

energized, except that, when such centers and transformers are moved while energized as permitted under this subsection, 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.

(Pub. L. 91-173, title III, §308, Dec. 30, 1969, 83 Stat. 780.)

#### REFERENCES IN TEXT

For the operative date of this subchapter, referred to in subsec. (d), see section 509 of Pub. L. 91-173, set out as an Effective Date note under section 801 of this title.

### § 869. Underground low- and medium-voltage alternating current circuits

#### (a) Circuits providing power for three-phase equipment; circuit breakers

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

#### (b) Circuits used underground; direct neutral grounds; ground conductors for frames; exceptions; grounding resistors

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 that circuit, except that the Secretary or his authorized representative may permit ungrounded 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.

#### (c) Inclusion of fail safe ground check circuits in resistance ground systems; operative functions; time extension; couplers for power circuits; guidelines for construction

Six months after the operative date of this subchapter, low- and medium-voltage resistance grounded systems 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 no less effective device approved by the Secretary or his authorized representative to assure such continuity,

except that an extension of time, not in excess of twelve months, may be permitted by the Secretary on a mine-by-mine basis if he 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.

#### (d) Disconnecting devices installed in conjunction with circuit breakers; purpose; trailing cables for mobile equipment; guidelines for construction; time extension; splices

Disconnecting devices shall be installed in conjunction with the circuit breaker to provide visual evidence that the power is disconnected. Trailing cables for mobile equipment shall contain one or more ground conductors having a cross sectional area of not less than one-half the power conductor, and, six months after the operative date of this subchapter, an insulated conductor for the ground continuity check circuit or other no less effective device approved by the Secretary or his authorized representative to assure such continuity, except that an extension of time, not in excess of twelve months may be permitted by the Secretary on a mine-by-mine basis if he determines that such equipment is not available. Splices made in the cables shall provide continuity of all components.

#### (e) Connections of single phase loads

Single phase loads shall be connected phase to phase.

#### (f) Circuit breakers; markings

Circuit breakers shall be marked for identification.

#### (g) Trailing cables for medium voltage circuits; guidelines for construction

Trailing cables for medium voltage circuits shall include grounding conductors, a ground check conductor, and ground metallic shields around each power conductor or a grounded 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.

(Pub. L. 91-173, title III, §309, Dec. 30, 1969, 83 Stat. 782.)

#### REFERENCES IN TEXT

For the operative date of this subchapter, referred to in subsecs. (c) and (d), see section 509 of Pub. L. 91-173, set out as an Effective Date note under section 801 of this title.

### § 870. Trolley wires and trolley feeder wires

#### (a) Intervals for cutoff switches

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.

#### (b) Overcurrent protection devices

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

#### (c) Location of wires

Trolley wires and trolley feeder wires, high-voltage cables and transformers shall not be lo-

cated in by the last open crosscut and shall be kept at least 150 feet from pillar workings.

**(d) Adequate insulation and guard devices; promulgation of safety guidelines**

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 (1) at all points where men are required to work or pass regularly under the wires; (2) on both sides of all doors and stoppings; and (3) at man-trip stations. The Secretary or his authorized representatives shall specify other conditions where trolley wires and trolley feeder wires shall be adequately protected to prevent contact by any person, or shall require the use of improved methods to prevent such contact. Temporary guards shall be provided where trackmen and other persons work in proximity to trolley wires and trolley feeder wires.

(Pub. L. 91-173, title III, §310, Dec. 30, 1969, 83 Stat. 783.)

**§ 871. Fire protection**

**(a) Firefighting equipment; promulgation of minimum requirements for equipment; existing requirements; examinations after blasting**

Each coal mine shall be provided with suitable firefighting equipment adapted for the size and conditions of the mine. The Secretary shall establish minimum requirements for the type, quality, and quantity of such equipment, and the interpretations of the Secretary or the Director of the United States Bureau of Mines relating to such equipment in effect on the operative date of this subchapter shall continue in effect until modified or superseded by the Secretary. After every blasting operation, an examination shall be made to determine whether fires have been started.

**(b) Underground storage areas for lubricating oils and greases; construction; exceptions**

Underground storage places for lubricating oil and grease shall be of fireproof construction. Except for specially prepared materials approved by the Secretary, lubricating oil and grease kept in all underground areas in a coal mine shall be in fireproof, closed metal containers or other no less effective containers approved by the Secretary.

**(c) Housing of underground structures, stations, shops, and pumps; construction; ventilation**

Underground transformer stations, battery-charging stations, substations, compressor stations, shops, and permanent pumps shall be housed in fireproof structures or areas. Air currents used to ventilate structures or areas enclosing electrical installations shall be coursed directly into the return. Other underground structures installed in a coal mine as the Secretary may prescribe shall be of fireproof construction.

**(d) Use of arc or flame in underground mines; fireproof enclosures; operations outside fireproof enclosures; procedures; standards**

All welding, cutting, or soldering with arc or flame in all underground areas of a coal mine

shall, whenever practicable, be conducted in fireproof enclosures. Welding, cutting or soldering with arc or flame in other than a fireproof enclosure shall be done under the supervision of a qualified person who shall make a diligent search for fire during and after such operations and shall, immediately before and during such operations, continuously test for methane with means approved by the Secretary for detecting methane. Welding, cutting, or soldering shall not be conducted in air that contains 1.0 volume per centum or more of methane. Rock dust or suitable fire extinguishers shall be immediately available during such welding, cutting, or soldering.

**(e) Installation of fire suppression devices on unattended underground equipment; flame-resistant hydraulic fluids**

Within one year after the operative date of this subchapter, fire suppression devices meeting specifications prescribed by the Secretary shall be installed on unattended underground equipment and suitable fire-resistant hydraulic fluids approved by the Secretary shall be used in the hydraulic systems of such equipment. Such fluids shall be used in the hydraulic systems of other underground equipment unless fire suppression devices meeting specifications prescribed by the Secretary are installed on such equipment.

**(f) Deluge-type water sprays at main and secondary drives**

Deluge-type water sprays or foam generators automatically actuated by rise in temperature, or other no less effective means approved by the Secretary of controlling fire, shall be installed at main and secondary belt-conveyor drives. Where sprays or foam generators are used they shall supply a sufficient quantity of water or foam to control fires.

**(g) Installation of slippage and sequence switches on belt conveyors; fire suppression devices on belt haulageways**

Underground belt conveyors shall be equipped with slippage and sequence switches. The Secretary shall, within sixty days after the operative date of this subchapter, require that devices be installed on all such belts which will give a warning automatically when a fire occurs on or near such belt. The Secretary shall prescribe a schedule for installing fire suppression devices on belt haulageways.

**(h) Flame-resistant conveyor belt**

On and after the operative date of this subchapter, all conveyor belts acquired for use underground shall meet the requirements to be established by the Secretary for flame-resistant conveyor belts.

(Pub. L. 91-173, title III, §311, Dec. 30, 1969, 83 Stat. 783; Pub. L. 102-285, §10(b), May 18, 1992, 106 Stat. 172.)

REFERENCES IN TEXT

For the operative date of this subchapter, referred to subsecs. (a), (e), (g), and (h), see section 509 of Pub. L. 91-173, set out as an Effective Date note under section 801 of this title.

CHANGE OF NAME

“United States Bureau of Mines” substituted for “Bureau of Mines” in subsec. (a) pursuant to section