VOLUME V - COAL MINES

TABLE OF CONTENTS

GENERAL POLICIES AND PROGRAMS

INTERPRETATION, APPLICATION, AND GUIDELINES ON ENFORCEMENT OF 30 CFR

GENERAL POLICIES AND PROGRAMS

V.G-1 Reporting PCB Spills

Under the authority of the Toxic Substances Control Act, the Environmental Protection Agency (EPA) requires that spills of polychlorinated biphenyl (PCB) be reported whenever the incident poses a substantial risk to human health or to the environment. PCBs have been shown to cause chronic toxic effects in many species even when they exist in very low concentrations. Well-documented tests show that PCBs cause, among other things, reproductive failures, gastric disorders, skin lesions, and tumors in laboratory animals.

Workers exposed to PCBs may show a number of symptoms and adverse effects including, but not limited to, chloracne and other epidermal disorders, digestive disturbances, jaundice, impotence, throat and respiratory irritations, and severe headaches.

Spills in mines most commonly result from damage to transformers or capacitors containing PCB dielectric fluid. EPA assumes that a transformer or capacitor contains PCBs if: (1) the nameplate indicates it contains PCB dielectric fluid; or (2) the owner or operator has any reason to believe that it contains PCB dielectric fluid. If a transformer or capacitor does not have a nameplate, and there is no information to indicate the type of dielectric fluid in it, the transformer or capacitor is assumed to contain PCB fluid. PCB dielectric fluids may be listed under the following trade names: Askarel, Aroclor, Pydraul, therminal, Pyroclor, Santotherm, Pyralene, Pyranol, Inerteen, Asbestol, Chlorextol, Diachlor, Dykanol, Elemex, Hyvol, No-Flamol, Saf-T-Kuhl, Aroclor B, Chlorinol, Chlorphen, and Eucarel.

As a general rule, EPA does not require that spills involving a single capacitor be reported unless PCBs threaten to enter a water-course. Minor leaks in transformers, such as bushing leaks or weeping, also do not require reporting. However, such spillage or leaking should be stopped and repaired as soon as possible.

If a spill should occur at a mine, the mine operator's first priority should be to control the spread of the spill by damming or diking the leak. Any threat of contamination to water supplies should be given the highest priority. Appropriate personal protection (e.g., impermeable gloves, boots and aprons, goggles, and respirators) must be worn by persons cleaning up spills pursuant to applicable MSHA regulations.

Once the spill is contained, clean-up measures can begin. All materials contaminated with PCBs, including soil and debris, should be collected, stored and disposed of in accordance with EPA regulations.

Upon discovery of a PCB spill, the district manager shall be notified immediately. The procedures for handling spills are set forth in the MSHA Health Inspection Handbook.

V.G-2 Operator Responsibility Over Customer Vehicles

It is the responsibility of the operator of a mine to enforce mandatory safety standards on all vehicles entering the mine property. In the area of backup alarms on customer trucks, the requirement could be met in several ways, including the following:

1. Traffic patterns can be established to eliminate the need to backup.

2. Operator personnel can act as observers where trucks are required to backup.

If the loading of customer trucks is being done in a hard hat area, it is the responsibility of the operator to see that all persons in the area wear hard hats. If hard hats are not available to the customer personnel, the following options will meet the requirement of the standard:

1. Rules can be established that while loading, the customer truck drivers must stay in their truck cabs if the cabs are protected by canopies; or

2. If the customer truck drivers must get out of their cabs, designated safe areas must be provided.

However, the policy is not applicable to independent contractors performing services on mine property.

V.G-3 Suspected "Foul Play" Felonies

It is MSHA's policy to cooperate with state and local law enforcement officials in all circumstances where a felony violating state or local law is suspected.

If, in the course of an inspection or investigation, there is reason to believe that foul play has occurred (for example, a death or an injury of suspicious cause or a fire of suspicious origin), the following procedures should be followed:

1. The inspector or investigator should consult through normal channels with the district manager.

2. The district manager should contact the Administrator's Office and the appropriate Regional Solicitor's Office.

3. After consultation with the Administrator's Office and an attorney in the Regional Solicitor's Office, promptly report the matter to appropriate state or local law enforcement officials.

4. Cooperate with the state and local officials, but ensure that any evidence which may also be relevant to a possible Mine Act violation is preserved.

5. If state or local law enforcement officials wish to participate in MSHA's investigation, the matter first should be cleared with the Supervisory Special Investigator in the headquarters office.

6. If only evidence or other information is being shared with state or local law enforcement officials, advance clearance from headquarters is not necessary, but the Supervisory Special Investigator should be promptly apprised of any such activities or contacts.

V.G-4 Mine Plan Approval Procedures

Under the Federal Mine Safety and Health Act of 1977, and the implementing standards and regulations, various plans and programs are required to be prepared by the mine operator and submitted to MSHA for approval. Inspectors should review all plans and programs before beginning a AAA inspection so that the plans and programs can be evaluated for adequacy during the inspection. In addition, management systems should be established in each District to ensure that all mine plans and programs are reviewed periodically. The period between reviews should be established on a plan-by-plan basis, except as provided for by Agency standards, such as the 6-month review of ventilation and roof control plans. In addition, the system should provide a record of all such reviews. Mine operators should be promptly advised to update their plans when an MSHA review indicates the plan is no longer adequate.

Among the information required with mine ventilation plans is a map (30 CFR 75.316-1) which shows the projections of anticipated mine development for at least 1 year. At least annually, updated maps should be acquired from mine operators, and one of the 6-

month reviews should result in correspondence with the operator that identifies the material that constitutes the mine's approved plan.

After the initial approval of plans, changes may be requested by the mine operator for approval. If MSHA cannot approve the requested changes or needs additional information, the operator should be notified in writing of what information is needed or why the changes cannot be approved. The process should be completed quickly and the entire plan should not be opened for review, unless it is scheduled for review under the District's management system.

A thorough review of proposed mine plan provisions includes evaluation of comments provided by interested persons, such as the representative of miners. Accordingly when such input is received, it is important that the District review and respond to the information.

Contest of Mine Plan Approval Actions

In those situations when MSHA can no longer accept a provision of an approved plan, cannot approve a provision in a new plan, or cannot approve a proposed change to an approved plan, operators should be afforded the opportunity to contest MSHA's denial of approval. Where the operator disagrees with MSHA and indicates the desire to seek a citation to contest before the Federal Mine Safety and Health Review Commission, a citation should be issued. Normally, this would be a 104(a) citation and not involve unwarrantable failure findings, unless the circumstances justify it. The following several paragraphs illustrate how the three situations described can be handled.

When a plan provision is considered no longer adequate, the plan approval revocation procedures need to be followed. (These procedures are described on pages 3 and 4, under MSHA-Initiated Mine Plan Changes.) Upon revocation of approval, a citation must be issued for operating without an approved mine plan. Abatement can then be accomplished by the operator adopting a plan provision satisfying MSHA's concern. It may be appropriate for the operator to have this acceptable plan provision prepared before the citation is issued so that prompt abatement occurs. With this approach, there is no need to operate in violation of the mine's approved plan, and the violation would be "technical" in nature.

In the case of an operator-proposed change to an existing approved mine plan, if approval of the change is denied, the

operator could notify the District that, as of a certain date, the mine's existing approved plan is no longer adopted by the operator, and that the operator intends to adopt the proposed change which is not approved. On that date, a 104(a) citation would be issued for the operator's failure to have and adopt an approved plan. Abatement would be achieved by the operator promptly adopting the provisions of the most recently approved plan for the mine. Again, there need not be any changes made in the actual mining procedures, and the violation would be "technical" in nature.

The case of a new mine plan with a provision that cannot be approved could be handled in a similar manner. The operator could indicate that mining operations will begin on a particular date, using the plan that contains the provision which is not approved. On the date indicated for starting operations, a citation would be issued for failure to adopt and follow an approved plan, as required by the applicable standard. Abatement would be achieved by the operator promptly adopting provisions that satisfy MSHA's previously documented concerns.

In each of these cases, the operator would have the option of contesting the citation issued and presenting to an administrative law judge the reasons why the disputed plan provision should have been approved. Likewise, we would present our reasons for revoking or denying approval.

Nothing in the above paragraphs is intended to interfere with or change the practice of issuing citations for any failure to follow approved plans found during inspections and investigations.

Criteria and Guidelines in Mine Plan Approvals

On occasion, MSHA has required criteria from the roof control and ventilation standards to be included in plans for all mines as a condition of the approval, without appropriate regard for the specific mining conditions. There have also been instances when Agency "guidelines" have been required in plans in a similar manner. The use of the criteria and guidelines in this manner has been successfully challenged in court and should be discontinued.

MSHA standards require suitable plans to be developed on a mine-by-mine basis. Criteria and guidelines are reference information in the same nature as experience and knowledge of the particular conditions at the mine. Certain criteria or guidelines may have broad application, but their inclusion should be on an "as

needed" basis, rather than an across-the-board requirement. The evaluation should be whether the provision contained in a guideline is needed at a specific mine, rather than being concerned with why it is not included in the mine plan. Plans are not required in all cases to conform to the criteria, provided that no less than the same measure of protection will be afforded to the miners as would result from conformance with the criteria. Likewise, when a mine operator exceeds the requirements of an approved mine plan, this should not result in immediately requiring the additional measures to be made a part of the mine plan. This kind of revision should be based on an "as needed" basis, taking into account current and projected mining conditions.

MSHA-Initiated Mine Plan Changes

After review by the District, if provisions of a mine plan are identified as unsuitable to the particular conditions at the mine, established Agency procedures apply. They are:

1. Written notification from the District Manager to the operator which states that changes are needed in the plan, identifies the reason why changes are needed, affords the operator an opportunity to meet with District personnel to discuss any proposed changes, and sets a reasonable time for the operator to submit revised plan provisions to the District.

2. If the operator fails to respond within the time provided, or through District and operator discussions the differences concerning the plan cannot be resolved and the operator does not resubmit a revised plan, a second written notification is sent from the District Manager to the operator. The purpose of this notification is to inform the operator that the District continues to be unable to approve the plan with the existing provisions, specify a time by which suitable plan provisions must be submitted by the operator to the District, and make it clear that after that time approval of the plan in its present form will be revoked and the operator will be without the required approved plan. Operating after the revocation date is a violation of the standard requiring the approved plan.

Management System Controls

The responsibility for plan approvals is assigned to the District Manager who functions through the District organization. This

approval authority is not to be redelegated. There are some fundamental management system controls necessary for proper administration of the plan and program approval process which must be developed and written for each District. These controls should accomplish the following:

1. Completion of the final staff review by personnel located at the District Office.

2. Establish a logging and tracking system to provide:

   a. timely action on each approval request;

   b. a record of when the plan was received;

   c. a record of the plan's progress through the approval procedures;

   d. the date the notice of approval or the denial of approval was mailed;

   e. the distribution of the mailing;

   f. a means to determine that the plan in the uniform mine file contains all currently approved materials, including supplements; and

   g. a means to identify mines when a formal review is due.

3. Coordination of the progress of the plan through the approval procedures by a supervisory technical specialist or engineer to ensure that the following are completed:

   a. a check is made to determine that all required information is submitted;

   b. a check is made to determine that comments received from representatives of the miners has been addressed;

   c. unusual proposals or requests are identified and further evaluated;

d. the plan is evaluated for provisions that are contrary to existing standards or regulations;

e. mine files are checked during review of existing approved plans for information relating to plan adequacy; and

f. cross-communication with other plan approval groups occurs when appropriate.

4. Evaluation of each plan's technical adequacy and completeness by the District Manager, through the supervisory technical specialist or engineer, as follows:

   a. when necessary, conducting an on-site investigation by technical specialists; and

   b. acquiring and considering field office input from local inspectors during plan reviews, and addressing specific recommendations.

5. Contacts by the District with mine operators to request additional information should be limited to specially designated MSHA personnel, or a specially designed system.

6. Upon conclusion of a mine-site evaluation by a technical specialist, a technical survey, or an inspector's evaluation, opportunity for discussions are required with mine operations officials and identified representatives of the miners.

7. Ensure that recommendations to approve or deny approval of plans are made to the District Manager.

8. Approved plans and/or approved supplements are to be promptly provided to the inspection supervisor assigned to the mine for inclusion in the uniform mine file.

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INTERPRETATION, APPLICATION, AND GUIDELINES ON ENFORCEMENT OF 30 CFR

PART 70 MANDATORY HEALTH STANDARDS - UNDERGROUND COAL MINES

Subpart A General

This Part 70 is not applicable to shaft and slope sinking operations until the coalbed is reached and actual mining begins in the coalbed. Until reached, the regulations set forth in Part 71 are applicable.

Subpart B Dust Standards

70.100 Respirable Dust Standards

(b) The 1.0 milligram standard for intake airways is applicable within 200 feet outby the working faces of each section. The 2.0 milligram standard identified in paragraph (a) of this section is applicable to the remaining parts of the intake airways.

70.101 Respirable Dust Standard When Quartz is Present

The lowering of the respirable dust standard from 2.0 mg/m^3 due to excessive levels of quartz will normally be based on the combined average of operator and MSHA samples. However, if operators elect not to participate in the dust standard setting process, or operator sample(s) are either voided or not received in time, the standard will be based on the MSHA sample only or on the sample (either MSHA's or operator's) with the highest quartz percentage, in accordance with the technical procedures of the revised quartz program implemented December 1, 1985. The respirable dust samples will be processed against a reduced dust standard as follows:

1. If an entity is in bimonthly processing at the time a new standard is set, and at least one sample is received that was taken prior to or on the date that the operator was notified of the change (the date of the data mailer), all samples taken for that bimonthly cycle will be applied against the prior standard. If all samples are taken after the date of the data mailer, the new standard will apply.

2. When an operator has been requested to submit five additional samples and a new standard is established, if at least one sample is received that was taken prior to or on the date of the data mailer informing the operator of the new standard, all five samples will be applied against the prior standard. If all samples are taken after the date of the data mailer, the new standard will apply.

3. If the samples submitted for a request for five additional samples results in compliance and also split cycle processing, the applicable standard will be based on the same criteria as regular bimonthly samples. If at least one sample that will determine compliance for the next cycle is taken prior to or on the new standard effective date, the prior standard will apply. Otherwise, the new standard will apply.

4. If an entity is in citation processing when a new standard is set, the applicable standard will be based on the date the fifth valid sample of any set is taken. If the sample taken date is after the standard is set, the new standard will apply. Otherwise, the prior standard will apply.

5. If samples submitted to abate a citation result in split cycle processing, the standard applied to determine compliance for the citation will also apply to determine compliance for the next bimonthly cycle.

Subpart C Sampling Procedures

70.201 Sampling; General Requirements

(b) In cases where the designated occupation of a MMU works longer than 480 minutes or the production shift for a DA is longer than 480 minutes, arrangements shall be made to remove the sampling device from the miner at the expiration of this time period.

(c) The purpose of this requirement is to enable MSHA to observe the sampling procedures of a particular operator. If MSHA requires a mine operator to submit the date on which respirable dust samples are to be collected and the operator fails to comply with this request, a citation for violating this section shall be issued. However, if an operator reports that samples are to be collected on a particular date but does not do so due to circumstances beyond the operator's control, a citation is not issued.

(d) If the respirable dust standard is changed when samples are being submitted to abate a citation, these respirable dust samples will be processed in accordance with the policy described under 70.101.

When the operator does not take corrective action to reduce the concentration of dust before taking samples, and the sampling results show continuing noncompliance, the inspector shall not extend the time for abatement of the violation and shall issue the appropriate order.

70.204 Approved Sampling Device; Maintenance and Calibration

(d) "Immediately before each sampling shift" is interpreted to mean not more than 3 hours before the shift in which the sampling device will be used to collect a sample for the Part 70 requirements.

70.205 Approved Sampling Devices; Operations; Air Flowrate

(c) In determining when the proper flowrate has not been maintained and when the certified person is required to note this on the dust data card, the following criteria shall be used:

If the rotometer float (flowrate indicator) has dropped below 0.5 float diameters for the MSA Model G sampler, the certified person is required to note on the dust data card that the proper flowrate was not maintained.

70.207 Bimonthly Sampling; Mechanized Mining Units

(a) Although this provision does not set forth exactly when during the bimonthly period, the required sampling should be conducted, it is to the operator's advantage to conduct sampling during the first month of each bimonthly period because it would provide an opportunity to collect replacement samples if any sample is voided.

If the respirable dust standard is changed during a bimonthly period, dust samples required by this section will be processed in accordance with the policy described under 70.101.

(b) This section establishes when an operator is required to begin bimonthly sampling on an MMU after the dust standard has been changed because of the presence of excessive levels of quartz dust. It applies only to the bimonthly period immediately following notification by MSHA and not to the subsequent bimonthly periods.

(e) If the operator's mining procedures result in the changing of miners from one occupation to another during a production shift, the sampling device must remain on or at the designated occupation (DO). For example, if an operator alternates the duties of the continuous miner operator on a one-half shift basis between the continuous miner operator and helper, the dust sampler shall be worn for one-half of a shift by the continuous miner operator and the other one-half of a shift by the helper, while each is operating the continuous mining machine, or the sampler shall remain on the machine as required by this section.

A change in the designated occupation of an MMU will be considered after the results of samples collected by MSHA indicate that a work position other than those identified in this section should be designated for bimonthly sampling. When the results of a sampling inspection demonstrate appreciably higher respirable dust levels at a nondesignated occupation within an MMU, consideration should be given to changing the designated occupation.

(f)(1) The MMU identification number will remain the same when individual pieces of equipment within that unit are replaced. The only time the MMU identification number sequence at a mine will change is when an existing unit of equipment is permanently removed from the mine or a new (or different type) unit of equipment is placed in a mine. The only time a reduced respirable dust standard associated with an MMU will be eliminated/changed is

either 1) based on the MMU being permanently removed from the mine and no other MMU being placed in producing status to maintain the number of active MMUs or 2) based on the quartz results of MSHA samples indicating quartz levels that are 5% or less on the existing or replacement MMU.

For example, an operator has an auger-type continuous mining machine on MMU 003-0, which is on a reduced respirable dust standard of 1.5 mg/m^3. The operator decides to replace the auger-type mining machine with a ripper-type continuous mining machine. Since the operator is replacing the auger-type machine with a ripper-type machine, MSHA changes the MMU number. However, since the designated occupation and dust control parameters will be changed, the operator will be required to submit a revised dust control plan and the reduced standard on MMU 003-0 would remain at 1.5 mg/m^3 on the new MMU until the operator can show a substantial reduction in the quartz levels on the MMU. Another example would be an operator changing a ripper type continuous mining machine with a different ripper-type mining machine. If the dust control parameters associated with both machines are the same, MSHA will not change the MMU number and the operator will not be required to submit a revised plan. However, a written notification of this change should be submitted by the operator and filed with the appropriate plan.

70.208 Bimonthly Sampling; Designated Areas

(a) Bimonthly sampling begins after each designated area is identified in the coal mine operator's dust control plan (see 75.371(t)) approved by the district manager and established in the computer database. Operator bimonthly dust samples from an entity not established in the database will be rejected by the computer.

(b) See 70.207(b) for explanation of the phrase "shall begin on the first production shift..." as it applies to this section.

Additionally, as with designated sampling entities, whenever a nondesignated entity (NDE) on a reduced dust standard changes to a nonproducing status and then, at a later date, becomes producing again, the reduced standard still applies to that NDE.

(c) This provision requires the operator to collect additional samples within 15 calendar days of receipt of the MSHA request. Sampling must begin on the first day following receipt of notification on which there is a production shift. The operator, however, is not required to collect these samples on consecutive calendar days. If compliance with the 15 calendar day sampling requirement has not been demonstrated or cannot be determined, the

inspector would issue a citation for failure-to-sample under this section. However, if the operator is able to show evidence that the additional valid samples were collected within the required time period, the inspector should vacate the citation. An advisory notice on noncompliance for failure to submit additional samples will also be sent to the district and subdistrict offices when an operator collects the required 5 additional samples within 15 calendar days of receipt of the MSHA request, but one or more of the samples is voided. When this occurs, the operator will be notified through the computer system that the voided sample(s) must be replaced. The replacement samples must be taken by the operator as soon as reasonably possible after notification. If an operator fails to replace the voided sample(s) promptly, a citation for failure to take 5 valid samples would be issued. If a replacement sample is voided, MSHA personnel should issue a citation for failure to take 5 valid samples in accordance with Section 70.208(c).

The procedure described above, which allows an operator an opportunity to replace one or more voided samples from a set of 5 additional samples, is discretionary with the district manager and is to be used only once or twice a year at a mine.

Operators shall not be allowed additional time to replace voided bimonthly samples.

If the respirable dust standard is changed prior to the time an operator has been requested to submit five additional samples or while collecting such samples, these samples will be processed in accordance with the procedures described under 70.101.

(e) The intent of this provision is to have samples collected at strategic locations in the mine where miners normally work or travel to demonstrate that the respirable dust concentration complies with the applicable standard.

The following guidelines are to be applied by the District Manager for selecting and approving designated areas (DAs), which shall be shown in detail in the ventilation system and methane and dust control plan (see 75.371(t)):

1. Track Haulage:

    a. Sample where miners are exposed to dust generated by rotary dumps.

b. Sample on haulage locomotives where it has been established that quartz content of the locomotive operator's environment has exceeded 5 percent, or when prior sampling of the locomotive operator has indicated concentrations in excess of 1.0 mg/m^3. The DA should be the same route of travel and type of locomotive where sampling indicated the problem.

2. Belt Haulage:

a. Sample belt to rail transfer points.

b. Sample where the air in the belt entry is regulated into the return airway. This applies only to areas where the major volume of air is being regulated into the return airway. It does not apply where small amounts of air are being bled off to control the air velocity along the belt.

c. Sample along the belt lines so that each measurement represents up to, but not more than, four dust generation sources (transfer points).

d. Sample each side upwind (opposite the direction of airflow) of the location where different splits of air join into a common return airway. This requires two designated area sampling locations.

3. Trackless Haulage:

a. Sample dump points outby the working section where it has been established that respirable dust concentrations exceed 1.0 mg/m^3.

b. Sample on coal haulage or supply vehicles where it has been established that the quartz content of the vehicle operator's environment has exceeded 5 percent or where prior sampling of the vehicle operator has indicated concentrations in excess of 1.0 mg/m^3. The designated area should be the same route of travel and type of vehicle where sampling indicated the problem.

4. All Other Dust Generation Sources:
Shops, section dumping points and other areas where miners may be exposed to respirable dust concentrations greater than 1.0 mg/m^3 as indicated by MSHA or prior

operator samples, are to be handled on an individual basis. If dust concentrations are greater than 1.0 mg/m^3, MSHA should require mine operators to add these areas to the plan as designated area sampling locations.

5. Selection of Sampling Points Within DA:
The placement of the respirable dust sampling instrument within a designated area is critical to obtaining a representative measurement of respirable dust concentrations at the location. Dust sampling instruments should be positioned within designated areas so that the measurement is indicative of the highest dust exposure to personnel who are required to work or travel in that area. The position of all dust sampling instruments shall be described in the dust control plan as required by 75.371(t). Guidelines for selection of this position are:

   a. Generally, within 10 to 20 feet downwind (with direction of airflow) of the dust generating source.

   b. In belt entries, approximately 50 feet upwind (opposite direction of airflow) from the center of each intersection where air is directed into a return airway.

   c. At normal breathing level, but not less than 1 foot from the roof or rib.

   d. More than 2 feet from any obstruction and placed in a manner where it will not be directly behind an obstruction which would affect the airflow around a sampling device.

   e. Within 36 inches of the operator's control station or normal work position, such as locomotive operators, trackless haulage equipment operators, etc.

6. Adding Designated Area Sampling Locations:
The district manager may require or accept designated area sampling locations based on:

   a. These guidelines.

b. Personnel working at or near a dust-generating source.

c. Respirable dust sample(s) collected in the proposed area during the last year which has exceeded 1.0 mg/m^3 or a reduced standard of 1.0 mg/m^3 or less.

d. The coal mine operator submitting additional designated area sampling locations for approval at any time.

7. Removing Designated Areas From Sampling Status: If each of the valid respirable dust samples collected from a DA by the operator during a 1-year period indicates a respirable dust concentration at or below 1.0 mg/m^3 when on a 2.0 mg/m^3 standard or at or below the applicable standard when on a reduced standard of 1.0 mg/m^3 or less, the district manager may remove the DA from sampling status provided:

a. At least one valid sample has been collected from the same DA within the same 1-year period by MSHA, and

b. Each respirable dust sample taken by MSHA indicates a respirable dust concentration at or below 1.0 mg/m^3 when on a 2.0 mg/m^3 standard or at or below the applicable standard when on a 1.0 mg/m^3 standard or less, and

c. A minimum of five valid respirable dust samples have been taken in the same DA. These five valid samples consist of a combination of MSHA and operator samples.

This only allows the operator to stop sampling the DA. Since the previous samples only indicated that the dust control measures were adequate, dust control parameters stipulated in the approved dust control plan shall not be changed unless the changes have been evaluated based on MSHA samples.

Between the 6-month reviews of dust control plans, it is not unusual for the physical layout of a mine to change, thus requiring some DAs to be placed in a nonproducing or abandoned status. When the physical layout of a mine changes, new DAs for that mine are not established until the next 6-month review

period. However, when status changes occur between 6-month reviews, (i.e., from nonproducing to producing) normal bimonthly sampling will commence during the bimonthly cycle in which the status change occurs.

In addition to uniquely identifying the DA to be sampled, the four-digit identification number or entity number identifies the type of DA. The following is a list of the DA types with corresponding codes assigned by MSHA which are required to be entered on the respirable dust data card accompanying each sample:

Numeric Designation	DA Type Description
100-0 through 199-9	Track haulage
200-0 through 299-9	Belt area
300-0 through 399-9	Trackless haulage
400-0 through 499-9	Shops
500-0 through 599-9	Section dumping points
600-0 through 699-9	Rotary dumps and crushers
700-0 through 799-9	Miscellaneous
800-0 through 899-9	Intake Airways
900-0 through 999-9	Roof Bolters

70.209 Respirable Dust Samples; Transmission by Operator

(b) Any time a citation is issued in accordance with this provision, all pertinent information shall be submitted to the Senior Special Investigator in the district. Based on the facts, this investigator will determine if further investigation and enforcement actions are warranted.

(c) When filling out each dust data card, it is important that the correct sample type be entered in the box provided. The environment sampled should be numbered as follows:

U.G. Designated Occupation 1
U.G. Nondesignated Occupation.....2
U.G. Designated Area.....3
Surface Designated Work Position.....4
Part 90 5
U.G. Nonface Occupations.....6
U.G. Intake Air 7
Surface Nondesignated Work Position 8

Code numbers 1 through 5 will be used by coal operators and MSHA inspectors, while numbers 6 through 8 will be used exclusively by MSHA inspectors only. Code number 2 is to be used by MSHA inspectors when an underground nondesignated occupation is sampled. The only time an operator would use code 2 would be

after an excessive dust citation has been issued on a nondesignated occupation and, as a result, the operator is sampling the environment to get back in compliance.

The four blocks in item 10 of the dust data card are for the number assigned by MSHA to identify the Mechanized Mining Unit (MMU), Designated Area (DA), Designated Work Position (DWP) or Part 90 miner. Part 90 miners working underground should be coded 850-0 if not working on an MMU. If the Part 90 miner is working on an MMU, the MMU identification number shall be used.

Part 90 miners working on the surface shall be coded 950-0. The entity being sampled must be properly identified before sampling can be credited.

(d) Although cassettes may not be of the approved type, the sampling unit must be approved as intrinsically safe if used inby the last open crosscut or in return air.

70.210 Respirable Dust Samples; Report to Operator

(b) This posting requirement applies to the monthly report of samples and does not include the data mailers that are received by the operator on a daily basis. However, Part 90 sampling data is not to be posted.

70.220 Status Change Reports

(a) This section shall be cited when it is determined that the operator has failed to collect samples for Part 70 and did not notify the District Manager, in writing, within 3 days after a status change affecting sampling occurred. A status change submitted within 3 working days after the end of a bimonthly period or more than 3 working days after the status change occurred does not meet this section's requirement.

Subpart D Respiratory Equipment

70.305 Respiratory Equipment; Gas, Dusts, Fumes, or Mists

As used in Section 204 of the Act, the term "short periods" is interpreted to be the time required to drill three or four holes for trolley hangers, to drill holes to take down a piece of loose roof, to drill shot holes in a roof fall, to make small spray applications of paint or sealing compound, etc.

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PART 71 MANDATORY HEALTH STANDARDS - SURFACE COAL MINES AND SURFACE WORK AREAS OF UNDERGROUND COAL MINES

Subpart A General

71.1 Scope

In shaft and slope sinking operations, Part 71 is applicable until the coalbed is reached and actual mining begins in the coalbed. Furthermore, the contractor who develops the shaft will be permitted to "bell out" or enlarge the bottom of the shaft before the applicable regulations, set forth in Part 70, become applicable.

Subpart B Dust Standard

71.100 Respirable Dust Standard

This provision applies to respirable dust as defined by 30 CFR 71.2(k) and collected in accordance with the requirements of 30 CFR part 71.

Exposures to airborne contaminants as specified in 30 CFR 71.700 will be monitored through sampling specified by 30 CFR 71.701.

71.101 Respirable Dust Standard When Quartz is Present

For specific policy applicable to this Section, refer to Section 70.101.

Subpart C Sampling Procedures

71.201 Sampling; General Requirements

For specific policy applicable to paragraphs (b), (c) and (d) of this Section, refer to Section 70.201 (b), (c) and (d).

The purpose of the waiver provision addressed by paragraph (e) of this Section is to enable an operator to anticipate wet weather seasons that may affect bimonthly sampling requirements. Therefore, it would not be proper to grant a waiver to an operator who experienced several days of wet weather within a bimonthly period. In this instance, the operator could have collected his bimonthly samples prior to the wet weather or after the wet weather occurred. Because of this, operators should be encouraged to collect samples as early as possible in a bimonthly period.

However, this does not preclude an operator from making a verbal request and being given a verbal response if both actions are followed up in writing. In cases where a verbal request is made and a waiver is granted based on this request, detailed notes are to be kept and filed with the written request once it is received.

In cases where rain does occur, it may still be a "normal work shift" as long as the rainfall during the shift does not suppress respirable dust to the extent that the sampling results will be measurably lower than if it had not rained. This judgment is made by a person certified in accordance with 71.202 (Certified person; sampling). When rainfall has not measurably affected the sampling results, a notation on the dust data card is not required.

In cases where rainfall occurs to the extent that it suppresses respirable dust, the certified person is required to make this notation on the dust data card unless the operator has a waiver of the rainfall provision. If the operator has a waiver of the rainfall provision, he shall submit the sample without placing this notation on the card.

In most instances, the respirable dust affecting employees working in surface facilities or structures is not affected by rainfall. Therefore, the waiver of the normal work shift provisions is not applicable to these occupations. In contrast, if the respirable dust affecting employees working on enclosed surface mobile equipment is affected by rainfall, the waiver provision of a normal work shift is applicable.

71.204 Approved Sampling Devices; Maintenance and Calibration

(d) For specific policy applicable to this Section, refer to 70.204(d).

71.205 Approved Sampling Devices; Operations; Air Flowrate

(c) For specific policy applicable to this Section, refer to 70.205(c).

71.208 Bimonthly Sampling; Designated Work Positions

(b) This Section establishes when an operator is required to begin bimonthly sampling of designated work positions after the dust standard has been changed because of the presence of excessive levels of quartz dust. It applies only to the bimonthly period immediately following notification by MSHA and not to any subsequent bimonthly periods.

As with designated work positions, whenever a nondesignated work position on a reduced dust standard changes to a nonproducing status and then, at a later date, becomes producing again, the reduced standard still applies to that entity.

(c) For specific policy applicable to this Section, refer to 70.208(c). Substitute "normal work shift" for "production shift" when applying the interpretation of 70.208(c) to this Section.

(e) At the completion of each MSHA sampling inspection at a surface mine or surface work area of an underground mine, the sampling results are to be reviewed. If the results of samples from work positions meet the criteria for designating them for sampling, they are to be added to the computer's data base as designated work positions in "A" status (producing). A designated work position must be first established on the data base before operator sampling can be credited.

(f) The following criteria are to be used by District Managers when withdrawing the designation of a work position from sampling:

1. DWP's with a standard between 1.0 and 2.0 mg/m^3 of air:

   a. Each of the valid respirable dust samples collected from the DWP by the operator during a 1-year period indicates a respirable dust concentration at or below 1.0 mg/m^3 of air;

b. At least one valid sample has been collected from the same DWP within the same 1-year period by MSHA, and,

c. Each respirable dust sample taken by MSHA indicates a respirable dust concentration at or below 1.0 mg/m^3 of air.

2. DWP's with a standard less than 1.0 mg/m^3 of air:

a. Each of the valid respirable dust samples collected from the DWP by the operator during a 1-year period indicates a respirable dust concentration at or below the applicable standard;

b. At least one valid sample has been collected from the same DWP within the same 1-year period by MSHA; and,

c. Each respirable dust sample taken by MSHA indicates a respirable dust concentration at or below the applicable standard.

71.209 Respirable Dust Sample; Transmission by Operator

For specific policy applicable to paragraphs (b) and (c) of this Section, refer to 70.209(b) and (c).

In addition, when completing Item 10 of the dust data card, DWP's at surface mines and facilities should be coded 001-0 through 099-9, and 900-0 through 999-9 if located at surface areas of underground mines.

71.210 Respirable Dust Sample; Report to Operator; Posting

(b) For specific policy applicable to this Section refer to 70.210(b).

71.220 Status Change Reports

(a) For specific policy applicable to this Section refer to 70.220(a).

Subpart D Respirable Dust Control Plans

71.301 Respirable Dust Control Plan; Filing Requirements

(a) These provisions provide guidance to District Managers when considering whether the plan should be approved. They prohibit approval of any dust control plan with which the operator's compliance cannot be objectively ascertained by MSHA (example: roadways will be wetted when the need arises). Each dust control measure shall be stated specifically, so that if not implemented, the inspector can take appropriate enforcement action.

(d) This provision is applicable as long as the approved plan is in effect at such mine.

(e) Full-shift respirable dust samples are to be collected by MSHA showing compliance with the applicable dust standard before dust control plan revisions are approved by the district manager.

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PART 75 MANDATORY SAFETY STANDARDS - UNDERGROUND COAL MINES

Subpart C Roof Support

75.209 Automated Temporary Roof Supports (ATRS) Systems

The purpose of the ATRS standard is to minimize hazards associated with miners working beyond permanently supported roof during the installation of roof supports. When this purpose is served, ATRS systems are required to be used. The use of an ATRS system is not necessary in the following three situations as miners are working in supported areas and are not exposed to unsupported roof:

1. installing roof bolts in an unsupported area with a remote-control roof bolting machine, where the operator does not proceed beyond the last row of permanent support;

2. placing truss supports in areas where permanent support is already in place, and where no adverse roof condition exists; and

3. on a longwall face when the face is within 5 feet of the longwall supports.

75.221 Roof Control Plan Information

Fatal roof fall accidents have occurred during pillar recovery operations. Investigation of a few of these accidents revealed that miners were occupying work locations inby the mining machine while coal was being mined or loaded. This practice should be discouraged, recognizing that recently mined coal pillars reduce the amount of support in these areas.

Work procedures and location of miners while coal is being mined or loaded should be incorporated into the roof control plan as part of the description of the mining system utilized during pillar recovery.

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Subpart D Ventilation

75.301 Definitions

30 CFR 75.301 defines return air as:
Air that has ventilated the last working place on any split of any working section or any worked-out area, whether pillared or nonpillared. If air mixes with air that has ventilated the last working place on any split of any working section or any worked-out area, whether pillared or nonpillared, it is considered return air. For the purposes of existing Section 75.507-1, air that has been used to ventilate any working place in a coal producing section or pillared area, or air that has been used to ventilate any working face if such air is directed away from the immediate return, is return air.

Title 30 CFR 75.507-1(a) states that "All electric equipment, other than power-connection points, used in return air outby the last open crosscut in any coal mine shall be permissible except as provided in paragraphs (b) and (c) of this section."

For multiple entry setups with intake entries on one side, return entries on the other side, and conveyor belt and other common entries in the center, problems have arisen in determining whether or not return air is being coursed in the outby direction over non-permissible electric equipment in the conveyor belt entry. An acceptable method for making this determination is to measure air quantities at a location three crosscuts outby the working face in both the intake and return air courses. Taking into consideration standard anemometer error, if a comparison of these readings indicates a significant variance, a violation of §75.507 may exist.

Sulfur hexaflouride (SF_6), tracer gas, should not be used as the primary means for determining compliance with this standard. If after analyzing appropriate intake and return air measurements, tracing clouds of chemical smoke, and examining the section ventilation system, a determination is made that there is a violation of 75.507-1, tracer gas may be used to substantiate the violation.

75.302 Main Mine Fans

Main mine fans shall be installed and operated as soon as possible after the first crosscut is made at drift mines and as soon as connections have been made between shaft and/or slope openings at shaft or slope mines.

75.310 Installation of Main Mine Fans

The purpose of paragraph (b)(1) is to ensure that the mine fan is provided with a dependable power supply that will not be affected by short circuits, ground faults, or overloads occurring in mine power circuits. Transformers or other power sources supplying mine fan circuits may also supply power to other circuits, provided that such circuits are protected in a manner ensuring that any malfunction in the other circuits will cause automatic deenergization of the affected circuit and will not affect the mine fan circuit.

75.323 Actions for Excessive Methane

Section 75.323 specifies actions to be performed for excessive methane. Neither the Act nor the regulations provide that a mere presence of methane gas in excess of 1.0 percent is per se a violation. A violation would exist if a mine operator, upon becoming aware of the presence of excessive methane fails to perform the actions specified in Section 75.323.

75.325 Air Quantity

(a)(3)The name plate quantity of the machine mounted dust collector or diffuser fan is acceptable to meet the requirements of 30 CFR 75.325(a)(3) and 75.371(j). If the operator submits the nameplate quantity in the approved ventilation plan as the operating volume, this is the minimum quantity that must be maintained at all times. If this quantity is not maintained, if the measured operating capacity reveals that the name plate quantity is not indicative of actual conditions, or if respirable dust samples indicate that this quantity is not sufficient, appropriate enforcement action shall be taken and plan revisions shall be necessary.

Paragraph (f) requires that the minimum ventilating air quantity for an individual unit of diesel-powered equipment must be provided. This requirement includes entries under paragraph (f)(3) where diesel-powered equipment is being operated outby the loading point in areas of the mine developed on or after April 25, 1997. Such entries include crosscuts, dead-end spurs and any other area where such equipment is positioned to allow passage of other equipment or personnel, or entering an area to place or retrieve supplies.

The minimum ventilating air quantity for a unit of diesel-powered equipment is established based on the quantity of air specified on the unit’s approval plate. The approval plate quantity is based on testing of the diesel exhaust gas concentrations of carbon monoxide (CO) and Oxides of Nitrogen measured as nitrogen

dioxide (NO_2). The approval plate quantity is the quantity of air that is required to dilute the concentration of CO and NO_2 at the tailpipe to the Threshold-Limit-Values (TLVs) specified in 75.322. The TLVs are established to protect persons from adverse health effects from exposure to the specified contaminates. The TLV for CO is 50 parts per million (ppm) and the TLV for NO_2 is 5 ppm and is noted as a "ceiling limit" which cannot be exceeded for any amount of time. Since the nameplate air quantity is the quantity of air necessary to dilute the engine exhaust to the TLV limit, it is imperative that this minimum air quantity be provided where the unit of diesel equipment is operating so as to ensure miners are not exposed to hazardous concentrations of CO and NO_2. It should be noted that the testing of the diesel engine to determine the nameplate air quantity is performed on a new engine set to the manufacturer's specifications which represents the best operation of the engine.

75.327 Air Courses and Trolley Haulage Systems

The air in the trolley haulage entry, when separated from the belt haulage entry, may be used to ventilate the active working places.

Should conditions develop that necessitate an increased velocity in trolley haulageways in excess of 250 feet per minute, the mine operator should apply to the district manager for an exception through the ventilation plan, Section 75.371(v), giving in detail the reason for the request.

75.330 Face Ventilation Control Devices

The "area of deepest penetration" referred to in Section 75.330(b)(2), in conventional mining sections, is considered to be the solid surface of the coalbed at the advancing end of the working place, in both uncut and undercut faces prior to blasting. After blasting, the "area of deepest penetration" is the toe of the coal fall before loading starts, and advances with the toe as the fall is loaded.

75.340 Underground Electrical Installations

Underground electrical installations shall be considered to be in a noncombustible structure if the enclosure provides protection against flame spread for at least 1 hour when subjected to a fire test incorporating an ASTM E119-88 time/temperature heat input or equivalent.

The following types of installations, if acceptable prior to November 16, 1992, will be accepted as meeting the requirements for a noncombustible structure required by 75.340:

1. Installations that are manufactured as packaged units fully enclosed in a metal housing such as:

   a. power centers;

   b. rectifiers and transformer stations that use dry-type transformers; or

   c. transformers filled with nonflammable fluid or inert gas.

2. Battery charging stations that:

   a. are enclosed in substantial metal housings;

   b. are used to charge batteries that are also enclosed in substantial metal housings; and

   c. remain on the machine during charging.

All electrical components that are nonpermissible or not intrinsically safe, at stoppings or regulators that separate intake and return air courses, must be located on the intake side of the stoppings or regulators.

75.341 Direct-Fired Intake Air Heaters

A carbon monoxide sensor placed at the bottom of the shaft, slope, or in the drift opening which provides continuous monitoring of the affected area and causes the heater to shut down when the carbon monoxide (CO) level reaches 50 parts per million will verify that CO is not entering the mine and that the heater is operating properly. The sensor will satisfy the examination requirements of this section.

75.342 Methane Monitors

On cutting machines, continuous-mining machines, and loading machines (including scoops and diesel-powered machines used to load coal from inby the last open crosscut but not including clean-up scoops), the methane monitor power-shutoff relay shall be connected into the machine's controls circuitry so that all electric motors on the machine (including auxiliary fan motors), all electric lights on the machine (except headlights that are evaluated by MSHA under Part 18 and are installed on diesel-powered machines), and all power take-off receptacles on the machine (except intrinsically safe receptacles) are automatically deenergized when the methane concentration reaches a maximum of 2.0 percent or the monitor is not operating properly. The methane monitor may remain energized.

When a methane monitor is required on a diesel-powered machine, the methane monitor shall also shut off the diesel engine when the methane concentration reaches a maximum of 2.0 percent or the monitor is not operating properly. The methane monitor power shutoff relay shall be connected into the control circuitry of an electrically-operated machine so that it is not possible to defeat the methane monitor by holding or blocking the machine's reset switch in the start position.

When a machine is operated by remote control, a warning device shall be installed in the remote control unit or on the machine in such a location that the warning device can be readily seen or heard by either the machine operator or by the machine operator helper at all locations from which the machine is operated. This does not, however, permit the machine operator to be positioned under unsupported roof or where he or she could be endangered by a sudden movement of the machine.

The sensing device for methane monitors required at the return air end of the longwall face shall be installed in the air current ventilating the longwall face near the return end of the longwall face where it will not be affected by a secondary intake if one is used. The methane monitor power shutoff relay shall be connected so that all electric motors, lighting circuits, and power take-off receptacles associated with the longwall mining installation are automatically deenergized when the methane concentration reaches a maximum of 2.0 percent or the monitor is not operating properly. The methane monitor and approved permissible telephones, however, may remain energized.

Methane monitor deficiencies should be cited under this section or Section 75.503, as applicable. Checks for operating accuracy shall be conducted with the sensor head filter or screen in place. Hand-held methane detectors shall not be used to check the operating accuracy of methane monitors. Enforcement personnel should test methane monitors with a known methane air test mixture when it is suspected that the monitor is defective or improperly calibrated.

Methane monitor readings shall not be used to meet the requirements for methane examinations. Such examinations are required to be made with approved methane detectors or atmospheric monitoring systems if used as specified in Section 75.351. Enforcement personnel shall not use methane monitor readings as a basis for issuing citations or orders.

75.350 Air Courses and Belt Haulage Entries

A district manager may not grant exceptions to these provisions to operators of mines opened after March 30, 1970. The operator should be advised that such requests should be submitted under the provisions of Section 101(c) of the Act (petition for modification of a mandatory safety standard).

Exceptions to this provision may be granted by the district manager in mines opened on or before March 30, 1970, and extensions of belt haulage entries in mines opened on or before March 30, 1970, only when an investigation determines that the conditions in the entries, other than the belt haulage entries, are necessary to provide adequate ventilation to the working places.

75.360 Preshift Examination

Roadways and track haulageways must be examined 3 hours immediately preceding each shift. This examination must include tests for methane in all high cavities where methane could accumulate. While traveling haulage roads, travelways, or belt conveyors, if high cavities in the roof are observed, the inspector should look for some method that has been provided for the preshift examiner to make such tests. Examples are ladders, tubes, methane detectors with probes, etc. Lack of some method to safely make such tests would be a good indication that tests were not being made or not properly being made. This could require issuing appropriate citations or orders.

75.371 Mine Ventilation Plan; Contents

Questions have been raised concerning whether the angles at which water sprays are directed must be included in the mine ventilation plan. As stated in the preamble to the final rule, this information is necessary for plan approval. It is not intended that enforcement personnel use engineering instruments to measure precise angles during inspection activities. Rather, the general spray direction and orientation and other parameters such as number of sprays, orifice size, and operating pressure would be determined by comparison with the requirements of the approved ventilation plan.

75.380 Escapeways; Bituminous and Lignite Mines

"The most direct, safe and practical route," as used in paragraph (d)(5) will be determined on a mine-by-mine basis. If the inspector believes that a particular escapeway is not the most direct, safe, and practical route, he or she must specifically inform the operator that another route is more direct, safe, and practical. This should be done by the inspector at the time of issuing a citation by orally notifying the operator of the preferred escapeway route and by noting in both the citation and inspector's notes, the escapeway

route which the inspector believes to be more direct, safe, and practical.

Serious consideration should be given to the inherent hazards related to rehabilitation of fallen areas. In addition to the hazards of exposure related to such rehabilitation, other factors affecting whether the operator has set out the most direct, safe and practical route include roof conditions, traveling height, fan location, physical dimensions of a mine opening, and similar factors.

For example, if bad roof conditions are present along the shortest direct route and those roof conditions are beyond reasonable control, then an alternate safest route, as designated by the mine operator, may be acceptable. The presence of roof falls does not necessarily indicate that the passageway would not be suitable for evacuation.

Where coal seam thickness varies to the extreme, the shortest route may be through lower coal, making travel relatively slow and difficult, whereas an alternate route through a high passageway may permit faster and easier travel. Such an alternate route, although longer, may be acceptable. Similarly, an old mine shaft may not be safe for travel because of badly deteriorated shaft lining, timbers, etc., even though it is still suitable for mine ventilation purposes.

Standard development projections will not have to be altered to drive additional rooms, entries, or crosscuts for the sole purpose of providing a passageway to the nearest mine opening. However, the construction of ventilation controls such as stoppings, overcasts, and undercasts, or installation of an escape facility, may be required to provide the most safe, direct, and practical escapeway.

75.385 Opening New Mines

The total number of 20 miners allowed in any mine at any one time shall be interpreted to mean that no more than 20 miners (including supervisory personnel) may be permitted to work in any individual shaft, slope, or drift opening until a connection is made. In determining the total number of persons in the mine before a connection is made, the number shall not include State or Federal inspectors, representatives of the miners, or equipment manufacturing representatives.

Only the work necessary to make connections between the mine

openings shall be permitted, and any development or other extraction of coal shall be prohibited until the connections are completed.

75.386 Final Mining of Pillars

The instructions outlined in Section 75.385 apply to this provision except that the limitation of 500 feet between the mine opening and working face shall be measured from the bottom of a shaft or slope or from the portal of drift mines to the working face.

Subpart E Combustible Materials and Rock Dusting

75.400 Accumulation of Combustible Materials

Experience and tests have shown that accumulations of coal dust can contribute greatly to the propagation and severity of mine explosions. Such accumulations are also potential fire hazards since they are more readily ignitable and, once ignited, are more difficult to control and extinguish. The intent of this Section is to prevent the accumulations of the specified combustible materials in order to reduce the dangers of mine fires and explosions.

Coal dust means particles of coal that pass a No. 20 sieve. It is this fraction of the coal that participates in the dust explosion reaction. Loose coal means coal fragments larger in size than those passing a No. 20 sieve.

Tests have shown that intermittent piles of coal dust are more hazardous than smooth layers because the irregular piles are eroded more readily by the air movement generated during an explosion. As little as two 300-pound piles, under experimental conditions, caused an explosion to propagate when the entry otherwise was adequately rock-dusted to 65 percent incombustible content.

Coal dust or coal and loose coal accumulations present a fire as well as an explosion hazard. The broken coal has considerably more surface area per unit mass than solid coal. For example, should an electric cable fail and cause an arc, the probability of igniting accumulations is greater than igniting solid coal. Also, when broken coal is ignited, fire propagates faster than in solid coal. As another example, if hydraulic oil is spilled into broken coal, the broken coal would ignite more easily and propagate flame faster than a similar spill on the smooth floor or against the coal rib.

Accumulations of coal dust, loose coal, or the combination of the two offer serious fire and explosion hazards and must be removed from the mine if, in the judgment of the inspector, they would lead to an intensification or spreading of a fire or an explosion. In evaluating whether the coal dust and loose coal would lead to an intensification or spreading of a fire or an explosion, the inspector should consider all the facts concerning the deposit. For example, float coal dust, loose coal and/or coal dust deposited near working faces and in active haulage entries, where sources of ignition are likely to be, are more hazardous than similar deposits in back entries. However, the remoteness of back entries is not necessarily a safeguard.

Stoppings that normally isolate back entries may be destroyed by the force of an explosion, and accumulations of float coal dust, loose coal or coal dust in the back entries would add fuel to the flame.

In citing a violation, the inspector should describe fully the conditions and practices, such as the location, dimensions, etc. Imminent danger conditions normally can be considered to exist when accumulations of coal dust, float coal dust, loose coal, and other combustible materials are exposed to probable explosion and fire ignition sources, and the conditions observed could reasonably be expected to cause death or serious physical harm to a miner if normal mining operations were permitted to proceed in the area before the dangerous conditions are eliminated. There may be times when the inspector's interpretation of what is an accumulation of float coal dust, loose coal and coal dust and/or other combustible materials will differ with the opinion of others. However, the inspector should base his decision upon the facts surrounding each occurrence, and document such facts as the dimensions, type, specific location, and all other related factors. The inspector's decision as to what is an accumulation must be an objective one based on the facts or circumstances surrounding each occurrence.

Experience has demonstrated that the loading of loose coal caused by sloughing ribs creates a hazardous condition in that the pillar size can be substantially reduced and the width of the entry or room dangerously increased; therefore, such loose coal shall not be considered accumulations of combustible material if such material is rendered inert by heavy applications of rock dust. However, such loose coal shall not be permitted to accumulate in the roadways or outby timberlines.

75.400-2 Cleanup Program

The program referred to by this Section shall be outlined in written form and shall be available to the Secretary or his authorized representative. Consideration shall be given as to whether the program is effective, systematic, and is adequate under normal circumstances to control dangers from float dust, dust and loose coal along beltways, and dust and loose coal in the area between the face and loading point. Observance of quantities of inadequately inerted loose coal or coal dust throughout various areas of the mine during a single inspection, or from shift to shift, or from day to day, should be taken into consideration and is a strong indication that a systematic and effective cleanup program is not in operation. This section is not to be cited. However, if excessive accumulations of combustible material are found, a citation under Section 75.400

should be issued.

75.402 Rock Dusting

If worked-out areas which are not rock-dusted are near active working areas and the rock-dusting can be done safely, they shall be rock-dusted in accordance with this Section. It would be unwise for an inspector to require rock-dusting of worked-out areas if miners would be exposed to potentially serious hazards such as bad roof, poor ventilation, etc. Nevertheless, where high-pressure rock-dusting machines are available, inspectors shall require that these machines be used at the outby edges of abandoned areas to rock-dust as much of the area that can be done safely.

75.403 Maintenance of Incombustible Content of Rock Dust

Provided the percentages of incombustible content specified in this Section are maintained, rock dust may be applied wet. Wet rock dust shall be limited to rib and roof surfaces in the face areas and shall not be used for redusting mine surfaces. In such applications, only limestone or marble dust which meets the specification contained in Section 75.2(d) shall be used. The application shall be at the rate of not less than 3 ounces of dust per square foot of surface, and shall be by a mixture of not more than 6 to 8 gallons of water with 100 pounds of dust, whether by premixed slurry or by mixing at the nozzle of a hose to assure that the mixture is not too fluid and that sufficient dust adheres to the surfaces. After the wet rock dust dries, additional dry rock dust shall be applied to all surfaces to meet applicable standards. Wet rock-dusting of ribs and roof does not eliminate the necessity for dry rock-dusting the floor.

Subpart F Electrical Equipment - General

75.503 Permissible Electric Face Equipment; Maintenance

Splices shall not be made in external wiring of permissible equipment except in connection boxes as originally approved. However, splices may be made in cables of intrinsically-safe circuits, provided the splices are made in splice boxes (not necessarily explosion-proof) or the cables are joined together by proper connecting plugs. Longwall motor and shearer cable policy is located in Volume II under 18.20. Pump motor cables' policy is located in Volume II under 18.20.

Flame-resistant cable repair sleeves are acceptable for repair of conduit hose under the following conditions:

1. Minimum wall thickness of conduit and sleeve must be 1/4 inch. If a section of damaged conduit is missing, this wall thickness may be achieved by placing a section of conduit under the sleeve before shrinking.

2. If a sleeve is used to join two pieces of conduit, the conduit ends must be cut at an angle between 30 degrees and 45 degrees from the center line of the hose and butted together tightly.

All circuit breakers and other overload-protection devices shall be maintained in proper working condition. (Opening the circuit breaker on board the machine should deenergize the complete machine, except the methane monitor.)

An approval plate should be attached to the machine; however, a missing approval plate does not constitute a violation.

Where it is determined that a unit of equipment was shipped after January 1, 1981, and the load-locking valves are not maintained, enforcement action should be taken under this Section, for failure to maintain the electric face equipment in permissible condition. Load-locking valves provided on equipment shipped from the manufacturer prior to January 1, 1981, shall also be maintained. Appropriate enforcement action under Section 75.1725(a) should be taken if these load-locking valves are not being maintained.

75.507 Power Connection Points

This Section does not prohibit the installation of high-voltage cables, control cables or telephone cables in return air. Furthermore, splices may be made in such cables if they are made in accordance with the applicable requirements of Sections 75.514, 75.603, 75.604, 75.804, and 75.810. However, unless high-voltage couplers are certified as explosion-proof, this Section prohibits their use in return air.

75.507-1 Electric Equipment Other Than Power-Connection Points; Outby the Last Open Crosscut; Return Air; Permissibility Requirement

"Return air," for the purpose of this Section, means air that has been used to ventilate any working face in a coal-producing section or pillared area, or air that has been used to ventilate any working face if such air is directed away from the immediate return. "Permissible," as used in this Section, means equipment to which an approval plate, label, or other device is attached as authorized by the Secretary and which meets requirements prescribed by the Secretary for the construction and maintenance of such equipment and are designed to assure that such equipment will not cause a mine explosion or a mine fire. Consequently, this Section prohibits the use, in return air, of any unit of equipment or any device which has not been approved as permissible or certified as explosion-proof by MSHA. This Section also prohibits the use in return air of approved or certified equipment which is not maintained in permissible condition. Furthermore, this Section prohibits nonpermissible-type electric equipment on the return air side of a permanent stopping, even if it is placed directly against the stopping with a block removed.

An approved or certified component which is maintained in permissible condition may be installed in return air if all nonpermissible components are installed in intake air. For instance, a certified explosion-proof motor that was formerly used on a permissible machine may be installed in return air if the motor is installed and maintained in permissible condition and all nonpermissible components, such as open switches and controllers, are installed in intake air.

Section 75.1105, provides that air currents used to ventilate structures or areas enclosing electrical installations, including battery charging station, "...shall be coursed directly into the return." To comply with 75.1105, all components of battery-charging stations at stoppings or regulators that separate intake and return air courses must be located on the intake side of the

stoppings or regulators. In addition, the intake split of air ventilating battery-charging stations must be coursed over the equipment and directly into the return.

Sections 75.507 and 75.507-1(a) also address the location of electric equipment in intake and return air. Section 75.507 provides that "except where permissible power-connection points are used, all power-connection points outby the last open crosscut shall be in intake air." Section 75.507-1 further provides that "all electric equipment, other than power-connection points, used in return air outby the last open crosscut...shall be permissible...." Electric equipment, such as a battery charger, which is not permissible must be used in intake air.

75.508 Map of Electrical System

Stationary electric equipment in connection with the mine electrical system shall be shown on the mine map by the use of symbols, print, or well-defined overlays, and shall be kept at the mine in a location that is accessible to the miners in the mine.

Equipment being used on the working section is not considered stationary equipment and need not be shown on the map; however, the circuit supplying power to the section should be identified.

75.508-2 Changes in Electrical System Map; Recording

"Completion of such changes" means when the equipment is energized and returned to service.

75.509 Electric Power Circuit and Electric Equipment; Deenergization

A violation of this Section shall be cited only when electrical work is being performed on an energized machine. A violation of Section 75.1725(c) shall be cited if mechanical work or lubrication work is being performed on an energized machine.

For the purpose of this Section, troubleshooting or testing includes the work of locating electrical, hydraulic, or mechanical problems on a machine and the work of verifying that proper repairs have been performed. Troubleshooting or testing does not include the repair of the electrical, hydraulic, or mechanical problems. When troubleshooting and/or testing an energized machine, extreme caution must be taken to prevent inadvertent contact with energized parts in close proximity and assurance that equipment will not be accidentally started.

Examples of tests which may be performed with equipment energized are:

1. Voltage and current measurements;

2. Pressure and volume measurements on hydraulic systems; and

3. Mechanical clutch setting.

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 indicate, this type of work presents a significant risk of hand injury. Therefore, gloves, in accordance with Sections 75.1720(c) and 77.1710(c), are 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- or medium-voltage circuits or equipment. This Section does not prohibit installation of temporary guarding on an energized trolley wire provided:

1. It is not necessary to remove the trolley wire from the clips or hangers to install the temporary trolley guarding;

2. It is not necessary to wrap the guarding material around trolley wire;

3. The temporary trolley wire guard is specifically designed for the purpose so that it can be easily and safely installed without exposing the miner to a shock hazard; and

4. The miner who installs the temporary wire guard has received training in the hazards of energized trolley wires and in the safe method for installing the temporary trolley wire guards used at the mine. All miners who perform tasks in proximity to energized trolley wires (e.g., motormen, brakemen, supply crewmen, trackmen, wiremen, and miners who rock dust and roof bolt in the track entry) should receive this training as part of the training they receive under the applicable provisions of Part 48.

When permanent guarding is to be installed on a trolley or trolley feeder wire by wrapping guarding material around the conductor or when it is necessary to remove the trolley or trolley feeder wire from the hangers or clips for installation of the guarding material, the circuit shall be deenergized before such work is performed.

75.510 Energized Trolley Wires; Repair

This Section contains exceptions to Section 75.509 and Section 75.511. These exceptions permit a miner who is properly trained (see Section 75.510-1) and who wears approved and tested insulated shoes and wireman's gloves to repair energized trolley wires, even though the miner is not a qualified electrician within the meaning of Section 75.153.

For the purpose of this Section, the term "trolley wires" would also include trolley feeder wires and cutout switches used in trolley circuits. For the purpose of this Section, the word "repair" includes work such as straightening kinks in trolley wires and replacing trolley wires and trolley feeder wires in the clips or hangers, but does not include work such as installing or removing trolley wires, trolley feeder wires or trolley cutout switches.

Wiremen's gloves used to satisfy the requirements of this Section shall have a manufacturer's rating of at least 750 volts. Rubber boots satisfy the requirements of this Section, provided they are maintained free from cuts, holes and excessively worn places. Leather footwear rated for electrical hazards should not be used to satisfy the requirements of this Section because leather shoes can become highly conductive in the normally damp or wet environment of underground coal mines. Insulated footwear and wireman's gloves shall be closely inspected for damage and defects before each period of use. Damaged or defective gloves and footwear shall be replaced before repairs are performed on energized trolley wires.

75.510-1 Repair of Energized Trolley Wires; Training

The training required by this Section shall be provided in accordance with the applicable provisions of Part 48.

75.511 Low-, Medium-, or High-Voltage Distribution Circuits and Equipment; Repair

For the purpose of this Section, electrical work is considered to be the work required to install or maintain electric equipment or conductors. Listed below are examples of work that is required

to be performed by a qualified person or a person trained to perform electrical work and to maintain electric equipment under the direct supervision of a qualified person.

1. Locating faults in cables

2. Replacing blown fuses, except blown fuses on trolley poles may be replaced by miners other than persons qualified to do electrical work when:

   a. it is not necessary to remove a cover lid or panel to gain access to the fuse;

   b. the correct replacement fuse is available;

   c. the fuse holder, power conductors, and motor controller have not been damaged;

   d. warning signs are placed on the equipment to warn miners of the dangers of changing a blown trolley pole fuse without removing the trolley pole;

   e. information signs are placed on the equipment to inform miners of the correct fuse for the equipment; and

   f. the miners who install the fuses have received training in the hazards of energized trolley wires, voltage and current ratings of fuses, and in the safe methods for installing fuses. All miners who perform tasks involving equipment that use trolley fuses (e.g., motorman, supply crewman) should receive this training as part of the training they receive under applicable provisions of Part 48.

3. Making splices, connections and terminations in electric conductors and cables

4. Installation of couplers on the end of cables

5. Repair of electric components of electrically-powered portable, mobile or stationary equipment

6. Installation of electric wiring

7. Electrical maintenance of permissible equipment

8. Any type of work performed inside rooms, vaults, substations and other similar enclosures where energized parts or conductors are exposed

9. Any type of work performed inside transformers, power centers, rectifiers, switch boxes, switch houses, panels and other enclosures of electric equipment or conductors

10. Electrical troubleshooting and testing

11. Handling energized high-voltage power cables (see Section 75.812)

Listed below are examples of work that is not required to be performed by a qualified person or by a person trained to perform electrical work and maintain electric equipment under the direct supervision of a qualified person:

1. operation of electric equipment;

2. normal operation of control switches, switch boxes, or circuit breakers, provided no energized parts or conductors are exposed;

3. operation of cutout switches in trolley circuits;

4. hanging or removing fuse nips on or from trolley wires;

5. changing bits;

6. lubrication;

7. handling energized trailing cables;

8. inserting low- and medium-voltage cable couplers into receptacles or withdrawing low- and medium-voltage cable couplers from receptacles;

9. transportation of electric equipment and cables;

10. mechanical repairs on electrically-powered equipment, provided no energized parts or conductors are exposed;

11. installation and repair of equipment and circuits in which shock hazards do not exist (having a nominal rating

of 40 volts or less), provided such equipment is not required to be permissible; and

12. installation, repair, and guarding of trolley wires and trolley feeder wires.

Section 75.510 states that energized trolley wires may be repaired only by a person trained to perform electrical work and to maintain electrical equipment. Repair work is not required to be performed by a qualified person but must be performed by a person trained to repair and maintain energized trolley wires. However, electrical work, such as connecting a feeder wire inside the enclosed housing of a rectifier, is required to be performed 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.

The phrase "under the direct supervision of a qualified person" must, as a minimum, include the following:

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 which he has assigned cannot be performed by the employee in the manner prescribed; and

4. The qualified person must examine and test, if necessary, the completed work before the circuit is energized or the machine is returned to service.

When a cable splice is made by a person other than a qualified person, the splice shall be inspected by a qualified person prior to reinsulation of the power conductors and prior to and after the final outer jacket is applied.

Testing and troubleshooting of energized equipment shall be done only by qualified persons, except that a person trained to

perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person may do testing and troubleshooting on energized circuits as a part of his or her training program if a qualified person is present at all times to observe, instruct, and aid the trainee during such testing and troubleshooting.

Mining equipment manufacturers' service representatives are not required to be qualified persons, but are considered to be persons "trained to perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person." When work is performed by manufacturers' service representatives who are not qualified persons, the completed work is required to be examined and tested, if necessary, by a qualified person before the machine or equipment is placed in service.

Rebuilding of electric equipment by original equipment manufacturers or rebuild shops may be performed by persons other than qualified persons; however, mine management is under a continuing responsibility to assure that such equipment is examined by a qualified person to assure safe operating condition before the equipment is placed in service.

Section 75.512 requires examinations and tests to be made only by a qualified person. The very nature of the required examinations and tests precludes the work being performed by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person.

The disconnecting device is intended to provide workers with a visible means of readily determining that the equipment or circuit is deenergized. The worker must be able to see the power disconnect blades or contacts easily to determine, without any doubt, that the circuit is deenergized.

Disconnecting devices shall be locked out, where possible, and suitably tagged by persons who perform the work. Locking out is "possible" in almost all cases and can be accomplished in a practical manner. Single-pole blade-type disconnects and fused-type disconnects in high-voltage circuits are examples of cases where locking out is not practically possible. In all instances, trailing cables equipped with cable couplers or fused nips shall be opened, tagged and locked out. Some methods by which locking out may be accomplished are:

1. Drilling a small hole in the shell of the cable coupling so as to accommodate a padlock;

2. Chaining the cable coupler to the power center with a short cable and padlock; and

3. Placing the cable couplers or fuse nips inside a box equipped with a padlock.

The person doing the work shall keep the key to the padlock in his/her possession to insure that the circuit or cable will not be inadvertently energized while he or she is in contact with the conductors.

In every instance, the padlock shall be removed by the person who installed it if the person is present in the mine. If the person who installed the padlock is not present, the operator or the operator's agent (a responsible official) must designate a person to remove the padlock.

"Suitably tagged" means that a sign with wording such as "Danger, Repairs in Progress," shall be attached to the locked disconnecting device.

Disconnecting Devices Installed On-Board Mine Equipment

When disconnecting devices are installed on-board mine equipment, they may be used to meet the requirements of 30 CFR 75.509, 75.511 and 75.1725(c), provided the disconnecting devices are safety constructed, designed, and installed on the equipment as required by 30 CFR 75.520.

To meet the requirements of 30 CFR 75.509, 75.511, and 75.1725(c), disconnecting devices must function so as to provide positive visual confirmation that the equipment or circuit is deenergized. The worker must be able to easily see the power disconnect blades or contacts to determine, without any doubt, that the equipment or circuit is deenergized.

To meet the requirements of 30 CFR 75.520, disconnecting device enclosures must be explosion-proof and installed in a location on the machine that will not be hazardous to the machine operator or diminish visibility. In addition, the enclosure housing the disconnecting device must be the first enclosure on-board the machine that the trailing cable enters. The covers of disconnecting device enclosures must be provided with interlock switches so that miners cannot be exposed to energized parts when

these covers are removed.

These covers must also be provided with caution labels to warn miners against entering these enclosures before deenergizing the trailing cables to the equipment. The disconnecting device must be capable of carrying the full-load current of the machine, and of interrupting the full-load current of the machine unless the device is interlocked to remove the load prior to opening. In addition, if the device is intended to interrupt short circuit current, it shall have a current interrupting rating greater than the available fault current at the machine.

Permitting a disconnecting device installed on-board a machine to be used as the visual disconnect for the equipment creates a change in established electrical work procedures. As a result, all miners who perform maintenance on this equipment must receive task training as required by 30 CFR 48.7(a)(3). This training must include clear instructions that the disconnecting device will only deenergize the machine, and that the trailing cable will remain energized.

75.512 Electric Equipment; Examination, Testing and Maintenance

This Section requires that each individual piece of electric equipment, including locomotives, personnel carriers, electric track switches and derails, compressors, car hauls, conveyor units, pumps, rock-dusting machines, battery-powered equipment and permissible equipment, be examined and tested. The required examinations and tests must be thorough enough to insure that the electric equipment has not deteriorated through neglect, abuse or normal use into an unsafe condition that could result in a shock, fire, or other hazard to the miners.

The record of examinations of electric equipment required by this Section shall list separately each individual piece of electric equipment in the mine.
If the qualified person making the required examinations and test finds any potentially dangerous condition, that person shall immediately cause the defective equipment to be removed from service until such condition is corrected.

If each individual piece of electric equipment is not listed separately and identified with a serial or company number and the location of each unit, and if all dangerous conditions and corrective actions are not recorded, the records of weekly examinations of electric equipment are incomplete and shall be

considered to be in violation of this Section.

The qualified person making the examination is not required to sign the book; however, the name of the qualified person who made the required examination and test shall appear under "Examiner" in the book, Form 6-1492 (Weekly Record). The results of examinations required by this Section may be entered or recorded by the qualified person making the examination or by a responsible mine official (superintendent, mine foreman, electrical or maintenance foreman) or may transfer information from a check list, filled out by the examiner, to the required book. If the examiner cannot be readily identified from the records of weekly examinations of electric equipment, the records are incomplete and in violation of this Section.

75.512-2 Frequency of Examinations

The examination of electric equipment may be made at any time during each calendar week, even if more than 7 days pass between examinations.

75.513-1 Electric Conductors; Size

If power cables are manufactured in accordance with the Insulated Cable Engineers Association (ICEA) standards, the ampacity tables by the ICEA shall be used for determining compliance with this Section.

75.514 Electrical Connections or Splices; Suitability

This Section requires that conductors be joined together with clamps, connectors, track bonds, or other suitable connectors to provide good electrical connections. Splices made by twisting conductors together or by tying knots in conductors, splices that have bare or exposed conductors, or splices that heat or arc under load shall constitute noncompliance.

When splices are made in insulated conductors, the conductors must be reinsulated with insulating materials similar to the original. Flame-resistant insulating material should be used to replace flame-resistant insulation. Glass, asbestos, or other heat-resistant material should be used to replace high temperature insulation.

Feeder wires shall be joined together by proper feeder-wire splices. Wire rope clamps will be acceptable for splicing feeder wire; however, a minimum of two clamps of the proper size should be used in making each splice. The wire rope clamps should be examined periodically for tightness.

Where track is used as a power conductor, efficient connections require that:

1. Both rails of main-line tracks shall be welded or bonded at every joint, and cross bonds shall be installed at intervals of not more than 200 feet. If the rails are paralleled with a feeder circuit of like polarity, such parallel feeder shall be bonded to the track rails at intervals of not more than 1,000 feet.

2. At least one rail on secondary track-haulage rails shall be welded or bonded at every joint, and cross bonds shall be installed at intervals of not more than 200 feet.

3. Track switches in entries shall be well bonded.

4. In rooms where electric equipment is dependent upon the room track rails as a power conductor, rail joints shall be secured by means of fish plates, angle bars, or the equivalent, and at least one rail shall be bonded at each joint.

Visible arcing or heating at rail joints indicates poor connections or poor bonding.

Main-line track is interpreted to be track used to transport coal outby the junction of two or more coal-producing sections. All other track is considered to be secondary track and includes track that is used to transport miners and material or coal from a single coal-producing section. Both rails of secondary track may need to be bonded or welded at each joint if the additional current-carrying capacity is needed for compliance with Section 75.1001.

Bonding as used herein means a connection used to insure the required electrical conductivity between the rails. The connection may be obtained mechanically, as with a wedge or by welding the bonds on the rails.

75.515 Cable Fittings; Suitability

This Section requires fittings of such design as to prevent chafing of cable or wire insulation that would expose or accidentally ground the conductors at points where they enter the compartment walls of switch boxes, starters, motors, cable couplers, etc. Insulated wires passing through walls of metal enclosures shall be protected against damage to the insulation by

insulated bushings or suitable insulating material, such as fire-resistant hose conduit used in conjunction with a suitable fitting or clamp that will prevent movement of the conductor in the opening. Fittings for cables need not be insulated. When insulated wires pass through holes in metal dividers within the same enclosure, insulating bushings or other suitable insulating material shall be used to bush the holes. For the purpose of this Section, "cable" means two or more insulated conductors covered by an additional abrasion-resistant covering.

75.516 Power Wires; Support

"Power wire" means a current-carrying conductor which may be bare, insulated, or part of a cable assembly.

Shielded cables that meet all of the requirements of Section 75.804 are not required to be installed on insulators, even if they are used to supply low-, medium-, or high-voltage equipment. All other power wires and cables supplying belt conveyor drives, pumps, air compressors, and other units of portable or stationary equipment (except distribution boxes, portable pumps, battery chargers, and rock-dusting machines which are used on coal-producing sections and which require frequent movement) shall be installed on insulators and are not allowed to contact combustible material, roof, or ribs.

Acceptable insulators are constructed of noncombustible, nonabsorptive insulating material adequate for the voltage being used. Furthermore, insulators must have sufficient mechanical strength and must be installed in such a manner as to provide adequate support for the power wires or cables installed on them. Cables that meet the requirements of Section 75.600 may be supported from noncombustible material such as sandrock or slate roof, concrete or metal roof supports, or masonry walls by lengths of flame-resistant cable or conveyor belting.

Trolley wires and trolley feeder wires shall be supported only on bell-and-clip-type insulated hangers or other supports especially designed for that purpose.

All wires and cables that are required to be supported on insulators shall be supported in such manner that they do not contact combustible materials, roof, or ribs.

75.516-1 Installed Insulators

J-hooks shall be acceptable as insulators for the permanent installation of insulated cables if the manufacturer certifies

the dielectric and tensile strength of the J-hook and if, in the opinion of the authorized representative of the Secretary, the J-hook is adequate for the duty imposed. The following guidelines shall be used as criteria for the acceptance of J-hooks as insulators:

1. The dielectric strength of the J-hook shall not be less than eight times the voltage of the circuit.

2. The tensile strength shall not be less than three times the weight the J-hook is intended to support.

Insulated J-hooks that do meet the above requirements will be acceptable as insulators for permanent installations of insulated control cables and insulated control wire (either single-conductor or twisted pair) or for temporary installation (not more than 6 months) of insulated power cables.

This Section does not prohibit single-conductor cables used in three-phase resistance-grounded low-voltage circuits from being installed on proper hangers and supported by a grounded messenger wire or insulated wires from being installed in grounded metal conduit.

75.517 Power Wires and Cables; Insulation and Protection

Any ungrounded power conductor extending from the track entry for any purpose shall be insulated. In addition, power wires and cables shall be installed under well supported roof and far enough away from any moving equipment to prevent damage; however, in some locations, metal or nonmetallic conduit may be necessary for additional protection against damage. Examples of these locations include: where power wires or cables other than trolley feeder wires cross the trolley wire; where power wires or cables pass through doors or stoppings; where power wires or cables are installed along supply storage areas; where power wires or cables are installed on tight corners with insufficient clearance; or other areas where power wires or cables cannot be isolated sufficiently to afford protection.

This Section also requires that damaged insulation on insulated power wires and cables (including trailing cables) and damaged jackets on power cables (including trailing cables) be repaired.

The outer jacket of a cable is intended to protect the internal conductors from cuts, abrasion, moisture, etc., and must be intact for the cable to be fully protected as required by this Section.

Tapes or other materials that are used to form the outer jacket of approved permanent splices may be used to replace damaged areas of outer jackets of trailing cable. Outer jackets shall be replaced in such manner so as to prevent moisture from entering the cable.

Tar-impregnated friction tape is not adequate for insulation or protection in the damp and wet areas of underground coal mines. Such tape will absorb mine water, which is highly conductive, creating a serious shock hazard to the miners.

75.518-1 Electric Equipment and Circuits; Overload and Short Circuit Protection; Minimum Requirements

In direct-current systems that are either ungrounded or provided with a neutral grounding point, protective elements shall be provided for both positive and negative lines. This necessitates the use of either a two-pole circuit breaker or a fuse in each polarity. Fuses of the correct type and capacity are acceptable as overload protection only for d.c. or single-phase a.c. circuits and motors. The proper selection is based on wire size, motor design, horsepower, and method of starting. If the computed value is other than a common size, the next higher size common fuse or thermal element is acceptable.

The installation of overload devices on locomotives operating on grades exceeding 5 percent can create a hazardous condition due to a decrease in braking power if the overcurrent protective devices open. Noncompliance with this Section shall not be cited for locomotives operating on grades exceeding 5 percent until suitable automatic brakes have been designed and installed on such locomotives and haulage cars.

75.518-2 Incandescent Lamps, Overload, and Short-Circuit Protection

Not more than 8 feet in distance means not more than 8 feet of ungrounded conductor.

75.519-1 Main Power Circuits; Disconnecting Switches; Locations

This Section applies to low- and medium-voltage power circuits entering a mine and to low-, medium-, and high-voltage power circuits at the bottom of shafts and boreholes. The requirements for disconnecting switches for high-voltage power circuits entering a mine are contained in Section 75.802(c).

A high-voltage cable coupler, switch, or other device not designed for load-breaking duty that is located at the bottom of a shaft or borehole may be used in conjunction with a high-voltage circuit breaker located on the surface provided:

1. A remote control switch that, when activated, will open the circuit breaker is provided at the bottom of the shaft or borehole; and

2. A visual or audible means to indicate that the circuit breaker has opened when the remote control switch is activated is provided at the bottom of the shaft or borehole. Signal lights will be acceptable if the lights receive power through the auxiliary contacts on the circuit breaker.

Unless fuse-type and knife-blade cutout switches are designed for load-breaking duty on high-voltage circuits, such switches shall be used for a disconnecting means only when some other means is first used to deenergize the circuit.

75.520 Electric Equipment; Switches

All control devices shall be fully enclosed to prevent exposure of bare wires and energized parts. The use of plugs and receptacles (e.g., Miller plugs), trolley taps, and trolley wire "stingers" to start and stop electric motors are examples of noncompliance with this Section.

75.521 Lightning Arrester; Ungrounded and Exposed Power Conductors and Telephone Wires

Conductors that are: (1) provided with metallic shields; (2) jacketed by a ground metal covering or enclosure; (3) installed under grounded metal framework; (4) buried in the earth; or (5) made of triplex or quadraplex that is supported by a grounded messenger wire, are not considered exposed for the length so protected. If the trolley wire of a d.c. system is paralleled by an exposed feeder cable, one lightning arrester would provide protection for both if they are connected together near the lightning arrester.

Lightning arrester ground fields shall be maintained with as low a resistance to earth as possible, preferably less than 5 ohms and no more than 25 ohms. Lightning arrester ground fields shall be separated from neutral ground fields by at least 25 feet. This distance prevents lightning surges from being transmitted to the neutral ground field where they could momentarily energize the frames of equipment grounded to the neutral ground field.

Mines using single-phase power originating at the power company's secondary and extending underground cannot normally comply with this Section due to the power company's practice of connecting the lightning arrester ground to the grounded neutral which also connects to the center tap of the transformer, unless an isolation transformer is installed or the power company isolates the lightning arrester ground from the center tap ground and a separate neutral ground field is established.

75.523-1 Deenergization of Self-Propelled Electric Face Equipment Installation Requirements

A machine that can only be operated from a remote location is not required to be provided with a device that will quickly deenergize the tramming motors of the machine in the event of an emergency. However, if at any time the remote controls are placed on the machine for the purpose of tramming the machine, or if for any other reason the operator trams the machine from onboard or alongside the machine, the machine shall be provided with a device that meets the requirements of this Section and Section 75.523-2.

Any device other than a bar or lever used for deenergizing tramming motors such as a "dead man control" can be accepted only by an approval letter from Technical Support.

75.523-2 Deenergization of Self-Propelled Electric Face Equipment; Performance Requirements

The actuating bar or lever and its associated linkage should be designed to activate a circuit breaker, control switch, hydraulic valve, or other device that will deenergize the tramming motors when the actuating bar or lever is depressed.

The bar or lever shall extend a sufficient distance in each direction to provide a ready means of deenergizing the tramming motors without requiring the operator to change position or search for a safe stop switch if an emergency occurs.

The actuating bar or lever shall be designed so that a horizontal or vertical (downward) pressure of 15 pounds force shall cause deenergization of the tramming motors before the bar has traveled more than 2 inches.

Subpart G Trailing Cables

75.600 Trailing Cables; Flame Resistance

In order to maintain the flame-resistant qualities of the cable, this Section prohibits the use of flammable materials for replacing the outer jacket. Only flame-resistant tapes or other materials that have been accepted by Technical Support as the jacketing material in permanent splice kits and jacket repair kits will be acceptable for the repair or replacement of outer jackets.

75.601 Short-Circuit Protection of Trailing Cables

Section 75.900 prohibits the use of fuses for the short-circuit protection of three-phase a.c. trailing cables. Only fuses that have been tested and approved by Technical Support under Part 28 are acceptable for the short-circuit protection of d.c. and single-phase a.c. trailing cables. Approved fuses are identified by an MESA or MSHA approval number. (See Sections 75.601-2 and 75.601-3.)

A length of cable meeting the requirements of Section 75.600 and installed between a power center or rectifier and a distribution box, and laying on the mine floor will be considered to be a trailing cable and is required to comply with all applicable requirements of this Subpart.

In systems where rectifiers supply ungrounded or neutral-grounded direct-current power to mobile face equipment, short-circuit protection must be provided for both ungrounded conductors of the trailing cable. A properly adjusted two-pole circuit breaker or MSHA approved fuses installed in each ungrounded conductor would constitute compliance.

Adequate current-interrupting capacity means that the fuse or circuit breaker is capable of safely interrupting the current that can flow upon the occurrence of a short circuit at any point in the protected circuit.

Enclosed circuit breakers are not acceptable as visual evidence that the power is disconnected. Plugs and receptacles located at the circuit breaker and trolley nips are acceptable as visual means of disconnecting the power.

A “disconnecting device” is defined as both the trailing cable plug (cathead) and the receptacle. Both the plug and the receptacle must be marked in a similar manner.

75.601-2 Short-Circuit Protection; Use of Fuses; Approval by the Secretary

The voltage rating of a fuse shall not be less than the maximum voltage of the circuit in which it is installed.

75.602 Trailing Cable Junctions

Plugs of the same size may be used for different cable sizes if dowel pins or other devices are provided to insure that each cable can only be connected to a circuit breaker of the proper size or if the plugs and receptacles are connected by a short length of chain long enough to permit the plug to be inserted into and withdrawn from the proper receptacle only.

75.603 Temporary Splices of Trailing Cables

A splice includes the mechanical joining of a grounding conductor that has been severed.

The connection of the trailing cable made inby the strain clamp on cable reel equipment that does not have provisions for the trailing cable to enter the collector ring compartment shall not be considered a temporary splice. The method of cable attachment accepted in the approval of the equipment will be in compliance with this provision.

The conductors of a temporary splice shall be joined together so that the passage of current will not create excessive heat at the connection. Each power conductor, grounding conductor, and ground-check conductor shall be individually spliced using a proper splicing sleeve, ring, or clamp; each power conductor shall be individually insulated with proper insulating tape, and the outer jacket shall be replaced with flame-resistant tape or other flame-resistant material to provide an outer jacket as thick as the original.

Torn or damaged insulation on a trailing cable shall be reinsulated and does not constitute a splice unless a conductor is severed.

75.604 Permanent Splicing of Trailing Cables

Materials listed by MSHA's Approval and Certification Center as flame resistant for use in making permanent splices in trailing cables shall be used in complete accordance with the manufacturer's instructions. Splice kits shall be applied without substituting or altering any parts. Any deviation would require additional evaluation or testing by MSHA. Without such evaluation, such deviations shall constitute noncompliance with this Section.

75.605 Clamping of Trailing Cables to Equipment

Section 18.40 requires insulated strain clamps or cable grips on the trailing cables of permissible machines, except that mesh-wire cable grips (e.g. Kellems grips) are not permitted on trailing cable reels. Where mesh-wire cable grips are permitted, they shall be installed in accordance with the following:

1. Sufficient slack shall be provided in the trailing cable between the machine and the cable grip.

2. A hose clamp shall be provided on the outby end of the cable grip to prevent slippage along the cable jacket.

A length of flame-resistant hose conduit is acceptable for insulating a metal strain clamp.

75.606 Protection of Trailing Cables

Trailing cables shall be placed away from roadways and haulageways where they might be run over or damaged by mobile equipment. Where the method of mining requires that trailing cables cross roadways or haulageways, the cables shall be securely supported from the mine roof, or if the height of the coal seam does not permit hanging the cables, the cables shall be installed in a trench cut into the mine roof or mine floor. A substantial bridge for the equipment to pass over the cables is also acceptable if, in the opinion of the inspector, the cables are adequately protected.

Subpart H Grounding

75.701 Grounding Metallic Frames, Casings, and Other Enclosures of Electric Equipment

When a three-phase resistance grounded system supplies power to a rectifier bridge and to other portable or mobile loads, neither the positive nor negative conductor of the direct-current circuit can be grounded. The frames of the direct-current equipment must be grounded to the alternating-current ground rectifier frame. However, when a power system is being designed so as to provide a separate bank of transformers to supply power to the rectifier bridge and a separate bank of transformers to supply power to the a.c. portable or mobile loads, then one polarity of the rectifier bridge can be grounded. All frames of direct-current equipment are then grounded to the grounded power conductor.

75.702 Protection Other Than Grounding

Portable tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the tool will be distinctly marked.

75.703 Grounding Off-Track Direct-Current Machines and Enclosures of Related Detached Components

"Related detached components" refers to associated parts such as contactor compartments, control switches, or rheostats that are not installed on the frame of the machine. The metal frames or enclosures of such components shall be connected to the same grounding medium as the main frame of the machine to which it is related.

Metal frames or housings of pumps, battery chargers, sequence and slippage switches, breaker boxes, remote control switches, rheostats, rock-dusting machines, auxiliary fans, belt drives, belt feeders, contactor compartments, and any other equipment or devices receiving power from direct-current power systems shall be grounded to the grounding medium of the power system feeding such equipment or devices. The grounding medium for d.c. systems is normally the mine track or grounded d.c. feeder. When ungrounded d.c. systems are used, the grounding medium is usually the grounded frame of the rectifier or generator.

The metal battery case of batteries being charged shall be grounded. In instances where batteries are being charged without removing them from mobile equipment, the frame of the machine or battery case shall be grounded to the grounded frame of the charger to prevent the machine from becoming "alive" through failure of insulation in the charger, such as between primary and

secondary windings of transformers and leakage through spilled electrolyte from the batteries.

This Section requires that metal battery trays be effectively grounded to the battery charger frame during charging. Technical Support's Mine Electrical Systems Branch conducted tests on two-pole battery connectors to evaluate the effectiveness of the electrical connection between the connector housings as the means of grounding the battery trays. These tests indicate that the tolerance fit between the male and female connector housings does not provide an effective electrical connection, particularly when the connectors are contaminated with water, rock dust, or mud.

This Section also requires that metal battery connector housings be effectively grounded to the battery charger frame during charging. Consequently, provisions must also be made to effectively ground metal battery connector housings during charging.

All grounding conductor connections shall be clamped or bolted connections, shall be capable of carrying any fault current to which it may be exposed, and shall be connected first and disconnected last.

75.703-3 Approved Methods of Grounding Off-Track Mobile, Portable, and Stationary Direct-Current Machines

Diode grounding of equipment is not acceptable on direct-current systems which have both the positive and negative polarities ungrounded.

75.706 Deenergized Underground Power Circuits; Idle Days - Idle Shifts

Circuits supplying power to automatically-operated pumps shall be considered as being in use although the pumps may not be operating continuously.

75.800 High-Voltage Circuits; Circuit Breakers

A suitable circuit breaker is one that is:

1. Capable of interrupting the maximum fault current to which it may be subjected without damage to itself;

2. Capable of carrying the continuous current imposed upon it without damage to itself; and

3. Rated for not less than the voltage of the circuit.

"Undervoltage protection" is defined in the IEEE Standard Dictionary of Electrical and Electronic Terms (IEEE Standards 100-1972) as "the effect of a device, operative on the reduction or failure of voltage, to cause and maintain the interruption of power to the main circuit." The principal purpose for undervoltage protection is to prevent automatic restarting of equipment when power is restored after an outage. Undervoltage protection can be provided by an undervoltage trip coil on the circuit breaker or by an undervoltage relay or a ground-check relay connected into the circuit breaker trip circuit. When an undervoltage relay or ground-check relay is used to operate the shunt trip coil on a circuit breaker, a stored-energy tripping source must be provided (i.e., capacitor trip or battery trip) to insure that the circuit breaker will trip during a power outage. The undervoltage relay may either be an induction or attraction type and must trip the circuit breaker when the line voltage decreases to 40 percent of nominal or less when power is lost.

A high-voltage circuit extending underground shall be protected against the harmful effects of a grounded phase in the underground circuit and in any surface circuit supplied from the same set of transformer windings. Consequently, if one set of transformer windings supplies resistance-grounded power to both underground and surface loads, the circuit(s) extending to the surface loads must also be provided with grounded-phase protection. Fuses may be used to provide grounded-phase protection only for small control transformers installed in the same substation as the transformers that supply the resistance- grounded circuit. In all other cases, circuit breakers equipped with grounded-phase protective devices must be used to provide the required grounded-phase protection.

Grounded-phase relays should be adjusted to operate on as low a value of current or voltage as practical. In order to provide safe, reliable relaying, settings should not exceed 50 percent of the maximum fault current for current relaying or 50 percent of

the phase-to-neutral voltage for potential relaying.

Where an ungrounded high-voltage circuit is accepted for use underground under the provisions of Section 75.802(b), the circuit must be provided with grounded-phase protection.

Grounded-phase indicating lights that do not trip the circuit breaker upon the occurrence of a phase-to-ground fault are not acceptable as compliance with this Section.

Short-circuit protection can be provided by using the instantaneous units of overcurrent relays or by using inverse-time overcurrent relays with minimal time dial settings.

The pickup of the instantaneous unit of an overcurrent relay is independent of the pickup of the inverse-time unit and is determined by the position of the top of the screw on the instantaneous unit.

Overcurrent devices are required in at least two phases of three-phase high-voltage underground distribution circuits.

75.800-3 Testing, Examination, and Maintenance of Circuit Breakers; Procedures

If the circuit breaker located on the surface provides overload, short-circuit, undervoltage, and grounded-phase protection for the entire underground circuit, only that circuit breaker is required to be tested by this Section. Circuit breakers installed underground for coordination purposes in such circuits are not required to be tested; however, each independent ground- check circuit must be tested in accordance with this Section.

The tests required by paragraph (b)(2) of this Section may be conducted one of three ways:

1. Primary injection test. This test method involves sufficient current to cause the circuit breaker to trip through at least two current transformers associated with the circuit breaker. Since this method requires that test connections be made on high-voltage conductors or terminals, stringent safety procedures must be followed. This method simultaneously tests the current transformer ratio, the current transformer secondary wiring, the operation and calibration of the relays, and the operation of the circuit breaker tripping circuit.

2. Secondary injection test. This test method involves passing sufficient current to cause the circuit breaker to trip through at least two of the protective relays associated with the circuit breaker.

   This method simultaneously tests the operation and calibration of relays and the operation of the circuit breaker trip circuit.

3. Mechanical activation test. This test method involves mechanically activating at least two of the protective relays associated with the circuit breaker with a non-conductive probe. This method tests the operation of the circuit breaker trip circuit.

75.801 Grounding Resistors

Grounding resistors that are manufactured to meet the extended time rating as set forth in IEEE Standard 32-1972, formerly AIEE Standard 32, are acceptable as compliance with this Section. Resistors that are not manufactured in compliance with IEEE Standard 32-1972 shall be "rated for maximum fault current continuously."

75.802 Protection of High-Voltage Circuits Extending Underground

Grounding transformers must be sized to carry the rated ground-fault current of the system continuously. Consequently, the kVA rating of a zigzag grounding transformer or a wye-delta grounding transformer bank shall not be less than the rated phase-to-neutral voltage of the system (VON) in kV times the rated ground-fault current of the system (I) in amperes. If other loads are supplied from a wye-delta grounding transformer bank, the rating of the transformer bank must be adequate to supply the additional loads plus the rated ground-fault current.

Transformer banks connected wye on the primary side and supplied power from a resistance-grounded circuit shall not have the primary neutral grounded.

When used, grounding transformers shall be connected on the line side of circuit breakers so that the system will always be grounded and must be located in/or adjacent to the same substation as the power source transformers.

This Section requires that the grounding resistor be located at the source transformers. As used in this Section, the term "source transformer" means the transformer that supplies power to the electric circuit.

The frames of electric equipment receiving power from a resistance-grounded system that supplies a circuit extending underground must be grounded to the grounded side of the grounding resistor, regardless of whether the equipment is located on the surface or underground. However, the metallic frames, enclosures, and supporting structures of all high-voltage equipment and conductors located inside either a portable or stationary substation (including the source transformers, control transformer, grounding resistor, and circuit breakers) must be grounded to the same grounding medium to prevent hazardous step and touch potentials from existing within the substation during a grounded-phase condition or a lightning strike. Therefore, the metallic frames, enclosures, and supporting structures of all electric equipment and conductors located inside either a portable or stationary substation shall be grounded to the substation grounding medium.

All high-voltage power transformers and other equipment that receive power from a resistance-grounded system that supplies a circuit extending underground should be located outside the substation containing the source transformers. The frames, enclosures, and supporting structures of such equipment should be grounded to the grounded side of the grounding resistor. When equipment receiving power from a resistance-grounded circuit is installed inside the same substation as the source transformer, compliance with Section 75.521 and 75.802 is extremely impractical without creating step and touch potential fault conditions and lightning strikes.

Voltage regulators and capacitors located on the load side of the source transformer inside the substation are part of the power source and are not considered part of the load. As part of the power source, they must be grounded to the substation-grounding medium.

Among other things, capacitors are used to improve the power-factor by reducing reactive power in the system. Capacitors lower system losses and improve voltage. Voltage regulators control voltage spread at the utilization equipment under all load conditions. These components do not receive power from the source transformer, but they regulate the power supplied to the different loads (equipment). If these components are located inside the substation, their frames must be grounded to the substation-grounding medium to prevent step and touch hazards.

Substations are normally designed in accordance with IEEE Std 80-1986 (ANSI) [3].

These designs include reinforcing bars contained on the below-grade foundation structure. The purpose of these designs is to limit step and touch potentials at substations to values that are intended to eliminate the risk of dangerous electric-shock exposure to persons either working within the substation or approaching the substation.

Ungrounded three-phase high-voltage circuits may be permitted to feed stationary equipment only after an investigation has been made to determine that the use of such circuits in a particular mine does not pose a hazard to the miners.

Ungrounded circuits shall not be accepted for circuits feeding portable power centers and rectifiers that supply power to mobile equipment. SHC cables (cables having common metallic shield around all conductors) are not to be accepted for use in underground high-voltage circuits.

In all cases where ungrounded circuits are accepted for use underground, the circuit breaker protecting the circuit must be equipped with a ground-phase tripping circuit. Ground-indicating lights that do not trip the circuit breaker upon occurrence of a phase-to-ground fault are not acceptable.

75.803 Fail Safe Ground Check Circuits on High-Voltage Resistance Grounded Systems

Ground check circuits are required to be designed so as to ensure a safe dependable path for fault current by causing the circuit breaker to open when either of the following occurs:

1. The ground check wire is broken at any point; or

2. The grounding conductor is broken at any point.

If low-resistance parallel paths are present that prevent the ground check circuit from actuating the ground check relay when the grounding conductor is broken, the ground check circuit shall be acceptable as compliance with this Section if the ground check circuit is designed to cause the circuit breaker to open when the impedance of the grounding circuit increases beyond the amount necessary to cause a 100-volt drop external to the grounding resistor during fault conditions.

The following method may be approved by electrical inspection personnel as an alternate method for ensuring continuity of a safe, dependable path for fault current for resistance-grounded circuits extending to permanently installed, stationary equipment located on the surface:

1. Grounding circuit shall originate at the grounded side of the grounding resistor and shall extend along with the power conductors and shall serve as a grounding conductor for the frames of all equipment receiving power from the circuit.

2. Second grounding circuit shall connect the frames of the stationary equipment to a low resistance ground field located near the utilization location.

3. The resistance of the grounding resistor and the resistance of the ground field shall be maintained in such a manner that not more than 100 volts will appear between the equipment frame and earth under fault conditions in the event that the grounding conductor should be severed.

75.803-2 Ground Check Systems not Employing Pilot Check Wires; Approval by the Secretary

Wireless ground check circuits shall not be approved unless such circuits are tested and evaluated by Technical Support.

75.804 Underground High-Voltage Cables

This Section does not apply to cables of ungrounded high-voltage circuits that are enclosed in steel armor or rigid steel conduit. All high-voltage cables, whether single or multiple conductor, shall conform to this Section.

If single-conductor high-voltage cables are used, the cables should be installed on a well-supported messenger wire or on cable hangers, and a power grounding conductor and ground check conductor shall extend along with the power conductors. The messenger wire, when paralleled with the cable shielding, can serve as the grounding conductor for the circuit if the impedance of the grounding circuit is low enough to limit the voltage drop to 100 volts or less. Normally, the high resistance of steel messenger wire will limit the distance the circuit can be extended. The shielding shall be connected to the messenger wire at each splice (single-conductor cables) and, at each termination. Inspectors must calculate the parallel resistance of the messenger wire and the three shields when determining compliance with the requirement for a maximum voltage drop of 100 volts.

Cables in systems using "other no less effective device approved by the Secretary or his authorized representative" as provided for in Section 75.803 for assuring grounding circuit continuity are exempted from the requirement to have an insulated ground check conductor.

75.805 Couplers

An existing high-voltage coupler that is not equipped with a pin for the ground check circuit may be used if a locking switch is mounted on the coupler so that it cannot be uncoupled until the key is inserted in the lock and the switch is opened. This operation breaks the ground check conductor first. Several

equipment companies are manufacturing conversion kits for installation on existing couplers not provided with ground check pins.

Cable couplers that are mounted on portable substations are considered to be receptacles and should be grounded to the same grounding medium as the substation enclosure. When these portable substations supply power to underground circuits, the grounding conductor and shielding in the cable should be insulated from the coupler housing, and the metallic housings of both the receptacle and the male part of the metallic frame of the portable substation. The grounding conductor shielding shall be connected to the grounded side of the groundings resistor.

75.807 Installation of High-Voltage Transmission Cables

Energized high-voltage cables shall be stored in unused crosscuts or other unused areas away from haulageways or mantrip stations where miners or equipment could contact or damage such cables.

75.808 Disconnecting Devices

A "branch line" means a circuit that is formed by connection to an existing high-voltage circuit for the purpose of feeding branch loads.

Cable couplers are acceptable as a disconnecting device only when used with an acceptable device such as a circuit breaker or oil-filled fused cutouts that are used to deenergize the circuit before the cable coupler is uncoupled.

If a remote switch in the ground check circuit is used to trip a circuit breaker prior to uncoupling the coupler, visible or audible evidence must be provided to indicate that the circuit breaker has opened before the coupler is uncoupled.

75.809 Identification of Circuit Breakers and Disconnecting Switches

The identifying markers for circuit breakers and disconnecting switches shall be large enough and shall be located so that they can be readily seen if the circuits need to be deenergized quickly.

Either metallic or plastic material may be used for the marker to adequately identify the circuit (e.g., No. 2 Belt Drive, No. 3 Rectifier, 1 Rt. 3 North, etc.).

The identifying markers shall leave no doubt as to which circuit or circuits will be deenergized when the switches are pulled.

75.900 Low- and Medium-Voltage Circuits Serving Three-Phase Alternating Current Equipment; Circuit Breakers

Each of the four protective features required by this Section must be provided for all underground low- and medium-voltage three-phase a.c. circuits with the exception of trailing cables, which must have short-circuit, undervoltage, and grounded-phase protection. Circuit breakers providing short-circuit protection for trailing cables shall be adjusted so as not to exceed the maximum allowable instantaneous settings specified under Section 75.601-1. Short-circuit and overcurrent protection for circuits shall conform to the National Electrical Code, 1968. Charts listing sizes and proper overload and short-circuit protection for motors and motor circuit conductors can be found in Appendix E of this volume. These tables shall be used to determine compliance with this Section.

"Adequate interrupting capacity" is the ability of a circuit breaker to safely interrupt the maximum amount of current that can flow through its contacts upon occurrence of a short circuit at any point in the circuit without damage to itself.

Low- and medium-voltage three-phase circuits used underground shall be protected against the harmful effects of a grounded phase in any circuit connected to the same transformer secondary. Consequently, if one bank of transformers supplies power to both underground and surface loads, both the surface and underground portions of the circuit(s) shall be provided with grounded-phase protection.

Grounded-phase protective devices for resistance-grounded circuits should be adjusted to operate on as low a value of fault current as practical, preferably not more than 50 percent of the current rating of the neutral grounding resistor.

75.901 Protection of Low- and Medium-Voltage Three-Phase Circuits Used Underground

When two phase conductors of a three-phase resistance grounded circuit are used to power single-phase loads, the equipment frames must be grounded to the grounded side of the grounding resistor. The grounding circuit shall be provided with a ground check circuit as required by Section 75.902 and the circuit shall be protected in accordance with the requirements of Section 75.900.

Ungrounded three-phase low- and medium-voltage circuits may be permitted in an underground coal mine to feed stationary equipment only after an investigation has been made by electrical personnel and after that investigation finds that the use of such circuits in a particular mine does not pose a hazard to the miners.

When two phase conductors of an ungrounded surface three-phase circuit are taken underground for use as a control circuit, this circuit exhibits all the hazards inherent in an ungrounded three-phase circuit and shall be judged accordingly. If an operator wishes to install an ungrounded circuit underground, including the control circuit described above, application should be made to the District Manager. The District Manager shall assign electrical inspectors or electrical engineers to an investigation of the application, and, if it is determined that no hazard is created by the installation of the ungrounded circuit, the District Manager shall notify the operator in writing of the acceptability of the circuit and of any restrictions imposed on the operation of the circuit.

Ungrounded circuits feeding portable distribution boxes or power centers that supply power to mobile equipment are not to be accepted.

In all cases where ungrounded circuits are accepted for use underground, the circuit breaker protecting the circuit must be equipped with grounded-phase protection. Ground-indicating lights that do not trip the circuit breaker when a phase-to-ground fault occurs are not acceptable.

75.902 Low- and Medium-Voltage Ground Check Monitor Circuits

The following criteria shall be used for determining compliance of ground check circuits in low- and medium-voltage systems supplying power only to stationary equipment.

1. If a ground check conductor is used, the ground check circuit will trip the circuit breaker when the ground check conductor is broken.

2. The ground check circuit will trip the circuit breaker if the ground wire is broken at any point in the grounding circuit. If low resistance parallel paths for fault current and monitoring current are present, the ground check circuit will be acceptable if it is designed to trip the circuit breaker when the impedance of the grounding circuit increases beyond the amount necessary to cause a 40-volt drop in the grounding circuit external to the grounding resistor under fault conditions.

3. Current flow in the ground check circuit will cause pickup of the ground check relay.

Ground check circuits meeting the above performance criteria are considered to be a no less effective device to assure continuity of the grounding conductor in circuits extending to properly installed stationary equipment only.

The following criteria shall be used for determining compliance of ground check circuits in low- and medium-voltage systems supplying power to self-propelled equipment:

1. If a ground check conductor is used, the ground check circuit will trip the circuit breaker when the ground check conductor is broken.

2. The ground check circuit will trip the circuit breaker if the ground wire is broken at any point in the grounding circuit. If low resistance parallel paths for fault current and monitoring current are present, the ground check circuit will be acceptable if it is designed to open the circuit breaker when the impedance of the grounding circuit increases beyond the amount necessary to cause a 40-volt drop in the grounding circuit external to the grounding resistor under fault conditions.

3. The ground check device shall be of failsafe design. "Failsafe" is interpreted to mean that the failure of any component, other than relay contacts, shall not prevent the ground check circuit from opening the circuit breaker when the conditions described in criteria 1 and 2 occur, unless the ground check circuit is designed to open the circuit breaker when such failure occurs.

Ground check circuits that have been accepted by Technical Support are assigned an MSHA acceptance number. Ground check devices that do not bear an MSHA acceptance number will be temporarily accepted if the first two criteria are satisfied. MSHA will obtain a similar device and will evaluate it for "failsafe" design.

When an arc suppression device is installed in a power center, the ground check circuit should be connected on the machine side of the device. Monitoring through an arc suppression device preloads the device and reduces its effectiveness in suppressing intermachine arcing and may also cause false tripping of the ground check circuit.

Any device inserted in a grounding conductor (including an arc suppression device and a parallel-path suppression device) shall

have a short-circuit capacity that is not less than that of the grounding conductor in which it is installed. MSHA Technical Support tests such devices to determine their short-circuit capacity.

When an arc suppression or parallel path suppression device for a circuit is installed in a power center or distribution box and the receptacle for the circuit is not insulated from the metal frame of the power center or the distribution box, the circuit grounding conductor must be insulated through the receptacle and the associated plug. This is necessary to prevent shorting out the arc suppression or parallel path suppression device.

Nevertheless, the metal casings of both the plug and receptacle must be grounded. Normally, the receptacle is grounded by bolting it directly to the metal frame of the power center or distribution box. However, the plug must be grounded to the metal frame of the power center of the distribution box by an external grounding shunt or separate internal grounding conductor in the receptacle and plug. The grounding shunt or grounding conductor shall be sized in accordance with Section 75.701-4. In some cases, receptacles are insulated from the metal frames of power centers to prevent shorting out arc suppression or parallel path suppression devices. In such cases, both the receptacles and the associated plugs shall be grounded to the grounding conductors in the cables. In all cases, the metal casings of both halves of in-line cable couplers shall be grounded to the grounding conductors in the cables.

When wireless ground check circuits are used, an interlock circuit shall be provided for all cable couplers (including in-line cable couplers) to ensure that the power circuit will be deenergized before the power conductors are broken when the coupler is uncoupled. Typically, the pilot pins are connected together in the cable couplers to provide an interlock to trip the circuit breaker.

The wiring methods used on power center receptacles and cable couplers shall not result in the ground check circuits becoming ineffective. The pilot pins of the cable couplers shall not be connected together when one of the two pilot pins is connected to the system ground.

The following may be approved by the District Manager as a no less effective method for ensuring the continuity of grounding circuits of permanently installed stationary equipment.

1. A second grounding conductor sized in accordance with 30 CFR 75.701-4 and visible for its entire length when practicable shall extend from the power source at the

grounded side of the grounding resistor to the frame of the stationary equipment.

2. The cable supplying power to the stationary equipment is shielded or steel armored and the shielding or armor is grounded at both ends.

Resistance grounded circuits extending to stationary low- or medium-voltage three-phase equipment located on the surface are not required to be equipped with ground check circuits.

75.902-2 Approved Ground Check Systems Not Employing Pilot Check Wires

This Section requires MSHA approval of all wireless ground check circuits; therefore, only wireless ground check devices bearing an MSHA acceptance number will be acceptable.

75.903 Disconnecting Devices

A connecting plug on the outby end of the trailing cable connected to the power center or distribution box will be accepted as a disconnecting device. Other means, such as switches with visible contacts, may also be acceptable for this purpose. Molded-case circuit breakers are not acceptable as visible disconnecting devices.

Disconnecting devices shall be plainly marked for identification to reduce the chance of energizing a cable while repairs are being made on the cable. While identification could take a variety of forms, one example of compliance with §§ 75.601, 75.903, and 75.904 would be to label the loading machine #1 cable plug, receptacles, and the circuit breaker through which the loading machine #1 is receiving power as "loader #1." Consequently, each of these would be labeled alike and easily identified.

75.904 Identification of Circuit Breakers

The circuit breaker must be marked to identify the circuit or machine receiving power through the circuit breaker. For example:
A circuit breaker through which "loader 1" is powered, is marked as "loader 1."

Either metal or plastic tags or markers may be used to identify circuit breakers if the tags or markers are attached securely to the circuit breaker enclosure and are large enough to be readily seen. The tag or marker should clearly identify the circuit or machine receiving power through the circuit breaker.

Subpart K Trolley Wires and Trolley Feeder Wires

75.1001-1 Devices for Overcurrent Protection; Testing and Calibration Requirements; Records

To provide the short-circuit protection required by this Section, trolley systems must be designed, installed, and maintained to assure, at all times, that a short circuit at any location in the trolley system will be cleared by one or more automatic circuit-interrupting devices.

Automatic circuit breakers and fuses used to protect trolley circuits shall have a voltage rating that equals or exceeds the maximum no-load voltage of the trolley circuit and shall be capable of interrupting the maximum fault current that can flow through the interrupting device. Molded-case circuit breakers are sometimes installed in trolley circuits with no-load voltages ranging from 275 to 350 volts d.c. Since most molded case circuit breakers are rated only 250 volts d.c., it is often necessary to connect two or more poles of the circuit breaker in series to achieve an adequate voltage rating. When two or more poles of a molded case circuit breaker are connected in series, the poles of the circuit breaker should be wired so the bottom of one pole is connected to the top of the next pole to decrease the voltage stress between adjacent poles when the circuit breaker opens under load. It is not acceptable to connect fuses in series to achieve a higher voltage rating.

A "short circuit" is defined as an abnormal connection of relatively low resistance, made accidentally or intentionally, between two points of different potential in a circuit.

The setting of an automatic circuit-interrupting device should not exceed 75 percent of the minimum available short-circuit current in the protected circuit to compensate for inaccuracies in the setting and the voltage drop across arcing faults. This safety factor is consistent with accepted engineering practice; however, in determining whether a violation of this Section exists, the safety factor shall not be used.

When a molded-case circuit breaker in the a.c. input leads of a rectifier bridge is used to provide short-circuit protection for a trolley circuit, the required instantaneous setting of the circuit breaker will be less than the required

setting of d.c. overload relay located in the output leads of the rectifier bridge. In such instances, the instantaneous setting of the circuit breaker shall not exceed 82 percent of the equivalent d.c. overload relay setting.

Reclosing circuit breakers used to protect trolley systems should be equipped with load-measuring circuits. Reclosing circuit breakers used to protect multiple-feed systems should also be equipped with voltage-differential circuits. Load-measuring and voltage-differential circuits are necessary to prevent the circuit breaker from reclosing on a short circuit or abnormally high load. Load-measuring circuits should be adjusted to as low a value of current as practical. In almost all instances, the system will perform satisfactorily with the load-measuring circuits adjusted at or below 300 amperes; however, there may be instances when slightly higher values are required because of pumps, lights, and other continuous loads on the system. Voltage-differential circuits should be adjusted to values equal to or exceeding 85 percent of the system voltage.

The mine operator should establish a program under which all trolley circuits will be tested and calibrated at least once every 6 months. The circuit breaker may be tested by loading the circuit until the current reaches that amount necessary to cause actuation of the circuit breaker or an external current source may be used. Circuit breakers equipped with solid state controls that are actuated by the voltage drop across a shunt may be tested by disconnecting the control circuit leads from the shunt and applying the proper amount of voltage to the shunt leads to cause actuation. Current actuated relays shall be tested by passing the necessary amount of current through them to cause actuation. Relays that have a current calibration coil may be calibrated with an external current calibration source, provided that: (1) each relay is installed, adjusted, maintained, tested and calibrated in accordance with the manufacturer's instructions; and (2) the tolerance of the calibration current source and the specified relay operating tolerance shall not exceed 15 percent.

The record required by this Section shall be kept in a book and should contain the following:

1. Date of test;

2. Name of qualified person making test;

3. Indicated current setting; and

4. Current required to activate the breaker.

75.1002-1 Location of Other Electric Equipment; Requirements for Permissibility

The distance shall be measured by following the shortest distance that air can travel (tight string distance) through crosscuts, entries or other openings.
In longwall mining, the 150-foot distance shall be measured in a straight line from the wire, cable or electric equipment in question to the outby edge of the longwall roof-support system.

Except in longwall mining, the 150-foot distance specified in this Section and Section 75.1002 shall be measured from the wire, cable or electric equipment in question to the nearer of either:

1. The outby edge of the pillar being mined; or

2. The inby edge of the solid pillars immediately outby the previously pillared area.

75.1003 Insulation of Trolley Wires, Trolley Feeder Wires and Bare Signal Wires; Guarding of Trolley Wires and Trolley Feeder Wires

Guarding shall be done with wood, plastic, or other substantial nonconductive material, firmly secured. Guarding shall extend for at least 6 feet from each side of the door or stopping. In advancing sections where the trolley feeder wire is extended beyond the track, or in retreating sections where the track is removed before the trolley or trolley feeder wires, adequate guarding shall be required between the end of such wires and the end of the tracks.

75.1003-1 Other Requirements for Guarding of Trolley Wires and Trolley Feeder Wires

"Equipment" for the purpose of this Section is interpreted to mean track-mounted equipment, off-track mining equipment, component parts of mining equipment, mine supplies, or any item used in the operation or maintenance of a coal mine.

This Section applies to movement of any item that is used in the production or transportation of coal or in performing any duty necessary for the operation and maintenance of the mine. This Section requires mine management to take adequate precautions prior to movement of equipment to prevent the item being moved from contacting the trolley or trolley feeder wire. If the

inspector has reason to believe that any equipment, including off-track mining equipment, has been allowed to contact the trolley or trolley feeder wires, creating a short circuit, this Section should be cited.

The following precautions are considered adequate for movement of equipment other than off-track mining equipment in track and trolley entries:

1. Maintenance of 12 inches vertical clearance between the equipment being moved and energized trolley or trolley feeder wires; or
2. Deenergization of the trolley and trolley feeder wire while equipment is being moved along track and trolley entries; or

3. Transportation of the equipment in a mine car or other vehicle having two sides with dimensions not greater than the sides of mine cars normally used in the track haulage system. The equipment being transported shall not extend above the sides of the mine car; or

4. Transportation of small items of mine equipment, such as small pumps, component parts of mining equipment, and mine supplies, in a vehicle that normally traverses the intended route, provided no part of the equipment being transported extends higher than that part of the frame of the vehicle that is in front of or to the rear of the item being transported.

If items 1 through 4 cannot be met, adequate protection would require compliance with Sections 75.1003-2(a) through 75.1003-2(f)(5) or other equally effective safeguards designed to insure that such equipment will not contact energized trolley wires or trolley feeder wires.

75.1003-2 Requirements for Movement of Off-Track Mining Equipment in Areas of Active Workings Where Energized Trolley Wires or Trolley Feeder Wires are Present; Premovement Requirements; Certified and Qualified Persons

"Off-track mining equipment" for the purpose of this Section is interpreted to be a major item of complete or reasonably complete mining equipment, built on its own individual frame, consisting of its own components, performing its own unique function, and not designed to operate on mine track. "Off-track mining equipment" includes all self-propelled equipment

including cat-mounted rubber-tired or skid-mounted equipment. "Off-track mining equipment" includes major items of complete or reasonably complete mobile or stationary mining equipment that is used in the production of coal or to supply electrical, hydraulic, or pneumatic power to mining equipment.

At times, cutting heads, drill booms, conveyor booms, electric motors, etc., are removed from machines to facilitate transportation in the restricted confines of coal mine entries. These machines are still considered to be off-track mining equipment within the meaning of this Section. However, the detached cutting heads, drill booms, conveyor booms, electric motors, etc., are component parts of a machine and cannot be considered to be off-track mining equipment. Neither can roof bolts, oil barrels, steel ties, steel rails, belt structure, or other mine supplies be considered as off-track mining equipment.

When the trolley wire and trolley feeder wire are 12 inches horizontally from the equipment being moved, the equipment almost always passes under turnouts where the trolley wire and trolley feeder wire will be directly over the equipment being moved. Therefore, 12 inches horizontal clearance is not acceptable as compliance with this Section.

The measurement of 12 inches vertical clearance shall be determined by measuring vertically from the trolley wire to a perpendicular line intersecting with the highest projection on the equipment being moved.

75.1100-1 Type and Quality of Firefighting Equipment

Waterlines, with hoses attached, shall be of sufficient size to deliver 50 gallons of water per minute at a nozzle pressure of 50 psig. With this water flow and nozzle pressure, an effective solid stream can be projected about 60 feet in a 6-foot high entry. Water flow through the nozzle can be measured by a pitot tube instrument if the diameter of the nozzle orifice is known. For adjustable nozzles, the rate of flow decreases as the water flow pattern changes from a solid stream to a spray or fog. The minimum rate of 50 gpm shall be available at the most distant point in the mine. The type and method of installation of waterlines are options of the operator, provided they meet the requirements of Subpart L.

Portable water cars shall be examined during each regular inspection to ensure that the pump, valves and fittings have not corroded excessively.

A portable chemical car shall contain 125 pounds of all-purpose dry powder for each 500 gallons of water capacity required of a water car. The car shall contain provisions for expelling dry chemical through a hose and attached nozzle. The hose shall be a minimum of 100 feet long and a maximum of 150 feet long. The dry chemical is expelled rapidly; therefore, firefighting operations using a portable chemical car should be conducted by personnel trained in its use.

The portable foam-generating machine or device shall be equipped with all hardware necessary to install the machine or device in a mine passageway. Generally, plastic brattice (or equivalent) material is needed to seal the entry at the installation location. The foaming agent tends to be corrosive to metal parts and, unless the machine or device is carefully cleaned after use, the valves, pump and fittings may become inoperative.

Only foam-producing and multi-purpose dry chemical portable fire extinguishers are acceptable. The older type sodium bicarbonate extinguisher can be converted for use with all-purpose dry chemicals; however, such conversion can be hazardous and voids the approval of Underwriters' Laboratories, Inc., and Factory Mutual Research Corp. Therefore, such converted extinguishers are not acceptable as complying with paragraph (e) of this Section.

Portable fire extinguishers purchased after March 30, 1971, shall

have a 2A 10 BC minimum rating. The letters "A," "B," "C" refer to the class of fire for which the dry chemical is effective, and the numerals "2" and "10" refer to the size of the standard fire for which the extinguisher is effective.

Class A fires are those occurring in solids such as coal, wood, rubbish, textiles and rubber. Class B fires are those occurring in flammable and combustible liquids such as fuel oils, lubricating oils, grease, paint, varnish and lacquer. Class C fires are those which involve energized electrical equipment where the electrical nonconductivity of the extinguishing medium is of importance. Where electricity is involved in a fire, the electric circuit should be broken or deenergized as soon as possible.

Fire hose suitable for use in coal mines must meet specific requirements. The lining material shall pass MSHA's test outlined in Schedule 2G to limit the flammability. Generally, the lining will be a synthetic rubber. The jacket shall be polyester or its equivalent. When subject to flame, the polyester jacket will melt and burn somewhat; however, the polyester is more vermin-resistant than other jacket materials. The flammability characteristics of the polyester jacket can be reduced by chemical treatment or by an impregnation of synthetic rubber of the type used for the liner. Such hose is highly recommended but is not necessary to meet the minimum specifications. The bursting pressure of the hose shall be at least four times the static pressure at the hose inlet. The hose coupling should also be designed to withstand the required bursting pressure. Couplings approved for fire hoses by the Underwriters' Laboratories, Inc., or Factory Mutual Research Corp. are recommended. Short shank couplings (of the type ordinarily used on water or air hose) will blow off at pressures ranging from 300 to 600 psig even if fastened with two hose clamps. Short shank couplings are not recommended for fire hoses; however, in a few instances, where the static pressure is less than 120 psig, they might meet the minimum requirements of the regulations, provided the water flow rate of 50 gpm through the nozzle is obtained. Short shank couplings cause excessive pressure loss; therefore, it is important to ensure that the minimum quantity of 50 gpm is met.

Fire hose purchased prior to December 30, 1970, may be used if it meets all requirements except those for flammability. An inspector having reason to doubt the acceptability of a specific fire hose should obtain all available manufacturer's specifications and refer such information to his supervisor. The supervisor should request clarification from the MSHA Approval

and Certification Center, Technical Support. Manufacturers of fire hose accepted by MSHA for flame resistance are required to place the acceptance numbers at intervals not to exceed 3 feet along the length of the fire hose.

Where waterlines are installed on a section, sufficient fire hose shall be provided to reach from the water outlet to each working face for fire-control operations. Water hose, ordinarily provided in a section and connected to machines for dust-suppression purposes shall be considered inadequate as fire hose if the rate of water flow through the hose and nozzle is less than the required 50 gallons per minute.

Average daily production figures shall be obtained from information submitted in accordance with procedures, as required by the respirable dust information reporting system.

Rock dust shall be dry and usable to comply with this section. If containers other than bags are used, a means of transporting the rock dust, such as shovels, pails, etc., to any location on the section shall be provided.

75.1100-2 Quantity and Location of Firefighting Equipment

Paragraph (a)(1) requires that each working section in the coal mine, where the production is 300 tons per shift or more, shall be provided with one of the combinations of firefighting equipment listed below:

	Combination Options and Number Required						
Fire Suppresion Equipment	a	b	c	d	e	f	g
Portable fire extinguisher	2	2	2	2	2	2	2
240 pounds of rock dust	1	1	1	1	1	1	1
Waterline with fire hose	1						
Portable water car			1	1			2
Portable chemical car		2			1	1	
Portable foam-generating machine			1		1		
Portable high-pressure rock-dusting machine				1		1	

Paragraph (a)(2) requires that each working section in the mine, where the mine production is less than 300 tons per shift, shall be provided with one of the combinations of firefighting equipment listed below:

	Combination Options and Number Required			
Fire Suppression Equipment	a	b	c	d
Portable fire extinguisher	2	2	2	2
240 pounds of rock dust	1	1	1	1
500 gallons of water with three 10-quart pails	1			
Waterline with fire hose		1		
Portable water car (500-gallon) with hose			1	
Portable all-purpose chemical car (125 pounds)				1

If 500 gallons of water and three 10-quart pails are provided, the water supply shall be available for transportation to any location on the section. Where water cars are used as section fire protection equipment, the water cars shall contain no less than the minimum amount of water required at all times. If the water cars provide water for dust abatement, etc., additional cars or water capacity shall be provided to ensure the availability of the minimum amount of required water at all times.

Firefighting equipment provided for working sections in all coal mines shall be stored in an accessible location at or inby the loading point.

The waterline required by paragraph (b) of this Section can be located in an adjacent entry, but outlets with valves must project into the belt entry every 300 feet. Fire hose connected to a waterline and projected into the belt entry will not be considered adequate since the valve must be located in the belt entry. "Entire length of belt conveyors," as used in this Section, includes that portion of underground belt conveyors that extend onto the surface of a mine, unless the surface located drive unit for the belt is 100 feet or more from any intake airway.

Five-hundred feet of fire hose, at strategic locations, shall be provided for each belt conveyor which is independently driven. However, where the length of the belt conveyor is less than 500 feet, only a length of fire hose sufficient to reach the length of such belt conveyor need be provided.

Direction of the air current along the belt, amount of fire hose, height of coal seam, and availability of transportation for men and materials must be considered to determine strategic locations for storing fire hose along belt conveyors. Ideally, the fire hose should be stored on intake air near the belt conveyor drive, but conditions may dictate that another location is suitable, or that a separation of the hose into two or more sections is necessary. Any tools or accessories required to join hose pieces or connect fire hose to the waterline shall be stored with the fire hose and shall be easily accessible. Waterlines are not required to parallel extensible and Lo-Lo conveyor belts serving mining machines if the length of such belt is less than 600 feet and sufficient fire hose is available to extend to the working face. Fire suppression devices and signal and alarm systems are not required to be installed along such conveyor belts. However, the belts considered as face equipment must have fire protection at the belt drive as specified in paragraph (e) of this Section for permanent electrical installations and, if hydraulically operated, must have fire suppression devices as provided in Section 75.1107.

Paragraphs (c)(1) and (c)(2) require that in mines producing 300 tons of coal or more per shift, all track entries in which mechanized equipment is used shall be protected by suitable firefighting equipment. Where waterlines are used, a minimum of 500 feet of fire hose shall be located at a readily accessible location which is plainly marked. Crosscuts, runarounds, sidetracks, etc. may be provided protection with one waterline if the outlet valves are located in a manner which allows 500 feet of fire hose, connected to one of the valves, to reach any such track location. Where two portable water cars are used in lieu of waterlines prescribed in this section, each water car shall operate individually and not be dependent on another water car for pump, hose, nozzle, or water. Where two or more adjacent mines are connected by track, one of the water cars required for each mine may be considered to be a common unit. All water cars shall be located on intake air as near the entrances to the mine as conditions permit and shall be properly filled, equipped, and ready for use at all times.

If rock dust is used as fire protection along such haulage tracks, the rock dust shall be in a dry, usable condition at all times.

One portable fire extinguisher is also required on each battery-powered tractor by paragraph (d).

A permanent electrical installation as addressed by paragraph (e) is electric equipment that is expected to remain in place for a relatively long or indefinite period of time.

Consequently, the following electric equipment should be considered permanently installed:

> All rectifiers, transformers, high-voltage switchgear, and battery chargers which are not located on and advanced with the working section, rotary converters, motor-generator sets; belt drives, compressors, pumps (except those excluded below), and other similar units of electric equipment.

The following electric equipment should not be considered permanently installed:

> Electric equipment which is located on and advanced with the working section, self-propelled electric equipment, portable pumps and portable rock dusters which are regularly moved from one location in the mine to another, and similar electric equipment.

Paragraph (f) does not apply to synthetic ester types of fire-resistant hydraulic fluids. Storage underground of more oil than is normally delivered to the working sections shall be considered a permanent oil storage station.

When welding, cutting, soldering or other operations using open flame are conducted on a working section, the firefighting equipment provided under paragraph (a) of this Section may be used at the welding, cutting, or soldering site to fulfill the requirement of paragraph (g).

As addressed in paragraph (i), if 5 tons of rock dust is readily available, within 2 miles of each working section, loaded in or on a wheeled vehicle, it does not have to be located with the other emergency materials. All other emergency materials shall be stored together and shall be readily accessible at all times.

When emergency material is stored at a central warehouse or building supply company, the inspector should determine whether the material will be available for shipment to the mine at all times.

75.1100-3 Condition and Examination of Firefighting Equipment

All firefighting equipment shall be maintained in a usable and operative condition. Rock dust shall be dry, water cars shall be kept filled and operative, water containers and pails shall be in usable condition, and chemical extinguishers shall be examined every 6 months. The inspection of chemical extinguishers should determine that:

1. The extinguisher is in its designated place.

2. Access and visibility to the extinguisher are not obstructed.

3. Seals should not be broken. This is an indication that the extinguisher may not be full. Some extinguishers have to be lifted slightly to determine if they are full.

4. The extinguisher has not been physically damaged or have any obvious defects (clogged nozzle, corrosion, leakage, damaged hose, etc.).

5. The examination record on the tag is up-to-date. This section is interpreted to mean that water shall be kept constantly in the waterlines in sufficient amounts to meet the requirements of Section 75.1100-1(a). The phrase "50 gallons of water per minute," as used in Section 75.1100-1(a), does not mean for only 1 minute.

In those instances where there is danger of freezing and bursting the waterlines if water is kept in the lines, the mine operator should consider a pressurized system, or should file a petition for modification under the provisions of Section 101(c) of the Act.

75.1101 Deluge-Type Water Sprays, Foam Generators; Main and Secondary Belt-Conveyor Drives

In requiring fire suppression systems for belt conveyor drives, apply the same rule used in Section 75.603 and in Section 75.1103, which permit the use of belt conveyor drives without a fire suppression system for 24 production shift hours after they have been installed before a citation is issued.

The figures "50 feet" and "150 feet" referred to in Sections 75.1101, 75.1101-5(b)(1) and (2), 75.1101-7(b) and 75.1101-14(a) mean lineal feet of belt entry.

Guidelines for Fire Protection at Surface Located Drive Units for Underground Belt Conveyors:

1. All belt drive units located within 25 feet of any intake airway should be equipped with an automatically actuated fire suppression system as described in this Section.

2. Belt drive units located more than 25 feet but less than 50 feet from any intake airway should be equipped with an automatically actuated fire suppression system, unless fire doors or air lock doors are provided in the belt entry and in all intake entries within 50 feet of the drive unit.

3. Belt drive units located more than 50 feet but less than 100 feet from any intake airway should be equipped with a sensor system which will automatically sound an alarm and stop the conveyor drive motor when a fire occurs on or near such belt drive.

   The alarm shall be at a location where it can be heard by a responsible person who is always on duty while men are underground.

   If a responsible person is not stationed where he can hear the alarm and/or is not always on duty while the belt is running and miners are underground, a fire door or air lock should be installed in the belt entry and all intake entries within 100 feet of the belt drive. If the conditions are not met, a fire suppression system should be required.

4. Belt drive units located 100 feet or more from any intake airway should be protected with one or two portable fire extinguishers as applicable under Sections 75.1100-2(e)(1) or (e)(2) (electrical installations).

   Measurements made to determine the distance between the drive unit and the mine opening should be made between the belt drive roller and the nearest mine opening or intake airway, as applicable. The fire suppression system, fire door/air lock doors, and sensor controlled stop and alarm described in paragraphs 1, 2, 3 and 4 are in addition to

portable fire extinguishers and waterlines equipped with fire hose outlets and valves required by Sections 75.1100-2(b) and 75.1100-2(e).

75.1101-3 Water Requirements

The following additional features are to be considered and, unless deemed not necessary by the District Manager, shall be included in the installation:

1. When activated, the sensor system (or water flow) should stop the belt;

2. Sensors and nozzles should be located at or near the electrical controls, belt takeup and gear reducing units;

3. A manually-operated by-pass valve, located away from the belt drive, should be installed to furnish water to the suppression system in the event the automatically activated valve fails to open;

4. The sensor system required by Section 75.1103 must be provided with a standby power source maintaining an operative system for a minimum of 4 hours, unless the belt haulageway is examined in accordance with Section 75.1103-4(e);

5. When activated, the sensor (or water flow) shall operate an effective alarm signal, preferably both audible and visual. The warning sign must be located at a site where someone is in constant attendance, such as an attended belt loading point, section loading point, dispatcher's office, shop, mine office, lamp house, etc.;

6. The sensor system shall include a warning indicator (or test circuit) which shows it is in operative condition; and

7. The system shall require manual shut-off.

The installation of a water deluge system generally requires two branch lines to provide adequate water on the top of the top belt and to the surfaces between the two belts. A single branch line located at the top belt ordinarily does not offer an equivalent flow pattern. However, the single branch line system can be considered equivalent when the following conditions are met:

1. The entry width does not exceed 16 feet, and the entry height is not less than 6 feet;

2. The static water pressure is not less than 250 psig and the quantity of water delivered with all nozzles operating is not less than 1.0 gallon per square foot of top belt surface area per minute; and

3. The nozzles are mounted above the top conveyor belt near the roof, and reasonable water coverage of the belt surfaces is achieved by splashing action.

The maximum distance between nozzles shall not be more than 8 feet to achieve a reasonable water spray pattern. In general, the nozzles need not be closer than 6 feet apart.

The regulations require that 50 feet of fire-resistant belt and 150 feet of nonfire-resistant belt adjacent to the drive be protected. Depending on ventilation, design, and belt arrangement, this 50 (or 150) feet of protected belt should begin at the discharge roller if the discharge roller and drive roller are not more than 25 (or 75) feet apart. Where the discharge roller and drive rollers are more than 25 (or 75) feet apart, the protected area should include 25 (or 75) feet of adjacent belt in each direction from the drive roller. Where air velocity is a factor, the greater part of the protected area should be downwind from the drive roller.

The type, number, and location of the sensors are critical features of a water deluge system. There are about a dozen basic types of sensors which can be used, i.e., fixed temperature (heat), rate of temperature rise, rate compensation, radiation, ionization, combustion gases, smoke, heat detecting wire, pneumatic tube type, and resistance bridge type.

The location of the sensors should, in general, be in accord with the recommendation of the manufacturer. Sensors responding to heat should be located near the roof, preferably above the belt, drive rollers, powered takeup unit, transmission, and motor. Often, one sensor can be situated strategically to serve two of the possibly hazardous units.

75.1101-5 Installation of Foam Generator Systems

Automatically-operated high-expansion foam devices may be used for fire suppression at belt drives. The capacity of the unit shall be sufficient to cover 50 feet of fire-resistant belt conveyor (150 feet of nonfire-resistant belt) as well as the takeup and gear reducing units and electrical controls with foam in 5

minutes. In calculating the capacity, the volume of foam generated need not fill the entry to the roof but must be capable of filling the entry to the top belt.
Generally, the foam generator should be located on the intake air side of the belt drive and other components to be protected so as to take advantage of the ventilating air in moving the foam and preventing air, contaminated by smoke and hot gases, from entering into the foaming unit. Smoke and hot gases in the intake air to the unit decrease the efficiency of foam generation. The warning device actuated by the sensor or foam generator should be located where a miner is in constant attendance.

The foaming agent used in most foam generators tend to corrode metal parts. Therefore, care should be taken to flush out and clear the unit after operation.

The development of a foam plug in a passageway will affect the ventilation pattern. If the belt is in a neutral airway, smoke will be trapped in the entry decreasing visibility and travel.

75.1101-8 Water Sprinkler Systems; Arrangement of Sprinklers

The installation of a water sprinkler system for fire suppression at belt drives generally requires two branch lines so that an effective water discharge pattern can be produced. A single branch line located at the top belt ordinarily does not offer an equivalent flow pattern. However, the following single branch line system can be considered equivalent when the following conditions are met:

1. The entry width does not exceed 16 feet, and the entry height is not less than 6 feet.

2. The static water pressure is not less than 250 psig, and the quantity of water delivered with all nozzles operating is not less than 1.0 gallon per minute per square foot of top belt surface area.

3. The nozzles are mounted above the top conveyor belt near the roof, and reasonable water coverage of the belt surfaces is achieved by splashing action.

The maximum distance between sprinklers shall not be more than 8 feet to achieve a reasonable water spray pattern. In general, the sprinklers need not be closer than 6 feet apart. If sprinklers are too close together, the cooling action of the water from one sprinkler may affect the operation of another.

It is important that sprinklers be located so as to be actuated by the heat from a potential fire. The sprinklers shall operate in the temperature range 150°F to 300°F. Under some circumstances, sprinklers operating below 212°F may be actuated by steam.

If a large number of sprinklers are actuated by steam, the quantity of water flowing through these may decrease the quantity of water through those sprinklers in the fire area.

Sprinklers cannot be tested directly for the yearly functional examination without destroying their usefulness. In order to test a sprinkler system, the end sprinkler should be removed to ensure adequate water flow. The sprinklers should be free of dirt, and all damaged sprinklers should be replaced.

Sprinkler system lines are normally filled with water. Where freezing temperatures exist, the pipes may freeze and burst, or ice may form and plug the lines. Alternative systems developed for this situation are:

1. Regular dry pipe system.

2. Preaction system.

3. Deluge system.

4. Combined dry-pipe and preaction system.

These alternative methods are acceptable provided they offer equivalent protection and are installed in accordance with the provisions of the Fire Protection Handbook published by the National Fire Protection Association.

75.1101-13 Dry Powder Chemical Systems; General

Suppression at belt drives by all-purpose dry powder was included to serve primarily where freezing temperatures exist. The dry powder system operates for a short period of time (1 minute) whereas the deluge or sprinkler systems operate for 10 minutes or longer. Therefore, the dry powder system must be carefully designed to be effective. The discharge pattern from the nozzles is critical, and, normally, the locations of the nozzles shall be designed by an expert. Damaged or misaligned nozzles should be replaced promptly. The dry powder system consists of an open pipeline system. In order to prevent moisture and dust from entering pipes, the nozzles should be loosely covered. This can be achieved by tape covering, by water-proof grease or equivalent means. Caps that are tightly fastened should be checked to ensure they will blow off readily; screw caps are unacceptable. If

grease or similar materials are used, the orifices should be checked to insure the material has not hardened.

When the dry powder system operates, the mine passageway becomes filled with a dense cloud (ammonium phosphate). This material is nontoxic, but may impair breathing and vision. For this reason, guardrails or equivalent devices must be provided for the safety of miners in the immediate vicinity.

After operation of the system, the pipelines must be cleaned of dust and dried. If dust remains in the pipe, it may absorb moisture and cake. The all-purpose powder is slightly corrosive to metal parts especially when wetted. Thus, metal equipment and components of the fire suppression system should be cleaned.

The yearly test of the suppression system can be made by checking the powder storage compartment, the gas expelling unit, and by blowing the dry air (preferably bottled nitrogen) through the piping. It is important to ensure that the dry powder is not exposed to the humid atmosphere. If so, it will absorb moisture and cake. It is recommended that all dry powder be discharged through the system every 2 years.

75.1103-2 Automatic Fire Sensors; Approved Components; Installation Requirements

Fire sensors used in belt passageways shall be listed or approved by Underwriters' Laboratories (UL) or Factory Mutual (FM). New or unique devices to be used as fire sensors that are not yet listed by UL or FM and which may meet the requirements of these regulations shall be submitted to the Technical Support Group, MSHA, through the Chief, Division of Safety, Coal Mine Safety and Health, 1100 Wilson oulevard, Arlington, Virginia 22209-3939, for a determination of acceptability and recommendation.

75.1103-3 Automatic Fire Sensor and Warning Device Systems; Minimum Requirements; General

The district manager can approve a sensor and alarm system even though the components are not listed or approved by a recognized testing laboratory. Some components, such as electronic items and new or unique devices, are not listed or approved by these agencies. However, such approval should be done judiciously, requiring detailed description and possible future compliance, if applicable, with Factory Mutual Research Corporation (FM) or Underwriters' Laboratories, Inc. (UL), standards. It is not mandatory that all components of the fire-warning device systems be listed or approved by UL or FM. However, MSHA will require that all components be adequate with regard to "type and quality."

For some components, this may mean the listing of approval by UL or FM.

All automatic fire warning systems must meet the requirements of 30 CFR 75.1103-4 through 75.1103-7, including when more than one type of system is installed in a belt entry. For example, if a CO monitoring system is installed in conjunction with a point-type heat sensor system, both systems must meet the installation and maintenance requirements of 30 CFR 75.1103-4 through 77.1103-7 and be fully operative at all times. This policy will not require the secondary system to be a complete system.

Application of this policy must take into consideration the installation and debugging phase that sometimes occurs when new types of fire warning systems are installed. Operators should be afforded a reasonable time for a redundant or replacement system to be installed and tested. Proper application of this policy is facilitated by the operator informing MSHA of plans to install a new system.

75.1103-4 Automatic Fire Sensor and Warning Device Systems; Installation; Minimum Requirements

Recognizing that a rise in temperature may activate either fire detection system installed on separate flights at the flight connection point, systems which activate either fire detection system upon a rise in temperature within 125 feet of the connection point can be considered equivalent to a system which provides identification of fire within each belt flight if the district manager determines that the miners are provided equivalent protection. If it has been determined that the system has failed to provide identification of a fire within a belt flight, any citations issued should be cited as a violation of this Section.

Where practicable, point-type sensors responding to temperature rise should be installed at or near the center of the belt and not more than 12 or less than 6 inches from the roof, except where installation of sensors in extremely high areas would pose a hazard through the use of ladders or scaffolding, or local irregularities prevent such installation.

Heat detecting Twisto Wire and Protecto Wire are acceptable as sensors, provided they are properly installed with two twists per linear foot. Proper tension is required on the Twisto Wire, and if Protecto Wire is used, it must be in minimum lengths of 12 inches and properly secured by soldering or other substantial means. However, acceptability does not apply to a system unless the entire system is in compliance with these regulations.

Any fire sensor and warning device system installed in a return airway must be approved as permissible by the Approval and Certification Center under Part 23. An approval under Part 23 requires that only components specified in the approval may be used with the system unless authorization for the use of different components has been obtained from the Approval and Certification Center by the mine operator. The unauthorized substitution of components different from those which were specified in the approval of a permissible fire sensor and warning device system used on a belt conveyor in a return airway shall be cited as a violation of Section 75.1103-7(b).

Some coal mines have intermixed heat sensors and heat sensor cables with reverse conductor color codes in the same polarized fire sensor and warning device system. Therefore, heat sensors which are polarized so that the white conductor must be positive have been installed in heat sensor cables which are polarized so the black conductor must be positive. Likewise, heat sensor cables which are polarized so that the white conductor must be positive have been connected to heat sensor cables which are polarized so that the black conductor must be positive.

If the colors are matched when splicing heat sensors and heat sensor cables with one conductor color code into heat sensor cables of the opposite conductor color code in accordance with customary electrical practice (black to black, white to white), the system will malfunction and no audible or visual signal will appear at the control station when an improperly polarized heat sensor(s) is activated. Although it is possible to correctly intermix heat sensors and heat sensor cables of opposite conductor color codes in polarized fire sensor and warning device systems, the potential confusion created by the differences in conductor color codes could create a safety hazard. Even if assurances are given that initial installation will be done in accordance with instructions to splice black to white conductors, there can be no satisfactory assurance that later maintenance will always be performed correctly because the method is contrary to common practice. Therefore, the use of heat sensors and heat sensor cables with opposite conductor color codes within the same polarized fire sensor and warning device system is not acceptable under Section 75.1103-2. Enforcement personnel should recognize that it is not important which conductor color code is used in a polarized fire sensor and warning device system as long as the conductor color code and polarity of all heat sensors and heat sensor cables within the system are the same and the polarity of the heat sensors

cable is compatible with the control unit and other components of the system.

The assistance of a coal mine inspector (electrical) or electrical engineer should be requested, when necessary, to determine if a mine operator has installed heat sensors or heat sensor cables with opposite conductor color codes within a polarized fire sensor and warning device system.

Other sensors addressed in paragraph (a)(2) that respond to effects of fire other than heat may be acceptable subject to individual determination. The Technical Support Group, in Bruceton, Pennsylvania, will provide assistance where needed in making this determination.

"Unplanned removal of power" and "preplanned removal of power" referred to in paragraphs (a)(3) and (e) do not include those times when it is necessary to remove the power to make minor repairs or adjustments. An examination is not required for that period of time normally required for shift change, provided the time required for shift change does not exceed 2 hours.

Where the operator chooses to make the examinations referred to in lieu of an automatic fire sensor and warning device system that will provide the 4-hour protection, the examination referred to would be required if the power supply to the sensor and alarm is removed, or the power is removed from the belt for more than 30 minutes during a production shift, or the belt is stopped prior to the beginning of an idle shift or an idle period such as weekends or holidays.

A battery must be disconnected automatically from the sensor system in the event the power is cut off as required by Section 75.321, unless the sensor system is intrinsically safe.

75.1103-5 Automatic Fire Warning Devices; Manual Resetting

"Effective warning signal" as used in paragraph (a) of this Section means "a signal indicating an emergency and requiring immediate action." Both audible and visual signals shall be provided as required by Section 75.1103-1.

The audible signal shall be capable of being heard from any point within the full range of the assigned duty locations of the person referred to in paragraphs (a)(1) and (a)(2), and the signal shall be audible above the normal sounds of the mining operation. This Section should be used to cite a failure of the system, when activated, when it does not provide an effective warning signal at either the work locations where miners may be endangered from a

fire at the belt flight or at a manned location where personnel have communication with all miners who may be endangered.

The visual signal shall be capable of attracting the attention of persons referred to in paragraphs (a)(1) and (a)(2) under normal mine lighting conditions.

Both signals need not be located in the same place. In some instances, the signals may be acceptable located a considerable distance apart, provided such signals can be seen or heard by responsible persons.

An alarm signal at the section telephone equivalent to that of a loud speaking telephone or "Page" system will be accepted for compliance with paragraph (a).

Sensors responding to effects of fire other than heat may be acceptable subject to individual determination. The Technical Support Group, Bruceton, Pennsylvania, will provide assistance where needed in making this determination.

Means for "Rapid Evaluation" as addressed in paragraph (b) is any method that will effectively demonstrate that the sensor and warning device systems are operative and capable of performing in the event of a fire. This will be determined on a system-by-system basis by the district manager.

MSHA will accept a system in which the trouble signal is or is not distinctive from the alarm signal. However, in this later instance, both the trouble and alarm signal will indicate a "fire" situation. The mine operator will then be required to respond to the signal prepared to control a fire. That is to say, that the communication lines need not be electrically monitored for short circuits, ground faults, and open circuits.

If communication lines are incorporated into a fire-warning system, MSHA will accept the use of communication systems without electrical supervision.

75.1103-6 Automatic Fire Sensors; Actuation of Fire-Suppression Systems

The fire sensor and suppression devices required at belt drives under Section 75.1101 may be separate and apart from the sensor and alarm system required under Section 75.1103, except that the sensor and alarm system required under Section 75.1103 shall transverse and include the belt drive area. If the systems required under Sections 75.1101 and 75.1103 are combined and are interconnected, then the more stringent requirements of Section

75.1103-7(b) shall apply. For example, if the sensor and alarm system under Section 75.1103 is intrinsically safe, then interconnected fire-suppression devices under Section 75.1101 shall also be intrinsically safe.

75.1103-7 Electric Components; Permissibility Requirements

In order for the sensor and alarm system to remain functional as required by Section 75.1103-4(e), the source of power can be the line side of the circuit breaker or other protective device normally used to stop the belt. When battery-powered systems are used to comply with this section, a relay may be used to disconnect the battery power supply. A manually-operated on/off switch actuated by a miner as he leaves the section is not acceptable.

75.1103-9 Minimum Requirements; Fire Suppression Materials and Location; Maintenance of Entries and Crosscuts; Access Doors; Communications; Fire Crews; High-expansion Foam Devices

One supply of materials required by paragraph (a) of this Section will suffice for two belt drives, provided the supply is located within 300 feet of each drive unit and the ventilating current in both belt drive entries travels in a direction opposite that of the normal movement of the belts.

"Five hundred feet of fire hose" required by paragraph (a)(1) of this Section may be satisfied by the same fire hose required by Section 75.1100-2(b) or (c) if such hose is within 300 feet of the belt drive or tailpiece, as applicable.

The fire suppression required by paragraphs (a)(2) and (d) of this Section may be an extension of the system required by Section 75.1101 or a separate system installed at the belt "discharge head." In either case, the fire suppression system need cover only the belt discharge head in addition to that area now protected by the requirements of Section 75.1101.

"A crew consisting of at least five members" as used in paragraph (e) of this Section means any five men within the mine during the same working shift.

75.1103-11 Test of Fire Hydrants and Fire Hose; Record of Tests

Fire hose shall be tested annually to ensure that the hose and couplings are serviceable. The test shall include unreeling and reloading all of the fire hose at each depot and flowing water through hose with a nozzle attached. The nozzle, if adjustable, shall be opened and closed quickly to introduce shock to the system. When the fire hose is made up of sections, at least one

section shall be so tested each year, and a record kept of the date, the pressure used, and the fire hose section tested. A different section of hose shall be tested each year. However, if the fire hose consists of more than five sections, then all of the sections shall be tested at least once during the 5-year period. In addition, if any water leakage occurs during a test, then all of the hose at the depot shall be tested, and all leaking hose and/or couplings replaced immediately. It shall not be necessary to dry the hose following a test. The outer surface of the hose shall be kept reasonably clean. In no instance shall a fire hose be tested with compressed air.

75.1104 Underground Storage, Lubricating Oil and Grease

Portable, closed metal containers are considered to be of fireproof construction for temporary storage of lubricating oil and grease in face regions and other underground working places. Small vessels should be of the "safety can" type approved by the National Fire Protection Association. However, small metal containers, such as 5-gallon metal containers with plastic pouring spouts or lids are acceptable. No additional storage container is required for grease gun cartridges stored in face regions and other underground working places, provided they are kept in their shipping containers.

Underground storage places for lubricating oil and grease shall be of fire-proof construction in that all sides, roof, and floor must be composed of incombustible material. Concrete, concrete block, cinder block, or plastered wire-mesh fastened on substantial framework (or equivalent) are acceptable. The framework should be metal; however, flame-retardant wood, bearing the Underwriter's Laboratories, Inc., seal may be used also. The floor should preferably be concrete to facilitate removal of spillage. Loose floor material such as sand, cinders,or limestone dust will absorb spilled oil and grease and become flammable.

The storage of emulsion-type fire-resistant hydraulic oils needs special consideration. The water in some emulsion-type oils may evaporate from spilled pools leaving the residue which is highly flammable. Where spillage in storage areas is a factor, the emulsion-type hydraulic oils should be considered as flammable.

Synthetic-ester and similar fire-resistant hydraulic oils remain fire retardant after spillage.

75.1106 Welding, Cutting, or Soldering with Arc or Flame

Underground

This standard requires, among other precautions, that work be done under the supervision of a qualified person and that testing for methane be conducted immediately before and continuously during cutting, welding, and soldering operations. The tests for methane must be made in locations where methane is likely to exist, and in no case is cutting, welding, or soldering permitted in an atmosphere that contains 1.0 percent or more methane.

A person will be considered qualified for testing for methane and for oxygen deficiency if: 1) the person has been qualified for this purpose in the State in which the mine is located, or 2) the person has been qualified for this purpose by the Secretary. Notwithstanding the provisions of 1) and 2), no person shall be a qualified person for testing for methane unless the person demonstrates to the satisfaction of an authorized representative of the Secretary that he or she is qualified to test for methane with a portable methane detector approved by MSHA.

"Continuously" as used in this section is interpreted to mean that a qualified person is to remain at the worksite, and tests for methane must be made at regular and frequent intervals. In mines where welding, cutting, or soldering with a flame is performed, the inspector should observe at least one such operation to determine if the frequency of such tests is sufficient to ensure a systematic and effective means of monitoring the methane content in the air in the vicinity of the worksite.

Methane tests are critical for safe cutting, welding or soldering in an underground coal mine and are somewhat different from methane tests used for general mine ventilation. While § 75.323(a) specifies that tests for methane concentrations must be made at least 12 inches from the roof, face, ribs and floor, this distance requirement is not applicable to welding, cutting or soldering activities performed under § 75.1106. MSHA's policy on § 75.1106 clearly states that methane tests conducted under this section must be made in locations where methane is likely to exist, and in no case is cutting, welding or soldering permitted in an atmosphere that contains 1.0 percent or more of methane. Since the face, roof, ribs, floors and any fully or partially enclosed areas of an underground coal mine are locations where methane is likely to exist, methane tests must also be made at or near the surface of these areas (not 12 inches away) and within any fully or partially enclosed areas that may be exposed to the aforementioned ignition sources. Welding, cutting or soldering activities are prohibited if any methane levels are 1.0 percent or greater within the affected areas. MSHA recommends the use of probes for methane detectors to take some of these measurements.

In a longwall mining system, adequate testing, cleaning, and rock dusting will generally require raising the chain conveyor and securing it above the mine floor before cutting, welding, or soldering operations begin. In this way, the space beneath the conveyor line can be ventilated and tested for methane, accumulated combustibles can be removed, and the area can be thoroughly rock dusted. Where raising the conveyor line is not practicable, other measures may be necessary to minimize the danger of ignitions.

During and after the cutting, welding, or soldering, this section also specifies that a diligent search be made for fire. This is a particularly important precaution because longwall chain conveyor line components or covers on other types of equipment may obscure a small fire.

75.1106-2 Transportation of Liquefied and Nonliquefied Compressed Gas Cylinders; Requirements

This section does not prohibit the transportation on mantrips of Dewars used with supplied-air breathing devices or oxygen bottles for self-contained breathing apparatuses or for first-aid treatment. In addition, the transportation of any compressed oxygen cylinders associated with approved self-contained self-rescuers are not controlled by this standard because they are personal protective devices rather than mining equipment.

75.1106-3 Storage of Liquefied and Nonliquefied Compressed Gas Cylinders; Requirements

Paragraph (b) of this section does not require that the cylinders be constantly attended while repair work is in progress and cutting or welding is done intermittently. However, the cylinders must be removed from the area inby the last open crosscut when the repair work is completed or when the repair work is interrupted for periods of time in excess of 15 minutes.

The term "when not in use" as used in paragraph (c) is not intended to be applied to intervals between intermittent cuts or welds at a given location while work is in progress and the cylinders are attended.

75.1107-1 Fire-Resistant Hydraulic Fluids and Fire-Suppression Devices on Underground Equipment

"Unattended enclosed motors, controls, etc.," as used in paragraph (a)(3) means a reasonable enclosure to afford protection against personal contact with energized parts and against internal deposition of dust. It does not mean "explosion proof." The electrical insulation of components within the "unattended enclosed" equipment is not considered combustible material. A determination should be made in respect to this section because equipment mounted on combustible material, such as untreated wood, coal, or coal dust, would be considered combustible. Equipment mounted on a metal carriage (skid) on the bottom or a top shield, as applicable, will be acceptable as "equivalent" as used in paragraph (a)(3)(iii) provided: a 4-inch air space exists between the unit and the carriage or top shield; the carriage or top shield is substantially constructed of metal at least 1/8-inch thick; and the carriage or top shield covers the entire underside or top surface of the unit, as applicable, and extends at least 2 feet beyond the unit on all four sides.

"Unattended enclosed" equipment referred to in paragraph a)(3) mounted on fire clay or a similar noncombustible mine floor will be acceptable as "equivalent," provided the floor is free of coal, coal dust, or other combustibles.

Small rubber-tired wheels (rim diameter 6 to 8 inches) on mobile transformers do not constitute combustible material within the meaning of paragraph (a)(3)(iii) and need not be removed from unattended electrical power equipment. This interpretation should not be construed to permit the presence or use of other combustible materials at the device, such as a wooden platform base, and shall be restricted to situations and equipment involving only small rubber-tired wheels.

In some instances a determination must be made in regard to similar noncombustible electrically-powered equipment. Careful consideration should be given to the equipment as to its similarity to enclosed motors, controls, transformers, and rectifiers in regard to its being located in a fireproof area or structure.

"Flammable fluid," as used in this section, means any liquid having a flash point below 140°F. This does not include lubricating oil and grease. Electrical cables are required to conform to Schedule 2G only if the equipment is installed in accordance with paragraph (a)(3)(iii) which requires the cables to meet Schedule 2G or that the cables be enclosed in metal conduit.

The intent of this section is that timber supports or other timber appurtenances should be considered as combustible material. Enforcement of this regulation may cause difficulty for some installations. Removal of or substitution of metal supports for the timber may not always be practical. Alternative equivalent fire protection in these instances could be provided by using asbestos boards or metal plates, considering the merits of each existing installation individually.

The "controls" in paragraph (a)(3) are intended to mean large power controls on a working section or other power distribution center. It is difficult to identify all such controls by an ampere rating, and some judgment must be used by the inspector. Questions may arise as to whether an "on-off" switch for an enclosed motor should be included as a "control" and whether such control could be mounted on a wooden post. Such practice can be tolerated if the switch is fully enclosed in a metal box comparable with paragraph (a)(3)(iii), which requires cables to meet Schedule 2G or be enclosed in metal conduit.

Brake fluid used in manually-operated automotive-type braking systems is not considered to be hydraulic fluid within the meaning of paragraph (b) of this section.

It is important that equipment, to be considered attended, be in line of sight of a miner at least once during a 30-minute period. If the normal duties of a miner require that the miner face in one direction opposite to a machine, for example at a belt discharge point, it can be assumed that the miner will turn his head to the machine behind him often enough to comply with the 30-minute requirement of paragraph (c). However, if a machine is closer to a miner than 500 feet but is around a corner, it would be classed unattended unless the normal duties of the miner require him to pass by the obstructing corner during every 30-minute interval, and he or she has reason to look around the corner when passing.

Paragraph (d) of this Section requires that machines normally used at the face be inspected (for fire), and the input powerline deenergized when the miner leaves the area for more than 30 minutes. Deenergization means disconnecting the power cable, or equivalent, at the power center.

75.1107-3 Fire-Suppression Devices; Approved Components; Installation Requirements

The purpose of this section is to ensure that the components of the fire-suppression device are of the type approved by Underwriters' Laboratories, Inc., or Factory Mutual Research Corporation ("UL" or the initials "FM" in a diamond-shaped box will be on the components or device). Generally, Underwriters' Laboratory, Inc., approves the entire system, whereas Factory Mutual Research Corporation approves components. Some hardware components on a fire-suppression device, such as nuts, bolts, clamps, brackets, and the like, need not bear UL or FM approval, but sound engineering judgment should be exercised in overall approval of such a device. Components of a type not listed as approved, or not installed in accordance with the recommendations of a nationally recognized testing laboratory (UL or FM), may be accepted if such components are of a type and installed in a manner approved by the Secretary, as determined by the district manager. However, components of fire-suppression devices on attended and unattended equipment shall be listed or approved by UL or FM where these companies have listed or approved the type of components used in a system.

The Approval and Certification Center has conducted tests on American Biltrite Rubber Company's Cover Compound No. 22107, accepted it for listing, and authorized the marking "USBM-2G-

13C."

Hoses manufactured during 1970, 1971, and 1972 with Biltrite Compound 22107 will be recognized and accepted as complying with paragraph (c) of this Section even though they are not marked 2G-13C.

The examples of the code letter identifications of Stratoflex 212 and 215 hoses are:

Stratoflex 212-8 H-4-V
Stratoflex 215-8 H-4-V

The numbers "212" and "215" identify the type hose, "-8" is the specific size (other members may appear in this location), "H-" indicates the hose was manufactured at Hohenwald, Tennessee, and "V" indicates the year of manufacture as 1970. "W" and "X" indicate 1971 and 1972, respectively.

"Where appropriate," as used in paragraph (d) of this Section, calls attention to the fact that most manufacturers' specifications refer to surface installations and, on occasion, these specifications may not be appropriate for underground installations. This determination will have to be made on a mine-by-mine basis by the district manager.

75.1107-4 Automatic Fire Sensors and Manual Actuators; Installation; Minimum Requirements

The "50 square feet of top surface area," referred to in this Section means the 50 square feet of top surface area and does not include the side surfaces of the machine or its components.

Heat detecting Protector Wire is acceptable as a sensor in minimum lengths of 12 inches, provided the wire is properly secured by soldering or other substantial means.

To be effective, all heat detecting sensors, including sprinklers, must be kept free of oil, grease, rock dust, and other materials that may have an insulating effect.

Paragraph (a)(2) of this Section requires that at least two manual actuators should be installed on all continuous-mining machines and machines with dual controls purchased prior to the effective date of this Section. Some of the smaller pieces of equipment may be equipped with one actuator.

Paragraph (a)(2)(i) of this Section requires that manual actuators on remote-controlled equipment shall be within easy reach of the operator's normal operating position and should be both insulated and clearly identified.

Remotely controlled continuous mining machines can be advanced beyond permanently supported roof while the operator remains in a location under permanent supports. When continuous mining machines are advanced inby permanently supported roof, fire suppression systems cannot be safely actuated as required by 30 CFR 75.1107-4(a)(2)(ii) unless special precautions are taken. Currently, there are two acceptable methods for actuating the fire suppression system on remotely controlled mining equipment:

1. the system can be manually actuated if, at all times, the actuator is located where the roof is permanently supported; or

2. the system can be actuated remotely from a permanently supported location, and the actuation device can be operated by its own power source, independent of the electrical power provided by the trailing cable, as required by 30 CFR 75.1107-4(c).

Mine operators presently employing extended-cut mining systems with continuous miners that are not equipped with fire suppression systems that can be actuated at all times from a location under permanently supported roof are in violation of 30 CFR 75.1107-4(a)(2)(ii). Fire suppression systems that have electrically powered actuation devices that are not powered independent of the trailing cable for the machine are in violation of 30 CFR 75.1107-4(c).

A point-type sensor is a bi-metal strip contactor, thermo-couple, or similar device. If other sensors (plastic-covered wire, radiation, gas, smoke) are used, equivalent protection shall be pro-vided. Manual application at a sprinkler system should consist of a water hose nozzle arrangement or equivalent in the immediate vicinity. This type back-up system is also desirable for other suppression devices.

Two or more manual controls shall be installed where practical. "Where practical" has reference to the size of the machine protected and possible avenues of approach. One control, for example, may suffice on a small roof drilling machine. Normally, the two controls should be on opposite ends or at least one of them in a position away from the operator's cab. The purpose of the two controls is to offer an alternate, should fire, heat or smoke engulf one set of controls.

Sensors as addressed in paragraph (b) shall, where practicable, be installed above the area of the equipment that is likely to produce the most heat in the event of a fire.

Paragraph (c) requires that where the fire-suppression system is dependent on the mine power supply, the power supply to the fire-suppression system must originate on the line side of the overload protection of the equipment being protected.

The purpose of paragraph (e) of this Section is to provide a rapid means of determining that the system is operative. Any effective method will be acceptable.

75.1107-5 Electrical Components of Fire-Suppression Devices; Permissibility Requirements

This Section and Section 75.1107-6 are general requirements for fire-suppression devices which permit the inspector to require proper devices for unusual conditions to insure that adequate fire controls will be achieved.

75.1107-6 Capacity of Fire-Suppression Devices; Location and Direction of Nozzles

"Enclosed to minimize runoff and overshoot of the extinguishing agent," as used in paragraph (b) of this Section, does not prohibit necessary openings in cable-reel compartments to facilitate cleanliness of equipment, provided the discharge nozzle is not directed toward the openings.

Where practicable, and within the intent of these regulations, extinguishant nozzles shall not be located where accidental discharge of the system will endanger the operator of such equipment.

75.1107-7 Water Spray Devices; Capacity; Water Supply; Minimum Requirements

"Inundating" means covering the whole top of the machine either by direct or indirect water spray. "Internal injection" means directing the extinguishing agent into the compartment of the machine.

Past experience has shown that approximately 40 percent of the fires on machines have had a cable to ignite in the cable reel compartment. Some of these fires may have been caused by poor splices and the excessive heat liberated in the coiled cable. Whether fire control with water is achieved by inundating or internal injection, the indicated amount of water shall be directed into the cable reel compartment.

The requirements of paragraph (f) state that the quantity of liquid stored on the machine can be reduced appreciably if certain approved liquid chemicals are added to the water. Tests show that a potassium bicarbonate solution is three to four times more effective than plain water. However, potassium bicarbonate solution is corrosive to unalloyed steel. Other chemicals that are noncorrosive or contain inhibitors are as effective for fire control.

The use of liquid chemical is not mandatory, but the industry should be encouraged to use such additives in water.

75.1107-8 Fire-Suppression Devices; Extinguishant Supply Systems

The purpose of the rising stem, or other visual indicator-type shutoff valve addressed in paragraph (a)(4), is to provide a visual means for assuring that the control valve is in the open position while the machine is operating.

"Reasonable time for changing hose," as used in paragraph (b) means without unnecessary delay.

75.1107-9 Dry Chemical Devices; Capacity; Minimum Requirements

In paragrapsh (b) and (c) of this Section and subsequent regulations, the word "nominal" is used to express the approximate weight in pounds of all-purpose dry chemical.

75.1107-11 Extinguishing Agents; Requirements on Mining Equipment Employed in Low Coal

This Section provides for lesser quantities of extinguishants on equipment with space limitations. However, there may be instances where the equipment is less than 32 inches high and

may not have space limitations. In those instances the full complement of extinguishant shall be installed.

75.1107-12 Inerting of Mine Atmosphere Prohibited

The term "total flooding" does not mean total flooding with water, but control of the potentially hazardous area by inerting the whole atmosphere, i.e., carbon dioxide. This method of fire control is not recommended in mines because of the limited means of escape for miners who might be trapped in the enclosed space.

75.1107-13 Approval of Other Fire-Suppression Devices

Where installation of fire-suppression devices on permissible mine machinery requires alteration of components, a field change approval will be required.

75.1107-15 Fire-Suppression Devices; Hazards; Training of Miners

This Section requires the operator to instruct the miners in safe operating procedures of fire-suppression devices on the equipment that the miners have been assigned to operate.

The inspector shall take appropriate action in each instance where the operator fails to instruct the equipment operator.

75.1107-16 Inspection of Fire-Suppression Devices

"Qualified," as used in paragraph (a) of this Section, does not mean formal training. A person qualified by reason of on-the-job experience and instruction may be designated by the mine operator to inspect the fire-suppression devices.

75.1108 Flame-Resistant Conveyor Belts

Conveyor belts which have been approved as flame-resistant by the Bureau of Mines, MESA, or MSHA are marked every 30 feet on alternate edges of the coal carrying side of the belt, with the following: Flame Resistant MESA, U.S.B.M., or MSHA No.

Subpart M Maps

75.1200 Mine Map

The original maps and tracings of a mine, those from which true copies are made, shall be kept in a fireproof repository to ensure the protection of such maps and tracings from damage or destruction by fire, water, or other such hazards.

Such repository shall be located on the surface of the mine in an area chosen by the operator. Such repository may be located on the surface at a central mine office or in the office of an individual, partnership, corporation, or other such firm contracting the engineering work for a mine, if the following conditions are met: A true copy of the mine map shall be maintained on the surface of the mine in a fireproof building or a fireproof container which meets the approval of the Coal Mine Safety and Health district manager of the district in which the mine is located, and such copy shall be certified by a registered engineer or registered surveyor in the state in which the mine is located.

75.1202 Temporary Notations, Revisions, and Supplements

The mine maps shall be kept up-to-date by temporary notations. However, such notations may be made on a true copy of the mine map. Such a true copy may be considered in compliance with the provision requiring that the mine map be kept up-to-date by temporary notations.

75.1203 Availability of Mine Map

The operator shall furnish to the Coal Mine Safety and Health district manager of the District in which the mine is located two copies of the mine map and any revision and supplement thereof on or before the first day of March of each year unless otherwise specified by the district manager. Such copies shall show all the required information, as posted on the mine map on or after the first day of January of each year.

75.1204 Mine Closure; Filing of Map With Secretary

If the mine is to be permanently abandoned, the operator shall notify the District Manager promptly after ventilation is discontinued and shall submit a complete map of the mine within 60 days of abandonment.

If the mine is to be temporarily closed, the operator shall notify the District Manager promptly after ventilation is discontinued and submit a completion map no later than the expiration of the 90-day period during which the mine was not ventilated.

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Subpart N Blasting and Explosives

There is a formal agreement between MSHA and the BATF relative to compliance inspections of surface explosives storage facilities. These inspections will determine compliance with both MSHA surface standards and requirements in 27 CFR Part 55. Procedures covered by this agreement can be found in the General Inspection Handbook.

75.1310 Explosives and Blasting Equipment

Permissible cap lamp batteries approved as shot-firing units are approved to fire single shots only.

Single-Shot Blasting Units approved under any Schedule except Schedule 12D are not permissible blasting units and must be removed from the mine.

75.1316 Preparation Before Blasting

Paragraph (d) of 30 CFR 75.1316 addresses blasting activities at approaching working faces when the faces are within 25 feet of each other. Some concerns have been expressed as to whether this provision restricts mining of crosscuts to one direction only. This paragraph recognizes that crosscuts could be developed from both directions simultaneously. It is designed to protect against premature detonation of explosives that can occur by accidentally cutting or drilling into loaded boreholes. The 25-foot limitation is based on the size of cutting machine cutter bar and drill steel lengths currently used by the coal mining industry. The hazard addressed is that if cutting and drilling occur simultaneously at two approaching faces with less than 25 feet of separation, drilling could be completed and borehole loading operations started at one face while cutting or drilling activities continue at the other face. Under these circumstances, limiting mining activities to only one face at a time will prevent accidents resulting from the cutting or drilling at one face contacting loaded boreholes in an approaching face, especially if mine communications fail or when the space separating approaching faces is less than anticipated.

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75.1400 Hoisting Equipment; General

A hoist used to transport person(s) shall comply with the provisions of this Section. The number of person(s) transported or the frequency of which the hoist is used to transport person(s) are not factors for compliance with this Section.

Although scaffolding hoists are not equipped with safety catches, they can comply with personnel hoisting regulations. Safety systems utilizing safety belts attached to independently suspended safety lines by lanyards and rope grabs can be approved by district managers as a no less effective device to be used in lieu of safety catches.

The following guidelines should be used in approving these devices.

1. Life lines must be attached to a structural member of the shaft or collar or surface facility and not to the hoist rope outrigger.

2. Life lines of at least first grade 5/8-inch nylon rope, 3/4 inch manila hemp rope, or equivalent, must be provided for each miner.

3. Substantial safety belts securely attached to the independently suspended safety lines by lanyards and rope grabs must be used at all times when embarking, disembarking or working on the platform.

75.1402 Communication Between Shaft Stations and Hoist Room

A signal code shall be adopted and used, and it should be posted in view of the hoisting engineer and at all places where signals are given.

Signals received by the engineer shall be repeated by the engineer when miners are to be hoisted or lowered.

75.1403 Other Safeguards

The safeguards, in addition to those included as criteria in the Federal Register, may be considered of sufficient importance to be required in accordance with this Section.
It must be remembered that these criteria are not mandatory. If an authorized representative of the Secretary determines that a transportation hazard exists and the hazard is not covered by a mandatory regulation, the authorized representative must issue a safeguard notice, allowing time to comply before a 104(a)

citation can be issued. Nothing here is intended to eliminate the issuance of a 107(a) order when an imminent danger exists.

75.1403-3 Criteria - Drum Clutch; Cage Construction

At the bottom of each hoisting shaft and at intermediate landings, a "runaround" should be provided for safe passage from one side of the shaft to the other. This passageway should be not less than 5 feet in height and 3 feet in width.

Ice should not be permitted to accumulate excessively in any shaft where miners are hoisted or lowered.

No person should ride a cage with equipment, supplies, or materials. This does not prohibit the carrying of small handtools, surveying instruments, or technical devices.

75.1403-5 Criteria - Belt Conveyors

The requirements for the transportation of persons on belt conveyors, as outlined in this Section, shall apply when any person is transported on belt conveyors at times other than during the regularly scheduled mantrip operations.

Bare pinch wires are acceptable for stopping and starting belt conveyors used to transport persons, provided that the voltage on such circuits is not more than 12 volts. A pull cord arrangement that will enable any person riding the belt to stop and start it shall be acceptable as compliance. Start switches may be located at intervals of not more than 500 feet along such belt conveyors.

An official or other responsible person designated by him should be in attendance while miners are boarding or leaving belts.

Ample clearance should be provided at conveyor-loadingheads and at conveyor-control panels.

75.1403-6 Criteria - Self-Propelled Personnel Carriers

Self-propelled track equipment should be equipped with sanding devices capable of applying sand to all rails in either direction of travel.

75.1403-7 Criteria - Mantrips

The following shall be adopted as additional policy to govern the use of "scoop tractors" when transporting persons:

1. Underground personnel may be transported in a scoop that is in the rear position according to the direction of travel. In other words, the scoop must be located so that, if a person accidentally fell from the scoop, the tractor would be moving in a direction away from the fallen person.

2. A locking device (stiff link or other accepted device) shall be used to preclude the possibility of accidental activation of the hydraulic control lever which operates the scoop.

3. If the scoop is equipped with an ejector blade, the control lever for the blade must also be locked in the neutral position.

4. Mantrip passengers should not ride under unguarded trolley wire unless suitable covered man-cars are used.

5. Failure to provide special locking devices on drop- bottom cars used for transporting miners on mantrips shall be considered to constitute a danger that a mantrip accident will occur immediately or before such danger can be eliminated within the meaning of Section 107(a) of the Act.

75.1403-8 Criteria - Track Haulage Roads

Rails should be secured at all joints by means of plates or welds.

75.1403-9 Criteria - Shelter Holes

Upon the approach of moving traffic, persons shall take refuge in shelter holes or other places of safety.

75.1403-10 Criteria - Haulage; General

During inspections of mines where reflectors or other devices are being used in lieu of permissible trip lights, the inspector should determine if approval to use the reflectors or other type device has been granted by the district manager. In the event approval has not been granted, a safeguard notice should be issued.

Backpoling should be prohibited except at places where the trolley pole cannot be reversed or when going up extremely steep grades, and then only at very slow speeds.

Main haulage roads are interpreted to be: (1) the road leading from the surface to the section of a one-section mine; and (2) the road leading from the surface into a multi-section mine, including the roads leading to the various sections of the mine.

Exceptions to main haulage roads are sidetracks or branch lines of limited distance which are not ordinarily used for through traffic. Sidetracks, branch lines, etc., may or may not extend from any main haulage road. Therefore, a main haulage road, as referred to in paragraph (b), is a roadway used for the transportation of personnel, equipment, materials, supplies and/or other articles taken into or out of a coal mine, or section of a coal mine, regardless of alternate methods used to transport coal from the working faces and regardless of the size of the mine. Any branch track leading to a nearby installation (pump, compressor, etc.), crosscut, or pillar place is considered as an exception to main haulage roads.

Sprinkling a shuttle car haulage road to allay dust shall not be construed as making the roadway wet and increasing the difficulty of controlling the shuttle car.

Abrupt changes in vertical clearance that present a hazard to persons riding on mobile equipment should be eliminated where possible. Otherwise, signs, preferably luminous, shall be posted to warn of the change in clearance.

New overcasts and similar structures installed on haulageways should be constructed so as to provide the same vertical clearance as the surrounding area or to permit operation of haulage equipment without restricting the operators' or passengers' normal position.

Material being transported should be so loaded and protected that there is no danger to the motorman or brakeman from sliding of equipment and material. Except in emergencies, timbers and other materials not necessary for, or not incidental to, the operation of locomotives, cutting machines, loading machines, and coal-drilling machines should not be transported on such equipment.

Track locomotives should be equipped with proper rerailing devices, safe seating facilities for the operator, audible warning devices, sealed-beam headlights or the equivalent on each end, a suitable lifting jack and bar, and properly installed and maintained sanding devices.

No person should get on or off moving locomotives or cars being moved by locomotives; however, the brakeman may get on or off the rear end of a slowly moving trip.

Standing cars on any track, unless held effectively by brakes, should be properly blocked or spragged. Cars shall be secured effectively at working faces.

Where it is clear at a particular mine that self-propelled, track-mounted, or rubber-tired equipment that is used to transport miners is operating on grades so steep that the ratio of the gear train is not sufficient to prevent movement of the equipment when it is parked, inspectors should determine the operator's method of preventing accidental movement. It should be noted that devices which trap hydraulic fluid, such as the "MICO Leverlock," are sometimes being used as parking brakes. This type of device is not suitable for use as a parking brake because pressure may be lost due to fluid leakage or contraction when it cools, allowing the vehicle to move. If the operator does not use a reliable method of preventing accidental movement of parked equipment, then a notice to provide safeguard under this section should be issued. Generally, the notice should indicate that the operator shall take reliable precautions against accidental movement of the affected equipment when it is parked. Inspectors should allow operators flexibility in providing the necessary precautions, while at the same time making it clear what constitutes compliance with the safeguard notice. Many manufacturers of mining equipment now have available parking brake systems for personnel carriers.

Where an inspector determines that a safeguard notice is necessary in order to address a transportation hazard, the specific safeguard requirements are to be determined by the inspector based on the actual, specific conditions or practices that constitute a transportation hazard at that particular mine. The inspector should document either in the notice or in the inspector's notes the conditions which provide the basis for the issuance of the safeguard notice. The safeguard notice should also identify the nature of the hazard to which it is directed. For example, if a notice to provide safeguards is issued to require a specific minimum clearance distance between pieces of haulage equipment, the safeguard should also include a statement of the hazards that the clearance distance is intended to prevent, such as injury to equipment operators from pieces of rib coal which could be knocked loose or, if the area is a walkway, injury to pedestrians by the equipment due to insufficient clearance.

Service brakes and parking brakes on personnel carriers must be maintained in an operative condition. Accordingly, such brakes that have been allowed to deteriorate into an inoperative condition constitute a violation of Section 75.1725. Emergency and parking brakes that are not installed and maintained on rubber-tired haulage equipment or parking brakes not installed

and maintained on other face equipment would constitute a violation of Section 75.523-3.

Where block signals are used, not more than one locomotive, except pushers, should operate in any signal block at the same time unless by special authority. All mine traffic should be under the direction of a person(s) designated by the operator, and no traffic should be in transit without prior clearance, verbally or by use of block signals.

Where seating facilities are provided, operators of equipment should be seated while such equipment is being operated.

This section shall be used to require audible warning devices on all self-propelled equipment, including off-track equipment. Such devices shall be of the type provided by the manufacturer of the equipment and shall be maintained in operative condition.

Self-propelled, rubber tired haulage equipment shall be equipped with sealed-beam lights.

Rubber-tired, battery-powered mine tractors should be equipped with a suitable lifting jack and bar adequately secured or carried in a compartment.

Since controls meeting the requirements of paragraph (m) are available, future notices to provide safeguards or 104(a) citations shall not give more than 30 days for compliance.

75.1404 Automatic Brakes; Speed Reduction Gear

This provision is not intended to require automatic brakes or speed reduction gears on locomotives used by mechanics and others solely to haul repair parts or supplies, or their transportation, provided that no more than one haulage car is used with such locomotives. All other locomotives shall be equipped with hydraulic brakes, pneumatic brakes or dynamic braking, in addition to manual brakes.

75.1405 Automatic Couplers

All track haulage cars which are regularly coupled and uncoupled shall be equipped with automatic couplers. This provision also applies to rubber-rail type haulage cars. Unless an alternate method of coupling has been approved which will at all times guarantee no less than the same measure of protection afforded by automatic couplers, operators are required to install the automatic couplers on their rubber-rail cars.

75.1502 Mine emergency evacuation and firefighting program of instruction

In addition to the simulated drills required by the regulation, the following additional activities may be included in the program of instruction:

The mine operator's program of instruction, required by 30 CFR 75.1502, must include all miners on all shifts. The training program should emphasize the location of the proper routes of travel and the importance of prompt evacuation when such an order is given. The program should incorporate provisions to advise miners of changes to the escapeways, such as rerouting, designation of other entries, and any changes in escape facilities. It should also emphasize proper Self-Contained-Self-Rescuer (SCSR) donning procedures. Specific situations such as encountering smoke dictate donning the SCSR immediately, while others may permit partial or complete evacuation without donning the unit. As evacuation through some smoke may be necessary, the program should include precautions to take when smoke is encountered, as well as instruction and drills in communication techniques emphasizing not to remove the SCSR mouthpiece to talk in contaminated air.

All aspects of mine emergency evacuation drills required by paragraph (c) of this Section need not be held underground. For example, portions of the drill, such as demonstrations of fire fighting equipment, may be conducted on the surface. The evacuation portion of the drill need not be held at the same time as the firefighting portion of the drill.

Subpart Q Communications

75.1600 Communications

The communication systems that are now in use at each mine will be acceptable at the present time. However, there must be at each mine an operative means of communications between each working section and the surface when the working section is more than 100 feet from the portal.

75.1600-1 Communication Facilities; Main Portals; Installation Requirements

The second sentence requires that at least one such communication facility be located where there is a responsible person who is always on duty when miners are underground and can hear the communication and respond.

A telephone or equivalent facility at a central location which may be greater than 500 feet from any portal will satisfy the requirements of the second sentence of this section, as it applies to multiple portals of any one mine or a number of mines within a reasonable geographical area, provided that a responsible person at the central location can hear the telephone and respond immediately.

Subpart R Miscellaneous

75.1700 Oil and Gas Wells

This provision shall apply to all oil and gas wells including active, inactive, abandoned, shut-in, previously plugged wells, water injection wells and carbon dioxide sequestration wells. This standard also applies to coal bed methane wells drilled from the surface that branch horizontally into the coal seam being mined or will connect through subsidence cracks to active workings. Approval for barriers of less than 300 feet in diameter around the well or horizontal branch of the well, and consistent with State laws, may be granted only by the District Manager. A petition for modification would be required to mine through the well or within the safe barrier as determined by the District Manager.

75.1702 Smoking; Prohibition

This Section is an absolute prohibition against having smoking articles underground and is directed to all persons. When smoking materials, matches, or lighters are found underground, a citation for violation of this section should be issued to the operator, as well as to the individual miner if he/she can be identified. No evidence is needed of negligence or fault on the part of the operator in order to issue the citation. The condition or practice described in the citation should indicate a violation of the prohibition against smoking articles underground.

The operator's search program for smokers' articles shall be systematic and conducted at least weekly at irregular intervals and as often as necessary to insure that the program is being adhered to and not being violated.

Records of searches for smokers' articles shall be made and kept in a book provided for that purpose in a safe place on the surface, and the records shall be available for inspection.

When an inspector observes a miner smoking underground, he/she shall obtain the name of the miner involved, the names of any witnesses, and issue a citation to the miner. He/she shall also issue a citation or an order of withdrawal to the operator.

Generally, orders of withdrawal are not to be issued, except in appropriate circumstances where an inspector actually observes a person smoking underground or where the operator's search program is not vigorously enforced. In other circumstances, where cigarette butts or cigarettes, lighters, or matches are observed underground, a citation of section 104(a) or 104(d) would be more appropriate. The operator shall post "No Smoking"

signs at or near the surface structures where smoking is prohibited.

75.1703 Portable Electric Lamps

Electric cap lamps used for portable illumination underground shall be maintained in permissible condition. Lamps that have been altered, such as by exposing a contact point in the headpiece for use as a shot-firing unit, shall be considered to be nonpermissible.

75.1708 Surface Structures, Fireproofing

Where existing structures are fireproof and were erected on or before March 30, 1970, the erection of fire doors is not necessary.

Fire doors shall be substantially constructed and located in the mine as near as practicable to the surface to prevent the products of combustion from entering and endangering persons underground.

75.1709 Accumulations of Methane and Coal Dust on Surface Coal-Handling Facilities

At least once during each working shift, or more often if necessary, in surface coal-handling and coal-storage facilities, a qualified person designated by the operator shall make examinations for methane wherever the possibility of accumulations exists. A record of such examinations shall be kept. The examinations for methane shall be made with a methane detector approved by the Secretary. When an accumulation of 1.0 percent or more of methane is detected in such surface facilities, means shall be provided to prevent methane from accumulating in such quantity. Tests for methane in surface structures shall be made prior to any repair work in which welding is done or an open flame is used.

The operator shall initiate an effective and systematic program of preventing coal dust from accumulating on coal-handling facilities. The presence of excessive concentrations of coal dust, whether in or on such facilities, constitutes a violation of this provision. Also, where excessive airborne dust could present an explosion hazard, water sprays or other effective means shall be used to allay such dust.

75.1710-1 Canopies or Cabs; Self-Propelled Electric Face Equipment; Installation Requirements

This Section requires that all self-propelled electric face equipment in all coal mines where the bottom to top (mine floor to mine roof) measurements are 42 inches or greater be equipped with cabs or canopies. The following guidelines are to be used

relative to the enforcement of this Section:

1. To determine if cabs or canopies are required, the following guidelines are applicable.

   a. Measurements are to be taken on a section-by-section basis at any given mine.

   b. Measurements are to be taken at the minimum height (bottom to top) in the working section provided this minimum height is not a result of poor mining practices. Should this be the case, such measurement is to be disregarded and the minimum height determined from measurements at locations where accepted practices were followed.

   c. For electric face equipment which is regularly required to travel to other areas of the mine, the minimum height (bottom to top) is to be determined within the area of regular travel.

   d. Where the minimum height frequently fluctuates below and above 42 inches, a citation for a violation of this Section is not to be issued when such fluctuations below 42 inches would routinely create the necessity to remove cabs or canopies. An evaluation of the minimum height is to be made periodically to determine if such fluctuations still exist. These evaluations should normally be made as a part of a mandated regular mine inspection.

   e. Self-propelled electric face equipment which has machine-mounted operating controls must be provided with a cab or a canopy, as required by this Section, even if the equipment is normally operated by remote controls. Self-propelled electric face equipment without machine-mounted controls is not required to have a cab or canopy as long as the operator using the remote controls is located away from the machine being operated. If, at any time, the remote controls are used for tramming or for any other reason, while placed on the equipment, the equipment operator must be protected by a cab or canopy. The cab or canopy must be positioned over the controls on the equipment so that the equipment operator is protected when using machine-mounted controls or when operating the equipment using remote controls placed on the equipment.

This Section applies only to self-propelled electric face equipment where the equipment operator is using remote controls. The equipment operator, however, must be located under roof that has been permanently supported and be a sufficient distance from the equipment to ensure the operator would not be endangered by movement of the equipment.

2. If it is determined that cabs or canopies are required (actual mine floor to mine roof is 42 inches or greater) and have not been installed, a citation is to be issued giving reasonable time for abatement. Extensions of time are to be granted only when the mine operator is able to establish to the District enforcement personnel's satisfaction that a "good faith" effort is being made to gain compliance. Examples of acceptable effort include, but are not limited to, the following:

   a. Management has ordered new or used lower profile equipment on which a cab or canopy is or will be installed and will be workable under the conditions encountered.

   b. Management has established an acceptable program for the installation of canopies on existing equipment.

   c. Management has established a test program agreement with the district manager.

3. The filing of an application for modification of a safety standard pursuant to the procedures set forth in Section 101(c) of the Act, or the fact that a hearing is pending on such application, is not a cause for staying the issuance of a citation at mines presently required to have cabs or canopies.

4. Similarly, the filing of such an application for modification or the fact that a hearing is pending is not grounds for MSHA to extend the reasonable time permitted for the abatement of a citation unless a "good faith" effort, as described in item 2, is also proposed.

5. New electric face equipment or used equipment new to a mine is required to have cabs or canopies if the bottom to top measurement is 42 inches or greater.

With reference to cab and canopy test program agreements submitted by mine operators, the following guidelines were developed to assist

District Managers in developing and evaluating such agreements.

1. When an operator elects to establish a test program, he/she should submit the following information in writing to the district manager(s):

   a. The name of mine(s) covered by the test program.

   b. The area(s) of the mine(s) selected for the test program.

   c. A description of the conditions in the areas(s) and how they would be considered as representative of the mine(s) covered by the test program.

   d. A list of the equipment to be tested and the type of equipment each test piece will represent.

   e. A description of the approach which will be pursued on each piece of test equipment.

   f. A time frame for the work to be performed.

   g. A general description of the method of orientation and training of the equipment operators in use of the test equipment.

   h. A commitment to submit periodic progress reports describing the success or failure of the test designs, the problems encountered and the changes made to resolve the problem, etc.

   i. The name and title of the person(s) designated to monitor, keep records and prepare progress reports on the program.

2. If an operator has a one-section mine, a program for testing one piece of equipment at a time would be acceptable.

3. If an operator has a multi-section mine, the program would include one piece of equipment of each type in the mine.

4. If an operator has several mines with similar conditions and equipment, a program for testing one piece of equipment of each type in these mines would be acceptable. These mines may be located in more than one MSHA District, provided the District Managers concur.

MSHA has determined that certain controls on roof bolting machines are not subject to the requirements of 30 CFR 75.1710-1(a). These

controls and the circumstances where their location does not necessitate a cab or a canopy are as follows:

1. Controls that position and set the Automated Temporary Roof Support (ATRS) system (including "inch tram" controls) are not required to be located under a canopy provided:

   a. the controls are located on the machine in such a manner that they are operable from under permanently supported roof, and

   b. the controls are used only within the working place and not to tram from place to place.

2. Controls that position the drill station canopy, such as canopy raise, canopy lower, boom swing levers, etc., are not required to be located under a canopy, provided these controls are located on the machine in such a manner that they are operable from under supported roof.

75.1711 Sealing of Mines

The regulation states that the openings of any coal mine that is declared inactive by the operator, or is permanently closed, or abandoned for more than 90 days, shall be sealed. Work to seal shall commence promptly after the 90-day period during which the mine was not ventilated and shall be performed with reasonable diligence.

Each coal mine is categorized by the appropriate District in one of seven statuses. These Statuses include, among others: Abandoned, Intermittent, and Temporarily Idle. These Particular statuses and their relation to the sealing requirements are discussed below.

Abandoned. Sealing is required for mines placed in abandoned status either by the operator or by MSHA. When an operator has not properly updated mine status to abandoned, MSHA will revise the status to abandoned and notify the operator in writing of the status change and the requirement for sealing within 90 days.

Intermittent. Mines place in intermittent status, as a result of being seasonally idled for more than 90 days, are not considered abandoned and the sealing requirements does not apply. However, the mine must remain essentially ready to resume production within a short timeframe. To maintain intermittent status, facilities and equipment such as the mine office, surface and underground power systems, the main mine fan, and underground coal haulage systems must remain intact. In addition, all mine openings must be provided with a positive means to prevent access by unauthorized persons.

Temporarily Idle. Mines in temporarily idled status, even though this status may last longer than 90 days, are not considered permanently closed or abandoned for the purposes of this standard. Mines are considered to be in temporarily idled status when the work of all miners has been terminated and production related activities has ceased. The mine still has recoverable reserves, it is anticipated that this is a temporary condition, and the mine will reopen in the future. This category includes mines that do not maintain ventilation or conduct underground examinations. The only activity at these mines would be security checks, visual examinations of surface areas to determine conditions, or surface activity due to another agency's requirements (e.g. state environmental agency).

While there is no specific time restriction applied to mines in temporarily idled status, it is necessary to verify what activity is taking place at the mine once each quarter. This may be accomplished by a brief mine visit or other documented contact with the mine operator. These mines do not require a regular inspection. The openings of all mines in temporarily idled status must be adequately fenced or guarded prohibiting the entrance of any persons. If an operator removes substantially all recoverable equipment and facilities, such that there is not demonstrable intention of reactivating the mine, the status will be revised to abandoned, the operator notified in writing and sealing shall be required within 90 days.

Prior to persons performing work at or entering temporarily idled mines, the mine operator must notify the District Manager and complete any necessary plan submission (30 CFR 75.1721) or status change.

Districts shall conduct regular reviews to assure that these mines are in the appropriate status. It is unlikely that a mine would remain in intermittent or temporarily idled status for more than 12 consecutive months. If it is determined that the condition has become permanent, the mine operator shall be required to seal the mine.

Appropriate enforcement action under this section shall be taken if it is determined that the openings of mines in either intermittent or temporarily idled status are not adequately fenced or guarded prohibiting access.

Mine sites that have active impoundments are still subject to inspection and therefore cannot be placed in temporarily idled status. However, the site should be reclassified as a surface site and any underground mine sealed, as appropriate.

75.1712-4 Waiver of Surface Facilities Requirements

The bathing facilities, clothing change rooms, and sanitary flush toilet facilities required by Sections 75.1712-1 and 75.1712-4, are at times waived under the authority of this Section. This is normally done because water is not available. Since Section 71.500 requires sanitary facilities at surface worksites of surface coal mines only, the waiving of sanitary facilities under this Section removes the only requirement for the mine operator to provide sanitary facilities at surface worksites of underground coal mines.

Therefore, all waivers should require a chemical toilet (approved under Section 71.500) at each surface worksite of the underground coal mine as a condition of waiving the flush toilets.

75.1712-5 Application for Waiver of Surface Facilities

Section 75.1712 provides that sanitary toilet facilities shall be provided in the active workings of the mine when surface facilities (as required in Section 75.1712-1) are not accessible to the active workings. Based on this provision, Section 75.

1712-6 requires an approved sanitary toilet underground within 500 feet of each working place in the mine.

Where a surface sanitary toilet is located within 500 feet of a working place, Section 75.1712-6 is satisfied and there is no requirement for an approved sanitary toilet to be located underground. Thus, for an underground mine which is less than 500 feet in depth, or for an underground drift mine which has advanced to a distance of less than 500 feet, which has sanitary toilet facilities on the surface, there is no requirement for an approved sanitary toilet to be located underground in those portions of the active workings which are within 500 feet of the surface sanitary toilets. In other cases, except where a waiver of the location requirement has been granted as provided in Section 75.1712-7, an approved sanitary toilet is required to be located underground within 500 feet of each working place in the mine where miners are regularly employed.

Sanitary toilets are to be approved by MSHA, Coal Mine Safety and Health. The primary responsibility for gaining approval is that of the toilet manufacturer. A list of approved sanitary toilets for use in underground coal mines is available in district and subdistrict offices and from MSHA, Coal Mine Safety and Health, 1100 Wilson Boulevard, Arlington, Virginia 22209-3939.

Where a sanitary toilet is found to be in a shipping crate or is otherwise not ready for service, the unit does not satisfy the requirement that an approved sanitary toilet be provided and maintained. If an approved sanitary toilet is not provided, not

properly located, or ready for service, a citation for violation of this Section shall be issued.

75.1712-7 Underground Sanitary Facilities; Waiver of Requirements

Upon determination of the District Manager, a waiver of the location requirement may be made. However, only the location requirement may be waived, and the waiver can be granted only on the basis of the thickness of the coal seam or of any other physical restriction in the underground workings. A sanitary toilet is required to be provided, either on the surface or underground, within 500 feet of each working place in the mine, except where a waiver of the location requirement has been granted.

75.1713-1 Arrangements for Emergency Medical Assistance and Transportation for Injured Persons; Agreements; Reporting Requirements; Posting Requirements

Paragraphs (a) and (b) of this Section are not to be interpreted to mean that a physician or an ambulance must be present at the mine at all times. These paragraphs do mean, however, that the required services must be arranged for and be readily available.

Paragraphs (c) and (d) of this Section have been disapproved by the Office of Management and Budget (OMB) pursuant to authority under Executive Order 12174 (44 FR 69609) and the Paperwork Reduction Act of 1980. Beginning January 1, 1982, no enforcement action shall be taken relative to the reporting requirements of these two paragraphs.

Discontinuance of these information reporting requirements does not alter the requirements of paragraph (a), (b), and (c) of this Section. Operators of underground coal mines still must have arrangements established with a licensed physician, medical service, medical clinic or hospital to provide 24-hour emergency medical service and arrangements with an ambulance service, or otherwise provide, for 24-hour emergency transportation for any person injured at the mine.

Likewise, operators must continue to post at appropriate places at the mine the names, titles, addresses, and telephone numbers of all persons or services available under the arrangements for medical assistance and emergency transportation. Where appropriate, inspectors shall make the necessary inquiries to determine the currency and accuracy of the information posted.

75.1714 Availability of Approved Self-Rescue Devices; Instruction in Use and Location

The term "visitor" used in paragraph (a) of this Section includes insurance inspectors, equipment manufacturers' representatives, and

others to whom the mine operator may deny entry, but does not include persons having the right to enter the mine. Accordingly, an operator shall not be cited for violation of paragraph (a) when a State mine inspector is observed underground without an SCSR.

Citations for failure of the mine operator to provide self- contained self-rescuers shall be cited under paragraph (a) of this Section. The inspector should include in the body of the citation a statement referring to 30 CFR 75.1714-1(b) which outlines how the provisions of paragraph (a) can be met.

75.1714-1 Approved Self-Rescue Devices

Under paragraph (b)(3) of this Section, MSHA will consider for approval as a self-rescue device or devices, when used and maintained as prescribed by MSHA, a combination of separate 10-minute and 60-minute self-contained breathing apparatus approved under Subpart H of 30 CFR Part 11.

75.1714-2 Self-Rescue Devices; Use and Location Requirements

Under paragraph (c) of this Section, the determination that wearing the self-contained self-rescuer is hazardous may be made by an individual miner or by the operator. The inspector should not issue a citation unless the person is more than 25 feet from his or her self-contained self-rescuer.

The District Manager is required in paragraph (e)(1) to consider 11 factors in deciding whether to permit an operator to place a self-contained self-rescue device more than 25 feet from a miner. In order to assist the inspector when considering these factors, the following guidelines are provided to help determine whether to permit or prohibit storage, storage distances, and storage methods and procedures.

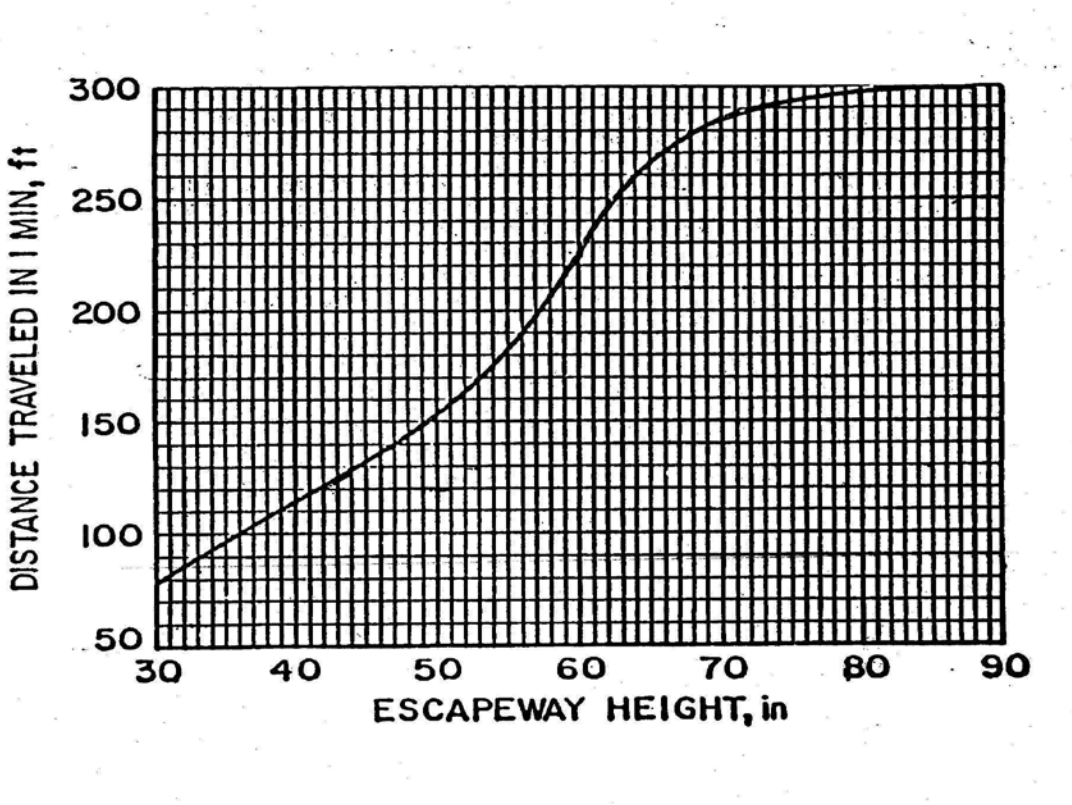
1. Distance from affected sections to surface. If the deepest penetration of a working section is not farther from the surface than the travel distance listed in 3. below, the district manager may approve a plan for the operator to provide miners only with filter-type self-rescuers. However, when the deepest penetration of a working section is greater than the travel distance listed in 3., operators shall be required to provide self-contained self-rescuers.

1. Pitch of seam in affected sections. In pitching seams, such as encountered in anthracite mines, self-contained self-rescuers should be stored on level travelways.

2. Height of coal seam in affected sections. The height of the travelway affects the speed of travel and consequently the distance that miners may be away from stored self-contained

self-rescuers. Miners generally should not be farther from self-rescuers than a distance that they can travel at a normal pace in 5 minutes. However, the time and distance can be increased or decreased after considering all factors. Miners should never be farther from self-contained self-rescuers than a distance they can travel at a normal pace in 10 minutes.

The chart below should be used to convert time to the travel distance.



4. Location of escapeways. Where designated escapeways are not readily available, such as during travel in remote locations of bleeders and return airways, storage of self-contained self-rescuers should be limited to not more than 5 minutes travel time.

5. Proposed location of self-contained self-rescuers. The preferred locations for storage of self-contained self-rescuers are in the intake escapeways and accessible from more than one entry. In longwall mining sections, self-contained self-rescuer units should be stored near the face on the headgate and tailgate sides of the longwall unit. Enough self-contained self-rescuer units for all miners covered by the storage plan should be stored at both locations.

The environment in the storage location should be in accordance with manufacturers' recommendations. Storage plans should include provisions for segregating visitors' self-contained self-rescuers from those provided for employees at the mine. Each miner must be trained to know the specific location of the self-contained self-rescuer that is available for him/her.

6. Type of work performed by affected miners. Different plans may be approved for various categories of miners, dependent primarily upon the amount of travel required to perform their work. Storage plans for section workers should rarely allow for travel times greater than 5 minutes. Storage plans for rovers may allow for travel time up to 10 minutes.

7. Degree of risk to which affected miners are exposed. e amount of methane liberation and size and type of power systems, i.e., battery, electrical (a.c. or d.c.) or diesel, are some of the factors that should be considered when evaluating the degree of risk. Another factor should be the history of violations that could lead to the cause and effect of fires, explosions, and inundations.

8. Potential for breaking into oxygen-deficient atmospheres. When mining near abandoned areas, as described in Section 75.1701, or into areas having a high potential for outbursts, storage of self-contained self-rescuers shall not be permitted.

9. Type of risks to which affected miners are exposed. The types of risks that should be considered when evaluating storage plans are the risks associated with explosions, fires, and inundations.

10. Accident history of mine. The types of accidents which should be considered are those relating to explosions, fires, inundation of gases, and outbursts.

11. Other matters bearing upon the safety of miners. Storage plans should include a requirement for examination of self-contained self-rescuers during the period of the preshift examination or at the beginning of the shift. If the self-contained self-rescuers are stored in substantially constructed containers, or in another permanent manner, and located so that the units are protected from damage, inspection of the self-contained self-rescuers once each 24 hours should be sufficient to assure reliability of the units. Plans should include a provision that would permit any miner to wear or carry a self-contained self-rescuer. The

tests required under the provisions of Section 75.1714-3(d) shall be made in accordance with the manufacturer's approved instructions.

The minimum number of self-contained self-rescuers underground at each mine must be equal to or greater than the number of miners underground.

The Bureau of Mines Report "Guidelines for Oxygen Self-Rescuer," Volumes I and II, is used by many operators as a basis for developing storage plans. Many recommendations made in the report are included above and the others may be helpful to the operator in preparing a storage plan and assist the inspector in approving plans. However, the guidance provided above for the 11 factors should be the primary source of guidance when giving permission for storage of self-contained self-rescuers.

Paragraph (e)(3) of this Section prohibits the operator from obtaining permission from the district manager to place the self-contained self-rescuers more than 25 feet away from miners on mantrips into and out of the mine. For purposes of this Section only, miners are not considered to be on mantrips while walking into or out of the mine, or while being transported in shafts or slopes. Therefore, permission may be granted for storage of self-contained self-rescuers for miners in these situations.

Violations of the approved storage plan for self-contained self-rescuers shall be cited under Section 75.1101-23. The provisions of paragraph (e) of this Section state that the miner operator may apply to the district manager under Section 75.1101-23 for permission to place the self-contained self-rescuer 25 feet away. This provision merely informs the operator of how to apply for a storage plan and shall not be used when citations are issued for violations of the storage plan.

75.1714-3 Self-Rescue Devices; Inspection, Testing, Maintenance, Repair and Recordkeeping

Paragraph (b) of this Section requires that the self-rescue device be inspected for damage and for the integrity of its seal after each time it is worn or carried by a person. The term "inspected" consists of visually examining the self-rescuer. In order to make a valid visual examination of the Drager 810, the self-rescuer must be removed from the carrying pouch. The examiner shall make sure that the top and bottom of each container is not separated.

In paragraph (c) of this Section, the phrase "...except devices using vacuum containers as the only method of sealing, shall be tested... by weighing ..." applies only to Drager 810 self-rescuers not provided with a stainless steel band to reinforce the seal. The

addition of the stainless steel band requires that the Drager 810 self-rescuer be weighed to check its condition.

Extensions of approvals have been granted for modification in the periodic testing procedures for the Mine Safety Appliances Company (MSA) 60-minute self-contained self-rescuers (SCSR) and the Draeger OXY-SR 60B SCSR.

The MSA 60-minute SCSRs are not required to have an annual dry leak test of all stored units and a 90-day dry leak test for units that are worn or carried. Any unit removed from storage must be tested before the unit is returned to storage. The water immersion test may be used in lieu of the dry leak test.

The periodic test for the Draeger OXY-SR 60B SCSRs now only requires a visual examination of the unit every 90 days.

During recovery operations at a mine explosion and during an inspection of an adjacent mine, it was brought to the attention of MSHA that the release pins and bands on the self-contained self-rescuers (SCSRs) in use at these two mines had been taped. The purpose for taping was to prevent the release pins from opening accidentally.

Several miners who were injured in the explosion were unable to open the cases of their SCSRs because their hands were burned. A miner who was not injured opened the cases for the injured miners. He stated that he had a very difficult time removing the tape to free the release pins and open the cases.

MSHA inspectors should, during the course of their inspections, determine if the releases of SCSRs are fastened in a manner other than as designed by the manufacturer. In those instances where other means are used, appropriate action shall be taken to have the extra fasteners removed.

75.1718 Drinking Water

Coal mine operators are required by this Section to supply drinking water in the active workings of mines and that the water "is carried, stored, and otherwise protected in sanitary containers." Coal operators have had difficulty in maintaining water containers in a sanitary manner, especially in keeping water containers clean. To alleviate this problem, sanitary, disposable, polyethylene water container liners are available. These liners are approved for use with foods by the Food and Drug Administration and have been used by the dairy industry to line milk cans. This type of sanitary liner is acceptable for use with water containers in coal mines.

75.1719-1 Illumination in Working Places

Included in the category of self-propelled mining equipment are loading machines, cutting machines, shuttle cars, coal scoops, clean-up scoops, tractors, roof-bolting machines, face drills, longwall and shortwall installations, and supply vehicles, but rubber-tired trailers pulled by battery tractors are not included.

Technical Support tests and evaluates lighting systems in a simulated working place prior to the installation of the lighting systems underground. Each lighting system submitted is tested and evaluated to determine whether the required amount of light is provided, if the system is designed and installed to minimize discomfort glare and if the system complies with the other applicable provisions of the illumination regulations.

A Statement of Test and Evaluation (STE) is issued by Technical Support for accepted lighting systems. Each STE specifies the maximum height and width of the working place, the type and model of machine (for machine-mounted lighting systems), the location and orientation of light fixtures, the type of diffusers or louvers, and other conditions under which the lighting system must be installed and operated to provide compliance with the applicable provisions of the illumination regulations.

Lighting system manufacturers are furnishing a 3-by-5-inch metal plate with each accepted machine-mounted lighting system. The metal plate contains pertinent information about the lighting system and should be attached to the machine near the permissi- bility plate. The 3-by-5-inch metal plate is not required by regulation; however, the plate must be present on the machine to consider the system as one for which an STE has been issued.

The operator is not required to have an STE; therefore, a citation shall not be issued for failure to comply with an STE. If the STE is not being complied with, and in order to issue a cita-tion, the inspector must take measurements to determine if the failure to comply with the STE results in a reduction of light below the 0.06 footlamberts required by paragraph (d) of this Section.

When an inspector observes self-propelled mining equipment being operated in a working place, a lighting system has been installed in accordance with an STE, and all of the provisions of the STE are being complied with as recorded on the metal plate, the lighting system shall be acceptable as being in compliance with paragraph (d) of this Section and the inspector shall not take light measurements.

Experience with STEs has shown that flexibility in the application of STEs is needed. Due to differences in machine design, manufacturers' mechanical design changes, and mine operators' modifications of

mining machines, it is, at times, impossible to install a light fixture exactly as specified in the STE. In other instances, if a light fixture is installed in the specified location, the light source is in direct view of the operator or helper and objectionable glare is created. Therefore, it has become necessary to establish procedures which will permit coal mine operators to make application to the district manager in the district in which the mine is located for approval of a modification of an STE.

The term "a miner's normal field of vision," as contained in paragraph (e), means surfaces that can be readily seen by a miner from any position in the working place that his/her duties require him/her to be while self-propelled mining equipment is being operated. Not included are floor surfaces under the machine or surfaces behind line curtains or ventilation tubing.

Paragraph (g) requires that light fixtures be designed and installed to minimize discomfort glare. There are some locations on board certain mining machines in thin coal seams in which it is impossible to install presently available fixtures without creating discomfort glare to miners.

Extremely bright lights are required to light the area from rib to rib in thin coal seams (less than 42 inches in thickness), and these light fixtures of necessity are installed at the miner's eye level which compounds the glare problem. To combat this glare problem in seams with mining heights less than 42 inches, it is necessary to reduce the area in which light measurements are made to not more than 5 feet from the machine and to specify other locations in which light measurements are not to be taken. The intent of this policy is not to allow a reduction in the number of light fixtures used, but to permit better locations, diffusing, and guarding of light fixtures as a method of reducing or eliminating discomfort glare.

This policy recognizes the technical problems involved in reducing glare and defines locations within the area specified in paragraph (e)(1) through paragraph (e)(6) in which light measurements are to be taken.

When the mining height is less than 42 inches, light measurements shall be made within an area the perimeter of which is 5 feet from any part of continuous-mining machines, loading machines, coal drills, and cutting machines when measured parallel to the mine floor.

Headlights on continuous-mining machines and loading machines should be oriented so that the maximum amount of light is provided on the coal face. This improves the ability of the machine operator to see

the location of the cutting bits or gathering arms. Therefore, to allow the most efficient utilization of the available light, light measurements shall not be taken of the floor area between the cutter boom hinge pin or gathering head hinge pin and the coal face. Scoops used as load/haul/dump vehicles, clean-up, or supply vehicles shall be illuminated in accordance with paragraph (e)(6) while such vehicles are being operated in the working place.

Auger-Type Continuous Miners

Most auger-type continuous-mining machines are operated with jack setters and timbermen working inby the miner operator in close proximity to rotating cutting bits or the machine. These miners must be able to communicate with the miner operator by means of signaling with their cap lamps and even small amounts of glare can be extremely hazardous.

Present technology will not permit installation of light fixtures on rope-propelled, auger-type continuous-mining machines in which miners are required to be inby the machines to set jacks or timbers without creating discomfort glare to the jack setters or timbermen. Therefore, illumination will not be required in working places in which rope-propelled, auger-type continuous-mining machines are operated if jack setters or timbermen are required to work inby the machine operator pending the development of glare-free illumination systems for these machines.

Illumination is not required in a working place in which a roof bolting machine is being operated if a rope-propelled, auger-type continuous-mining machine is also being operated in the same working place.

Remotely-Controlled Continuous Miner

When the mining height is less than 42 inches and remotely-controlled continuous-mining machines are operated in the working place, light measurements shall not be made of the area on the right side of the machine and outby the center of the main frame.

Shortwall Mining Equipment

1. When either chain conveyors or extensible belt conveyors are used to transport the coal from the continuous miner to the section loading point, the following areas shall be illuminated:

   a. The face;

   b. The area for the length of the self-advancing roof support system and all surfaces within the miner's normal field of vision between the gob-side of the

travelway and the side of the block of coal from which coal is being extracted; and

c. The control station and the headpiece and tail- piece of the conveyor, and all surfaces within 5 feet horizontally from the control station, head-piece and tailpiece.

2. When shuttle cars are used to transport the coal from the continuous miner to the section loading point, illumination shall be provided in accordance with the following:

a. The face, ribs, roof, floor, and exposed surfaces of mining equipment between the face and the outby edge of the rear bumper of the continuous-mining machine shall be illuminated by the stationary lighting fixtures in accordance with the requirements of paragraph (e)(4) or by lighting fixtures installed on the continuous-mining machine in accordance with the requirements of paragraph (e)(1).

b. The shuttle car roadway shall be illuminated by stationary lighting fixtures in accordance with the requirements of paragraph (e)(4) or by lighting fixtures installed on the shuttle car in accordance with the requirements of paragraph (e)(6).

Longwall Mining Equipment

Problems have been encountered in illuminating the coal face and face conveyor to 0.06 footlamberts in longwall mining installations operating in coal seams under 42 inches in thickness. The problems have been caused by the lack of sufficient clearance between the bottom of the roof support chocks and the side of the face conveyor, leaving little or no space through which light fixtures installed on the chocks can cast light on the face conveyor or the coal face. Therefore, in determining compliance with the illumination requirements for longwall mining installations operating in coal seams less than 42 inches in thickness, measurements shall not be taken on the face conveyor or the coal face. Measurements shall be taken the entire length of the travelway and the area within a distance of 5 feet horizontally from the control station, headpiece, and tailpiece.

High spillboards are installed on many longwall face conveyors so that the coal will be retained on the face conveyor to prevent spillage. These spillboards are necessary to prevent spilled coal and coal dust from accumulating along the travelway and between the roof-support shields or chocks. In some instances, the roof-support shields or chocks barely clear the spillboards.

The spillboards on longwall face conveyors are considered "other obstructions necessary to insure safe mining conditions," as provided in Section 75.1719-3(b)(8). Consequently, in determining compliance with the illumination regulations for longwall mining installations, light measurements shall not be made of areas where shadows are cast by spillboards installed on the longwall face conveyors.

Roof-Bolting Equipment

When the mining height is less than 42 inches, measurements shall not be taken of the area in front of and to the side of the roof-bolting machine operator(s) position(s). This does not apply to roof drills that are an integral part of a continuous mining machine.

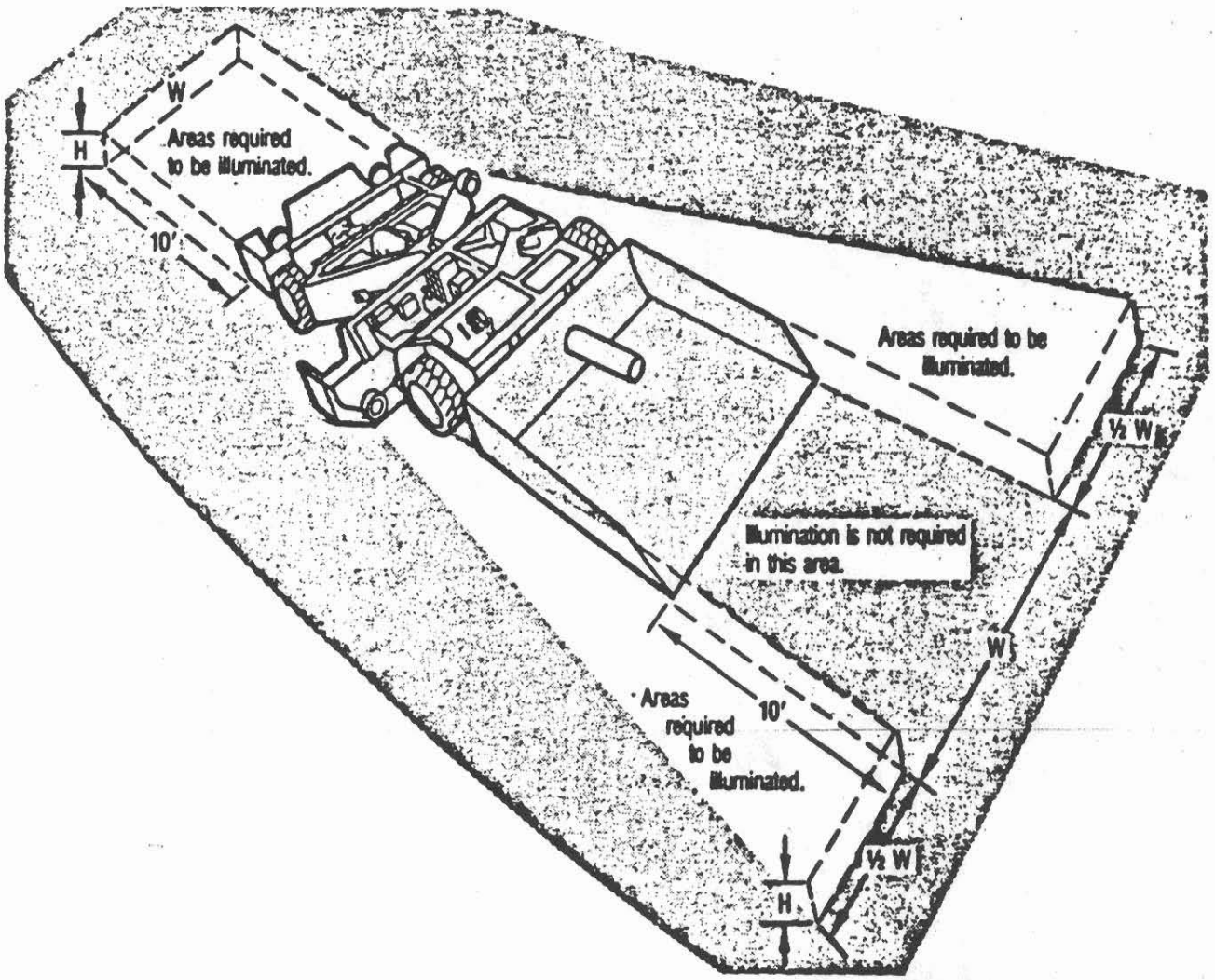
Light fixtures installed adjacent to supply trays on dual-head roof-bolting machines create objectionable glare to the operator and helper. Therefore, to allow removal or repositioning of these light fixtures, the lighting system shall be considered to be in compliance if the required level of light is provided as determined by illumination measurements made with the drill heads either together or separated approximately 8 feet and in position to drill holes or install roof bolts.

Shuttle Cars and Other Self-Propelled Equipment

The requirements of paragraph (e)(6) apply at all times when shuttle cars are being trammed in the working place even though a continuous-mining machine or loading machine is also being operated in the same working place. However, this does not prevent the shuttle car operator from turning the headlights out while the shuttle car is under the boom of the continuous mining machine or loading machine.

When determining the height and width of the coal surface to be illuminated as provided in paragraph (e)(6)(ii), the maximum height of the equipment (including sideboards, cabs, and canopies) and the maximum width of the equipment (including bumpers, tires, cabs, and canopies) shall be used. The height and width of the coal surface that is required to be illuminated will be the same in both directions of travel.

When the mining height will not permit installation of light fixtures at a location that will light the area directly in front of shuttle cars, tractors, maintenance vehicles, scoops, load/haul/dump vehicles, etc., the unshaded areas outlined on the following illustration may be lighted and measurements taken accordingly.



Areas required to be illuminated when coal seam height will not permit the installation of light fixtures on top of the machine.

75.1719-2 Lighting Fixtures; Requirements

The required illumination may be provided by light fixtures which are mounted onboard mining equipment and receive power from the equipment, by stationary light fixtures which are mounted on the roof or along the rib and receive power through trailing cables, or by a combination of these two systems. Light fixtures installed on shearers in longwall systems or continuous miners in shortwall systems shall be considered machine-mounted light fixtures. Light fixtures installed on roof support equipment of longwall or shortwall mining systems shall be considered stationary light fixtures.

Stationary lighting fixtures which receive power from alternating-current systems which are not resistance grounded as provided in paragraph (c)(2) or from direct-current systems shall be grounded in accordance with the appropriate section of Part 75, Subpart H.

The requirements of paragraph (c)(3) apply to all machine-mounted lighting fixtures including headlights that were furnished as original equipment on the machine. The required grounded conductor may be inside the supply cable to the fixture or may be an external grounding shunt. The required grounding conductor shall be in addition to any holes or welds used to fasten the fixture to the machine.

When a grounding conductor inside of the supply cable is used to ground a machine-mounted lighting fixture, the grounding conductor shall connect the frame of the fixture to the grounded explosion-proof enclosure from which the machine-mounted lighting system receives its power.

Paragraph (e) requires that trailing cables conducting power to stationary lighting fixtures be protected against short circuits and overloads. The settings of the circuit breakers providing short-circuit protection for such trailing cables shall not exceed the minimum available short-circuit current at the end of the cable or the setting specified in Section 75.601-1, whichever is lower. The rating of the device providing overload protection shall not exceed the capacity rating of the cable.

Since the required electrical protection for circuits and trailing cables supplying power to stationary lighting fixtures is specifically contained in paragraphs (c) and (e), a fail-safe ground-check monitor is not required for a three-phase circuit supplying power to stationary lighting fixtures. Likewise, undervoltage protection is not required for a three-phase circuit supplying power to stationary lighting fixtures. The maximum length of trailing cables conducting power to stationary lighting fixtures is not specified; however, the requirement for short-circuit protection will limit the length of such cable.

75.1720 Protective Clothing; Requirements

Hard hats or hard caps are required to be worn by miners at underground coal mines in accordance with paragraph (f) of this Section. The purpose of the safety standard is to provide substantial protection for the head from falling objects and to protect miners against electrical shock or burn. Hard hats are required to be suitable for these purposes, and if they are painted, the paint base must be nonmetallic.

Hard hats or caps that meet or exceed the applicable specifications of the American National Standards Institute (ANSI) provide appropriate head protection and comply with these requirements. The applicable standards are ANSI's "Safety Requirement for Industrial Head Protection," Z89.1, and "Safety Requirements for Industrial Protective Helmets for Electrical Workers, Class B," Z89.2.

Hard hats or caps that do not meet or exceed the applicable ANSI or equivalent standards should not be used. Plastic "baseball-type" caps and thin plastic hats do not have adequate suspension systems and are not constructed of sufficiently substantial material to afford the necessary protection from impact and penetration of falling objects. Hats or caps constructed of metal materials create an additional hazard of electrical shock or burn because they are conductive.

The phrase "when other hazards to the eyes exist from flying particles" is interpreted to mean that face shields or goggles shall be worn by miners when performing work such as breaking material with a hammer, digging with a pick, tightening a roof support with an axe or hammer, sounding roof, riding in or on haulage equipment (except closed-type equipment such as covered man cars), and any other work considered hazardous to the miners' eyes.

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.

75.1722 Mechanical Equipment Guards

Guards installed to prevent contact with moving parts of machinery shall:

1. Be of substantial construction;

2. Be of such construction that openings in the guard are too small to admit a person's hand;

3. Be firmly bolted or otherwise installed in a stationary position; and

4. Be of sufficient size to enclose the moving parts and exclude the possibility of any part of a person's body from contacting the moving parts while such equipment is in motion.

Guards designed to prevent contact with ventilating fans having exposed blades shall completely enclose the outby side of the fan blades.

Guards, such as substantial chains, cables, or the equivalent, installed to protect persons from contact with the inby side of ventilating fans shall:

1. Be located at least 6 feet on the inby side of the fan blade;

2. Be installed to a height of at least one-half the height of the air passageway; and

3. Extend the width of the air passageway. Inspectors should carefully examine each belt conveyor drive to determine whether all rollers are sufficiently guarded to prevent persons from becoming entangled between the rollers and the conveyor belt.

75.1723 Stationary Grinding Machines; Protective Devices

Face shields or goggles shall be worn when operating any type of grinding wheel regardless of how the wheel is guarded.

75.1724 Hand-Held Power Tools; Safety Devices

If a hand-held power tool is equipped with a friction device in lieu of a switch which requires constant pressure to keep the tool operating, the friction device shall be adjusted to readily slip in case of emergency.

75.1725 Machinery and Equipment; Operation and Maintenance

The presence of defects, such as worn tires, defective steering or brakes, malfunctioning hydraulic controls, worn lagging on belt conveyor drive rollers, or frozen or damaged idler rollers could indicate that such machinery and equipment is not maintained in safe operating condition. Therefore, a violation of this section would exist if such defects render the equipment or machinery unsafe to operate.

When an inspector finds a violation as described above, he shall issue a citation requiring the condition to be corrected in reasonable time. Since this Section also requires that unsafe equipment or machinery be removed from service immediately, the

operator should be advised of the requirement. If the operator removes such unsafe equipment or machinery from service immediately it should be noted on the citation. If the operator does not remove such equipment or machinery from service immediately, another citation for such failure should be issued giving the operator reasonable time to comply.

This Section in no way affects enforcement of other mandatory safety standards and should be used only where such condition is not covered by any other regulation. Lack of frame grounding, improper protection, etc., are to be cited under the appropriate sections in accordance with Section 104 of the Act allowing reasonable time for compliance.

Loading machines and continuous-mining machines shipped from the manufacturer after January 1, 1981, are required to be equipped with load-locking valves in the boom and head lift cylinders. Where it is determined that a unit of equipment was shipped after January 1, 1981, and the load-locking valves are not maintained, enforcement action should be taken under Section 75.503, for failure to maintain the electric face equipment in permissible condition. Load-locking valves provided on equipment shipped from the manufacturer prior to January 1, 1981, also have to be maintained. Appropriate enforcement action under this Section should be taken if these load-locking valves are not being maintained.

The tramming of solid-state controlled battery powered equipment in the high-tram mode immediately upon energization of the tram motors indicates that an electrical fault is present on the equipment. When this occurs, the equipment is not in safe operating condition and must be removed from service and properly repaired.

Faulty equipment responds in two ways. First, the tram motors may start in high tram and then immediately stop, which causes the machine to "lurch" a short distance. This response indicates that the protective circuits in the solid-state logic unit are sensing a fault and are functioning properly. Second, the tram motors immediately start in high-tram and continue to run in this mode. This response indicates that an electrical fault is present on the machine and that the protective circuits in the solid-state logic unit are inoperative.

Proper functioning of temperature-sensitive switches or other devices which shut down air compressor motors when overheating occurs is essential to the safe operation of this equipment. Examinations and testing performed on air compressors must include attention to overtemperature devices, and whenever these safety features are not functioning properly the equipment must be immediately removed from

service.

Management shall have the responsibility of designating only properly trained personnel to operate equipment and machinery.

The trailing cable shall be disconnected from the source of power before repairs are made on portable or mobile equipment, except when the equipment must be operated for making adjustments.

Raised, elevated, and unsecured equipment must be securely blocked to prevent movement before miners position themselves under or between movable components of the equipment.

Occasionally more than one component location on a machine must be blocked. Blocking material must be capable of supporting the weight of the equipment or component. Wood used for blocking material must be solid and should be flat sided. Most equipment can be safely blocked with a wooden crib. The crib should be installed on a solid footing and wedged tightly to the machine to prevent any initial movement that could dislodge the blocking.

Machinery shall not be lubricated manually while in motion or while energized unless facilities are provided to assure against equipment accidentally starting while being lubricated. Section 75.509 prohibits equipment from being lubricated while energized. This would prohibit the use of machine-powered, hand-operated lubricators on the same machine that is being lubricated.

When it is necessary to position certain mechanical parts of equipment for repairs, maintenance, or lubrication, or when hydraulic fluid must be power-pumped, the machine may be energized for that portion of work. However, when hydraulic fluid is power-pumped, no other repair, maintenance, or lubrication work shall be done. Repair, maintenance, or lubrication work shall not be done until the power is removed from the machine. This would prohibit the use of machine-powered, hand-operated lubricators on the same machine that is being lubricated, unless all incoming power connectors are broken by a circuit breaker. A small circuit breaker, connected to the lineside of the power circuit breaker, could supply power to a machine-mounted lubricating system if the power circuit breakers are opened before the machine is lubricated. Opening a circuit breaker which is installed on the machine, and which opens all power conductors entering the machine, shall be acceptable as compliance with this Section for lubrication or changing bits. Opening a double-pole control switch which will open both the negative and positive control circuits, shall be acceptable on direct-current-powered cutting machines and continuous miners for the purpose of deenergizing the machine for changing cutting bits.

When machines are mechanically connected to each other but trammed independently, and are sufficiently different in size, weight, and power, an emergency stop switch shall be installed on the smaller machine to deenergize the larger machine. Without an emergency stop switch the equipment is not considered to be in a safe operating condition and must be removed from service.

75.1729 Welding Operations

Welding operations shall be shielded to the extent that the other persons working in the adjacent area will not be able to view the welding area directly. Areas in which welding operations are being performed shall be ventilated sufficiently to prevent accumulation of smoke and other contaminants.

75.1730 Compressed Air; General; Compressed Air Systems

All pressure vessels shall be plainly marked with the manufacturer's name and maximum allowable working pressure. Safety relief valves shall be adjusted to flow at a pressure not exceeding the maximum allowable working pressure of the vessel, except that if the vessel is exposed to fire or other sources of external heat the relief valve may be adjusted to a value not exceeding 110 percent of maximum allowable working pressure.

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Subpart C Surface Installations

77.100 Demonstration of Ability to Test for Methane andfor Oxygen Deficiency

The demonstration of ability requirement of 30 CFR 77.100 applies when an applicant works at a surface area of an underground mine or a surface mine where there is a need for competence in testing for methane and/or oxygen deficiency. Locations where such tests are required include:

Tests for Methane

77.201-1 structures, enclosures, or other facilities where coal is handled or stored;

77.211(b) tunnels located below stockpiles, surge piles, and coal storage silos;

77.1112(b) areas where welding, cutting, or soldering will take place and that are likely to contain methane;

77.1916(c) any slope or shaft designed to penetrate into any coalbed below the surface and where welding, cutting, or soldering is to be performed;

Tests for Oxygen Deficiency and Methane

77.1501(c) the collar of auger holes when the auger hole penetrates an abandoned or mined out area of an underground mine; and

77.1901(a) slope and shaft areas.

Applicants for temporary certification who work at mines where one or more of the above standards has application are required to demonstrate their ability to competently perform the prescribed test to an MSHA inspector or training specialist. Where none of the circumstances or conditions described by the above standards are present, persons working at such mines and applying for temporary certification are not required to demonstrate their ability to perform methane or oxygen deficiency tests. MSHA inspectors will determine whether a demonstration of ability is necessary on a mine-by-mine basis. A temporary certification under 30 CFR 77.100 applies only to the mine where the miner is employed at the time the temporary certification is granted.

77.200 Surface Installations; General

This Section does not apply to housekeeping. It is to be used for keeping surface facilities in good repair relative to safety.

Inspections of surface facilities, structures, and enclosures should include an examination of all load-carrying members and related bracing. When such members or bracing are substantially warped, bent, deteriorated due to corrosion or weathering, or otherwise damaged or missing, the structure may be unstable or have a reduced load-carrying capacity. These conditions can cause or contribute to serious accidents and injuries, and appropriate enforcement action must be taken pursuant to this Section to require the structure, enclosure, or other facility to be maintained in good repair.

The district engineering staff should be consulted to evaluate the condition of a surface structure where assistance is needed in determining whether the condition causes instability or reduces the load-carrying capacity of the structure.

77.201 Methane Content in Surface Installations

Methane tests are not required where there are no surface structures, enclosures, or other facilities where methane could accumulate; where auger mining is not being conducted; or where tunnels are not located below stockpiles. There may be other conditions that do not require methane tests, in which case the inspector should use good judgment in requiring compliance with this regulation.

77.201-1 Tests for Methane; Qualified Person; Use of Approved Device

These tests are required regardless of any other gas detecting methods used.

77.201-2 Methane Accumulations; Change in Ventilation

This Section may be used to determine if a ventilation fan is needed for various surface facilities. However, it does not provide the authority to require a fan if other satisfactory adjustments in ventilation can be made.

77.202 Dust Accumulations in Surface Installations

This section is not meant to control dust from a health standpoint. It is meant to control dangerous quantities of coal dust that would create a fire or explosion hazard.

77.206 Ladders; Construction; Installation and Maintenance

The phrase "wooden members" in Paragraph (b) includes the side members and rungs of ladders.

The words "used regularly" in Paragraph (c) mean, if the ladder is used for any regularly scheduled purpose regardless of the time interval. Paragraph (c) also states that backguards are required on all steep or vertical ladders that are more than 7 feet in height. This requirement in Paragraph (c) cannot be used to cite ladders on mobile equipment or for step ladders and vertical ladders that are not secured at a fixed location.

77.207 Illumination

The inspector should also consider the quality of light in providing a safe working environment. Attention should be given to glare, diffusion, and direction of the light. In areas where moving equipment is present, it is necessary to have the general working area lighted in order to provide sufficient illumination. An area may be illuminated by fixed lighting, machine-mounted lights, or portable lights.

77.208 Storage of Materials

It is not the intent of Paragraph (b) of this section to require valve covers on well secured intermittently used compressed gas cylinders in occupied shops and designated repair areas. However, the valve should be closed promptly after each period of use. Paragraph (e) permits the transportation and storage of compressed gas cylinders with recessed valves without additional protection.

77.211 Draw-off Tunnels; Stockpiling and Reclaiming Operations; General

The requirements of Paragraph (a) of this section may be used as a factor in making a determination as to the need for a ventilation fan. However, it does not provide the authority to require a fan if satisfactory ventilation can be achieved by other means. Paragraph (b) does not require installation of a methane monitor.

77.212 Draw-off Tunnel Ventilation Fans; Installation

This section does not require the installation of a fan to ventilate a draw-off tunnel; however, it does regulate the installation if used.

77.213 Draw-Off Tunnel Escapeways

This section applies to any tunnel of sufficient length in which a miner could be entrapped. The escapeway shall be provided from the enclosed end to the surface by an exit other than the existing

tunnel. "Equivalent size" means that the smallest dimension in the escapeway from draw-off tunnels shall be no less than 30 inches.

77.214 Refuse Piles; General

A "safe distance," as used in Paragraph (a) of this section, should be at least 300 feet. Any proposal to construct a refuse pile within 300 feet should be reviewed by the District Manger.

"Fenced or otherwise guarded" as used in Paragraph (d) means a gate or other similar barrier across the entrance or exits to and from the refuse pile.

77.215 Refuse Piles; Construction Requirements

Paragraph (e) does not prohibit the operator from constructing a valley-fill type refuse pile, side hill refuse pile, etc., provided the operator installs hydraulic structures which will pass runoff from the affected watershed either around or under the refuse pile. The 100 year six-hour frequency storm should be used to determine the size of the hydraulic structure(s) used to accommodate surface runoff.

Paragraph (g) does not prohibit the operator from storing coal on a refuse pile in the form of a temporary stockpile.

77.215-1 Refuse Piles; Identification

This section does not specify a minimum or maximum size for the identification marker, nor for the letters/numbers used on the identification marker.

77.215-2 Refuse Piles; Reporting Requirements

The USGS topographic map, required by Paragraph (b)(2), should be legible of sufficient size to indicate the drainage area affecting the refuse pile. The nearest landmarks or communities should also be indicated.

Information, required by Paragraph (b)(3), should contain, as a minimum, the initial starting date of the pile (if known), foundation preparation (if known), material transport and handling (aerial tram, conveyor belt, truck haulage, etc.), approximate size(s) of refuse material, compaction equipment that had been used or is being used, and the lift thickness of the refuse material being placed.

Paragraph (b)(6) requires the operator to furnish information regarding diversion ditch size, decant pipe size, and any other hydraulic structure being used to pass water around or under a refuse pile in a permanent manner.
Under paragraph (b)(8), the operator shall submit revised reporting requirements if there are any significant changes

made in paragraphs (b)(1) through (b)(8) of this Section.

77.215-3 Refuse Piles; Certification

Paragraphs (a) and (b) do not require specific wording for certification. However, the registered engineer should incorporate the wording in paragraph (a) as part of the certification. In addition, the certification should include statements describing the remedial work performed at the site that has minimized the hazardous condition(s).

77.216 Water, Sediment, or Slurry Impoundments and Impounding Structures; General

For the purpose of determining the elevation to which water, sediment or slurry can be impounded, measurements should be taken from the upstream toe of the structure to the lowest point on the crest of the structure. If the lowest point on the crest of the structure is the invert of a properly designed open channel spillway, then that point is the proper location for the upper measurement. Where decant pipes and pipe spillways are used, the elevation must still be measured to the lowest point on the crest of the structure, not to the invert of the decant riser or spillway pipe.

As the emphasized language above makes clear, the impoundment capacity of a structure may be based on a measurement to the invert of the spillway only if two contingencies are satisfied. The spillway must be an open channel configuration, and it must be properly designed. Where either of these requirements is lacking, the impoundment capacity of a structure must be determined based on a measurement made to the lowest point on the crest of the structure, without reference to the spillway.

To assure that the requirement of a properly designed spillway is satisfied when the impoundment capacity of a structure is to be determined by measurement to the invert of the spillway, district managers are advised to adopt the following procedures:

1. For impounding structures completed after August 6, 1981, the District Manager should notify the operator that, in order to rely on a measurement to the invert of the spillway for determining impoundment capacity,the operator must supply the information and analyses necessary for the district manager to make a meaning-ful evaluation of whether the spillway is properly designed. If this information is not made available to the district manager, then measurements should be made to the crest of the structure when determining impoundment capacity.

2. For impounding structures completed before August 6, 1981, if the district manager has reason to believe that the spillway is not properly designed, the operator may be required to supply the information necessary for the district manager to make a meaningful evaluation of whether the spillway is properly designed.

This Section will not generally apply to incised ponds constructed on undisturbed, relatively flat ground unless such ponds are determined by the district manager to present a hazard to coal miners.

77.216-3 Water, Sediment, or Slurry Impoundments and Impounding Structures; Inspection Requirements; Correction of Hazards; Program Requirements

In paragraph (c), "at the mine" refers to the mine office, preparation plant, engineering office, etc., depending on which location would be in the closest proximity to the site.

"One of the following persons" referred to in paragraph (d) should also include the preparation plant superintendent or foreman.

To comply with the training requirements of 30 CFR 77.216-3(g), a coal company shall submit, and the district manager may approve, a mine's training plan for persons whose work assignments require them to be qualified or certified. The intent of the plan is to ensure that the potential qualified person "shall be trained to recognize specific signs of structural instability and other hazardous conditions by visual observation and, if applicable, to monitor instrumentation."

The Mine Safety and Health Administration will consider the following items when evaluating a person to become qualified to inspect impoundments. The person must initially be trained according to an approved 30 CFR Part 77 training plan that has a program of instruction on impoundment inspection. The training course may be given by an instructor from the National Mine Health and Safety Academy, a district training or technical impoundment specialist, Technical Support personnel designated by the district manager, or an instructor designated to instruct impoundment inspection on an approved 30 CFR Part 77 training plan.

Before the person is considered qualified and is eligible to inspect water, sediment, or slurry impoundments according to 30 CFR 77.216-3, the person in the training program must pass an evaluation. The district manager may make use of an oral,

written or practical demonstration, in order to determine the successful completion of training by the person.

The results will be recorded on the appropriate Certification/ Qualification Examination Report (MSHA Form 5000-17) by the Agency's representative who conducted the examination and forwarded to the Qualification and Certification Unit, P.O. Box 25367, Denver, CO 80225-0367.
The qualification status will become a permanent record in the Agency's data base and will not expire as long as retraining is attended on an annual basis.

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Subpart D Thermal Dryers

77.301 Dryer Heating Units; Operation

Additional standards which should be consulted with regard to paragraph (b) of this Section are: The National Fire Protection Association Standards Number 60 "Standards for the Installation and Operation of Pulverized Fuel Systems"; and 653 "Prevention of Dust Explosions in Coal Preparation Plants." Both can be found in the NFPA National Fire Codes, Volume 3--Combustible Solids, Dusts, and Explosives, 1971-72.

77.303 Hot Gas Inlet Chamber Dropout Doors

The phrase, "At the bottom," as used in this Section, is interpreted to mean in the bottom area, not necessarily underneath.

77.313 Wet-Coal Feedbins; Low-level Indicators

"Wet coal bins," as referred to in this Section, mean large surge bins where audible and visible low level indicators are necessary.

77.314 Automatic Temperature Control Instruments

The instrument referred to in paragraph (b) of this Section need not be locked. However, the mechanism that controls the temperature setting shall be locked or sealed to prevent tampering or unauthorized adjustment.

77.400 Mechanical Equipment Guards

The word "line," used in paragraph (b) of this Section, means beltline and should read "... if whipping action from a broken beltline would be hazardous to persons below." The guard required in paragraph (c) should extend a minimum distance of 30 inches from the point where persons could become caught between the belt and the pulley.

77.401 Stationary Grinding Machines; Protective Devices

Only wheels or discs with manufacturer's identification tags still attached, showing the proper r.p.m. rating of the wheel, shall be used. A grinding wheel or disc rated for 5,000 r.p.m. should not be used with a machine rated for 7,000 r.p.m.

77.403 Mobile Equipment; Falling Object Protective Structures (FOPS)

In enforcing paragraphs (a) and (b) of this Section, the inspector must make an independent judgment that a FOPS is necessary in order to protect the operator of the equipment. If an inspector observes equipment being operated and, in his/her opinion, a FOPS is necessary, the inspector shall issue a citation or order.

When mobile equipment other than what is listed in this Section, such as an excavator with a rotating deck, is used where there exists a hazard from falling objects, steps shall be taken to protect the operator. If, upon inspection, any machine is found operating in close proximity to a highwall and there is a danger from falling material, an order of withdrawal under the provisions of Section 107(a) of the Act would be appropriate to protect the machine operator.

77.403a Mobile Equipment; Rollover Protective Structures (ROPS)

Section 77.403a and 77.403b are written without parentheses. A citation may be written as 77.403a(c)(1). There are other possible combinations, but ensure that the correct transposition is made.

If an inspector, upon an inspection of a mine, finds that an imminent danger does exist which involves equipment manufactured prior to July 1, 1969, and relates to the lack of ROPS for such equipment, he/she shall issue an order under Section 107(a) of the Act. Such orders should describe the conditions (equipment, grades, etc.) and/or practices which constitute the imminent danger. Any such order issued should require the equipment (or similar equipment) to be withdrawn prohibited from operation under the conditions that created the imminent danger.

When such order has been issued, it should not be terminated because the mine operator has removed the equipment from service at the area where the imminent danger was found. The order should remain in effect to prevent the mine operator from putting that equipment (or similar equipment) back in operation under the same conditions after the inspector leaves the mine.

When an inspector finds a ROPS that is damaged or otherwise altered from its original configuration so that it no longer complies with these standards, a citation or order, as appropriate, should be issued for violation of paragraph (a) describing the condition observed.

Alterations and repairs to ROPS shall also be carefully examined for insufficient or defective welds. A ROPS with an insufficient or defective weld does not meet the requirements of paragraph (a), and a citation or order, as appropriate, should be issued. This condition also indicates that the weld may not have been performed by a certified welder, as required by paragraph (f). To determine whether a violation of paragraph (f) has occurred, the inspector should ask the operator to furnish evidence that the weld was performed by a certified welder.

77.404 Machinery and Equipment; Operation and Maintenance

Paragraph (a) of this Section does not affect enforcement of other mandatory safety standards and should be used only where such condition is not covered by any other regulation. Lack of frame grounding, improper protection, etc., are to be cited under the appropriate section in accordance with Section 104(a) of the Act, allowing reasonable time for compliance.

The presence of defects, such as worn tires, defective steering or brakes, malfunctioning hydraulic controls, worn lagging on belt conveyor drive rollers, or frozen or damaged idler rollers, could indicate that such machinery and equipment are not maintained in safe operating condition. Therefore, a violation of this Section would exist if such defects render the equipment unsafe to operate.

When an inspector finds a violation as described above, he/she shall issue a citation requiring the condition to be corrected in a reasonable time. This Section also requires that unsafe equipment be removed from service immediately. The operator should be advised of the requirement. If the operator removes such unsafe equipment from service immediately, this should be noted on the citation. If the operator does not remove such equipment from service immediately, another citation for such failure should be issued, giving the operator reasonable time to comply.

During the inspection of shop areas, battery-charging stations, and other places where hoisting equipment is used, such equipment should be closely examined to assure that the equipment is in safe operating condition.

These installations should be closely examined to make certain that:

1. The hoist is securely fastened to the dolly or other support.

2. The dolly rides the I-beam without excessive side play.

3. The hoist has proper operating controls that allow the hoist to be operated from a safe position.

4. The dolly or hoist does not contain bent or defective parts or defective ropes or chains.

5. The hoist is being operated within its rated capacity.

6. Hoists attached to I-beams are being used for vertical lifting only.

7. The structure the hoist is attached to is provided with adequate stops or devices to prevent it from traveling beyond the end of the supporting structure.

The failure of safety devices such as horns, headlights, taillights, brake lights, or mirrors on mobile surface equipment can contribute to serious accidents involving these vehicles. Mine operators should be aware that horns, lighting systems, and other safety features can be rendered inoperable by accumulations of dust, mud, grease, or oil, as well as defective mechanical or electrical components. Accordingly, all such safety devices are required, under paragraph (a), to be maintained in operating condition or the mobile equipment must be removed from service.

MSHA's policy on Paragraph (c) of this section is similar to the policy on Section 77.500, which states that it is not necessary to completely deenergize large surface mining equipment where means are provided in the equipment to deenergize any part where repair work is to be done. Similarly, to comply with Paragraph (c), it is not necessary to completely deenergize large surface mining equipment where the motion of the operating equipment does not pose a hazard, and means are provided in the equipment to deenergize that part where repair or maintenance work is to be done. Each repair or maintenance job must be examined

separately for hazards related to that particular job or work area. If the machine's operation poses a hazard to the employee performing the work, the machine shall be shut down until the work is completed or the hazard no longer exists. General maintenance and housekeeping can normally be performed while the machine is in motion except around unguarded energized electric or moving mechanical equipment.

77.405 Performing Work From a Raised Position; Safeguards

Mechanical means that are manufactured as an integral part of the machine for the purpose of securing a portion of the machine in a raised position are acceptable as meeting the requirements of this section.

Paragraph (b) of this Section requires that raised, elevated, and unsecured equipment must be securely blocked to prevent movement before miners position themselves under or between moveable components of the equipment. Occasionally, more than one component location on a machine must be blocked. Blocking material must be capable of supporting the weight of the equipment or component. Wood used for blocking material must be solid and should be flat sided. Most equipment can be safely blocked with a wooden crib. The crib should be installed on a solid footing and wedged tightly to the machine to prevent any initial movement that could dislodge the blocking.

77.408 Welding Operations

Welding operations within enclosed areas where excessive smoke and fumes accumulate should be ventilated by mechanical means.

77.410 Mobile Equipment; Automatic Warning Devices

The warning device required by this Section need not be provided for automobiles, jeeps, pickup trucks, and similar vehicles where the operator's view directly behind the vehicle is not obstructed. Service vehicles making visits to surface mines or surface work areas of underground mines are not required to be equipped with such warning devices.

77.413 Boilers

It is not the intent of this regulation to cause electric hot water heaters to meet the requirements of this Section, even though the name "boiler" appears on the name plate. The regulation applies only to steam boilers.

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.

"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.

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, switchboxes, 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 switchboxes, 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."

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.

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.

77.502 Electric Equipment; Examination, Testing and Maintenance

For purposes of this Section, "electric equipment" shall include all control circuits; control switches or devices; circuit breakers; fuses; conduits; wiring; motors; transformers; lighting equipment; hand-held tools such as drills, wrenches, and saws; etc. The tests, examinations, and proper maintenance required by this Section shall include all items mentioned above and all other such equipment at the mine.

77.503 Electric Conductors

Section 77.503 requires that, "electric conductors shall be sufficient in size and have adequate current carrying capacity and be of such construction that a rise in temperature resulting from normal operation will not damage the insulating materials." Section 77.503-1 outlines the term "sufficient" and states that electric conductors must "meet the minimum current carrying capacity provided for in the National Electric Code, 1968" (emphasis added). While Section 77.503 states general ampacity and conductor size requirements, Section 77.503-1 incorporates the specific minimum requirements of standards promulgated by consensus standards organizations.

Since publication of the 1968 NEC, technological advances in power cable manufacture have been made. Insulated conductors having better grades of insulation and temperature ratings have been developed which far exceed the capabilities of conductors addressed by the 1968 NEC. Therefore, ampacity tables for insulated conductors other than trailing cables used on the surface and manufactured in accordance with minimum NEC standards, or which meet the more general safety test of Section 77.503 are acceptable.

For example, conductors manufactured in accordance with the Insulated Cable Engineers Association (ICEA) standards, which conform to the ICEA ampacity tables or other nationally recognized standards would be acceptable as meeting the requirements of

Section 77.503. Enforcement action should not be taken if cables do not meet the specifics of the 1968 NEC ampacity and temperature rating standards, but equal or surpass the minimum level of safety afforded by compliance with the NEC. This enforcement policy will allow the use of newly-designed electric conductors which are not addressed by the 1968 NEC, but which do comply with Section 77.503 and offer equal or greater miner protection.

Trailing cables are required to meet the minimum capacity requirements of the Insulated Power Cable Engineers Association (IPCEA) - National Electric Manufacturers Association (NEMA) standards. This policy does not affect MSHA's treatment of trailing cables.

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.

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.

77.506 Electric Equipment and Circuits; Overload and Short-Circuit Protection

Section 77.506 requires "automatic circuit-breaking devices or fuses of the correct type and capacity" on electric equipment and circuits to protect against short circuits and overloads. Section 77.506-1 specifies what was considered to be the correct type and capacity for circuit breakers and fuses at the time the standard was enacted. It requires such devices and fuses to meet the minimum requirements of the 1968 NEC. For certain excavation equipment, requiring strict compliance with the terms of the 1968 NEC could prevent the use of circuit protective devices of appropriate type and capacity. Therefore, Section 77.506-1 should not be applied to some equipment which meets the requirements of Section 77.506.

Alternating- and direct-current loop (feedback) systems and their controls, which are used on large shovels, draglines and in-mine hoisting installations are normally designed so that their currents are limited to values below those which would cause a harmful overload condition to circuits or motors. These circuits on the equipment specified above comply with Section 77.506, and will not be required to have short-circuit or overload protective devices to comply with the terms of the NEC.

77.507 Electric Equipment; Switches

The intent of this Section is to require that all control devices be fully enclosed to prevent exposure of bare wires and energized parts. Improvised starting methods such as plug and receptable devices, trolley taps and trolley wire "stingers" that are used to start or stop electric motors are examples of noncompliance with this provision.

77.508 Lightning Arresters, Ungrounded and Exposed Power Conductors and Telephone Wires

Conductors that are provided with a metallic shield or are

jacketed by a grounded metal covering or enclosure, suspended by a grounded messenger wire, installed under grounded metal framework, protected by the umbrella-effect of overhead grounded static line, or are buried in the earth are not considered exposed for the length so protected. If the trolley wire of a d.c. system is paralleled by an exposed feeder cable, one lightning arrester would provide protection for both if they are interconnected near the lightning arrester.

To comply with this Section, three-phase alternating-current circuits should be provided either with three separate lightning arresters or with a three-phase arrester which consists of three arresters in one case having a common ground terminal.

77.511 Danger Signs at Electrical Installations

"Major electrical installations" shall include the following:

1. All high-voltage installations housing exposed energized parts, such as: fence enclosed substations; skid-mounted transformers; transformers or switchgear located in vaults or rooms; circuit breaker and switch houses; enclosures on board machines, in preparation plants, or shops, that house high-voltage switches, fuses or exposed buss; and high-voltage motor controls.

   Examples of high-voltage installations that are not considered to be major are: high-voltage cables serving surface mine equipment; pole-mounted transformers, regulators and capacitors; pole-mounted disconnecting switches; motor generator sets having no exposed high-voltage parts, and high-voltage cables or wiring in conduits passing through enclosures from floor to floor in preparation plants or machines.

2. Rooms or areas housing switchboards containing exposed parts energized at more than 40 volts to ground.

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:

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

2. 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 linestarters, fuse boxes, and other low-voltage switchgear containing renewable parts.

77.516 Electric Wiring and Equipment; Installation and Maintenance

Section 77.516 requires, in addition to compliance with Sections 77.503 and 77.506, that electric equipment installed after June 30, 1971, meet the requirements of the NEC. The NEC has been incorporated into MSHA standards to address wiring and wiring methods for surface facilities and structures not specifically covered in Part 77. The NEC will continue to be applied to surface facilities and structures other than the specified excavation equipment. The NEC contains safety guidelines which are not specifically tailored to surface mine excavation equipment and conductors, but which cover a much broader scope. While Section 77.516 addresses wiring and electric equipment installed after June 30, 1971, on surface mining machines, many provisions of the NEC are not applicable to the wiring methods, types of equipment, and conditions on these machines. For example, certain excavation equipment designed and installed since June 30, 1971, is not compatible with the requirements of the 1968 NEC. Therefore, strict application of and compliance with the NEC for the wiring methods used on surface mine excavation equipment is not practicable.

Wiring and electric equipment installed after June 30, 1971, on-board electric or diesel-powered surface excavation equipment are not required to comply with the NEC under Section 77.516, although mine operators are free to rely on it as a guideline. This policy applies to equipment such as draglines, shovels, dozers, bucket wheel excavators, mobile

drills, mobile cranes, haulage trucks, and endloaders. However, all other relevant provisions in Part 77 will continue to apply to these machines. Equipment and wiring installed after June 30, 1971, will be inspected and enforcement action taken in the same manner as on equipment installed prior to that date. For example, Sections 77.404 and 77.502 requiring examination and proper maintenance will be enforced, along with appropriate conductor ampacities under Section 77.503, short-circuit and overload protection under Section 77.506 and all relevant grounding provisions.

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77.600 Trailing Cables; Short-Circuit Protection; Disconnecting Devices

This Section does not permit the use of single element fuses for trailing cable short-circuit protection. Dual element fuses with adequate interrupting capacity may be used to provide short circuit protection for single phase and d.c. trailing cable circuits.

"Adequate interrupting capacity" means that the fuse or circuit breaker is capable of interrupting the maximum short-circuit current the circuit may conduct without destruction to the device.

This Section requires that short-circuit protection be provided for each undergrounded power conductor. Therefore, in direct current systems in which neither polarity is grounded, protective elements shall be provided for both the positive and negative lines. This necessitates the use of either a fuse in each polarity or a two-pole circuit breaker.

A visual means of disconnecting power from trailing cables must be provided so that it can readily be determined whether or not the cable is deenergized. Enclosed circuit breakers are not acceptable as visual evidence that power is disconnected. Plugs and receptacles located at the circuit breaker would be acceptable as the visible means of disconnecting the power.

77.603 Clamping of Trailing Cables to Equipment

If a strain clamp is used, it shall be designed and installed to prevent damage to the cable jacket. Cable grips, such as Kellems grips, anchored to the machine, may be used in lieu of strain clamps.

77.606 Energized Trailing Cables; Handling

Other protective devices such as insulated sleeves, insulated jackets, insulated aprons, insulated cable handling hooks, etc., are required by this Section when they are necessary to prevent the energized trailing cable from contacting the cable handler's body or clothing.

77.606-1 Rubber Gloves; Minimum Requirements

Rubber gloves with a rating of at least 20,000 volts shall be worn while handling energized high-voltage trailing cables, regardless of what other protective devices are used.

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77.700-1 Approved Methods of Grounding

Approved methods of grounding the metallic enclosures of electric equipment receiving power from ungrounded alternating-current power systems are contained in Section 77.701-1.

Approved methods of grounding the metallic enclosures of electric equipment powered from direct-current power systems are contained in Section 77.701-2.

Subpart H does not specify approved methods of grounding the metallic enclosures of stationary equipment receiving power from low- and medium-voltage, solidly grounded alternating-current systems. Nevertheless, Section 77.701 requires that such enclosures be grounded by methods approved by an authorized representative of the Secretary. An inspector shall not approve any method of grounding that does not include a solid connection to a grounding conductor which extends to the grounded point of the power source. The grounded power conductor of a solidly grounded alternating-current power system may serve as the equipment grounding conductor only between the grounded point of the power source and the grounded enclosure of the service disconnecting means for a building or other stationary facility. The grounded point of the power source and the metallic enclosure of each service disconnecting means shall be connected to an acceptable grounding medium such as metal waterlines having low-resistance to earth, a low-resistance ground field, etc.

Subpart H does not specify approved methods of grounding the metallic enclosures of portable or mobile equipment receiving power from high-voltage systems since the requirements for grounding such enclosures are specifically contained in Section 77.802.

This Section specifies approved methods of grounding metallic sheaths, armors and conduits enclosing power conductors. The approved methods of grounding listed in this Section are similar in that they each require a solid connection to an acceptable grounding medium. In resistance-grounded systems, the only acceptable grounding medium is the grounded neutral of the system. In other systems, an acceptable ground medium includes:

1. Metal waterlines having low-resistance to earth;

2. A low-resistance ground field; or

3. Any other grounding medium which ensures that there is no difference in potential between the metallic enclosures

and earth.

It should be emphasized that the metallic enclosures of all circuits supplied power from the same system must be solidly connected to the same grounding medium.

77.701 Grounding Metallic Frames, Casings, and Other Enclosures of Electric Equipment

Certain moveable electric equipment, e.g., rail-mounted and pivoting coal stackers, traveling shop cranes on track rails, small traveling hoists on I beams, etc., cannot be strictly classified as portable, mobile or stationary equipment. For the purposes of frame grounding, such equipment shall be considered stationary. Consequently, the grounding requirements of Subpart H apply to such equipment.

This Section requires that metallic frames of electric equipment be grounded by methods approved by an authorized representative of the Secretary. Therefore, rail-mounted and pivoting coal stackers, traveling shop cranes on track rails, small traveling hoists on I beams, and similar equipment shall be grounded in accordance with the following:

All tracks shall be bonded or welded at each joint, and each individual track rail or I beam shall be solidly grounded through a grounding conductor which meets the requirements of Section 77.701-3 to an acceptable grounding medium. In instances where the conveyor, hoisting and/or tramming motors receive power through a trailing cable, the moving frame shall be grounded to an acceptable grounding medium through a proper size grounding conductor inside the cable. In instances where the conveyor, hoisting and/or tramming motors receive power through a trolley system, the moving frame shall be grounded to an acceptable grounding medium through an additional grounding trolley contact.

77.701-1 Approved Methods of Grounding of Equipment Receiving Power From Ungrounded Alternating-Current Power Systems

The metallic enclosures of all equipment supplied power from the same system must be solidly connected to the same grounding medium.

77.701-2 Approved Methods of Grounding Metallic Frames, Casings and Other Enclosures of Electric Equipment Receiving Power from a Direct-Current Power System

Paragraph (b) requires that metal battery trays be solidly connected to the grounded frame of the battery charger while the batteries are being charged.

77.702 Protection Other Than Grounding

Portable tools and appliances that are protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment will be distinctly marked.

77.703 Grounding Frames of Stationary High-Voltage Equipment Receiving Power From Ungrounded Delta Systems

The term "ungrounded," as used in Sections 77.701-1, 77.703, 77.704-1(a) and 77.704-11, refers to the type of system grounding. The term does not refer to the grounding of metallic enclosures of electric equipment and circuits.

77.703-1 Approved Methods of Grounding

The grounding methods approved for grounding metallic enclosures of equipment receiving power from ungrounded alternating-current power systems (Section 77.701-1) are acceptable for grounding the metallic enclosures of stationary high-voltage equipment receiving power from ungrounded delta systems, provided the requirements of Sections 77.802 and 77.810 are also met.

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.

77.704-8 Protective Equipment; Testing and Storage

Tested gloves that are not in use and kept in a storeroom or warehouse shall be given the same consideration as new gloves.

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.

Subpart I Surface High-Voltage Distribution

77.800 High-Voltage Circuits; Circuit Breakers

High-voltage circuits supplying power to portable or mobile alternating-current equipment shall be protected against the harmful effects of a grounded phase in any circuit connected to the same transformer secondary. Consequently, if one bank of transformers supplies power to both stationary and portable or mobile loads, the circuit(s) extending to the stationary loads, as well as the circuit(s) extending to the portable or mobile loads, shall be provided with grounded phase protection.

Grounded phase protection for resistance-grounded circuits should be adjusted to operate on as low a value of fault current as practical; preferably not more than 40 percent of the current rating of the neutral grounding resistor.

77.800-1 Testing, Examination, and Maintenance of Circuit Breakers; Procedures

Paragraph (c) does not require the tank surrounding the oil circuit breakers to be dropped during this examination unless there is doubt of the qualified person making this examination as to conditions inside the tank.

77.802 Protection of High-Voltage Circuits; Neutral Grounding Resistors; Disconnecting Devices

The exception in this Section applies to high-voltage systems which supply power to stationary surface equipment only. Consequently, if a high-voltage system supplies power to equipment located underground in a mine, as well as equipment located on the surface, the frames of all equipment supplied power from the system shall be grounded in accordance with Section 75.802. Likewise, if a high-voltage system supplies power to portable or mobile equipment located on the surface, as well as stationary equipment located on the surface, the frames of all equipment supplied power from the system shall be grounded in accordance with the resistance grounding requirements of this Section.

77.803 Fail Safe Ground Check Circuits on High-Voltage Resistance-Grounded Systems

The ground check circuit required by this Section shall cause the circuit breaker to trip when any of the following occur:

1. The ground check wire is broken; and

2. Either the ground wire is broken at any point, or the impedance of the grounding circuit increases beyond the amount necessary to cause a 100-volt drop in the grounding circuit external to the grounding resistor under ground fault conditions.

It shall not be possible to reclose the circuit breaker while either of the above faults exist.

This Section permits the approval of a no less effective device in lieu of a fail safe ground check circuit. The following alternate method shall be considered no less effective than a fail safe ground check circuit for assuring the continuity of the grounding circuit extending to permanently installed stationary equipment which is supplied power from a high-voltage resistance-grounded system:

1. An equipment grounding conductor, sized in accordance with Section 77.701-3, shall originate at the grounded side of the grounding resistor and shall extend along with the power conductors and shall serve as a grounding conductor for the frames of all equipment receiving power from the resistance-grounded system.

2. A grounding electrode conductor shall connect the frames of the stationary equipment to a low resistance ground field located near the utilization location.

3. The ohmic value of the grounding resistor and the impedance of the low resistance ground field shall be maintained in such a manner that not more than 100 volts will appear between the equipment frame and earth under fault conditions in the event that the equipment grounding conductor should be severed.

4. The ohmic value of the grounding resistor and the impedance of the ground field to which the grounding resistor is grounded shall be maintained in such manner that not more than 100 volts will appear between the grounded side of the grounding resistor and earth under fault conditions in the event that the equipment grounding conductor should be severed.

5. This method for assuring the continuity of grounding circuits shall not be approved for high-voltage circuits which supply power to high-voltage equipment underground in a mine or to portable or mobile high-voltage equipment on the surface. The continuity of such grounding circuits shall be continuously monitored by fail safe ground check

circuits as required by Sections 75.803 and this Section.

77.803-2 Ground Check Systems Not Employing Pilot Check Wires; Approval by the Secretary

High-voltage trailing cables used with ground check systems not employing ground check wires, as provided in this Section, are not required to be equipped with installed ground check conductors.

77.805 Cable Couplers and Connection Boxes; Minimum Design Requirements

Existing medium- and high-voltage cable couplers that are not equipped with a terminal contact for the ground check conductor may be used if suitable means are provided for breaking the ground check conductor first when the coupler is being uncoupled. Suitable means include the installation of a locking switch on the coupler so that the coupler cannot be uncoupled until the ground check conductor is broken, or the installation of an external ground check connector on the coupler so that the ground check conductor is broken first when the coupler is being uncoupled.

Except for connections made inside cable connection boxes, totally enclosed metal switchhouses, etc., this Section expressly prohibits the use of single-pole couplers (Miller plugs) in medium- or high-voltage power circuits.

77.808 Disconnecting Devices

A "branch line" means a circuit that is formed by connection to an existing high-voltage circuit for the purpose of feeding branch loads. "Visual observation," as referred to in this Section, means that a physical separation in the current-carrying parts of the disconnecting device can actually be seen. Enclosed circuit breakers, oil-filled cutout switches, and other devices which do not have a visual means of determining that the circuit is deenergized do not meet the requirements of this Section.

A cable coupler or other device that is not designed for load-break purposes is not acceptable as a disconnecting device unless it is used in conjunction with a current-interrupting device such as a circuit breaker or oil-filled cutout which can be used to deenergize the circuit before the cable coupler or other device is opened. If a remote switch in the ground check circuit is used to trip a circuit breaker prior to uncoupling the coupler, visual or audible evidence must be provided to indicate that the circuit breaker has opened when the control switch is operated.

77.809 Identification of Circuit Breakers and Disconnecting Switches

The identifying markers for circuit breakers and disconnecting switches shall be large enough and located where they can be readily seen in the event that the circuit must be deenergized quickly.

Either metallic or plastic material may be used for the marker which should adequately identify the circuit (e.g., No. 1 Loader, Dragline, No. 1 Transformer Skid, etc.).

Where cable couplers are used in conjunction with current-interrupting devices to meet the requirements of Section 77.808, both the cable coupler and the current-interrupting device shall be labeled.

77.810 High-Voltage Equipment; Grounding

"Effectively grounded," as used in this Section, means that the frames, supporting structures and enclosures of high-voltage equipment are grounded in a manner that will prevent lethal voltages from appearing on such equipment during ground fault conditions.

The frames, supporting structures and enclosures of high-voltage equipment receiving power from a system, required by Section 75.802 or Section 77.802 to be resistance grounded, shall be considered effectively grounded only when they are grounded in accordance with the resistance grounding requirements contained in Section 75.802.

The frames, supporting structures and enclosures of stationary high-voltage equipment receiving power from a resistance-grounded power system other than a system which is required to be resistance grounded by Section 75.802 or Section 77.802 shall be considered effectively grounded provided:

1. Such frames, structures and enclosures are solidly connected to a grounding conductor which originates at the grounded side of the grounding resistor, extends along with the power conductors and serves as the grounding conductor for the frames, supporting structures and enclosures of all high-voltage equipment supplied power from the system; and

2. The grounding conductor is solidly connected to a ground field at the power source and at each utilization location.

The frames supporting structures and enclosures of stationary high-voltage equipment receiving power from a wye-connected power system in which the neutral of the source is solidly grounded shall be considered effectively grounded provided:

1. such frames, structures and enclosures are solidly connected to a neutral conductor which originates at the neutral point of the power source, extends along with the power conductors and serves as the grounding conductor for the frames, supporting structures and enclosures of all high-voltage equipment supplied power from the system; and

2. the neutral conductor is solidly connected to a ground field at the power source and at each utilization location.

77.900 Low- and Medium-Voltage Circuits Serving Portable or Mobile Three-Phase Alternating-Current Equipment; Circuit Breakers

Low- and medium-voltage circuits supplying power to portable or mobile three-phase alternating-current equipment shall be protected against the harmful effects of a grounded phase in any circuit connected to the same transformer secondary. Consequently, if one bank of transformers supplies power to both stationary and portable or mobile loads, the circuits, extending to the stationary loads, as well as the circuits extending to the portable or mobile loads, shall be provided with grounded phase protection.

Grounded phase protection for resistance-grounded circuits should be adjusted to operate on as low a value of fault current as practical; preferably not more than 40 percent of the current rating of the neutral grounding resistor.

77.902 Low- and Medium-Voltage Ground Check Monitor Circuits

The ground check circuit required by this Section shall cause the circuit breaker to trip when any of the following occur:

1. The ground check wire is broken. Existing low- and medium-voltage cable couplers that are not provided with a terminal contact for the ground check conductor may be used if suitable means are provided for breaking the ground check conductor first when the coupler is being uncoupled.

2. Either the ground wire is broken at any point, or the impedance of the grounding circuit increases beyond the amount necessary to cause a 40-volt drop in the grounding circuit external to the grounding resistor under ground fault conditions.

77.903 Disconnecting Devices

"Visual evidence," as used in this Section, means that a physical separation of the current-carrying parts of the disconnecting device can actually be seen. Consequently, molded case circuit breakers are not acceptable as disconnecting devices. A connecting plug on the outby end of a cable with which the cable is connected to the power source box shall be accepted as a disconnecting device. Other visible disconnecting means, such as switches with visibly opened contacts, will also meet the requirements of this Section.

77.904 Identification of Circuit Breakers

Either metal or plastic tags may be used to identify circuit breakers if they are attached securely to the circuit breaker enclosure and are large enough and placed so that they can be readily seen. The trailing cable should also be identified with the circuit breaker.

77.906 Trailing Cables Supplying Power to Low-Voltage Mobile Equipment; Ground Wires and Ground Check Wires

Low-voltage trailing cables used with ground check systems not employing ground check wires, as provided in Section 77.902-2, are not required to be equipped with insulated ground check conductors.

77.1004 Ground Control; Inspection and Maintenance; General
If an area is posted in accordance with paragraph (b), such posting shall be done in a manner to ensure that any worker in the area would be immediately aware of the hazard.

77.1005 Scaling Highwalls; General
The phrase, "The material removed from a safe location," as used in paragraph (b), means that the person who is removing the material must be in a safe location.

77.1006 Highwalls; Men Working
"Special safety precautions," as used in paragraph (c), shall include a thorough examination of the highwall or spoil bank for dangerous conditions and, if dangerous conditions are found, they shall be corrected before miners are permitted to work in such areas.

77.1008 Relocation of Drills; Safeguards
This Section does not apply when moving from hole to hole in a series, but the requirements apply when moving from one general area to another.

77.1009 Drills; Operation
Should an inspector observe a drill in operation with the controls unattended, enforcement action under this Section should be taken.

77.1100 Fire Protection; Training and Organization

The firefighting organizational plan should include a list of the persons trained and a written plan for extinguishing a fire if one should occur. The written plan should include a list and location of firefighting equipment. The scope of the training shall be commensurate with the size of the buildings and machinery involved and related to the number of employees. Further information can be obtained from the Fire Protection Handbook published by the National Fire Protection Association, Section II.

77.1101 Escape and Evacuation; Plan

The escape and evacuation plan should be written and posted in a proper location.

The requirements of paragraph (a) refer primarily to surface structures such as preparation plants, drawoff tunnels, shops, and other buildings where persons work. When applying this Section at surface mines, the inspector shall be cognizant of the potential fire hazard at surface mines and require only those means of escape commensurate with the hazard.

Paragraph (b) requires that all employees, including office and clerical personnel, shall be instructed on the current escape and evacuation plan, fire alarm signals, and applicable procedures.

Judgment should be used in enforcing paragraph (c) regarding the maintaining of exits from areas where persons are required to work or travel. For example, small washrooms and certain offices may be equipped with one exit as is common practice in surface buildings. However, large offices, generally those housing three or more people, wash and change houses, plants, shops, lunch-rooms, etc., shall have at least two exits. "Means for exit from all areas" means a continuous and unobstructed way of exit from any point in the building to a public way. The exits should be marked by readily visible signs, and every exit should be suitably illuminated. Should questions arise relative to the number, location, and design of exits, the National Fire Protection Code No. 101 and the Fire Protection Handbook shall be used for references.

77.1103 Flammable Liquids; Storage

Reference is made to the standards of the National Fire Protection Association and the applicable portion in Code No. 30--Flammable and Combustible Liquids. The basic requirements

for storing flammable liquids are:

1. Buildings or rooms within buildings in which flammable and combustible liquids are stored shall be of noncombustible structure, including walls, floor, and ceiling; properly ventilated and, where possible, located away from stairways or exits. If heated, only electric heaters, hot water, or low-pressure steam shall be used.

2. Drums and other containers stored in the open shall be located to reduce the spread of fire to other materials in storage or other property areas. The surrounding area shall be kept free of combustible materials, brush, etc.

"Safety can" shall mean an approved container, of not more than a 5-gallon capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

77.1104 Accumulations of Combustible Materials

This Section, in essence, refers to good housekeeping. Excessive quantities of coal or coal dust shall not be permitted to accumulate, particularly where other highly flammable materials are present.

77.1106 Battery-Charging Stations; Ventilation

Battery-charging stations shall be adequately ventilated to prevent the accumulation of explosive gases, particularly hydrogen which can be released during the charging cycle.

77.1108 Firefighting Equipment; Requirements; General

The intent of this general paragraph is to give the operator a choice in the type of extinguishing agent and, in some respects, the size or quantity of the unit. Questions can arise on the definition of the term "adequate supply," particularly for portable fire extinguishers as, for example, at a motor drive. Many of these questions can be answered by referring to the National Fire Protection Codes, particularly Code No. 10.

The entire fire control system shall be considered. For example, if the operator provides a sprinkler system at a hazardous location, then smaller hand-held units would be acceptable at a specific location within the sprinkler-protected area. Likewise, if a good water hydrant-hose system is offered, then small units could be acceptable at a specific location. An isolated plant ordinarily would require a higher degree of

protection than a plant served by a local fire department.

77.1108-1 Type and Capacity of Firefighting Equipment
The size and location of fire extinguishers required in paragraph (b) should follow recommendations given in the appropriate National Fire Protection Association Codes. The type of extinguishing agent shall conform with the size and class of potential fire hazard. Carbon tetrachloride fire extinguishers are not acceptable in accordance with the National Fire Protection Code. Carbon tetrachloride is toxic and is harmful if not handled properly.

77.1109 Quantity and Location of Firefighting Equipment
When questions arise concerning paragraph (a), the standards presented in National Fire Protection Code No. 10 shall be used as a guide. Generally, a minimum of one extinguisher having a rating no less than 2A8B or 2A8BC where electrical installations are present shall be provided on each floor or level in the structure. At least one extinguisher shall be provided for each 3,000 square feet of floor space.

Where the floor space exceeds 3,000 square feet, and more than one extinguisher is required, they shall be no more than 75 feet apart. If the area protected contains permanent electrical installations, the maximum distance between extinguishers shall be no more than 50 feet.

The purpose of paragraph (b) is to insure that a water stream or dry powder extinguishing agent can be applied at any location in the building. The 125-pound extinguisher can be a single unit or made up of several smaller units, provided the total weight of powder meets the requirement.

A 125-pound dry chemical extinguishing unit shall be provided for each 5,000 square feet of floor area in a building of noncombustible construction, or 2,500 square feet area in a building of combustible construction.

A single 125-pound unit can provide protection for more than a single floor if the system is permanently installed with rigid piping. Thus, a portable 125-pound unit can serve only a single floor, but a permanently installed unit may serve one or more floors, provided the floor area does not exceed 2,500 or 5,000 square feet, depending on the type of construction.

The following portable fire extinguisher ratings will be acceptable as meeting the requirements of paragraph (c)(1). All trucks up to and including those of 20-ton (load) capacity

should be equipped with at least one extinguisher having a minimum rating of 5BC. Trucks larger than 20-ton capacity should be equipped with an extinguisher having at least a 10BC rating. Two 5BC extinguishers are acceptable.

Other mobile equipment, such as front-end loaders, bulldozers, portable welding units, and augers of comparable size (to the trucks) should be rated on an equivalent basis, except hydraulically-operated equipment containing flammable and combustible liquids, trucks transporting flammable and combustible liquids, and diesel-powered motor generator sets. Examples are as follows:

1. A front-end loader or portable welding unit no larger in size (weight) than a 20-ton truck should require the same protection as a 20-ton truck or 5BC.

2. A front-end loader, bulldozer, auger, etc., larger than a 20-ton truck should require the same protection as a truck larger than a 20-ton or 10BC.

Mobile equipment containing flammable and combustible liquids, including trucks transporting flammable and combustible liquids and diesel-powered motor generator sets, should be protected with extinguishers having a minimum rating twice that required for other mobile equipment in examples 1 and 2; except that additional fire protection shall not be required for equipment using hydraulic fluids only for power-steering and power-breaking systems.

Paragraph (c)(2) requires equipment larger in size than that equivalent to a 50-ton truck to be provided with additional fire protection commensurate with the hazard. A minimum of one extinguisher having the proper rating shall be provided on each of all multilevel equipment such as shovels and draglines.

The extinguisher required by paragraph (c)(3) should be rated no less than 5BC.

When implementing paragraph (d), judgment shall be used in the evaluation of the requirements for extinguishers at each permanent electrical installation. One portable extinguisher can serve several adjacent electric motors or transformers. Extinguishers provided and located according to paragraph (a) shall be acceptable as protection for electrical installations within that area, provided such extinguishers are no more than 50 feet from the electrical installation.

Substation - Two extinguishers having a total rating of 20BC shall be provided at permanent substations.

The requirement in paragraph (e) of two portable fire extinguishers at the stated combustible liquid storage depots clarified in NFPA Code No. 30 means that two portable units, each having a rating of not less than 10-B units, shall be provided. Questions will arise as to whether a single extinguisher having a rating of 20-B units can be used instead of two 10-B fire extinguishers. Decisions shall be made for individual circumstances. Two 10-B extinguishers are generally preferred, as a greater chance exists that at least one unit will not be downwind of the fire. Decisions shall be based on the size of liquid storage, location and surrounding conditions. Rock dust in the amount of at least 500 pounds, kept dry and maintained usable, will be acceptable as "equivalent" to two portable extinguishers at remote combustible liquid storage installations, provided a shovel or equivalent means is available for applying the rock dust.

Fire protection referred to in paragraph (f) means two extinguishers having a rating of not less than 5BC each.

77.1300 Explosives and Blasting

Refer to Section 75.1300 for the policies related to joint MSHA and ATF activities.

77.1303 Explosives; Handling and Use

The following are guidelines for enforcing paragraph (g):

In the event the explosive haulage vehicle has to be moved within the blasting area, precautions shall be taken to avoid driving the vehicle over or dragging hoses over firing lines, detonator wires or explosive materials. The driver, in moving the vehicle, shall obtain the assistance of a second person to guide his/her movement.

During charging and firing, only the work activities associated with the explosives operation shall be permitted in the blasting area. Blasting operations shall be under the direct control of authorized persons. Boreholes shall be stemmed immediately after charging and shots, shall be fired as soon as practical after charging has been completed.

Holes to be blasted shall be charged as near to blasting time as practical, and such holes shall be blasted as soon as possible after charging has been completed. Where required to postpone the firing of the blast, the provisions of paragraph (g) shall be followed.

Paragraph (j) governs surface drilling and blasting when there is a danger that these operations can affect the active workings of an underground coal mine. In such instances, the appropriate orders should be issued to ensure that underground miners will be withdrawn from the endangered area before blasting is done.

To prevent damage to detonating cord, as addressed in paragraph (r), detonating cord downlines used in the charging of boreholes should be cut from the spool after the primed charge is in position.

Paragraph (qq) requires that, before entering the blast area, personnel shall make certain that it is completely free of visible reddish brown fumes, an indication of a highly toxic concentration of nitrogen dioxide gas.

MSHA recognizes that the use of ANFO, cast primers, and detonating cord, provides one of the safest means of blasting

available. However, it should be emphasized that detonating cord and cast primers contain explosives and are designed to explode. Consequently, they should be used with respect and common sense afforded an explosive, and it must be kept in mind that every explosive can be detonated under certain critical conditions.

77.1400 Personnel Hoists and Elevators

Safety systems utilizing safety belts attached to independently suspended safety lines by lanyards and rope grabs must be utilized when scaffolding hoists are used at surface facilities.

The following guidelines should be used when inspecting these devices:

1. Lifelines must be attached to a structural member of the shaft or collar or surface facility and not to the hoist rope outrigger.

2. Lifelines of at least first grade 5/8-inch nylon rope, 3/4-inch manila hemp rope, or equivalent, must be provided for each miner.

3. Substantial safety belts securely attached to the independently suspended safety lines by lanyards and rope grabs must be used at all times when embarking, disembarking or working on the platform.

Subpart P Auger Mining

77.1501 Auger Mining; Inspections

"The drilling site," as referred to in paragraph (a), should include that area of the highwall under which augering operations will be conducted during the shift. "All loose material," as used, is to be construed to mean loose material that poses a hazard to miners.

The term, "shall be inspected frequently," as used in paragraph (b), shall be construed to mean that such inspections should be made at intervals not to exceed 30 minutes when augering operations are conducted during a heavy rainfall and as often as necessary to assure the safety of the worker after a heavy rainfall or during any period of intermittent freezing and thawing.

77.1504 Auger Equipment; Operation

The following example meets the requirements of paragraph (c): If the control cab on the augering machine is located directly above or to the side of the auger train, the auger machine operator shall not be considered as being in direct line with the borehole during augering operations.

To meet the requirements of paragraph (e), the face of highwalls at auger mining sites shall be provided with adequate illumination for a distance of 25 feet on both sides of each drilling site.

77.1505 Auger Holes; Blocking

In accordance with this Section, the blocking material should be piled at least 12 inches above the top of the auger hole to allow for settling. "Other suitable material" shall consist of material that will not fire readily.

77.1605 Loading and Haulage Equipment; Installations

Cracks or discolorations in the cab windows that impair or distort the operator's vision or a crack that will damage the windshield wiper blade are examples of noncompliance of paragraph (a). Plexiglass may be used in lieu of safety glass in cab windows if the transparency is not impaired by scratches or discoloration.

Paragraph (k) is applicable to all elevated roadways on mine property, including roads used to transport coal, equipment, or personnel, and regardless of the size, location, or characterization of the roadways. Berms or guards are required on all exposed banks of elevated roadways. Thus, elevated roadways with two exposed banks are required to have berms or guards on both sides.

Berms or guardrails are required along the section of an elevated roadway crossing the crest of an impounding structure when the structure has been built to its final crest elevation and when the section of road over the impounding structure is completed. However, temporary berms or guardrails are not required along the section of an elevated roadway where it crosses the working surface of the impounding structure while the site is under active construction. Placement of such temporary berms or guardrails can be detrimental to the overall, long-term integrity of the structure, since the optimum moisture content and the required compaction parameters would be adversely affected.

On elevated roadways, leading to or constructed on the inclined surfaces of the impounding structure, berms or guardrails are required to be maintained as the structure increases in height.

If active construction on an impounding structure is suspended for any reason, and the roadway has not yet achieved the final elevation in accordance with the approved construction plan, then berms or guardrails are required if the site is an elevated roadway.

The requirements of paragraph (k) apply to that part of an elevated haulage road where one bank is, or both are, unprotected by a natural barrier which will prevent vehicles or equipment from running off and rolling down the unprotected bank(s).

"Elevated roadways," as used in this requirement, are roadways of sufficient height above the adjacent terrain to create a hazard in the event that mobile equipment should run off the roadway.

"Berm," as used in this Section, means a pile or mound of material at least axle high to the largest piece of equipment using such roadway and as wide at the base as the normal angle of repose provides. Where guardrails are used in lieu of berms, they shall be of substantial construction.

The width of the haulage road does not preclude the need for berms or guardrails.

77.1606 Loading and Haulage Equipment; Inspection and Maintenance

Mobile loading and haulage equipment shall be inspected by a competent person before such equipment is placed in operation at the beginning of each shift. Any defects found affecting safety during the required inspection shall be recorded and reported to the mine operator.

77.1702 Arrangements for Emergency Medical Assistance and Transportation for Injured Persons; Reporting Requirements; Posting Requirements

Paragraphs (a) and (b) of this Section are not to be interpreted to mean that a physician or an ambulance must be present at the mine at all times. These paragraphs do mean, however, that the required services must be arranged for and be readily available.

Paragraphs (c) and (d) of this Section have been disapproved by the Office of Management and Budget (OMB) pursuant to authority under Executive Order 12174 (44 FR 69609) and the Paperwork Reduction Act of 1980. Beginning January 1, 1982, no enforcement action shall be taken relative to the reporting requirements of these two paragraphs.

Discontinuance of these information reporting requirements does not alter the requirements of paragraphs (a), (b), and (e) of this Section. Operators of surface coal mines still must have arrangements established with a licensed physician, medical service, medical clinic or hospital to provide 24-hour emergency medical assistance and must have arrangements with an ambulance service, or otherwise provide, for 24-hour emergency transportation for any person injured at the mine.

Likewise, operators must continue to post at appropriate places at the mine the names, titles, addresses, and telephone numbers of all persons or services available under the arrangements for medical assistance and emergency transportation. The posted information is required to be current and accurate. Where appropriate, inspectors shall make the necessary inquiries to determine the accuracy of the information posted.

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.

The purpose of paragraph (d) is to provide substantial protection for the head from falling objects and to protect miners against electrical shock or burn. Hard hats are required to be suitable for these purposes and, if they are painted, the paint base must be nonmetallic.

Hard hats or caps that meet or exceed the applicable specification of the American National Standards Institute (ANSI) provide appropriate head protection and comply with these requirements. The applicable standards are ANSI's "Safety Requirements for Industrial Head Protection," Z89.1, and "Safety Requirements for Industrial Protective Helmets for Electrical Workers, Class B," Z89.2.

Hard hats or caps that do not meet or exceed the applicable ANSI or equivalent standards should not be used. Plastic "baseball-type" caps and thin plastic hats do not have adequate suspension systems and are not constructed of sufficiently substantial material to afford the necessary protection from impact and penetration of falling objects. Hats or caps constructed of metal materials create an additional hazard of electrical shock or burn because they are conductive.

Paragraph (g) of this Section requires that safety belts and lines shall be worn at all times by all miners working in positions where there is a danger of falling, except where safety belts and lines may present a greater hazard or are impractical. In those cases, the standard requires that alternative precautions be taken to provide the miners with an equal or greater degree of protection. Substantial scaffolding with adequate guardrails or safety nets are acceptable alternatives. The objective of this policy is to insure that miners working where there is a danger of falling are always protected.

77.1711 Smoking Prohibition

This Section prohibits smoking or open flame where such practice may cause a fire or explosion. Section 77.1702 requires that areas be posted with warning signs where fire or explosion hazards exist.

77.1712 Reopening Mines; Notification; Inspection Prior to Mining

Failure of the operator to notify MSHA of the reopening of the mine before operations begin is a violation of this Section. Failure to have all the plans, programs and systems submitted during this inspection is not necessarily a violation. During a

reopening inspection required by Section 77.1712, the inspector should ascertain that the operator is fully informed and aware of the applicable plans, programs, and systems required by Part 77.

77.1713 Daily Inspection of Surface Coal Mines; Certified Persons; Reports of Inspection

MSHA will continue to require that daily on-shift examinations be made in accordance with this Section at active working areas of surface mines, active surface installations at these mines, and preparation plants not associated with underground coal mines. MSHA will not require daily on-shift examinations of the surface work areas of underground coal mines.

77.1800 Cutout Switches

It is the intent of this Section to require that cutout switches be installed in both trolley wires and parallel trolley feeder wires at the same point. Where it is necessary to use a cutout switch in each circuit, they shall be installed reasonably close to facilitate the opening of both circuits. The practice of using a jumper to bridge a removed section of trolley wire as a means of disconnecting power shall not be accepted.

77.1802 Insulation of Trolley Wires, Trolley Feeder Wires; and Bare Signal Wires; Guarding of Trolley Wires and Trolley Feeder Wires

It is the intent of this Section that guarding shall be done with wood, plastic or other substantial nonconductive material, and be firmly secured. The mine inspector shall require additional guarding of trolley wires at all locations where a potential shock hazard exists.

Subpart T Slope and Shaft Sinking

In addition to the requirements of Subpart T, all applicable requirements of Part 77 shall apply to slope and shaft sinking operations unless specifically excepted by Subpart T.

77.1900 Slopes and Shafts; Approval of Plans

When inspecting shaft and slope sinking operations, Part 77 will apply for inspection purposes until such time as mining is started in the coalbed to be mined. At that time, all of the applicable provisions of Part 75 shall be met by the responsible organization that commences the mining cycle in the coalbed that is to be mined.

Excavation of a newly commenced slope or shaft progresses from the surface, through the overlying strata, to the coalbed to be mined. When an existing slope or shaft is extended that is open to the surface, excavation progresses from the existing slope or shaft bottom on down through underlying strata to the next coalbed to be mined. Part 77 standards will apply in these instances.

When excavation of a new slope or shaft reaches the coalbed to be mined, additional excavation or construction is often required before the mining cycle can commence. Frequently, horizontal excavations in the coalbed and surrounding strata must be advanced from the shaft or slope bottom to a point that permits installation or setup of mining equipment needed for the mining cycle to begin. Similarly, a skip loading pocket, a sump area, or similar vertical excavation may need to be developed above or below the coalbed before the mining cycle can begin. In order for Part 77 standards to apply, the plans for the development and construction at the coalbed level or above or below the coalbed from the slope or shaft bottom must be submitted and addressed under the approved slope or shaft construction plan.

Sufficient excavation and construction work will be permitted under the approved slope or shaft construction plan to allow installation and set up of the mining and ventilation equipment necessary to begin the mining cycle. In some cases, this excavation and construction work may include driving a connection between slopes and/or shafts. The extent of slope or shaft excavation and development work permitted under the Part 77 slope or shaft construction plan is to be kept to a minimum consistent with this policy, detailed in the approved plan, appropriate for the conditions at the mine and approved by the District Manager. After completing the work as detailed in the approved plan, application of §77.1900 will cease, and application of Part 75 standards will commence. Part 77 standards will continue to apply to all activities on the surface.

In cases where a new slope or shaft is constructed from the surface into an existing mine or is raised from an existing mine

to the surface, Part 77 standards will apply to the slope or shaft construction and to areas at the immediate slope or shaft bottom to the extent necessary to install equipment and complete construction.

Where a new slope or shaft is constructed from an underground area of an existing mine from one coalbed to another coalbed to be mined, where the slope or shaft does not directly intersect the surface, Part 75 standards will apply because the slope or shaft does not originate from the surface and will not directly intersect the surface. Construction, repair or inspection of these slopes or shafts will be covered under Part 75 standards.

In cases where construction, repairs or inspection are necessary at existing slopes or shafts that originate from the surface, Part 77 standards will be applied to the construction, repair or inspection activity. Any construction, repair, or inspection activity performed under Part 77 standards will be confined to the slope or shaft and the immediate slope or shaft bottom. Ongoing routine maintenance of the slope or shaft or routine maintenance of equipment installed in the slope or shaft would fall under Part 75 standards. An approved slope or shaft construction plan under Part 77 will not be required if Part 75 standards are complied with.

The hoist used under an approved slope or shaft construction plan is not intended for use as a permanent man hoisting installation. If the hoist used in conjunction with the slope or shaft construction, repair, or inspection does not comply with all provisions of Part 75 standards then only those persons engaged in the slope or shaft construction, repair, or inspection will be permitted to ride the hoist during these activities. It is not the intention of this policy to permit access to the mine by using a hoist approved under a slope or shaft construction plan for any other purpose except for construction, repair, or inspection activity directly related to the slope or shaft.

A slope or shaft construction plan as required under §77.1900 shall be approved by the District Manager prior to commencing any work activity that will be addressed under the Part 77 plan.

77.1908 Hoist Installations; Use

"Crossheads," as referred to in paragraph (d), are members that engage the guides.

"Independently powered auxiliary hoists," as referred to in paragraph (f), means any safe method that can be used to remove miners from a slope or shaft quickly in the event of an emergency.

77.1908-1 Hoist Operation; Qualified Hoistman

A qualified hoistman within the meaning of this Section is an individual who meets the requirements of Section 77.105.

77.1909-1 Use of Nonpermissible Explosives and Nonpermissible Shot-Firing Units; Approval by Health and Safety District Manager

When an inspector finds nonpermissible explosives and nonpermissible shot-firing units being used, he shall check to see if a permit, as required by this Section, has been issued, and to determine if the proper safeguards were being employed.

77.1913 Fire-Resistant Wood

This Section requires that all timbers and other wood products except track crossties permanently installed in slopes and shafts shall be fire-resistant.

Subpart A General

90.2 Definition of Transfer

When a Part 90 miner is assigned to a job classification, work location, and regular duties, any change in the assignment of the miner constitutes a "transfer" under Part 90. For example, it is a transfer when a Part 90 miner's established assignment as a surface mechanic at a surface shop is expanded to include occasional mechanic work underground. This addition to the miner's established regular duties at the surface shop constitutes a "transfer" for purposes of Part 90.

Generally, it is not a "transfer" when a Part 90 miner assigned to a specific occupation also performs other work assignments that do not correspond exactly to his or her occupation code as long as the work assignments have been established as part of the miner's normal work duties. For example, if a Part 90 miner works as a mechanic at the surface shop and occasionally works at a nonface underground position, it is not a "transfer" when the underground mechanic work is performed because it has already been established as part of the miner's regularly scheduled work duties. However, under Section 90.2, it is a "transfer" if, at any time, a Part 90 miner is moved to or from a mechanized mining unit (MMU). Therefore, if a Part 90 miner working as a surface shop mechanic, occasionally works underground on an MMU, movement to and from the MMU is a "transfer" by regulation. A miner's normal work duties are established prior to the commencement of compliance sampling under Section 90.207(a)(1) and (a)(3).

90.3(c) Part 90 Option and Eligibility

This section requires that any Part 90 miner who is transferred to another position by the operator remains a Part 90 miner at the new position, even if the job is at a surface mine. However, the miner can exercise the Part 90 option only while employed at an underground mine. If a Part 90 miner waives Part 90 status, the option can only be re-exercised at an underground mine.

90.3(d) Exercise of Part 90 Option

Regardless of when the option was awarded, the miner is under no time limit as to when he or she must exercise the option. However, when the option is signed and dated, the miner's option must have been received by the Chief, Division of

Health, Coal Mine Safety and Health, Arlington, Virginia, before the option is recognized as being exercised.

90.3(e) Re-exercising the Option

In numerous instances, miners have given up the right to work in a low dust area. This section allows the Part 90 miner or 203(b) miner under the old program to re-exercise the option, if employed at an underground mine. Re-exercise of the option means that the miner can reuse the option any time his or her status changes from active to inactive. Also, the miner must send a written request to the Chief, Division of Health, Coal Mine Safety and Health, each time the option is re-exercised.

90.3(f) Medical Information

If an operator requires medical information from a miner, the inspector shall issue a citation to the operator for a violation of Section 90.3(f).

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90.100 Respirable Dust Standard

The mine operator has a 20-calendar-day grace period in which to assure that a Part 90 miner is in an environment of 1.0 milligrams per cubic meter of air. If any sampling conducted after the twentieth calendar day by either MSHA or the operator shows this standard has been exceeded, the inspector shall issue a 104(a) citation for a violation of 90.100.

This section in the amended Part 90 rule supersedes the 203(b)(2) dust standard which allowed mine operators to place miners in an environment with concentrations of respirable dust that were the lowest attainable below 2.0 mg/m^3 when the 1.0 mg/m^3 standard was not attainable. In other words, Part 90 miners can only work where concentrations of dust are at or below 1.0 mg/m^3.

90.101 Dust Standard When Quartz is Present

The 1.0 mg/m^3 standard is applicable only when the amount of quartz is equal to or less than 10 percent in the Part 90 miner's environment in the active workings. Because the Part 90 miner's environment could be at any location (MMU, DWP or DA), Section 90.101 shall be cited only if the amount of quartz in the Part 90 miner's samples exceeded 10 percent and if this miner was exposed to concentrations of respirable dust that exceeded the reduced dust standard.

The maximum standard for a Part 90 miner is l.0 mg/m^3 of air. Therefore, quartz must be 11.0 percent or greater to cause a reduction in the dust standard. Conversely, when a Part 90 miner is on a reduced standard and a subsequent analysis is 10.9 percent of quartz or less, do not raise the dust standard above 1.0 mg/m^3 of air.

90.102(a) Transfer, Shift Protection

At some coal mines, mine employees are rotated periodically to different shifts. Under the rule the mine operator must allow the Part 90 miner to continue to work on his or her shift rotation. Exception:

The operator may transfer a Part 90 miner without regard to these job and shift limitations if the respirable dust concentration in the position of the Part 90 miner complies with the dust standard, but circumstances require changes in job assignments at the mine. Reductions in workforce or

changes in operational methods at the mine may be the most likely situations which would affect job assignments.

90.102(b) Notifications

The letter which notifies the coal mine operator that a Part 90 miner has exercised the option is sent by certified mail, with a copy going to the District Manager. Inspection personnel can determine if the operator has met the time requirement by comparing the date the operator received this letter (from the certified mail receipt) with the date of the operator's written notice to the District Manager concerning the Part 90 miner's occupation assignment.

90.103(a) Compensation

The Part 90 miner is entitled to not less than the regular rate of pay that was being received immediately before exercising the option. If the miner was in Job 1 at $7.00 per hour when exercising the option, the operator is required to continue to pay the Part 90 miner at least $7.00 per hour.

90.103(d) Compensation, Raises

If a Part 90 miner was employed as a belt cleaner and this position received a $.30 per hour increase, the operator must give this raise to the miner.

90.103(e) Compensation, Temporary Assignment

For example, the miner was classified as belt cleaner at $7.00 per hour, but was temporarily assigned for greater than 2 months as a roof bolting machine operator. While in the roof bolting job, the miner exercised the Part 90 option. The roof bolting machine operator's regular rate of pay was $7.50 per hour when the miner exercised the option. The operator must pay this Part 90 miner at least $7.50 per hour, even if the miner is reassigned to the belt cleaner job.

90.205(c) Examinations of Sampling Devices
See policy under Section 70.205(c).

90.207 Compliance Sampling
All samples required under Part 90 must be collected while normal work duties are being performed. Section 90.2 defines "normal work duties" as "duties which the Part 90 miner performs on a routine day-to-day basis in his or her job classification at a mine." For example, a Part 90 miner, occupation code 304, surface mechanic, may be regularly scheduled to work at the surface shop and, from time to time, at other assignments in the underground mine. Because respirable dust samples must represent the mine atmosphere to which the miner is exposed, samples shall be collected during the Part 90 miner's regularly assigned duties. Therefore, if this Part 90 miner spends a significant amount of time performing other work assignments which do not correspond exactly to his or her occupation, it is appropriate to require the operator to collect samples while the Part 90 miner is working both on the surface and underground. For additional policy in relation to sampling Part 90 miners, refer to Section 70.208(c).

90.209(b) Tampering With Dust Samples
See policy under Section 70.209(b).

90.209(d) Purpose of Sampling
See policy under Section 70.209(d).

90.220 Status Change Reports
See policy under Section 70.220.

90.300(a) Respirable Dust Control Plan; Filing Requirements

If the mine operator moved the Part 90 miner to another less dusty position to abate the violation, a respirable dust control plan is not required.

90.301(a) Respirable Dust Control Plan; Approval By District Manager

Section 90.301(a)(2) prohibits the approval of any dust control measures with which the operator's compliance cannot be objectively ascertained by MSHA (example: roadways will be wetted when the need arises). Each dust control measure shall be stated specifically, so if not implemented, the inspector can take appropriate enforcement action.