



*State of West Virginia*  
Earl Ray Tomblin, Governor

WV Office of Miners' Health, Safety & Training  
Eugene White, Director  
#7 Players Club Rd., Suite 2 • Charleston, West Virginia • 25311-1626  
Telephone 304-558-1425 • Fax 304-558-1282  
[www.wyminesafety.org](http://www.wyminesafety.org)

April 16, 2013

Mr. David Maust  
Vice President & General Manager  
Strata Safety Refuge Alternatives  
8995 Roswell Rd. -Suite 200  
Sandy Springs, GA 30350

Mr. Shawn Sitterud  
Manager- Modern Mine Safety Supply  
475 W Highway 31  
Huntington, UT84528

Subject: Modification of Emergency Refuge Shelter™ Approval under WV Legislative Rule Title 56, Series 4  
Emergency Rules Governing Protective Clothing and Equipment

Sirs,

After the evaluation of the documentation submitted regarding proposed modifications the Office of Miners' Health Safety and Training approves your request to remove the existing breathable air and hazardous gas removal components from your Emergency Refuge Shelter™ and replace them with MSHA CFR 30 Part 7 approved breathable air and harmful gas removal components produced by Strata Safety Products. Such modified units are deemed to meet the Emergency Shelters/Chambers requirements outlined in the West Virginia Emergency Rule Governing Protective Clothing and Equipment, §56-4-8.

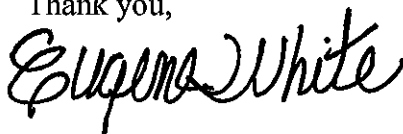
Units so modified shall have their serial numbers changed by appending "7C" to the end of the number and shall also prominently display marking indicating that they contains Strata Safety Products components. All training materials will be modified and miners in the affected mines shall be retrained on their use prior to being placed into operation.

Modern Mine Safety Supply shall, upon request, provide this office with verification of valid orders, delivery dates, and status of delivery as required for this office to enforce §56-4-8.

David Maust  
Shawn Sitterud  
Page 2  
April 16, 2013

Any changes required or enhancements to the approved design affecting the ability to meet any provision of §56-4-8 shall require approval of this Office prior to any affected Emergency Refuge Shelter™ being placed into operation.

Thank you,



Eugene White  
Director

EW/rh



WHERE SAFETY IS SUCCESS.™



Randall Harris  
Engineering Adviser  
WV Office of Miners' Health, Safety & Training  
#7 Players Club Rd  
Suite 2  
Charleston, West Virginia, 25311-1626

April 9, 2013

Dear Mr. Harris,

The purpose of this letter is to seek final approval from WVOMHST regarding the installation of MSHA CFR 30 Part 7 approved Breathable Air and Harmful Gas Removal components owned by Strata Safety Products, LLC (SSP), into Refuge Alternatives constructed by Modern Mine Safety Supply (MMSS), currently approved under W VA Code R. 56-4-8. This letter is also in response to your letter dated April 2, 2013 outlining the procedure for obtaining this approval.

We have engaged Petersen, Inc., Ogden, UT, as requested to review the proposed changes to the MMSS refuge alternative required to accommodate the SSP components. I have attached the Petersen, Inc. analysis to this letter. I have also attached the models outlining the proposed changes reviewed by Petersen, Inc. as well.

To reiterate the changes to the structure:

- Removal of existing bottle rack and install new bottle and SSP scrubber assembly.
- Add viewports so that bottle pressures may be checked without entry into refuge alternative.
- Add sampling ports to accommodate sampling of external atmosphere.
- Attachment of various brackets and hold downs necessary to secure tubing for oxygen and compressed air lines.
- Addition of SSP human waste disposal system assembly to and through wall of MMSS RA.

- Addition of communication ports and associated communication component assemblies.
- Addition of necessary storage assemblies for CO2 absorbent and/or material.

After the refit of the MMSS refuge alternative is complete, the serial number of the unit will be modified. The modification will be done as follows:

<b>Current MMSS serial number</b>	<b>Serial number after refit</b>
PC1011024	PC1011024-7C
PC0608005 17-387	PC0608005 17-387-7C

All existing serial numbers will have a -7C added to reflect that the unit has been upgraded to contain CFR 30 Part 7 components. Additionally, the unit will be branded as a Strata refuge alternative after the refit is complete.

Thank you for taking your time to review this request. We greatly appreciate the responsiveness of the WV Office of Miners' Health, Safety & Training in this matter. Feel free to contact Shawn or me should you have any questions or concerns.

Best Regards,



Shawn Sitterud  
Manager- Modern Mine Safety Supply

**David  
Maust**

Digitally signed by David Maust  
DN: cn=David Maust,  
email=dmaust@strataproducts.  
com, o=Strata Products  
Worldwide, LLC  
Date: 2013.04.11 13:48:15  
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David Maust  
Vice President & General Manager  
Strata Safety Refuge Alternatives

Strata Worldwide  
Strata Safety Products, LLC

Attachments.



**PETERSEN**  
I N C O R P O R A T E D

*"A Winning Combination."*

1527 North 2000 West, Ogden, Utah 84404 \* Phone (801) 732-2000 \* Fax (801) 732-2098

April 8, 2013

Shawn D. Sitterud  
Manager - Modern Mine Safety Supply, LLC  
475 W Highway 31  
Huntington, Utah 84528

**Subject:** Portable Underground Coal Mine Refuge Alternative (RA) Engineering Analysis Update  
Modern Mine Safety Supply: Purchase Order SDS032613-1  
Peteresen Incorporated: Job Number 9513.

**Purpose:** Discuss the configuration of the baseline standard RA and structurally evaluate proposed minor changes from the baseline in subsequent RA versions.

**Description of Baseline Analysis:**

- Linear static, elastic stress analysis.
- Linear buckling analysis.
- Acceptance criteria: Working stress < Yield strength
- 15 psi external pressure uniformly distributed on all external surfaces
- 1g gravity load included
- Operating temperature -20 to 100F (no decrease in material strength)
- Baseline chamber dimensions = 96" wide x 62" high x 24' long
- All plate = 1/4" Material = A-36 (yield strength = 36,000 psi)
- All frame members = 3 x 2 x 1/4" Material = A500 Grade B (yield strength = 42,000 psi)
- Welding is assumed 3/16" fillet (or equal) continuous.

**Discussion of Baseline Results:**

- The represented model geometry conservatively represents the construction of the standard RA (verified by Shawn Sitterud of Modern Mine Safety Supply).
- Predicted deflections are within a reasonable range.
- Maximum stress in the center of the highest stress plate panel (1/4" thick) is less than 36,000 psi yield strength of the plate.
- Maximum stress on the edge/corners of the highest panel exceeds the yield strength, but occurs over a very small area near the discontinuity of the corner. This stress will be blunted by minor local yielding in the ductile material and is acceptable based on engineering judgment.
- Maximum stress in the reinforcing beams (TS 2x3x1/4") are less than 42,000 psi yield strength, except as discussed in the next bullet.
- Maximum stress at reinforcing beam joints exceed the yield strength, but occurs over a very small area, created by the discontinuity of the corners. This stress will be blunted by minor local yielding in the ductile material and is acceptable based on engineering judgment.
- Maximum compressive stress shown in the reinforcing beams joints would be of marginal concern for possible buckling failure, except that they are additionally reinforced by the 1/4" panels and miscellaneous internal structure.



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Baseline Analysis Conclusion:

- The baseline Mine Refuge Chamber configuration as defined and analyzed in this report is certified for a uniform external pressure of 15 psi.

Discussion of Proposed Deviations from Baseline:

- Change to the configuration of equipment located inside the RA. Will not affect the ability of the structure to support the 15 psi pressure loading.
- RA may be 7" shorter than the baseline 62" tall RA. Shorter member lengths (spans) will have greater strength and will not reduce the ability of the structure to support the 15 psi pressure loading.
- RA may be 4' shorter than the baseline 24' long RA. Shorter member lengths (spans) will have greater strength and will not reduce the ability of the structure to support the 15 psi pressure loading.

Deviation from Baseline Analysis Conclusions:

- The deviations to the baseline RA configuration as defined and analyzed in this report are certified for a uniform external pressure of 15 psi based upon a comparison to the original baseline analysis.

Sincerely,

Steve Dowden, PE (Utah)



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April 2, 2013

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Sandy Springs, GA 30350

Mr. Shawn Sitterud  
Manager- Modern Mine Safety Supply  
475 W Highway 31  
Huntington, UT84528

Subject: Response to your request for guidance of March 27, 2013

Sirs,

The original Modern Mine shelter approval was granted based upon a comprehensive analysis of its structure by a licensed engineer. That analysis was done by the firm of Petersen, Inc. of Ogden Utah using Finite Element Analysis. The results were subsequently certified by independent engineer Lloyd English, PE and successfully defended before a review team of engineers and professors at West Virginia University in March of 2007.

Upon review of your proposed modifications it suggested that the best way for you to proceed is to engage Petersen Inc. to rerun their Finite Element Analysis using the structural modification proposed. Provided that the Modern Mine shelter's performance under the stresses is found to be equal to or superior to that demonstrated in the original analysis the structural modifications will be considered minor and acceptable.

David Maust  
Shawn Sitterud  
Page 2  
April 2, 2013

Regarding the use of Strata approved CRF30 Part 7 components in the Modern Mine shelter; since those components that meet the MSHA requirements are deemed to comply with West Virginia §56-4-8 simply providing copies of those approvals along with revised interior drawings and revised operator instructions will be sufficient for acceptance.

Thank you,



Eugene White  
Director





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Randall Harris  
Engineering Adviser  
WV Office of Miners' Health, Safety & Training  
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Charleston, West Virginia, 25311-1626

March 27, 2013

Dear Mr. Harris,

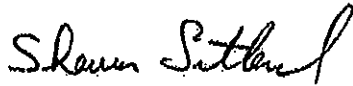
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Both Strata and Modern Mine believe that Strata approved components are 100% compatible with the MMSS refuge alternatives and will apply to MSHA under MSHA RAMP provisions to fit the approved SSP components in to the MMSS refuge alternatives. Neither SSP nor Modern Mine intends to pursue MSHA Structural approval for the MMSS refuge alternative at this time. Due to the fact, that the MMSS structure will remain, as approved, under W VA Code R. 56-4-8; with minor changes to the interior and exterior of the refuge alternative to accommodate installation of the SSP, CRF30 Part 7, approved components, we are seeking approval from WVOMHST to undertake this action. We propose to submit drawings to WVOMHST and

MSHA outlining these changes and we would appreciate if you could outline any additional information needed so that approval of our request can be granted.

Thank you for taking your time to review this request. Feel free to contact Shawn or me should you have any questions or concerns.

Best Regards,



Shawn Sitterud  
Manager- Modern Mine Safety Supply

David  
Maust

Digitally signed by David Maust  
DN: cn=David Maust,  
email=dmaust@strataproducs.co  
m, o=Strata Products Worldwide,  
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Date: 2013.03.29 16:10:44 -0400

David Maust  
Vice President & General Manager  
Strata Safety Refuge Alternatives

Strata Worldwide  
Strata Safety Products, LLC



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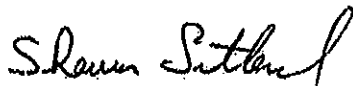
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