



**DEPARTMENT OF LABOR**

**Mine Safety and Health Administration**

**30 CFR Part 75**

**[Docket No. MSHA-2013-0032]**

**RIN 1219-AB84**

**Refuge Alternatives for Underground Coal Mines**

**AGENCY:** Mine Safety and Health Administration, Labor.

**ACTION:** Final action.

**SUMMARY:** The Mine Safety and Health Administration (MSHA) is notifying the mining community and other interested parties of the Agency's determination that the existing standards addressing the frequency of miners' training on refuge alternatives for underground coal mines effectively protect miners' safety and will remain in effect without change. This determination responds to a decision from the United States Court of Appeals for the District of Columbia Circuit.

**DATES:** [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

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**SUPPLEMENTARY INFORMATION:**

**I. Background**

On December 31, 2008, MSHA published a final rule, *Refuge Alternatives for Underground Coal Mines*, establishing requirements for refuge alternatives in underground coal mines.<sup>1</sup> See 73 FR 80656; see generally 30 CFR part 7, subpart L; *id.* part 75, subpart P. The final rule requires mine operators to provide training regarding the deployment and use of refuge alternatives, including three types of training - annual motor-task (hands-on), decision-making, and expectations training. 30 CFR 75.1504(c). Motor-task (hands-on) training consists of performing activities necessary to safely and effectively deploy and use a refuge alternative and its components. Decision-making training consists of learning when it is appropriate to use refuge alternatives rather than to attempt escape from the mine. Expectations training consists of anticipating and experiencing the

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<sup>1</sup> A refuge alternative is a protected, secure space with an isolated atmosphere and integrated components that create a life-sustaining environment for persons trapped in an underground coal mine. 30 CFR 7.502.

conditions that might be encountered during use of a refuge alternative (e.g., heat and humidity, confined space).

On January 13, 2009, the United Mine Workers of America petitioned the United States Court of Appeals for the District of Columbia Circuit (Court) to review MSHA's refuge alternatives final rule. The Court issued its decision on October 26, 2010. See *Int'l Union, United Mine Workers of America v. MSHA*, 626 F.3d 84 (D.C. Cir. 2010). The Court held that MSHA was not bound by recommendations of the National Institute for Occupational Safety and Health (NIOSH), but that MSHA had failed to adequately explain its departure from NIOSH's quarterly training recommendations. The Court found that MSHA's "conclusory" reliance on its "knowledge and expertise" was unsupported by the rulemaking record. *Id.* at 93. Among other considerations, the Court described analysis from a NIOSH study that found that, after 90 days, miners' ability to accomplish the six-step process for donning self-contained self-rescuers (SCSRs) severely deteriorated<sup>2</sup> -- deterioration that NIOSH presumed would be similar for the

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<sup>2</sup> An SCSR is an apparatus worn by individual miners in underground coal mines that can be used to provide at least one hour of breathable air to enable miners to escape from the mine or to reach a refuge alternative when the mining environment, due to smoke, inadequate oxygen and/or carbon monoxide, would not support human life. See 30 CFR 75.2 and 75.1714.

referenced eighteen-step process needed to operate refuge alternatives. *See id.* at 87-88, 93.

The Court remanded, but did not vacate, the final rule. It directed MSHA to explain the basis for the training frequency provision from the existing record or to reopen the record and allow additional public comment if needed. *Id.* at 86, 94. MSHA then reopened the record twice to obtain public comments on the appropriate frequency of motor-task (hands-on), decision-making, and expectations training for miners to deploy and use refuge alternatives in underground coal mines. *See* 78 FR 48592 (Aug. 8, 2013); 78 FR 68783 (Nov. 15, 2013).

## **II. MSHA's Current Standards Effectively Protect Miners**

MSHA received three comments after reopening the record. Two of those comments favored retaining the existing rule.

The first commenter recognized that escape – not seeking refuge – is the first line of defense in an underground coal mine in an emergency. AB84-COMM-1. The commenter described the quarterly training miners currently receive in using SCSRs and additional quarterly training concerning storage locations for SCSRs, escapeways, and lifelines, as well as review of refuge alternative deployment and use. The commenter highlighted how training

related to SCSRs in particular is likely the highest-quality training miners receive during their careers, and asserted that studies reveal "the single-most important element of survival [in] a mining disaster [is] the ability to properly don the [SCSR] and exit the mine." The commenter believed that resources for quarterly deployment of refuges and related motor-task (hands-on) training would be better utilized if miners were prepared for prompt, orderly, and efficient escape during a mine disaster through comprehensive SCSR, lifeline, and escapeway training. The commenter also described costs associated with quarterly motor-task (hands-on) training for deploying refuge alternatives. The commenter concluded "that the current refuge chamber alternative training requirements are adequate," and MSHA agrees.

A second commenter opposed changing the rule and agreed with MSHA that the final rule provided adequate miner training regarding when to use refuge alternatives. AB84-COMM-3. The commenter recognized that mine operators could supplement the mandated quarterly review of the procedures for deploying and using the refuge alternatives with limited motor-task (hands-on) training using a panel mock-up of the valve and door arrangements of the refuge alternatives in use at the mine, as well as video training.

The commenter stated that training using a mock-up of the doors and valves would provide both motor-task (hands-on) and expectations training. MSHA agrees with the substance of these comments, which are consistent with MSHA's resolution of this issue, and the Agency supports initiatives, as deemed appropriate by individual operators, to supplement existing quarterly refuge alternative deployment and use training as described by the commenter and as discussed below.

The third commenter stated that annual deployment and use of a refuge alternative is inadequate and, based in part on NIOSH's 2007 report,<sup>3</sup> advocated quarterly motor-task (hands-on) training. AB84-COMM-2. The commenter argued that the task of donning an SCSR, for which quarterly motor-task (hands-on) training is required, is not as difficult as deploying a refuge chamber. This commenter also stated that decision-making and expectations training should be provided quarterly in order to adequately train miners for emergency situations. MSHA disagrees with the commenter's arguments and analysis, as explained below.

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<sup>3</sup> NIOSH, Office of Mine Safety & Health, *Research Report on Refuge Alternatives for Underground Coal Mines*, Dec. 2007.

After considering these comments, MSHA believes it should retain the final rule without revision. This approach is consistent with the training requirements in West Virginia, the only state that specifies training for refuge alternative deployment requirements. MSHA concludes that annual motor-task (hands-on), decision-making, and expectations training, supplemented by existing mandated quarterly review of deployment and use procedures, as well as existing mandated quarterly evacuation training and quarterly evacuation drills with review of a mine's evacuation plan, which include discussion of emergency scenarios and options for escape and refuge, will prepare miners to deploy and use refuge alternatives appropriately and effectively in an emergency.

***Motor-Task (Hands-On) Training***

MSHA's determination regarding the appropriate frequency for motor-task (hands-on) training on refuge alternatives is supported by how miners are trained to use, and must use, SCSRs in emergencies; the overlap between the actions miners take in the normal course of mining and the actions necessary to deploy and use refuge alternatives; and how existing quarterly training already addresses the sequence of steps needed to deploy and use a refuge alternative.

Miners are trained to use - and, in emergencies, historically have used - SCSRs, which will facilitate miners' subsequent deployment of refuge alternatives when escape from the mine is not possible. When donning an SCSR, miners are faced with a perceived immediate threat to their lives. In a toxic environment, a single breath could kill a miner. A miner must don an SCSR immediately so he or she can continue breathing in the moments after ascertaining the need for the SCSR. Consequently, miners must be able to don the SCSR by instinct, relying on instant recall of the SCSR donning process, a process that requires performing actions not otherwise undertaken during the normal course of mining. Given the need to immediately don an SCSR in an environment in which miners often cannot see instructional material, as well as the impracticality of associating instructional materials with individual SCSRs, miners cannot benefit from manuals and other guidance while donning an SCSR.

By contrast to the need to immediately don SCSRs without the benefit of written instruction, a miner deploying a refuge alternative will have the benefit of an SCSR and, therefore, significantly more time to deploy the refuge alternative. The 60-minute oxygen supply associated with an SCSR provides miners up to 30 minutes to travel to

a refuge alternative and at least 30 additional minutes to deploy the refuge alternative.<sup>4</sup> Thus, miners will have time to review instructions/manuals located at (and inside) the refuge alternative and to be more deliberative in their recall of the skills and knowledge acquired during their training sessions. Once inside the isolated atmosphere after completing the initial actions necessary to deploy a refuge alternative, and where they are free from smoke and other contaminants that may be associated with the mine environment during an emergency, miners can refer to the available manual, quick-start guides, or signage, and they can work cooperatively (when there is more than one miner) and deliberately to complete deployment of the refuge alternative.

The rulemaking record supports MSHA's general understanding and approach. During a July 31, 2008, public hearing seeking comment regarding the proposed refuge alternative rule, a witness testified that, after clearing a refuge alternative's airlock, miners could start the flow of oxygen within minutes and would be in a safe environment, allowing them ample time to reference

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<sup>4</sup> The final rule provides that miners never will be more than a 30-minute travel distance from either a refuge alternative or a safe exit from the mine. 30 CFR 75.1506(c).

available placards and manuals, if needed, and undertake subsequent steps necessary to maintain a breathable environment within the unit. MSHA Public Hearing, 7/31/08, pg. 91; See <https://arlweb.msha.gov/REGS/Comments/E8-13565/Transcripts/20080731CharlestonWV.pdf>.

Additionally – and unlike the actions needed to use an SCSR – the actions that must be performed to deploy and use a refuge alternative are similar to many actions in which miners regularly engage during the course of normal mining operations. For example, the operation of valves on oxygen and acetylene compressed gas cylinders used when conducting maintenance activities, such as cutting and welding, is similar to the operation of valves associated with refuge alternatives. In addition, many miners carry, and routinely use, gas monitors like those used in the deployment and use of a refuge alternative to measure gaseous concentration levels during their shifts. Further, the design and use of access doors and latches located on refuge alternatives are similar to existing airlock doors and personnel doors that are located at various points of the mine where miners often travel and work. In part because of this overlap, MSHA has determined annual motor-task (hands-on) training on refuge alternatives is adequate.

In addition to having the benefit of SCSRs, as well as signage, brief written instructions (e.g., quick start guides), and manuals, and familiarity with basic actions developed through their work experiences, miners also already receive quarterly training on the procedures to deploy and use refuge alternatives. 30 CFR 75.1504(b)(6) and (8). Because miners have familiarity with many of the underlying physical actions needed to deploy and use a refuge alternative effectively, MSHA has concluded that it is more important for miners to know the order in which those actions need to be performed - a sequence that is addressed during the quarterly training.

When deploying a refuge alternative, miners must perform the following steps:<sup>5</sup>

- 1) open/inflate the unit;
- 2) enter the airlock and purge contaminants;
- 3) enter the livable space and turn on oxygen;
- 4) deploy carbon dioxide scrubbing material;
- 5) begin to monitor air quality.

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<sup>5</sup>While the Court referenced an 18-step process for deploying an using a refuge alternative, *Int'l Union, United Mine Workers of America v. MSHA*, 626 F.3d at 87-88, 93, the referenced process includes discrete, minor actions that more appropriately are included within the five steps listed above. Indeed, NIOSH similarly has recommended development of four-step *Quick Start Guides* for the deployment and use of refuge alternatives [*Guidelines for Instructional Materials on Refuge Chamber Setup, Use, and Maintenance*, IC 9514, NIOSH 2009, page 7].

After performing the first three steps, the miners are in the habitable space and have ample time to safely perform the remaining actions. MSHA agrees with a commenter that the mandated quarterly review of deployment procedures, including these initial steps, effectively reinforces the annual training that miners receive (see 30 CFR 75.1504(b)(6); AB58-COMM-21, pgs. 3-4). MSHA's confidence that miners effectively will learn and remember the necessary steps, and the order in which they are performed, through annual motor-task (hands-on) training and quarterly review is supported by the facts that the steps are relatively few in number and the order in which they are performed is consistent with the manner in which one naturally would seek refuge from a dangerous environment into a secured, breathable environment -- i.e., prepare the unit for use; leave the dangerous mine environment for the enclosed airlock; purge hazardous gasses that may have entered the airlock during entry; enter the unit's livable space and start the flow of oxygen; activate the carbon dioxide scrubbing material; and monitor to assure the appropriate oxygen and carbon dioxide concentrations during habitation. Therefore, motor-task (hands-on) retraining on the deployment and use of refuge alternatives does not need to be as frequent as motor-task

(hands-on) training for the donning of an SCSR, particularly in light of the related, quarterly refuge alternative deployment and use training mandated in 30 CFR 75.1504(b) (6) and (8).

MSHA notes that its conclusion regarding the appropriate frequencies for training miners parallels the frequencies at which miners must be trained under West Virginia state law. In response to mine accidents in 2006, the State of West Virginia also supplemented its provisions for protecting miners in an emergency, including provisions related to SCSRs and emergency shelters/chambers. Recognizing the critical importance of donning an SCSR immediately and effectively in an emergency (Mine Safety Technology Task Force Report - May 29, 2006 at <https://minesafety.wv.gov/PDFs/MSTTF%20Report%20Final.pdf>),<sup>6</sup> the West Virginia legislature mandates that miners receive quarterly SCSR training. See, WV Code section 22A-2-

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<sup>6</sup>MSHA notes that the West Virginia Task Force, which included two representatives from the United Mine Workers of America, as well as industry representatives, addressed training regarding the use of SCSRs extensively in their report, while providing more limited discussion of training to be associated with emergency shelters/chambers. See Mine Safety Technology Task Force Report at 36, 38-38, 42, 52-3, 59, 107-09. The Task Force ultimately recommended that mine operators provide a shelter/chamber plan that, among other things, "ensure[s] that emergency shelters/chambers are included in initial mine hazard training in such a manner that it is in compliance with all manufacturer's requirements and is provided yearly in addition to annual refresher training." Id. at 17, 59.

55(f) (1); W. Va. Code St. R, section 56-4-5.3. Conversely, pursuant to State law, miners receive training in the proper use of emergency shelters/chambers on an annual basis. See W. Va. Code St. R, section 56-4-8.14.2.

When deploying refuge alternatives, miners have the benefit of SCSRs and written instruction, familiarity with basic actions needed to deploy and use refuge alternatives, and, in addition to annual motor-task (hands-on training), quarterly training on the sequence of steps and procedures for deployment and use. In light of these considerations, and consistent with training requirements contained in West Virginia law, MSHA believes annual motor-task (hands-on) training on the use of refuge alternatives effectively protects miner safety.

***Decision-Making and Expectations Training, Collectively***

MSHA's divergence from NIOSH's quarterly decision-making and expectations training recommendation reflects the absence of NIOSH-cited research and the limited analysis regarding the appropriate frequency for providing such training. While favorably referencing research and analysis underlying NIOSH's recommendation that motor-task (hands-on) training be performed on a quarterly basis, the Court's holding reflects that, while NIOSH recommended that decision-making and expectations training be included in

conjunction with hands-on quarterly training, NIOSH had not performed any specific research regarding the appropriate frequency for providing decision-making and expectations training. See *Int'l Union, United Mine Workers of America v. MSHA*, 626 F.3d at 87-88, 93 (referencing NIOSH and UMWA-identified studies regarding recollection following motor-task (hands-on) training, while merely mentioning NIOSH's more cursory recommendation that decision-making training and expectations training be given at the same time as the motor-task (hands-on) training). MSHA agrees with NIOSH that decision-making and expectations training practically could be performed in conjunction with motor-task (hands-on) training. See NIOSH's *Research Report On Refuge Alternatives For Underground Coal Mines* at 15. However, NIOSH's recommendation appears to be based on utilizing an opportunity to provide these trainings in tandem, rather than on identified research and/or substantive analysis evidencing a verified improvement in safety outcomes associated with quarterly decision-making and expectations training. See, e.g., *Issues Regarding Refuge Chamber Training*, referenced on Page 3 of NIOSH's *Research Report On Refuge Alternatives For Underground Coal Mines* ("The optimum intervals for retraining on a refuge chamber are not known."). MSHA finds the fact that decision-making

training and expectations training could be conducted in conjunction with motor-task (hands-on) training to be an insufficient basis to justify the provision of such training at intervals more frequently than was demonstrated in the NIOSH report and research to be needed for miner safety.

### ***Decision-Making Training***

MSHA has determined that the decision-making training currently required on an annual basis is effective in protecting miner safety and is enhanced by other safety measures that inform miners' decision-making during emergencies.

MSHA requires annual training to include instruction on the deployment and use of refuge alternatives, including their component systems, and on decision-making training. See 30 CFR 75.1504(c)(3)(ii) (requiring "[i]nstruction on *when* to use refuge alternatives during a mine emergency, emphasizing that it is the last resort when escape is impossible" (emphasis added)). The existing rule also requires quarterly evacuation training and quarterly evacuation drills, as well as review of a mine's evacuation plan, which include discussion of emergency scenarios and options for escape and refuge. See 30 CFR 75.1502(c)(4) and 75.1504(a) and (b)(3)-(4). The quarterly evacuation

training and quarterly evacuation drills complement the annual decision-making training because they require consideration of the best options for miners in various mine emergency scenarios, including the option to seek shelter in a refuge alternative and the application of survival strategies, which would address the relative merits of escape and shelter options in specific emergency situations, during realistic escapeway drills. See 30 CFR 75.1502(c) (4) (vi) and 75.1504(b) (3). Decision-making training materials developed by NIOSH help miners better understand the factors relevant to a determination regarding the ability to escape versus the need to take refuge. These and similar materials can and should be used during the quarterly training sessions and quarterly drills. See NIOSH materials at <http://www.cdc.gov/niosh/mining/content/refugechambers.html#TheRefugeChamberTrainingModules>.

In addition to this training, other factors enhance miners' decision-making. Real-time information concerning the specific nature of an emergency and actual post-accident conditions in the mine – in conjunction with miners' knowledge of the mine's layout and features from their daily work and travel in the mine – is critical to making sound determinations about when to escape and when

to seek refuge. The Mine Improvement and New Emergency Response Act of 2006 (MINER Act) sought to provide miners with this situation-specific information. Since publication of the refuge alternatives final rule, emergency communication and electronic tracking systems mandated by the MINER Act have been installed in all underground coal mines. See 30 U.S.C. 876(b)(2)(F)(ii). These systems allow surface personnel to determine each miner's underground location and to convey real-time information to miners about the nature of the emergency and the mine conditions that they may encounter along various available escape routes. While these systems were not installed when the refuge alternatives final rule was promulgated, and thus not explicitly considered when establishing the rule's training intervals, MSHA recognizes that the present availability of these tracking and communication systems provides situation-specific, real-time information on conditions in an underground mine. In turn, better information and communication help miners make the right decisions in an emergency, such that the annual training, the quarterly drills, and the real-time information will allow miners effectively to choose whether to attempt escape or to seek shelter in specific situations that might be encountered during an emergency. Given these

systems and existing quarterly and annual training, MSHA believes additional decision-making training is unnecessary and that the final rule effectively protects miners' safety.

***Expectations Training***

Expectations training involves the actual, annual deployment and use of a refuge alternative (see 30 CFR 75.1504(c)(3)) and simulates the experience of being enclosed with other miners in a refuge alternative with supplied air, limited space, and limited light. Given the unique and visceral nature of such an experience, MSHA has no reason to believe that quarterly training is necessary for miners to remember the experience of occupying a refuge alternative.

Moreover, expectations training is intended to provide miners a basic understanding of the general sensation associated with occupancy in a refuge alternative, so as to minimize some of the stress and/or disorientation that otherwise may accompany occupancy in an emergency situation. The training goal is accomplished when miners experience and appreciate the physiological and psychological sensations that can be expected when occupying a refuge alternative, and is not dependent on miners mastering and remembering detailed or sequential

information. Importantly, this type of training is materially distinct in nature from the type of training associated with SCSR use (which involves mastery of, and immediate, highly-accurate performance of, multi-step actions) that NIOSH referenced when generally suggesting quarterly training for all aspects of refuge alternative deployment and use. Given the experiential nature of expectations training, as well as the unique and visceral nature of the experience, MSHA has determined that annual expectations training provides an experience sufficient to enable miners to apply their knowledge, other training, and available written instruction to effectively use the refuge alternative in an emergency.

### **III. Conclusion**

For the reasons stated above, MSHA concludes that annual motor-task (hands-on), decision-making, and expectations training – supplemented by existing mandated quarterly reviews, instructions, and drills – effectively will prepare miners to deploy and use a refuge during an emergency. Accordingly, the existing rule *Refuge Alternatives for Underground Coal Mines* remains in effect without change.

AUTHORITY: 30 U.S.C. 811.

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