WEST VIRGINIA CODE: §22A-2-40

§22A-2-40. General provisions.

Operators of coal mines in which electricity is used as a means of power shall comply with the following provisions:

(1) All surface transformers, unless of a construction which will eliminate shock hazards, or unless installed at least eight feet above ground, shall be enclosed in a house or surrounded by a fence at least six feet high. If the enclosure is of metal, it shall be grounded effectively. The gate or door to the enclosure shall be kept locked at all times, unless authorized persons are present.

(2) Underground transformers shall be air cooled or cooled with noninflammable liquid or inert gas.

(3) Underground stations containing circuit breakers filled with inflammable liquids shall be put on a separate split of air or ventilated to the return air, and shall be of fireproof construction.

(4) Transformers shall be provided with adequate overload protection.

(5) “Danger — High Voltage” signs with the voltage indicated shall be posted conspicuously on all transformer enclosures, high-potential switchboards, and other high-potential installations.

(6) Dry insulating platforms of rubber or other suitable nonconductive material shall be kept in place at each switchboard and at stationary machinery where shock hazards exist.

(7) Capacitors used for power factor correction shall be nonflammable liquid filled. Suitable drain-off resistors or other means to protect miners against electric shock following removal of power shall be provided.

(8) All unattended underground loading points where electric driven hydraulic systems are used shall utilize a fireproof oil or emulsion.

(9) Before electrical changes are made to permissible equipment for use in a mine, they shall be approved by the director.

(10) Reverse current protection shall be provided at storage battery charging stations to prevent the storage batteries from energizing the power circuits in the event of power failure.

(11) In all mines all junction or distribution boxes used for making multiple power connections inby the last open crosscut shall be permissible.

WV Legislature

(12) All hand-held electric drills, blower and exhaust fans, electric pumps, and such other low horsepower electric face equipment which are taken into or used inby the last open crosscut of any coal mine shall be permissible.

(13) All electric face equipment which is taken into or used inby the last open crosscut of any coal mine shall be permissible.

(14) In mines operated in coal seams which are located at elevations above the water table, the phrase "coal seams above the water table" means coal seams in a mine which are located at an elevation above a river or the tributary of a river into which a local surface water system naturally drains.

(15) The operator of each coal mine shall maintain in permissible condition all electric face equipment, which is taken into or used inby the last open crosscut of any mine.

(16) Except where permissible power connection units are used, all power-connection points outby the last open crosscut shall be in intake air.

(17) All power circuits and electric equipment shall be deenergized before work is done on such circuits and equipment, except when necessary for trouble shooting or testing.

(18) Energized trolley wires may be repaired only by a person trained to perform electrical work and to maintain electrical equipment and the operator of a mine shall require that such persons wear approved and tested insulated shoes and wireman's gloves.

(19) No electrical work shall be performed on low-, medium-, or high-voltage distribution circuits or equipment, except by a qualified person or by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person. Disconnecting devices shall be locked out and suitably tagged by each person who performs such work, except that in cases where locking out is not possible, such devices shall be opened and suitably tagged by such persons who installed them, or, if such persons are unavailable, by qualified persons authorized by the operator or his or her agent.

(20) All electric equipment shall be examined weekly, tested, and properly maintained by a qualified person to assure safe operating conditions. When a potentially dangerous condition is found on electric equipment, such equipment shall be removed from service until such condition is corrected. A record of such examinations shall be kept and made available to an authorized representative of the director and to the miners in such mine.

(21) All electric conductors shall be sufficient in size and have adequate current-carrying capacity and be of such construction that a rise in temperature resulting from normal operation will not damage the insulating material.

(22) All electrical connections or splices in conductors shall be mechanically and electrically efficient, and suitable connectors shall be used. All electrical connections or splices in insulated wire shall be reinsulated at least to the same degree of protection as the

WV Legislature

remainder of the wire.

(23) Cables shall enter metal frames of motors, splice boxes, and electric compartment only through proper fittings. When insulated wire, other than cables, pass through metal frames, the holes shall be substantially bushed with insulated bushings.

(24) All power wire (except trailing cables on mobile equipment, specially designed cables conducting high-voltage power to underground rectifying equipment or transformers, or bare or insulated ground and return wires) shall be supported on well-installed insulators and shall not contact combustible material, roof, or ribs.

(25) Power wires and cables, including, but not limited to, phone communication and control wires, except trolley wires, trolley feeder wires, and bare signal wires, shall be insulated adequately and fully protected. The provisions of this subdivision became effective on January 1, 1978.

(26) Automatic circuit-breaking devices or fuses of the correct type and capacity shall be installed so as to protect all electric equipment and circuits against short circuit and overloads. Three-phase motors on all electric equipment shall be provided with overload protection that will deenergize all three phases in the event that any phase is overloaded.

(27) Incandescent lamps installed along haulageways and at other locations shall not contact combustible material, and if powered from trolley or direct current feeder circuits, need not be provided with separate short circuits or overload protection, if the lamp is not more than eight feet in distance from such circuits.

(28) In all main power circuits, disconnecting switches shall be installed underground within 500 feet of the bottoms of shafts and boreholes through which main power circuits enter the underground area of the mine and within 500 feet of all other places where main power circuits enter the underground area of the mine.

(29) All electric equipment shall be provided with switches or other controls that are safely designed, constructed, and installed.

(30) Each underground, exposed power conductor that leads underground shall be equipped with suitable lightning arrestors of approved type within 100 feet of the point where the circuit enters the mine. Lightning arrestors shall be connected to a low-resistance grounding medium on the surface which shall be separated from neutral ground by a distance of not less than 25 feet.

(31) Except for areas of a coal mine inby the last open crosscut, incandescent lamps may be used to illuminate underground areas. When incandescent lamps are used in a track entry or belt entry or near track entries to illuminate special areas other than structures, the lamps shall be installed in weatherproof sockets located in positions such that the lamps will not come in contact with any combustible material. Lamps used in all other places must be of

WV Legislature

substantial construction and be fitted with a glass enclosure.

(32) An authorized representative of the director may require in any mine that electric face equipment be provided with devices that will permit the equipment to be deenergized quickly in the event of an emergency.

(33) An authorized representative of the director shall require manually operated emergency stop switches, designed to deenergize the traction motor circuit when the contractors or controller fail to open, to be installed on all battery powered tractors, taken into or used inby the last open crosscut of any entry or room.

(34) Trailing cables used in coal mines shall meet the requirements for flame-resistant cables.

(35) Short circuit protection for trailing cables shall be provided by an automatic circuit breaker or other no less effective device approved by the director of adequate current-interrupting capacity in each ungrounded conductor. Disconnecting devices used to disconnect power from trailing cables shall be plainly marked and identified and such devices shall be equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected.

(36) When two or more trailing cables junction to the same distribution center, means shall be provided to assure against connecting a trailing cable to the wrong size circuit breaker.

(37) One temporary splice may be made in any trailing cable. Such trailing cable may only be used for the next 24-hour period. No temporary splice shall be made in a trailing cable within 25 feet of the machine, except cable reel equipment. Temporary splices in trailing cables shall be made in a workmanlike manner and shall be mechanically strong and well insulated. Trailing cables or hand cables which have exposed wires or which have splices that heat or spark under load shall not be used. As used in this section, the term “splice” means a mechanical joining of one or more conductors that have been severed.

(38) When permanent splices in trailing cables are made, they shall be:

(A) Mechanically strong with adequate electrical conductivity and flexibility;

(B) Effectively insulated and sealed so as to exclude moisture; and

(C) Vulcanized or otherwise treated with suitable materials to provide flame-resistant qualities and good bonding to the outer jacket.

(39) Trailing cables shall be clamped to machines in a manner to protect the cables from damage and to prevent strain on the electrical connections. No cables will be hung in a manner which will damage the insulation or conductors.

(40) Trailing cables shall be adequately protected to prevent damage by mobile equipment.

WV Legislature

(41) Trailing cable and power cable connections to junction boxes and to electrical equipment shall not be made or broken under load.

(42) All metallic sheaths, armors and conduits enclosing power conductors shall be electrically continuous throughout and shall be grounded by methods approved by an authorized representative of the director.

(43) Except where waived by the director, metallic frames, casings and other enclosures of electric equipment that can become alive through failure of insulation or by contact with energized parts shall be grounded, and shall have a ground monitoring system.

(44) In instance where single-phase 110-220 volt circuits are used to feed electrical equipment, the only method of grounding that will be approved is the connection of all metallic frames, casings, and other enclosure of such equipment to a separate grounding conductor which establishes a continuous connection to a grounded center tap of the transformer.

(45) The attachment of grounding wires to a mine track or other grounded power conductor will be approved if separate clamps, suitable for such purpose, are used and installed to provide a solid connection.

(46) The frames of all offtrack direct-current machines and the enclosures of related detached components shall be effectively grounded or otherwise maintained at no less safe voltages.

(47) Installation of silicon diodes shall be restricted to electric equipment receiving power from a direct-current system with one polarity grounded. Where such diodes are used on circuits having a nominal voltage rating of 250, they must have a forward current rating of 400 amperes or more, and have a peak inverse voltage rating of 400 or more. Where such diodes are used on circuits having nominal voltage rating of 550, they must have a forward current rating of 250 amperes or more, and have a peak inverse voltage rating of 800 or more.

(48) In addition to the grounding diode, a polarizing diode must be installed in the machine control circuit to prevent operation of the machine when the polarity of a trailing cable is reversed.

(49) When installed on permissible equipment, all grounding diodes, over-current devices, and polarizing diodes must be placed in explosion-proof compartments.

(50) High-voltage lines, both on the surface and underground, shall be deenergized and grounded before work is performed on them, except that repairs may be permitted, in the case of energized surface high-voltage lines, if such repairs are made by a qualified person in accordance with procedures and safeguards, including, but not limited to, a requirement that the operator of such mine provide, test and maintain protective devices in making such

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repairs.

(51) When two or more persons are working on an energized high-voltage surface line simultaneously, and any one of them is within reach of another, such persons shall not be allowed to work on different phases or on equipment with different potentials.

(52) All persons performing work on energized high-voltage surface lines shall wear protective rubber gloves, sleeves, and climber guards if climbers are worn. Protective rubber gloves shall not be worn wrong side out or without protective leather gloves. Protective devices worn by a person assigned to perform repairs on high-voltage surface lines shall be worn continuously from the time he or she leaves the ground until he or she returns to the ground, and, if such devices are employed for extended periods, such person shall visually inspect the equipment assigned him or her for defects before each use, and, in no case, less than twice each day.

(53) Disconnecting or cutout switches on energized high-voltage surface lines shall be operated only with insulated sticks, fuse tongs, or pullers which are adequately insulated and maintained to protect the operator from the voltage to which he or she is exposed. When such switches are operated from the ground, the person operating such devices shall wear protective rubber gloves.

(54) Solely for purposes of grounding ungrounded high-voltage power systems, grounded messenger wires used to suspend the cables of such systems may be used as a grounding medium.

(55) When not in use, power circuits underground shall be deenergized on idle days and idle shifts, except that rectifiers and transformers may remain energized.

(56) High-voltage circuits entering the underground area of any coal mine shall be protected by suitable circuit breakers of adequate interrupting capacity. Such breakers shall be equipped with devices to provide protection against undervoltage, grounded phase, short circuit, and overcurrent.

(57) Circuit breakers protecting high-voltage circuits entering an underground area of any coal mine shall be located on the surface and in no case installed either underground or within a drift.

(58) One circuit breaker may be used to protect two or more branch circuits, if the circuit breaker is adjusted to afford overcurrent protection for the smallest conductor.

(59) The grounding resistor, where required, shall be of the proper ohmic value to limit the voltage drop in the grounding circuit external to the resistor to not more than 100 volts under fault conditions. The grounding resistor shall be rated for maximum fault current continuously and insulated from ground for a voltage equal to the phase-to-phase voltage of the system.

WV Legislature

(60) High-voltage circuits extending underground and supplying portable mobile or stationary high-voltage equipment shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the source transformers, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all high-voltage equipment supplied power from the circuit, except that the director or his or her authorized representative may permit ungrounded high-voltage circuits to be extended underground to feed stationary electrical equipment if such circuits are either steel armored or installed in grounded, rigid steel conduit throughout their entire length, and upon his or her finding that such exception does not pose a hazard to the miners. Within 100 feet of the point on the surface where high-voltage circuits enter the underground portion of the mine, disconnecting devices shall be installed and so equipped or designed in such a manner that it can be determined by visual observation that the power is disconnected, except that the director or his or her authorized representative may permit such devices to be installed at a greater distance from such area of the mine if he or she determines, based on existing physical conditions, that such installation will be more accessible at a greater distance and will not pose any hazard to the miners.

(61) High-voltage resistance grounded systems serving portable or mobile equipment shall include a fail-safe ground check circuit to monitor continuously the grounding circuit to assure continuity, and the fail-safe ground check circuit shall cause the circuit breaker to open when either the ground or pilot check wire is broken, or other no less effective device approved by the director or his or her authorized representative to assure such continuity.

(62) Underground high-voltage cables used in resistance grounded systems shall be equipped with metallic shields around each power conductor with one or more ground conductors having a total cross-sectional area of not less than one half the power conductor, and with an insulated internal or external conductor not smaller than No. 10 (A.W.G.) for the ground continuity check circuit.

(63) All such cables shall be adequate for the intended current and voltage. Splices made in such cables shall provide continuity of all components.

(64) Single-phase loads, such as transformer primaries, shall be connected phase-to-phase.

(65) All underground high-voltage transmission cables shall be installed only in regularly inspected air courses and haulageways, and shall be covered, buried, or placed so as to afford protection against damage, guarded where men regularly work or pass under them unless they are six and one-half feet or more above the floor or rail, securely anchored, properly insulated, and guarded at ends, and covered, insulated, or placed to prevent contact with trolley wires and other low-voltage circuits.

(66) Disconnecting devices shall be installed at the beginning of branch lines in underground high-voltage circuits and equipped or designed in such a manner that it can be determined by visual observation that the circuit is deenergized when the switches are open.

WV Legislature

(67) Circuit breakers and disconnecting switches underground shall be marked for identification.

(68) In the case of high-voltage cables used as trailing cables, temporary splices shall not be used and all permanent splices shall be made in accordance with the manufacturers' specifications.

(69) Frames, supporting structures and enclosures of stationary, portable, or mobile underground high-voltage equipment and all high-voltage equipment supplying power to such equipment receiving power from resistance grounded systems shall be effectively grounded to the high-voltage ground.

(70) Low- and medium-voltage power circuits serving three-phase alternating current equipment serving portable or mobile equipment shall be protected by suitable circuit breakers of adequate interrupting capacity which are properly tested and maintained as prescribed by the director. Such breakers shall be equipped with devices to provide protection against under-voltage, grounded phase, short circuit, and overcurrent.

(71) Power centers and portable transformers shall be deenergized before they are moved from one location to another, except that, when equipment powered by sources other than such centers or transformers is not available, the director may permit such centers and transformers to be moved while energized, if he or she determines that another equivalent or greater hazard may otherwise be created, and if they are moved under the supervision of a qualified person, and if such centers and transformers are examined prior to such movement by such person and found to be grounded by methods approved by an authorized representative of the director and otherwise protected from hazards to the miner. A record shall be kept of such examinations. High-voltage cables, other than trailing cables, shall not be moved or handled at any time while energized, except that when such centers and transformers are moved while energized as permitted under this section, energized high-voltage cables attached to such centers and transformers may be moved only by a qualified person and the operator of such mine shall require that such person wear approved and tested insulated wireman's gloves.

(72) Low- and medium-voltage three-phase alternating-current circuits used underground shall contain either a direct or derived neutral which shall be grounded through a suitable resistor at the power center, and a grounding circuit, originating at the grounded side of the grounding resistor, shall extend along with the power conductors and serve as a grounding conductor for the frames of all the electrical equipment supplied power from the circuit, except that the director or his or her authorized representative may permit underground low- and medium-voltage circuits to be used underground to feed such stationary electrical equipment if such circuits are either steel armored or installed in grounded rigid steel conduit throughout their entire length. The grounding resistor, where required, shall be of the proper ohmic value to limit the ground fault current to 25 amperes. The grounding resistor shall be rated for maximum fault current continuously and insulated from ground for a voltage equal to the phase-to-phase voltage of the system.

WV Legislature

(73) Low- and medium-voltage resistance grounded systems serving portable or mobile equipment shall include a fail-safe ground check circuit to monitor continuously the grounding circuit to assure continuity which ground check circuit shall cause the circuit breaker to open when either the ground or pilot check wire is broken, or other not less effective device approved by the director or his or her authorized representative to assure such continuity, except that an extension of time, not in excess of 12 months, may be permitted by the director on a mine-to-mine basis if he or she determines that such equipment is not available. Cable couplers shall be constructed so that the ground check continuity conductor shall be broken first and the ground conductors shall be broken last when the coupler is being uncoupled.

(74) Disconnecting devices shall be installed in conjunction with circuit breakers serving portable or mobile equipment to provide visual evidence that the power is connected.

(75) Circuit breakers shall be marked for identification.

(76) Single-phase loads shall be connected phase-to-phase.

(77) Trailing cables for medium-voltage circuits shall include grounding conductors, a ground check conductor, and grounded metallic shields around each power conductor or a ground metallic shield over the assembly, except that on equipment employing cable reels, cables without shields may be used if the insulation is rated 2,000 volts or more.

(78) Trolley wires and trolley feeder wires shall be provided with cutout switches at intervals of not more than 2,000 feet and near the beginning of all branch lines.

(79) Trolley wires and trolley feeder wires shall be provided with overcurrent protection.

(80) Trolley wires and trolley feeder wires, high-voltage cables, and transformers shall not be located within 15 feet of the last open crosscut and shall be kept at least 150 feet from pillar workings.

(81) Trolley wires, trolley feeder wires, and bare signal wires shall be insulated adequately where they pass through doors and stoppings and where they cross other power wires and cables. Trolley wires and trolley feeder wires shall be guarded adequately:

(A) At all points where men are required to work or pass regularly under the wires.

(B) On both sides of all doors and stoppings.

(C) At man-trip stations.

(82) Temporary guards shall be provided where trackmen and other persons work in close proximity to trolley wires and trolley feeder wires.

(83) Adequate precaution shall be taken to ensure that equipment being moved along

WV Legislature

haulageways will not come in contact with trolley wires or trolley feeder wires.

(84) Trolley and feeder wires shall be installed as follows: Where installed on permanent haulage, they shall be:

(A) At least six inches outside the track gauge line.

(B) Kept taut and not permitted to touch the roof, rib, or crossbars. Particular care shall be taken where they pass through door openings to preclude bare wires from coming in contact with combustible material.

(C) Installations of trolley wire hangers shall be provided within three feet of each splice in a trolley wire.

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