

# Atmospheric Monitoring Systems Operator's Training Guide

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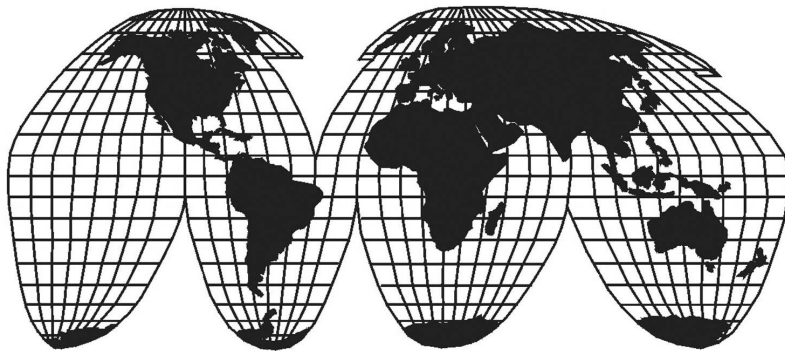


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Visit the Mine Safety and Health Administration  
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## Scope

Title 30 of the Code of Federal Regulations (**30 CFR § 48.27(a)**) requires miners assigned to new work tasks, including Atmospheric Monitoring System (AMS) operators, be task trained before they perform these duties.

This requirement applies to AMS operators who monitor methane or carbon monoxide sensors used to meet the requirements stated in:

- **30 CFR § 75.323(d)(1)(ii)** – Actions for excessive methane;
- **30 CFR § 75.340(a)(1)(ii)** and **30 CFR § 75.340(a)(2)(ii)** – Electrical installations;
- **30 CFR § 75.350(b)** and **30 CFR § 75.350(d)** – Use of air from a belt entry to ventilate working sections and point-feed regulators; or
- **30 CFR § 75.362** – On-shift examinations.

**30 CFR § 75.156(a)** requires that to be qualified as an AMS operator, a person shall be provided with task training on duties and responsibilities at each mine where an AMS operator is employed in accordance with the mine operator's approved Part 48 training plan. Since no AMS operator was required to receive task training under an MSHA-approved Part 48 training plan before December 31, 2008, they must be trained under this provision.

Also, AMS operators must be task trained at each mine in which they perform these duties due to different AMS designs, variations in ventilation plans and systems, complexities of evacuation plan requirements, and differences in mining conditions.

**30 CFR § 75.156(b)** requires that the AMS operator must be able to demonstrate to an Authorized Representative of the Secretary that he/she is qualified to perform the assigned tasks.

In making this determination, the inspector will ask the AMS operator questions regarding the responses to AMS signals; notification requirements; approved mine plans; recordkeeping requirements; and AMS operating requirements.

Appendix A of this guide includes a list of appropriate questions inspectors may use. The list is not intended to be comprehensive; additional questions may be asked based on mine-specific conditions.

**30 CFR § 75.351(q)(1)** requires that all AMS operators must be trained annually in the proper operation of the AMS including the following subjects:

- Familiarity with underground mining systems
- Basic atmospheric monitoring system requirements
- The mine emergency evacuation and firefighting program of instruction
- The mine ventilation system (including planned air directions)
- Appropriate response to alert and alarm signals, and malfunctions
- Use of mine communication systems (including emergency notification procedures)
- AMS recordkeeping requirements

A thorough understanding and a working knowledge of these subjects is essential to properly perform the duties of an AMS operator. The content of this training must address specific conditions and practices at the mine where the AMS operator is employed.

**30 CFR § 75.351(q)(2)** requires that, at least once every six months, all AMS operators must travel to all working sections to retain familiarity with underground mining systems including haulage, ventilation, communication, and escapeways.

## Purpose

In the event of a mine emergency, the sole responsibility of the AMS operator is to respond to the emergency.

AMS operators must have the background, experience, training, and authority to assure that proper actions are taken in response to AMS signals, including alerts, alarms, and malfunctions.

The material in this training guide is intended to assist mine operators to develop a program for task and annual training for AMS operators. This training must be conducted by a qualified trainer, a supervisor experienced in the assigned task, or other person experienced in the assigned task.

Since a significant portion of the knowledge necessary for an AMS operator is mine-specific, the materials in this guide must be tailored with the mine's existing training plan to create an effective program of site-specific instruction for AMS operators.

This guide is divided into eight sections which correspond with the training subjects as prescribed in **30 CFR § 75.351(q)**. Each section of this guide is arranged to assist qualified trainers to conduct both annual and task training for AMS operators.

Appendix A of this guide is a list of questions to facilitate AMS operator training. The questions provide a representative sample of the information an AMS operator may be required to know.

Appendix B is a suggested task training template to assist in the development of mine-specific task training for AMS operators. An operator may incorporate the template as part of its approved Part 48 task training plan by submitting it to the MSHA District Manager as required in § 48.23.

Since regulations, policy, and mining technology can change, it is important that mine operators keep their AMS training plans current and up-to-date. Visit MSHA's website at <http://www.msha.gov> for additional information.

# Training Guidelines

## AMS Operator Training Course Objectives

AMS operators will demonstrate knowledge and skills in the proper operation of their mine's AMS, including these mine-specific subjects:

- Underground Mining Systems
- Mine Ventilation Systems
- Mine Emergency Evacuation and Firefighting Program of Instruction
- Basic Atmospheric Monitoring System Requirements
- Appropriate Responses to Alert and Alarm Signals, and Malfunctions
- Communication Systems
- Recordkeeping Requirements
- Underground Travel Requirements

## Materials and Instructional Resources

In addition to this guide, you will need these materials to conduct this training:

- Title 30 Code of Federal Regulations (30 CFR)
- Approved Part 48 Training Plan (applicable to AMS operators)
- Appendix A, "Questions for AMS Operators" (included with this guide)
- AMS Operator Training Program, Materials, and/or Procedures
- Approved Emergency Response Plan (ERP); Emergency Notification Plan; and Emergency Evacuation and Firefighting Plan
- Mine Maps – with ventilation systems and escapeway systems
- Approved Ventilation Plan
- Manufacturer's Technical Manuals and Training Guidelines

**Other Helpful Instructional Aids:** PowerPoint, DVD, CD-ROM, pencils, notepads, notebooks, highlighters, etc.

## Training Methods

Suggested instructional techniques include:

- Review and Discussion
- Supervised On-the-Job Training (supervised practice during nonproduction or supervised operation during production)
- Hands-on Training/Demonstration Exercises

## **Evaluation**

To ensure the AMS operator thoroughly understands and demonstrates a working knowledge of the AMS used at the mine, the trainer should evaluate the training effectiveness as the AMS operator progresses through each subject. One or more of the following evaluation methods may be useful.

- Discussion
- Feedback
- Q&A (Appendix A)
- Skills Demonstration Exercises



# Underground Mining Systems

## Objective

Using the information in this section as a guide, the AMS operator/trainee will gain an understanding and a working knowledge of underground mining systems used at the mine including haulage, fire protection, communication, and tracking.

**NOTE TO TRAINER:** Make appropriate modifications to this training objective based on site-specific underground mining systems.

## Materials

This section requires use of:

- 30 CFR Part 75
- Appendix A, "Questions for AMS Operators" (included with this guide)
- Approved Part 48 Training Plan (applicable to AMS operators)
- The Mine's AMS
- Mine Maps/Schematics
- Any other applicable plans, work procedures, and/or safety policies used at the mine

## Activities and Content

Review and discuss underground mining systems used at the mine. Ask questions and make sure the AMS operator/trainee provides appropriate verbal feedback and demonstrates proficiency in all topics covered. Correct any misunderstanding or confusion before moving on to another topic.

## Evaluation

The AMS operator/trainee will demonstrate, through verbal explanation, an understanding and a thorough working knowledge of haulage, fire protection, communication, tracking, or any other relevant mine specific systems.

**NOTE TO TRAINER:** Refer to Appendix A, "Questions for AMS Operators." Ask the AMS operator/trainee the questions which apply to this section.

# Underground Mining Systems

## Training Topics

The primary duties and responsibilities of an AMS operator are extremely important to the health and safety of miners working underground. The mine's designated AMS operators must have a thorough working knowledge of the mine's underground mining systems.

The AMS operator must know the location and type of each AMS sensor; know the intended air flow direction at each location; and know how to promptly evaluate and respond to alert and alarm signals, and malfunctions.

**NOTE TO TRAINER:** Using the topics listed below, review, ask questions, and discuss systems applicable to the duties and responsibilities of the mine's AMS operators.

- Belt conveyor haulage
- Electrical installations
- Fire protection systems
- Two-way communication and tracking systems
- Other mine-specific systems

# Mine Ventilation System

## Objective

Using the information in this section as a guide, the AMS operator/trainee will gain a thorough working knowledge of the mine's ventilation system (including planned air directions).

## Materials

This session requires use of:

- Appendix A, "Questions for AMS Operators" (included with this guide)
- 30 CFR Part 75 Subpart D – Ventilation (applicable sections)
- Approved Part 48 Training Plan (applicable to AMS operators)
- The Mine's AMS
- Approved Ventilation Plan
- Mine Maps/Schematics Showing:
  - Working sections
  - Air directions
  - Sensor type and location
- Other applicable mine-specific plans, procedures, and safety policies

## Activities and Content

Review the mine's ventilation plan, ventilation maps/schematics (showing working sections), air directions, and sensor locations. Ask questions and make sure the AMS operator/trainee provides appropriate verbal feedback and demonstrates proficiency in all topics covered. Correct any misunderstanding or confusion before moving on to another topic.

## Evaluation

The AMS operator/trainee will demonstrate, through verbal explanation and a demonstration of skills, a thorough working knowledge of the mine's ventilation system (including planned air directions).

**NOTE TO TRAINER:** Refer to Appendix A, "Questions for AMS Operators." Ask the AMS operator/trainee the questions which apply to this section.

# Mine Ventilation System

## Training Topics

AMS operators need to maintain familiarity with the ventilation system used at the mine. The AMS operator's performance is **critical** in monitoring the mine's atmosphere when using air from the belt entry to ventilate working sections or areas where mechanized mining equipment is installed or removed.

**NOTE TO TRAINER:** Using the topics listed below, review, ask questions, and discuss the mine's ventilation system and approved ventilation plan. As applicable, add other topics on the ventilation system used at the mine.

- Maps/schematics of the mine's ventilation system
- Ventilation Plan Requirements (30 CFR § 75.371)
  - Location of point-feed regulators
  - Time delays
  - Reduced alert and alarm settings
  - Alternate instrument; alert and alarm levels for monitoring (30 CFR § 75.352)
- Ventilation Map
  - Location and type of all AMS sensors
  - Location of escapeways
- Planned air directions
- Ventilation controls
- Mine fan operation
- Mine fan stoppage
- Directions of airflow (displayed on the AMS)
- Air velocities
- Point-feed regulator
- Bleeder systems

# Mine Emergency Evacuation and Firefighting Program of Instruction

## Objective

Using the information in this section as a guide, the AMS operator/trainee will gain a thorough working knowledge of the mine's mine emergency evacuation and firefighting program of instruction.

## Materials

This session requires use of:

- Appendix A, "Questions for AMS Operators" (included with this guide)
- Approved Part 48 Training Plan (applicable to AMS operators)
- Emergency Response Plan (ERP)
- The Mine's Emergency Evacuation and Firefighting Program of Instruction
- Mine Maps/Schematics Showing:
  - Working sections
  - Ventilation system
  - Escapeway systems
  - Fire protection systems (if applicable)
- Approved Mine Ventilation Plan
- Other applicable mine-specific plans and/or policies

## Activities and Content

Review the mine's ERP and emergency evacuation and firefighting program of instruction. Ask questions and make sure the AMS operator/trainee provides appropriate verbal feedback and demonstrates proficiency in all topics covered. Correct any misunderstanding or confusion before moving on to another topic.

## Evaluation

The AMS operator/trainee will demonstrate, through verbal explanation and a demonstration of skills, a thorough working knowledge of the mine's ERP and emergency evacuation and firefighting program of instruction.

**NOTE TO TRAINER:** Refer to Appendix A, "Questions for AMS Operators." Ask the AMS operator/trainee the questions which apply to this section.

# Mine Emergency Evacuation and Firefighting Program of Instruction

## Training Topics

The AMS operator can perform additional duties as long as the alert and alarm signals, can be seen or heard, and a timely response can be initiated. However, in the event of a mine emergency, the sole responsibility of the AMS operator shall be to respond to the emergency.

**NOTE TO TRAINER:** Using the topics listed below, review, ask questions, and discuss the mine's emergency evacuation and firefighting program of instruction. As applicable, add other procedures or policies used at the mine.

- Procedures for evacuation of all miners not responding to the emergency
- Communication systems and protocols for notification of miners in all working sections
- Tracking system
- Procedures for consultation with responsible person
- Contact list of all appropriate personnel
- Primary, alternate, and/or other escapeway systems
- Location of refuge alternatives
- Locations, types, and operation of automatic fire warning devices
- Location of electrical installations monitored by AMS sensors
- Plan for rapid assembly and transportation of necessary miners, firefighting equipment, and rescue apparatus to the scene of the mine emergency
- Locations and types of fire suppression and firefighting equipment
- Plans for evacuations according to various scenarios:
  - Fire
  - Explosion
  - Water inundation
  - Gas inundation

# Basic Atmospheric Monitoring System Requirements

## Objective

Using the information in this section as a guide, the AMS operator/trainee will gain a thorough working knowledge of basic AMS requirements at the mine.

## Materials

This session requires use of:

- Appendix A, “Questions for AMS Operators” (included with this guide)
- 30 CFR § 75.351 – Atmospheric Monitoring Systems
- Approved Part 48 Training Plan (applicable to AMS operators)
- The Mine’s AMS
- Manufacturer’s Technical Manuals and Training Guidelines
- Mine Maps/Schematics (showing locations of sensors)
- Mine Ventilation Plan/Maps/Schematics
- Other applicable mine-specific plans and/or policies

## Activities and Content

Review and discuss the basic requirements for the AMS in use at the mine. Ask questions and make sure the AMS operator/trainee provides appropriate verbal feedback and demonstrates proficiency in AMS operations. Correct any misunderstanding or confusion before moving on to another topic.

## Evaluation

The AMS operator/trainee will demonstrate, through verbal explanation and a demonstration of skills, the basic requirements for the AMS in use at the mine.

**NOTE TO TRAINER:** Refer to Appendix A, “Questions for AMS Operators.” Ask the AMS operator/trainee the questions which apply to this section.

# Basic Atmospheric Monitoring System Requirements

## Training Topics

MSHA requires the training of AMS operators who monitor methane or carbon monoxide sensors used to meet the requirements for:

- 30 CFR § 75.323(d)(1)(ii) – Actions for excessive methane (return split alternative);
- 30 CFR § 75.340(a)(1)(ii) and § 75.340(a)(2)(ii) – Electrical installations (ventilation and monitoring);
- 30 CFR § 75.350(b) and § 75.350(d) – Use of air from a belt entry to ventilate working sections and point-feed regulators; or
- 30 CFR § 75.362 – On-shift examinations (section return split testing).

**NOTE TO TRAINER:** Using the topics listed below, review, ask questions, and discuss the basic AMS requirements for the mine, as well as the responsibilities of the AMS operator in fulfilling these requirements.

- AMS operator specified duties
- Actions for excessive methane
- Underground electrical installations
- Belt air course ventilation
- On-shift examination
- Schematic (map) of sensor locations
- Names and method to contact key personnel (including responsible person)
- Location and installation of AMS sensors
- Visual examination of system each shift
- Functional test of alarm every seven days
- Calibration of sensors every 31 days
- Operation of the AMS console; various screens
- Visual and audible signals – malfunctions/alerts/alarms
- Prompt response to signals
- Established alert and alarm levels
- Established ambient levels at the mine
- Maintenance requirements for all AMS components:
  - Contact list of AMS manufacturer technical assistance
  - Procedure for AMS hardware and software troubleshooting/repair
- Uninterruptible Power Supply (UPS)



# Appropriate Response to Alert and Alarm Signals, and Malfunctions

## Objective

Using the information in this section as a guide, the AMS operator/trainee will gain a thorough working knowledge of appropriate responses to AMS alert and alarm signals, and malfunctions.

## Materials

This session requires use of:

- Appendix A, “Questions for AMS Operators” (included with this guide)
- 30 CFR § 75.352 – Actions in response to AMS malfunction, alert, or alarm signals
- Approved Part 48 Training Plan (applicable to AMS operators)
- The Mine’s AMS
- Manufacturer’s Technical Manuals and Training Guidelines
- Mine Maps/Schematics Showing:
  - Locations of sensors
  - Working sections and areas where equipment is being installed or removed
- Approved Communication and Tracking Systems
- Other applicable mine-specific plans and/or policies

## Activities and Content

Review, discuss, and demonstrate the appropriate actions and notification for responses to alerts, alarms, and malfunction signals of the AMS in use at the mine. Ask questions and make sure the AMS operator/trainee provides appropriate verbal feedback and demonstrates proficiency in AMS operations. Correct any misunderstanding or confusion before moving on to another topic.

## Evaluation

The AMS operator/trainee will demonstrate, through verbal explanation and a demonstration of skills, the appropriate actions for alerts, alarms, and malfunction signals of the mine’s AMS.

**NOTE TO TRAINER:** Refer to Appendix A, “Questions for AMS Operators.” Ask the AMS operator/trainee the questions which apply to this section.

# Appropriate Response to Alert and Alarm Signals, and Malfunctions

## Training Topics

When an AMS alert or alarm signal is received at the designated surface location, the AMS operator must be able to identify the sensor(s) activated and promptly notify appropriate personnel.

**NOTE TO TRAINER:** Using the topics listed below, review and discuss the mine's AMS. Where applicable, AMS operators need to demonstrate proficiency in operating the AMS used at your mine.

- Identify and locate the sensor that has been activated
- Names of appropriate personnel to contact
- When to contact appropriate personnel
- Take required actions based on situation
- Communication with responsible person
- Initiate mine wide evacuation if necessary
- Notification procedures to ensure safety of miners in all working sections
- Investigate to determine cause
- Type(s) of sensor(s) activated
- Actions and notification procedures in the event of a malfunction
- Plans and notification procedures for underground persons qualified to respond to emergency
- Actions for inoperative sensors
- Monitor air course in belt entry (appropriate persons)
- Time Delays

# Communication Systems and Notification

## Objective

Using the information in this section as a guide, the AMS operator/trainee will gain a thorough working knowledge of the communication systems and notification procedures used at the mine.

## Materials

This session requires use of:

- Appendix A, “Questions for AMS Operators” (included with this guide)
- 30 CFR § 75.351(r) – Atmospheric Monitoring Systems – *Communications*
- 30 CFR § 75.1600-2
- Approved Part 48 Training Plan (applicable to AMS operators)
- The Mine’s AMS
- Communication systems used at the mine
- Tracking systems used at the mine
- Other applicable mine-specific plans, procedures, and/or notification protocols

## Activities and Content

Review, discuss, and demonstrate the voice communications and notification protocols in use at the mine. Ask questions and make sure the AMS operator provides adequate feedback. Correct any misunderstanding or confusion before moving on to another topic.

## Evaluation

The AMS operator/trainee will demonstrate, through verbal explanation and a demonstration of skills, voice communications and notification protocols used at the mine.

**NOTE TO TRAINER:** Refer to Appendix A, “Questions for AMS Operators.” Ask the AMS operator/trainee the questions which apply to this section.

# Communications Systems and Notification

## Training Topics

A critical duty of an AMS operator is communicating information to appropriate personnel at the mine.

Reliable communication and notification during a mine emergency are a vital part of emergency evacuation activities. A successful evacuation or firefighting operation is dependant on the quality and timeliness of the information that is communicated.

**NOTE TO TRAINER:** Using the topics listed below, review, discuss, and demonstrate the mine's voice communications systems and notification protocols in use at the mine.

- Communication systems
- Tracking systems
- Location of communication devices
- Audible/visual communication devices
- Notification procedures for communicating to all working sections
- Notification during AMS testing/calibration
- Notification during an emergency
- Notification for mine-wide evacuation

# Recordkeeping Requirements

## Objective

Using the information in this section as a guide, the AMS operator/trainee will gain a thorough working knowledge of recordkeeping requirements for the AMS at the mine.

## Materials

This session requires use of:

- Appendix A, "Questions for AMS Operators" (included with this guide)
- Approved Part 48 Training Plan (applicable to AMS operators)
- 30 CFR § 75.351(o) Records
- 30 CFR § 75.351(p) Record Retention
- AMS Logs and Records

## Content

Review and discuss the recordkeeping requirements for AMS operators at the mine. Ask questions and make sure the AMS operator provides adequate feedback. Correct any misunderstanding or confusion before moving on to another topic.

## Evaluation

The AMS operator/trainee will demonstrate, through verbal explanation, knowledge of AMS recordkeeping requirements at the mine.

**NOTE TO TRAINER:** Refer to Appendix A, "Questions for AMS Operators." Ask the AMS operator/trainee the questions which apply to this section.

## Recordkeeping Requirements

### Training Topics

The records required by this section must be kept either in a secure book that is not susceptible to alteration, or electronically in a computer system that is secure and not susceptible to alteration.

These records must be maintained separately from other records and identifiable by a title, such as the “AMS Log.”

**NOTE TO TRAINER:** Using the topics listed below, review and discuss the mine’s AMS recordkeeping requirements.

- Alerts and alarms
- Type and location of sensor
- Cause for activation
- Malfunctions (cause and corrective action)
- Seven-day functional test
- Calibrations
- Maintenance performed
- Person entering record must include name, date, and signature
- Records retention requirements

# Underground Travel Requirements

## Objective

The AMS operator/trainee will, by traveling to working sections underground every six months, gain first-hand knowledge of underground mining conditions and underground mining systems used at the mine.

## Materials

This session requires use of:

- Appendix A, “Questions for AMS Operators” (included with this guide)
- Approved Part 48 Training Plan (applicable to AMS operators)
- 30 CFR § 75.351(q)(2) – Underground Travel Requirement (Semi-annual)
- Transportation for underground travel
- A notebook or other means for note-taking underground
- Other applicable mine-specific plans, work procedures, and/or safety policies

## Activities and Content

The AMS operator/trainee will travel to all working sections of the mine. This will help both inexperienced and experienced AMS operators gain a working knowledge and understanding of the current mining conditions **and** underground mining systems used at the mine.

## Evaluation

After the AMS operator/trainee completes the requirement for underground travel to all working sections of the mine, they should demonstrate, through verbal explanation, knowledge of current conditions **and** underground mining systems.

**NOTE TO TRAINER:** Refer to Appendix A, “Questions for AMS Operators.” Ask the AMS operator/trainee the questions which apply to this section.

## NOTES



## Appendix A

### Questions for AMS Operators

30 CFR § 75.156 requires that an AMS operator be trained on duties and responsibilities in accordance with the mine operator's approved Part 48 training plan to be qualified as an AMS operator.

In addition, an AMS operator must be able to demonstrate to an MSHA inspector that he/she is qualified to perform in the assigned position. To facilitate this demonstration, MSHA inspectors will be asking AMS operators a series of questions to assure these miners are properly trained and able to respond to the signals given by the AMS.

The following list (although not inclusive) is a representative sample of the type of information an AMS operator may be required to understand. As all mines are not the same, and the use of an AMS is tailored to the needs of particular mines, the inspector may ask questions regarding details specific to the mine's operations.

#### General Questions

1. What types of sensors are used in the mine?
2. Who is the responsible person on the current shift?
3. Do you have a list of emergency phone numbers posted at the designated surface location?
4. What is the maximum sensor spacing for CO sensors installed along the belt conveyor?
5. What are the alert, alarm, and ambient CO levels in the mine?
6. How are alert and alarm signals indicated by the AMS?
7. Please explain how a typical work shift would take place.
8. What duties other than AMS operator are you permitted to perform?
9. If there is a fire underground, what duties are you permitted to perform?
10. Are you required to perform any duties that interfere with responding to the AMS?
11. (If diesel equipment is used) Has the AMS ever had alert and alarm signals caused by diesel exhaust? If so, how often?
12. Has the AMS ever had alert and alarm signals caused by hydrogen produced at a battery charging station? If so, how often?
13. When did you last travel to all of the working sections?

## **Response to Alert and Alarm Signals – Carbon Monoxide**

1. When an alert signal is indicated on the AMS, what actions must you take?
2. When an alarm signal is indicated, what actions must you take?
3. If an alarm is indicated at (sensor a), which miners would be working in affected areas?
4. How would you primarily communicate with these miners?
5. Is there a second communication system available for contacting miners in the event of an emergency? Are you able to use this system?
6. How do you acknowledge an alert or alarm signal?
7. What records must you make for alert and alarm signals?
8. Have you had any recent alert or alarm signals? Fires?

## **Response to Alarm Signals – Methane**

1. Where are sensors located underground for monitoring methane?
2. What actions must you take when a methane sensor indicates an alarm condition?

## **Determining System Malfunctions**

1. What would a carbon monoxide level of -5 ppm for a sensor on the AMS display indicate? Would you need to take any action if you discovered such a reading?
2. What would you do if the system indicates a sensor is no longer communicating with the computer?
3. Explain what the weekly functional test is intended to confirm.

## **Point-Feed Regulators**

1. What is the purpose of a point-feed regulator?
2. Where are the point-feed regulators located in this mine?
3. Is there a means installed for you to remotely close the regulator in the event of a fire in the primary escapeway?
4. When should the regulator be closed?

## **System Maintenance**

1. Are you required to take any special precautions when CO sensors are calibrated?
2. How often must CO sensors be calibrated?
3. Where are records for CO sensor calibrations and weekly functional tests maintained?

## Appendix B

### 30 CFR § 48.27(a) Task Training for Atmospheric Monitoring System (AMS) Operators (Suggested Outline)

SUBJECT	OBJECTIVES	TEACHING METHODS	COURSE MATERIAL	EVALUATION METHODS
Familiarity with Underground Mining Systems Used at the Mine (General Overview of Topics)	<p>The AMS operator/trainee will demonstrate a working knowledge of underground mining systems used at their mine (cover topics in the context of the AMS operator's duties):</p> <ul style="list-style-type: none"> <li>• Discuss underground belt haulage and ventilation system in use at the mine.</li> <li>• Identify and discuss underground electrical installations in use at the mine.</li> <li>• Describe and discuss fire protection systems in use at the mine.</li> <li>• Describe and discuss the mine's two-way communication and tracking systems.</li> </ul>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>"AMS Operator's Training Guide" 30 CFR Part 75 Mine Maps/Schematics Other Applicable Mine-Specific Plans and/or Work Procedures</p>	<p>Verbal Responses  Discussion  Demonstration</p>
Mine Ventilation System Used at the Mine	<p>The AMS operator/trainee will demonstrate a thorough working knowledge of the mine's ventilation system:</p> <ul style="list-style-type: none"> <li>• Discuss the mine's ventilation plan.</li> <li>• Discuss/describe the type of ventilation system used at the mine.</li> <li>• Discuss/describe planned air directions.</li> <li>• Identify and discuss ventilation controls in use at the mine.</li> <li>• Discuss belt-air course ventilation.</li> <li>• Discuss minimum and maximum air velocity requirements, based on the mine's approved ventilation plan.</li> <li>• Locate all designated escapeways at the mine.</li> </ul>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>"AMS Operator's Training Guide" 30 CFR Part 75 Subpart D – Ventilation (applicable sections) The Mine's AMS Approved Ventilation Plan Mine Ventilation Map/Schematics Mine Maps/Schematics (showing air directions, working sections, and escapeways) Other Applicable Mine-Specific Plans and/or Work Procedures</p>	<p>Verbal Responses  Discussion  Demonstration  <b>NOTE:</b> Where applicable, skills demonstration should include operation of the AMS console and graphic displays.</p>

SUBJECT	OBJECTIVES	TEACHING METHODS	COURSE MATERIAL	EVALUATION METHODS
<p>The Mine's Emergency Evacuation and Firefighting Program of Instruction</p>	<p>The AMS operator/trainee will demonstrate a thorough working knowledge of the mine's emergency evacuation and firefighting program of instruction:</p> <ul style="list-style-type: none"> <li>• Discuss the mine's ERP.</li> <li>• Identify the mine's responsible person(s).</li> <li>• Discuss/describe the mine's procedures for an emergency evacuation.</li> <li>• Locate the mine's escapeways, exits, and routes of travel to the surface.</li> <li>• Locate the mine's emergency shelters/refuge alternatives.</li> <li>• Locate the mine's firefighting equipment.</li> <li>• Describe operation of the mine's underground personnel tracking system.</li> <li>• Locate contact list of all appropriate personnel.</li> </ul>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>"AMS Operator's Training Guide" 30 CFR Part 75 Subpart L and Subpart P The Mine's AMS ERP The Mine's Emergency Evacuation and Firefighting Program of Instruction Mine Maps/Schematics showing: <ul style="list-style-type: none"> <li>• Working Sections</li> <li>• Ventilation System</li> <li>• Escapeway Systems</li> <li>• Location of Firefighting Equipment</li> </ul> Other Applicable Mine-Specific Plans and/or Work Procedures</p>	<p>Verbal Responses Discussion Demonstration <b>NOTE:</b> Where applicable, skills demonstration should include operation of the AMS console and graphic displays.</p>
<p>Mine Specific Basic AMS Requirements</p>	<p>The AMS operator/trainee will demonstrate a thorough working knowledge of the basic requirements for the AMS used at their mine:</p> <ul style="list-style-type: none"> <li>• Identify, locate, and describe all hardware and software components of the mine's AMS, including the Uninterruptible Power Supply (UPS).</li> <li>• Identify and locate all types of sensors monitored by the mine's AMS.</li> <li>• Demonstrate daily audio/visual function tests on AMS (alerts/alarms).</li> <li>• Select appropriate icons to check operation of underground equipment.</li> <li>• Demonstrate ability to monitor sensors, equipment, and working sections.</li> </ul> <p style="text-align: center;"><i>(continued on next page)</i></p>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>"AMS Operator's Training Guide" The Mine's AMS 30 CFR § 75.351 – Atmospheric Monitoring Systems Other Applicable Mine-Specific Plans and/or Work Procedures</p>	<p>Verbal Responses Discussion Demonstration <b>NOTE:</b> Where applicable, skills demonstration should include operation of the AMS console and graphic displays.</p>

SUBJECT	OBJECTIVES	TEACHING METHODS	COURSE MATERIAL	EVALUATION METHODS
<p>Mine Specific Basic AMS Requirements</p>	<p><i>(continued from previous page)</i></p> <ul style="list-style-type: none"> <li>• Demonstrate ability to monitor and record data relevant to conditions, equipment, sensors, alerts, and alarms.</li> <li>• Distinguish between alert and alarm signals.</li> <li>• State ambient levels in the mine.</li> <li>• Demonstrate actions for excessive methane if applicable.</li> <li>• Identify underground electrical installations (intake air for battery charging stations) if applicable.</li> <li>• Demonstrate ability to monitor belt air course ventilation if applicable.</li> <li>• Locate point-feed regulators if applicable.</li> <li>• Demonstrate on-shift examinations/tests for methane if applicable.</li> <li>• Locate key contact list of AMS manufacturer technical experts.</li> </ul>			
<p>Appropriate Responses to Alert and Alarm Signals, and Malfunctions</p>	<p>The AMS operator/trainee will demonstrate the appropriate actions and notification protocols for alert and alarm signals, and malfunctions of the AMS in use at the mine:</p> <ul style="list-style-type: none"> <li>• Identify and locate the sensor that has been activated.</li> <li>• Identify type(s) of sensor(s) activated.</li> <li>• Initiate prompt notification of appropriate personnel.</li> <li>• Notify appropriate personnel to investigate to determine cause.</li> <li>• Take required actions based on situation.</li> </ul> <p><i>(continued on next page)</i></p>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>“AMS Operator’s Training Guide” 30 CFR § 75.351 – Atmospheric Monitoring Systems The Mine’s AMS Manufacturer’s Technical Manuals and Training Guidelines Mine Maps/Schematics (showing locations of sensors) Mine Maps Other Applicable Mine-Specific Plans and/or Work Procedures Mine Communication Equipment</p>	<p>Verbal Responses Discussion Demonstration <b>NOTE:</b> Where applicable, skills demonstration should include operation of the AMS console and graphic displays.</p>

SUBJECT	OBJECTIVES	TEACHING METHODS	COURSE MATERIAL	EVALUATION METHODS
<p>Appropriate Responses to Alert and Alarm Signals, and Malfunctions</p>	<p><i>(continued from previous page)</i></p> <ul style="list-style-type: none"> <li>• Communicate with responsible person.</li> <li>• Notify all working sections.</li> <li>• Initiate mine wide evacuation, if necessary.</li> <li>• Demonstrate actions and notification procedures in the event of a malfunction.</li> <li>• Describe Time Delays.</li> <li>• Describe plans and notification procedures for underground persons qualified to respond to emergency.</li> <li>• Demonstrate actions for inoperative sensors.</li> <li>• Identify appropriate persons to monitor air course in belt entry.</li> </ul>			
<p>Use of the Mine's Communication Systems (Including Emergency Notification Procedures)</p>	<p>The AMS operator/trainee will:</p> <ul style="list-style-type: none"> <li>• Use two-way voice communication.</li> <li>• Describe types of communication systems.</li> <li>• Identify the location of communication devices.</li> <li>• Demonstrate Audible/Visual Communication Devices.</li> <li>• Notify all working sections with voice communication.</li> <li>• Notify appropriate persons for AMS testing/calibration.</li> <li>• Demonstrate notification procedure for mine-wide evacuation.</li> </ul>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>"AMS Operator's Training Guide"</p> <p>The Mine's AMS 30 CFR § 75.351(r) 30 CFR § 75.1600-2</p> <p>The Mine's AMS Mine Maps/Schematics Communication system equipment used at the mine</p> <p>Other applicable mine-specific plans, procedures, and/or notification plans.</p>	<p>Verbal Responses Discussion Demonstration</p>

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AMS Recordkeeping Requirements	<p>The AMS operator/trainee will demonstrate knowledge of AMS recordkeeping requirements at the mine:</p> <ul style="list-style-type: none"> <li>• Alerts and alarms.</li> <li>• Type and location of sensor.</li> <li>• Cause for activation.</li> <li>• Malfunctions (cause and corrective action).</li> <li>• Seven-day test.</li> <li>• Calibrations.</li> <li>• Maintenance performed.</li> <li>• Person entering record must include name, date, and signature.</li> <li>• Demonstrate knowledge of recording and logging information correctly.</li> <li>• Show the location of where records are kept.</li> </ul>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>“AMS Operator’s Training Guide” The Mine’s AMS Mine Maps/Schematics 30 CFR § 75.351(o) 30 CFR § 75.351(p) AMS Logs and Records</p>	<p>Verbal Responses Discussion Demonstration <b>NOTE:</b> Where applicable, skills demonstration should include operation of the AMS console and graphic displays.</p>
Underground Travel Requirements	<p>The AMS operator/trainee will travel to all working sections underground in order to retain familiarity with the underground mining system at their operation.</p>	<p>Demonstration Discussion Q&amp;A OJT</p>	<p>“AMS Operator’s Training Guide” 30 CFR § 75.351(q)(2) Transportation underground Notebook Other Mine-Specific Materials</p>	<p>Verbal Responses Discussion Demonstration</p>