways shall not be started until the operator has ascertained that everyone is in the clear.

**R11-1-1704. Reserved**

**R11-1-1799.**

**ARTICLE 18. GASSY MINES**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304 and 27-3-5.

**R11-1-1800. Reserved**

**R11-1-1801. Gassy mines operated in accordance with mandatory standards**

Gassy mines shall be operated in accordance with all mandatory standards in this part. Such mines shall also be operated in accordance with the mandatory standards in this section. The standards in this section apply only to underground operations.

**R11-1-1802. Classifying mines gassy**

A mine shall be deemed gassy, and thereafter operated as a gassy mine if:

1. The State Mine Inspector classifies the mine as gassy; or
2. Flammable gas emanating from the orebody or the strata surrounding the orebody has been ignited in the mine; or
3. A concentration of 0.25 percent or more, by air analysis, of flammable gas emanating only from the orebody or the strata surrounding the orebody has been detected not less than 12 inches from the back, face, or ribs in any open working; or
4. The mine is connected to a gassy mine.

**R11-1-1803. Flammable gases detected**

Flammable gases detected while unwatering mines and similar operations shall not be used to class a mine gassy.

**R11-1-1804. Men shall not smoke or carry smoking materials underground**

Men shall not smoke or carry smoking materials, matches or lighters underground. The operator shall institute a reasonable program to ensure that persons entering the mine do not carry smoking materials, matches, or lighters. A “reasonable program” means, at the least, a personal search on an irregular basis by mine officials.

**R11-1-1805. Use of open flames**

Except when necessary for welding or cutting, open flames shall not be used in other than fresh air or in places where flammable gases are present or may enter the air current.

**R11-1-1806. Welding or cutting underground**

Welding or cutting with arc or flame underground in other than fresh air or in places where flammable gases are present or may enter the air current shall be under the direct supervision of a qualified person who shall test for flammable gases before and frequently during such operations.

**R11-1-1807. Welding or cutting in atmospheres containing more than 1.0 percent of flammable gases**

Welding or cutting shall not be performed in atmospheres containing more than 1.0 percent of flammable gases. The concentration of flammable gases is to be determined by a device (approved by the Inspector) other than a permissible flame safety lamp.

**R11-1-1808. Ventilation, main fans – installation**

Main fans shall be:

1. Installed on the surface.

2. Powered electrically from a circuit independent of the mine power circuit. Internal combustion engines shall be used only for standby power, or where electrical power is not available.
3. Installed in fireproof housing provided with fireproof air ducts.
4. Offset not less than 15 feet from the nearest side of the mine opening and equipped with ample means of pressure relief unless:
  - a. The opening is not in direct line with forces which would come out of the mine should an explosion occur, and
  - b. Another opening not less than 15 feet nor more than 100 feet from the fan opening is equipped with a weak-wall stopping or explosion doors in direct line with the forces which would come out of the mine should an explosion occur.
5. Installed to permit prompt reversal of airflow.
6. Attended constantly, or provided with automatic devices to give alarm when the fans slow down to stop. Such devices shall be placed so that they will be seen or heard by responsible persons.

**R11-1-1809. Ventilation, main fans – operation**

Main fans should be:

1. Operated continuously except when the mine is shut down for an extended period.
2. Provided with pressure-recording gauges.

3. Inspected daily each day during which the fan is operated and records kept of such operations and of fan maintenance.

**R11-1-1810. Main intake and return air currents**

The main intake and return air currents in mines should be in separate shafts, slopes, or drifts.

**R11-1-1811. Single shafts used for intake and return**

When single shafts are used for intake and return the curtain wall or partition shall be constructed of reinforced concrete or equivalent and provided with pressure relief devices.

**R11-1-1812. When main fan fails or stops**

When a main fan fails or stops and ventilation is not restored in a reasonable time, and in no event more than fifteen minutes, action shall be taken to cut off the power to the areas affected and to withdraw all men from such areas.

**R11-1-1813. When there has been a failure of ventilation**

When there has been a failure of ventilation and ventilation has been restored in a reasonable time, all active workings and travelways where flammable gas may have accumulated should be examined by qualified persons and determined to be free of flammable gas before power is restored and work resumed.

**R11-1-1814. When ventilation is not restored in a reasonable time**

When ventilation is not restored in a reasonable time, and in no event more than fifteen minutes, all men shall be removed from the area affected and after ventilation has been restored, the areas affected shall be examined by qualified persons for gas and other hazards and made safe before power is restored and before men other than the examiners and other authorized persons return to the areas affected. The word “safe” as used in this rule means that the flammable gas concentration is not more than 1 percent and other hazards are no more hazardous than those experienced in routine normal mining operations.

**R11-1-1815. When main fan or fans have been shut down**

When the main fan or fans have been shut down with all men out of the mine, no person, other than those qualified to examine the mine, or other authorized persons, shall go underground until the fans have been started and the mine examined for gas and other hazards and declared safe.

**R11-1-1816. Booster fans – operation**

Booster fans shall be:

1. Operated by permissible drive units maintained in permissible condition.
2. Operated only in air containing not more than 1 percent flammable gas.

**R11-1-1817. Booster Fans – inspection, equipment**

Booster fans shall be:

1. Inspected by a qualified person at least once each shift during which the fan has been operated or provided with automatic devices to give alarm when the fan has slowed down or stopped.
2. Equipped with devices that automatically cut off the power in areas affected if the fans slow down or stop, when the fans are not provided with automatic alarm devices.
3. Provided with air locks, the doors of which open automatically if the fan stops operating.

**R11-1-1818. Auxiliary fans – operation**

Auxiliary fans should be:

1. Operated by permissible drive units maintained in permissible condition.
2. Operated only in air containing not more than 1.0 percent flammable gas.

**R11-1-1819. Auxiliary fans – inspection**

Auxiliary fans should be:

1. Inspected by competent persons at least twice each shift.

**R11-1-1820. When auxiliary or booster fans slow down or stop**

Men shall be withdrawn from areas affected by auxiliary or booster fans when such fans slow down or stop.

**R11-1-1821. Volume and velocity of the current of air**

The volume and velocity of the current of air coursed through all active areas shall be sufficient to dilute and carry away flammable gases, smoke and fumes.

**R11-1-1822. Quantity of air**

The quantity of air coursed through the last open crosscuts in pairs or sets of entries or through other ventilation openings nearest the face, shall be at least 6,000 cubic feet a minute.

**R11-1-1823. Measuring quantity of air at least once a week**

At least once each week, a qualified person shall measure the volume of air entering the main intakes and leaving the main returns, the volume of the intake and return of each split, and the volume through the last open crosscuts or other ventilation openings nearest the active faces. Records of such measurements shall be kept in a book on the surface.

**R11-1-1824. Permanently installed battery-charging and transformer stations**

Permanently installed battery-charging and transformer stations should be ventilated by separate splits of air conducted directly to return air courses.

**R11-1-1825. Intake air**

Electrically operated pumps, compressors, and portable substations should be in intake air.

**R11-1-1826. Changes in ventilation**

Changes in ventilation that materially affect the main air current of any split thereof and may affect the safety of persons in the mine shall be made only when no work is being done in the mine other than that necessary to effect the ventilation change. Only those persons engaged in making such changes shall be permitted in the mine during the change. Power shall be removed from the areas affected by the change before work starts and not restored until the effect of the change has been ascertained and the affected areas determined to be safe by a qualified person.

**R11-1-1827. Flammable gas in excess of 1.0 percent**

If flammable gas in excess of 1.0 percent by volume is detected in the air not less than 12 inches from the back, face, and rib of an underground working place, or in air returning from a working place or places, adjustments shall be made in the ventilation immediately so that the concentration of flammable gas in such air is reduced to 1.0 percent or less.

**R11-1-1828. Flammable gas in excess of 1.5 percent**

If 1.5 percent or higher concentration of flammable gas is detected in air returning from an underground working place or places, the men shall be withdrawn and the power cut off to the portion of the mine endangered by such flammable gas until the concentration of such gas is reduced to 1.0 percent or less.

**R11-1-1829. Air containing 0.25 percent or more of flammable gas**

Air that has passed by an opening of any unsealed abandoned area and contains 0.25 percent or more of flammable gas shall not be used to ventilate working areas. Examinations of such air shall be conducted during the preshift examination required by R11-1-1847.

**R11-1-1830. Air inaccessible for inspection shall not be used for ventilation**

Air that has passed through an abandoned panel or area which is inaccessible for inspection shall not be used to ventilate any active face workings

in such mine. No air which has been used to ventilate an area from which the pillars have been removed shall be used to ventilate any active face workings in such mine, except that such air may be used to ventilate enough advancing working places or rooms immediately adjacent to the line of retreat to maintain an orderly sequence of pillars recovery on a set of entries.

**R11-1-1831. Abandoned areas shall be sealed or ventilated**

Abandoned areas shall be sealed or ventilated; areas that are not sealed shall be barricaded and posted against unauthorized entry.

**R11-1-1832. Seals shall be of substantial construction**

Seals shall be of substantial construction. Exposed surfaces shall be made of fire resistant material such as gunite-covered wood or material, asbestos sheeting, masonry, concrete or reinforced concrete, and steel or covered steel. If a commodity mined is combustible, seals should be made of incombustible materials.

**R11-1-1833. Sampling of atmosphere and measurement of pressure**

One or more seals of every sealed area shall be fitted with a pipe and a valve or cap to permit sampling of the atmosphere and measurement of the pressure behind such seals.

**R11-1-1834. Crosscuts**

Crosscuts shall be made at intervals not in excess of 100 feet between entries and between rooms.

**R11-1-1835. Crosscuts closed**

Crosscuts should be closed where necessary to provide adequate face ventilation.

**R11-1-1836. Line brattice or other suitable devices**

Line brattice or other suitable devices shall be installed from the last open crosscut to a point near the face to assure positive air flow to the face of every active underground working place, unless the Inspector or his authorized representative permits an exception to the requirement.

**R11-1-1837. Brattice cloth**

Brattice cloth should be of fire-resistant material.

**R11-1-1838. Damaged brattices**

Damaged brattices shall be repaired promptly.

**R11-1-1839. Crosscuts provided**

Crosscuts should be provided, where practicable, at or near the faces of entries and rooms before they are abandoned.

**R11-1-1840. Entries or rooms shall not be started off entries**

Entries or rooms shall not be started off entries beyond the last open crosscuts, except that room necks and entries not to exceed 18 feet in depth may be turned off entries beyond the last open crosscuts if such room necks or entries are kept free of accumulations of flammable gas by use of line brattice or other adequate means.

**R11-1-1841. Stoppings in crosscuts between intake and return airways**

Stoppings in crosscuts between intake and return airways, on entries other than room entries, should be built of solid, substantial material; exposed surfaces should be made of fire-resistant material such as gunite-covered wood or material, asbestos sheeting, masonry, concrete or reinforced concrete, and steel or covered steel. If the material mined is combustible, stoppings should be made of incombustible material.

**R11-1-1842. Stoppings airtight**

Stoppings should be reasonably airtight.

**R11-1-1843. Main ventilation**

The main ventilation shall be so arranged by means of air locks, overcasts, or undercasts that the passage of trips or persons does not cause interruptions of air currents. Where air locks are impracticable, single doors may be used if they

are attended constantly while the areas of the mine affected by the doors are being worked, unless they are operated mechanically or are self-closing.

**R11-1-1844. Air locks shall be ventilated sufficiently**

Air locks shall be ventilated sufficiently to prevent accumulations of flammable gas in concentrations greater than 1 percent inside the locks.

**R11-1-1845. Doors shall be kept closed**

Doors shall be kept closed except when men or equipment are passing through the doorways.

**R11-1-1846. Overcasts and undercasts**

Overcasts and undercasts should be:

1. Constructed tightly of incombustible material.
2. Of sufficient strength to withstand possible falls from the back.
3. Kept clear of obstructions.

**R11-1-1847. Preshift examinations**

Preshift examinations shall be made of all working areas by qualified persons within 3 hours before any workmen, other than the examiners, enter the mine.

**R11-1-1848. Qualified examiners**

Only qualified examiners and persons authorized to correct the dangerous conditions shall enter places or areas where danger signs are posted.

**R11-1-1849. Danger signs shall not be removed**

Danger signs shall not be removed until the dangerous conditions have been corrected.

**R11-1-1850. Examinations for dangerous conditions**

Examinations for dangerous conditions, including tests for flammable gas with a device approved by the Inspector should be made at least once each week, and at intervals of not more than 7 days, by the mine foremen or other designated mine official, except during weeks in which the mine is idle for the entire week.

The foreman or other designated mine official should:

1. Examine and make tests:

- A. In the return of each split where it enters the main return,
  - B. On accessible pillar falls,
  - C. At seals,
  - D. In the main return,
  - E. In at least on entry of each intake and return airway in its entirety,
  - F. In idle workings,
  - G. In abandoned workings, insofar as conditions permit,
2. Mark his initials and the date at the places examined.
  3. Report dangerous conditions, promptly to the mine operator or other designated person.
  4. Record the results of his examination with ink or indelible pencil in a book kept for that purpose at a designated place on the surface of the mine.

**R11-1-1851. Prompt action to correct dangerous conditions**

The mine foreman or other designated mine official should read and countersign promptly the reports of daily and weekly examinations by qualified persons, and should take prompt action to have dangerous conditions corrected.

**R11-1-1852. Diesel-powered equipment**

Diesel-powered equipment shall not be taken into or operated in places where flammable gas exceeds 1.0 percent at any point not less than 12 inches from the back, face, and rib.

**R11-1-1853. Trolley wires and trolley feeder wires**

Trolley wires and trolley feeder wires shall be on intake air and shall not extend beyond the last open crosscut or other ventilation opening. Such wires shall be kept at least 150 feet from pillar workings.

**R11-1-1854. Only permissible equipment maintained**

Only permissible equipment maintained in permissible condition shall be used beyond the last open crosscut or in places where dangerous quantities of flammable gases are present or may enter the air current.

**R11-1-1855. Only permissible distribution boxes shall be used**

Only permissible distribution boxes shall be used in working places and other places where dangerous quantities of flammable gas may be present or may enter the air current.

**R11-1-1856. Electrical equipment**

No electric equipment shall be taken into or operated in places where flammable gas can be detected in the amount of 1.0 percent or more at any point not less than 12 inches from the back, face, and rib.

**R11-1-1857. Illumination**

Only permissible electric lamps shall be used for portable illumination underground.

**R11-1-1858. Explosives not designated permissible by Bureau of Mines**

Explosives not designated as permissible by the Bureau of Mines shall not be used in any underground gassy mine until the Bureau of Mines and State Mine Inspector have given written approval for each such specific explosive to be used.

**R11-1-1859. Granting approval of unpermissible explosives**

The Bureau of Mines and the State Mine Inspector, in granting approval referred to in R11-1-1858 above, shall provide the operator with a written list of conditions for using the specific explosives covered by the approval and adapted to the mining operation.

**R11-1-1860. Blasts in gassy mines shall be initiated electrically**

Blasts in gassy mines shall be initiated electrically, and multiple-shot blasts shall be initiated only with millisecond-delay detonators. Permissible

blasting units of capacity suitable for the number of holes in a round to be blasted shall be used unless the round is fired from the surface when all men are out of the mine.

**R11-1-1861. Boreholes stemmed**

Boreholes shall be stemmed as prescribed for the explosives used.

**R11-1-1862. Examinations for flammable gas**

Examinations for flammable gas shall be made immediately before and after firing each shot or round.

**R11-1-1863. Shots or rounds shall not be fired**

Shots or rounds shall not be fired in places where flammable gas can be detected with a permissible flame safety lamp, or where 1.0 percent or more of flammable gas can be detected by any other Bureau of Mines approved device or method, at a point not less than 12 inches from the back, face, and rib.

**R11-1-1864. Shots or round should be fired by qualified persons**

Shots and rounds should be fired by qualified persons.

**R11-1-1865. Reserved**

**R11-1-1899.**

## **ARTICLE 19. MISCELLANEOUS PROVISIONS**

The rules in this article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304 and 27-305.

**R11-1-1900. Reserved**

**R11-1-1901. Failure of a water or silt retaining dam**

If failure of a water or silt retaining dam will create a hazard, it shall be of substantial construction and inspected at regular intervals.

**R11-1-1902. Reserved**

**R11-1-1903. Prior notification of inspection**

No employee of the State Mine Inspector's Office, shall advise or notify an operator of a mine, any employee of a mine, or a representative of the employee of a mine, that a health and safety inspection, or industrial hygiene study or survey, of a mine is imminent or about to be made, or the date on which such inspection, survey, of a mine is imminent or about to be made, or the date on which such inspection, survey or study will be made.

**R11-1-1904. Reserved**

**R11-1-1999.**

**ARTICLE 20. STORAGE AND MIXING OF REAGENTS IN  
CONCENTRATIONS**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes, and A.R.S. §§ 27-304 and 27-305.

**R11-1-2000. Chemicals, general**

CHEMICALS IN ANY FORM CAN BE SAFELY STORED, HANDLED  
OR USED IF THE PHYSICAL, CHEMICAL AND HAZARDOUS  
PROPERTIES ARE FULLY UNDERSTOOD AND THE NECESSARY  
PRECAUTIONS, INCLUDING THE USE OR PROPER SAFEGUARDS AND  
PERSONAL PROTECTIVE EQUIPMENT ARE OBSERVED.

Hazardous chemicals: The following list of chemicals shall be classified as hazardous and rules shall so stipulate. The following list shall not be limited to the below mentioned chemicals:

Name	Threshold Limit Value
Ammonium Sulphide	1Mg/M <sup>3</sup> of air
Butyl Alcohol	100 P.P.M.
Calcium Cyanide	
Carbon Disulphide	20 P.P.M.
Chlorine	1 P.P.M.
Cresylic Acid	5 P.P.M.
Hydrogen	
Hydrogen Sulphide	10 P.P.M.
Methyl Isobutyl Carbinol	25 P.P.M.
Peroxide (+ 45% Strength)	1 P.P.M.
Phosphorous Pentasulfide	1 Mg/M <sup>3</sup> of air
Sodium Cyanide	5 Mg/M <sup>3</sup> of air
Sodium Hydrosulfide	None, Liberates H <sub>2</sub> S
Sodium Hydroxide	2 Mg/M <sup>3</sup> of air
Sodium Hypochlorite	
Sodium Metabisulphite	
Sulphur Dioxide	5 P.P.M.
Sulphuric Acid	1 Mg/M <sup>3</sup> of air

**R11-1-2001. Good housekeeping**

Good housekeeping is a must in reagent storage, mixing and use.

**R11-1-2002. Personal protective equipment**

Personal protective equipment shall be available for use in hazardous reagent mixing area.

**R11-1-2003. Safety showers and eye wash fountains**

Safety showers and eye wash fountains shall be located in those areas where exposure to reagents could create a hazard to personnel.

**R11-1-2004. Adequate fire protection**

Adequate fire protection shall be provided for storage and mixing areas.

**R11-1-2005. Self-contained breathing equipment in mills where hazardous reagents are present**

Mills where hazardous reagents are present shall have self-contained breathing equipment available. Men on each shift shall be trained in the use of this equipment.

**R11-1-2006. Distinctive warning devise**

A distinctive warning device will be installed in all areas of mills where the production of toxic or noxious fumes or gases is possible. Such a device is to alert personnel of the need to evacuate the building.

**R11-1-2007. Error omission in these rules and regulations**

No error or omission in these rules and regulations shall be construed as permitting an unsafe, unhealthy or unsanitary condition to exist.

**R11-1-2008. Reserved**

**R11-1-2014.**

**R11-1-2015. Tanks labeled**

All tanks must be labeled as to contents.

**R11-1-2016. Tanks provided with means of measuring**

All tanks shall be provided with a safe means of measuring content level.

**E11-1-2017. Tanks labeled as to contents**

All reagent containers must be labeled as to contents and stored in designated areas.

**R11-1-2018. Liquid storage tanks, suitable means of disposal**

All liquid storage tanks shall be supplied with suitable means of containment or disposal to provide safe disposal of contents in event of tank

failure. Liquid storage tanks must also be equipped with overflow piping to contain overflow to a suitable and safe disposal area.

**R11-1-2019. Storage tanks vented**

All storage tanks must be vented except those under pressure.

**R11-1-2020. Reagent containers stored**

Reagent containers shall be stored so as to protect the contents from the effects of weather if such exposure would create a hazardous situation.

**R11-1-2021. Oxidizing agents stored**

Oxidizing agents shall not be stored adjacent to reducing agents or flammable material where container failure could allow combining of materials.

**R11-1-2022. Warning signs at reagent storage areas**

Suitable warning signs shall be posted at all reagent storage areas limiting entry and smoking, where a hazard exists.

**R11-1-2023. Reagent tanks emitting toxic vapor**

Reagent tanks capable of emitting toxic vapor shall be either located outside the mill building or positively vented to the outside.

**R11-1-2024. Reagent stocks rotated**

Reagent stocks should be rotated on a first-in, first-out basis.

**R11-1-2025. Stacking reagent containers**

Stacking of reagent containers shall not present a hazard.

**R11-1-2026. Disposal obsolete reagents**

Disposal of obsolete reagents should be accomplished according to safe procedure.

**R11-1-2027. Broken containers or spilled reagents**

Broken containers or spilled reagents must be cleaned up immediately.

**R11-1-2028. Reagent storage facilities well drained**

Reagent storage facilities shall be well drained. Storage facilities should be constructed of fire-resistant material if reagents stored therein are flammable or corrosive to wood.

**R11-1-2029. Heat applied to storage tanks**

Heat shall not be applied to storage tanks except in compliance with recognized Trade Association Handling Code.

**R11-1-2030. Reserved**

**R11-1-2031. Hazardous reagents mixed**

Hazardous reagents shall be mixed in areas that minimize personnel exposure.

**R11-1-2032. Personnel mixing reagents**

All personnel mixing reagents must be trained in the mixing procedure.

**R11-1-2033. Phosphorous Pentasulfide**

Phosphorous Pentasulfide shall be added slowly to the Sodium Hydroxide solution from a container large enough to hold just the amount needed for one batch. This conveyor shall be constructed of spark-resistant materials, driven by an explosion proof motor, thermostatically controlled at a safe mixing solution temperature. The container shall be electrically bonded and grounded or constructed of non-sparking material.

**R11-1-2034. Men designated for hazardous reagent mixing certified**

Men designated for hazardous reagent mixing must be certified by the mill superintendent and a copy of such names filed in the office of the mill superintendent and available to the State Mine Inspector.

**R11-1-2035. Mixing tanks and holding tanks labeled**

All mixing tanks and holding tanks shall be labeled as to contents.

**R11-1-2036. Mixing tanks used for different reagents**

If a mixing tank is used for different reagents, and if a hazard exists, the tank and distribution lines should be flushed after mixing each reagent.

**R11-1-2037. Reagent mixes with exothermic reaction**

Reagent mixes with exothermic reaction shall be subject to positive temperature control if such reaction can create a hazard.

**R11-1-2038. Adequate ventilation in mixing area**

Hazardous reagent mixing areas must have adequate ventilation.

**R11-1-2039. Suitable warning signs at mixing area**

Suitable warning signs shall be posted at all reagent mixing areas, limiting entry and smoking where a hazard exists.

**R11-1-2040. Hydrogen storage**

Hydrogen shall be stored in an open area which shall be roofed to prevent direct sunlight from heating the containers. The area shall be posted with “No Smoking” or “Open Flame” signs.

**R11-1-2041. Reserved**

**R11-1-2099.**

**ARTICLE 21. ASSAY AND METALLURGICAL LABORATORIES**

The rules in this Article are adopted in accordance with the provisions of Article VII, Chapter 3, Title 27, Arizona Revised Statutes and A.R.S. §§ 27-304 and 27-305.

**R11-1-2100. Reserved**

**R11-1-2101. Mixing or heating of chemicals producing noxious fumes or gases**

All mixing or heating of chemicals that may produce noxious fumes or gases must be performed under a hood or performed in adequately ventilated enclosures.

**R11-1-2102. Hoods ventilated**

Hoods must be positively ventilated to the outside.

**R11-1-2103. Velocity of air moving through the hood**

There shall be sufficient velocity of air moving through the hood to remove all fumes or gas produced in the hood.

**R11-1-2104. When hood fails to exhaust properly**

When a hood fails to exhaust properly, it will be promptly reported to maintenance and repaired before being used again.

**R11-1-2105. No unplanned recirculation of exhaust air**

A means shall be provided to assure that no unplanned recirculation of exhaust air occurs.

**R11-1-2106. Involving the use of perchloric acid**

Hoods and ducts that are to be used in the digestion and/or evaporation, involving the use of perchloric acid must be made of chemically inert, non-combustible material and so constructed and designed that they can be thoroughly washed with water. The exhaust system shall discharge to a safe location and the fans be accessible for cleaning.

**R11-1-2107. Reserved**

**R11-1-2199.**

## **ARTICLE 22. CYANIDE LEACH OPERATIONS**

The rules in this Article are adopted in accordance with the provisions of Article 7, Chapter 3, Title 27, Arizona Revised Statutes and A.R.S. 27-124, 27-304, 27-305, 27-307, 27-311, 27-312, 27-412, and 27-462 and shall apply to cyanide leaching operations.

### **R11-1-2201. Reserved**

### **R11-1-2202. Cyanide safety training**

- A. Supervisors working in an area where cyanide is used or stored shall successfully complete a cyanide safety course conducted by the State Mine Inspector, prior to starting a cyanide leaching operation.
- B. Employees working in an area where cyanide is used or stored shall be indoctrinated in safety rules and safe work procedures by the supervisor during the first work shift.
- C. Employees working in an area where cyanide is used or stored shall complete a cyanide safety course conducted by the Arizona State Mine Inspector as soon as possible but no later than 30 days after the start of employment.

- D. Supervisors and employees working in an area where cyanide is used or stored shall possess a cyanide training certificate indicating the course completed and the date of completion. A copy of current certification shall be made available to the State Mine Inspector upon request.
- E. Supervisors and employees shall receive training required by this section at least once every 12 months.

**R11-1-2203. Posting of emergency procedures**

Cyanide first aid emergency procedures shall be posted and visible at the operation's main office and at each first aid station and in all area where cyanide is handled.

**R11-1-2204. Emergency provisions, cyanide antidote kits**

- A. Approved cyanide antidote kits for treatment of cyanide poisoning shall be made available at work places where cyanide is used, stored or handled or where there is a potential for exposure to hydrogen cyanide gas or dry or solution cyanide contamination.
- B. An approved cyanide antidote kit is one containing:
  - 1. Two dozen current amyl nitrite pearls for inhalation
  - 2. Two ampoules of sterile sodium nitrite solution for injection (10 milliliters of a 3-percent solution in each)

3. Two ampoules of sterile sodium thiosulfate for injection (50 milliliters of a 25-percent solution in each)
  4. Two sterile 10-milliliter syringes and one sterile 50-milliliter syringe with sterile intravenous needles
  5. One tourniquet to facilitate the administration of injectable medications
  6. One stomach tube to wash swallowed solutions from the stomach
- C. Contents of cyanide antidote kits shall be administered only by trained persons during a medical emergency and for the purpose of first aid procedures only. A trained person is one who has completed a cyanide safety course approved by the Arizona State Mine Inspector.
- D. In no case shall there be less than two cyanide antidote kits on the property unless removed during a medical emergency.
- E. Cyanide antidote kits contents shall be replaced and stored according to manufacturer's instructions and shall contain complete instructions for use.

**R11-1-2205. Conditions for employee working alone**

No employee shall be assigned or permitted to work alone in any area where hazardous conditions exist or may exist that would endanger the worker's

safety unless the worker can communicate with others in the immediate vicinity or can be visually observed at all times.

**R11-1-2206. Attendance**

No cyanide leaching operation shall be left unattended while cyanide is present in dry or solution form.

**R11-1-2207. Safety showers and eyewash facilities, EMERGENCY**

**WATER**

Safety showers and eye wash fountains shall be available in the areas where cyanide, caustics or acids are used or stored. Eye wash equipment shall be inspected and tested at regular intervals daily.

**R11-1-2208. Reserved**

**R11-1-2209. Fire protection**

Adequate fire protection and fire suppression apparatus shall be provided for all storage and mixing areas.

**R11-1-2210. Reserved**

**R11-1-2211. Personal protective equipment**

- A. Persons handling cyanide salts or solutions during the operation, mixing, maintenance and leaching procedures shall wear appropriate protective equipment consisting of, but not limited to eye protection, water resistant gloves, water resistant body protection, water resistant footwear, and a full-face chemical cartridge respirator, with a high efficiency filter, that is used for acid gas and that is approved by the Mine Safety and Health Administration (MSHA) and the National Institute of Occupational Safety and Health (NIOSH) according the requirements of 30 CFR part 11, Subparts A-G and L (10-1-92 edition and no later editions), on file with the Arizona State Mine Inspector's Office and the Office of the Secretary of State.
- B. All personal protective equipment shall be washed, cleaned or replaced after use and otherwise maintained in a safe, usable condition.

**R11-1-2212. Instruction on use of personal protective equipment**

All persons handling cyanide salts, solutions or open containers or other hazardous chemicals shall be instructed in the proper use of personal protective equipment prior to use.

**R11-1-2213. Spillage**

Chemical spills shall be immediately returned to circuit or rendered harmless in a way consistent with standards of the industry.

**R11-1-2214. Reporting spills or leaks to State Mine Inspector**

- A. Any unplanned release of a cyanide solution that may pose a threat to the health and safety of any employee or the general public shall be reported to the State Mine Inspector as soon as possible.
- B. Any release of HCN gas of 50 ppm or more shall be reported as soon as possible to the State Mine Inspector.
- C. All spills or releases shall be documented on a form provided by the State Mine Inspector.

**R11-2215. Reported suspected leaks or equipment failure**

Employees shall immediately report to their supervisor any leaks, or spills of cyanide and any equipment failure within the cyanide circuit. The supervisor shall take immediate remedial action.

**R11-1-2216. Circuit identification and posting**

- A. All lines and valves in cyanide circuits shall be identified.
- B. Potable water containers, sources or outlets shall be identified.

**R11-1-2217. “LOCK, TAG AND TEST” prior to work on ELECTRICAL circuit**

Prior to and during any maintenance or repair work on any portion of the system, the disconnect switch shall be locked out, tagged and the system tested. No persons, other than the person placing the locks shall remove them.

**R11-1-2218. HCN detection instrument**

When cyanide solution is utilized inside an enclosed structure an audible and visual HCN warning device shall be installed, and set to activate at an HCN concentration of 10 ppm.

**R11-1-2219. Ventilation**

Ventilation capable of keeping the HCN concentration at or below 10 ppm shall be provided in all enclosed structures where cyanide, either dry or in solution is used or stored.

**R11-1-2220. Reserved**

**R11-1-2221. Mixing tank**

The mixing tank shall be constructed in such a manner as to minimize any dust or gas generation.

**R11-1-2222. Reserved**

**R11-1-2223. Reserved**

**R11-1-2224. Maintain pH and records**

- A. The “make-up”/mixing solution shall be maintained at a pH of 12.0 or higher. The leaching solution shall be maintained at a pH of 10.5 or higher.
- B. A shift record shall be kept of pH levels and cyanide concentrations. These records shall be available upon request for inspection by the State Mine Inspector.

**R11-1-2225. Dry cyanide storage**

- A. Cyanide storage containers shall be stored in a secure and ventilated area.
- B. The secured storage area shall be posted with signs clearly indicating the hazard potential and safety precautions.

**R11-12226. Separated container storage**

Cyanide shall not be stored or transported where it may become exposed to or mixed with acidic agents, nitrates, peroxides or chlorates, or any agent capable of creating a hazardous reaction.

**R11-1-2227. Fencing**

Leaching pads, ponds and open tanks containing cyanide solutions and any portion of an operation containing hazardous amounts of cyanide or other chemicals shall be fenced to restrict unauthorized entry by persons or entry by animals.

**R11-1-2228. Warning Signs**

- A. Suitable warning signs shall be posted at all gates and other points of entry to any cyanide leach operation.
- B. Signs shall be posted on fencing at a minimum of 100 foot intervals and at each corner and shall be clearly visible and maintained so they may be easily seen and identified from a distance of 50 feet.

**R11-1-2229. Drum disposal**

Empty, non-returnable cyanide containers shall be flushed at least three times with a large volume of water and flushing shall continue until no cyanide remains in the drum. Drum labels shall be removed or obliterated and drums destroyed. The flush water shall be returned to the circuit.

**R11-1-2230. Reserved**

**R11-1-2231. Cyanide circuit protection**

- A. Cyanide leach pads, solution ponds and other areas which may contain cyanide solutions within the circuit shall have an impervious liner of a material that will prevent its penetration by the cyanide solution.
- B. An overflow safety pond or similar solution retention area shall be constructed to receive and contain all potential overflow from the leach pad and pregnant solution pond.

**R11-1-2232. Waste lines**

All lines from emergency shower, wash areas, or other cyanide waste sources shall be returned to the circuit.

**R11-1-2233. Inspections and maintenance**

All leach pads and solution ponds shall be inspected and maintained so as to prevent any accidental cyanide solution release outside the protected circuit.

**R11-1-2234. Reserved**

**R11-1-2235. Operator responsibility-shutdown**

- A. The operator shall give written notice to the State Mine Inspector prior to:
  - 1. Abandoning the property; and, or
  - 2. Suspending operations for more than 30 days; or
  - 3. Closing the operation
- B. The operator shall be responsible for treating and testing all pads, ponds or other cyanide use areas. Test results of free cyanide shall be forwarded to the State Mine Inspector upon completion and shall be available for inspection upon request.

**R11-1-2236. Receipt, off-loading, Storage of Liquid Cyanide Solution**

- A. Tank trucks will be visually inspected for leaks before they are allowed to enter the plant.
- B. Off-loading shall be performed only when lighting is available.
- C. The off-loading pad shall be constructed of an impervious base material and be arranged so liquid spillage will drain away from the truck and exposed structures and into the storage tank containment area. The pad shall be of sufficient length to allow the truck and trailer a minimum of 4-foot clearance at each end and a

minimum of 2-foot clearance on each side. The vehicle must be positioned in a manner to allow forward movement away from off-loading pad.

- D. Only qualified and properly trained employees shall operate the truck and make the off-loading or loading hook-up. A qualified and properly trained employee is one who has an Arizona commercial drivers license with a current endorsement authorizing operation of a motor vehicle transporting hazardous materials, hazardous substances or hazardous waste as defined by A.R.S. 28-2401, or the equivalent license and endorsement from another state.
- E. Truck parking brakes shall be set and, where necessary, the wheels blocked during off-loading and loading.
- F. Warning signs shall be placed at all areas where cyanide is loaded and off-loaded.
- G. Piping shall be arranged so the cyanide will drain toward the storage tank when the discharge valve is closed.
- H. All pump packing and thrust seals at shaft shall be provided with splash guards in cases where personnel would be exposed to cyanide leaks or sprays.
- I. Safety chains shall be used at all cyanide hose connections.

- J. All storage tanks shall be adequately bermed, diked or otherwise protected, with an impervious base material, designed to hold the maximum capacity of the tank in the event of a spill or rupture.

