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Mine Ventilation Plan Review Procedures

PREFACE

This handbook sets forth guidelines and instruction for Mine Safety and Health Administration (MSHA) personnel who evaluate and process mine ventilation plans. The handbook provides general, primarily procedural guidance that must be applied with the recognition that circumstances associated with specific mines and ventilation schemes vary widely. Individualized approaches consistent with the mandate of the Federal Mine Safety and Health Act of 1977 (Mine Act) and Mine Improvement and New Emergency Response (MINER) Act of 2006 will be appropriate in various situations.

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CHAPTER 1 - INTRODUCTION

A. Mine Ventilation Plans

Mine ventilation plans establish minimum ventilation system requirements to protect persons underground from hazardous conditions specific to the mine.

B. Authority

Section 101(a) of the Federal Mine Safety and Health Act of 1977, as amended by the MINER Act, for all mines.

30 CFR 57.8520 requires that a written plan, with specified content, be developed for each underground metal or non-metal mine. Upon written request, the mine operator must submit the plan to the District Manager (DM) for review and comments.

30 CFR 75.370 specifies submission and approval procedures for underground coal mine ventilation plans that are designed to control methane and respirable dust.

30 CFR 75.371 specifies the minimum information that must be included in an underground coal mine ventilation plan. Additional information may be required to suit the particular conditions and mining system at the mine.

30 CFR 75.372 lists information the mine operator of an underground coal mine must include on the mine map submitted to MSHA. The map shows information critical to the plan approval process but is not subject to approval by the DM. Only the portion of map that contains the information required under §75.371 is subject to approval. The mine map required by §75.1200 may be used to satisfy the requirements for the ventilation map, if all the information required by §75.372 is contained on the map.

C. Responsibility

Only the DM or his or her designee has the responsibility and authority to approve an underground coal mine's ventilation plan. A person delegated to act in the DM's absence cannot delegate plan approval responsibility and authority to another person.

CHAPTER 2 - VENTILATION PLAN

A. Plan Submittals

Plan submittals are described in §75.370 for coal mines and §57.8520 for metal and non-metal mines. No proposed plan shall be implemented before it is approved by the DM, as required.

Each coal mine ventilation plan must be reviewed every 6 months by an authorized representative of the Secretary to assure that it remains appropriate for conditions and practices at the particular mine and that it continues to provide ventilation adequate to protect the health and safety of miners.

For underground coal mines, §75.370(d) describes the type of intentional changes to the ventilation system that require written approval by the DM before implementation. §75.370(d) also provides that any change to the information required by §75.371 requires written approval by the DM before implementation.

Program Information Bulletin (PIB) P10-13 provides examples of intentional changes that MSHA has determined to require prior approval because they materially affect the safety or health of miners.

B. Maps

Underground metal and non-metal mine map requirements are provided in §57.8520(b)(1-10). Underground coal mine ventilation map requirements are provided in §§75.372(a)(1), 75.372(a)(2), 75.372(b)(1-20), 75.372(c).

In addition to the information requirements of §75.372, the map may also be used to depict and explain plan contents that are required in §75.371. Specific information that must be shown on the map to satisfy the requirements of §75.371, such as bleeder system evaluation details, shall be treated as plan requirements. The review process should identify and reference §75.371 items that are shown on the map. This information is subject to approval.

CHAPTER 3 - PROCEDURES FOR PLAN REVIEW

Mine operators submit all requests for approval or acceptance of ventilation plans, or for revisions to approved ventilation plans, to the appropriate district office. District offices should use the following basic procedures in reviewing the plans:

A. The Assistant District Manager (ADM) will assign a lead reviewer for each plan to track the progress of the plan through the review process. Plan or revision review should be managed to allow review in accordance with the goals described in MSHA's current Fiscal Year Operating Plan, as applicable.

B. The ADM will ensure a file is created and maintained for each mine, in which all accident reports and technical studies pertaining to the mine will be retained as part of the active mine files. This will ensure that relevant historical information is available to specialists, supervisors, and other MSHA personnel as needed.

C. The ADM will ensure that the lead reviewer uses appropriate Ventilation, Health, and Field Office Supervisors, as well as inspectors, to provide input into the plan review process. A method of documenting this input should be established, but the format and process is at the discretion of the DM.

D. Appendix contains information that may be useful for consideration and evaluation during the review process.

E. For coal mines, the Supervisory Mine Safety and Health Specialist (Ventilation) is the "lead reviewer." The specialist or the ventilation subordinates will review the plan as follows:

1. The maps should be reviewed against §75.372 to ensure that all required information is shown. In addition to an administrative review of the listed items, the reviewer should ensure the current and projected systems are viable and reliable.

2. The reviewer should consider comments offered by the representative of miners, which may be submitted by the representative of miners to the DM in writing, according to §75.370(b).

3. Many proposed coal mine ventilation plan changes or revisions address specific portions of the approved plan. The ADM may expedite the review process where the nature of the revision warrants.

F. The lead reviewer will review the ventilation plan to identify any provisions that

are inconsistent with standards. This action prevents the approval or acceptance of a plan containing a provision that the mine operators need to request in a petition for modification under Section 101(c) of the Mine Act.

G. When the reviewer completes the ventilation plan or revision review, he or she will forward it to the ADM. The ADM will make a recommendation of approval or disapproval for coal mines to the DM, or make an acknowledgement or statement of deficiencies for metal and non-metal mines, to the DM.

H. After a review of a proposed plan or revision is completed, the mine operator must be notified in writing whether the proposed plan or revision is acceptable.

1. If the plan or revision is acceptable, the DM will send written notification to the mine operator that approval for the coal mine ventilation plan is granted or the metal or non-metal mine ventilation plan is acknowledged.

2. If the DM determines provisions in a mine ventilation plan are unsuitable to the particular conditions at the mine, he or she shall specify the deficiencies and instruct the mine operator to submit a revised ventilation plan. The mine operator is then given an opportunity to discuss the identified deficiencies and potential solutions with the DM.

   If a coal mine ventilation plan cannot be approved due to deficiencies, MSHA procedures established in the Program Policy Manual, Volume V, V.G-4 apply.

I. A periodic review of the ventilation plan is required at least every 6 months for coal mines to assure current mining conditions are considered (§75.370(g)).

The date on which an original plan is approved becomes the date of record for the plan. All subsequent six-month reviews are conducted based on the original date of record. When a fully revised plan is submitted and approved, as provided in §75.370(a)(2), the new approval date becomes the date of record for subsequent six-month reviews.

1. Supporting documentation may be submitted for the completion of a ventilation plan review conducted by an authorized representative who is also permited to comment on the adequacy of the plan. When the documentation indicates a deficiency, proper steps should be taken by the authorized representative to ensure the operator corrects any deficiencies noted. Proper steps would include discussion and review of the comments contained in the authorized representative's documentation with the field office supervisor. The documentation would then be forwarded to the

lead reviewer.

The supporting documents are used in the deliberative process and not intended for distribution outside the Agency or to the public.

2. Reviews for producing and non-producing coal mines may vary depending upon operating status.

   a. Producing Mines

      1. Each 6-month review should include a physical inspection of the mine ventilation system by an authorized representative and consideration of relevant items listed in the Appendix. The inspector should observe a representative number of ventilation controls/construction, extended cut operations, worked out areas, and bleeders, if applicable. As determined by the DM, a ventilation specialist may participate in the inspection at mines with complex or challenging ventilation systems.

      2. It is not necessary to routinely require a complete plan submittal to perform this review. However, when the number of revisions makes it difficult to determine the plan's operative provisions, the DM should instruct the mine operator in writing to submit a revised plan that incorporates all revisions in an orderly manner and deletes those provisions that are no longer applicable.

      3. After each 6-month review, the Ventilation and Health Departments should provide input to the DM regarding the written correspondence that will be sent to the mine operator. The correspondence identifies the material that constitutes the complete approved plan and includes any comment regarding that material. A copy of the correspondence, identifying all material constituting the complete plan, should be used to check the contents of the Electronic Mine File for accuracy and completeness.

   b. Non-Producing Mines

      1. The procedures for the review of approved plans for non-producing mines should be the same as for producing mines, except that, at the discretion of the DM, these reviews

need not require an underground inspection if miners infrequently travel underground (e.g., only to perform minor maintenance work or to conduct examinations). In these cases, the approved plan on file should be reviewed and the operational status of the mine should be verified.

CHAPTER 4 –TRACKING MINE VENTILATION PLANS AND REVIEWS

MSIS/MCAS is available in each district. This database should be used to track all plans and reviews. Data that should be entered into the system includes:

1. Mine identification number;

2. Dates plans were received;

3. Dates plans were approved for coal mines (acknowledged for metal and non-metal mines);

4. Dates 6-month reviews for coal mines were conducted; and

5. Dates annual ventilation maps for coal mines were submitted and acknowledged.

In addition to the information above, which should be tracked, MSIS/MCAS can accept and track other information depending on the need or desire of the district. MSIS/MCAS may restrict access to some information, but it may be retrieved upon ventilation plan reviewer's request to the District Office. Quarterly reports, for example, as well as reports generated for other timeframes, can be produced and used to aid in tracking and maintaining programs.

CHAPTER 5 - VENTILATION PLAN APPROVAL IN COAL MINES WHERE DIESEL-POWERED EQUIPMENT IS OPERATED

A. Individual Units of Diesel-Powered Equipment -- §75.325(f)

1. §75.325(f)(1) It is anticipated that this air quantity will be measured in the same required location as the air quantity reaching the working face, as described in §75.325(a)(2). This would necessitate making only one air quantity measurement to determine compliance with both §75.325(a)(1) and §75.325(f)(1). However, an air quantity measurement in the entry of the working place also would be acceptable.

2. §75.325(f)(2) The location for this air quantity is required by §75.371(tt) to be specified in the mine ventilation plan.

3. §75.325(f)(3) This quantity can be determined either within one crosscut of the diesel-powered machine or with the machine pulled into a crosscut.

4. §75.325(f)(4) This quantity can often be determined either within one crosscut of the diesel-powered machine or with the machine pulled into a crosscut. However, air quantity measurement locations in a multiple entry air course should be made in each entry directly across from the previous entry's measurement location.

5. §75.325(f)(5) allows the DM to require minimum ventilating air quantities at other locations where individual units of diesel-powered equipment are being operated. Any such locations should be specified in the ventilation plan. Examples of such locations include underground repair shops, permanent fuel storage facilities, temporary fuel storage areas, and construction sites.

B. Multiple Units of Diesel-Powered Equipment -- §75.325(g)(1-3)

1. When multiple units of diesel-powered equipment are operated on the working section, the minimum ventilating air quantity shall represent the sum of the nameplate ventilating air quantities of all of the diesel-powered equipment located on the working section, i.e., equipment located inby the loading point, excluding any equipment specifically exempted in the plan.

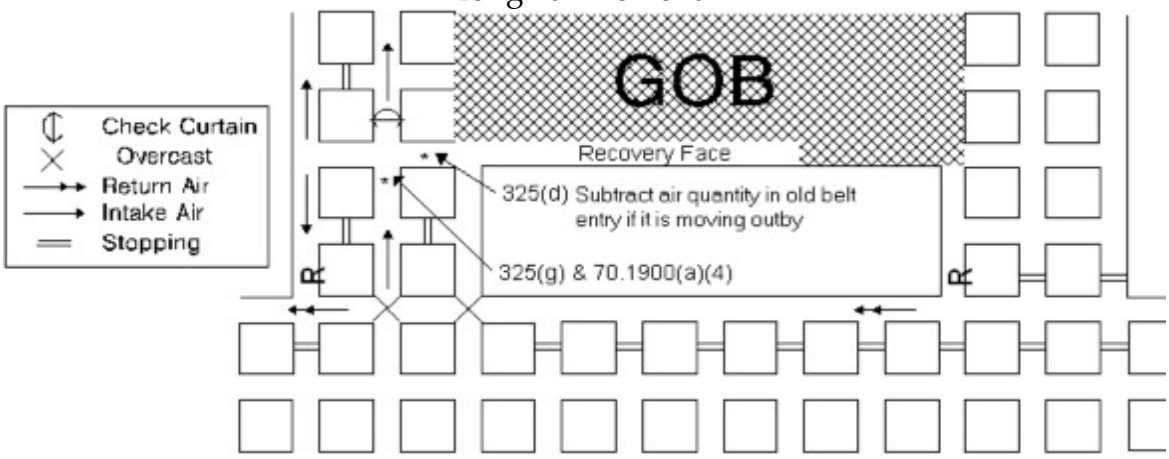
2. Monitoring points may be set up under §70.1900(a)(4) to ensure that diesel-powered equipment is being adequately ventilated in the intake

haulage entry.

3. §75.325(d) should be used to address diesel-powered equipment that is actually on the recovery or setup face -- i.e., those pieces of equipment inby the last loading point or future loading point. The initial air quantity (before any exclusions) would be the sum of the nameplate ventilating air quantities on those pieces of equipment. The location where the minimum quantity must be maintained would be either in the crosscut conducting the air onto the face or at another appropriate inby location.

4. The diagram below provides examples of locations where minimum ventilating air quantities should be maintained for multiple units of diesel-powered equipment, and also indicates an example of a location for an air quality monitoring point required by §70.1900(a)(4). This would be in addition to the monitoring point required by §70.1900(a)(3).

Longwall Removal



   a. §75.325(d) - Quantity for equipment located inby former loading point.
   b. §75.325(g) - Quantity required to be maintained during removal of longwall equipment.
   c. §70.1900(a)(4) - Possible sampling location designated by the DM.

5. The following diesel-powered equipment may be excluded from the calculations of minimum ventilating air quantity under §75.325(g) for multiple units of diesel-powered equipment. All such exclusions must be approved by the DM and specified in the ventilation plan.

   a. Self-propelled equipment meeting the requirements of §75.1908(b) ("light-duty" equipment). Generally, light-duty equipment may be

excluded from the calculation if the operator can substantiate that the duty cycle of such equipment will produce minimal impact on miners' exposure to nitrogen dioxide and carbon monoxide. Thus, an exclusion may be appropriate for a diesel-powered mantrip that does not contribute significantly to the miners' exposure because it is operated only to take the crew to and from the working section. Alternatively, a diesel-powered pick-up truck operated frequently in the intake haulage entry during a longwall set-up, transporting supplies and personnel likely would contribute significantly to the miners' exposure to carbon monoxide and nitrogen dioxide during the shift.

b. Equipment that discharges its exhaust into intake air that is coursed directly into a return air course. Usually all this equipment may be excluded from the calculation.

c. Equipment that discharges its exhaust directly into a return air course. Usually all this equipment may be excluded from the calculation.

d. Other equipment having duty cycles such that the emissions would not significantly affect the exposure of miners. The length, duty cycle and type of operation of the equipment must be evaluated in making this determination. In some cases, sampling may be needed to assess the effect of the equipment operation on the exposure of miners.

C. Approval of Reduced Minimum Ventilating Air Quantities under §75.325(i)

1. The minimum ventilating air quantity required under 30 CFR §75.325(g) is based on the nameplate air quantities for the equipment engines. These nameplate quantities are determined by laboratory testing using MSHA test procedures, which are designed to map the operational range of the engines. The ventilation rates are based on the exhaust contaminants measured at different engine speeds and loading factors. Because in-mine operation of multiple engines can vary depending on equipment loads and speeds, the regulations allow mine operators to request reductions in the required minimum ventilating air quantity for multiple units of equipment. However, the minimum ventilating air quantity for an individual unit of diesel-powered equipment cannot be reduced.

2. It is the mine operator's responsibility to provide MSHA with data, such as results of on-shift, environmental, and personal sampling, to support

any request for a reduced minimum ventilating air quantity. Such data may include a continuous and complete record of carbon monoxide, nitrogen dioxide, and the air quantities measured on the section. Data should be collected for all locations where the minimum air quantity is required to be maintained. Data logging instrumentation generally provides the most usable results. Computer-based, mine-wide monitoring systems also may provide valuable data. Data should indicate the time-weighted averages for the contaminants measured, peak contaminant concentrations, the associated measured air quantities, section production records, and the reduced minimum air quantity the company is requesting. The sampling period must be of a sufficient time to provide MSHA with enough data to make a valid determination.

3. The plan reviewer may need to observe some of the mine operator's data gathering and sampling to be able to fully evaluate the reduced air quantities.

4. The plan reviewer should review data to determine the potential effect of a reduction in ventilating air quantity by calculating the projected time-weighted average (TWA) concentrations for the contaminants. The following relationship can be used as a tool for making this determination:

$$\text{TWA projected} = \frac{Q \text{ measured}}{Q \text{ requested}} (\text{TWA measured})$$

The projected TWA must be less than the associated Threshold Limit Value (TLV®) adopted by the ACGIH for each contaminant for the reduced air quantity to be approved.

After calculating the projected TWA for the sampling data, the plan review can determine the potential for exceeding the 50 percent action level for sampling conducted as required under §70.1900(c). This can be calculated in the same manner as the projected TWA and is a method that can be used in determining if an increase in the action level requested by the mine operator is warranted:

$$\text{PEAK projected} = \frac{Q \text{ measured}}{Q \text{ requested}} (\text{PEAK measured})$$

When a reduction in the minimum ventilating air quantity has been approved and the reduction has been implemented, MSHA should

confirm through sampling that the reduced air quantity is adequate to maintain compliance with the applicable TLV.

D. Approval of Higher Action Levels under §75.325(j)

1. The mine operator may request that the action level specified in §70.1900(c) be raised. The increase in action level may be requested either separately or at the same time that a request for reduction in minimum ventilating air quantities is made.

2. It is the mine operator's responsibility to provide MSHA with data, such as results of on-shift, environmental, and personal sampling, to support any request for an increased action level. Such data may include a continuous and complete record of carbon monoxide, nitrogen dioxide, and the air quantities measured on the section where the sampling is conducted. Data should be collected for all locations where the minimum air quantity is required to be maintained. Data logging instrumentation generally provides the most reliable results. Computer-based, mine-wide monitoring systems also may provide valuable data.

3. Sampling in the areas or locations being evaluated, and/or personal sampling, should be conducted by the mine operator to determine whether an increased action level would continue to ensure that miners are not being overexposed to gaseous diesel exhaust contaminants. Gas sampling data submitted to MSHA should include the peak concentrations for each location and TWAs for each occupation.

4. If full-shift exposures for miners are appropriate, the results should be compared to the peak concentrations measured in the corresponding areas or locations. If compliance with the TLV® adopted by the ACGIH is maintained at the same time that the gaseous contaminant levels in the return air course are greater than the 50 percent action level, the DM may increase the action level.

5. Sampling must provide sufficient data representative of normal operating conditions. Sampling duration must be appropriate given the circumstances at the mine. Data logging instrumentation generally will provide the most valuable data for this analysis. MSHA should confirm through sampling that the increased action levels continue to provide protection to mine personnel.

6. §75.371(vv) requires the minimum ventilating air quantity for multiple units of equipment be stipulated in the ventilation plan. This air quantity

should be the sum of the nameplate air quantities of the units of diesel-powered equipment typically operated on the working section. However, if other units of diesel-powered equipment are being operated in addition to those that were used to calculate the air quantity stipulated in the ventilation plan, the minimum air quantity provided in locations stipulated in paragraph §75.325(g) must be the sum of the nameplate air quantities for all of the diesel-powered equipment, excluding exempted equipment, on the working section. This would result in a greater ventilating air quantity than the quantity stipulated in the ventilation plan.

MSHA inspectors, therefore, must measure the air quantity in the last open crosscut or other appropriate locations specified in §75.325, to determine if that air quantity is equal to or greater than the minimum air quantity stipulated in the ventilation plan. Inspectors also must identify the diesel-powered equipment on the working section and add up all of the equipment nameplate air quantities, excluding exempted equipment, to determine if the measured air quantity in the last open crosscut is equal to or greater than that summed minimum.

E. Corrective Action in Response to Sampling Results above the Action Level under §70.1900(c)

§70.1900(c) states "Except as provided in §75.325(j) of this chapter, when sampling results indicate a concentration of CO and/or NO_2 exceeding an action level of 50 percent of the TLV® adopted by the ACGIH, the mine operator shall immediately take appropriate corrective action to reduce the concentrations of CO and/or NO_2 to below the applicable action level."

Actions that an operator may take to reduce the concentrations below the applicable action level include the following:

1. Identification of the contaminant source, such as a poorly maintained diesel engine, and removing it from service;

2. Increasing the air quantity in the affected area; and

3. Reduction of the number of diesel-powered equipment in service.

APPENDIX – ADDITIONAL INFORMATION FOR EVALUATION AND CONSIDERATION

In addition to items addressed above, consideration of the following information may be appropriate when conducting a ventilation plan review:

1. The ventilation plan, including any related plans.

2. The mine map, including escapeways.

3. Methane liberation history (if any).

4. Ignition history (if any).

5. Citations related to ventilation, including airborne contaminants.

6. Petitions for Modification related to ventilation.

7. Respirable Dust Inspection Reports/Relevant Sample Analyses.

8. Escape and Evacuation Plan.

9. Comments from representatives of miners.

10. Comments from the mine operator.

11. Review of the active mine file for relevant historical information.

12. Review of blasting procedures and post-blast examinations, including ventilation of the blast area.

13. Metal and non-metal mine category or subcategory -- §57.22003.
    - Gassy metal and non-metal mines require provision of additional information in the written plan or on the map.
    - Category VI metal and non-metal mines must address natural ventilation where utilized.