

# Refuge Alternatives for Underground Coal Mines

Final Rule

December 31, 2008

# Overview

- Refuge alternative rule includes requirements for:
  - Testing and approval of refuge alternatives and components of refuge alternatives
  - Assuring that refuge alternatives are readily available, capable of sustaining trapped miners for 96 hours, and maintained in operating condition
  - Training miners to locate, use, maintain, and transport refuge alternatives

# Final Rule

- Proposed rule published June 16, 2008
- Public hearings held in:
  - Salt Lake City, UT
  - Charleston, WV
  - Lexington, KY
  - Birmingham, AL
- Comment period closed August 18, 2008
- Final rule published December 31, 2008

# Background

- Based on current Emergency Response Plans
  - MINER Act of 2006 (Section 2)
    - PPL P06-V-10 (Oct. 24, 2006) and PIB P07-03 (Feb. 8, 2007)
      - *Both superseded by final rule*
- Incorporates NIOSH report on Refuge Alternatives (December 2007)
- Incorporates public testimony and comments

# Implementation Timing

- Final rule is effective on March 2, 2009
  - § 7.503 applications for approval of a refuge alternative (RA) or a component in 2009 must be received by April 30, 2009
  - § 75.1502 Mine emergency evacuation and firefighting program of instruction
    - For mines with RA in the mine on March 2, 2009, a revised program of instruction must be submitted by April 30, 2009
    - For mines that acquire RA after March 2, 2009, a revised program of instruction must be submitted within 30 days of receipt of RA or components

# Implementation Timing (cont)

- § 75.1504 Mine emergency evacuation training and drills
  - Mines must conduct initial mine emergency evacuation training and drills on the refuge alternatives and components, under § 75.1504(b)(3)(ii), (b)(4)(ii), and (b)(6) through (9), within 30 days of program approval
- § 75.1504(c)(3)— Annual expectations training
  - Mines with RA in the mine on March 2, 2009, the operator shall complete the initial annual expectations training on the refuge alternatives and components no later than December 31, 2009.
  - Mines with no RA in the mine on March 2, 2009, the operator shall complete the initial annual expectations training on the refuge alternatives and components no later than December 31, 2009, or within 60 days of receipt.

# Part 7

## ■ ACC approval of pre-fabricated, self-contained units and components

- § 7.503 Application requirements
- § 7.504 Refuge alternatives and components; general requirements
- § 7.505 Structural components
- § 7.506 Breathable air components
- § 7.507 Air-monitoring components
- § 7.508 Harmful gas removal components
- § 7.509 Approval markings
- § 7.510 New technology

# Part 7

- Testing and approval of refuge alternatives and components
  - Applies to manufacturers of refuge alternatives and components
  - For further information contact:
    - MSHA Approval and Certification Center  
765 Technology Drive  
Triadelphia, West Virginia 26059
- Phone: 304-547-0400

# Part 75

- Applies to coal mine operators
- Safety standards for refuge alternatives including:
  - Minimum capacities and requirements
  - Locations
  - Maintenance
  - Training requirements
  - Emergency response plan requirements

# Part 75

## § 75.221 Roof control plan information

(a)(12) A description of the roof and rib support necessary for the refuge alternatives

## § 75.313 Main mine fan stoppage with persons underground

(f) Any electrical refuge alternative components exposed to the mine atmosphere shall be approved as intrinsically safe for use during fan stoppages. Any electrical refuge alternative components located inside the refuge alternative shall be either approved as intrinsically safe or approved as permissible for use during fan stoppages

§ 75.360 Preshift examination at fixed intervals

(d) The person conducting the preshift examination shall check the refuge alternative for damage, the integrity of the tamper-evident seal and the mechanisms required to deploy the refuge alternative, and the ready availability of compressed oxygen and air

§ 75.372 Mine ventilation map

(b)(11) The location of all escapeways and refuge alternatives

§ 75.1200–1 Additional information on mine map

(n) The locations of refuge alternatives

§ 75.1202–1 Temporary notations, revisions, and supplements

(b)(4) Escapeways and refuge alternatives

## § 75.1501 Emergency evacuations

(a)(1) The responsible person shall have current knowledge of the assigned location and expected movements of miners underground, the operation of the mine ventilation system, the locations of the mine escapeways and refuge alternatives, the mine communications system, any mine monitoring system if used, locations of firefighting equipment, the mine's Emergency Response Plan, the Mine Rescue Notification Plan, and the Mine Emergency Evacuation and Firefighting Program of Instruction

§ 75.1502 Mine emergency evacuation and firefighting program of instruction

(c)(3) The deployment, use, and maintenance of refuge alternatives.

(4)(iv) Switching escapeways, as applicable;

(v) Negotiating any other unique escapeway conditions; and

(vi) Using refuge alternatives.

(8) A review of the mine map; the escapeway system; the escape, firefighting, and emergency evacuation plan in effect at the mine; and the locations of refuge alternatives and abandoned areas.

(10) A summary of the procedures related to deploying refuge alternatives.

(11) A summary of the construction methods for 15 psi stoppings constructed prior to an event.

(12) A summary of the procedures related to refuge alternative use.

## § 75.1504 Mine emergency evacuation training and drills

(b)(3)(ii) Physically locates and practices using the continuous directional lifelines or equivalent devices and tethers, and physically locates the stored SCSRs and refuge alternatives;

(4)(ii) Locating escapeways, exits, routes of travel to the surface, abandoned areas, and refuge alternatives.

(6) Reviewing the procedures for deploying refuge alternatives and components.

(7) For miners who will be constructing the 15 psi stoppings prior to an event, reviewing the procedures for constructing them.

(8) Reviewing the procedures for use of the refuge alternatives and components.

(9) Task training in proper transportation of the refuge alternatives and components.

## 75.1504 Mine emergency evacuation training and drills

(c) Annual expectations training. Over the course of each year, each miner shall participate in expectations training that includes the following:

- (1) Donning and transferring SCSRs in smoke, simulated smoke, or an equivalent environment.
- (2) Breathing through a realistic SCSR training unit that provides the sensation of SCSR airflow resistance and heat.
- (3) Deployment and use of refuge alternatives similar to those in use at the mine, including—
  - (i) Deployment and operation of component systems; and
  - (ii) Instruction on when to use refuge alternatives during a mine emergency, emphasizing that it is the last resort when escape is impossible.
- (4) A miner shall participate in expectations training within one quarter of being employed at the mine.

## § 75.1505 Escapeway maps.

(a) Content and accessibility. An escapeway map shall show the designated escapeways from the working sections or the miners' work stations to the surface or the exits at the bottom of the shaft or slope, refuge alternatives, and SCSR storage locations. The escapeway map shall be posted or readily accessible for all miners—

(1) In each working section;

(2) In each area where mechanized mining equipment is being installed or removed;

(3) At the refuge alternative; and

(4) At a surface location of the mine where miners congregate, such as at the mine bulletin board, bathhouse, or waiting room.

(b) Keeping maps current. All maps shall be kept up-to-date and any change in route of travel, location of doors, location of refuge alternatives, or direction of airflow shall be shown on the maps by the end of the shift on which the change is made.

§ 75.1506 Refuge alternatives.

(a) Each operator shall provide refuge alternatives and components as follows:

(1) Prefabricated self-contained units, including the structural, breathable air, air monitoring, and harmful gas removal components of the unit, shall be approved under 30 CFR part 7; and

(2) The structural components of units consisting of 15 psi stoppings constructed prior to an event shall be approved by the District Manager, and the breathable air, air monitoring, and harmful gas removal components of these units shall be approved under 30 CFR part 7.

## § 75.1506 Refuge alternatives

(a)(3) Prefabricated refuge alternative structures that states have approved and those that MSHA has accepted in approved Emergency Response Plans (ERPs) that are in service prior to March 2, 2009 are permitted until December 31, 2018, or until replaced, whichever comes first. Breathable air, air monitoring, and harmful gas removal components of either a prefabricated self-contained unit or a unit consisting of 15 psi stoppings constructed prior to an event in a secure space and an isolated atmosphere that states have approved and those that MSHA has accepted in approved ERPs that are in use prior to March 2, 2009 are permitted until December 31, 2013, or until replaced, whichever comes first. Refuge alternatives consisting of materials prepositioned for miners to deploy in a secure space with an isolated atmosphere that MSHA has accepted in approved ERPs that are in use prior to March 2, 2009 are permitted until December 31, 2010, or until replaced, whichever comes first.

(b) Except as permitted under paragraph (a)(3) of this section, each operator shall provide refuge alternatives with sufficient capacity to accommodate all persons working underground.

(1) Refuge alternatives shall provide at least 15 square feet of floor space per person and 30 to 60 cubic feet of volume per person according to the following chart. The airlock can be included in the space and volume if waste is disposed outside the refuge alternative.

<b>Mining Height (inches)</b>		<b>Unrestricted Volume (cubic feet per person)*</b>
36 or less	...	30
>36–≤42	...	37.5
>42–≤48	...	45
>48–≤54	...	52.5
>54	...	60

\* Includes an adjustment of 12 inches for clearances.

(b)(2) Refuge alternatives for working sections shall accommodate the maximum number of persons that can be expected on or near the section at any time.

(3) Each refuge alternative for outby areas shall accommodate persons reasonably expected to use it.

(c) Refuge alternatives shall be provided at the following locations:

(1) Within 1,000 feet from the nearest working face and from locations where mechanized mining equipment is being installed or removed except that for underground anthracite coal mines that have no electrical face equipment, refuge alternatives shall be provided if the nearest working face is greater than 2,000 feet from the surface.

(2) Spaced within one-hour travel distances in outby areas where persons work such that persons in outby areas are never more than a 30-minute travel distance from a refuge alternative or safe exit. However, the operator may request and the District Manager may approve a different location in the ERP. The operator's request shall be based on an assessment of the risk to persons in outby areas, considering the following factors: proximity to seals; proximity to potential fire or ignition sources; conditions in the outby areas; location of stored SCSRs; and proximity to the most direct, safe, and practical route to an intake escapeway.

(d) Roof and rib support for refuge alternative locations shall be specified in the mine's roof control plan.

(e) The operator shall protect the refuge alternative and contents from damage during transportation, installation, and storage.

(f) A refuge alternative shall be removed from service if examination reveals damage that interferes with the functioning of the refuge alternative or any component.

(1) If a refuge alternative is removed from service, the operator shall withdraw all persons from the area serviced by the refuge alternative, except those persons referred to in § 104(c) of the Mine Act.

(2) Refuge alternative components removed from service shall be replaced or be repaired for return to service in accordance with the manufacturer's specifications.

(g) At all times, the site and area around the refuge alternative shall be kept clear of machinery, materials, and obstructions that could interfere with the deployment or use of the refuge alternative.

(h) Each refuge alternative shall be conspicuously identified with a sign or marker as follows:

(1) A sign or marker made of a reflective material with the word "REFUGE" shall be posted conspicuously at each refuge alternative.

(2) Directional signs made of a reflective material shall be posted leading to each refuge alternative location.

(i) During use of the refuge alternative, the atmosphere within the refuge alternative shall be monitored. Changes or adjustments shall be made to reduce the concentration of methane to less than 1 percent; to reduce the concentration of carbon dioxide to 1 percent or less and excursions not exceeding 2.5 percent; and to reduce the concentration of carbon monoxide to 25 ppm or less. Oxygen shall be maintained at 18.5 to 23 percent.

(j) Refuge alternatives shall contain a fire extinguisher that—

- (1) Meets the requirements for portable fire extinguishers used in underground coal mines under this part;
- (2) Is appropriate for extinguishing fires involving the chemicals used for harmful gas removal; and
- (3) Uses a low-toxicity extinguishing agent that does not produce a hazardous by-product when activated.

§ 75.1507 Emergency Response Plan; refuge alternatives.

(a) The Emergency Response Plan (ERP) shall include the following for each refuge alternative and component:

- (1) The types of refuge alternatives used in the mine, i.e., a prefabricated self-contained unit or a unit consisting of 15 psi stoppings constructed prior to an event in a secure space and an isolated atmosphere.
- (2) Procedures or methods for maintaining approved refuge alternatives and components.
- (3) The rated capacity of each refuge alternative, the number of persons expected to use each refuge alternative, and the duration of breathable air provided per person by the approved breathable air component of each refuge alternative.
- (4) The methods for providing breathable air with sufficient detail of the component's capability to provide breathable air over the duration stated in the approval.

(5) The methods for providing ready backup oxygen controls and regulators.

(6) The methods for providing an airlock and for providing breathable air in the airlock, except where adequate positive pressure is maintained.

(7) The methods for providing sanitation facilities.

(8) The methods for harmful gas removal, if necessary.

(9) The methods for monitoring gas concentrations, including charging and calibration of equipment.

(10) The method for providing lighting sufficient for persons to perform tasks.

(11) Suitable locations for the refuge alternatives and an affirmative statement that the locations are—

(i) Not within direct line of sight of the working face; and

(ii) Where feasible, not placed in areas directly across from, nor closer than 500 feet radially from, belt drives, take-ups, transfer points, air compressors, explosive magazines, seals, entrances to abandoned areas, and fuel, oil, or other flammable or combustible material storage. However, the operator may request and the District Manager may approve an alternative location in the ERP if mining involves two-entry systems or yield pillars in a longwall that would prohibit locating the refuge alternative out of direct line of sight of the working face.

(12) The maximum mine air temperature at each of the locations where refuge alternatives are to be placed.

(b) For a refuge alternative consisting of 15 psi stoppings constructed prior to an event in a secure space and an isolated atmosphere, the ERP shall specify that—

(1) The breathable air components shall be approved by MSHA; and

(2) The refuge alternative can withstand exposure to a flash fire of 300 degrees Fahrenheit (°F) for 3 seconds and a pressure wave of 15 pounds per square inch (psi) overpressure for 0.2 seconds.

(c) If the refuge alternative sustains persons for only 48 hours, the ERP shall detail advanced arrangements that have been made to assure that persons who cannot be rescued within 48 hours will receive additional supplies to sustain them until rescue. Advance arrangements shall include the following:

(1) Pre-surveyed areas for refuge alternatives with closure errors of less than 20,000:1. (2) An analysis to demonstrate that the surface terrain, the strata, the capabilities of the drill rig, and all other factors that could affect drilling are such that a hole sufficient to provide required supplies and materials reliably can be promptly drilled within 48 hours of an accident at a mine.

(3) Permissions to cross properties, build roads, and construct drill sites.

(4) Arrangement with a drilling contractor or other supplier of drilling services to provide a suitable drilling rig, personnel and support so that a hole can be completed to the refuge alternative within 48 hours.

(5) Capability to promptly transport a drill rig to a pre-surveyed location such that a drilled hole would be completed and located near a refuge alternative structure within 48 hours of an accident at a mine.

(6) The specifications of pipes, air lines, and approved fans or approved compressors that will be used.

(7) A method for assuring that within 48 hours, breathable air shall be provided.

(8) A method for assuring the immediate availability of a backup source for supplying breathable air and a backup power source for surface installations.

(d) The ERP shall specify that the refuge alternative is stocked with the following:

- (1) A minimum of 2,000 calories of food and 2.25 quarts of potable water per person per day in approved containers sufficient to sustain the maximum number of persons reasonably expected to use the refuge alternative for at least 96 hours, or for 48 hours if advance arrangements are made under paragraph (c) of this section;
- (2) A manual that contains sufficient detail for each refuge alternative or component addressing in-mine transportation, operation, and maintenance of the unit;
- (3) Sufficient quantities of materials and tools to repair components; and
- (4) First aid supplies.

§ 75.1508 Training and records for examination, maintenance and repair of refuge alternatives and components.

(a) Persons examining, maintaining, or repairing refuge alternatives and components shall be instructed in how to perform this work.

(1) The operator shall assure that all persons assigned to examine, maintain, and repair refuge alternatives and components are trained.

(2) The mine operator shall certify, by signature and date, the training of persons who examine, maintain, and repair refuge alternatives and components.

(b) At the completion of each repair, the person conducting the maintenance or repair shall make a record of all corrective action taken.

(c) Training certifications and repair records shall be kept at the mine for one year

§ 75.1600–3 Communications facilities; refuge alternatives.

(a) Refuge alternatives shall be provided with a communications system that consists of—

- (1) A two-way communication facility that is a part of the mine communication system, which can be used from inside the refuge alternative; and
- (2) An additional communication system and other requirements as defined in the communications portion of the operator's approved Emergency Response Plan.



UNITED STATES DEPARTMENT OF LABOR

MINE SAFETY & HEALTH ADMINISTRATION (MSHA)

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