Chapter ILHR 8

MINES, PITS AND QUARRIES

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Note: Chapter Ind 3 as it existed on June 30, 1983 was renumbered as ch. ILHR 8 and revised, effective July 1, 1983.

ILHR 8.001 Scope. The provisions of this chapter shall apply to all openings or excavations in the earth for the purpose of extracting minerals or other materials and the equipment related to processing or manufacturing of ores, aggregates, cements, lime, clay and silica sands.

Note: The department of natural resources has administrative rules concerning metallic mineral exploration, metallic mineral prospecting and metallic mineral mining.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.002 Application. The provisions of this chapter shall apply to both existing mines, pits and quarries and to those established after the effective date of these rules, unless specifically stated otherwise in the rule.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.003 Saving and severable clauses.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83; r. under s. 13.93 (2m) (b) 16, Stats., Register, September, 1984, No. 345.

ILHR 8.01 Definitions. (1) "Abandoned mine" means a mine in which all work has stopped on the mine premises and an office with a responsible person in charge is no longer maintained at the mine.

(2) "Abandoned workings" means deserted mine areas in which further work is not intended.

(3) "Active workings" means areas at, in, or around a mine or plant where persons work or travel.

(4) "American Table of Distances" means "The American Table of Distances for Storage of Explosives" published by the institute of makers of explosives.

(5) "Approved" means accepted by the department.

(6) "Authorized person" means a person approved or assigned by mine management to perform a specific type of duty or duties or to be at a specific location or locations in the mine.

(7) "Auxiliary fan" means a fan used to deliver air to a working place off the main airstream; generally used with ventilation tubing.

(8) "Barricaded" means obstructed to prevent the passage of persons, vehicles, or flying materials.

(9) "Berm" means a pile or mound of material capable of restraining a vehicle.

(10) "Blasting agent" means any material or mixture consisting of a fuel and oxidizer intended for blasting, not otherwise classified as an explosive and in which none of the ingredients is classified as an explosive, provided that the material or mixture cannot be detonated by a No. 8 test blasting cap under the conditions specified for the cap sensitivity test.

(11) "Blasting area" means the area near blasting operations in which concussion or flying material can reasonably be expected to cause injury.

(12) "Blasting cap" means a detonator which is initiated by a safety fuse.

(13) "Blasting circuit" means the electrical circuit used to fire one or more electric blasting caps.

(14) "Blasting switch" means a switch used to connect a power source to a blasting circuit.

(15) "Booster" means any unit of explosive or blasting agent used for the purpose of perpetuating or intensifying an initial detonation.

(16) "Booster fan" means a fan installed in the main airstream or a split of the main airstream to increase airflow through a section or sections of a mine.

(17) "Capped fuse" means a length of safety fuse to which a blasting cap has been attached.

(18) "Capped primer" means a package or cartridge of explosives which is specifically designed to transmit detonation to other explosives and which contains a detonator.

(19) "Circuit breaker" means a device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent setting without injury to itself when properly applied within its rating.

(20) "Combustible" means capable of being ignited and consumed by fire.

(21) "Company official" means a member of the company supervisory or technical staff.

(22) "Competent person" means a person having abilities and experience that fully qualify such person to perform the duty assigned.

(23) "Conductor" means a material, usually in the form of a wire, cable or bus bar, capable of carrying an electric current.

(24) "Delay connector" means a nonelectric short interval delay device for use in delaying blasts which are initiated by detonating cord.

(25) "Department" means the department of industry, labor and human relations.

(26) "Detonating cord" means a flexible cord containing a solid core of high explosives.

(27) "Detonator" means any device containing a detonating charge that is used to initiate an explosive and includes but is not limited to blasting caps, electric blasting caps and nonelectric instantaneous or delay blasting caps.

(28) "Distribution box" means a portable apparatus with an enclosure through which an electric circuit is carried to one or more cables from a single incoming feed line, each cable circuit being connected through individual over-current protective devices.

(29) "Electric blasting cap" means a detonator designed for and capable of being initiated by means of an electric current.

(30) "Electrical grounding" means to connect with the ground to make the earth part of the circuit.

(31) "Employe" means a person who works for wages or salary in the service of an employer.

(32) "Employer" means a person or organization which hires one or more persons to work for wages or salary.

(33) "Escapeway" means a passageway by which persons may leave if the ordinary exit is obstructed.

(34) "Excavation" or "workings" as defined in s. 101.15 (2) (a) 3., Stats., means any or all parts of a mine excavated or being excavated, including shafts, tunnels, drifts, cross cuts, raises, winzes, stopes and all other working places in a mine.

(35) "Explosive" means 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 both gas and heat, unless such compound, mixture or device is otherwise classified by the department.

(36) "Face or bank" means that part of any mine, pit or quarry where excavating is progressing or was last done.

(37) "Fire door" means an openable closure for a passageway, shaft or other mine opening to serve as barrier to fire, the effects of fire, and air leakage.

(38) "Flammable" means capable of being easily ignited and of burning rapidly.

(39) "Flash point" means the minimum temperature at which sufficient vapor is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure.

(40) "Highway" means any public street, public alley or public road.

(41) "High potential" means more than 650 volts.

(42) "Hoist" means a power driven windlass or drum used for raising ore, rock, or other material from a mine, and for lowering or raising persons and material.

(43) "Igniter cord" means a fuse, cordlike in appearance, which burns progressively along its length with an external flame at the zone of burning, and is used for lighting a series of safety fuses in the desired sequence.

(44) "Insulated" means separated from other conducting surfaces by a dielectric substance permanently offering a high resistance to the passage of current and to disruptive discharge through the substance. When any substance is said to be insulated, it is understood to be insulated in a manner suitable for the conditions to which it is subjected. Otherwise, it is, within the purpose of this definition, uninsulated. Insulating covering is one means for making the conductor insulated.

(45) "Insulation" means a dielectric substance offering a high resistance to the passage of current and to a disruptive discharge through the substance.

(46) "Lay" means the distance parallel to the axis of the rope in which a strand makes one complete turn about the axis of the rope.

(47) "Low potential" means 650 volts or less.

(48) "Magazine" means a facility for the storage of explosives, blasting agents or detonators.

(49) "Main fan" means a fan that controls the entire airflow of the mine, or the airflow of one of the major air circuits.

(50) "Major electrical installation" means an assemblage of stationary electrical equipment for the generation, transmission, distribution or conversion of electrical power.

(51) "Man-trip" means a trip on which persons are transported to and from a work area.

(52) "Mill" includes any ore mill, sampling works, concentrator, and any crushing, grinding, screening or other preparation plant used at, and in connection with, an excavation, mine, pit or quarry.

(53) "Mine" means a surface or underground opening or excavation in the earth for the purpose of extracting minerals or other materials.

(54) "Mine opening" means any opening or entrance from the surface into a mine.

(55) "Mineral", as defined in s. 101.15 (2) (a) 2., Stats., means a product recognized by standard authorities as mineral, whether metalliferous or nonmetalliferous.

(56) "Misfire" means the complete or partial failure of a blasting charge to explode as planned.

(57) "Multipurpose dry-chemical fire extinguisher" means a listed or approved multipurpose dry-chemical fire extinguisher having a minimum rating of 2-A:10-B:C, by Underwriters' Laboratories, Inc., and containing a minimum of 4.5 pounds of dry-chemical agent.

(58) "Nonelectric delay blasting cap" means a detonator with an integral delay element and capable of being initiated by miniaturized detonating cord.

(59) "Operator" means the person or firm that operates or is responsible for an excavation in the earth for the purpose of extracting minerals or other materials, or for the crushing, screening or washing equipment.

(60) "Overburden" means material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials or ores that are to be mined.

(61) "Overload" means that current which will cause an excessive or dangerous temperature in the conductor or conductor insulation.

(62) "Permissible" means a machine, material, apparatus or device which has been investigated and approved by the department, and which is maintained in permissible condition.

(63) "Pit" means a surface opening or excavation in the earth for the purpose of extracting minerals or other materials.

(64) "Potable water" means water which is satisfactory for human consumption, hygiene and culinary use and meets the applicable health requirements of the department.

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

(66) "Primer" means a unit, package or cartridge of explosives used to initiate other explosives or blasting agents, and which contains a detonator.

(67) "Quarry" means a surface opening or excavation in the earth for the purpose of extracting nonmetallic minerals or other nonmetallic materials.

(68) "Reverse-current protection" means a method or device used on direct-current circuits or equipment to prevent the flow of current in a reverse direction.

(69) "Roll protection" means a framework, safety canopy or similar protection for the operator when equipment overturns.

(70) "Safety can" means an approved container, of not over 5 gallons capacity, having a spring-closing lid and spout cover.

(71) "Safety fuse" means a flexible cord containing an internal burning medium by which fire is conveyed at a continuous and uniform rate for the purpose of firing blasting caps or a black powder charge.

(72) "Safety switch" means a sectionalizing switch that also provides shunt protection in blasting circuits between the blasting switch and the shot area.

(73) "Scaling" means removal of insecure material from a face or highwall.

(74) "Secondary safety connection" means a second connection between a conveyance and rope, intended to prevent the conveyance from running away or falling in the event the primary connection fails.

(75) "Shaft", as defined in s. 101.15 (2) (a) 1., Stats., means an opening made for mining minerals, for hoisting and lowering persons or material, or for ventilating underground workings.

(76) "Short circuit" means an abnormal connection of relatively low resistance, whether made accidentally or intentionally, between two points of different potential in a circuit.

(77) "Slurry" (as applied to blasting) See "Water gel".

(78) "Stray current" means that portion of a total electric current that flows through paths other than the intended circuit.

(79) "Signs" means a communication conspicuously posted, legible, having a contrasting background and a legend composed of block letters.

(80) "Substantial construction" means construction of such strength, material and workmanship that the object will withstand all reasonable shock, wear and usage to which it will be subjected.

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

(82) "Travelway" means a passage, walk or way regularly used and designated for persons to go from one place to another.

(83) "Trip light" means a light displayed on the opposite end of a train from the locomotive or engine.

(84) "Water gel" or "Slurry" (as applied to blasting) means an explosive or blasting agent containing substantial portions of water.

(85) "Wet drilling" means the continuous application of water through the central hold of hollow drill steel to the bottom of the drill hole.

(86) "Working level" or "WL" means any combination of the short-lived radon daughters in one liter of air that will result in ultimate emission of 1.3×10^5 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 1 WL for 173 hours results in an exposure of 1 WLM.

(87) "Working place" means any place in or about a mine where work is being performed.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.02 Notification to begin operation. (1) Each year before work is commenced in a pit or quarry, the pit or quarry operator shall complete and return to the department form SBD 6736, Notice to Begin Operation, for each pit or quarry. The notification shall be returned to the de-

partment at least 10 days prior to the beginning of work in each pit or quarry.

Note #1: The notice is required from the operator for all pits and quarries where work is performed, whether or not the operator owns the pit or quarry. Only one initial notice is required for a pit or quarry where work is performed on an intermittent basis during the year.

Note #2: Copies of form SBD 6736 are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

(2) Each year before work is commenced in a pit or quarry, the pit or quarry operator shall notify the local sheriff and make arrangements for obtaining emergency medical assistance and transportation for injured persons.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.03 Permits. Before an excavation of a shaft may be commenced, a permit shall be obtained from the department. As provided by s. 101.15 (2) (c), Stats., this requirement does not apply to shafts which will be less than 50 feet in depth wherein persons are not employed, or which are not equipped with power driven hoists used for hoisting persons in and out of the shafts, or which are not covered with a flammable building.

(1) APPLICATION FOR PERMIT. Application for a shaft excavation shall be made on form SBD 52, Mine Shaft Excavation Permit Application, prescribed by the department.

Note #1: Copies of form SBD 52 are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

Note #2: See s. ILHR 8.04 for permit fees.

(2) PLANS AND SPECIFICATIONS. Plans and specifications shall be submitted at the time of application for shaft excavation permits which show that the shaft, excavation and workings are to be in compliance with the provisions of this chapter.

(3) PERMIT PROCESSING TIME. The department shall review and make a determination on a shaft excavation permit application within 30 business days of receiving the required information and fees.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83; cr. (3), Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 8.04 Fees. (1) INSPECTION FEES. An annual safety service fee, special inspection fee and drill rig inspection fee shall be submitted to the department as specified in ch. Ind 69, Wis. Adm. Code.

(2) FEE FOR ISSUANCE OF PERMIT. A fee as specified in ch. Ind 69, Wis. Adm. Code, shall be submitted for all shaft excavation permits issued by the department at the time of permit application.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.05 Petitions for variance. (1) PROCEDURE. The department shall consider and may grant a variance to an administrative rule upon receipt of a fee and a completed petition for variance form from the owner, provided an equivalency is established in the petition for variance which meets the intent of the rule being petitioned. The department may impose specific conditions in a petition for variance to promote the protection of the health, safety or welfare of the employes or the public. Viola-

tion of those conditions under which the petition for variance is granted constitutes a violation of these rules.

(2) PETITION PROCESSING TIME. Except for priority petitions, the department shall review and make a determination on a petition for variance within 30 business days of receipt of all calculations, documents and fees required to complete the review. The department shall process priority petitions within 10 business days.

Note: Copies of the petition for variance (form SB-8) are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83; am. Register, September, 1984, No. 345, eff. 10-1-84; cr. (2), Register, February, 1985, No. 350, eff. 3-1-85.

ILHR 8.06 Inspections. (1) GENERAL REQUIREMENTS. The authorized inspectors of the department, upon presenting appropriate credentials to the owner, operator or agent in charge, are authorized to:

(a) Enter without delay and at reasonable times any factory, plant, establishment, construction site, or other area, workplace or environment where work is performed by an employe of an employer; and

(b) Inspect and investigate during regular working hours and at other reasonable times, and within reasonably limits and in a reasonable manner, any such place of employment and all pertinent conditions, structures, machines, apparatus, devices, equipment, and materials therein, and to question privately any such employer, owner, operator, agent or employe.

(2) REPRESENTATION. The inspector, before making an inspection, shall contact the employer or employers representative who shall be given an opportunity to accompany the inspector during the physical inspection of any workplace under sub. (1).

Note #1: The department policy is not to give advance notice but in the scheduling and in the act of inspecting it may not always be possible to avoid advance notice or to obtain accompaniment, but otherwise these rules will be diligently observed.

Note #2: See s. ILHR 8.04 for inspection fees.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.07 Penalties. The department may impose penalties and obtain additional remedies for violations of this chapter, as provided in ss. 101.02 (13) and 101.15 (2) (f) 2., Stats.

Note #1: Section 101.02 (13) (a), Stats. If any employer, employe, owner, or other person violates ss. 101.01 to 101.25, Stats., or fails or refuses to perform any duty lawfully enjoined, within the time prescribed by the department, for which no penalty has been specifically provided, or fails, neglects or refuses to obey any lawful order given or made by the department, or any judgment or decree made by any court in connection with ss. 101.01 to 101.25, Stats., for each such violation, failure or refusal, such employer, employe, owner or other person shall forfeit and pay into the state treasury a sum not less than $10 or more than $100 for each such offense.

Note #2: Section 101.15 (2) (f) 2., Stats. The department may apply to a court of record for the closing of any underground mine, quarry, pit, zinc works or other excavation where the same is being operated in violation of any of its rules or orders, and the owners or operators have failed within a reasonable time to correct any unsafe methods of operation. The failure of any owner or operator to comply with the order or judgment of the court shall subject such party or parties to criminal contempt proceedings.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

Register, February, 1985, No. 350

ILHR 8.08 Adoption of standards. (1) GENERAL. Pursuant to s. 227.025, Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the following standards:

(a) American Conference of Governmental Industrial Hygienists (ACGIH) Standard; THRESHOLD LIMIT VALUES FOR CHEMICAL SUBSTANCES IN WORKROOM AIR ADOPTED BY ACGIH FOR 1982; and

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(b) American National Standards Institute (ANSI) Standards:

1. Practices for Respiratory Protection, ANSI Z88.2-1980;

2. Radiation Protection in Uranium Mines, ANSI N13.8-1973; and

3. General Purpose Sound Level Meters, ANSI S1.4-1971 (R1976).

(2) INTERIM AMENDMENTS. Interim amendments of the standards in sub. (1), shall have no effect in the state until such time as this section is correspondingly revised to reflect the changes.

(3) COPIES OF STANDARDS. Copies of the standards are on file in the offices of the department, the secretary of state and the revisor of statutes. Copies for personal use may be obtained, at a cost, from the organizations listed.

(a) ACGIH STANDARDS. American Conference of Governmental Industrial Hygienists, P.O. Box 1937, Cincinnati, Ohio 45201.

(b) ANSI STANDARDS. American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.10 Ground control.

SURFACE ONLY

(1) Standards acceptable to the department for the safe control of pit walls, including the overall slope of the pit wall, shall be established and followed by the operator. Such standards shall be consistent with prudent engineering design, the nature of the ground and the kind of material and mineral mined, and shall insure safe working conditions according to the degree of slope. Mining methods shall be selected which will insure wall and bank stability, including benching as necessary to obtain a safe overall slope.

(2) 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, and the loose, unconsolidated material shall be sloped to the angle of repose.

(3) To insure safe operation, the width and height of benches shall be governed by the type of equipment to be used and the operation to be performed.

(4) Safe means for scaling pit banks shall be provided. Where power shovels are used for scaling, banks shall be limited to heights that can be scaled with the shovel buckets. Exposed bank areas shall be scaled before any other work is performed in the exposed bank area.

(5) Persons shall not work near or under dangerous banks. Overhanging banks shall be taken down immediately and other unsafe ground conditions shall be corrected promptly, or the areas shall be barricaded and posted with warning signs.

(6) Persons shall approach loose rock and areas to be scaled from above and shall scale from a safe location.

(7) The supervisor, or a competent person designated by the supervisor, shall examine working areas and faces for unsafe conditions at least

at the beginning of each shift and after blasting. Any unsafe condition found shall be corrected before any further work is performed at the immediate area or face at which the unsafe condition exists.

(8) Persons shall examine their working places before starting work and frequently thereafter and any unsafe condition shall be corrected.

(9) Banks, benches and terrain sloping into the working areas shall be examined after every rain, freeze or thaw before persons work in such areas.

(10) Persons shall not work between equipment and the pit wall or bank where the equipment may hinder escape from falls or slides of the bank.

UNDERGROUND ONLY

(20) Ground support shall be used if the operating experience of the mine, or any particular area of the mine, indicates that it is required. If it is required, support, including timbering, rock-bolted reinforcing, or other methods shall be consistent with the nature of the ground and the mining method used.

(21) Miners shall examine and test the back, face, and rib of their working places at the beginning of each shift and frequently thereafter. Supervisors shall examine the ground conditions during daily visits to insure that proper testing and ground control practices are being followed. Loose ground shall be taken down or adequately supported before any other work is done. Ground conditions along haulageways and travelways shall be examined periodically and scaled or supported as necessary.

(22) Timbers used for support of ground in active workings shall be set blocked, or blocked and wedged so that a tight fit is achieved. Damaged, loosened, or dislodged timbers which create a hazardous condition shall be promptly repaired or replaced.

(23) Shaft pillars or other support systems shall have sufficient strength to support operating shafts.

(24) Calibrated torque meters or torque wrenches shall be available at mines where rock-bolts which require torquing are used for ground control. Periodic tests shall be made to determine the torque meter or torque wrench accuracy. Periodic testing of torque wrenches means when repaired or at least annually, and whenever a torque wrench is suspected of being inaccurate or damaged.

(25) Operators of mines that have experienced rock bursts within the mine shall develop a comprehensive rock burst detection plan applicable to current conditions in that mine within 90 days after the effective date of this chapter or, thereafter, within 90 days after a rock burst has been experienced. This plan shall be updated from time to time as conditions and available technology warrant. This comprehensive rock burst detection plan shall be available to the department or its authorized representative, and to mine employees.

GENERAL-SURFACE AND UNDERGROUND

(50) Material, other than hanging material, to be broken by secondary drilling and blasting, or by any other method shall be positioned or

blocked to prevent hazardous movement before persons commence breaking operations. Persons who perform those operations shall work from a location where, if movement of material occurs, those persons will not be endangered.

(51) Where manual scaling may be required at a work place, a scaling bar at least 6 feet in length 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.

(52) When rock-bolts are used as a means of ground support, anchorage test procedures shall be established and tests shall be conducted to determine the anchorage capacity of rock-bolt installations. Test results shall be in writing and made available to the department or its authorized representative.

(53) Rock-bolts used as a means of ground support and which require torquing shall be torqued to a value within the range determined from information obtained by tests in the strata in which the rock-bolt assembly is used. In no case shall the applied torque cause a bolt tension that would exceed the yield point or anchorage capacity of the rock-bolt assembly being used.

(54) When installing point-anchor rock-bolts which require torquing:

(a) A torque test shall be conducted on at least every fourth installed bolt;

(b) Torque testing shall be conducted immediately after bolt installation;

(c) If the recommended torque has not been achieved, the equipment used to install the bolt shall be adjusted and the next bolt installed shall then be tested; and

(d) If the recommended torque has not been achieved on the majority of bolts installed in a working place through equipment adjustment, supplemental support equivalent to longer roof bolts with adequate anchorage, steel or wood sets, or cribs shall be installed.

(55) Rock-bolt hole drill bits shall be easily identifiable by sight or feel and diameters shall be within a tolerance of $\pm$ 0.030 inches of the manufacturer's recommended hole diameter for the anchor used.

(56) If used in rock-bolt assemblies to reduce friction between the bolt head and the bearing plate, washers shall:

(a) Have hardness in the range of 35-45 HRC (Hardness Rockwell C Scale);

(b) Conform to the shape of the bolt head and bearing plate; and

(c) Have sufficient strength to withstand loads up to the yield point of the rock-bolt.

(57) When rock-bolts are needed for ground support, they shall be installed as soon as practicable after an area is exposed.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.11 Fire prevention and control.

GENERAL-SURFACE AND UNDERGROUND

(1) No person may smoke or use an open flame:

(a) Where flammable solvents, liquids, fluids, or other flammable materials are stored, transported, handled, or used;

(b) Where oil or grease is stored, transported, handled, or used, if smoking or the use of an open flame may cause a fire; or

(c) Within an unsafe distance of any area where smoking or the use of an open flame may cause a fire or an explosion.

(2) Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

(3) Areas surrounding electric substations, transformers, explosive magazines and unburied tanks used for the storage of flammable or combustible liquids shall be free of combustible materials (including dry vegetation) for a distance of at least 25 feet.

(4) Flammable and combustible liquids shall be stored and handled in accordance with ch. Ind 8, Wis. Adm. Code. Small quantities of flammable and combustible liquids drawn from storage shall be kept in appropriately labeled safety cans.

(5) Means shall be provided to confine, remove, control or drain away spilled or flowing flammable liquids.

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

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

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

(9) Abandoned electrical circuits shall be deenergized and isolated so that they cannot become energized inadvertently.

(10) Combustible materials, grease, lubricants or flammable liquids shall not be allowed to accumulate where they can create a fire hazard.

(11) Materials, such as oily waste and rags, which are subject to spontaneous combustion shall be placed in tightly covered metal containers until disposed of properly.

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

(13) Solvents shall not be used near an open flame or other ignition source, or near any source of heat, or in an atmosphere that can elevate the temperature of the solvent above the flash point.

(14) 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.

(15) Floors around drip pans shall be covered with sand or other suitable noncombustible material and such sand or material shall be replaced as necessary.

(16) Oxygen cylinders shall not be stored near oil or grease.

(17) Gauges and regulators used with oxygen or acetylene cylinders shall be kept clean and free of oil and grease.

(18) Battery-charging stations shall be located in well-ventilated areas.

(19) Equipment powered by internal combustion engines except diesel engines, where the fuel tank is an integral part of the equipment, shall be shut off and stopped before being fueled.

(20) Each mine shall have available or be provided with suitable fire fighting equipment adequate for the size of the mine.

(21) Fire fighting equipment which is provided on the mine property shall be strategically located, readily accessible, plainly marked, properly maintained and inspected periodically. Records shall be kept of such inspections.

(22) Fire extinguishers and fire suppression devices shall be:

(a) Of the appropriate type for the particular fire hazard involved;

(b) Adequate in number and size for the particular fire hazard involved;

(c) Replaced immediately with a fully charged extinguisher or device after any discharge is made from the extinguisher or device;

(d) Inspected, tested and maintained at regular intervals according to the manufacturer's recommendations; and

(e) Approved by the Underwriters' Laboratories, Inc., or other competent testing agency acceptable to the department.

(23) Whenever fire hydrants are used, they shall be provided with:

(a) Uniform fittings;

(b) Readily available wrenches or keys to open the valves; and

(c) Readily available adapters that connect hydrant fittings to the hose equipment of local fire departments.

(24) Water pipes, valves, outlets, hydrants and hoses designated for fire fighting purposes shall be inspected every 90 days and tested annually.

(25) Whenever self-propelled mobile equipment with an enclosed cab is used, such equipment shall be provided with a suitable fire extinguisher readily accessible to the equipment operator.

(26) Welding, cutting, arc welding or soldering shall be performed by a competent person.

(27) 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.

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

(29) Before any heat is applied to pipelines or containers which have contained flammable or combustible substances, they shall be drained, ventilated, thoroughly cleaned of residual substances and filled with either an inert gas or, where compatible, filled with water.

SURFACE ONLY

(40) 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 a fire.

(41) Every building or structure where persons normally work shall be provided with exits sufficient to permit the prompt escape of persons in case of fire.

(42) (a) No combustible materials may be permitted within 100 feet of main and booster fans and underground mine openings, except for one day's requirements of mine materials or supplies. However, such supplies or materials shall not be permitted within 25 feet of mine openings.

(b) In this chapter, the phrase "combustible materials" includes dry vegetation which is within 25 feet of mine openings but does not include installed wiring, ground support and track support, headframes, any materials in transit, or any buildings and other structures in compliance with sub. (43).

(43) Buildings and other similar structures, which are within 100 feet of mine openings used for intake air and mine openings that are designated escapeways in exhaust air, shall be constructed in compliance with chs. Ind 50 to 64, Wis. Adm. Code.

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

(a) Mine openings;

(b) Buildings or snowsheds connected to mine openings;

(c) Fan installations or housings; or

(d) Hoist houses.

(45) Belt conveyors shall be equipped with a safety switch capable of automatically stopping the drive pulley in the event of excessive slippage of the belt, where ignition of the belt could create a hazard to personnel. When it is necessary to operate the conveyor while temporarily by-passing the safety switch or any automatic function of the switch, a person shall attend the belt at the drive pulley.

(46) All employes 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 instruction shall be kept for 2 years.

UNDERGROUND ONLY

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

(51) Fire alarm systems adequate to warn all employes shall be provided and maintained in operating condition.

(52) Gasoline shall not be stored, taken or used underground.

(53) The use of liquefied petroleum gases shall comply with the provisions of ch. Ind 9, Wis. Adm. Code.

(54) 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.

(55) Transformer stations, pump rooms, compressor rooms and similar installations, which are located in timbered areas or in areas where exposed rock is combustible, shall be provided with suitable fire protection.

(56) Trailing cables shall be fire-resistant.

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

(58) (a) To prevent the spread of smoke or gas in the event of a fire, ventilation doors shall be installed at or near shaft stations of intake shafts and at any shaft designated as an escapeway as specified in s. ILHR 8.18 (53), or at other locations which provide equivalent protection. The location and relocation of doors required by this subsection shall be submitted for review and approval by the department upon written request.

(b) Doors required by this subsection shall be:

1. Constructed and maintained in accordance with s. ILHR 8.12 (31);

2. Constructed according to the specifications within the definition of "fire door", if located in a timbered area, in an area where the exposed rock is combustible, or in an area where a significant fire hazard is present;

3. Provided with a means of remote closure unless other means of closing the door are assured;

4. Constructed so that, once closed, they will not reopen as a result of a differential in air pressure;

5. Constructed so that they can be opened from either side by one person, or provided with a man door that can be opened from either side; and

6. Kept clear of obstructions and extraneous materials.

(59) (a) To confine or prevent the spread of toxic gases from a fire originating in an underground shop, the mine operator shall install in each opening to the shop a fire door or bulkhead constructed in accordance with the definition of "fire door".

(b) Each fire door shall be:

1. Constructed so that, once closed, it will not reopen as a result of a differential in air pressure;

2. Constructed so that it can be opened from either side by one person or be provided with a man door that can be opened from either side;

3. Suitably airtight; and

4. Kept clear of obstructions and extraneous materials.

(c) This subsection shall not apply when mine shop exhaust air is routed directly to an exhaust system in such a manner that personnel would not be exposed to toxic gases in the event of a fire originating in the underground shop.

(60) Timber in mine entrances shall be fire-retardant to the extent that the flame spread rating shall be 25 or less for at least 200 feet inside the mine portal or collar, or the mine entrance shall be provided with fire protection capable of controlling a fire for at least 200 feet inside the mine portal or collar.

(61) Waterline outlets located at shaft stations shall have at least one fitting suitably located for, and capable of, immediate connection to fire fighting equipment.

(62) Suitable fire protection shall be provided at the head, tail, drive and takeup pulleys of belt conveyors and at intervals along the belt line.

(63) A mine rescue station equipped with at least 10 sets of approved and properly maintained 2-hour 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.

(64) 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.

(65) At mines employing 75 or more persons underground, at least 2 rescue crews (10 persons) shall be trained at least annually in the use, care, and limitations of self-contained breathing and fire fighting apparatus and in mine-rescue procedures. Smaller mines shall have at least one person so trained for each 10 persons employed underground.

(66) Only trained mine rescue team members shall participate in rescue and fire fighting operations in advance of the fresh air base.

(67) Mine evacuation drills shall be held for each shift once every 6 months. Record of such drills, showing the time and date, shall be kept for at least 2 years after each drill. These evacuation drills shall involve all employes on each shift and shall include:

(a) Activation of the fire-alarm system; and

(b) Evacuation of all persons from their work areas to the surface or to designated central evacuation points at some time other than a shift change.

(68) All employes 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 employes shall receive such instructions before going underground. Whenever an employe is assigned to work in another area of the mine, such employe shall be instructed on the escapeway for that area at the time of such assignment. However, employes who normally work in more than one area of the mine shall be instructed at least once each calendar year in the location 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 employes shall be instructed of such change. Records of instruction shall be kept for 2 years.

(69) Belt conveyors shall be equipped with slippage and sequence switches.

(70) Where welding or cutting with an arc or open flame, or thawing pipes electrically, excluding heat tape, or soldering with an open flame, a multipurpose dry-chemical fire extinguisher shall be provided.

(71) Where welding or cutting with an arc of open flame, or thawing pipes electrically, excluding heat tape, within 35 feet, or where soldering with an open flame within 10 feet, of more than one gallon of combustible liquid, unless the combustible liquid is in a closed noncombustible metal container, or more than 50 pounds of nonfire-retardant wood, or more than 10 pounds of combustible plastic, the following precautions, in addition to a multipurpose dry-chemical fire extinguisher, shall be taken:

(a) A second multipurpose dry-chemical fire extinguisher, or fire extinguishing equipment having equivalent extinguishing capability and appropriate for the particular hazard involved, shall be provided;

(b) The combustible materials and the area between them and the operation shall be wetted down with the necessary precautions taken against electrical shock, before and after the operation. If wetting down is not practical, then the combustibles shall be isolated by noncombustible material or the operation shall be shielded to insure that smoldering metal or sparks do not result in a fire;

(c) If the precautions in par. (b) are not practical, then a second person shall be present to observe and extinguish fires; and

(d) Inspection of the affected areas shall be made during the first hour after the operation is terminated. If the mine operator deems that working conditions and the degree of potential hazard warrant it, additional inspections shall be made or other extra-precautionary measures shall be taken.

(72) Where welding or cutting with an arc or open flame, or thawing pipes electrically, excluding heat tape, in or within 35 feet, or where soldering with an open flame in or within 10 feet, of a shaft, raise, or winze and where there is a risk that combustible materials may be ignited by falling sparks or heated material, the following precautions, in addition to a multipurpose dry-chemical fire extinguisher, shall be taken:

(a) A second multipurpose dry-chemical fire extinguisher, or fire extinguishing equipment having equivalent extinguishing capability and appropriate for the particular hazard involved, shall be provided;

(b) The combustible materials and the area between them and the operation shall be wetted down with the necessary precautions taken against electrical shock, before and after the operation. If wetting down is not practical, then the combustibles shall be isolated by noncombustible material or the operation shall be shielded to insure that smoldering metal or sparks do not result in a fire;

(c) Or, if practical, the opening immediately below or adjacent to the operation shall be covered or bulkheaded with a noncombustible material;

(d) If the precautions in par. (b) or (c) are not practical, then a second person shall be present to observe and extinguish fires; and

(e) Inspection of the affected area shall be made during the first hour after the operation is terminated. If the mine operator deems that working conditions and the degree of potential hazard warrant it, additional inspections shall be made or other extra-precautionary measures shall be taken.

(73) Stationary diesel equipment shall not be supported on a combustible base.

(74) Stationary diesel equipment shall be provided with a thermal sensor which automatically stops the diesel engine should overheating occur.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.12 Air quality, ventilation, radiation, and physical agents.

AIR QUALITY
GENERAL - SURFACE AND UNDERGROUND

(1) Except as permitted in sub. (4), the following requirements shall be met:

(a) Except as provided in par. (b), 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 Hygienists, as set forth and explained in the 1982 edition of the Conference's publication, entitled "Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1982," which is incorporated by reference in s. ILHR 8.08. Excursions above the listed thresholds shall not be of a greater magnitude than is characterized as permissible by the Conference.

(b) The 8-hour time-weighted average airborne concentration of asbestos dust to which employes are exposed shall not exceed 2 fibers greater than 5 microns in length, per milliliter, as determined by the membrane filter method at 400-450 magnification (4 millimeter objective) phase contrast illumination. No employes may be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers longer than 5 microns, 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 up of fibrils. Although there are many asbestos minerals, the term "asbestos" as used herein is limited to the following minerals: chrysotile, amosite, crocidolite, anthophylite asbestos, tremolite asbestos and actinolite asbestos.

(c) Employes 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.

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

(3) Holes shall be collared and drilled wet, or other efficient dust control measures shall be used when drilling non-water-soluble material. Efficient dust control measures shall be used when drilling water-soluble materials.

(4) Control of employe 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 work involved (for example, while establishing controls or occasional entry into hazardous atmospheres to perform maintenance or investigation), employes 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:

(a) Respirators which are applicable and suitable for the purpose intended shall be furnished, and employes shall use the protective equipment in accordance with training and instruction.

(b) A respirator program consistent with the requirements of ANSI Z88.2 - 1980, published by the American National Standards Institute and entitled "American National Standards Practices for Respiratory Protection ANSI Z88.2 - 1980," which is incorporated by reference in s. ILHR 8.08.

(c) 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.

(5) The following chemical substances shall not be used or stored except by competent persons under laboratory conditions approved by a nationally recognized agency acceptable to the department:

(a) Carbon tetrachloride;

(b) Phenol;

(c) 4-Nitrobiphenyl;

(d) Alpha-naphthylamine;

(e) 4, 4-Methylene Bis (2-chloroaniline);

(f) Methyl-chloromethyl ether;

(g) 3, 3 Dichlorobenzidine;

(h) Bis (chloromethyl) ether;

(i) Beta-napthylamine;

(j) Benzidine;

(k) 4-Aminodiphenyl;

(l) Ethyleneimine;

(m) Beta-propiolactone;

(n) 2-Acetylaminofluorene;

(o) 4-Dimethylaminobenzene; and

(p) N-Nitrosodimethylamine.

SURFACE ONLY

(10) Silica sand or other materials containing more than one percent free silica, shall not be used as an abrasive substance in abrasive blasting cleaning operations without requiring full-flow respiratory protection, or equivalent, to all exposed persons.

UNDERGROUND ONLY

(15) Air in all active workings shall contain at least 19.5 volume percent oxygen.

(16) Silica sand or other materials containing more than one percent free silica, shall not be used as an abrasive substance in abrasive blasting cleaning operations.

VENTILATION
GENERAL - SURFACE AND UNDERGROUND

(20) Areas within 25 feet of main and booster fans shall be kept free of combustible materials except for installed wiring, materials used for fan maintenance, direct fired heaters and materials used for ground support.

(21) (a) All mine main and booster fans installed and used to ventilate the active workings of the mine shall be operated continuously while persons are underground in the active workings. However, this provision is not applicable during scheduled production-cycle shutdowns or planned or scheduled fan maintenance or fan adjustments where air quality is maintained in compliance with the applicable requirements of this section and all persons underground in the affected areas are advised in advance of such scheduled or planned fan shutdowns, maintenance or adjustments.

(b) In the event of main or booster fan failure due to a malfunction, accident, power failure or other such unplanned or unscheduled event:

1. The air quality in the affected active workings shall be tested at least within 2 hours of the discovery of the fan failure and at least every 4 hours thereafter by a competent person for compliance with the requirements of this section until normal ventilation is restored; or

2. All persons, except those working on the fan, shall be withdrawn, the ventilation shall be restored to normal and the air quality in the affected active workings shall be tested by a competent person to assure that the air quality meets the requirements of this section, before any other persons are permitted to enter the affected active workings.

(22) All underground main fans shall have controls placed at a suitable protected location remote from the fan and preferably on the surface.

UNDERGROUND ONLY

(25) A plan of the mine ventilation system shall be set out by the operator in written form. Revisions of the system shall be noted and updated at least annually. The ventilation plan or revisions thereto shall be submitted to the department for review and comments upon written request. The plan shall, where applicable, contain the following:

(a) The mine name;

(b) The current mine map of schematic or series of mine maps or schematics of an appropriate scale, not greater than 500 feet to the inch, showing:

1. Direction and quantity of principal air flows;

2. Locations of seals used to isolate abandoned workings;

3. Locations of areas withdrawn from the ventilation system;

4. Locations of all main, booster and auxiliary fans not shown in par. (d);

5. Locations of air regulators and stoppings and ventilation doors not shown in par. (d);

6. Locations of overcasts, undercasts and other airway crossover devices not shown in par. (d);

7. Locations of known oil or gas wells;

8. Locations of known underground mine openings adjacent to the mine;

9. Locations of permanent underground shops, diesel fuel storage depots, oil fuel storage depots, hoist rooms, compressors, battery charging stations and explosive storage facilities. Permanent facilities are those intended to exist for one year or more; and

10. Signifncant changes in the ventilation system projected for one year;

(c) Mine fan data for all active main and booster fans including manufacturer's name, type, size, fan speed, blade setting, approximate pressure at present operating point and motor brake horsepower rating;

(d) Diagrams, descriptions or sketches showing how ventilation is accomplished in each typical type of working place including the approximate quantity of air provided, and typical size and type of auxiliary fans used; and

(e) The number and type of internal combustion engine units used underground, including make and model of unit, type of engine, make and

model of engine, brake horsepower rating of engine and approval number.

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

(27) Main fans shall be maintained according to either the manufacturer's recommendations or a written periodic schedule adopted by the operator which shall be available at the operation on request of the department or its authorized representative.

(28) Flame safety lamps or other suitable devices shall be used to test for acute oxygen deficiency.

(29) Unvented areas shall be sealed, or barricaded and posted against entry.

(30) When auxiliary fan systems are used, such systems shall minimize recirculation and be maintained to provide ventilation air that effectively sweeps the working places.

(31) Ventilation doors shall be:

(a) Substantially constructed;

(b) Covered with fire-retardant material, if constructed of wood;

(c) Maintained in good condition;

(d) Self-closing, if manually operated; and

(e) Equipped with audible or visual warning devices, if mechanically operated.

(32) 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.

RADIATION

UNDERGROUND ONLY

(35) (a) Auxiliary fans installed and used to ventilate the active workings of the mine shall be operated continuously while persons are underground in the active workings, except for scheduled production-cycle shutdowns or planned or scheduled fan maintenance or fan adjustments where air quality is maintained in compliance with the applicable requirements of this section, and all persons underground in the affected areas are advised in advance of such scheduled or planned fan shutdowns, maintenance or adjustments.

(b) In the event of auxiliary fan failure due to malfunction, accident, power failure or other such unplanned or unscheduled event:

1. The air quality in the affected active workings shall be tested at least within 2 hours of the discovery of the fan failure, and at least every 4 hours thereafter by a competent person for compliance with the requirements of this section until normal ventilation is restored; or

2. All persons, except those working on the fan, shall be withdrawn, the ventilation shall be restored to normal and the air quality in the affected active workings shall be tested by a competent person to assure

that the air quality meets the requirements of this section, before any other persons are permitted to enter the affected active workings.

(36) Seals shall be provided with a means for checking the quality of air behind the seal and a means to prevent a water head from developing unless the seal is designed to impound water.

(37) (a) In all mines at least one sample shall be taken in exhaust mine air by a competent person to determine if concentrations of radon daughters are present. Sampling shall be done using suggested equipment and procedures described in section 14.3 of ANSI N13.8-1973, entitled "American National Standard Radiation Protection in Uranium Mines", by the American National Standards Institute, Inc., which is incorporated by reference in s. ILHR 8.08. The mine operator may request that the required exhaust mine air sampling be done by the Mine Safety and Health Administration. If concentrations of radon daughters in excess of 0.1 WL are found in an exhaust air sample, thereafter:

1. Where uranium is mined - radon daughter concentrations representative of worker's breathing zone shall be determined at least every two weeks at random times in all active working areas such as stopes, drift headings, travelways, haulageways, shops, stations, lunch rooms, magazines and any other place or location where persons work, travel or congregate. However, if concentrations of radon daughters are found in excess of 0.3 WL in an active working area, radon daughter concentrations thereafter shall be determined weekly in that working area until such time as the weekly determinations in that area have been 0.3 WL or less for 5 consecutive weeks.

2. Where uranium is not mined - when radon daughter concentrations between 0.1 and 0.3 WL are found in an active working area, radon daughter concentration measurements representative of worker's breathing zone shall be determined at least every 3 months at random times until such time as the radon daughter concentrations in that area are below 0.1 WL, and annually thereafter. If concentrations of radon daughters are found in excess of 0.3 WL in an active working area radon daughter concentrations thereafter shall be determined at least weekly in that working area until such time as the weekly determinations in that area have been 0.3 WL or less for 5 consecutive weeks.

(b) If concentrations of radon daughters less than 0.1 WL are found in an exhaust mine air sample, thereafter:

1. Where uranium is mined - at least one sample shall be taken in the exhaust mine air monthly.

2. Where uranium is not mined - no further exhaust mine air sampling is required.

(c) The sample date, locations and results obtained under pars. (a) and (b) shall be recorded and retained at the mine site or nearest mine office for at least 2 years and shall be made available for inspection by the department or its authorized representative.

(38) No person may receive an exposure in excess of 4 WLM in any calendar year.

(39) Except as provided in sub. (4), persons shall not be exposed to air containing concentrations of radon daughters exceeding 1.0 WL in active workings.

(40) (a) The operator shall calculate and record complete individual exposures to concentrations of radon daughters as follows:

1. Where uranium is mined - the complete individual exposures of all mine personnel working underground shall be calculated and recorded. These records shall include the individual's time in each active working area such as stopes, drift headings, travelways, haulageways, shops, stations, lunch rooms, magazines and any other place or location where persons work, travel or congregate, and the concentration of airborne radon daughters for each active working area.

2. Where uranium is not mined - the complete individual exposure of all mine personnel working in active working areas with radon daughter concentrations in excess of 0.3 WL shall be calculated and recorded. These records shall include the individual's time in each active working area and the concentrations of airborne radon daughters for each active working area. The operator may discontinue calculating and recording the individual exposures of any personnel assigned to work in actice working areas where radon daughter concentrations have been reduced to 0.3 WL or less for 5 consecutive weeks provided that such exposure calculation and recordation shall not be discontinued with respect to any person who has accumulated more exposure than 1/12 of a WLM times the number of months for which exposures have been calculated and recorded in the calendar year in which the exposure calculation and recordation is proposed to be discontinued.

(b) The operator shall maintain the form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000-9), or equivalent forms that are acceptable to the department, on which there shall be recorded the specific information required by the form with respect to each person's time-weighted current and cumulative exposure to concentrations of radon daughters.

Note: Copies of form 4000-9 are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

1. The form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000-9), shall consist of an original of each form for the operator's records which shall be available for examination by the department or its authorized representative.

2. On or before February 15 of each calendar year or within 45 days after the shutdown of mining operations for the calendar year, each mine operator shall submit to the department a copy of the "Record of Individual Exposure to Radon Daughters" (Form 4000-9), or acceptable equivalent form, showing the data required by the form for all personnel for whom calculation and recording of exposure was required during the previous calendar year.

3. Errors detected by the operator shall be corrected on any forms kept by the operator and a corrected copy of any forms submitted to the department shall be submitted within 60 days of detection and shall identify the errors and indicate the date the corrections are made.

4. The operator's records of individual exposure to concentrations of radon daughters and copies of "Record of Individual Exposure to Radon Daughters" (Form 4000-9) or acceptable equivalent form or true legible facsimiles thereof (microfilm or other), shall be retained at the mine or nearest mine office for a period as specified in paragraph 9.8, ANSI N13.8-1973, or shall be submitted to the department. These records, if retained by the operator, shall be open for inspection by the department or its authorized representative.

5. Upon written request from a person who is a subject of these records, a statement of the year-to-date and cumulative exposure applicable to that person shall be provided to the person or to whomever such person designates.

6. The blank form entitled "Record of Individual Exposure to Radon Daughters" (Form 4000-9) may be obtained on request from the department.

Note: To calculate an individual's exposure to WLM for a given period of time, multiply the total exposure time (hours to the nearest half-hour) in an active working area by the average concentration of airborne radon daughters for the applicable active working area (average working level calculated to the nearest hundredth working level) and divide the product by the constant 173 hours per month.

(c) An average airborne radon daughter concentration for a designated active working area shall be determined by averaging all sampling results for that working area during the time that persons are present. Any sample taken by federal or state mine inspectors, which represents exposure to miners and reported to the operator within 3 days of being taken, shall be included in the average concentration; except that if the mine operator samples simultaneously with the inspector, the mine operator's sample results may be used.

(41) Smoking shall be prohibited in all working areas of a mine where exposure records are required to be kept in compliance with sub. (40).

(42) The wearing of respirators approved for protection against radon daughters shall be required in environments exceeding 1.0 WL and respirator use shall be in compliance with sub. (4).

(43) Inactive workings, in which radon daughter concentrations are above 1.0 WL, shall be posted against unauthorized entry and designated by signs indicating them as areas in which approved respirators shall be worn.

(44) Where radon daughter concentrations exceed 10 WL, respirator protection against radon gas shall be provided in addition to protection against radon daughters. Protection against radon gas shall be provided by supplied air devices or by face masks containing absorbent material capable of removing both the radon and its daughters.

(45) Gamma radiation surveys shall be conducted annually in all underground mines where radioactive ores are mined.

(a) Surveys shall be in accordance with American National Standards Institute (ANSI) Standard N13.8-1973, entitled "Radiation Protection in Uranium Mines", section 14.1, which is incorporated by reference in s. ILHR 8.08.

(b) Where average gamma radiation measurements are in excess of 2.0 milliroentgens per hour in the working place, gamma radiation dosimeters shall be provided for all persons affected, and records of cumulative individual gamma radiation exposure shall be kept.

(c) Annual individual gamma radiation exposure shall not exceed 5 Rems.

PHYSICAL AGENTS

GENERAL - SURFACE AND UNDERGROUND

(50) (a) No employe may be permitted an exposure to noise in excess of that specified in Table 8.12. Noise level measurements shall be made using a sound level meter meeting specifications for type 2 meters contained in American National Standards Institute (ANSI) Standard S1.4-1971 (R1976), "General Purpose Sound Level Meters," which is incorporated by reference in s. ILHR 8.08, or by a sound level meter with similar accuracy.

TABLE 8.12

PERMISSIBLE NOISE EXPOSURE

Duration Per Day, Hours of Exposure	Sound Level dBA, Slow Response
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
1/2	110
1/4 or less	115

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

2. When the daily noise 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

$$(C_1/T_1) + (C_2/T_2) + \ldots (C_n/T_n)$$

exceeds unity, then the mixed exposure shall be considered to exceed the permissible exposure. C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level. Interpolation between tabulated valves 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 in dBA.

(b) When employe's exposure exceeds that listed in Table 8.12, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce exposure to within permissible levels, personal protection

equipment shall be provided and used to reduce sound levels to within the levels of the table.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.13 Explosives. The storage, handling and intrastate transportation of explosives and blasting agents shall comply with the provisions of ch. Ind 5, Wis. Adm. Code.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.14 Drilling.

SURFACE AND UNDERGROUND

(1) Equipment defects affecting safety shall be corrected before the equipment is used.

(2) The drilling area shall be inspected for hazards before starting the drilling operations.

(3) Persons shall not be on a mast while the drill-bit is in operation unless they are provided with a safe platform from which to work and they are required to use safety belts to avoid falling.

(4) Drill crews and others shall stay clear of augers or drill stems that are in motion. Persons shall not pass under or step over a moving stem or auger.

(5) 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.

(6) If a drill helper assists the drill operator during movement of a drill to a new location, the helper shall be in sight of, or in communication with, the operator at all times.

(7) In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

(8) 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.

(9) While in operation, drills shall be attended at all times.

(10) Drill holes large enough to constitute a hazard shall be covered or guarded.

(11) Persons shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling.

(12) Before hand-held drills are moved from one working area to another, air shall be turned off and bled from the hose.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.15 Rotary jet piercing.

SURFACE ONLY

(1) Jet piercing drills shall be provided with:

(a) A system to pressurize the equipment operator's cab, when a cab is provided; and

(b) A protective cover over the oxygen flow indicator.

(2) Safety chains or other suitable locking devices shall be provided across connections to and between high pressure oxygen hose lines of 1-inch inside diameter or larger.

(3) A suitable means of protection shall be provided for the employe when lighting the burner.

(4) When rotary jet piercing equipment requires refueling at locations other than fueling stations, a system for fueling without spillage shall be provided.

(5) Persons shall not smoke and open flames shall not be used in the vicinity of the oxygen storage and supply lines. Signs warning against smoking and open flames shall be posted in these areas.

(6) The oxygen intake coupling on jet piercing drills shall be constructed so that only the oxygen hose can be coupled to it.

(7) The combustion chamber of a jet drill stem which has been sitting unoperated in a drill hole shall be flushed with a suitable solvent after the stem is pulled up.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.16 Loading, hauling and dumping.

GENERAL - SURFACE AND UNDERGROUND

(1) Self-propelled equipment that is to be used during a shift shall be inspected by the equipment operator before being placed in operation. Equipment defects affecting safety shall be reported to, and recorded by the mine operator. The records shall be maintained at the mine or nearest mine office for at least 6 months from the date the defects are recorded. Such records shall be made available for inspection by the department or its authorized representative.

(2) Equipment defects affecting safety shall be corrected before the equipment is used.

(3) Powered mobile equipment shall be provided with working brakes.

(4) Operators shall be certain, by signal or other means, that all persons are clear before starting or moving equipment.

(5) When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all persons are in the clear before starting the conveyor. When the entire length of the 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.

(6) Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.

(7) Operators shall sound warning before starting trains and when trains approach crossings, other trains on adjacent tracks, persons and any place where vision is obscured.

(8) Equipment operators' cabs shall not be equipped, altered or otherwise modified in a manner which impairs operating visibility.

(9) Cab windows shall be of safety glass or equivalent, in good condition and shall be kept clean.

(10) Cabs of mobile equipment shall be kept free of extraneous materials.

(11) 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.

(12) No person may ride a power-driven chain, belt or bucket conveyor, unless the belt is specifically designed for the transportation of persons.

(13) 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.

(14) Roadbeds, rails, joints, switches, frogs and other trackage elements on railroads subject to the control of the operator shall be designed, installed and maintained in a safe manner consistent with the speed and type of haulage.

(15) Equipment operating speeds shall be consistent with conditions of roadways, grades, clearance, visibility, traffic and the type of equipment used.

(16) Track guardrails, lead rails and frogs shall be protected or blocked so as to prevent a person's foot from becoming wedged.

(17) 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.

(18) Berms or guards shall be provided on the outer bank of elevated roadways.

(19) Trackless haulage equipment shall be operated under power control at all times.

(20) Mobile equipment operators shall have full control of the equipment while it is in motion.

(21) Dippers, buckets, loading booms or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in safe locations, unless the trucks are designed specifically to protect the drivers from falling material.

(22) 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.

(23) The operator, when present, shall be notified before persons get on or off equipment.

(24) Switch throws shall be installed so as to provide adequate clearance for switchmen.

(25) Persons shall not work or pass under the buckets or booms of loaders in operation.

(26) When traveling between work areas, the equipment shall be secured in the travel position.

(27) Dippers, buckets, scraper blades and similar movable parts shall be secured or lowered to the ground when not in use.

(28) Movements of 2 or more pieces of rail equipment operating independently on the same track shall be suitably controlled for safe operation.

(29) Electrically-powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling.

(30) Mobile equipment shall not be left unattended unless the brakes are set. Mobile equipment with wheels or tracks, when parked on a grade, shall be either blocked or turned into a bank or rib; and the bucket or blade lowered to the ground to prevent movement.

(31) Persons shall not get on or off moving equipment, except that trainmen may get on or off of slowly moving trains.

(32) Persons shall not be transported:

(a) In or on dippers, forks, clamshells, beds of trucks unless special provisions are made for their safety, or buckets except shaft buckets;

(b) On top of loaded haulage equipment;

(c) Outside the cabs and beds of mobile equipment, except trains;

(d) Between cars of trains; or

(e) In conveyances equipped with unloading devices unless means are provided to prevent accidental starting of the unloading mechanism.

(33) Only authorized persons shall be permitted to ride on trains or locomotives and they shall ride in a safe position.

(34) Rocker-bottom or bottom-dump rail cars shall be equipped with locking devices.

(35) Equipment which is to be hauled shall be loaded and protected so as to prevent sliding or spillage.

(36) Backpoling of trolleys shall be avoided wherever possible; but when necessary, backpoling shall be done only at slow speeds.

(37) Parked railcars, unless held effectively by brakes, shall be blocked securely.

(38) Railroad cars with braking systems, when in use, shall be equipped with effective brake shoes.

(39) When in the dark or under conditions of limited visibility, all vehicles carrying loads which project beyond the sides or more than four feet beyond the rear of the vehicles shall display a warning light at the

end of the projection; or in the light, a warning flag not less than 12 inches square shall be displayed at the end of the projection.

(40) Railcars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

(41) Persons shall not go over, under, or between cars unless the train is stopped and the motorman has been notified and the notice acknowledged.

(42) 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.

(43) Water, debris or spilled material which create hazards to moving equipment shall be removed.

(44) Berms, bumper blocks, safety hooks or similar means shall be provided to prevent overtravel and overturning at dumping locations.

(45) 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.

(46) Where necessary, bumper blocks or the equivalent shall be provided at track dead ends.

(47) Grizzlies, grates and other stationary sizing devices shall be anchored securely.

(48) If truck spotters are used, they shall be well in the clear while trucks are backing into dumping positions and dumping; lights shall be used at night to direct trucks.

(49) 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.

(50) Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

(51) Stockpile and muckpile faces shall be trimmed to prevent hazards to personnel.

(52) Rocks too large to be handled safely shall be broken before loading.

(53) Ramps and dumping facilities shall:

(a) Be of substantial construction; and

(b) Have suitable width, clearance and headroom to accommodate the equipment using the facilities.

(54) Chute-loading installations shall be designed so that the persons pulling chutes are not required to be in a hazardous position while loading cars or trucks.

(55) Cars shall not be coupled, or uncoupled, manually from the inside of curves unless the railroad and cars are so designed to eliminate any hazard from manual coupling.

(56) When a locomotive on one track is used to move equipment on a different track, a suitable chain, cable or drawbar shall be used.

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

(58) Lights, flares or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

(59) Tires shall be deflated before repairs on them are started and means shall be provided to prevent wheel locking rims from creating a hazard during tire inflation.

(60) A tow bar of substantial construction or other suitable means of control shall be used to tow heavy equipment. A substantial safety chain or wire rope shall be used in conjunction with any primary rigging.

(61) Traffic rules including speed, signals and warning signs shall be standardized at each mine and posted.

(62) Persons attempting to free hangups shall be experienced persons who understand the hazards involved.

(63) Defective equipment, removed from service as unsafe to operate, shall be tagged to prohibit further use until repairs are completed.

(64) Dust shall be suitably controlled at muck piles, material transfer points, crushers and on haulage roads where hazards to personnel may be created as a result of impaired visibility.

SURFACE ONLY

(80) Where possible, at least 30 inches continuous clearance from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks; all places where it is not possible to provide 30-inch clearance shall be marked conspicuously.

(81) Tools, materials and equipment shall not be transported with persons in rail cars and other vehicles and conveyances unless means have been provided to make such transportation safe.

(82) Heavy duty mobile equipment shall be provided with audible warning devices. When the operator of such 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.

(83) (a) Excluding equipment that is operated by remote control, all self-propelled track-type (crawler mounted) or wheeled (rubber-tired) scrapers; front-end loaders; dozers; tractors, including industrial and agricultural tractors but not including over-the-road type tractors (the type that pull trailers or vans on highways); and motor graders; and wheeled prime movers (a tractor of the type and kind normally used as the mode of power for rubber-tired scrapers); all as used in metal and nonmetal mining operations, with or without attachments, shall be used in such mining only when equipped with approved roll-over protective structures (ROPS) and seat belts.

(b) 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.

(c) Each ROPS shall have the following information permanently affixed to the structure:

1. Manufacturer's or fabricator's name and address;

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 existence when this chapter goes into effect, 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.

UNDERGROUND ONLY

(90) Tools or materials, except properly located and secured rerailing devices, shall not be carried on top of locomotives. Tools or materials shall not be carried in the cab if they would interfere with the operation of the locomotive.

(91) Trains shall be brought to a complete stop, then moved very slowly when coupling or uncoupling cars manually.

(92) Makeshift couplings shall not be used.

(93) Supplies, materials and tools other than small handtools shall not be transported with persons in man-trip cars. Man-trips shall be operated independently of ore and supply trips.

(94) When signalmen are used during slushing operations, they shall be positioned in a safe place.

(95) Collars of open draw holes shall be kept free of muck and material.

(96) Warning devices of conspicuous markings shall be installed where chute lips, ventilation doors and obstructions create a hazard to persons on equipment.

(97) To prevent rock from flying out when broken material is dumped into an empty chute:

(a) The chute shall be properly guarded prior to filling; or

(b) Sufficient material shall be left in the chute bottom.

(98) Ample warning shall be given to persons who may be affected by the draw or otherwise exposed to danger from chute-pulling operations.

(99) Persons 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.

(100) Shelter holes shall be provided to ensure the safety of persons along haulageways where continuous clearance of at least 30 inches from the farthest projection of moving equipment on at least one side of the haulageway cannot be maintained.

(101) Shelter holes shall be at least 4-feet wide, marked conspicuously with lights or reflective signs or reflective tape or reflectors or luminous paint, provide a minimum of 40-inch clearance from the farthest projection of moving equipment, and shall not be used for storage of timber, tools or other materials unless a 40-inch clearance is maintained.

(102) On rail haulage, trip lights shall be used on the rear of pulled trips and on the front of pushed trips.

(103) Man-trips shall be operated at speeds consistent with the condition of tracks and equipment used.

(104) Where man-trips are used, discharge and boarding points shall be designated. Persons shall not board or leave moving man-trip cars.

(105) Man-trips shall be covered if there is danger of passengers contacting the trolley wire.

(106) During shift changes the movement of rock or material trains shall be limited to areas where such trains could not present a hazard to persons coming on or going off shift.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.17 Aerial tramways.

SURFACE ONLY

(1) Buckets shall not be overloaded, and feed shall be regulated to prevent spillage.

(2) Inspection and maintenance of carriers, including loading and unloading mechanisms, ropes and supports, and brakes shall be performed by competent persons according to the recommendations of the manufacturer.

(3) Any hazardous defects shall be corrected before the equipment is used.

(4) Positive-action-type brakes and devices which apply the brakes automatically in the event of a power failure shall be provided on aerial tramways.

(5) Track cable connections shall not obstruct the passage of carriage wheels.

(6) Towers shall be suitably protected from swaying buckets.

(7) Guard nets or other suitable protection shall be provided where tramways pass over roadways, walkways or buildings.

(8) Persons other than maintenance persons shall not ride aerial tramways unless the following features are provided:

(a) Two independent brakes, each capable of holding the maximum load;

(b) Direct communication between terminals;

(c) Power drives with emergency power available in case of primary power failure; and

(d) Buckets equipped with positive locks to prevent accidental tripping or dumping.

(9) Persons shall not ride loaded buckets.

(10) Where possible, aerial tramways shall not be started until the operator has ascertained that everyone is in the clear.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.18 Travelways and escapeways.

TRAVELWAYS

GENERAL - SURFACE AND UNDERGROUND

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

(2) Crossovers, elevated walkways, elevated ramps and stairways shall be of substantial construction, provided with handrails 42 inches in height and maintained in good condition. Where necessary, toeboards shall be provided.

(3) Ladders shall be of substantial construction and maintained in good condition.

(4) Portable rigid ladders shall be provided with suitable bases and placed securely when used.

(5) Fixed ladders shall be anchored securely and installed to provide at least 6 inches of toe clearance.

(6) Fixed ladders shall project at least 3 feet above landings, or substantial handholds shall be provided above the landings.

(7) Wooden components of ladders shall not be painted except with a transparent finish.

(8) 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.

(9) Vertical clearance above stair steps shall be a minimum of 7 feet, or suitable warning signs or similar devices shall be provided to indicate an impaired clearance.

(10) Persons using ladders shall face the ladders and have both hands free for climbing and descending.

(11) Openings above, below or near travelways through which persons or materials may fall shall be protected by railings, barriers or covers. Where it is impractical to install such protective devices, adequate warning signals shall be installed.

(12) Crossovers shall be provided where it is necessary to cross conveyors.

(13) Moving conveyors shall be crossed only at designated cross-over points.

(14) Regularly used walkways and travelways shall be sanded, salted, or cleared of snow and ice as soon as practicable.

(15) Fixed ladders shall not incline backwards.

SURFACE ONLY

(25) Fixed ladders, except on mobile equipment, shall be offset and have substantial railed landings at least every 30 feet unless backguards or equivalent protection, such as safety belts and safety lines, are provided.

(26) Fixed ladders 70° to 90° from the horizontal and 30 feet or more in length shall have backguards, cages or equivalent protection, starting at a point not more than 7 feet from the bottom of the ladders.

(27) Scaffolds and working platforms shall be of substantial construction and provided with handrails and maintained in good condition. Floorboards shall be laid properly and the scaffolds and working platforms shall not be overloaded. Working platforms shall be provided with toeboards when necessary.

UNDERGROUND ONLY

(35) Trap doors or adequate guarding shall be provided in ladderways at each level. Doors shall be kept operable.

(36) Ladderways shall have a minimum unobstructed cross-sectional opening of 24 inches by 24 inches measured from the face of the ladder.

(37) Before entering a manway where persons may be working or traveling, a warning shall be given by the person entering the manway and acknowledged by any person present in the manway.

(38) Travelways steeper than 35° from the horizontal shall be provided with ladders or stairways.

(39) Fixed ladders with an inclination of more than 70° from the horizontal shall be offset with substantial landings at least every 30 feet or have landing gates at least every 30 feet.

ESCAPEWAYS

UNDERGROUND ONLY

(50) (a) Every mine shall have 2 or more separate, properly maintained escapeways to the surface from the lowest levels which are so positioned that damage to one shall not lessen the effectiveness of the others. A method of refuge shall be provided while a second opening to the surface is being developed. A second escapeway is recommended, but not required, during the exploration or development of an ore body.

(b) In addition to separate escapeways, a method of refuge shall be provided for every employe who cannot reach the surface from the working place through at least 2 separate escapeways within a time limit of one hour when using the normal exit method. These refuges shall be positioned so that the employe can reach one of them within 30 minutes from the time of leaving the workplace.

(51) Escape routes shall be:

(a) Inspected at regular intervals and maintained in safe, travelable condition; and

(b) Marked with conspicuous and easily read direction signs that clearly indicate the ways of escape.

(52) Refuge areas shall be:

(a) Of fire-resistant construction, preferably in untimbered areas of the mine;

(b) Large enough to accommodate readily the normal number of persons in the particular area of the mine;

(c) Constructed so they can be made gastight; and

(d) Provided with compressed air lines, waterlines, suitable handtools, and stopping materials.

(53) 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. A copy of the plan and revisions thereof shall be available to the department or its authorized representative. Also, copies of the plan 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 department or its authorized representative at least once every six months from the date of the last review. The plan shall include:

(a) 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 persons congregate;

(b) Procedures to show how the miners will be notified of emergency;

(c) 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 persons congregate;

(d) A fire fighting plan;

(e) 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; and

(f) A statement of the availability of emergency communication and transportation facilities, emergency power and ventilation and location of rescue personnel and equipment.

(54) Telephone or other voice communication shall be provided between the surface and refuge chambers and such systems shall be independent of the mine power supply.

(55) Any portion of a designated escapeway which is inclined more than 30° from the horizontal and that is more than 300 feet in vertical extent shall be provided with an emergency hoisting facility.

(56) The procedure for inspection, testing and maintenance required by s. ILHR 8.26 (120) shall be utilized at least every 30 days for hoists designated as emergency hoists in any evacuation plan.

(57) 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.

(58) For the protection of operators of hoists located underground which are part of the mine escape and evacuation plan required under sub. (53), the hoist operator shall be provided with a respirable atmosphere completely independent of the mine atmosphere. This independent ventilation system shall convert, without contamination, to an approved and properly maintained 2-hour self-contained breathing apparatus to provide a safe means of escape for the hoist operator after the hoisting duties have been completed as prescribed in the mine escape and evacuation plan for that hoist. The hoist operator's independent ventilation system shall be provided by one of the following methods:

(a) A suitable enclosure equipped with a positive pressure ventilation system which may be operated continuously or be capable of immediate activation from within the enclosure during an emergency evacuation. Air for the enclosure's ventilation system shall be provided in one of the following ways:

1. Air coursed from the surface through a borehole into the hoist enclosure directly or through a metal pipeline from such borehole; or

2. Air coursed from the surface through metal duct work into the hoist enclosure, although this duct work shall not be located in timber-supported active workings; or

3. Air supplied by air compressors located on the surface and coursed through metal pipe into the hoist enclosure;

(b) A back-up system shall be provided for a hoist enclosure ventilation system provided by either of the methods specified in par. (a) 2. and 3. This back-up system shall consist of compressed air stored in containers connected to the enclosure. This back-up system shall provide and maintain a respirable atmosphere in the enclosure for a period of time equal to at least twice the time necessary to complete the evacuation of all persons designated to use that hoist as prescribed in the mine escape and evacuation plan required in sub. (53); or

(c) An approved and properly maintained self-contained breathing apparatus system which shall consist of a mask connected to compressed air stored in containers adjacent to the hoist controls. The self-contained breathing system shall provide a minimum of 24 hours of respirable atmosphere to the hoist operator. In addition, the self-contained breathing system shall be capable of a quick connect with the approved 2-hour self-contained breathing apparatus above.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.19 Electricity.

GENERAL - SURFACE AND UNDERGROUND

(1) Circuits shall be protected against overcurrent by fuses or circuit breakers of the correct type and capacity.

(2) Electric equipment and circuits shall be provided with switches or other controls. Such switches or controls shall be of approved design and construction and shall be installed as specified in the Wisconsin Electrical Code, Vol. 2, ch. ILHR 16.

(3) Individual overcurrent protection shall be provided for the trailing cables of mobile equipment.

(4) Electrical conductors shall be sized in accordance with the Wisconsin Electrical Code, Vol. 2, ch. ILHR 16, to ensure that a rise in temperature resulting from normal operations will not damage the insulating materials. Electrical conductors exposed to mechanical damage shall be protected.

(5) Mobile equipment shall not run over conductors, nor shall loads be dragged over conductors, unless the conductors are properly bridged or protected.

(6) Panelboards and switchboards shall be provided with a disconnecting device for each circuit. Such disconnecting devices shall be equipped or designed in such a manner that it can be determined by visual observation when such a device is in the open position. The panelboards and switchboards shall be labeled to show which circuit each disconnecting device controls.

(7) Trailing-cable and power-cable disconnects shall not be made or broken under load.

(8) Electrical wires and cables shall be insulated where they pass into or out of electrical compartments. Cables shall enter metal frames of motors, splice boxes and electrical compartments only through approved fittings. When insulated wires, other than cables, pass through metal frames, the holes shall be bushed with insulated bushings.

(9) Telephone and low-potential signal wire shall be protected by isolation or insulation, or both, from contacting energized conductors or any other electrical source.

(10) High-potential electrical conductors shall be covered, insulated or placed to prevent contact with low potential conductors.

(11) The potential on bare signal wires accessible to contact by persons shall not exceed 48 volts.

(12) Splices and repairs made in electrical cables, including the equipment grounding conductor where provided, shall be:

(a) Mechanically strong with electrical conductivity the same as that of the original;

(b) Insulated at least equal to that of the original, and sealed to exclude moisture; and

(c) Provided with damage protection equal to that of the original, including bonding to the outer jacket.

(13) Electrical cables energized to potentials in excess of 150 volts, phase-to-ground, shall not be moved with equipment unless sleds or slings, insulated from such equipment, are used. When such energized cables are moved manually, insulated hooks, tongs, ropes or slings shall be used unless protection for persons is provided by other means. This does not prohibit pulling or dragging of cable by the equipment it powers when the cable is physically attached to the equipment by approved mechanical devices, and the cable is insulated from the equipment in conformance with other requirements in this section.

(14) Electrically powered equipment shall be deenergized before mechanical work is done on such equipment. Switches shall be locked out or other measures taken which shall prevent the equipment from being energized without the knowledge of the individuals working on it. Warning notices shall be posted at the switches and signed by the individuals who are to do the work. Such locks or preventive devices shall be removed only by the persons who installed them or by authorized personnel.

(15) Electrical circuits shall be deenergized before work is done on such circuits unless hot-line tools are used. Warning signs shall be posted by the individuals who are to do the work. 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.

(16) Disconnects shall be labeled to show which units they control, unless identification can be made readily by location.

(17) Where access is necessary, working clearances shall be provided at stationary electrical equipment or switchgear.

(18) Dry wooden platforms, insulating mats, or other electrically nonconductive material shall be kept in place at all switchboards, panelboards 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, noncurrent-carrying parts of the equipment to be operated may be used.

(19) Danger signs shall be posted at all electrical supply installations.

(20) Areas containing electrical supply installations shall be entered only by authorized persons.

(21) Electrical connections and resistor grids shall be insulated or guarded unless protection is provided by location.

(22) All metal enclosing or encasing electrical circuits shall be grounded or insulated. This requirement does not apply to battery-operated equipment.

(23) Metal fencing and metal buildings enclosing transformers and switchgear shall be grounded.

(24) Frame grounding shall be provided for mobile equipment powered through trailing cables.

(25) Continuity and resistance of grounding systems shall be tested immediately after installation, repair and modification and annually thereafter. A record of the resistance measured during the most recent test shall be made available upon request by the department or its authorized representative.

(26) When a dangerous condition is found it shall be corrected before equipment or wiring is energized.

(27) Inspection and cover plates on electrical equipment and junction boxes shall be kept in place at all times except during testing or repairs.

(28) Hand-held electric tools shall not be operated at voltages over 150 volts to ground.

(29) Portable extension lights, and other lights that by their location present a shock or burn hazard, shall be guarded.

(30) Lamp sockets shall be of a weatherproof type where they are exposed to weather or wet conditions, and they shall not create a shock hazard.

(31) Fuses shall not be removed or replaced in an energized circuit, unless equipment and techniques especially designed to prevent electrical shock are provided and used for such purpose.

(32) Fuse tongs or hotline tools shall be used when fuses are removed or replaced in high-potential circuits.

(33) Trailing cables shall be attached to machines in a manner that protects the cable from damage and prevents strain on the electrical connections.

(34) Surplus trailing cables to shovels, cranes and similar equipment shall be:

(a) Stored in cable boats;

(b) Stored on reels mounted on the equipment; or

(c) Otherwise protected from mechanical damage.

(35) Operating controls shall be installed so that they can be operated without danger of contact with energized conductors.

(36) Switches and controllers shall be of safe design and capacity.

(37) Both rails shall be bonded or welded at every joint and rails shall be crossbonded at least every 200 feet if the track serves as the return trolley circuit. When rails are moved, replaced, or broken bonds are discovered, they shall be rebonded within three working shifts.

(38) Overhead high potential powerlines shall be installed as specified in the Wisconsin Electrical Code, Vol. 1, ch. PSC 114, Wis. Adm. Code.

(39) Guy wires of poles supporting high-voltage transmission lines shall meet the requirements for grounding or insulator protection as specified in the Wisconsin Electrical Code, Vol. 1, ch. PSC 114, Wis. Adm. Code.

(40) 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 in the Wisconsin Electrical Code, Vol. 1, ch. PSC 114, Wis. Adm. Code.

(41) Trolley wires shall be installed at least 7 feet above rails where height permits, and aligned and supported to control sway and sag.

(42) Ground wires for lighting circuits powered from trolley wires shall be connected securely to the ground return.

SURFACE ONLY

(65) Powerlines, including trolley wires, and telephone circuits shall be protected against overcurrent and lightning.

(66) Where metallic tools or equipment can come in contact with trolley wires or bare powerlines, the lines shall be guarded or deenergized.

(67) 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.

(68) Transformer enclosures shall be kept locked against unauthorized entry.

(69) Each ungrounded conductor or telephone wire that leads underground and is exposed to lightning shall be equipped with surge (lightning) arrestors of an approved type within 100 feet of the point where the circuit enters the mine. Surge arrestors shall be connected to a low resistance grounding medium on the surface and shall be separated from neutral grounds by a distance of not less than 25 feet.

(70) When equipment must be moved or operated near energized high-voltage powerlines, other than trolley lines, and the clearance is less than 10 feet, the lines shall be deenergized or other precautionary measures shall be taken.

UNDERGROUND ONLY

(80) Trolley wires and bare power conductors shall be guarded at mantrip loading and unloading points, and at shaft stations. Where such trolley wires and bare conductors are less than 7 feet above the rail, they shall be guarded at all points where persons work or pass regularly beneath.

(81) All metallic pipelines, 1,000 feet or more in length running parallel to trolley tracks, that are used as a ground return circuit shall be bonded to the return circuit rail at the ends of the pipeline and at intervals not to exceed 500 feet.

(82) Open insulated conductors of 600 volts or less shall be separated at least two inches from waterlines, telephone lines and air lines, or separated by a continuous nonconductive covering in addition to the insulation of the conductor.

(83) Electrical cables in shafts and boreholes shall be fastened in such a manner as to prevent undue strain on the sheath, insulation or conductors, or shall be separated by a continuous nonconductive covering in addition to the insulation of the conductor.

(84) Switches that can be opened under load shall be provided underground at all branch circuits extending from feeder circuits near shafts, adits, levels and boreholes.

(85) Transformer stations shall be enclosed to prevent persons from unintentionally or inadvertently contacting energized parts.

(86) Trolley and trolley feeder wire shall be installed opposite the clearance side of haulageways, except where physical limitations would prevent the safe installation or use of such trolley and trolley feeder wire.

(87) No splice, except a vulcanized splice or other approved splice, may be made in a trailing cable within 25 feet of the machine unless the machine is equipped with a cable reel or other power feed cable payout-retrieval system. However, a temporary splice may be made to move the equipment for repair.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.20 Compressed air and boilers.

GENERAL - SURFACE AND UNDERGROUND

(1) All boilers and pressure vessels shall be constructed, installed and maintained in accordance with chs. Ind 41 to 42, Wis. Adm. Code.

COMPRESSED AIR

(10) (a) Except as provided in par. (b), reciprocating-type air compressors rated over 10 horsepower shall be equipped with automatic temperature-actuated shutoff mechanisms which shall be set or adjusted to the compressor when the normal operating temperature is exceeded by more than 25%.

(b) Paragraph (a) does not apply to reciprocating-type air compressors rated over 10 horsepower if fusible plugs are installed in the compressor discharge lines and are designed to melt at temperatures at least 50° below the flash point of the compressors' lubricating oil.

(11) Air receiver tanks shall be equipped with one or more automatic pressure-relief valves. The total relieving capacity of the relief valves shall prevent pressure from exceeding the maximum allowable working pressure in a receiver tank by not more than 10%. Air receiver tanks also shall be equipped with indicating pressure gages which accurately measure the pressure within the air receiver tanks.

(12) Compressor air intakes shall be installed to insure that only clean, uncontaminated air enters the compressors.

(13) (a) Compressed-air receivers and other unfired pressure vessels shall be inspected internally at least once per year by qualified inspectors.

(b) Records of inspections shall be kept and shall be made available to the department or its authorized representative.

(14) Compressor discharge pipes where carbon build-up may occur shall be cleaned periodically as recommended by the manufacturer, but no less frequently than once every 2 years.

(15) Repairs involving the pressure system of compressors, receivers or compressed-air-powered equipment shall not be attempted until the pressure has been bled off.

(16) Compressed air shall not be directed toward a person. When compressed air is used, all necessary precautions shall be taken to protect persons from injury.

(17) Except where automatic shutoff valves are used, safety chains or other suitable locking devices shall be used at connections to machines of high-pressure hose lines of 3/4-inch inside diameter or larger, and between high-pressure hose lines of 3/4-inch inside diameter or larger, where a connection failure would create a hazard.

BOILERS

(30) Boilers shall be equipped with guarded, well-maintained water gauges and pressure gauges placed so that they can be observed easily. Water gauges and pipe passages to the gauges shall be kept clean and free of scale and rust.

(31) Boilers shall be equipped with automatic pressure-relief valves; valves shall be tested each shift.

(32) Boiler installations shall be provided with safety devices meeting the requirements of chs. Ind 41 to 42, Wis. Adm. Code, to protect against hazards of flame outs, fuel interruptions and low-water level.

(33) Blowoff valves shall be piped outside the building and shall have outlets so located or protected that persons passing by, near or under them will not be scalded.

(34) Boilers shall be inspected internally at least once a year by licensed inspectors; records of such inspections shall be kept.

Note: See chs. Ind 41 to 42, Wis. Adm. Code, for complete requirements for boilers and pressure vessels.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.21 Use of equipment.

GUARDS

GENERAL - SURFACE AND UNDERGROUND

(1) Gears; sprockets; chains; drive, head, tail and takeup pulleys; flywheels; couplings; shafts; sawblades; fan inlets; and similar exposed moving machine parts which may be contacted by persons, and which may cause injury to persons, shall be guarded.

(2) Power transmission belts shall be guarded if the action from a broken belt would be hazardous to persons.

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

(4) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

(5) Guards shall be of substantial construction and properly maintained.

(6) Stationary grinding machines other than special bit grinders shall be equipped with:

(a) Peripheral hoods (less than 90° throat openings) capable of withstanding the force of a bursting wheel;

(b) Adjustable tool rests set as close as practical to the wheel; and

(c) Safety washers.

(7) Grinding wheels shall be operated within the specifications of the manufacturer of the wheel.

(8) Hand-held power tools, other than rock drills, shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

(9) Guards, shields or other suitable protection shall be provided in areas where flying or falling materials present a hazard to personnel.

(10) Fork-lift trucks, front-end loaders and bulldozers shall be provided with substantial canopies when necessary to protect the operator.

(11) Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

METHODS AND PROCEDURES

GENERAL - SURFACE AND UNDERGROUND

(20) Unsafe equipment or machinery shall be removed from service immediately.

(21) Operation of machinery or equipment shall be assigned only to competent persons.

(22) Repairs or maintenance shall not 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.

(23) Persons shall not work on or from a piece of mobile equipment in a raised position until it has been blocked in place securely. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

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

(25) Belts, chains and ropes shall not be guided onto power-driven moving pulleys, sprockets or drums with the hands except on slow moving equipment especially designed for hand feeding.

(26) Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

(27) Belt dressing shall not be applied manually while belts are in motion unless an aerosol-type dressing is used.

(28) Machinery shall not be lubricated while in motion where a hazard exists, unless equipped with extended fittings or cups.

(29) Tools and equipment shall not be used beyond the design capacity intended by the manufacturer, where such use may create a hazard to personnel.

(30) Welding operations shall be shielded and well ventilated.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.22 Personal protection.

GENERAL - SURFACE AND UNDERGROUND

(1) Adequate first-aid materials, including stretchers and blankets, shall be provided at places convenient to all working areas. Water or neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled or used.

(2) All persons shall wear suitable hard hats when in or around a mine or plant where falling objects may create a hazard.

(3) All persons shall wear suitable protective footwear when in or around an area of a mine or plant where a hazard exists which could cause an injury to the feet.

(4) All persons shall wear safety glasses, goggles or face shields or other suitable protective devices when in or around an area of a mine or plant where a hazard exists which could cause injury to unprotected eyes.

(5) Safety belts and lines shall be worn when persons work where there is danger of falling; a second person shall tend the lifeline when bins, tanks or other dangerous areas are entered.

(6) Special protective equipment and special protective clothing shall be provided, maintained in a sanitary and reliable condition and used whenever hazards of process or environment, chemical hazards, radiological hazards, or mechanical irritants are encountered in a manner capable of causing injury or impairment.

(7) Protective clothing or equipment and face-shields or goggles shall be worn when welding, cutting or working with molten metal.

(8) Snug-fitting clothing shall be worn around moving machinery and equipment.

(9) Gloves or finger rings shall not be worn where they could create a hazard by becoming entwined or caught in moving parts of machinery.

(10) Life jackets or belts shall be worn where there is danger from falling into water.

UNDERGROUND ONLY

(30) A 1-hour self-rescue device approved by the department shall be made available by the operator to all personnel underground. Each operator shall maintain self-rescue devices in good condition.

(31) (a) Except as provided in pars. (b) and (c), self-rescue devices meeting the requirements of sub. (30) shall be worn or carried by all persons underground.

(b) Where the wearing or carrying of self-rescue devices meeting the requirements of sub. (30) is hazardous to a person, such self-rescue de-

vices 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.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.23 Materials storage and handling.

GENERAL - SURFACE AND UNDERGROUND

(1) Supplies shall not be stacked or stored in a manner which creates tripping or fall-of-material hazards.

(2) (a) Bins, hoppers, silos, tanks and surge piles, where loose unconsolidated materials are stored, handled or transferred shall be:

1. Equipped with mechanical devices or other effective means of handling materials so that during normal operations persons are not required to enter or work where they are exposed to entrapment by the caving or sliding of materials; and

2. Equipped with supply and discharge operating controls. The controls shall be located so that spills or overruns will not endanger persons.

(b) Where persons are required to move around or over any facility listed in this subsection, suitable walkways or passageways shall be provided.

(c) Where persons are required to enter any facility listed in this subsection for maintenance or inspection purposes, ladders, platforms or staging shall be provided. No person may enter the facility until the supply and discharge of materials have ceased and the supply and discharge equipment is locked out. Persons entering the facility shall wear a safety belt or harness equipped with a lifeline suitably fastened. A second person, similarly equipped, shall be stationed near where the lifeline is fastened and shall constantly adjust it or keep it tight as needed, with minimum slack.

(3) Materials that can create hazards if accidentally liberated from their containers shall be stored in a manner that minimizes the dangers.

(4) Hazardous materials shall be stored in containers of a type approved for such use by recognized agencies; such containers shall be labeled appropriately.

(5) Compressed and liquid gas cylinders shall be secured in a safe manner.

(6) 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.

(7) (a) Taglines shall be attached to loads that may require steadying or guidance while suspended.

(b) Hitches and slings used to hoist materials shall be suitable for the particular material handled.

(8) Personnel shall stay clear of suspended loads.

(9) To protect personnel, material shall not be dropped from an overhead elevation until the drop area is first cleared of personnel and the area is then either guarded or a suitable warning is given.

(10) Persons shall not ride on loads being moved by cranes or derricks, nor shall they ride the hoisting hooks unless such method eliminates a greater hazard.

(11) Chemical substances, including concentrated acids and alkalies, shall be stored to prevent inadvertent contact with each other or with other substances, where such contact could cause a violent reaction or the liberation of harmful fumes or gases.

(12) Suitable warning shall be given before molten metal is poured and before a container of molten metal is moved.

(13) Operator-carrying overhead cranes shall be provided with:

(a) Bumpers at each end of each rail;

(b) Automatic switches to halt uptravel of the blocks before they strike the hoist;

(c) Effective audible warning signals within easy reach of the operator; and

(d) A means to lock out the disconnect switch.

(14) No person may work from or travel on the bridge of an overhead crane, unless the bridge is provided with substantial footwalks with toeboards and railings the length of the bridge.

(15) Fork and other similar types of lift trucks shall be operated with the:

(a) Upright tilted back to steady and secure the load;

(b) Load in the upgrade position when ascending or descending grades in excess of 10%;

(c) Load not raised or lowered enroute except for minor adjustments; and

(d) Load-engaging device downgrade when traveling unloaded on all grades.

(16) Where the stretching or contraction of a hoist rope could create a hazard, chairs or other suitable blocking shall be used to support conveyances at shaft landings before heavy equipment or material is loaded or unloaded.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.24 Illumination.

SURFACE ONLY

(1) Illumination sufficient to provide safe working conditions shall be provided in and on all surface structures, paths, walkways, stairways, switch panels, loading and dumping sites, and working areas.

(2) Active outdoor work areas shall have illumination of at least 5 foot-candles. Special seeing tasks shall have illumination of at least 20 foot-candles.

UNDERGROUND ONLY

(10) Individual electric lamps shall be carried for illumination by all persons underground.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.25 Safety programs.

GENERAL - SURFACE AND UNDERGROUND

(1) The employer shall establish a definite effective program and continually functioning safety program and make every attempt to prevent accidents and increase safety. Employes shall actively participate in the safety program.

(2) (a) A competent person designated by the operator shall examine each working place at least once each shift for conditions which may adversely affect safety or health. The operator shall promptly initiate appropriate action to correct such conditions.

(b) A record that such examinations were conducted shall be kept by the operator for a period of one year, and shall be made available for review by the department or its authorized representative.

(c) In addition, conditions that may present an imminent danger which are noted by the person conducting the examination shall be brought to the immediate attention of the operator who shall withdraw all persons from the area affected until the danger is abated.

(3) Serious accidents shall be investigated to determine the cause and the means of preventing recurrence. Records of those investigations shall be kept and the information shall be made available to the employes.

(4) Company safety regulations pertinent to the various operations shall be published or posted for employe information.

(5) All employes and officials shall be familiar with company, state and federal safety regulations.

(6) New employes shall be indoctrinated in applicable safety rules and safe work procedures.

(7) Inexperienced employes shall be assigned to work with experienced persons until such employes have acquired the necessary skills to perform their duties safely.

(8) Each working place shall be visited by a supervisor or a designated person at least once each shift and more frequently as necessary to insure that work is being done in a safe manner.

(9) When persons are working at the mine, a competent person designated by the mine operator shall be in attendance to take charge in case of an emergency.

(10) Selected supervisors shall be trained in first aid. First aid training shall be made available to all employes.

(11) All supervisors and employes shall be trained in accident prevention.

(12) Emergency telephone numbers shall be posted at appropriate telephones.

(13) A suitable communication system shall be provided at the mine to obtain assistance in the event of an emergency.

(14) No employe may be assigned, or allowed, or be required to perform work alone in any area where hazardous conditions exist that would endanger their safety unless they can communicate with others, can be heard, or can be seen.

UNDERGROUND ONLY

(20) All persons who are required to go underground shall receive instruction in mine emergency and self-rescue procedures in an instruction program approved by the department.

Note: An instruction program certified by the mine safety and health administration is acceptable to the department.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.26 Personnel hoisting.

Note: The hoisting standards in this section apply to those hoists and appurtenances used for hoisting persons. However, where persons may be endangered by hoists and appurtenances used solely for handling ore, rock and materials, the appropriate standards should be applied. Emergency hoisting facilities should conform to the extent possible to safety requirements for other hoists, and should be adequate to remove the persons from the mine with a minimum of delay.

HOISTS

(1) Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used.

(2) Hoists shall be anchored securely.

(3) Belt, rope or chains shall not be used to connect driving mechanisms to man-hoists.

(4) Any hoist used to hoist persons shall be equipped with a brake which shall be capable of holding its fully loaded cage, skip or bucket at any point in the shaft.

(5) The operating mechanism of the clutch of every man-hoist drum shall be provided with a locking mechanism, or interlocked electrically or mechanically with the brake to prevent accidental withdrawal of the clutch.

(6) Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

(7) All man-hoists shall be provided with devices to prevent overtravel. When utilized in shafts exceeding 100 feet in depth, such hoists shall also be provided with overspeed devices.

(8) Where creep or slip may alter the effective position of safety devices, friction hoists shall be equipped with synchronizing mechanisms that recalibrate the overtravel devices and position indicators.

(9) An accurate and reliable indicator of the position of the cage, skip, bucket or cars in the shaft shall be provided.

(10) Hoist controls shall be placed or housed so that the noise from machinery or other sources will not prevent hoistmen from hearing signals.

(11) Flanges on drums shall extend radially a minimum of 4 inches or three rope diameters beyond the last wrap, whichever is the lesser.

(12) Where grooved drums are used, the grooves shall be of suitable size and pitch for the ropes used.

(13) 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.

(14) In a friction hoist installation, tapered guides or other approved devices shall be installed above and below the limits of regular travel of the conveyance and arranged to prevent overtravel in the event of failure of other devices.

(15) Each electric hoist shall be equipped with a manually-operable switch that will initiate emergency braking action to bring the conveyance and the counterbalance safely to rest. This switch shall be located within reach of the hoistman in case the manual controls of the hoist fail.

(16) When an overtravel bypass switch is installed, the switch shall function so as to allow the conveyance to be moved through the overtravel position when the switch is held in the closed position by the hoistman. The overtravel bypass switch shall return automatically to the open position when released by the hoistman.

WIRE ROPE

(20) The static load safety factors specified in Table 8.26-1 shall be used for selecting ropes to be used for hoisting persons and for determining when such ropes shall be removed from man-hoists.

TABLE 8.26-1

STATIC LOAD SAFETY FACTORS

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

Note: The specifications of the American National Standards Institute "Wire Ropes for Mines", ANSI M11.1, is an excellent guide in the selection, installation and maintenance of wire ropes used for hoisting.

(21) 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 subsection does not apply to friction hoists.

(22) 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 Babbitt metal or lead for socketing wire ropes is prohibited. If the thimble-and-clip method is used, the following shall be observed:

(a) 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.

(b) 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.

(c) As a minimum, the number of clips or equivalent specified in Table 8.26-2 shall be used for various diameters of 6-strand, 19-wire, plowsteel ropes.

TABLE 8.26-2
ROPE CLIPS

Diameter of Rope, Inches	Number of Clips	Center-to-Center Spacing of Clips, Inches
3/4	4	4-1/2
7/8	4	5-1/4
1	4	6
1-1/8	5	6-3/4
1-1/4	5	7-1/2
1-3/8	6	8-1/4
1-1/2	6	9
1-5/8	6	9-3/4
1-3/4	7	10-1/2
1-7/8	8	11-1/4
2	8	12
1-1/8	8	13
2-1/4	8	14

Note: Manufacturer's recommendations should be followed for other kinds of wire rope and clips.

(d) For all ropes less than three-quarter inch in diameter at least 4 clips or equivalent shall be used.

(e) 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 Table 8.26-2.

(23) New ropes shall be broken-in according to the manufacturer's recommendations.

(24) Safety device attachments to hoist ropes shall be selected, installed, and maintained according to manufacturer's specifications to minimize internal corrosion and weakening of the hoist rope.

HEADFRAMES AND SHEAVES

(35) All headframes shall be constructed with suitable design considerations to allow for all dead loads, live loads and wind loads.

(36) Headframes shall be high enough to provide clearance for overtravel and safe stopping of the conveyance.

(37) Fleet angles on hoists shall not be greater than one and one-half degrees for smooth drums or 2° for grooved drums.

(38) Platforms with toeboards and handrails shall be provided around elevated head sheaves.

(39) All personnel hoists, except emergency escape hoists and hoists with rope speeds of 200 feet per minute or less, shall have drum and sheave tread diameters:

(a) Not less than 60 times the hoist rope diameter for slope or inclined shaft applications;

(b) Not less than 80 times the hoist rope diameter if the hoist ropes are one inch in diameter or greater, or not less than 60 times the hoist rope diameter if the hoist ropes are less than one inch in diameter for vertical shaft applications; or

(c) Not less than 100 times the hoist rope diameter for locked coil ropes.

(40) Head, idler, knuckle and curve sheaves shall have grooves of proper contour for the specific rope diameter used.

CONVEYANCES

(45) Personnel cages and skips used for hoisting or lowering employes or other persons in any vertical shaft or any incline shaft with an angle of inclination of 45° from the horizontal shall be covered with a metal bonnet.

(46) Personnel cages shall be fireproof, of substantial construction and provided with:

(a) Fully enclosed sides, and safety gates; gates shall be at least 5 feet high and have no openings except those necessary for signaling;

(b) Escape hatches; and

(c) Safety catches. This paragraph does not apply to friction-hoist cages that are suspended from more than one pin.

(47) All skips conveying persons shall be provided with:

(a) Safety catches. This paragraph does not apply to friction-hoist skips that are suspended from more than one pin;

(b) Safe means of access;

(c) Platforms, where necessary, to provide safe footing;

(d) Stop controls to prevent travel into the dumping position;

(e) Anchored platforms inside the skips, if they are bottom-dumping; and

(f) Devices to prevent tilting.

(48) Personnel cars shall be of substantial construction and provided with:

(a) Drags or equivalent safety devices on the last car of man-trips operated in inclined shafts where guides are not provided;

(b) Safety catches if guides are provided;

(c) Secondary safety connections where possible;

(d) Safety chains or wire ropes between cars; and

(e) Adequate seating for the number of persons handled.

(49) Buckets shall not be used to hoist persons except during shaft sinking operations, inspection, maintenance and repairs.

(50) Buckets used to hoist persons during vertical shaft sinking operations shall:

(a) Be securely attached to a crosshead when traveling in either direction between the lower and upper crosshead parking locations;

(b) Have overhead protection when the shaft depth exceeds 50 feet;

(c) Have sufficient depth or a suitably designed platform to transport persons safely in a standing position; and

(d) Have devices to prevent accidental dumping where the bucket is supported by a bail attached to its lower half.

(51) In shaft sinking where a platform is suspended by wire ropes, such ropes shall have an approved rating for the suspended load.

(52) Where rope guides are used in shafts other than in shaft sinking operations, the rope guides shall be a type of lock coil construction.

HOISTING PROCEDURES

(55) When a manually operated hoist is used, a qualified hoistman shall remain within hearing of the telephone or signal device at all times while any person is underground.

(56) When automatic hoisting is used, a competent operator of the hoist shall be readily available at or near the hoisting device while any person is underground.

(57) No person may operate a hoist unless within the preceding 12 months such person has had a medical examination by a qualified, licensed physician who shall certify fitness to perform this duty. Such certification shall be available at the mine.

(58) Only experienced hoistmen shall operate the hoist except in cases of emergency and in the training of new hoistmen.

(59) The safe speed for hoisting persons shall be determined for each shaft, and this speed shall not be exceeded. Persons shall not be hoisted at a speed faster than 2,500 feet per minute, except in an emergency.

(60) Maximum normal operating acceleration and deceleration shall not exceed 6 feet per second per second. During emergency braking, the deceleration shall not exceed 16 feet per second per second.

(61) Only authorized persons shall be in hoist rooms.

(62) Conveyances shall not be lowered by the brakes alone except during emergencies.

(63) In shafts inclined over 45°, the operator shall determine and post in the conveyance or at each shaft station the maximum number of persons permitted to ride in a hoisting conveyance at any one time. Each person shall be provided a minimum of 1.5 square feet of floor space.

(64) During shift changes, an authorized person shall be in charge of each trip in which persons are hoisted.

(65) Persons shall enter, ride and leave conveyances in an orderly manner.

(66) Persons shall not enter or leave conveyances which are in motion or after a signal to move the conveyance has been given to the hoistman.

(67) Cage doors or gates shall be closed while persons are being hoisted; they shall not be opened until the cage has come to a stop.

(68) Persons shall not ride in skips or buckets with muck, supplies, materials, or tools other than small hand tools.

(69) When combinations of cages and skips are used in the same compartment, the cages shall be enclosed to protect personnel from flying material and the hoist speed shall not exceed 1,000 feet per minute. Muck shall not be hoisted with personnel during shift changes.

(70) Rock or supplies shall not be hoisted in the same shaft as persons during shift changes, unless the compartments and dumping bins are partitioned to prevent spillage into the cage compartment.

(71) Persons shall not ride the ball, bail, rim, bonnet or crosshead of any shaft conveyance except when necessary for inspection and maintenance, and then only when suitable protection for persons is provided.

(72) Open hooks shall not be used to hoist buckets or other conveyances.

(73) When persons are hoisted in buckets, speeds shall not exceed 500 feet per minute and shall not exceed 200 feet per minute when within 100 feet of the intended station.

(74) Buckets shall be stopped about 15 feet from the shaft bottom to await a signal from one of the crew on the bottom for further lowering.

(75) All buckets shall be stopped after being raised about 3 feet above the shaft bottom. A bucket shall be stabilized before a hoisting signal is given to continue hoisting the bucket to the crosshead. After a hoisting signal is given, hoisting to the crosshead shall be at a 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 engaged.

(76) Where mine cars are hoisted by cage or skip, means for blocking cars shall be provided at all landings and also on the cage.

(77) When tools, timbers or other materials are being lowered or raised in a shaft by means of a bucket, skip or cage, they shall be secured or so placed that they will not strike the sides of the shaft.

(78) When conveyances controlled by a hoist operator are not in use, they shall be released and the conveyances shall be raised or lowered a suitable distance to prevent persons from boarding or loading the conveyances.

(79) A manually operated device shall be installed on each electric hoist that will allow the conveyance of counterbalance to be removed from an overtravel position. Such device shall not release the brake, or brakes, holding the overtravelled conveyance or counterbalance until sufficient drive motor torque has been developed to assure movement of the conveyance of counter balance in the correct direction only.

SIGNALING

(90) There shall be at least 2 effective approved methods of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or intercom.

(91) Hoist operators shall accept hoisting instructions only by the regular signaling system unless it is out of order. In such an event, and during other emergencies, the hoist operator shall accept instructions to direct movement of the conveyances only from authorized persons.

(92) A method shall be provided to signal the hoist operator from cages or other conveyances at any point in the shaft.

(93) A standard code of hoisting signals shall be adopted and used at each mine. The movement of a shaft conveyance on a "one bell" signal is prohibited.

(94) A legible signal code shall be posted prominently in the hoist house within easy view of the hoistman, and at each place where signals are given or received.

(95) 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.

(96) Any person responsible for receiving or giving signals for cages, skips and man-trips when persons or materials are being transported shall be familiar with the posted signaling code.

SHAFTS

(100) Shaft landings 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.

(101) Positive stop-blocks or a derail switch shall be installed on all tracks leading to a shaft collar or landing.

(102) A means shall be provided to guide the movement of a shaft conveyance.

(103) Dumping facilities and loading pockets shall be constructed so as to minimize spillage into the shaft.

(104) Suitable clearance at shaft stations shall be provided to allow safe movement of persons, equipment and materials.

(105) A safe means of passage around open shaft compartments shall be provided on landings with more than one entrance to the shaft.

(106) Shaft sets shall be kept in good repair and clean of hazardous material.

(107) Hoistmen shall be informed when persons are working in a compartment affected by that hoisting operation and a "Men Working in Shaft" sign shall be posted at the hoist.

(108) When persons are working in a shaft "Men Working in Shaft" signs shall be posted at all devices controlling hoisting operations that may endanger such persons.

(109) Shaft inspection and repair work in vertical shafts shall be performed from substantial platforms equipped with bonnets or equivalent overhead protection.

(110) A substantial bulkhead or equivalent protection shall be provided above persons at work deepening a shaft.

(111) Substantial fixed ladders shall be provided from the collar to as near the shaft bottom as practical during shaft-sinking operations, or an escape hoist powered by an emergency power source shall be provided. When persons are on the shaft bottom, a chain ladder, wire rope ladder or other extension ladders shall be used from the fixed ladder or lower limit of the escape hoist to the shaft bottom.

INSPECTION AND MAINTENANCE

(120) A systematic procedure of inspection, testing and maintenance of shafts and hoisting equipment shall be developed and followed. If it is found or suspected that any part is not functioning properly, the hoist shall not be used until the malfunction has been located and repaired or adjustments have been made.

(121) Complete records shall be kept for 3 years of inspections, tests and maintenance of shafts and hoisting equipment.

(122) Parts used to repair hoists shall have properties that will insure the proper and safe function of the hoist.

(123) Wire ropes shall be lubricated or treated with dressing as recommended or approved by the rope manufacturer.

(124) Hoist ropes other than those on friction hoists shall be cut off at least 6 feet above the highest connection to the conveyance at time intervals not to exceed one year unless a shorter time is required by sub. (126), or by conditions of use. The portion of the rope that is cut off shall be examined and inspected by a competent person for damage, corrosion, wear and fatigue.

(125) Hoist ropes wound in multiple layers shall have a length cut off at the drum end at least 3 times during the anticipated life of the rope and whenever necessary as required by sub. (126), to distribute the wear at change-of-layer and crossover points. The length of rope cut off shall not be a whole number multiple of the circumference of the drum.

(126) Hoist ropes shall be examined over the entire active length at least every month to evaluate wear and possible damage. When such examinations or other inspections reveal that the rope is worn, and at least every 6 months, caliper measurements or nondestructive tests shall be made at the following locations:

(a) Wherever wear is evident;

(b) Immediately above the socket or clip and above the safety connection;

(c) Where the rope rests on the sheaves;

(d) Where the ropes leave the drums when the conveyances are at the regular stopping point;

(e) Where a layer of rope begins to overlap another layer on the drum; and

(f) At 100 feet intervals. Measurements shall be made midway between the last previously calipered points.

(127) Ropes shall not be used for hoisting when they have:

(a) More than 6 broken wires in any lay;

(b) Crown wires worn to less than 65% of the original diameter;

(c) A marked amount of corrosion or distortion; or

(d) A combination of similar factors individually less severe than those above but which in aggregate might create an unsafe condition.

(128) Hoistmen shall examine their hoists and shall test overtravel, deadman controls, position indicators and braking mechanisms at the beginning of each shift.

(129) Before hoisting persons and to assure that the hoisting compartments are clear of obstructions, empty hoist conveyances shall be operated at least one round trip after:

(a) Any hoist or shaft repairs or related equipment repairs that might restrict or obstruct conveyance clearance;

(b) Any oversize or overweight material or equipment trips that might restrict or obstruct conveyance clearance;

(c) Blasting in or near the shaft that might restrict or obstruct conveyance clearance; or

(d) Remaining idle for one shift or longer.

(130) Hoist conveyance connections shall be inspected at least once during any 24-hour period that the conveyance is used for hoisting persons.

(131) (a) A performance drop test of hoist conveyance safety catches shall be made at the time of installation, or prior to installation, in a mockup of the actual installation. The test shall be certified to in writing by the manufacturer or by a registered professional engineer performing the test.

(b) After installation and before use, and at the beginning of any 7 day period during which the conveyance is to be used, the conveyance shall be suitably rested and the hoist rope slackened to test for the unrestricted functioning of the safety catches and their activating mechanisms.

(c) The safety catches shall be inspected by a competent person at the beginning of any 24-hour period that the conveyance is to be used.

(132) Shafts that have not been inspected within the past 7 days shall not be used until an inspection has been conducted by a competent person.

(133) Sheaves in operating shafts shall be inspected weekly and kept properly lubricated.

(134) Rollers used in operating inclined shafts shall be lubricated, properly aligned, and kept in good repair.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.27 Miscellaneous.

GENERAL - SURFACE AND UNDERGROUND

(1) Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Persons under the influence of alcohol or narcotics shall not be permitted on the job.

(2) An adequate supply of potable drinking water shall be provided at all active working areas.

(a) The common drinking cup and containers from which drinking water must be dipped or poured are prohibited.

(b) Where single service cups are supplied, a sanitary container for unused cups and a receptacle for used cups shall be provided.

(c) When water is cooled by ice, the ice shall either be of potable water or shall not come in contact with the water.

(d) Potable water outlets shall be posted.

(e) Potable water systems shall be constructed to prevent backflow or backsiphonage of nonpotable water.

(3) At all mining operations:

(a) Workplaces, passageways, storerooms and service rooms shall be kept clean and orderly.

(b) The floor of every workplace shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats or other dry standing places shall be provided where practicable.

(c) Every floor, working place and passageway shall be kept free from protruding nails, splinters, holes or loose boards, as practicable.

(4) Carbon tetrachloride shall not be used.

(5) (a) Toilet facilities shall be provided for the employes at convenient locations. Where both sexes are employed, separate toilet rooms for each sex shall be provided in accordance with the sanitation requirements established in chs. Ind 50 to 64, Wis. Adm. Code.

(b) In locations where a public sewer system is not available and where a sewage disposal system cannot be provided, privies, chemical toilets, recirculating toilets or combustion toilets may be used.

(c) Toilet facilities shall be provided in the mines unless the miners are permitted to use the toilet facilities on the surface.

(6) Dusts suspected of being explosive shall be tested for explosibility. If tests prove positive, appropriate control measures shall be taken.

(7) If failure of a water retaining dam will create a hazard it shall be of substantial construction and inspected at regular intervals.

(8) Areas where health or safety hazards exist that are not immediately obvious to employes shall be barricaded, or warning signs shall be posted at all approaches. Warning signs shall be readily visible, legible, display the nature of the hazard, and any protective action required.

(9) Toxic materials used in conjunction with or discarded from mining or milling of a product shall be plainly marked or labeled so as to positively identify the nature of the hazard and the protective action required.

(10) Receptacles with covers shall be provided at suitable locations and used for the disposal of waste food and associated materials. They shall be emptied frequently and shall be maintained in a clean and sanitary condition.

(11) No person may consume or store food or beverages in a toilet room nor in any area exposed to a toxic material.

SURFACE ONLY

(20) Access to unattended mine openings shall be restricted by gates or doors, or the openings shall be fenced and posted.

(21) Upon abandonment of a mine, the owner or operator shall effectively close or fence off all surface openings down which persons could fall or through which persons could enter. Upon or near all such safeguards, trespass warnings and appropriate danger notices shall be posted.

UNDERGROUND ONLY

(30) Whenever any working place in a mine is being advanced in an area where a dangerous inrush of water, silt or gas may be encountered, test holes of sufficient depth, proper orientation and number shall be drilled in advance of such workings to insure that at least 20 feet of tested ground remains to prevent an uncontrolled inrush after any blast advancing the face.

(31) In areas where dangerous accumulations of water, gas, mud or fire atmosphere could be encountered, persons shall be removed to safe places before blasting.

(32) Telephones or other two-way communication equipment with instructions for their use shall be provided for communication from underground operations to the surface.

(33) (a) All underground workings shall be surveyed and mapped within a reasonable time as work develops. All underground workings shall be surveyed and mapped before they are allowed to become inaccessible. All surveys shall be tied to an exterior quarter section corner.

(b) Before any mine having underground workings is abandoned, the operator of such a mine shall cause to be made by an engineer or surveyor, a map, on a scale not smaller than 100 feet to the inch, showing all underground workings. A print or copy of such a map certified by the operator or designee as being accurate shall be filed with the department.

(34) Whenever any mine shaft or exploration shaft is abandoned or its use discontinued, the operator or contractor shall promptly fill in the shaft or well to grade or enclose the shaft or well with a fence. The surface property owner shall be responsible for maintaining the fence or fill in a safe condition.

(a) Fences shall be constructed of woven wire at least 46 inches wide. The fence shall be constructed so no crawl space exists between the bottom of the fence and the ground. At least one strand of barbed wire shall be provided at the top of the fence. All wires shall be fastened to posts set into the ground and spaced at not more than 8 foot intervals. Woven wire fences shall not be smaller than No. 12 wire gauge. Cross wires and mesh wires shall be not smaller than No. 16 wire gauge. The strands shall be not more than 12 inches apart.

(b) Where shafts or wells are capped, the cap shall consist of reinforced concrete slabs at least 6 inches in thickness or with a native stone at least 3 times the diameter of the test well, or with a tapered concrete plug.

(35) (a) No mine workings may approach nearer than 30 feet of any part of a winze, stope or other opening in which there is a known or a suspected dangerous accumulation of water.

(b) Notice shall be given to the department in writing before starting to advance mine workings toward another mine workings where a dangerous accumulation of water is suspected. A borehole shall be drilled at least 30 feet in advance of the face of the drift when in the vicinity of any mine workings with a dangerous accumulation of water, and also, if necessary in other directions.

(c) Where there is danger of a sudden inburst of water, additional raises, drifts or other safety provisions shall be constructed as are necessary in the opinion of the department to insure the escape of workers.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.

ILHR 8.28 Gassy mines. Gassy mines shall be operated in accordance with all the applicable requirements in this chapter in addition to the requirements in this section. The requirements in this section apply only to underground gassy mine operations.

MINE CLASSIFICATION

(1) A mine shall be deemed gassy, and thereafter operated as a gassy mine, if:

(a) The state of Wisconsin classifies the mine as gassy; or

(b) Flammable gas emanating from the orebody or the strata surrounding the orebody has been ignited in the mine; or

(c) A concentration of 0.25% 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 workings; or

(d) The mine is connected to a gassy mine.

(2) Flammable gases detected only while unwatering mines or flooded sections of mines or during other mine reclamation operations shall not be used to permanently classify a mine gassy. During such periods that any flammable gas is present in the mine, the affected areas of the mine shall be operated in accordance with appropriate requirements in this section.

FIRE PREVENTION AND CONTROL

(10) Persons 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.

(11) 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.

(12) Immediately before and continuously during welding or cutting with an arc or open flame or soldering with an open flame, in other than fresh air, or in places where methane is present or may enter the air current, a competent person shall test for methane with a device approved by the department for detecting methane.

(13) Welding or cutting with an arc or open flame or soldering with an open flame shall not be performed in atmospheres containing more than one percent of methane as determined by a device approved by the department for detecting methane.

VENTILATION

(20) Main fans shall be:

(a) Installed on the surface;

(b) Installed to permit prompt reversal of airflow;

(c) Powered electrically;

(d) Installed in noncombustible housing provided with noncombustible air ducts;

(e) Offset not less than 15 feet from the nearest side of the mine opening to which the fan is connected. The fan installation shall be equipped with explosion-doors or a weak-wall having an area at least equivalent to

the cross-sectional area of the airway. Such doors or weak-wall shall be in direct line with possible explosion forces; and

(f) Provided with an automatic signal device to give warning or alarm should the fan system malfunction. The signal device shall be so located that it can be seen or heard by a responsible person at all times when persons are underground.

(21) Main fans shall be:

(a) Operated continuously while persons are underground, except when stopped or slowed down for fan maintenance or fan adjustments and related ventilation system adjustments and compliance is made with the provisions of sub.(24);

(b) Provided with pressure-recording gages which shall be examined daily for good operating condition. The charts of such gages shall be changed after completing one revolution; and

(c) Inspected daily and logs kept of such inspections and of fan maintenance. Charts and logs shall be retained for a minimum of one year. Such records and charts shall be available for inspection by the department or its authorized representative.

(22) The main intake and return air currents in mines shall be in separate shafts, slopes or drifts, except that during shaft or slope development, vent tubing may be used in the same opening. Until a second opening to the surface can be provided, single shafts used for intake and return air shall be provided with a curtain wall or partition.

(23) 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.

(24) (a) At mines where a single main fan is used and such fan stops, or at mines where multiple main fans are used and all such fans stop, the operator shall take the following immediate action:

1. Withdraw all persons from the affected active workings;

2. Deenergize the power in affected active workings; and

3. Withdraw all persons from the mine when a 1.0% concentration of methane in air is measured in any active working.

(b) If ventilation has been interrupted for more than 15 minutes, all working places and active workings where methane may accumulate shall be examined by a competent person. The power shall not be restored or persons permitted to reenter the affected active workings until the competent person has determined that the methane concentration in such active workings is less than 1.0%.

(c) At mines where multiple main fans are used and one or more but not all fans stop, and air flow in intake and return air courses is maintained, the operator shall take the following immediate action:

1. Monitor the air in all active workings for methane content;

2. Withdraw all persons from, and deenergize the power in, all active workings when a 1.0% concentration of methane in the air is measured; and

3. Comply with all related requirements in this section.

(25) When there has been a failure of mine ventilation other than a failure of a main fan as described in sub. (24), the operator shall take the following immediate actions:

(a) Withdraw all persons from the affected active workings; and

(b) Deenergize the power in affected active workings. The power shall not be restored or persons permitted to reenter the affected active workings until a competent person has determined that the methane concentration in such active workings is less than 1.0%.

(26) When the main fan or fans have been shut down with all persons out of the mine, no person, other than those competent to examine the mine, or other authorized persons, may go underground until the fans have been started and the mine is examined for methane and other hazards and declared safe.

(27) Booster fans shall be:

(a) Operated by permissible drive units maintained in permissible condition;

(b) Operated only in air containing less than 1.0% methane; and

(c) Kept in continuous operation when persons are in active workings of the mine affected by such fans.

(28) Booster fans shall be:

(a) Provided with an automatic signal device to give warning or alarm should the fan system malfunction. The signal device shall be so located that it can be seen or heard by a responsible person at all times when persons are underground;

(b) Equipped with a device that automatically deenergizes the power in affected active workings should the fan system malfunction;

(c) Provided with air locks, the doors of which open automatically should the fan stop; and

(d) Equipped with 2 sets of controls capable of starting, stopping and reversing the fans. One set of controls shall be located at the fan. A second set of controls shall be at another location remote from the fans.

(29) (a) Auxiliary fans shall be of a permissible type, maintained in permissible condition, so located and operated to avoid recirculation of air. Auxiliary fans shall not be used to ventilate any working place during the interruption of normal mine ventilation.

(b) If the auxiliary fan is stopped or fails, the electrical equipment in the affected area shall be stopped and the power disconnected at the power source until ventilation in the affected area is restored.

(c) Tests shall be made at the fan for methane before auxiliary fans are started. The air passing over or through auxiliary fan units shall not exceed 1.0% of methane.

(30) Auxiliary fans shall be inspected by competent persons at least twice each operating shift.

(31) The volume and velocity of the current of air coursed through all active areas shall be sufficient to dilute, render harmless and carry away methane, smoke, fumes and dust.

(32) The quantity of air coursed through the last open crosscut in pairs or sets of entries or through other ventilation openings nearest the face, shall be at least 6,000 cubic feet per minute, or 9,000 cubic feet per minute in longwall and continuous miner sections.

(33) 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.

(34) Permanently installed battery-charging stations and transformer stations in combustible areas shall be ventilated by separate splits of air conducted directly to return air courses. Permanently installed means stations that are intended to exist for one year or more.

(35) Changes in ventilation that materially affect the main air current or any split thereof and may affect the safety of persons in the mine shall be made only when the mine is idle. 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.

(36) If methane gas in excess of 1.0% is detected in the air not less than 12 inches from the back, face or rib of an underground working place, adjustments shall be made in the ventilation immediately so that the concentration of methane gas in such air is reduced to 1.0% or less. While such changes or adjustments are underway and until they have been achieved, power to electric equipment located in such place shall be cut off, no other work shall be permitted in such place, and due precautions shall be carried out under the direction of the operator or the operator's agent so as not to endanger other areas of the mine.

(37) If 1.5% or higher concentration of methane gas is present in air returning from an underground working place, or is present in the air not less than 12 inches from the back, face or rib of an underground working place, all persons shall be withdrawn from the area of the mine endangered by such methane gas until the concentration of methane in such areas is reduced to 1.0 % or less.

(38) Air that is passed by an opening of any unsealed abandoned area and contains 0.25% or more of methane shall be coursed directly to a return airway. Examinations of such air shall be conducted during the preshift examinations required by sub. (54).

(39) Air that has passed through an abandoned panel or area which is inaccessible or unsafe for inspection shall not be used to ventilate any working place in such mine. No air which has been used to ventilate an area from which the pillars have been removed may be used to ventilate any working place in such mine, except that such air, if it does not contain 0.25 volume percent or more of methane, may be used to ventilate enough advancing working places immediately adjacent to the line of

retreat to maintain an orderly sequence of pillar recovery on a set of entries.

(40) Abandoned areas shall be sealed or ventilated; areas that are not sealed shall be barricaded and posted against unauthorized entry.

(41) Seals shall be of substantial construction. Exposed surfaces shall be made of fire-resistant material, or, if the commodity mined is combustible, seals shall be made of incombustible material.

(42) 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.

(43) Crosscuts shall be made at intervals not in excess of 100 feet between entries and between rooms.

(44) 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 department or its authorized representative permits an exception to this requirement.

(45) Brattice cloth shall be of flame-resistant material.

(46) Damaged brattices shall be repaired promptly.

(47) Crosscuts shall be provided where practicable at or within 18 feet of the face of drifts, entries and rooms before the workings are abandoned in any unsealed area of the mine. When crosscuts are not practicable, line brattice or other suitable means of ventilation shall be provided to the drifts, entries or rooms.

(48) 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 methane by use of line brattice or other adequate means.

(49) Stoppings in crosscuts between intake and return airways, on entries other than room entries, shall be built of solid, substantial material; exposed surfaces shall be made of fire-resistant material or, if the material mined is combustible, stoppings shall be made of incombustible material.

(50) 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.

(51) Air locks shall be ventilated sufficiently to prevent accumulations of flammable gas inside the locks.

(52) Doors which control the flow of air by being closed shall be kept closed, except when persons or equipment are passing through such doorways. Doors shall be plainly marked to indicate whether they shall be closed or open for ventilation control purposes.

(53) Overcasts and undercasts shall be:

(a) Constructed tightly of incombustible material;

(b) Of sufficient strength to withstand possible falls from the back; and

(c) Kept clear of obstruction.

(54) 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.

(55) Only qualified examiners and persons authorized to correct the dangerous conditions shall enter places or areas where danger signs are posted.

(56) Danger signs shall not be removed until the dangerous conditions have been corrected.

(57) Each operator shall use permissible devices accepted by the department for detecting flammable gases, oxygen deficiency, carbon monoxide and other air contaminants. Such permissible devices shall be provided and maintained in serviceable and permissible condition. In the detection of flammable gases, a permissible flame safety lamp may be used only as a supplementary testing device.

(58) At intervals not greater than 7 days, the mine foreman or other competent person designated by the mine foreman, shall examine for hazardous conditions and for compliance with health and safety standards, and shall test for methane and carbon monoxide. The tests shall be made with approved devices at the following locations:

(a) In the return of each split where it enters the main return;

(b) Adjacent to retreat areas, if accessible;

(c) At seals;

(d) In the main return;

(e) In at least one entry of each intake and return airway;

(f) In idle workings; and

(g) In unsealed abandoned workings, as conditions permit.

(59) The mine foreman or other designated official shall read and countersign promptly the reports of the required examinations made by competent persons. Where such reports disclose hazardous conditions, the affected employes shall be so informed and such conditions shall be corrected promptly. If such conditions create an imminent danger, the operator shall withdraw all persons from, or prevent any person from entering, as the case may be, the area affected by such conditions until such danger is abated. A responsible mine official at the next highest level of authority, if such level exists, shall also read and countersign at least weekly the required reports to insure that proper inspections have been made and remedial action taken.

(60) All gassy mines shall be ventilated mechanically.

(61) Airflow shall be maintained in all intake and return air courses of a mine. When multiple main fans are used, such ventilation systems shall not develop neutral areas (areas without perceptible air movement).

(62) In mines ventilated by a combination of multiple blowing or multiple exhausting main fans, each main fan installation shall be equipped with noncombustible doors designed and positioned so that, in the event of failure of a main fan, these doors will automatically close to prevent air reversal through the fan. The doors shall be located so that they are not in direct line with forces which would come out of the mine, should an explosion occur.

EQUIPMENT

(75) Diesel-powered equipment shall not be taken into or operated in places where methane exceeds 1.0% at any point not less than 12 inches from the back, face or rib.

(76) Trolley wires and trolley feeder wires shall be on intake air and shall not extend into the last open crosscut or other ventilation opening. Such wires shall be kept at least 150 feet from pillar recovery workings.

(77) 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.

(78) Only permissible distribution boxes shall be used in working places and other places where one percent or more of methane may be present or may enter the air current.

(79) A methane monitoring device (methane monitor), approved by the department, shall be installed and properly maintained on all continuous miners and longwall face equipment. The sensing unit of methane monitor shall be positioned as close to the working face as practicable. When the concentration of methane is 1.0% or more, the monitor shall give a warning and deenergize the equipment automatically when the concentration reaches 1.5%. The methane monitor also shall deenergize such equipment automatically when the monitor is not functioning properly.

ILLUMINATION

(90) Only permissible electric lamps shall be used for portable illumination underground.

EXPLOSIVES

(95) Explosives not designated as permissible by the department shall not be used in any underground gassy mine until the state inspector has given written approval for each such specific explosive to be used.

(96) The state inspector, in granting approval referred to in sub. (95), 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.

(97) 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 persons are out of the mine.

(98) When blasting on shift, examinations for methane shall be made immediately before firing each shot or round, and again before other work is performed. Examinations shall be made by competent persons with devices approved by the department for detecting methane.

(99) Shots or rounds shall not be fired in places where 1.0% or more of methane is present at a point no less than 12 inches from the back, face or rib. Tests to determine the presence of methane shall be made by a competent person with devices approved by the department for detecting methane.

Note: See ch. Ind 5, Wis. Adm. Code, for further requirements for explosives and blasting agents.

History: Cr. Register, June, 1983, No. 330, eff. 7-1-83.