

# **MSHA Handbook Series**

U.S. Department of Labor  
Mine Safety and Health Administration  
Coal Mine Safety and Health  
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**Handbook Number PH92-V-6**  
**Mine Ventilation Plan**  
**Approval Procedures**

## **PREFACE**

This handbook sets forth guidelines and instructions for evaluating and processing mine ventilation plans. The instructions are primarily procedural and are intended to serve as an organizational aid for all MSHA coal enforcement personnel.

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## **Chapter 1**

### **INTRODUCTION**

#### A. Purpose Of Mine Ventilation Plans

Plans adopted by the mine operator and approved by the district manager define minimum safety and health requirements for the mine. A sound ventilation plan is essential to maintaining adequate ventilation and respirable dust control in the mine. A good plan includes information that supervisors and miners need to be aware of to have effective ventilation in their working environment. The plan adopted by the mine operator and approved by the district manager should define minimum requirements for the mine.

#### B. Authority

Section 303(o) of the Mine Act.

30 CFR 75.370

30 CFR 75.371 specifies information which must be included in the ventilation plan as a minimum. Additional information may be required to suit the particular conditions at the mine.

30 CFR 75.372 lists information the operator must submit on the mine map to MSHA. The map shows information which is critical to the plan approval process but is not subject to approval by the district manager. Only that portion of map which contains the information required under 30 CFR 75.371 is subject to approval.

#### C. Responsibility

Only the district manager or those designated as acting in the manager's absence have the responsibility and authority for plan approvals. **THIS APPROVAL AUTHORITY CANNOT BE REDELEGATED.**

## **Chapter 2**

## VENTILATION PLAN

### A. Plan Submittal

The mine operator is required by 30 CFR 75.370 to set out in printed form a ventilation plan and revisions thereof. Under 30 CFR 75.370 the plan must be reviewed every 6 months by an authorized representative of the Secretary. This requirement implies that the plan in effect must be reviewed to determine if it is still appropriate for the mine and continues to provide for an adequate ventilation system. It is not necessary to routinely require a complete plan submittal to satisfy this review. However, when required in writing by the district manager, the operator must submit a fully revised plan by consolidating the plan and all revisions in an orderly manner and by deleting all outdated material.

Any changes to the ventilation system that may materially affect the safety and health of persons in the coal mine, or that constitute a change to the information provided pursuant to 75.371, are the type of changes that require approval by the district manager before they are implemented.

### B. Maps

The operator is required to submit information in accordance with 30 CFR 75.372. This information is provided on an accurate up-to-date map at least once every 12 months. The map shows information which is critical to the plan approval process but is not subject to approval by the district manager. The information includes anticipated mine projections for at least a year and will assist in the evaluation of the adequacy of the ventilation system for the period of time between reviews.

Specific information that may be shown on the map to satisfy the requirements of 75.371, such as bleeder system evaluation details, is different from the informational requirements and shall be treated as plan requirements. The review process should identify and reference the 75.371 items which are shown on the map. Such information is subject to approval; and, no proposed revision to these plan requirements will be implemented before it is approved by the district manager.

### **Chapter 3**

## **PROCEDURES FOR PLAN APPROVAL**

While responding promptly to each request for a ventilation plan approval is an important part of the review process, review quality and thoroughness are utmost in importance. All districts should follow similar standard operating procedures to accomplish an expeditious and efficient review. The basic procedures are as follows:

- A. All requests for approval of ventilation plans or revisions thereof should be submitted to the district office. Districts that desire an arrangement for mine operators to submit plans to other locations should obtain approval of these other locations by the Administrator.
- B. The progress of the plan through the approval process should be coordinated by the Engineering Coordinator/ Chief of Engineering Services. Plan or revision requests should be handled efficiently with an effort to complete all requests of any proposed plan, revision, or change in a time period of 45 calendar days.
- C. The supervising ventilation specialist or the ventilation subordinates will critically review the plan as follows:
  - 1. The information to be included on the map is listed in 30 CFR 75.372. The maps should be reviewed against the standard to ensure that all the basic information is shown. In addition to a mechanical review of the listed items, the reviewer should apply his (her) expertise to ensure that the current and projected systems are viable and reliable. It is important to note that only that portion of the map which contains information required under 30 CFR 75.371 will be subject to approval by the district manager.
  - 2. Determine that information required by 30 CFR 75.371 has been submitted. The plan needs to contain only the particular air flow, methane, and dust control measures necessary to address the unique conditions at the mine. Circumstances referred to in 75.371, but not present in the mine, do not need to be addressed. The ventilation regulations are structured to require in the plan only those standards which differ from requirements listed in the applicable standards. For example, an air quantity should be specified in the plan only if the quantity required at the intake to longwall sections is different from that specified in 30 CFR 75.325(c), 30,000 cfm.
  - 3. Written comments from representatives of miners should be considered in the review process.
  - 4. Ensure that the plan does not contain any statements which are inconsistent with existing mandatory regulations. The reviewer must be cognizant of this potential problem to avoid approving a plan containing a provision that

is required to be addressed as a petition for modification under Section 101(c) of the Mine Act.

5. Information that may be useful in the review process is listed at Appendix A.
- D. The district ventilation group will take the steps necessary to have the subdistrict/assistant district manager, field office supervisor and a designated inspector provide input into the review process. A method of documenting this input should be established but the format and process is at the discretion of the district manager.
- E. When the ventilation plan documents and review forms are completed, they will be forwarded to the Chief of Engineering Services/Engineering Coordinator. The coordinator is responsible for making a recommendation of approval or disapproval to the district manager.
- F. It is recognized that many changes or revisions are proposed that address specific portions of the approved plan. Therefore, all steps in Paragraph C may be unnecessary in all situations. The Engineering Coordinator may expedite the review process where the nature of the revision warrants in that case. The persons indicated in Paragraph D will be informed at the earliest opportunity concerning the details of an approved revision.
- G. After a thorough review of a proposed plan or revision, the operator must be notified in writing whether the proposed plan or revision is acceptable.
  1. If the plan or revision is acceptable, the district manager will send written notification to the operator that approval is granted.
  2. If a separate standard or a provision of a ventilation plan has been determined by MSHA to be unsuitable to the particular conditions at the mine, the district manager may require revisions by the operator. MSHA will advise the operator of the deficiencies of the proposed plan or revision for which approval is denied. The operator is then given an opportunity to discuss with the district manager the problems identified and potential solutions. If provision(s) cannot be approved, MSHA procedures established in the Program Policy Manual, Volume V, V.G-4 apply.

## **Chapter 4**

### **MANAGEMENT SYSTEM CONTROLS**

A Mine Plan Approval System (MPAS) is in place in each district. This program is a database application to track plan approvals and reviews. Data that must be entered into the system include:

- A. dates plans were received;
- B. dates plans were approved;
- C. dates 6-month review letters were signed; and
- D. mine identification number

The date on which an original plan is approved becomes the date of record for that 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 30 CFR 75.370(a)(2), the new approval date becomes the date of record for subsequent six month reviews.

Although the above represents the minimum information to be tracked, the program can accept and track other information depending on the need or desire of the district.

Most information can be retrieved upon request to the district office. Quarterly reports, and reports generated for any other timeframe, can be produced and used to aid in tracking and maintaining programs current. Responsible personnel should familiarize themselves with the MPAS, which serves as a useful management tool.

## **Chapter 5**

### **SIX MONTH REVIEWS**

The periodic review of the ventilation plan is required at least every 6 months (30 CFR 75.370). However, reviews for producing and non-producing mines may vary somewhat.

#### A. Producing (A-status) Mines

Each 6-month review should include a physical inspection of the mine ventilation system by either a ventilation specialist or regular inspector. It is important that the ventilation plan be discussed with the operator and representative of the miners during the physical inspection and during the close-out conference following each physical ventilation inspection. Regular inspectors assigned to conduct ventilation reviews should schedule



sufficient underground activities to evaluate the application and adequacy of the ventilation plan.

The ventilation specialist should participate as frequently as possible in all facets of the plan review, including the in-mine inspection, with strong emphasis on mines with complex ventilation systems. A 6-month review consists of:

1. a complete re-examination of the ventilation plan;
2. a mine visit to observe the ventilation system in operation;
3. inspection of the bleeder system, if applicable;
4. examination of a representative portion of ventilated worked out areas;
5. observation of ventilation controls and construction;
6. review the information listed in Appendix A; and,
7. review of mine maps for required information.

It is not necessary to routinely require a complete plan submittal to satisfy this review. However, when required in writing by the district manager, the operator must submit a fully revised plan by consolidating the plan and all revisions in an orderly manner and by deleting all outdated material. When the number of revisions to the plan make it difficult to determine the operative provisions of the plan, the district manager should notify the 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.

The 6-month review should result in correspondence to the operator which identifies the material which constitutes the complete approved plan. A copy of the letter, identifying all material constituting the complete plan, should be used to check the contents of the Uniform Mine File for accuracy and completeness.

#### B. Non-producing (B-status) Mines

The procedures for the review of approved plans for non-producing mines should be the same as for producing mines except that these reviews need not require underground visits where no one is working or where all ongoing work is on the surface. In such cases the approved plan on file as well as the operational status of the mine should be reviewed.

**Chapter 6**  
**PLAN REVIEW FORMS 2000-204 AND 2000-86**

Plan Review Form 2000-204 is submitted to document the completion of a 6-month ventilation plan review conducted by regular inspectors and to permit comment by the inspectors on the adequacy of the plan. When the review indicates a deficiency in the respirable dust control portion of the plan, Form 2000-86 should be completed to record the comments. The MPAS is designed to project 6-month ventilation plan review due dates. Form 2000-204 provides data for the program. The form is an in-house document and is not intended for distribution outside the district or to the public.

When preparing Form 2000-204 for submittal, the reviewer should record on the form the names of mine officials and miners' representatives who participated in the review discussion.

**Chapter 7**  
**INTERNAL CONTROL OF CONTENT OF PLAN**

An important aspect of the plan approval process is minimizing the complexity and amount of information in such plans. This can be accomplished in part by eliminating unnecessary language. For example:

- A. Mandatory standards should not be repeated in the written text of the plan. This avoids the potential for typographic errors that can change the meaning of the standard. This approach will also reduce the complexity of the plan, since there is no need to repeat mandatory standards in the plan.
- B. Specific plans should not be required when the general plan is adequate. For example, the operator need not submit longwall recovery or setup ventilation plans each time a longwall is moved to a new location. One typical recovery and setup ventilation plan showing ventilation controls and minimum ventilation quantities for the planned longwall panels will suffice in most cases.
- C. The operator should not be required to submit a revised plan each time a panel is developed for connection to the bleeder system. This is unnecessary duplication when the entire bleeder system design and mining projections are shown on the mine map.

**Chapter 8**  
**GUIDANCE FOR VENTILATION PLAN APPROVAL**  
**IN MINES WHERE DIESEL-POWERED EQUIPMENT IS OPERATED**

Individual Units of Diesel-powered Equipment

§75.325(f) requires that a minimum quantity of ventilating air be maintained where individual units of diesel-powered equipment are being operated. The minimum ventilating air quantities for individual units of equipment are not required to be specified in the ventilation plan. Paragraphs (f)(1) through (f)(3) indicate the locations where the minimum ventilating air quantity must be maintained.

Paragraph (f)(1) requires the minimum ventilating air quantity to be maintained in any working place where the equipment is being operated. It is anticipated that this quantity will be measured in the same required location as the quantity reaching the working face, 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 would also be acceptable.

Paragraph (f)(2) requires the minimum ventilating air quantity to be maintained at the section loading point during any shift when equipment of the type that can be used to perform work at the section loading point is on the working section. The location for this quantity is required by §75.371(l) to be specified in the mine ventilation plan.

Paragraph (f)(3) requires the minimum ventilating air quantity to be maintained in the entry where the equipment is being operated outby the section loading point in areas of the mine developed on or after April 25, 1997. This quantity can be determined either within one crosscut of the diesel-powered machine or with the machine pulled into a crosscut.

Paragraph (f)(4) requires the minimum ventilating air quantity to be maintained in any air course with single or multiple entries where the equipment is being operated outby the section loading point in areas of the mine developed prior to April 25, 1997. This quantity can 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.

Paragraph (f)(5) allows the district manager 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. The preamble to the final rule provides some examples of such locations, including underground repair shops, permanent fuel storage facilities, temporary fuel storage areas, or construction sites.

#### Multiple Units of Diesel-powered Equipment

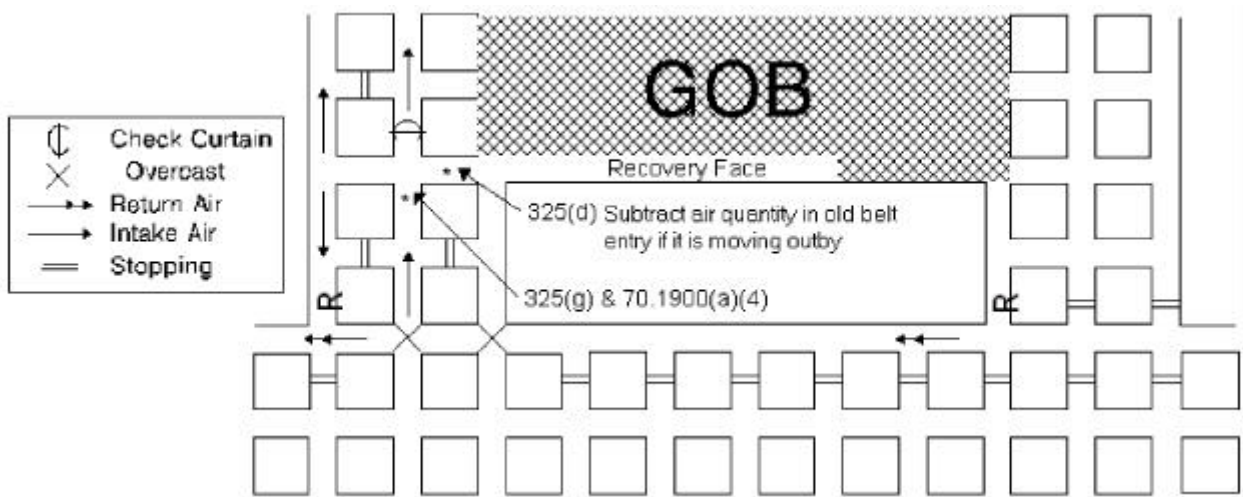
When multiple units of diesel-powered equipment are on the working section, the minimum ventilating air quantity shall represent the sum of the nameplate ventilating air quantities of all of the diesel-powered equipment located on the working section, i.e., equipment located inby the loading point, excluding any equipment specifically exempted in the plan. The locations where the minimum air quantity must be maintained are stipulated in paragraph (g)(1) through (g)(3).

When multiple units of diesel-powered equipment are being operated in areas where mechanized mining equipment is being installed or removed, the minimum ventilating air quantity approved in the ventilation plan should represent the sum of the nameplate ventilating air quantities of all of the diesel-powered equipment located inby the mouth of the panel, excluding any equipment specifically exempted in the plan. This equipment should include all diesel-powered equipment used in the setup or removal process, such as shield haulers, scoops, pickups, etc. The location of the minimum air quantity would be specified in the intake entry or entries just outby the crosscut conducting the air into the face. Also, a monitoring point(s) may be set up under §70.1900(a)(4) to ensure that diesel-powered equipment is being adequately ventilated in the intake haulage entry.

Paragraph (d) should be used to address diesel-powered equipment that is actually on the removal 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.

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 under §70.1900(a)(4). This would be in addition to the monitoring point required by §70.1900(a)(3).

## Longwall Removal



75.325(d) -Quantity for equipment located inby former loading point

75.325(g) -Quantity required to be maintained during removal of longwall equipment

70.1900(a)(4) - Possible sampling location designated by the District Manager

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

1. Self-propelled equipment meeting the requirements of §75.1908(b) (this would be “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 have a minimal impact on the nitrogen dioxide and carbon monoxide exposure of miners. An example where the equipment may not be excluded is a diesel-powered pick-up truck operated frequently in the intake haulage entry during a longwall set-up, transporting supplies and personnel. The use of this equipment is such that it would contribute significantly to the miners’ total exposure to carbon monoxide and nitrogen dioxide during the shift. An example where exclusion may be appropriate is a diesel-powered mantrip which has a duty cycle that does not contribute significantly to the miners exposure because the mantrip is operated only to take the crew to and from the working section.

2. Equipment that discharges its exhaust into intake air that is coursed directly into a return air course. Usually all such equipment would be excluded from the calculation.
3. Equipment that discharges its exhaust directly into a return air course. Usually all such equipment would be excluded from the calculation.
4. 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.

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

The minimum ventilating air quantity required under paragraph (g) is based upon the nameplate air quantities for the equipment engines. These nameplate quantities are determined by laboratory testing using MSHA test procedures, which are designed to approximate the duty cycles of the engines. The ventilation rates are based upon 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. It is important to note that the minimum ventilating air quantity for an individual unit of diesel-powered equipment cannot be reduced.

It is the mine operators 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 could also 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 should be of a sufficient time to provide MSHA with enough data to make a valid determination.

To minimize possible concerns about the validity of the sampling data, MSHA should consider observing some portion of the mine operator's data gathering and sampling to assist in evaluating the request for reduced air quantities.

MSHA 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:

$$TWA_{\text{projected}} = \frac{Q_{\text{measured}}}{Q_{\text{requested}}} * TWA_{\text{measured}}$$

The projected TWA must be less than the associated TLV for each contaminant for the reduced air quantity to be approved.

After calculating the projected TWA for the sampling data, the MSHA representative responsible for the data review can determine the potential for exceeding the 50 percent action level for sampling conducted as required under §70.1900. 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:

$$PEAK_{\text{projected}} = \frac{Q_{\text{measured}}}{Q_{\text{requested}}} * PEAK_{\text{measured}}$$

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<sup>®</sup>s.

#### Approval of Higher Action Levels under §75.325(j)

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.

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 usable results. Computer-based mine wide monitoring systems may also provide valuable data.

Sampling in the area(s) or location(s) being evaluated, and/or personal sampling, should be conducted to demonstrate that 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 time-weighted averages for each occupation.

If full shift exposures for miners are appropriate, the results should be compared to the peak concentrations measured in the corresponding area(s) or location(s). If compliance with the TLV<sup>®</sup>s 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 district manager may increase the action level.

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

Under §75.371(nn) the minimum ventilating air quantity for multiple units of equipment must 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 that are 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(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 must also 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.

Corrective Action in Response to Sampling Results above the Action Level under §70.1900(c)  
§70.1900(c) states that “Except as provided in §75.325(j) of this chapter, when sampling results indicate a concentration of CO and/or NO<sub>2</sub> exceeding an action level of 50 percent of the threshold limit values(TLV<sup>®</sup>) adopted by the American Conference of Governmental Industrial Hygienists, the mine operator shall immediately take appropriate action to reduce the concentrations of CO and/or NO<sub>2</sub> 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. redistribution of the available ventilating air quantity;
3. increasing the air quantity in the affected area; and



4. reduction of the number of diesel-powered equipment in service.

## **APPENDIX A**

### **INFORMATION FOR EVALUATION**

To effectively perform an evaluation of a plan, some information could be needed to diagnose the conditions or situation at the mine. The information may include, but is not limited to, the following:

1. A map for an overview of the mine.
2. Analyses of air samples for methane liberation.
3. Ignition history (if any).
4. Citations related to Subpart D - Ventilation.
5. Citations for exceeding the respirable dust standard.
6. Petitions for Modification related to ventilation.
7. Respirable Dust Inspection Reports.
8. Remote control operations.
9. Diesel equipment.
10. Escapeways identified on the map.
11. Comments from Representatives of Miners.