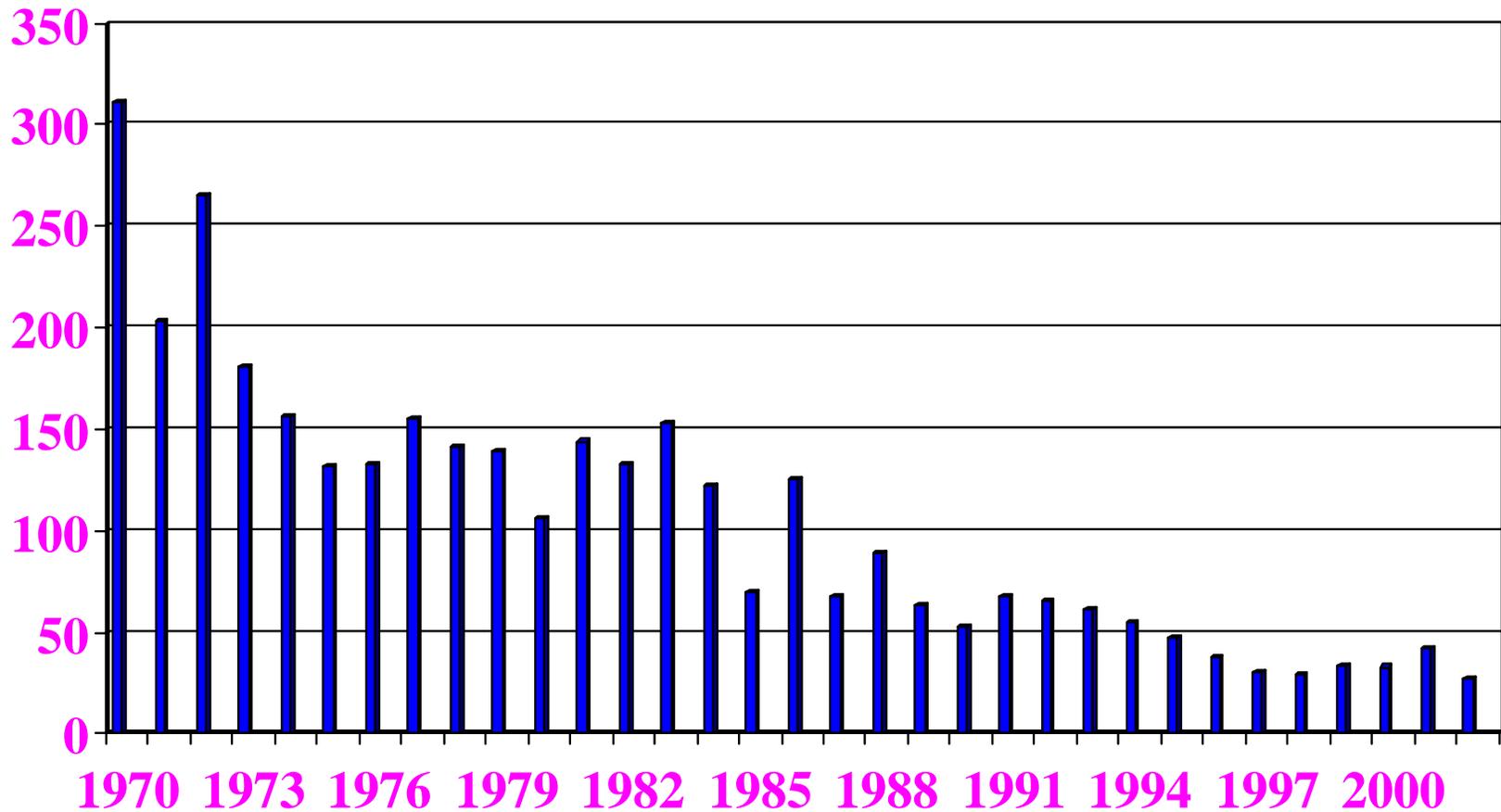


Surface Regulations and Policies

COAL FATALITIES

1970 - 2002

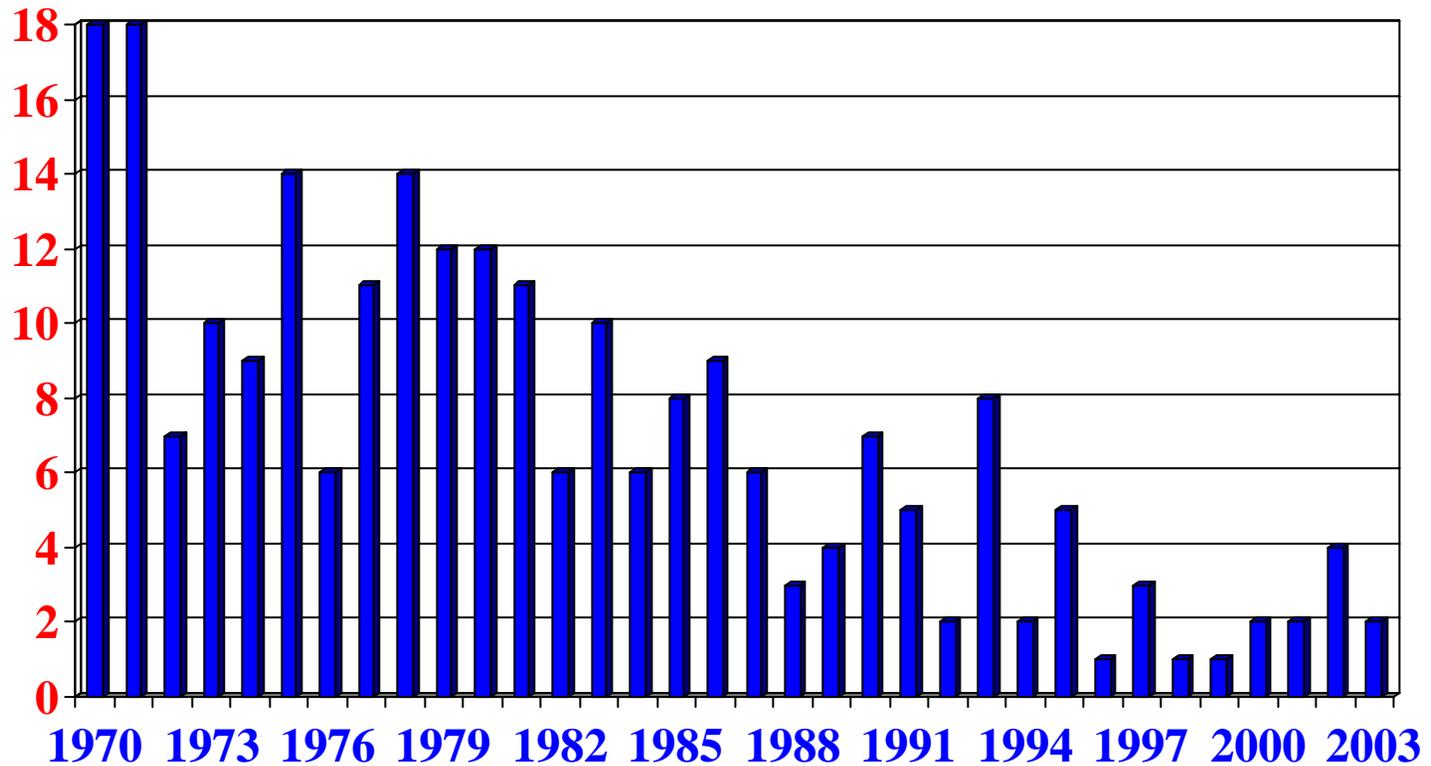


From January 1, 1970 through today, a total of 240 coal miners have lost their lives in Electrical Accidents

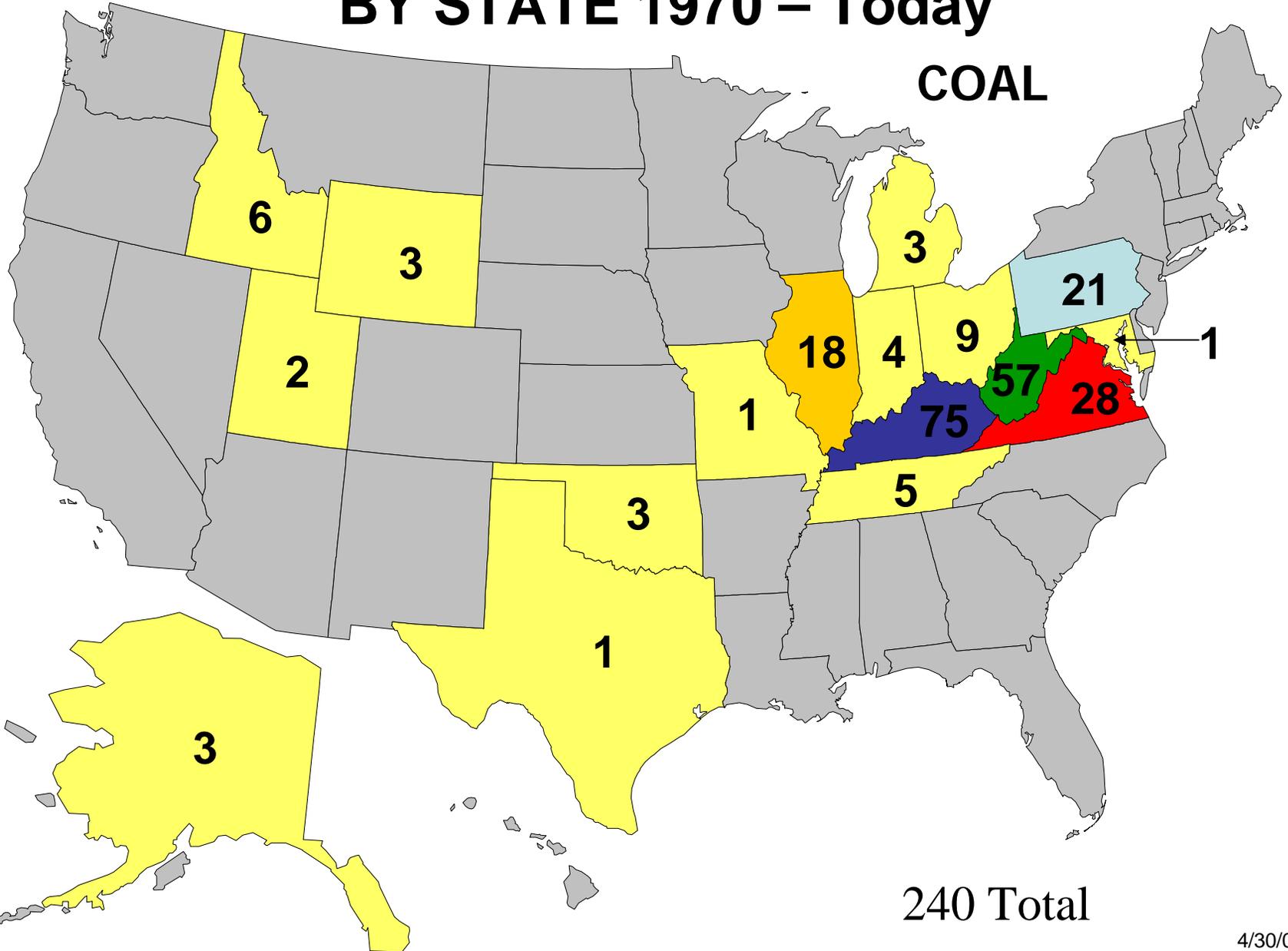
ELECTRICAL FATALS

1970 - Today COAL

240 Total



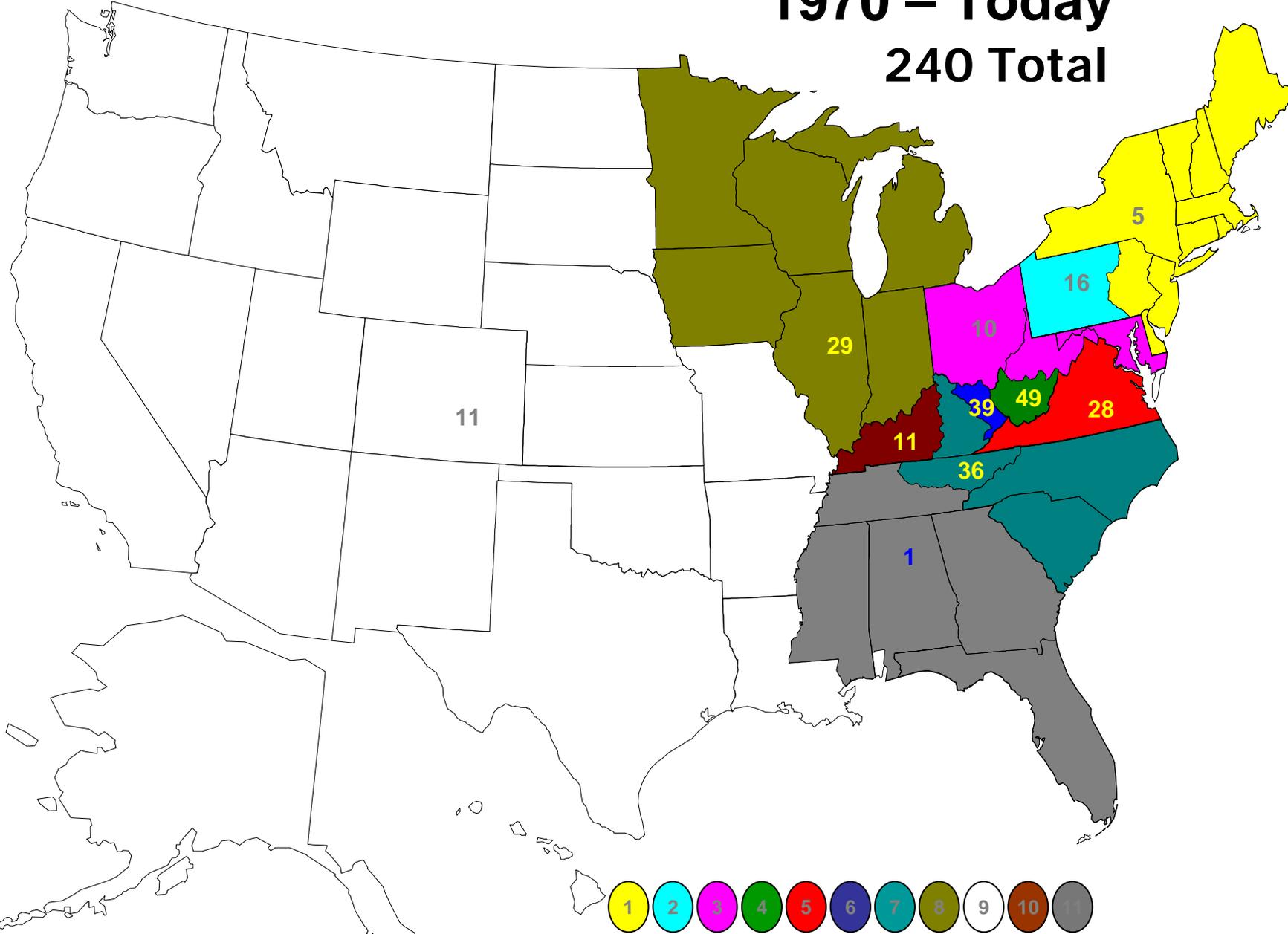
ELECTRICAL FATALITIES BY STATE 1970 – Today



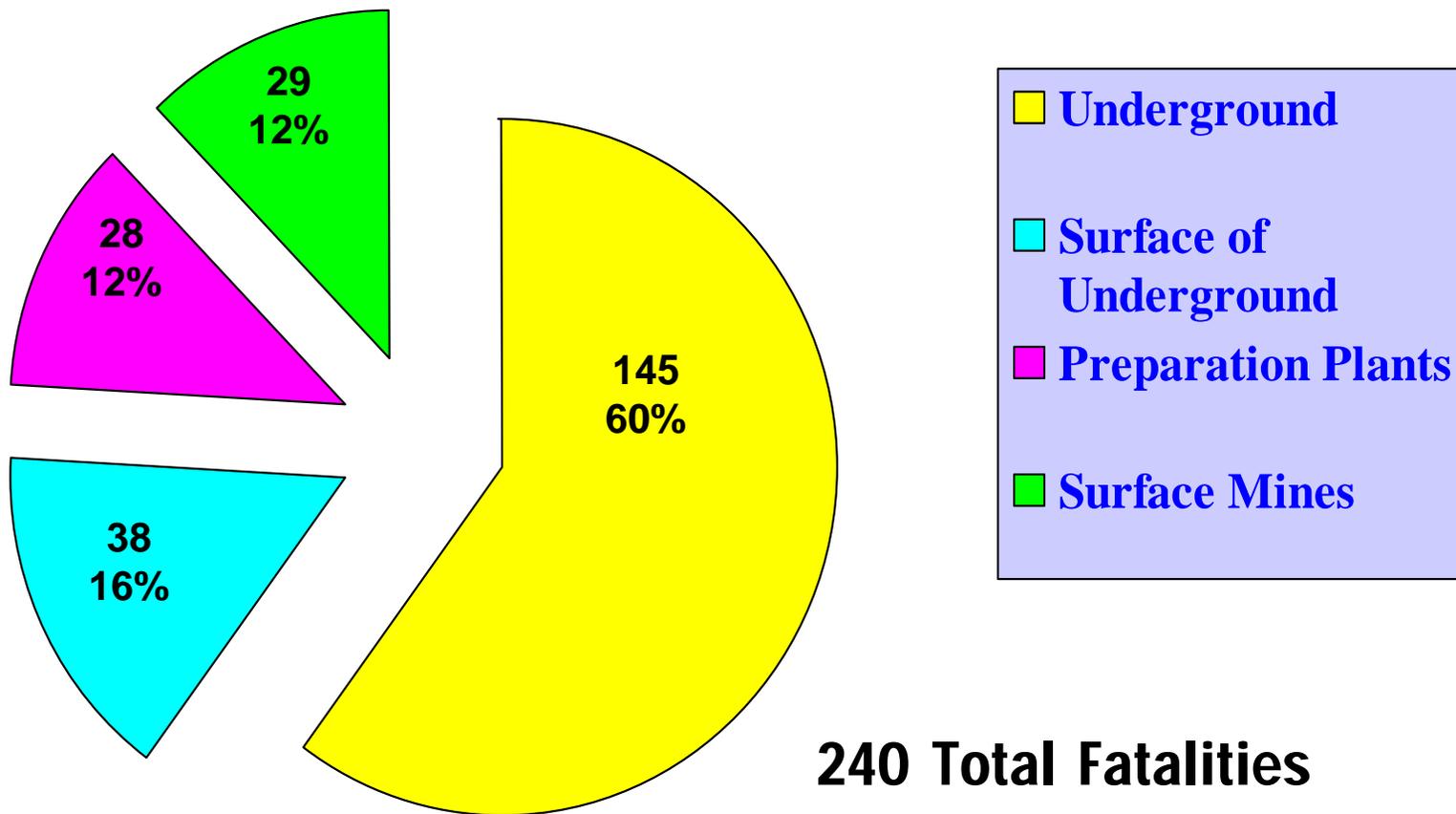
ELECTRICAL FATALITIES BY DISTRICT

1970 – Today

240 Total



COAL ELECTRICAL FATALS 1970 – Today LOCATIONS

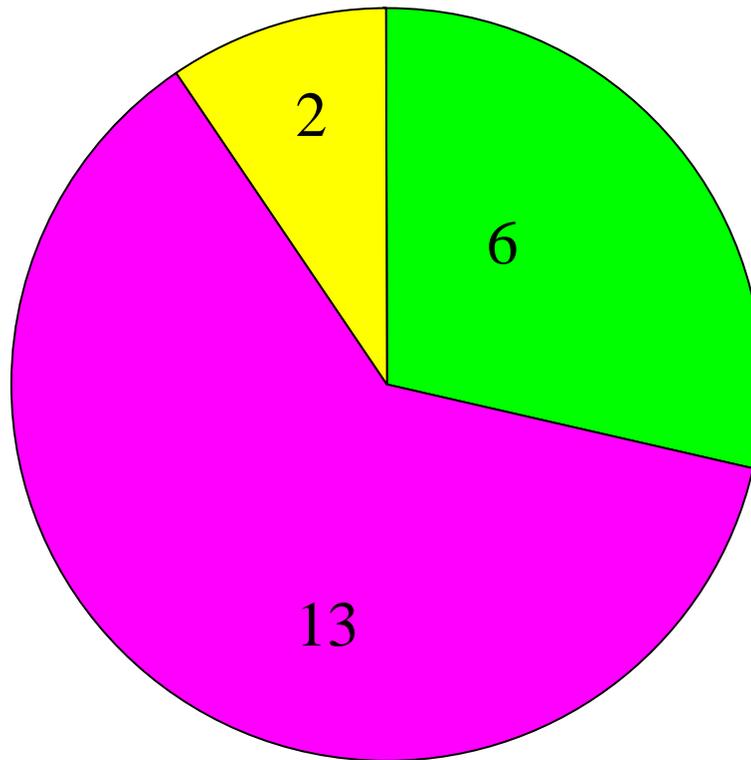


95 on Surface

Causes of Electrical Fatalities

1995 – 4/28/2003 Coal

21 Deaths



- Improper Maintenance
- Working on Energized/ Failure to Lockout
- Contact with Overhead Power Lines

During 2002, the MSHA Coal Mine Inspectors (Compliance Specialists) issued:

- 219** C/O for violations of electrical standards at Prep. Plants or approx. 3% of all paper issued at Plants
- 247** C/O for violations of electrical standards at Surface Mines or approx. 3.2% of all paper issued at Surface Mines; an
- 5,501** C/O for violations of electrical standards at Underground Mines or approx. 12% of all paper issued at such mines

While on an inspection, you happen to come upon the two individuals in this photo. They tell you that the motor which receives power from this circuit won't run and they are trying to find out why.



Regulation

30 CFR § 77.500 Electric power circuits and electric equipment; deenergization.

Power circuits and electric equipment shall be deenergized before work is done on such circuits and equipment, except when necessary for troubleshooting or testing.

Policy

77.500 Electric Power Circuits and Electric Equipment; Deenergization

When electrical work is being performed on equipment, it is not necessary to completely deenergize the power system if means are provided on the equipment to deenergize the particular part or circuit on which repair work is to be done.

When work is performed in close physical proximity to exposed electric circuits or parts, they shall be deenergized. High-voltage circuits that are not equipped with metallic shielding are considered to be exposed. Sections 110-16 and 710-34 of the 1968 National Electrical Code pertaining to working clearances can be used as a guide in determining "close physical proximity." All circuits within an electrical enclosure shall be deenergized before work is performed within the enclosure unless such energized circuits are guarded by suitable physical guards or adequate physical separation.

Cont.

"Troubleshooting or testing", for the purpose of this Section, would include the work of locating an electrical problem in the electric circuits on an energized machine, but would not include the actual repair with the machine energized.

Sections 75.1720(c) and 77.1710(c) require that protective gloves be worn by miners when they are performing work "which might cause injury to the hands," unless the gloves would create a greater hazard by becoming entangled in the moving parts of equipment. As the accident and injury data associated with working on energized circuits and equipment clearly indicates, this type of work presents a significant risk of hand injury. Therefore, gloves worn in accordance with 75.1720(c) and 77.1710(c) will be required whenever miners troubleshoot or test energized electric power circuits or electric equipment. Work gloves in good condition are acceptable for troubleshooting or testing energized low- and medium-voltage circuits or equipment.

End

Regulation

30 CFR § 77.1710 Protective clothing; requirements.

Each employee working in a surface coal mine or in the surface work areas of an underground coal mine shall be required to wear protective clothing and devices as indicated below:

(c) Protective gloves when handling materials or performing work which might cause injury to the hands; however, gloves shall not be worn where they would create a greater hazard by becoming entangled in the moving parts of equipment.

Policy

77.1710 Protective Clothing; Requirements

This Section does not require operators of service vehicles making visits to surface mines or surface work areas of underground mines to wear protective clothing.

Paragraph (c) of this Section requires that miners wear gloves whenever they troubleshoot or test energized electric power circuits or electric equipment. Work gloves in good condition are acceptable for troubleshooting or testing energized low- and medium-voltage circuits or equipment. High-voltage gloves, rated at least for the voltage of the circuit, are required for troubleshooting or testing of energized high-voltage circuits or in compartments containing exposed energized high-voltage circuits.

End

Regulation

30 CFR § 77.501 Electric distribution circuits and equipment; repair.

No electrical work shall be performed on electric 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 the persons who perform such work, except that in cases where locking out is not possible, such devices shall be opened and suitably tagged by such persons. Locks or tags shall be removed only by the persons who installed them or, if such persons are unavailable, by persons authorized by the operator or his agent.

Policy

77.501 Electric Distribution Circuits and Equipment; Repair

"Electrical work," as referred to in this Section, includes the design, installation, maintenance or repair of electric equipment and circuits. Splices and terminations made in electric cables, installation of couplers on the ends of cables, electric machine repairs, electric wiring, pole and line work, work performed inside electrical substations or other areas in proximity to exposed energized electrical parts, work performed inside transformers, switch boxes, switch houses, electric panels or other enclosures of electric equipment and circuits are examples of tasks that are considered to be "electrical work" and are required to be performed by or under the direct supervision of a qualified person.

Examples of duties that are not considered to be "electrical work" and would not be required to be performed by a qualified person or under the direct supervision of a qualified person are, operation of electric equipment, transportation of equipment and cables, operation of control switches, circuit breakers or switch boxes, provided no energized parts are exposed, changing cutting bits, lubrication work, moving of energized trailing cables, or inserting or withdrawing proper cable couplers into or from their receptacles. These tasks are considered to be part of the normal routine operation of electric equipment; therefore, they are not considered to be "electrical work."

Cont.

The term "direct supervision" shall not be interpreted to mean that the qualified person be physically present at all times during the performance of such repairs, but the qualified person has the following responsibilities:

1. The qualified person shall examine and/or test an electric circuit or machine and determine the need for repair or maintenance.
2. The qualified person must give specific instructions to the employee assigned to perform this work with respect to the nature and extent of the repairs to be performed and, where necessary, prescribe the manner in which the work is to be performed.
3. The qualified person is, at all times, under continuing duty to instruct, advise, or consult with the employee, in the event the work assigned cannot be performed by the employee in the manner prescribed.
4. The qualified person must examine and test the completed work before the circuit is energized or the machine is returned to service.

Cont.

It is MSHA's policy that a person trained to perform electrical work and to maintain electric equipment under the direct supervision of a qualified person shall not be assigned the duty of testing or troubleshooting energized circuits. Persons trained to perform electrical work and to maintain electric equipment may only do testing and troubleshooting on energized circuits as part of their training program. During this testing and troubleshooting operation, a qualified person, as defined in Section 77.103, must be present at all times to observe, instruct, and aid the trainee.

"Suitably tagged" means that a sign with wording such as "Danger - Hands Off - Do Not Close - Miners Working on Line," shall be attached to the opened disconnecting device. The tag should bear the name of the workman who installed it.

Keys to locks used to lock out switches should be kept by the person working on the circuit or equipment.

End



30 CFR § 77.807-2 Booms and masts; minimum distance from high-voltage lines.

The booms and masts of equipment operated on the surface of any coal mine shall not be operated within 10 feet of an energized overhead powerline. Where the voltage of overhead powerlines is 69,000 volts, or more, the minimum distance from the boom or mast shall be as follows:

69 – 114,000 volts	12 feet
115 – 229,000 volts	15 feet
230 – 344,000 volts	20 feet
345 – 499,000 volts	25 feet
500 – more	35 feet

NO POLICY



While inspecting a load-out you see the cable splice in the above photo.

Regulation

30 CFR § 77.504 Electrical connections or splices; suitability.

Electrical connections or splices in electric 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 remainder of the wire.

77.504 Electrical Connections or Splices; Suitability

This Section requires that splices made in electric conductors be made in a workman-like manner and establish sufficient electrical conductivity so that the joined conductors will not heat or spark under load. Because of the different characteristics of devices, such as pressure terminal or pressure splicing connectors and soldering lugs, they shall be suitable for the material of the conductor and shall be properly installed and used.

Conductors of dissimilar metals shall not be intermixed in a terminal or splicing connector where physical contact occurs between dissimilar conductors, unless the device is suitable for the purpose and conditions of use. Materials such as solder, fluxes, inhibitors, and compounds, where employed, shall be suitable for the use and shall be of a type which will not adversely affect the conductors, installation, or equipment.

Soldered splices in electric conductors shall be joined with suitable connectors and then soldered. Splices made by twisting conductors together, tying knots in conductors, splices that have bare or exposed conductors, splices that heat or arc under load, or splices in multiple conductor cables that do not have the outer jacket replaced would constitute noncompliance.

All connections or splices in insulated conductors shall be reinsulated to at least the same degree of protection as the remainder of the conductor. Tape, such as rubber, glass, asbestos, or plastic will be acceptable as insulation. Friction tape is not an acceptable insulation material, but may be used to provide mechanical protection.

While you are conducting an inspection, you see Mr. Cook and Mr. Jones doing this work in the substation. They state that they are going to work on the high-voltage line between the substation and the plant.



30 CFR § 77.704 Work on high-voltage lines; deenergizing and grounding.

High-voltage lines shall be deenergized and grounded before work is performed on them, except that repairs may be permitted on energized high-voltage lines if (a) such repairs are made by a qualified person in accordance with procedures and safeguards set forth in §§77.704-1 through 77.704-11 of this Subpart H as applicable, and (b) the operator has tested and properly maintained the protective devices necessary in making such repairs.

30 CFR § 77.704-1 Work on high-voltage lines.

(a) No high-voltage line shall be regarded as deenergized for the purpose of performing work on it, until it has been determined by a qualified person (as provided in §77.103) that such high-voltage line has been deenergized and grounded. Such qualified person shall by visual observation (1) determine that the disconnecting devices on the high-voltage circuit are in open position, and (2) insure that each ungrounded conductor of the high-voltage circuit upon which work is to be done is properly connected to the system grounding medium. In the case of resistance grounded or solid wye-connected systems, the neutral wire is the system grounding medium. In the case of an ungrounded power system, either the steel armor or conduit enclosing the system or a surface grounding field is a system grounding medium;

Policy

77.704 Work on High-Voltage Lines; Deenergizing and Grounding

High-voltage lines shall be deenergized with a disconnecting device so that it can be determined by visual observation that the circuit is deenergized before the lines are grounded (refer to Section 77.704-9 when operating disconnecting devices), except that repairs may be permitted on energized high-voltage lines as specified in the regulations.

77.704-1 Work on High-Voltage Lines

There may be instances where one qualified electrician will go back some distance from the work site and deenergize and ground the high-voltage system to be repaired. This qualified electrician must be in either direct telephone or radio communication with the qualified electrician performing the actual work, and when he/she has deenergized and grounded the system, he/she can inform the qualified electrician to make the repairs.

End

A photograph of an electrical substation. In the foreground, there is a metal platform with a grid pattern on a gravel surface. To the left, a vertical metal structure supports a gang-operated air break disconnect switch. In the background, there is a large white metal cabinet on a metal frame, surrounded by other electrical equipment and metal structures. The ground is covered in gravel.

While conducting an inspection, you see an individual operate this gang operated air break disconnect switch. He did stand on the metal plate, but was not wearing gloves.

Regulation

30 CFR § 77.513 Insulating mats at power switches.

Dry wooden platforms, insulating mats, or other electrically nonconductive material shall be kept in place at all switchboards and power-control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded, metal, non-current-carrying parts of the power switches to be operated may be used.

77.513 Insulating Mats at Power Switches

Insulating mats or dry wooden platforms are required to be kept in place where a person would normally stand at switchboards or power control switches only if a shock hazard exists.

Installations where a shock hazard exists include, but are not limited, to the following:

all live front switchboards with exposed components energized at more than 40 volts to ground; and

all overhead high-voltage disconnect switches which are operated from the ground by means of mechanical linkage. (See Section 77.704-9 for requirements for high-voltage switches.)

Enclosed power control switches such as portable circuit breakers of switch houses that are supplied power from a resistance-grounded system, as required by Section 77.802 or 77.901, are not considered to pose a shock hazard.

Grounded metal mats or plates may not be used instead of insulating mats in front of live front switchboards.

Insulating mats or platforms installed at high-voltage installations shall be rated for not less than the phase-to-phase voltage of the circuit. Insulating mats can provide such additional safety if placed at low-voltage line starters, fuse boxes, and other low-voltage switchgear containing renewable parts.

Regulation

30 CFR § 77.704-9 Operating disconnecting or cutout switches.

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 is exposed. When such switches are operated from the ground, the person using such devices shall wear protective rubber lineman's gloves, except where such switches are bonded to a metal mat as provided in §77.513.

No Policy



Regulation

30 CFR § 77.705 Guy wires; grounding.

Guy wires from poles supporting high-voltage transmission lines shall be securely connected to the system ground or be provided with insulators installed near the pole end.

Policy

77.705 Guy Wires; Grounding

Guy wires attached to poles supporting high-voltage transmission lines must either be securely connected to the system ground or provided with insulators installed near the pole end as required by 30 CFR 77.705. One of the safety purposes of this requirement is to ensure that guy wires do not become energized so that a shock hazard is presented to persons on the ground. Therefore, when insulators are installed, they must be located below or extend below all high-voltage lines supported by the pole.

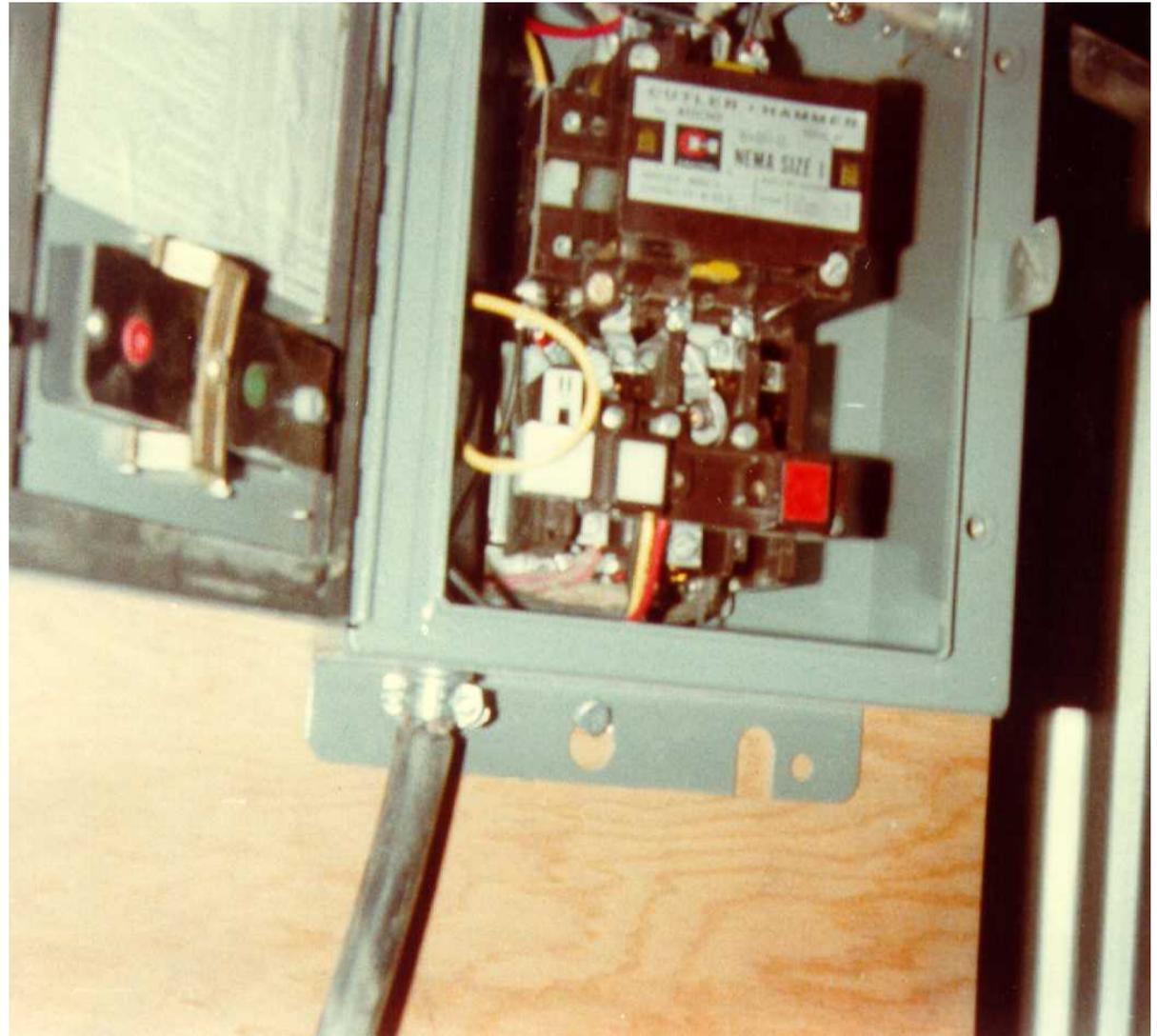
The in-line insulator, if used, should be at least 8 feet from the ground, according to the National Electrical Safety Code, 1973.

A guy wire connected to a pole butt ground which is not connected to the system ground would be an example of noncompliance with this Section.

End

While conducting an inspection at a surface load-out, you see the starter enclosure at the right.

You find all the protective settings to be correct and the conductors are sized correctly.



Regulation

30 CFR § 77.505 Cable fittings; suitability.

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

Policy

77.505 Cable Fittings; Suitability

For the purpose of this Section, a cable, with either single or multiple conductors, is one that has an outer jacket in addition to the insulation provided for each power conductor. An electrical fitting is an accessory such as a clamp or other part of a wiring system that is intended primarily to perform a mechanical rather than an electrical function. The function of a proper electrical fitting for a cable entering a junction box, electrical panel, termination box, or other electrical enclosure is to prevent a strain on the electrical connections and to prevent chafing or other movement of the cable that might allow an energized electrical conductor to fault to the enclosure frame. Proper fittings would permit box connectors, packing glands, strain insulators, strain clamps, or metal or wood clamps, etc.

Electric circuits that are made up of individual insulated wires that enter junction boxes, termination boxes or other electrical enclosures need not have fittings, but must be provided with insulated bushings.



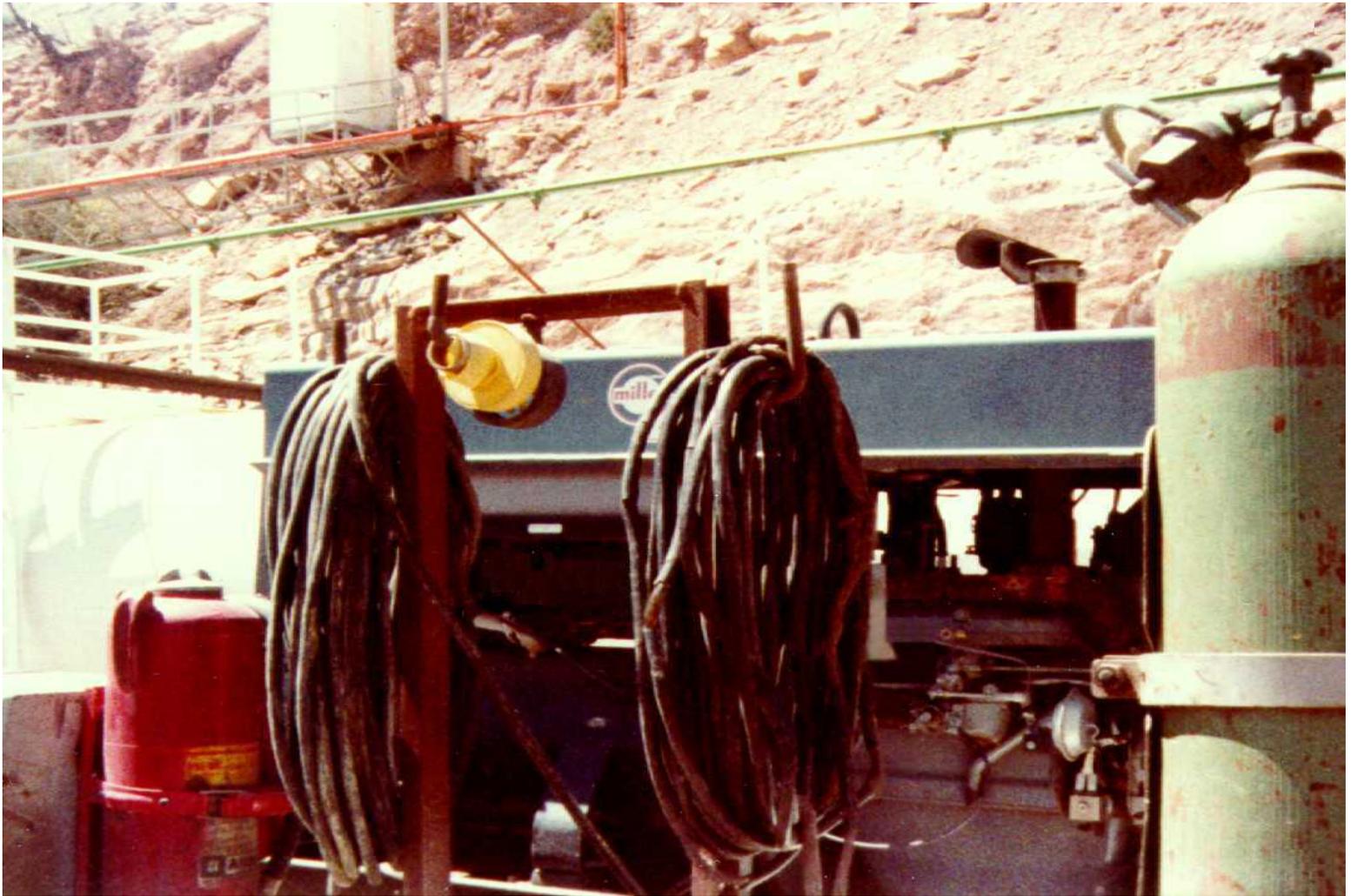
While conducting an inspection of a Load-out, you happen upon the motor in the photo here. The motor is in operation

Regulation

30 CFR § 77.512 Inspection and cover plates.

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

No Policy



While inspecting around a load-out, you see the welding machine in the photo above. You find that it is firmly bolted to the structural steel of the load-out, which is not shown in the photo.