WEST VIRGINIA SECRETARY OF STATE

MAC WARNER

ADMINISTRATIVE LAW DIVISION

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Office of West Virginia
Secretary Of State

NOTICE OF FINAL FILING AND ADOPTION OF A LEGISLATIVE RULE AUTHORIZED BY THE WEST VIRGINIA LEGISLATURE

AGENCY: Miners Health Safety And Training

TITLE-SERIES: 56-23

RULE TYPE: Legislative

Amendment to Existing Rule: Yes

Repeal of existing rule: No

RULE NAME: Operating Diesel Equipment in Underground Mines in West Virginia

CITE STATUTORY AUTHORITY: W. Va. 22A-2A-1001 and 22A-2A-308(a)

The above rule has been authorized by the West Virginia Legislature.

Authorization is cited in (house or senate bill number) H.B. 4086

Section W. Va. Code 64-10-3(h)

Passed On 2/29/2024 12:00:00 AM

This rule is filed with the Secretary of State. This rule becomes effective on the following date:

April 24, 2024

This rule shall terminate and have no further force or effect from the following date:

August 01, 2029

BY CHOOSING 'YES', I ATTEST THAT THE PREVIOUS STATEMENT IS TRUE AND CORRECT.

Yes

Garner Marks -- By my signature, I certify that I am the person authorized to file legislative rules, in accordance with West Virginia Code §29A-3-11 and §39A-3-2.

TITLE 56
LEGISLATIVE RULE
WEST VIRGINIA OFFICE OF MINERS' HEALTH, SAFETY AND TRAINING

SERIES 23
RULES FOR OPERATING DIESEL EQUIPMENT IN UNDERGROUND MINES IN WEST VIRGINIA

§56-23-1. General.

1.1. Scope. -- This legislative rule establishes the standards, procedural and interpretative guidelines under which diesel powered equipment may be used in an underground coal mine in the state of West Virginia.

1.2. Authority. -- W. Va. Code §§22A-2A-1001 and 22A-2A-308(a).

1.3. Filing Date -- April 24, 2024.

1.4. Effective Date -- April 24, 2024.

1.5. Sunset Provision. -- This rule shall terminate and have no further force or effect upon August 1, 2029.

§56-23-2. Definitions.

2.1. Unless the context in which a word or phrase appears clearly requires a different meaning, all terms used in this rule that are not defined herein shall have the meanings set forth in W. Va. Code §22A-1-2.

2.2. "ASE certified diesel mechanic" means a diesel mechanic certified by the National Institute for Automotive Service Excellence.

2.3. "Board" means the board of coal mine health and safety continued by W. Va. Code §22A-6-3.

2.4. "Certificate of approval" means a formal document issued by MSHA stating that a complete assembly has met the requirements of part 36, title thirty of the code of federal regulations, 30 CFR §36.1, *et seq.*, for mobile diesel-powered transportation equipment and authorizing the use and attachment of an official approval plate so indicating.

2.5. "Diesel fuel tank" means a closed metal vessel specifically designed for the storage or transport of diesel fuel.

2.6. "Diesel fuel transportation unit" means a self-propelled or portable wheeled vehicle used to transport a diesel fuel tank.

2.7. "Diesel engine" means any compression ignition internal combustion engine using the basic diesel cycle where combustion results from the spraying of fuel into air heated by compression.

2.8. "Diesel power package" means a diesel engine with an intake system, exhaust system, and a safety shutdown system installed that meets the specific requirements for MSHA approval of diesel power packages intended for use in approved equipment in areas of underground coal mines where electric equipment is required to be permissible.

2.9. "Director" means the director of the office of miners' health, safety and training or his or her authorized representative.

2.10. "Exhaust emission" means any substance emitted to the atmosphere from the exhaust port of the combustion chamber of a diesel engine.

2.11. "Exhaust emissions control and conditioning system" means a device or combination of devices that will collect and treat diesel exhaust emissions at the exhaust port of the engine, and will reduce the volume of, or eliminate emissions of, diesel particulate matter, carbon monoxide and oxides of nitrogen in accordance with the requirements and standards of the commission established in accordance with the provisions of W. Va. Code §22A-2A-403.

2.12. "ISO 8178-1" means an international standard set by the International Organization for Standardization that specifies the standard reference temperature for geometrical product specification and verification.

2.13. "MSHA" means the mine safety and health administration of the United States Department of Labor.

2.14. "Office of miners' health, safety and training" means the West Virginia office of miners' health, safety and training continued by W. Va. Code §22A-1-1.

2.15. "Permanent underground diesel fuel storage facility" means a facility designed and constructed to remain at one location for the storage or dispensing of diesel fuel, which does not move as mining progresses.

2.16. "Safety can" means a metal container intended for storage, transport or dispensing of diesel fuel, with a nominal capacity of five gallons, listed or approved by a nationally recognized independent testing laboratory.

2.17. "Temporary underground diesel fuel storage area" means an area of a mine provided for the short-term storage of diesel fuel in a fuel transportation unit, which moves as mining progresses.

2.18. "Underground diesel generator" means any machine powered with an approved diesel power package and electrical components used as an alternative electrical power source.

§56-23-3. Underground Use.

3.1. Underground use of inby and outby diesel-powered equipment, including mobile equipment, stationary equipment and equipment of all horsepower ratings, may only be approved, operated and maintained as provided in this rule, except for emergency fire-fighting equipment to be used specifically for that purpose.

3.2. All diesel-powered equipment shall be attended while in operation with the engine running in underground mines. For purposes of this rule, "attended" shall mean a diesel equipment operator is within sight or sound of the diesel-powered equipment.

3.3. Inby and outby diesel-powered equipment may be used in underground mines if the inby or outby diesel-powered equipment uses an engine approved or certified by MSHA, as applicable, for inby or outby use that, when tested at the maximum fuel-air ratio, does not require an MSHA Part 7 approval plate ventilation rate exceeding 75 c.f.m. per rated horsepower. Should MSHA promulgate new regulations that change the MSHA part 7 approval plate ventilation rate, the cfm requirement per rated horsepower will be revised either up or down on a direct ratio basis upon the recommendation of the director.

§56-23-4. Diesel-Powered Equipment Package.

4.1. All diesel-powered equipment shall be approved by the director as a complete diesel-powered equipment package, which shall be subject to all of the requirements, standards and procedures set forth in this rule.

4.2. Diesel engines shall be certified or approved, as applicable, by MSHA and maintained in accordance with MSHA certification or approval and the director's approval.

4.3. All approved diesel powered equipment packages shall be listed on an inventory sheet submitted to the director with a copy maintained at the mine. The following information shall be provided on the inventory list:

4.3.1. Name, address and permit number of the mine.

4.3.2. The telephone number and name of the contact person responsible for maintenance and testing of the diesel equipment.

4.3.3. The following specific information for each engine:

4.3.3.a. Manufacturer, serial number and model of the equipment using the power-package.

4.3.3.b. Manufacturer, model number and serial number of the engine.

4.3.3.c. MSHA 7E approval number.

4.3.3.d. Rated HP and RPM.

4.3.3.e. DPM gr/hr rating and mg over m to the third power.

4.3.3.f. Ventilation rate.

4.3.4. The following specific information for each filter system:

4.3.4.a. Manufacturer and model of the filter system.

4.3.4.b. MSHA Efficiency Rating of the specific filter system(s) or an accepted third party rating.

4.3.4.c. System type and composition (i.e., Passively Regenerated Cordierite, etc.).

4.3.4.d. The manufacturer/model of regeneration system (if applicable).

4.4. The mine operator shall be permitted to replace a filter or catalyst of the same make and model without contacting the office of miners' health, safety and training. A record must be maintained of all of the pertinent data and available for inspection.

§56-23-5. Exhaust Emissions Control.

5.1. Underground diesel-powered equipment shall include an exhaust emissions control and conditioning system that has been laboratory tested with the diesel engine, except as provided in section 5.3., using the ISO 8178-1 test and has resulted in diesel particulate matter emissions that do not exceed an average concentration of 0.12 mg over m to the third power when diluted by one hundred percent of the MSHA Part 7 approval plate ventilation rate for that diesel engine. Should MSHA promulgate new regulations that change the MSHA Part 7 approval plate ventilation rate, the dilution percentage relative to the approval plate ventilation rate will be adjusted either up or down on a direct ratio basis upon recommendation of the director.

5.2. The exhaust emissions control and conditioning system shall be required to successfully complete a single series of laboratory tests conducted at a laboratory accepted by the director for each diesel engine, except as provided in section 5.3.

5.3. An exhaust emissions control and conditioning system may be approved for multiple diesel engine applications through a single series of laboratory tests, known as the ISO 8178-1 test, only if data is provided to the director that reliably verifies that the exhaust emissions control and conditioning system will meet, for each diesel engine, the in-laboratory diesel particulate matter standard established by this section. Data provided to satisfy this provision shall include diesel particulate matter production rates for the specified engine as measured during the ISO 8178-1 test, if available. If ISO 8178-1 test data for diesel particulate matter production is not available for a specified engine, comparable data may be provided to the director that reliably verifies that the exhaust emissions control and conditioning system will meet, for the specified diesel engine, the in-laboratory diesel particulate matter standard established by this section. This standard shall only be used for in-laboratory testing for approval of diesel-powered equipment for use underground.

5.4. The exhaust emissions control and conditioning system shall include the following:

5.4.1. A diesel particulate matter (DPM) filter that has proven capable of at least a seventy-five percent reduction of diesel particulate matter.

5.4.2. An oxidation catalyst or other gaseous emissions control device capable of reducing undiluted carbon monoxide emissions to 100 ppm or less under all conditions of operation at normal engine operating temperature range.

5.4.3. An engine surface temperature control capable of maintaining significant external surface

temperatures below three hundred two degrees Fahrenheit.

5.4.4. A system capable of reducing the exhaust gas temperature below three hundred two degrees Fahrenheit.

5.4.5. An automatic engine shutdown system that will shut off the engine before the exhaust gas temperature reaches three hundred two degrees Fahrenheit and, if waterjacketed components are used, before the engine coolant temperature reaches two hundred twelve degrees Fahrenheit. A warning shall be provided to alert the equipment operator prior to engine shutdown.

5.4.6. A spark arrestor system.

5.4.7. A flame arrestor system.

5.4.8. A sampling port for measurement of undiluted and untreated exhaust gases as they leave the engine.

5.4.9. A sampling port for measurement of treated undiluted exhaust gases before they enter the mine atmosphere.

5.4.10. For inby diesel equipment, any additional requirements of MSHA regulations at 30 CFR Part 36 (relating to mobile diesel-powered transportation equipment for gassy noncoal mines and tunnels).

5.5. On-board engine performance and maintenance diagnostics systems shall be capable of continuously monitoring and giving readouts for subsections 5.5.1. thru 5.5.8. of this section. The diagnostics system shall identify levels that exceed the engine and/or component manufacturer's recommendation or the applicable MSHA or director's requirements as to the following:

5.5.1. Engine speed;

5.5.2. Operating hour meter;

5.5.3. Total intake restriction;

5.5.4. Total exhaust backpressure;

5.5.5. Cooled exhaust gas temperature;

5.5.6. Coolant temperature;

5.5.7. Engine oil pressure;

5.5.8. Engine oil temperature.

§56-23-6. Ventilation.

6.1. Minimum quantities of air where diesel-powered equipment is operated shall be maintained

pursuant to this section.

6.2. Each specific model of diesel-powered equipment shall be approved by the director before it is taken underground. The director shall require an approval plate that must be attached to each piece of the diesel-powered equipment. The approval plate shall specify the minimum ventilating air quantity for the specific piece of diesel-powered equipment. The minimum ventilating air quantity shall be determined by the director based on the amount of air necessary at all times to maintain the exhaust emissions at levels not exceeding the exposure limits established in section 7 of this rule.

6.3. The minimum quantities of air in any split where any individual unit of diesel-powered equipment is being operated shall be at least that specified on the approval plate for that equipment. Air quantity measurements to determine compliance with this requirement shall be made at the individual unit of diesel-powered equipment.

6.4. Where multiple units are operated, the minimum quantity shall be at least one hundred percent of MSHA's Part 7 approval plate quantities for each unit operating in that split. Air quantity measurements to determine compliance with this requirement shall be made at the most downwind unit of diesel-powered equipment that is being operated in that air split. Should MSHA promulgate new regulations that change the MSHA Part 7 approval plate ventilation rate, the minimum quantity where multiple units are operated shall be revised on a direct ratio basis upon recommendation of the director.

6.5. The minimum quantities of air on any split where any diesel-powered equipment is operated shall be in accordance with the minimum air quantities required in sections 6.1 and 6.2 and shall be specified in the mine diesel ventilation plan.

§56-23-7. Exhaust Gas Monitoring and Control.

7.1. In monitoring and controlling exhaust gases, the ambient concentration of exhaust gases in the mine atmosphere shall not exceed 35 ppm ceiling for carbon monoxide (CO), 25 ppm ceiling for nitric oxide (NO) and 3 ppm ceiling for nitrogen dioxide (NO2). The concentration of these exhaust gases shall be measured at the equipment operator's or equipment attendant's position and inby the last piece of diesel-powered equipment operating in the same split of air. Measurements shall be made weekly or more often if necessary by a qualified person and shall be conducted pursuant to the requirements of this section.

7.2. Measurement of exhaust gases shall be made with a sampling instrument no less precise than detector tubes.

7.3. If the concentration of any of the gases listed in section 7.1 is seventy-five percent or more of its exposure limit, changes to the use of the diesel equipment, the mine ventilation or other modifications to the mining process shall be made.

7.4. If the concentration of any of the gases listed in section 7.1 exceeds the exposure limit, the diesel equipment operating in that split shall be removed from service immediately and corrective action taken. After corrective action has been taken by the mine operator, the diesel equipment may be returned to service in its regular operating mode for emissions testing purposes only, and emissions testing shall be conducted immediately to assure that the concentration does not exceed seventy-five per cent of the exposure limit. Corrective action must be taken until the concentration does not exceed seventy-five

percent of the exposure limit before the diesel equipment can be returned to full operation.

7.5. In addition to the other maintenance requirements set forth in this rule, the mine operator shall comply with the following requirements:

7.5.1. Repair or adjustment of the fuel injection system, engine timing or exhaust omissions control and conditioning systems shall only be performed by qualified mechanics authorized by the engine manufacturer or ASE certified diesel mechanics.

7.5.2. Complete testing of the emissions system in accordance with section 20 of this rule shall be conducted prior to any piece of diesel-powered equipment being put into service, after any repair or adjustment to the fuel delivery system, engine timing or exhaust emissions control and conditioning system.

7.5.3. Service and maintenance of the intake air filter exhaust particulate filter and the exhaust system shall be performed at specific time intervals based on the component manufacturer's recommendation, compliance with the engine or emissions control operation specifications and, as needed, based on the on-board diagnostics and/or emissions test results. Accurate records shall be maintained of all such service and maintenance.

§56-23-8. Fuel Storage Facilities.

8.1. An underground diesel fuel storage facility shall be any facility designed and constructed to provide for the storage of any mobile diesel fuel transportation unit(s) or the dispensing of diesel fuel.

8.2. Diesel-powered equipment shall be used underground only with fuel that meets the standards of the most recently approved EPA guidelines for over-the-road-fuel. Additionally, the fuel shall also meet the ASTM D975 fuel standards with a flash point of one hundred degrees Fahrenheit or greater at standard temperature and pressure. The operator shall maintain a copy of the most recent delivery receipt from the supplier that will prove that the fuel used underground meets the standard listed above.

8.3. Underground diesel fuel storage facilities shall meet the following general requirements:

8.3.1. Fixed underground diesel fuel storage tanks are prohibited.

8.3.2. No more than five hundred gallons of diesel fuel shall be stored in each underground diesel fuel storage facility.

8.4. Underground diesel fuel storage facilities shall be located as follows:

8.4.1. At least one hundred feet from shafts, slopes, shops and explosives magazines;

8.4.2. At least twenty-five feet from trolley wires, haulage ways, power cables and electric equipment not necessary for the operation of the storage facilities; and

8.4.3. In an area that is as dry as practicable.

8.5. Underground diesel fuel storage facilities shall meet the construction requirements and safety

precautions enumerated in this section.

8.5.1. Underground diesel fuel storage facilities shall meet all of the following:

8.5.1.a. Be constructed of noncombustible materials and provided with either self-closing or automatic closing doors.

8.5.1.b. Be ventilated directly into the return air course using noncombustible materials.

8.5.1.c. Be equipped with an automatic fire suppression system complying with section 12 of this rule. The director may approve an alternate method of complying with section 12 of this rule on a mine by mine basis.

8.5.1.d. Be equipped with at least two portable twenty-pound multipurpose dry-chemical type fire extinguishers.

8.5.1.e. Be marked with conspicuous signs designating combustible liquid storage.

8.5.1.f. Be included in the pre-shift examination.

8.5.2. Welding or cutting other than that performed in accordance with subdivisions 8.5.2.a. and 8.5.2.b. below shall not be done within fifty (50) feet of a diesel fuel storage facility. When it is necessary to weld, cut or solder pipelines, cylinders, tanks or containers that may have contained diesel fuel, the following requirements shall apply:

8.5.2.a. Cutting or welding shall not be performed on or within containers or tanks that have contained combustible or flammable materials until such containers or tanks have been thoroughly purged and cleaned or inerted and a vent or opening is provided to allow for sufficient release of any buildup pressure before heat is applied.

8.5.2.b. Diesel fuel shall not be allowed to enter pipelines or containers that have been welded, soldered, brazed or cut until the metal has cooled to ambient temperature.

§56-23-9. Transfer of Diesel Fuel.

9.1. Diesel fuel shall be transferred as provided in this section.

9.2. When diesel fuel is transferred by means of a pump and a hose equipped with a nozzle containing a self-closing valve, a powered pump may be used only if:

9.2.1. The hose is equipped with a nozzle containing a self-closing valve without a latch-open device; and

9.2.2. The pump is equipped with an accessible emergency shutoff switch.

9.3. Diesel fuel shall not be transferred using compressed gas.

9.4. Diesel fuel shall not be transferred to the fuel tank of diesel-powered equipment while the equipment's engine is running.

9.5. Diesel fuel piping systems shall be designed and operated as dry systems.

9.6. All piping, valves and fittings shall meet the following:

9.6.1. Be capable of withstanding working pressures and stresses.

9.6.2. Be capable of withstanding four times the static pressures.

9.6.3. Be compatible with diesel fuel.

9.6.4. Be maintained in a manner that prevents leakage.

9.7. Vertical pipelines shall have manual shutoff valves installed at the surface filling point and at the underground discharge point.

9.8. Unburied diesel fuel pipelines shall not exceed three hundred feet in length and shall have shutoff valves located at each end of the unburied pipeline.

9.9. Horizontal pipelines shall not be used to distribute fuel throughout the mine.

9.10. Diesel fuel piping systems shall be used only to transport fuel from the surface directly to a single underground diesel fuel transfer point.

9.11. When boreholes are used, the diesel fuel piping system shall not be located in a borehole with electric power cables.

9.12. Diesel fuel pipelines located in any shaft shall be included as part of the required examination of the shaft.

9.13. Diesel fuel piping systems located in entries shall not be located on the same side of the entry as electric cables or power lines.

9.14. Diesel fuel pipelines shall not be located in any trolley-haulage entry, except that they may cross the entry perpendicular if buried or otherwise protected in steel conduit or an equivalent from damage and sealed.

9.15. Diesel fuel piping systems shall be protected to prevent physical damage.

§56-23-10. Containers.

10.1. Containers for the transport of diesel fuel shall meet the requirements of this section.

10.2. Diesel fuel shall be transported only in containers specifically designed for the transport of diesel fuel.

10.3. No more than one safety can, conspicuously marked, shall be transported on a vehicle at any time.

10.4. Containers other than safety cans used to transport diesel fuel shall be provided with the following:

10.4.1. Devices for venting.

10.4.2. Self-closing caps.

10.4.3. Vent pipes at least as large as the fill or withdrawal connection, whichever is larger, but not less than one and one-fourth inch nominal inside diameter.

10.4.4. Liquid-tight connections for all container openings that are identified by conspicuous markings and closed when not in use.

10.4.5. Shutoff valves located within one inch of the tank shell on each connection through which liquid can normally flow.

10.5. When tanks are provided with openings for manual gauging, liquid-tight caps or covers shall be provided and shall be kept closed when not open for gauging.

10.6. Containers used for the transport of diesel fuel shall not exceed a capacity of five hundred gallons.

10.7. Containers, other than safety cans, used for the transport of diesel fuel shall be permanently fixed to the transportation unit; provided, however, that the director may develop criteria on a mine by mine basis that allows for approved diesel fuel transportation units to be transported on (or by) a secondary transportation unit to their respective work areas.

10.8. Diesel fuel transportation units shall be transported individually and not with any other cars, except that two diesel fuel transportation units up to a maximum of five hundred gallons each may be transported together.

10.9. Diesel fuel shall not be transported on conveyor belts.

10.10. When transporting diesel fuel in containers other than safety cans, a fire extinguisher shall be provided on each end of the transportation unit. The fire extinguishers shall be multipurpose type dry-chemical fire extinguishers containing a nominal weight of twenty pounds.

10.11. Diesel fuel transportation units shall have a fire suppression system that meets the requirements of section 11 of this rule.

10.12. In mines where trolley wire is used, diesel fuel transportation units shall be provided with insulating material to protect the units from energized trolley wire, and the distance between the diesel fuel transportation unit and the trolley wire shall not be less than twelve inches, or the trolley wire shall be de-energized when diesel fuel transportation units are transported through the area.

10.13. Unattended diesel fuel transportation units shall be parked only in underground diesel fuel storage facilities.

10.14. Safety cans shall be used for emergency fueling only.

10.15. Safety cans shall be clearly marked, have a maximum capacity of five gallons and be constructed of metal and equipped with a nozzle and self-closing valves.

§56-23-11. Fire Suppression for Equipment and Transportation.

11.1. Fire suppression systems for diesel-powered equipment and fuel transportation units shall meet the requirements of this section.

11.2. The system must be an automatic multipurpose dry-powder type fire suppression system suitable for the intended application and listed or approved by a nationally recognized independent testing laboratory. Installation requirements are as follows:

11.2.1. The system shall be installed in accordance with the manufacturer's specifications and the limitations of the listing or approval.

11.2.2. The system shall be installed in a protected location or guarded to minimize physical damage from routine operations.

11.2.3. Suppressant agent distribution tubing or piping of the system shall be secured and protected against damage, including pinching, crimping, stretching, abrasion and corrosion.

11.2.4. Discharge nozzles of the system shall be positioned and aimed for maximum fire suppression effectiveness in the protected areas. Nozzles shall also be protected against the entrance of foreign materials such as mud, coal dust or rock dust that could prevent proper discharge of suppressant agent.

11.3. The fire suppression system shall provide automatic fire detection and suppression for all of the following:

11.3.1. The engine, transmission, hydraulic pumps and tanks, fuel tanks, exposed brake units, air compressors and battery areas, as applicable, on all diesel-powered equipment.

11.3.2. Fuel containers and electric panels or controls used during fuel transfer operations on fuel transportation units.

11.4. The fire suppression system shall include a system fault and fire alarm annunciator that can be seen and heard by the equipment operator.

11.5. The fire suppression system shall provide for automatic engine shutdown. Engine shutdown and discharge of suppressant agent may be delayed for a maximum of fifteen (15) seconds after the fire alarm annunciator alerts the operator.

11.6. At least two manual actuators shall be provided with at least one manual actuator at each end of

the equipment. If the equipment is provided with an operator's compartment, one of the mechanical actuators shall be located in the compartment within easy reach of the operator. For stationary equipment, the two manual actuators shall be located with at least one actuator on the stationary equipment and at least one actuator a safe distance away from the equipment and in intake air.

§56-23-12. Fire Suppression for Storage Areas.

12.1. Fire suppression systems for diesel fuel storage areas shall meet the requirements of this section.

12.2. The system shall be an automatic multipurpose dry-powder type fire suppression system or other system of equal capability, suitable for the intended application and listed or approved by a nationally recognized independent testing laboratory. The system shall meet the following installation requirements:

12.2.1. The system shall be installed in accordance with the manufacturer's specifications and the limitations of the listing or approval.

12.2.2. The system shall be installed in a protected location or guarded to minimize physical damage from routine operation.

12.2.3. Suppressant agent distribution tubing or piping of the system shall be secured and protected against damage, including pinching, crimping, stretching, abrasion and corrosion.

12.2.4. Discharge nozzles of the system shall be positioned and aimed for maximum fire suppression effectiveness in the protected areas. Nozzles must also be protected against the entrance of foreign materials such as mud, coal dust and rock dust that could prevent proper discharge of suppressant agent.

12.3. The fire suppressant system shall provide automatic fire detection and suppression for the fuel storage tanks, containers, safety cans, pumps, electrical panels and control equipment in fuel storage areas.

12.4. Audible and visual alarms to warn of fire or system faults shall be provided at the protected area and at a surface location that is always staffed when persons are underground. A means shall also be provided for warning all endangered persons in the event of fire.

12.5. Fire suppression systems shall include two manual actuators with at least one located within the fuel storage facility and at least one located a safe distance away from the storage facility and in intake air.

12.6. The fire suppression system shall remain operative in the event of electrical system failure.

12.7. If electrically operated, the detection and actuation circuits shall be monitored and provided with status indicators showing power and circuit continuity. If not electrically operated, a means shall be provided to indicate the functional readiness status of the system.

12.8. Fire suppression devices shall be visually inspected at least once each week by a person qualified to make such inspections.

12.9. Each fire suppression device shall be tested and maintained.

12.10. A record shall be maintained of the inspection required by this section. The record of the weekly inspections shall be maintained at an appropriate location for each fire suppression device.

12.11. All miners normally assigned to the active workings of a mine shall be instructed about any hazards inherent to the operation of all fire suppression devices installed and, where appropriate, the safeguards available for each device.

§56-23-13. Use of Certain Starting Aids Prohibited.

13.1. The use of volatile or chemical starting aids is prohibited.

§56-23-14. Fueling.

14.1. Fueling of diesel-powered equipment shall not be conducted in the intake escapeway unless the mine design and entry configuration make it necessary. In those cases where fueling in the intake escapeway is necessary, the mine operator shall submit a plan for approval to the director outlining the special safety precautions that will be taken to insure the protection of miners. Such plan shall specify a location, (such as end of the tail track or adjacent to the load out point), where fueling will be conducted in the intake escapeway and all other safety precautions that will be taken, which shall include an examination of the area for spillage or fire by a qualified person.

14.2. Diesel fuel and other combustible materials shall be cleaned up and not be permitted to accumulate anywhere in an underground mine or on diesel-powered or electric equipment located therein.

14.3. At least one person specially trained in the cleanup and disposal of diesel fuel spills shall be on duty at the mine when diesel-powered equipment or mobile fuel transportation equipment is being used or when any fueling of diesel-powered equipment is being conducted.

§56-23-15. Fire and Safety Training.

15.1. All underground employees at the mine shall receive special instruction related to fighting fires involving diesel fuel. This training may be included in annual refresher training under MSHA regulations at 30 CFR Part 48 (relating to training and retraining of miners) or included in the fire drills required under MSHA regulations at 30 CFR 75.1101-23 (relating to program of instruction; location and use of fire fighting equipment; location of escapeways, exits and routes of travel; evacuation procedures; fire drills.)

15.2. All miners shall be trained in precautions for safe and healthful handling and disposal of diesel-powered equipment filters. All used intake air filters, exhaust diesel particulate matter filters and engine oil filters shall be placed in their original containers or other suitable enclosed containers and removed from the underground mine to the surface no less than once in a twenty-four (24) hour period. Arrangements will be made for safe handling and disposal of these filters within a timely manner after they have reached the surface.

§56-23-16. Maintenance.

16.1. Diesel-powered equipment shall be maintained in an approved and safe condition as described in this rule or shall be removed from service.

16.2. An operator choosing to use diesel equipment in an underground coal mine must develop a maintenance plan and submit his or her plan to the director for approval. Failure of the mine operator to comply with the maintenance requirements of this section may result in the revocation of the director's approval of the complete diesel-powered equipment package, provided appropriate notification has been given to the mine operator and the procedures of this section have been taken. Upon receiving such notice, the mine operator shall have thirty days to submit a plan to achieve and maintain compliance. Such plan shall be evaluated by the director, and, upon approval, the mine operator shall implement the plan. The director shall monitor the mine operator's compliance. At any time the director determines that the mine operator is unable or unwilling to comply, the director shall revoke the mine operator's approval, which would in turn prohibit use of all diesel equipment at that mine.

16.3. To acquire and maintain approval of a complete diesel-powered equipment package, the mine operator shall comply with the following requirements:

16.3.1. All service, maintenance and repairs of approved complete diesel-powered equipment packages shall be performed by mechanics that are trained and qualified in accordance with section 24 of this rule.

16.3.2. Service and maintenance of approved complete diesel-powered equipment packages shall be performed according to:

16.3.2.a. The specified routine maintenance schedule;

16.3.2.b. On-board performance and maintenance diagnostics readings;

16.3.2.c. Emissions test results; and

16.3.2.d. Component manufacturer's recommendations.

§56-23-17. Records.

17.1. A record shall be made of all emissions tests, preoperational examinations and maintenance and repairs of complete diesel-powered equipment packages. The records made pursuant to this section shall meet the requirements of this section.

17.2. The person performing the emissions test, examination, maintenance or repair shall certify by date, time, engine hour reading and signature that the emissions test, examination, maintenance or repair was made.

17.3. Records of emissions tests and examinations shall include the specific results of such tests and examination.

17.4. Records of maintenance and repairs shall include the work that was performed, any fluids or oil added, parts replaced or adjustments made and the results of any subsequently required emissions testing.

17.5. Records of preoperational examinations shall be retained for the previous one hundred-hour

maintenance cycle.

17.6. Records of emissions tests, two hundred (200) hour maintenance tests and repairs shall be countersigned once each week by the certified mine electrician or mine foreman.

17.7. All records required by this section shall be retained for at least one year at a surface location at the mine and made available for inspection by the director, district mine inspector and by miners and their representatives.

§56-23-18. Duties of Operator.

18.1. Prior to using a piece of diesel-powered equipment during a shift, an equipment operator shall conduct an examination as follows:

18.1.1. Check the exhaust emissions control and conditioning system components to determine that the components are in place and not damaged or leaking.

18.1.2. Assure that the equipment is clean and free of accumulations of combustibles.

18.1.3. Assure that the machine is loaded safely.

18.1.4. Check for external physical damage.

18.1.5. Check for loose or missing connections.

18.1.6. Check engine oil level.

18.1.7. Check transmission oil level.

18.1.8. Check other fluid levels, if applicable.

18.1.9. Check for hydraulic, coolant and oil leaks.

18.1.10. Check fan, water pump and other belts.

18.1.11. Check the fan for damage.

18.1.12. Check guards.

18.1.13. Check the fuel level.

18.1.14. Check for fuel leaks.

18.1.15. Comply with record keeping requirements pursuant to section 17 of this rule.

18.2. After the engine is started and warmed up, the equipment operator shall conduct an examination as follows:

18.2.1. Check all on-board engine performance and maintenance diagnostics system gauges for proper operation and in-range readings. The equipment operator shall immediately shut down the engine and notify the operator if the on-board readings indicate any of the following:

18.2.1.a. Intake restriction at full engine speed is greater than the manufacturer's recommendation.

18.2.1.b. Exhaust restriction at full engine speed is greater than the manufacturer's recommendation.

18.2.1.c. Coolant temperature is at or near two hundred twelve degrees Fahrenheit.

18.2.1.d. Low engine oil pressure.

18.2.1.e. High engine oil temperature.

18.2.2. Check safety features, including, but not limited to, the throttle, brakes, steering, lights and horn.

18.2.3. Comply with record keeping requirements pursuant to section 17 of this rule.

§56-23-19. Scheduled Maintenance.

19.1. At intervals not exceeding two hundred (200) hours of engine operation, a qualified mechanic shall perform the following maintenance and make all necessary adjustments or repairs or remove the equipment from service:

19.1.1. Wash or steam-clean the equipment.

19.1.2. Check for and remove any accumulations of coal, coal dust or other combustible materials.

19.1.3. Check the equipment for damaged or missing components or other visible defects.

19.1.4. Conduct electrical and safety component inspections.

19.1.5. Replace engine oil and filter. An independent analysis shall be conducted of the engine oil.

19.1.6. Check the transmission oil level and add oil, if necessary.

19.1.7. Check hydraulic oil level and add oil, if necessary.

19.1.8. Check the engine coolant level and add coolant, if necessary.

19.1.9. Check all other fluid levels and add fluid, if necessary.

19.1.10. Check for oil, coolant and other fluid leaks.

19.1.11. Inspect the cooling fan, radiator and shroud. Remove any obstructions and make necessary repairs.

19.1.12. Check all belts. Tighten or replace, if necessary.

19.1.13. Check the battery and service as necessary.

19.1.14. Check the automatic fire suppression system.

19.1.15. Check the portable fire extinguisher.

19.1.16. Check the lights.

19.1.17. Check the warning devices.

19.1.18. With the engine operating, check and replace or repair the following:

19.1.18.a. Oil pressure.

19.1.18.b. Intake air restriction at full engine speed.

19.1.18.c. Exhaust gas restriction at full engine speed.

19.1.18.d. Exhaust flame arrestor.

19.1.18.e. All gauges and controls.

19.1.19. Conduct repeatable loaded engine-operating test in accordance with section 20 of this rule.

19.1.20. Evaluate and interpret the results of all of the above tests and examinations and make all necessary repairs or remove equipment from service.

19.1.21. Comply with recordkeeping requirements pursuant to section 17 of this rule.

§56-23-20. Emissions Monitoring and Control.

20.1. Emissions for diesel-powered equipment shall be monitored and controlled as provided in this section.

20.2. When any diesel-powered machine first enters service at a mine, baseline emission values shall be determined by a qualified mechanic. Unless the director approves an alternate procedure, the qualified mechanic shall:

20.2.1. Verify that the seal on the engine fuel injector pump is in place and that the proper fuel pump is on the equipment.

20.2.2. Install a new clean intake air cleaner, measure and record the intake restriction pressure.

20.2.3. Check the level of engine oil.

20.2.4. Change the engine lubrication oil if not fresh.

20.2.5. Check the level of the transmission fluid.

20.2.6. Flush the exhaust system, if needed. Measure and record the exhaust back pressure. If exhaust gas backpressure is above that recommended by the manufacturer, then steps must be taken to bring the exhaust gas back pressure within the manufacturer's recommended limit prior to beginning the test described in this section.

20.2.7. Test the brakes.

20.2.8. Place the equipment into an intake entry.

20.2.9. Set the brakes and chock the wheels.

20.2.10. Start the engine and allow it to warm up to operating temperature.

20.2.11. For mobile equipment, shift into the highest gear and put the engine at full throttle, or for stationary equipment, induce a load and put the engine at full throttle.

20.2.12. Start the CO sampler and measure and record CO levels every thirty seconds for ninety seconds.

20.2.13. Comply with recordkeeping requirements pursuant to section 17 of this rule.

20.2.14. An alternative to the testing provided in the aforementioned subsections may be developed by the director.
Note: CO baseline emissions must be representative of MSHA's approval data.

§56-23-21. Diagnostic Testing.

21.1. At intervals not exceeding once every two hundred (200) hours of engine operation, a qualified mechanic shall perform equipment maintenance diagnostic testing of each piece of diesel-powered equipment in the mine. The qualified mechanic shall:

21.1.1. Verify the identification numbers on the equipment;

21.1.2. Check the level of the engine lubricating oil;

21.1.3. Check the level of the transmission fluid;

21.1.4. Set the brakes and chock the wheels;

21.1.5. Install the portable CO sampling device into the untreated exhaust port coupling;

21.1.6. Start the engine and allow it to warm up to operating temperature;

21.1.7. Check the intake restriction and the exhaust back pressure at high idle speed;

21.1.8. If the intake restriction is more than the manufacturer's maximum recommended intake restriction, replace the intake filter with a clean one;

21.1.9. If exhaust gas backpressure is above that recommended by the manufacturer, then steps must be taken to bring the exhaust gas back pressure within the manufacturer's recommended limit prior to beginning the test described in this section;

21.1.10. For mobile equipment, shift into the highest gear and put the engine at full throttle, or for stationary equipment, induce a load and put the engine at full throttle.

21.1.11. Start the CO sampler and record CO levels every thirty (30) seconds for ninety (90) seconds;

21.1.12. Install the portable CO sampling device into the treated exhaust port coupling and repeat steps 21.1.l and 21.1.k;

21.1.13. If the average CO reading for treated exhaust gas is greater than 100 ppm, the equipment has failed and must be serviced and retested before it is returned to regular service; and

21.1.14. Comply with recordkeeping requirements pursuant to section 17 of this rule.

21.1.15. An alternative to the testing provided in subsections 21.1.1 thru 21.1.15. may be developed and/or approved by the director.

§56-23-22. Training and General Requirements.

22.1. To use diesel equipment in an underground mine the mine operator shall submit a training plan to the director for approval.

22.2. All training course instructors and all training plans required by this section and sections 23 and 24 of this rule shall be approved by the director. Operator training and qualification shall meet the requirements of this section.

22.3. Training shall be conducted in the basics of the operation of a diesel engine, federal and state regulations governing their use, company rules for safe operations, specific features of each piece of equipment and the ability to recognize problems and shall be provided to each equipment operator and the mine health and safety committee if one exists. This training shall be designed to bring every operator to a level of good understanding of diesel equipment operation. Each operator will be qualified by attending a minimum eight-hour course, including classroom training on diesel fundamentals and equipment-specific hands-on training on the job.

22.4. Upon successful completion of both training sessions, the operator shall be issued a Certificate of

Qualification (MSHA 5000-23) that qualifies him or her to operate a specific type of diesel-powered equipment. An operator may be qualified to operate more than one type of equipment by completing additional equipment-specific training covering differences specific to each additional type of equipment.

22.5. The mine operator shall furnish all required training. The employees will suffer no loss of pay for attending training.

22.6. The minimum eight-hour training required by section 22.3 shall include instruction in the following classroom subjects:

22.6.1. Engine fundamentals, which shall include an introduction to the function of a diesel engine and recognition of all major components and their functions.

22.6.2. Diesel regulations, which shall include an introduction to federal and state regulations governing the use of diesel equipment.

22.6.3. Diesel emissions, which shall include an introduction to diesel emissions and their adverse health effects.

22.6.4. Factors that affect diesel emissions, which shall include a detailed presentation of engine faults and diesel fuel quality and their effect on emissions and the preventive actions that can be taken to minimize emissions levels.

22.6.5. Emissions control devices, which shall include a detailed presentation of the different emissions control devices employed to reduce emissions and details about actions the operator must take to keep the devices in working order.

22.6.6. Diagnostic techniques, which shall include a presentation of techniques that can be employed by the operator to assure the equipment is in safe operating condition and instruction about how to recognize and diagnose certain engine faults that may cause increases in emissions.

22.6.7. The preoperational inspection, which shall include a presentation of the purpose, benefits and requirements of the preoperational inspection.

22.6.8. Ventilation, which shall include an introduction to special ventilation requirements for areas where diesel-powered equipment will operate.

22.6.9. Fire suppression system, which shall include an introduction to the fire suppression system and its function and when and how to activate the fire suppression manually.

22.6.10. Operating rules, which shall include a detailed presentation of the driving rules, safe driving speeds, traffic control devices and equipment limitations.

22.6.11. Emergency procedures, which shall include discussion of emergency situations, such as fire, diesel fuel spills, component failure, loss of ventilation air and emergency escape procedures and discussion of the potential use of the diesel-powered vehicle as an emergency escape vehicle in case of a mine emergency situation.

22.6.12. Record keeping and reporting procedures, which shall include a presentation on required record keeping and reporting procedures for problems or unsafe conditions, high emissions levels and preoperational inspections made by the equipment operator.

§56-23-23. Equipment-Specific Training.

23.1. Equipment-specific hands-on orientation training shall be given in an area of the mine where the equipment will be operated. This orientation shall be specific to the type and make of the diesel machine and shall be presented in small groups. The following subjects shall be included in the training:

23.1.1. Equipment layout, which shall include familiarization with the layout of the equipment, the operator's compartments and the controls.

23.1.2. Pre-operation inspection, which shall include familiarization with the pre-operation inspection procedure and review of specific details of the inspection and location of the components to be inspected.

23.1.3. Equipment limitations, which shall include instruction relating to equipment performance, speeds, capacities and blind areas.

23.1.4. Operating areas, which shall include instruction relating to areas in which the equipment may be operated.

23.1.5. Operation, which shall include familiarization with the controls, gauges and warning devices and safe operating limits of all indicating gauges.

23.1.6. Refueling procedure, which shall include familiarization with fuel handling, permissible refueling areas, spill prevention, cleanup and potential hazards from diesel fuel.

23.1.7. Emergency devices, which shall include instruction relating to the location and use of the fire extinguisher and fire suppression devices.

23.1.8. Driving practice, which shall include supervised operation of the equipment.

§56-23-24. Diesel Mechanic Training.

24.1. Diesel mechanic training and qualification shall meet the requirements of this section.

24.2. Diesel mechanics shall be trained and qualified to perform maintenance, repairs and testing of the features of diesel equipment certified by MSHA and the director.

24.3. To be qualified, a diesel mechanic must successfully complete a minimum of sixteen hours of a training program approved by the director regarding the general function, operation, maintenance and testing of emissions control and conditioning components. The diesel mechanic must be qualified to perform these tasks on the specific machines used at the mine or mines where they are employed. Additional engine-specific training shall be provided to diesel mechanics in accordance with a plan approved by the director.

24.4. Annual retraining programs of eight (8) hours for diesel mechanics shall be required and approved by the director. The annual retraining shall include refresher training as well as new procedure and new technology training as necessary. Such training shall be separate from refresher training pursuant to MSHA regulations at 30 CFR Part 48 (relating to training and retraining of miners) and electrical training required by MSHA. The mine operator shall furnish all required training and refresher training. The employees will suffer no loss of pay for attending training and refresher training.

24.5. The minimum sixteen-hour diesel mechanic training programs shall be submitted for approval to the director and shall include training in the following minimum subject requirements:

24.5.1. Federal and state requirements regulating the use of diesel equipment.

24.5.2. Company policies and rules related to the use of diesel equipment.

24.5.3. Emissions control system design and component technical training.

24.5.4. On-board engine performance and maintenance diagnostics system design and component technical training.

24.5.5. Service and maintenance procedures and requirements for the emissions control systems.

24.5.6. Emissions testing procedures and evaluation and interpretation of test results.

24.5.7. Troubleshooting procedures for the emissions control systems.

24.5.8. Fire protection systems test and maintenance.

24.5.9. Fire and ignition sources and their control and elimination.

24.5.10. Fuel system maintenance and safe fueling procedures.

24.5.11. Intake air system design and components technical training and maintenance procedures.

24.5.12. Engine shutdown device tests and maintenance.

24.5.13. Special instructions regarding components, such as the fuel injection system, that shall only be repaired and adjusted by a qualified mechanic who has received special training and is authorized to make such repairs or adjustments by the component manufacturer or ASE certified diesel mechanic.

24.5.14. Instruction on record keeping requirements for maintenance procedures and emissions testing.

24.5.15. Other subjects determined by the director to be necessary to address specific health and safety needs.

24.6. Individuals successfully completing the approved sixteen (16) hour diesel mechanic training will be considered to be a trained operator providing he or she has received the necessary task training on the specific piece of diesel equipment.

§56-23-25. Operation of Diesel-Powered Equipment.

25.1. In addition to other requirements of this rule, diesel-powered equipment shall be operated pursuant to the standards set forth in this rule.

25.2. All diesel-powered equipment shall be attended while in operation with the engine running in underground mines.

25.3. Unnecessary idling of diesel-powered equipment shall be prohibited.

25.4. All roadways where diesel-powered equipment is operated shall be maintained as free as practicable from bottom irregularities, debris and wet or muddy conditions that will affect control of the equipment.

25.5. Operating speeds shall be consistent with conditions of roadways, grades, clearances, visibility and traffic and type of equipment used.

25.6. Equipment operators shall have full control of the mobile equipment while it is in motion.

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

25.8. All diesel-powered equipment shall be maintained in a safe and healthful operating condition. Equipment in an unsafe or unhealthful condition or not maintained in accordance with the engine or emissions control operating specifications shall be removed from service immediately and shall not be returned to service until all necessary corrective actions have been taken.

§56-23-26. Diesel Inspectors; Employment; Training.

26.1. The office of miners' health, safety and training shall assign a diesel inspector in each region of the state's four regional offices.

26.2. The diesel inspector may be assigned other duties as prescribed by the director.

26.3. The office of miners' health, safety and training shall provide the diesel inspectors with specific training on this rule; also they shall train and equip the diesel inspectors with the proper equipment so that the inspectors may effectively test for diesel emissions and properly enforce this rule as prescribed by the director.

26.4. The diesel inspectors shall be trained in accordance with criteria as established and approved by the director.

26.5. After the implementation of this rule, the office of miners' health, safety and training shall employ additional diesel inspectors as needed.

§56-23-27. Diesel Inspector -- Training Course.

27.1. Training for diesel inspectors shall include, but is not limited to, the following:

27.1.1. Engine Fundamentals – Components and Operation of a Diesel Engine.

27.1.2. Fuel Standards – Fuel Requirements and Effect of Various Fuels on DPM Emissions.

27.1.3. Diesel Regulations – State and Federal.

27.1.4. DPM – Health Effects.

27.1.5. Factors that increase/decrease DPM emissions.

27.1.6. Emission Control Techniques – Operation, Maintenance and Testing.

27.1.7. Diagnostics – Instruments, Testing and Evaluation.

27.1.8. Inspection Techniques – Enforcement.

27.1.9. Ventilation.

27.1.10. Fire Suppression Systems – Operation, Testing and Maintenance.

27.1.11. Emergency Procedures – Firefighting, Spills/Containment.

27.1.12. Fuel Handling/Storage.

27.1.13. Manufacturer Training.

27.1.14. Training Requirements – Plans, Record Keeping.

§56-23-28. Operation of Underground Diesel Powered Electric Generators.

28.1. While being operated, the diesel generator shall be vented directly to the return air course.

28.2. At least one person shall be present within sight and sound while the generator is in operation (engine running) and he/she shall have a multi-gas detector capable of detecting nitric oxide (NO), nitrogen dioxide (NO_2) and carbon monoxide (CO).

28.3. All current state rules and statutes relating to the use of diesel-powered equipment and electricity remain in force.

28.4. Prior to the initial operation of the diesel generator underground, the operator shall give the director or his/her authorized representative ten (10) days' written notice. In case of an emergency, the operator shall notify the director or his/her authorized representative as soon as possible prior to its initial use.

§56-23-29. Electrical Provisions for Diesel-Powered Electrical Generators.

29.1. Electrical provisions for diesel-powered electrical generators used as an alternative to power centers for moving equipment in, out, and around the mine and to perform work in areas where permissible equipment is not required, must comply with the following:

29.1.1. A grounding resistor rated for the phase-to-phase voltage of the system must be provided to limit the ground-fault current to not more than 0.5 amperes.

29.1.1.a. The grounding resistor(s) must be located:

29.1.1.a.1. Between the wye-connected generator neutral and the generator frame or

29.1.1.a.2. Between the wye-connected generator neutral and the generator frame and between the wye-connected transformer secondary and the transformer frame when an isolation transformer(s) is used and the generator is supplying power to the other equipment or

29.1.1.a.3. Between the wye-connected generator neutral and the generator frame when an auto-transformer is used.

29.2. Each three-phase output circuit of the generator must be equipped with a sensitive ground fault relay. The protective relay must be set to cause the circuit interrupting device that supplies power to the primary windings of each transformer to trip and shut down the diesel engine when a phase-to-frame fault of not more than 90 milliamperes occurs.

29.3. The neutral grounding resistor shall be provided with backup ground fault protection that will shut down the diesel engine if a ground fault occurs with the neutral grounding resistor open.

29.4. Each three-phase output circuit that supplies power to equipment must be equipped with an instantaneous sensitive ground-fault relay that will cause its respective circuit interrupting device(s) to trip and cause shutdown of the diesel engine when a phase-to-frame fault occurs. The grounded-phase protection must be set at not more than 90 milliamps. Current transformers used for the ground-fault protection must be single window-type and must be installed to encircle all three phase conductors. Equipment safety grounding conductors must not pass through or be connected in series with ground-fault current transformers.

29.5. Each three-phase circuit interrupting device must be provided with a means to provide short-circuit, overcurrent, grounded-phase, under-voltage, and ground wire monitoring protection. The instantaneous only trip unit for the circuit interrupting device(s) in use must be adjusted to trip at not more than seventy-five percent (75%) of the minimum available short circuit current at the point where the portable cable enters the equipment, specified in Table 56-23A found at the end of this rule.

29.6. The equipment portable cable length(s) must not exceed the length(s) specified in Table 56-23B found at the end of this rule.

29.7. Permanent label(s) listing the maximum circuit interrupting device setting(s) and maximum portable cable length(s) must be installed on each instantaneous trip unit or be maintained near each three-phase circuit interrupting device. The permanent label(s) must be maintained legibly.

29.8. The circuit interrupting device that supplies three-phase power circuit(s) to the equipment being

powered must be limited to the use of only one circuit interrupting device at a time when equipment is being moved in, out, and around the mine.

29.9. The grounding system must include an MSHA-accepted ground wire monitor system to assure that grounding conductor is connected to the frames of all equipment and to the frame of the generator. Double grounding will not be accepted in lieu of ground monitoring.

29.10. All trailing cables extending from the generator to equipment must comply with the design of trailing cables for medium-voltage circuits.

29.11. 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.

29.12. A strain relief device must be provided on each end of the trailing cables that extends between the generator and the piece of equipment being powered.

29.13. Prior to moving each piece of equipment or performing work, a functional test of each ground fault and ground wire monitor system must be performed by a qualified electrician. The ground-fault circuit must be tested without subjecting the circuit to an actual grounded phase condition. A record of each test must be maintained and made available to authorized representatives of the director and to the miners in such mine.

29.14. The diesel generator must be provided with power quality monitoring. This shall include volt meter(s), ammeters and a frequency meter to determine the power quality of all three phases.

Table 56-23A

Conductor Size AWG or MGM	Maximum Allowable Circuit Breaker Instantaneous Setting (Ampheres)
14	50
12	75
10	150
8	200
6	300
4	500
3	600
2	800
1	1,000
1/0	1,250
2/0	1,500
3/0	2,000
4/0	2,500
250	2,500
300	2,500
350	2,500
400	2,500
450	2,500
500	2,500

TABLE 56-23B

SPECIFICATIONS FOR PORTABLE CABLES LONGER THAN 500 FEET

Conductor Size -- AWG or MCM	Max. Allowable Length (Feet)	Normal Ampacity at 60° C. Copper Temperature (40° C. Ambient)	Resistance at 60° C. Copper Temperature (Ohms)
6	550	50	0.512
4	600	70	.353
3	650	80	.302
2	700	95	.258
1	750	110	.220
1/0	800	130	.185
2/0	850	150	.157
3/0	900	175	.130
4/0	1,000	200	.116
250	1,000	220	.098
300	1,000	240	.082
350	1,000	260	.070
400	1,000	280	.061
450	1,000	300	.054
500	1,000	320	.050