From: Watzman, Bruce <bwatzman@nma.org>
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To: zzMSHA-Standards - Comments to Fed Reg Group
Subject: RIN 1219-AB79
Attachments: RFI.pdf

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Attached are the comments of the National Mining Association in response to the Request for Information on refuge alternative for underground coal mines.

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AB79-COMM-6

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April 2, 2015

Ms. Sheila McConnell
Acting Director
Office of Standards, Regulations and Variances
Mine Safety and Health Administration
1100 Wilson Boulevard, Room 2350
Arlington, VA 22203

Re: RIN 1219-AB79

Dear Ms. McConnell:

These comments are submitted on behalf of the members of the National Mining Association (NMA) in response to the Request for Information regarding refuge alternatives for underground coal mines, 78 Fed. Reg. 48,593 (Aug. 8, 2013). We appreciate the opportunity to provide input as the agency considers revisions to the current regulations governing the installation and maintenance of refuge alternatives in underground coal mines 30 C.F.R. § 75.1506. NMA has answered some of the questions, others are dependent upon individual company experience that is outside the scope of these comments.

NMA offers its comments as the starting point for a dialog that should continue until the Dec. 31, 2018 expiration of the "grandfathering" of State-approved portable refuge alternative structures. As explained below, NMA believes that the following actions are needed to assure that miners are able to make the most of the current generation of refuge alternatives while improvements are made and built-in-place refuge alternatives (BIPRAs) are developed:

- Miners need to be provided with training on the use and deployment of refuge alternatives that thoughtfully considers their potential limitations as identified by NIOSH.
- A partnership between MSHA, NIOSH and operators should be formed to develop formal rules and standards for BIPRAs.

- The Dec. 31, 2018 deadline should be re-evaluated before the end of 2017. This is to allow operators to study/develop the safest options for compliance without being forced to adopt a compliance solution based on nothing more than market availability.

Miners need to be provided with training on the use and deployment of refuge alternatives that thoughtfully considers their potential limitations as identified by NIOSH.

The development and deployment of portable refuge alternatives represents the fulfillment of years of cooperation between MSHA, NIOSH, manufacturers and operators. With the leadership of State officials in West Virginia, portable refuge alternatives were designed, tested, approved and deployed within a few years of the tragic loss of life at Sago. Since their initial deployment, manufacturers have continued to improve on their designs while working closely with MSHA during the Part 7 approval process. As a result, the current fleet of portable refuge alternatives reflects the most important advancement in safety technology since self-rescuers were first developed and MSHA is to be commended for its leadership in shepherding this often difficult process.

The most important part of miners' training on the deployment and use of portable refuge alternatives has been appropriately emphasized since the very beginning of the development of portable refuge alternatives: that they be used as a last resort only after all means of escape have been exhausted.

NMA is concerned that not enough guidance has been provided to miners on what needs to be considered prior to deployment of a portable refuge alternative. This concern is shaped by a developing body of NIOSH research. MSHA has already responded to some of this research by issuing its March 19, 2014 safety alert. In addition to the March 2014 safety alert, manufacturers updated their training materials to address changes in purging procedures.

While MSHA worked with manufacturers during the rigorous apparent temperature testing performed on Part 7 approved components, NIOSH's research into heat and temperature rise within portable refuge alternatives demonstrates the need to provide additional guidance on this potential problem. However, NMA believes that the potential problems with purging and heat can be addressed fairly simply:

Miners should confirm that communications at their section's RA are operational prior to making their initial efforts to evacuate and provide that information to the responsible persons designated in the mine's emergency response plan. If communications at the RA are not operational, miners should "danger out" the RA so that any miners who subsequently retreat to the RA's location will be aware of the problem and factor such into their decision-making.

MSHA's March 2014 safety alert illustrates the importance of this instruction. If miners are wearing their self-rescuers when they deploy an RA, they will only be able to communicate with each other to a very limited extent, and not at all with responsible persons or mine rescue. Unless communication has been previously verified, miners could find themselves unable to obtain vital information needed for their rescue, and also be unable to provide mine rescue with vital information related to their health, location and mine conditions. The lack of post-accident communications ability at an RA could be no less dangerous than the failure of any other component of an RA—and the presence of post-accident communication could be no less vital to the survival of miners than any other component.

NMA urges MSHA to instruct miners to confirm the availability of communications prior to seeking refuge. NMA also urges NIOSH to update their refuge alternative training modules to reflect MSHA's March 2014 safety alert and also harmonize those materials with its published findings on refuge alternatives.

Finally, NMA urges both MSHA and NIOSH to regularly review NIOSH's ongoing research and incorporate the findings into safety alerts and training materials. By doing so, we can be certain that the current fleet of portable refuge alternatives is being used safely while promising new safety technology is developed.

A partnership between MSHA, NIOSH and operators should be formed to develop formal rules and standards for BIPRAs, and to evaluate the entire escape regulations.

Built in place refuge alternatives may present a unique, superior option for mine operators, and NMA looks forward to reviewing closely NIOSH's report on BIPRAs. BIPRAs have been in use in NMA member mines for many years, and have received MSHA approval for their stoppings and components.

NMA believes that the unique advantages of BIPRAs that are identified in NIOSH's report can only be achieved if appropriate rulemaking is undertaken in time for mines to incorporate BIPRAs into their emergency response plans prior to Dec. 31, 2018. NIOSH's report should be regarded as the starting point for a discussion that needs to be engaged formally, and quickly, in order to assure that the advantages noted by NIOSH are available to miners as soon as possible.

In general, we would welcome MSHA re-opening the refuge shelter rule for re-writing. We would also urge the Agency to look at the entire escape regulations i.e. refuge shelters, SCSR locations, and training and re-open the rule to better take advantage of the experience and knowledge gained since the passage of the MINER Act.

The December 31, 2018 deadline should be re-evaluated before the end of 2017.

NMA is concerned that operators will be forced to commit well before December 2018 to continued deployment of portable refuge alternatives in order to achieve compliance in January 2019. In fact, the Dec. 31, 2018 compliance deadline is both technology forcing and effectively creates a barrier for entry for manufacturers and operators who wish to adopt innovated new technologies and BIPRAs. Operators currently have to choose between upgrading their existing fleet of portable refuge alternatives to meet the Jan. 1, 2019 requirement for Part 7 structure approval, or waiting to see if BIPRAs emerge as a viable compliance choice.

The truth is that unless a separate regulatory system is established for BIPRAs that contemplates their advantages over portable refuge alternatives, the current regulatory requirement that refuge alternatives be maintained within 1,000 feet of the working face will preclude their adoption in the overwhelming majority of mines. Despite the fact that their advantages could benefit a great many miners, their adoption will continue to be limited to a fairly small number of mines.

NMA urges MSHA to consider the effect of the December 31, 2018 compliance deadline in terms of miner safety. NMA is not suggesting that operators who choose to deploy portable RAs exclusively be relieved of the requirement to provide fully Part 7 compliant units effective Jan. 1, 2019. Rather, NMA is requesting that MSHA consider extending the Dec. 31, 2018 compliance deadline if doing so will facilitate the wider adoption of BIPRAs and/or combinations of BIPRAs and portable RAs in mines.

Moreover, the RFI also contemplates other emerging technologies, such as SCBA self-rescuers, whose potential advantages might not be realized if operators are forced to select off-the-shelf compliance solutions in order to achieve compliance by Dec. 31, 2018. While the deadline effectively assures the compliance of the nation's coal mines in January 2019, it effectively erects an insurmountable barrier for any manufacturer that tries to bring such fledgling technology to market.

Nevertheless, NMA does not believe that the time is ripe for such a decision, and any extension of the Dec. 31, 2018 deadline would be more thoughtfully reasoned within the context of the other recommendations that we are making. If the training that is provided to miners regarding the use of refuge alternatives is consistent with the latest research into their abilities and limitations, and a dialog is opened in regard to the best use and regulatory requirements for BIPRAs, NMA suggests that a decision be made in regard to the Dec. 31, 2018 deadline by August 2017. If MSHA chooses to retain the deadline at that time, operators must be afforded sufficient time to assure that an off-the-shelf compliance solution is available and deployed by January 2019.

Today, nine-years following enactment of the MINER Act, what remains is a patchwork regulatory framework that instills little, if any, confidence in those whose lives might become dependent on the emergency escape procedures derived from the Act. We

implore MSHA to use this RFI as a springboard to initiate a dialogue among the agency's stakeholders to construct an emergency escape program that instills confidence.

With these recommendations in mind, NMA offers the following responses to the questions presented in the RFI.

Sincerely,

Bruce Watzman

Request for Information

Questions & Response

Miner Training on Refuge Alternatives

1. At the time of the final rule, training units for refuge alternatives and components were not available. Now that some manufacturers offer training units, describe if and how such units have been incorporated into required refuge alternatives training and quarterly emergency mine evacuation training and drills. How effective are these training units? What are the costs associated with the use of training units? What is the service life of a training unit?

- By providing "hands-on training" the training units do seem to be effective in helping the miners to become more familiar with the deployment procedures.

2. What publicly-available or commercial training products and guidance have you used for training miners about the deployment and use of refuge alternatives? In your experience, were these training aids adequate? If so, what features of the products or guidance were the most useful or effective and why? Please provide specific suggestions for improvement, if appropriate.

3. Discuss training experiences, e.g. frequency of miners' training needs for in-place shelters and prefabricated units.

- Shelter training has been required by the regulations. Manufacturers have developed training units for the prefabricated units that (if purchased) can be used during the quarterly training prescribed by the regulations.

A. In-Place Shelters

- When discussing in-place shelters our answers are based on defining shelters as Built–in-Place (BIP) units that derive air from a borehole directly connected to the BIP or a shelter connected to a surface borehole via compressed air lines.

4. How could in-place shelters improve safety for escaping miners if they were incorporated into an evacuation and SCBA/SCSR storage plan? MSHA requests information on how to design an escape strategy using one or more in-place shelters to facilitate escape.

- Each mine's escape strategy will be different. Whether the shelter is in-place or fabricated is only one factor in an overall strategy. The MINER Act and the

regulations governing shelters, breathable air, escape system training, tracking and communication systems and lifelines etc. were promulgated as a reaction to the 2006 mine disasters. How all of these requirements fit into an escape strategy was given limited consideration at the time. Now that the MINER Act and the subsequent regulations and policies derived from the Act are in place it seems logical to review the rules' effectiveness and to make changes as needed to make the overall escape strategy effective.

For example, the shelter requirement in the regulation requiring a shelter to be no more than 1000 feet from the face limited the usage of in-place shelters of any type. Is that still a logical location for a shelter of any type? We would say "no", as the travel routes are now populated with breathable air (SCSRs) and equipped with lifelines to help speed the travel distances. It seems logical that a greater distance from the face would put the miners into the escape system heading out of the mine (the rational first choice in an escape strategy). In addition, the training on SCSR usage and escape way travel is exponentially more robust than pre-MINER Act training. When reviewing the escape strategy we would recommend that the section shelter be located at the maximum distance from the face as feasible. Factors affecting feasibility would be the SCSR locations including those on the miners and in the section and travel height as well as any other conditions that could impede travel. The goal should be to place the shelter as near to the section neck off as practical, while providing a safety factor for crews traveling to the shelter. The distance of travel to the first shelter is a variable based on various mine specific conditions. A maximum of 1000 feet however is too close to the face and that distance should be extended.

5. Stoppings for in-place shelters must be at least 15 psi. MSHA seeks information and supporting rationale on the adequacy of 15 psi stoppings to assure the post-explosion integrity of SCSRs (or SCBAs) stored in an in-place shelter located between adjacent escapeways.

- The design criteria for approving SCSR storage between adjacent escapeways should not be intermixed with BIP shelter requirements. The present MSHA regulations for breathable air storage between adjacent escapeways are very prescriptive. These requirements include a hardened room that meets seal design criteria as well as positive pressure borehole ventilation (30 C.F.R. 75.1714-4 (d)(1&2)). SCSR storage adequacy is not contingent on a borehole or 15 psi stoppings but on the integrity of the SCSR unit and storage containment construction. Why should assuring the post-explosion integrity of SCSRs stored between adjacent escapeways be any different than the SCSR storage anywhere else in the mine?

6. Currently, refuge alternatives are required to be located within 1,000 feet of the face. Provide options for the location of in-place shelters that provide equivalent protection and include your rationale for the options.

- We believe that the 1000 foot location for refuge alternatives is too near the face to allow for realistic BIP installations. We have presented rationale for extending that distance in answer to other questions (No. 4 for example). It is unlikely that any design other than pre-fabricated units can or will be used on working sections in the vast majority of mines due to the speed of advancement / retreat and the logistics for current BIP requirements. We understand that NIOSH has a Report of Investigation on this subject that should be published in the near future. While we have not seen the final version we understand that NIOSH provides a rationale for a greater distance for the initial refuge chamber outby the working face. While we are not endorsing the Report of Investigation as we have not seen a final version, the Report of Investigation should be added to the record even if the report is finalized after the RFI deadline.

7. If there is an in-place shelter located between the working face and the mouth of the section, what are the advantages and disadvantages of also requiring a prefabricated refuge alternative within 1,000 feet of the face?

- The ultimate objective is for all miners to safely exit the mine should an accident occur. The clear goal should be to have everyone moving toward the surface in an emergency. The overall escape strategy (including logistics and cost) should be reviewed. Adding a second shelter without reviewing an overall escape strategy is not a strategy. The shelters (in-place or fabricated) are designed to only be used when travel towards the surface is impossible. When addressing the escape strategy consideration must be given to all of the tools now in the escape strategy tool box (multiple escapeways, lifelines, SCSR storage units, robust training, refuge alternatives, etc.) all of which are part of an emergency process designed for miners to escape. Having a shelter outby puts the miners "on the move" towards the surface. When they reach the outby shelter location the next decision needs to be made i.e. continue to travel or activate the shelter.

8. Discuss (or list) the advantages, disadvantages, and restrictions on providing breathable air and communication through a borehole to an in-place shelter. Please share your experiences with implementation of inplace shelters, e.g., surface access rights, difficult terrain, limited access, other land uses, and cost.

- Providing breathable air through a borehole is the ultimate option for shelters, however, it is highly unlikely that this option is logistically possible in all mines and certainly BIP shelters equipped with surface boreholes cannot replace pre-fabricated shelters in all of the presently required locations particularly working sections. BIP shelter usage must take into account surface property availability

and access, multiple permitting requirements (borehole drilling, access roads, site installation, drainage control and runoff water sampling, etc.), multiple seam mining, access road installation / maintenance / drainage control, surface security, as well as all of the associated costs.

We believe that the use of a compressed airline located in the mine needs more research concerning methods of protection from explosion forces and day-to-day mine usage. It is not a coincidence that none of the Built in Place (BIP) shelters are supported via a compressed airline located in the mine. Predicting explosion force magnitude at any point in a mine without knowing anything about the explosion or the location of the refuge alternative is far from an exact science – more like being in the "Land of If"! While we recognize the difficulty in researching this issue we would recommend that this issue be addressed through research projects and research paper review.

9. What are appropriate design characteristics, including doors, for a stopping used to construct an in-place shelter to ensure an isolated atmosphere following a mine emergency?

- The NIOSH December 2013 Internal Report on "Investigation of Purging and Airlock Contamination of Mine Refuge Alternatives" page 49 states: *Establishing the parameters of an explosion scenario, including the post-explosion environment, is an inexact endeavor because the circumstances of both vary widely from event to event. If a set of worst-case parameters is selected from historical disasters, then it quickly becomes a nearly impossible problem to design, build, and deploy a mobile refuge alternative with the requisite characteristics."* I believe the same statement can apply to BIP shelters. The current 15 psi requirement was based on information extracted from post mine explosion analysis for areas not in "direct line of explosion force" along with military information on human survival after being exposed to pressure forces. I question whether this number is applicable to BIP shelter installations. Further research into this subject is sorely needed prior to setting design requirements.

10. Discuss the advantages and disadvantages of (1) an in-place shelter and (2) a prefabricated refuge alternative. Please include specific costs, such as the cost of installation of piping and associated components to an in-place shelter. What are the maintenance costs for (1) an in-place shelter and (2) a prefabricated refuge alternative?

- Advantages, disadvantages, location, components, initial cost, maintenance cost for either type will vary widely depending on logistics and location!

11. MSHA standards require the doors of the in-place shelter to remain closed to maintain an isolated atmosphere and prevent the accumulation of methane or toxic gases and to protect the interior components from overpressure and flash fire. Describe

how the in-place shelter could be ventilated during normal mining operations to prevent coal dust, smoke, and gas accumulations in the interior of the in-place shelter.

12. If mine air is used to ventilate the in-place shelter, what concentrations of carbon monoxide, methane, and other toxic gases should an in-place shelter be designed to purge following an explosion or fire to accomplish the initial purge in 20 minutes?

- This concentration should be based on unprotected exposure time and not just an arbitrarily chosen concentration. In general, acceptable CO levels related to unprotected shelter occupants should be established based on exposure times to the CO level present without causing permanent harm. For example, an initial post-purge level could be as high as 400 – 800 ppm if exposure time was limited and purging to lower levels continues. The normally acceptable "long term" contamination level for preventing CO poisoning is 50 ppm and this should be the lowest level to consider for initial post-purge.

13. How can piping used to supply breathable air to an in-place shelter be protected from mining activity, as well as an explosion or fire? Explain what type of piping and protection should be used and why.

- See answers to Questions 8 and 9. While there are methods to protect compressed air lines that have been discussed and the type of appropriate pipe that we believe will be satisfactory can be listed, without further research or reviews of other non-mining research it would be inappropriate for us to do so.

  We would recommend that this issue be researched and appropriate options for pipe protection as well as the appropriate pipe options be made available as an output from that research.

14. If the pipe is buried or covered, how could the operator maintain and inspect the pipe to ensure that breathable air can be provided in acceptable quantities to the in-place shelter?

- See answer to Question 8, 9 and 13

15. Breathable air, air monitoring, and harmful gas removal components of refuge alternatives must be approved under 30 C.F.R. Part 7 by Dec. 31, 2013. What are the specific costs for retrofitting existing prefabricated refuge alternatives to meet MSHA's Part 7 approval criteria? How do these costs compare to the costs associated with installing in-place shelters?

- This issue is no longer applicable.

16. Discuss technology that can be used to provide emergency communications to the in-place shelter by taking advantage of the protected piping system or borehole that delivers breathable air.

- Boreholes / Piping should allow for current "wired' technology to provide communication.

B. Escape Methodology

17. If an SCBA system is used, discuss the feasibility of using full-face respirator masks, recognizing the need for fit testing and for miners to be clean shaven.

- The currently available SCBA systems will only be used in limited circumstances due to the mask issues as well as the cost of retrofitting a system from SCSR storage to SCBA storage. The mask fit test and the "clean shaven" issues, along with SCBA storage on transportation equipment, are all impediments to the use of SCBA units. The more important issue is that in reality SCBAs are not designed for escape but for firefighting. The robust design and mask is more than is needed for a true escape unit. Until a breathable air system is designed that is a cost effective alternative to the SCSR units, systems such as SCBAs will not be a common selection for escape systems except in specific instances.

18. Please provide information regarding how maximum distances between in-place shelters could be affected by using improved SCSRs or SCBAs with greater than one-hour ratings.

- The present rule does not require shelters to be placed at set distances. Each worker is assigned a shelter for the area in which he is assigned to work. Travel distances between caches of SCSRs would be affected by a breathable air unit that is rated at more than one hour. That increased rating would allow for the refuge shelters of any model to be spaced according to the longer travel time of the SCSR.

  The maximum distances associated with shelters should not be contingent on in-place shelters versus manufactured units. The critical factor is the distance a group of miners can realistically travel on the amount of breathable air available to them. Presently, the rule for a 1000 foot distance from the face as the section location is too limiting to make the distance a concern. There is a need to extend the initial shelter distance further from the face area using a formula for location that incorporates both travel speed and number of SCSR (or other breathable devices) available to the workers traveling to the shelter.

C. Replacement of Brass Fittings

19. Brass fittings and cylinder valves used in refuge alternatives have exhibited degradation over time and are currently being replaced by fittings and valves made from materials such as Monel and stainless steel. Please provide information regarding the need for a predictive maintenance or replacement schedule for these new fittings and valves to guard against leakage or failure and the cost to retrofit and maintain these units. Include information from specific experience, if applicable.

D. Part 7 Testing and Approval

20. Based on your experience, what issues have arisen during the operation, calibration, or maintenance of gas monitoring equipment?

- MX6 units have historically had issues with gas detection sensors.

21. Based on your experience with the part 7 approval requirements for refuge alternatives and components, provide other options that offer equivalent product performance, thus assuring equivalent or greater protection for miners.

E. Apparent Temperature

22. Provide information on the availability, use and cost of air conditioning units in refuge alternatives to control apparent temperatures.

23. Please provide information on the effects outside air temperatures have on the apparent temperatures inside in-place shelters; include your rationale.

- Additional research on "Apparent Temperature" is needed. Not only are there questions as to what "Apparent Temperature" should be used for design but how to test the units for compliance.

F. Physiological and Psychological Factors

24. Provide comments on miners' confidence in the effectiveness of existing refuge alternatives or their willingness to use one during an emergency.

- All comments related to this question can only be based on anecdotal evidence. We believe that the training conducted in the industry on how to activate units has been effective and provides miners with the confidence they need to properly activate and use the units. It is not the lack of training in shelter activation that will keep miners from using shelters. Miners are trained on how to activate the units but they are also trained to use the shelters as a last resort. Everything included in their training emphasizes that the units are a last resort measure.

25. Recognizing that an in-place shelter would allow direct connection to the surface, through which unlimited breathable air and communications can be provided, and would not require a miner to depend on a carbon dioxide scrubbing system, how might the use of in-place shelters affect a miner's psychological and physiological wellbeing when escape is impossible?

- See answer to question 26. This question presupposes that an in-place shelter will be available that provides direct communications and borehole air with an unlimited supply of breathable air. That type of system is going to be extremely limited for all the reasons previously stated i.e. the topography, the shelter distance from the face, the access to setting up not only a borehole but compressors. If escape were truly impossible and the choice to be made was between a shelter that had a limited air supply (in-place or manufactured) and a shelter that had communications and an unlimited supply of breathable air than the obvious answer is the latter choice would be preferable. That stated, we cannot emphasize enough that that type of shelter will be extremely limited in its applicability.

26. Regarding space and volume available to miners, what advantages do in-place shelters provide over prefabricated units with regard to the psychological and physiological wellbeing of trapped miners? Please be specific.

- Space and volume is not necessarily dependent on whether the unit is in-place or prefabricated. Both can be designed to meet a specific volume and space target. The in-place unit could likely be made to provide more comfort via benches, tables, etc. as space is more available. This would likely be true if the in-place shelters were equipped with carbon dioxide scrubbing units or boreholes.

G. Additional Requests for Information

27. What innovations in the areas of escape and refuge should be considered to improve miner safety?

28. Some manufacturers conduct inspections of prefabricated refuge alternatives at regular intervals, such as every 6 months. Based on your experience, what would be an appropriate examination interval for refuge alternatives and what should this examination include? Please be specific and include detailed rationale for your recommendation. Who should conduct these examinations and what qualifications or training should the person conducting these examinations possess?

29. Currently, state-approved, prefabricated structural components that were accepted in ERPs prior to March 2, 2009, are grandfathered until Dec. 31, 2018. What would be the impact of changing the grandfathering allowance for structural components and requiring an earlier date for part 7 approvals?

- NMA believes that requiring an earlier date than Dec. 31, 2018 would be misguided at best and effectively doom many potentially innovative technologies, including built in place refuge alternatives. Regardless, any such change would require notice and comment rulemaking and NMA would provide a response to any justification provided by MSHA as a part of that process.

30. How can an inflatable stopping (to be installed post-event) be an effective and safe means for creating a protected, secure space with an isolated atmosphere? What factors should MSHA consider when determining whether to allow the use of inflatable stoppings in conjunction with boreholes or piping to provide effective shelter?

31. Please provide information regarding the prevention of oxygen enrichment (greater than 23 percent) in the interior atmosphere of a refuge alternative when only oxygen is provided by breathable air components over a period of 96 hours. Please provide any other data or information that you think would be useful to MSHA as the Agency evaluates the effectiveness of its regulations and standards related to refuge alternatives in underground coal mines.