# 2018 Structural Component Approval for Refuge Alternatives

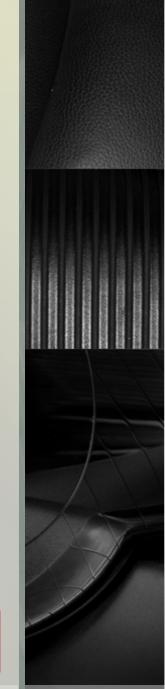
MSHA Technical Support, Approval and Certification Center Applied Engineering Division

NIOSH Refuge Alternative Partnership Meeting

June 7, 2017

Pittsburgh, PA

U.S. Department of Labor



### Refuge Alternatives for Underground Coal Mines; Final Rule

- Effective Date March 2, 2009
- Establishes requirements for refuge alternatives
- Includes testing, performance, and documentation requirements for approval
- Implements Section 13 of the MINER Act of 2006



#### **Approved Refuge Alternative Components**

- Breathable Air approved in 2013
- Air Monitoring approved in 2013
- Harmful Gas Removal approved in 2013
- Structural allowance for state approval expires after 12/31/2018
  - Applies to Pre-Fabricated Refuge Alternatives
  - Includes Steel Structure and Inflatable, if applicable



#### Feedback from Partnership and NIOSH research

- In 2013, MSHA received applications for structural component approval
- Based on the discussion at these partnership meetings, MSHA delayed evaluating these approvals so that NIOSH apparent temperature research could be completed
- Key research topics resulted in
  - Supporting that 95 degree F apparent temperature is protective
  - Establishing that the full occupancy heat rate (117W) per person is appropriate
  - Establishing moisture input per person
  - Establishing an acceptable relative humidity when dry tests are performed
  - Documenting the temperature rise in strata and mine air surrounding the refuge
  - Describing acceptable temperature measurement strategies (average temperatures)
  - Describing acceptable general test procedures (pre-conditioning, data logging, instrumentation, etc.)

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#### **MSHA** Actions

- MSHA reviewed apparent temperature test procedures and results included with structural component approval applications whose evaluations had been delayed.
- Applicants were informed of any additional items or changes that needed to be addressed based on the results of NIOSH research and reports.



#### Structural Tests and Design Requirements

- For MSHA part 7 approval consideration, applicants must
  - Conduct 8 tests and provide results
    - Apparent Temperature, Over-pressure, Rip & tear, Flash Fire, Gases & Odor, Deployment, Repair, and Stretcher
  - Submit design documents addressing 13 requirements
    - Space/Volume, Isolation, Preshift, Unauthorized entry, Pressurization, Human waste, Exterior gas measurement, Durability, Transport, Two way communication, Flame Resistance, Maintenance accessibility, Loss of pressure



#### **Refuge Alternative Retrofits**

- Most of the existing refuge alternatives had scrubbing chemicals and provisions replaced during the 2013 retrofit
- The 2018 effective rule date coincides with the five year replacement schedule for scrubbing chemicals and provisions for many units
- The majority of tent type units will need to be brought outside for resupply. Steel units may be resupplied underground, if manufacturer allows

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#### **Refuge Alternative Retrofits**

- Tents may need to be replaced in order to:
  - Meet the puncture and tear resistance requirement
  - Increase in airlock size to accommodate an injured miner on a stretcher
  - Meet floor space and volume requirements



#### **Refuge Alternative Retrofits**

- Steel storage containers for tent type units may require modification to:
  - Accommodate a larger sized tent
  - Provide ability to conduct preshift examinations without entering the structure
- Replacement of scrubbing chemicals and provisions
- Cylinders may need to be re-certified (DOT requirement)
- Refuge alternatives will be out-of-service during retrofits



#### Mine Operator Responsibilities

- Pre-fabricated refuge alternatives in service after December 31, 2018 must have MSHA part 7 approvals for structural components as well as breathable air, harmful gas removal and air monitoring components
- Pre-fabricated refuge alternative structures with only State approvals will no longer be accepted
- Emergency Response Plans (ERPs) may need to be updated to reflect the refuge alternative structural component approval
- Mine operators must provide training on the refuge alternative in the approved ERP



#### **Mine Operator May Encounter**

- Change in maximum occupancy rating
  - Many tent units will maintain close to current maximum occupancy – discuss with your manufacturer
  - Reductions in occupancy for steel units may affect the ability to provide refuge for the maximum amount of persons expected to use the refuge alternative
- Change in maximum mine air temperature rating
- Modification (retrofit) of the refuge alternative to comply with 2018 requirements



#### **Scheduling and Coordination**

• Mine operators are encouraged to contact the manufacturers who supply refuge alternatives to their mines if they have further questions or need additional information.



#### **Approval Update**

- MSHA has issued two Structural Component approvals that cover the following refuge alternative models:
  - Strata M2624-4.0
  - Strata M2630-4.0
  - Strata M2630-3.0T
  - Strata S-M3636
  - Strata S-MC3635
  - Strata S-M3630



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## QUESTIONS?

