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**Cc:** Bumbico, Tony; DiClaudio, Gene; Conaway, Doug; Vicini, James; Bridge, Ray; Cooper, Mike; Estep, Dickie; Leaming, Gary; Olsen, Bill; Howard, Buddy; Bailey, Stewart

**Subject:** RIN 1219-AB58

Attached are comments submitted by Arch Coal, Inc. to Mine Safety and Health Administration In Response to Refuge Alternatives for Underground Coal Mines dated June 16, 2008 – RIN 1219-AB58 submitted by Tony Bumbico, Vice President of Safety. A hard copy will also be sent via FedEx.

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AB58-COMM-12

**Comments of  
Arch Coal, Inc,**

**Submitted to  
Mine Safety and Health Administration**

**In Response to  
Refuge Alternatives For  
Underground Coal Mines  
June 16, 2008**

**RIN 1219-AB58**

**Submitted by  
Tony Bumbico  
Vice-President of Safety  
Arch Coal, Inc.**

August 15, 2008

Patricia W. Silvey  
Director, Office of Standards, Regulations & Variances  
U.S. Department of Labor  
Mine Safety and Health Administration  
1100 Wilson Boulevard  
Arlington, VA 22209-3939

Dear Ms. Silvey:

These comments are submitted by Arch Coal, Inc. (Arch). Arch is the third largest coal producer in the United States with corporate offices in St. Louis, Missouri. We have approximately 4,000 employees and operate mines in Colorado, Utah, Kentucky, Virginia, West Virginia and Wyoming.

These comments are submitted in response to the Proposed Rule issued by the Mine Safety and Health Administration (MSHA) on June 16, 2008 titled *Refuge Alternatives for Underground Coal Mines*.

The intent of the Proposed Rule is to improve emergency preparedness training and to provide refuge alternatives for miners unable to exit the mine during a life-threatening event. Arch supports the objectives of this Proposed Standard. While our primary focus is on mitigating risks that might lead to a life-threatening event, we agree that refuge alternatives may be a benefit to an underground miner in certain emergency situations.

Arch's subsidiary operations provide employees with emergency response training that exceeds state and federal requirements. The primary focus of this training is on preparing employees to escape the mine during a life-threatening event. We have, however, purchased fifty-six (56) Strata refuge chambers to address the "breathable air" requirements of the Miner Act. As these units are delivered to our subsidiary mines, they are placed into service. We anticipate these units will all be delivered by 9/30/2008.

Prior to this rule, many operators made a decision to provide employees with the best available technology to deliver "breathable air" during a life-threatening emergency situation. In our view, the best alternative for addressing this issue was a manufactured state-approved refuge chamber. As

a result, our subsidiary operations made a considerable investment in state-approved refuge chambers prior to this proposed regulation being issued.

It is essential that MSHA not punish those operators who were proactive and made investments to improve health and safety conditions for their employees prior to being required to do so. In our opinion, the state-approved manufactured refuge chambers purchased by the Arch subsidiaries and several other operators should be unconditionally grandfathered in the final version of this regulation.

The remainder of this document attempts to respond to the Agency's request for information and comments on a number of questions outlined in the proposed regulation relevant to the issue of refuge alternatives.

**1. MSHA solicits comments on the estimated service life of the pre-fabricated and self-contained units. Comments should be specific, including alternatives, rationale, and supporting data.**

*Prefabricated Refuge Chambers should be evaluated and tested by a certified third party at a pre-determined date. Each brand of chamber is constructed differently. Each mine is different and each mine will move chambers in a different fashion. In our opinion, pre-fabricated refuge chambers and related components should not have a pre-disposed expiration date. They can be periodically evaluated and tested. We suggest a testing interval of every 3 years.*

**2. MSHA requests comments on the apparent temperature and mitigation of heat stress and heat stroke. Comments should address the generation of heat and the methods for measuring heat stress on persons occupying the refuge alternative.**

*The proposed rule apparent temperature of 95 degrees F appears to be lower than recommendations proposed by NIOSH in <http://www.cdc.gov/niosh/86-113.html> (see Figure 1, page 14). The ceiling limit shown in the referenced figure is 104 degrees F WBGT (HSI) at the lowest metabolic heat output level (at rest). This conclusion is the work of industrial hygienists and occupational health authorities who have extensively researched this subject by utilizing scientific-based methods to measure heat stress. See the above reference and: <http://www.safetycenter.navy.mil/acquisition/heatstress/resources.htm>*

**3. MSHA requests comments on including a requirement that refuge alternatives be designed with a means to signal rescuers on the surface. This would assure that rescuers on the surface could be contacted if the communications system became inoperable.**

*If the communications system becomes inoperable, then the rescuers on the surface cannot be contacted. In any barricading situation, including pre-fabricated refuge chambers, the only way to signal your location is through sound. Our miners have been trained to pound 10 times on the roof or roof bolt every ten minutes until they hear 3 shots from the surface. If a signal device is created, it would have to be a sound device. However, any communications requirement that includes capability to contact persons on the surface should be deferred until proven technology is commercially available.*

**4. MSHA requests comments on including a requirement that the manufacturer design refuge alternatives with a means to signal underground rescuers with a homing device.**

*Refuge Alternatives are placed in a permanent location or in a fixed location and the location is updated on escapeway maps. As rescuers advance they will know the location of refuge alternatives deployed in the mine. It would not be necessary to incorporate a homing device to locate chamber alternatives.*

**5. MSHA requests comments on the types, sources and magnitude of lighting needed for the proper functioning of a refuge alternative and the needs of the occupants.**

*Tasks required for maintaining the functionality of a refuge chamber can be done with cap lamps brought into the chamber and the light sticks provided in the chamber. Miners should be trained regarding how and when to use the lighting available when they attempt to isolate themselves in a refuge alternative and act prudently to conserve the resources they have available to them.*

**6. MSHA solicits comments on the minimum space and volume requirements.**

*We must remember that refuge alternatives are for survival until rescuers reach trapped miners. The 24-person rated chambers we purchased are approved to provide the needed atmosphere and supplies for 24 persons for 96 hours. It is our opinion, the size and occupancy rating of our chambers is sufficient. The square footage requirement in part 7, item #6 will not work with our chambers in order to provide for maximum chance of survival.*

*The proposed rule of 15 sq. ft. floor space and 60 cubic feet volume appears to have had its origin in the Office of Civil Defense volume "Shelter Design and Analysis", Vol. 3, 1969. The material referenced by Foster-Miller in "Development of Guidelines for Refuge Chambers, Volume 1", 1983 does not recommend the volume per chamber occupant, merely the floor space. This may be a result of assuming that the refuge chambers would be entry (or close to entry) height.*

*In the current "state of the art" refuge chambers, transportability and*

*seam heights are more relevant than luxury (i.e., floor space and volume per miner) in the case of pre-fabricated, inflatable or hard-sided chambers. To this end, a review of the best practices for the use of refuge chambers in South Africa appears more relevant given the consideration of a constructed or pre-fabricated chamber. In a report prepared in 2007, a floor space of approximately 6.5 sq. ft. is required (by law). This requirement would appear more realistic and appropriate for mine emergency refuge alternatives. Another source to be considered is the US Navy and its DISSUB program for disabled submarines and survival considerations. Such research can be obtained, but sufficient time must be allowed to establish contacts and clearances.*

**7. MSHA solicits comments on the proposed 96-hour supply of breathable air.**

*Our approved pre-fabricated 24-person chambers do provide a 96-hour supply of breathable air for each person. In our opinion a 96-hour supply is more than adequate for the amount of oxygen required in storage.*

**8. MSHA requests comments regarding the flow rate (12.5 cubic feet per minute of breathable air for each miner).**

*The flow-rate proposed per miner is less a concern than the oxygen content (i.e. 18.5 to 23 percent). The South African mining standard is a minimum of 16.5 percent which should be considered in light of their experience and research. Similarly, the carbon dioxide content 1 percent or less with excursions not to exceed 2.5 percent appears in light of international standards to be conservative where a 5 percent maximum concentration is cited.*

**9. MSHA requests comments on the proposed setting for pressure relief (0.25 psi above mine atmosphere pressure) and whether a higher pressure relief should be required.**

*We are uncertain what the mine atmosphere pressure would be after an event that would require miners who cannot escape directly to the surface to seek refuge in a refuge alternative. The unknown mine pressure after any potential underground mine event suggests that a differential pressure relief valve be considered. In this case, 0.25 psi differential relief pressure seems reasonable.*

**10. MSHA solicits comments on the use of refuge alternatives in low coal mines.**

*No Comment*

## Refuge Chamber Questions

### Part 75

**1. MSHA requests specific comments on the visual damage that would be revealed during the preshift examination. The agency is concerned with the feasibility and practicality of visually checking the status of refuge alternatives without having to enter the structure or break the tamper-evident seal.**

*There is no need for a pre-shift examination. We suggest conducting an exterior examination after a refuge chamber is relocated instead of a pre-shift exterior examination. We also recommend a quarterly interior examination. This would be similar to the type of examination we currently conduct for SCSR units. We check to make sure the exterior integrity is maintained intact.*

**2. MSHA solicits comments on the proposed approach to expectation training.**

*Annual Refuge Alternative Expectations training can and should be held annually with the required annual SCSR expectations training. Each new miner should receive Refuge Alternative Expectations training within 90 days of hire.*

**3. MSHA is interested in practical floor space and volume requirements for mining operations. (see #6 above)**

*Pre-fabricated refuge alternatives must remain a size that can be moved without damage and can provide survival until rescue is made.*

*The consideration of "practical" floor space and volume would imply that the requirements in Part 7, Item 6 are recognized to be a site-specific element of refuge alternatives design. Low seam heights, narrow entries, mechanical/structural design-to-purpose and ultimately survivability of the refuge alternative and occupants must be considered in setting standards for refuge alternatives. The proposed rule cites 15 sq. ft. and 60 cu. ft. for floor space and volume respectively without realizing the impracticality of attaining either in situations where operators elect for pre-fabricated inflatable or hard-sided chambers.*

**4. MSHA solicits comments of the proposed approach to refuge alternative capacity. (outby – persons assigned to work outby & state and federal inspectors; inby – the maximum number of persons that can be expected on or near the section at any time)**

*Requirements for outby refuge alternatives should be for the number of persons that are **normally** assigned each shift to a particular outby area. Outby refuge alternatives should be 30 minutes' walking distance from each*

*other and in the primary escapeway that employees will travel in the event evacuation is required.*

**5. MSHA is considering including the following: to allow depending on mine specific conditions refuge alternatives with boreholes to be located up to 4,000 feet from the working face**

*No Comment*

**6. MSHA solicits comments on the requirements that refuge alternatives be located between 1,000 and 2,000 feet from the working face and from areas where mechanized mining equipment is being installed or removed.**

*In our opinion, the location of refuge alternatives should in part be determined by regional conditions. At our Western underground mines, we feel that the amount of potential damage that could result from transporting a unit could be minimized if distances remained at 2000 feet from working faces. A 1000 foot distance would at times place the chamber at or near the dump-point. A 2000 foot distance would be in a location more easily accessible after all escape routes have been exhausted. Sections with two entry systems would further congest their available space and create further safety issues.*

*We also support the distance locations adopted by the State of West Virginia. In our opinion, these requirements adequately address the regional conditions of the underground mines in that state.*

**7. MSHA solicits comments on the proposed approach to locating refuge alternatives in outby areas, including minimum and maximum distances.**

*Outby refuge alternatives should be 30 minutes' walking distance from each other and in the primary escapeway that employees will travel in the event evacuation is required. Refuge alternatives should be installed and maintained at every other self rescuer cache required by each mine's specific ERP.*

**8. MSHA requests comments on the training requirements and whether it would be more appropriate to include training on examining, maintaining, transporting and repairing refuge alternatives under Part 48.**

*Persons who examine, maintain, repair, and/or transport refuge alternatives should be trained in accordance with manufacturer's recommendations.*



**9. MSHA solicits comments on the proposed two-way communication facility.**

*A two-way pager phone system or similar system could be installed to connect to the mine communication facility in the event persons must barricade themselves inside a refuge alternative. We are not sure the leaky feeder system can be used as a secondary communication system. We recommend testing the leaky feeder to see if it can be used as a secondary communications system.*

We appreciate the opportunity to share our views on this important safety issue. In our opinion, providing refuge alternatives in underground coal mines will provide underground miners with an alternative if they are unable to escape the mine during a life-threatening event. As a result, we feel that refuge alternatives will serve to reduce risks and improve emergency preparedness processes.

Although the technology and components used in refuge alternatives are not new, their application to underground coal mines in this country is new. As a result, hope that MSHA will carefully evaluate all available information and revise the final rule to address our concerns.

In conclusion, we support the comments made by Director Ron Wooten (West Virginia Office of Miner's Health, Safety and Training); and Mr. Jim Dean (Co-Chairman of the West Virginia Mine Technology Task Force) related to this proposed rule at the Charleston, West Virginia Public Hearing on July 31, 2008. We are also in agreement with the written comments submitted to MSHA on this subject by the National Mining Association.

Sincerely,



Tony Bumbico  
Vice-President of Safety  
Arch Coal, Inc.