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**From:** Rick Rutledge [mailto:rrutledge@alleecorp.com]  
**Sent:** Monday, August 18, 2008 5:06 PM  
**To:** zzMSHA-Standards - Comments to Fed Reg Group; Silvey, Patricia - MSHA  
**Cc:** 'Leonard Urtso'  
**Subject:** Comments on Refuge Alternatives for underground coal mines  
**Importance:** High

To Whom It May Concern;

Attached are the comments from A. L. Lee Corporation concerning the Proposed Rule for Refuge Alternatives for Underground Coal Mines

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# Evaluation of MSHA Proposed Mine Shelter Rules

This report is directed to MSHA concerning the new MSHA DOL report on the Refuge Alternatives for Underground Coal Mines; Proposed Rule as presented in their printed report and also area discussed at the open hearing in Charleston on July 31, 2008.

In general we, as a manufacturer, support the findings of the WV Task Force as presented at the July 31 hearing. In addition to those findings, there are other issues which directly affect the design of our refuge chamber, the LifeShelter. I will go over each of those issues in detail below.

## **Tent Size** Section 7.505 (a) (1)

Section 7.5.5 (a) (1) states a requirement that the refuge chamber "...provide a minimum of 15 square feet of usable floor space and a minimum of 60 cubic feet....For mines with lower heights, the 60 cubic feet of space may need to be attained by increasing the length of floor area."

Example; Our LS4042-25 has 13.4 square feet per person but only has 46.5 cubic feet per person. This is a major issue for us.

### UNRESTRICTED AREAS AND VOLUMES

Persons in Tent	Total Unrestricted Sq Ft	Unrestricted Sq Ft per person	Total Unrestricted cubic ft Model 3236- XX	Unrestricted CF/person Model 3236-XX	Total Unrestricted cubic ft Model 4042- XX	Unrestricted CF/person Model 4042-XX
15	354	23.6	1236	69.7	1046	82.4
20	347	17.4	1212	51.1	1022	60.6
25	334	13.4	1163	38.9	973	46.5
30	327	10.9	1139	31.6	949	38
35	320	9.2	1115	26.4	924	31.9

#### NOTES;

Tent size is 13.5 feet X 25 feet for both models 3236-XX and 4042-XX  
 Airlock is 12 X 3  
 Bathroom is 4 X 6  
 Curtain stand is 36 in X 27 in X 30 in high

There are practical limitations on the maximum size of the tent. It has been reported to us from people in the mines that the longest tent/container combination would be 60 feet. Right now we are at 48 feet. Our current width is 14 feet and is limited by the seam height of the mine since the tent must be unfolded and not hit the roof of the mine. The width may be able to be increased, but only in mines with a seam height of 48 inches or more. To increase the length by 12 feet will make the tent larger in diameter when stored in the container and will make the tent more difficult to deploy. A redesign of the container would be necessary for a larger tent to be put into the container.

To increase the tent size to increase the unrestricted volume will also require more deploy air to fill the tent when initially inflated. We do not have any more space for additional air bottles. Again, a redesign would be necessary to achieve the 60 cubic feet per person in a twenty five or more person configuration.

Our experience shows that 15 square feet per person is more than is actually necessary to safely accommodate the people in the tent for the four day period. The WV Task Force presented excellent data in their report supporting a square foot requirement in the 6.4 square foot range. We took some pictures showing what 35 people in our tent looks like. Please see the picture below. We feel that 9 square feet of unrestricted area is sufficient to accommodate the occupants. If a person is lying down on their back, they will on average require a space 6 X 2 or 12 square feet. However, not everyone will be lying flat on their back at the same time. Many people will be sitting up or leaning on the tubes. A sitting person requires a space no larger than 3 X 2 or 6 square feet.

Proposing the same unrestricted cubic foot requirement for all situations regardless of seam height is problematic. The manufacturer can not control the seam height. The amount of vacant space overhead seems unimportant as to the health and safety of the occupants. To provide 60 cubic feet in a 24 inch seam of coal requires 30 square feet of space. This is not efficient utilization of floor space. As the manufacturer we propose that the square foot per person requirement is the critical measurement, not cubic feet.



**Section 7.501** Comments concerning service life of pre-fabricated self contained units

Our fabricated steel container is pressure tested prior to assembly. As long as the unit can maintain the specified pressure and all openings and entrances perform properly, we see no reason to remove a unit from service after an arbitrary 10 year period. Items

that have a specified service life such as the soda lime curtains and the water will be replaced upon their expiration date.

Furthermore; according to Title 49: Transportation; of the Electronic Code of Federal Regulations section 180.205 paragraph (b), the high pressure gas cylinders may be used beyond the five year period so long as they have not leaked more than the specified amount.

We recommend that this regulation concerning the arbitrary 10 year service period be stricken from the Proposed Rule as unneeded.

#### **Section 7.506 (c) (1) (iv)** Comments on pressurization of the refuge chamber

Section 7.506 (c) (1) (iv) states that “most manufactured refuge alternatives have a relief valve set at .25 psi” and that comments are asked for as to whether or not this pressure is set high enough. We assume this applies only to hard shell chambers. This statement is NOT true of an inflatable chamber and at this pressure an inflatable will burst. We recommend that inflatable chambers be expressly excluded from this requirement.

#### **Section 7.506 (c) (1)** Comments regarding air flow rates

Section 7.506 (c) (1) includes a requirement for “compressed air from cylinders, ...provide a minimum flow rate of 12.5 cubic feet per minute of breathable air for each miner.” We can not do this in our refuge chamber. To provide this much air would require 5600 air cylinders in a 35 man refuge chamber. Since we have a CO2 scrubber, these kinds of flow rates are not necessary.

#### **Section II A. Part 7** Third Party Testing

We would like a further explanation of the wording found in Section II, *A. Part 7 Approval*. We propose that MSHA accept the state of WV as an approved third party.

#### **Section 7.503 (d)** Airlocks

Section 7.503(d) speaks of “volume of...air available for removing harmful gases”. Then there is significant discussion concerning the air lock and how it functions. We find these discussions both confusing and limiting. The specification should be performance based as opposed to requiring certain specifications such as the volume of air required. We have no data that leads us to believe that a standard airlock can be made to perform adequately in this underground application. This point was well made by the WV Task Force in the data they presented from a study done at West Virginia University. Section 7.505 (a) (3) refers to an exception for the need to have an airlock stating “except for a refuge chambers ...capable of maintaining adequate positive pressure.” In Section 7.508 (c) (2) it is stated that the airlock when it is tested must be filled with a test gas and “airlocks need the capability to remove contaminants...” This gets into a lengthy discussion of what is expected from the airlocks. Does the exception for an airlock as stated in 7.503 (d) extend through Section 7.508 (c) (2)?

#### **Section 7.505 (b)(7)** Puncture and Tearing and Repair Requirement

This section requires that “each reasonably anticipated repair can be completed within 10 minutes of opening the storage space...” We as a manufacturer can not guarantee any particular time frame for repairs and should not be held accountable for that which we

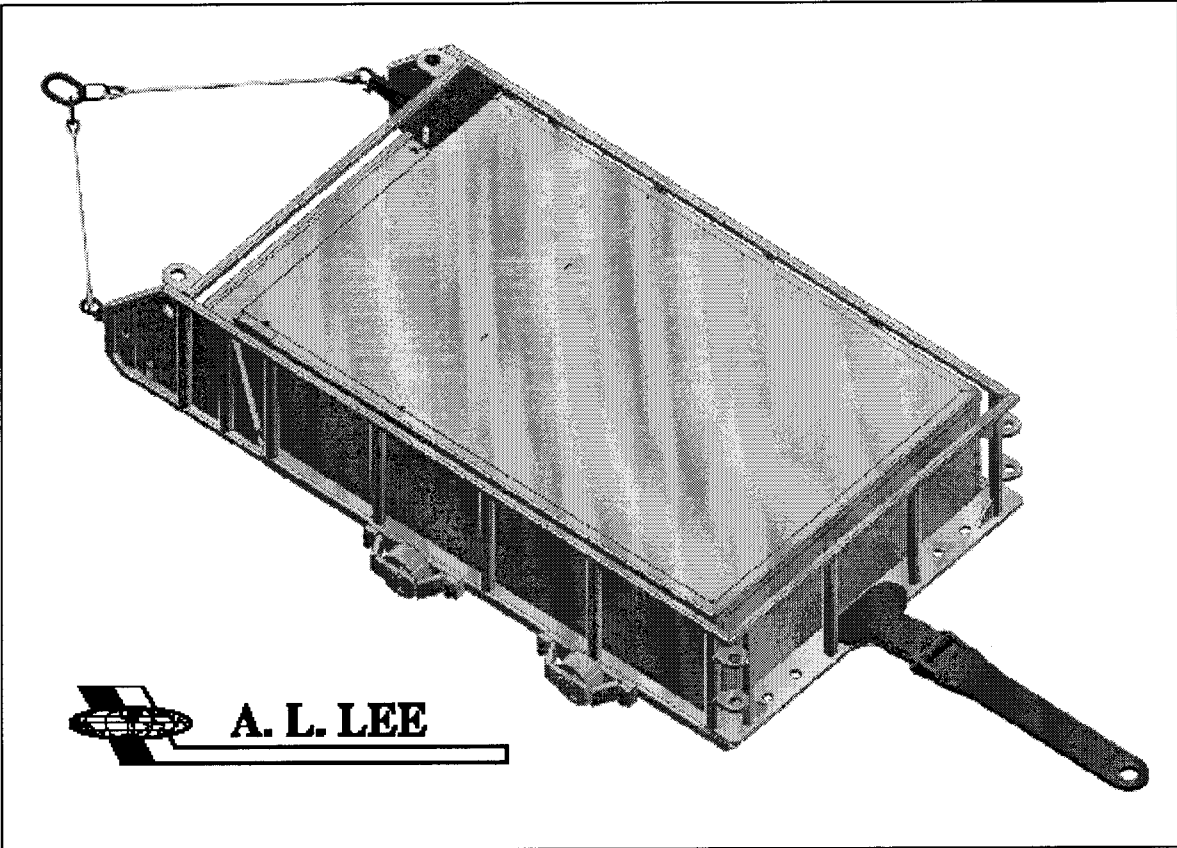
have no control over. The mining environment and the mental state of the individual miners during an emergency is totally unpredictable and un-measurable. Mandating a time limit for implementing repairs under these circumstances is neither practical nor enforceable.

**Section 75.1504 (c)(3) Training**

The training that we, as a manufacturer, provide at the mine site provides the miners with the necessary training to know how to activate and maintain their LifeShelter unit. This section states that the “Agency would require that this training expose the miners to the expected heat and humidity conditions...” This requirement can not be met at the mine site. To meet this requirement would require specialized heaters and humidifiers and a special room to control air flows. This can not be done in a portable training area and would require a dedicated training area. There is a real risk involved here in subjecting these people to the heat and humidity in an enclosed area if not done properly. We, as a manufacturer, can not safely provide this level of training at the mine site.

**Section 7.504 (a)(4) Towing/Moving the Shelter Underground**

This section states “The refuge alternative should be designed with proper connections and devices to eliminate or reduce the use of chains, ropes and slings.” The preferred method taught at the mine site by our trainers for units equipped with wheels is the use of the towbar, which can only be used from the rear. The use of a towbar in the front would cause us two problems; 1) the towbar itself would get in the way of the deployment door in the case of an emergency and 2) towing from the front increases the likelihood of damage to the deployment door area. However, the mines have requested the ability to tow from the front under certain circumstances. To accommodate their need, we have designed a dedicated cable system expressly for the purpose of towing from the front. Though discouraged, this cable system will allow the mine to tow from the front if absolutely necessary and only when towing with the towbar is not an option. Please note that the optional wheels are depicted.



**A. L. LEE**