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# *NIOSH Research for Improved Escape and Rescue from Underground Coal Mines*

*May 11, 2010*

*Mine Emergency Preparedness and Response  
Stakeholder Meeting*

*National Mine Health and Safety Academy  
Beckley, WV*



# *Overarching Goals*

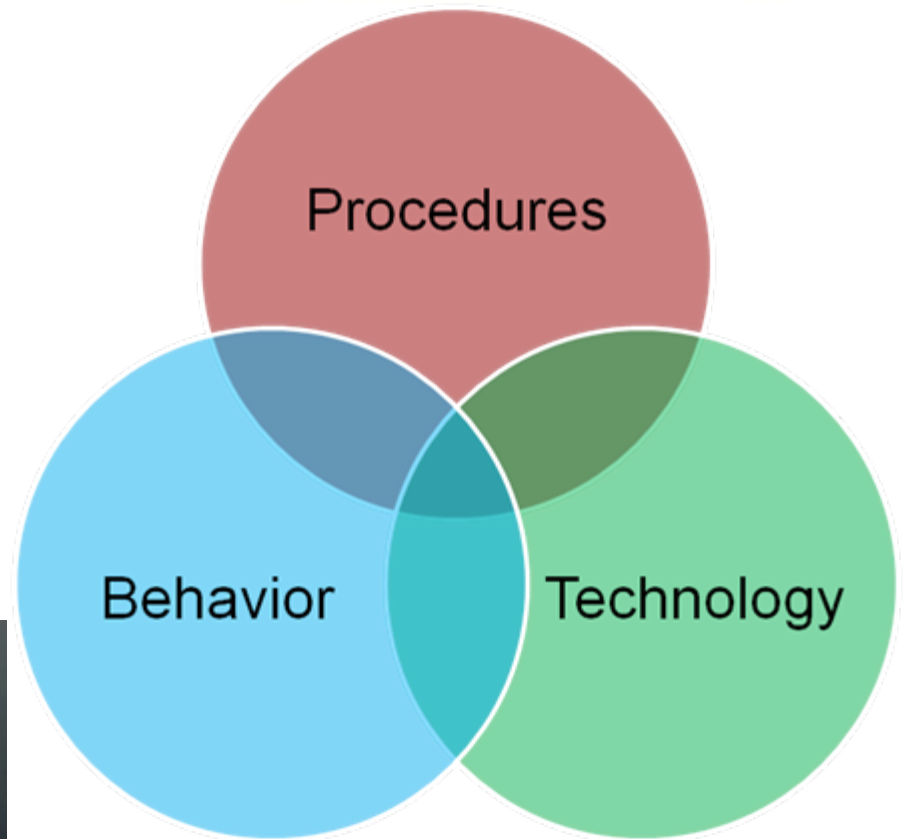
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- Understand the “state-of-the-art” in escape and rescue
- Identify opportunities to improve the capabilities for self-escape and safe and efficient rescue operations.
- Conduct research and prevention activities to achieve goals
- Facilitate communication and adoption of improved escape & rescue methods and technologies through the use of partnerships



# *Areas of Planned Research*

- **Self-Escape**
- **Safe-Rescue**
- **Incident Command**
- **Training**



# *Self-Escape Improvements*

**Develop an integrated, systems approach to self-escape planning and training :**

- **Refuge, Oxygen supply, Communication & Tracking**
  - Opportunities at the “systems” level rather than the component level
  
- **Planning & Training for Self Escape**
  - Planning Methods
  - Skill sets required for self escape
    - Non-Verbal Communications
    - Lifeline Skills Competency
    - Navigation in Smoke



# Safe Rescue: Training Improvements



- Overcome disparity in emergency response skills:
  - Evaluate benefits of greater realism
  - Improve inter-team coordination during emergencies



- Develop technologies to improve realism
  - Virtual reality
  - Gas Detector Simulator

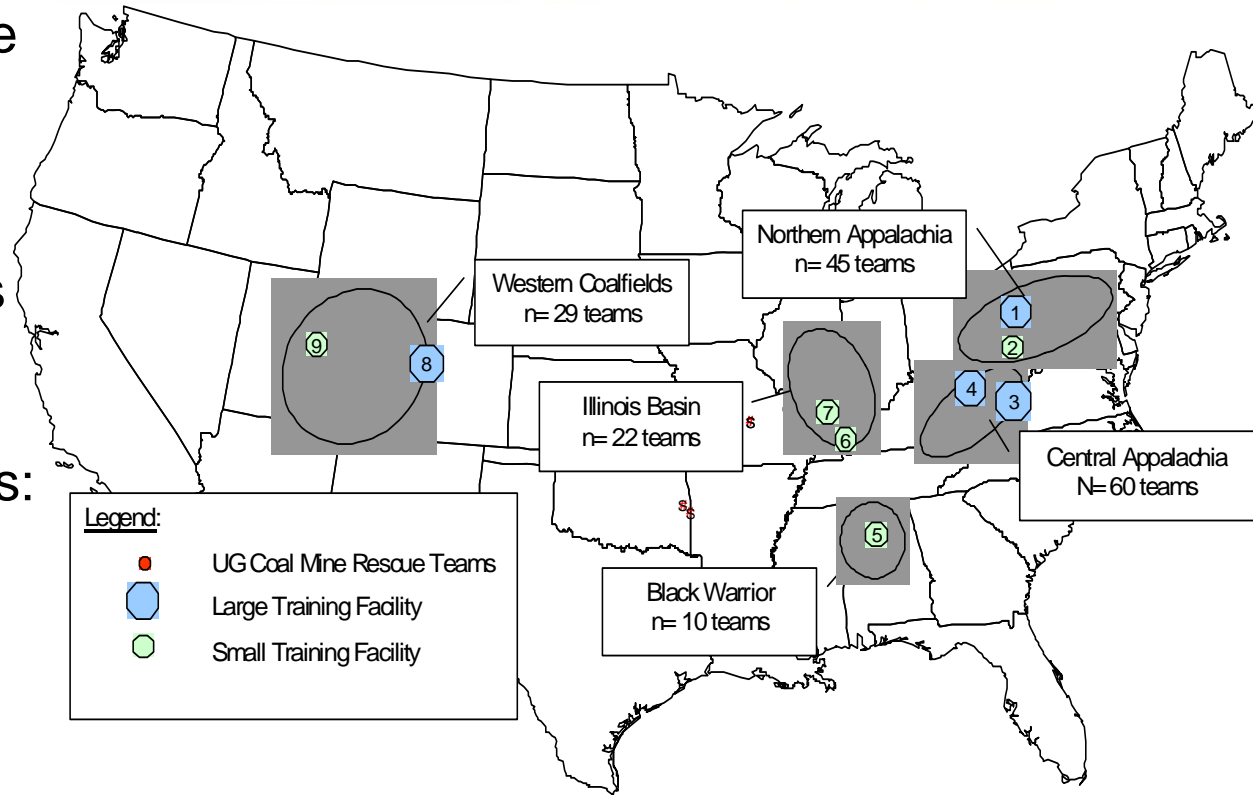


# Coal Mine Rescue Training Facilities

Currently 10 coal mine rescue facilities are available

Need for new facilities  
Central Appalachia

Identify enhancements:  
standardized,  
realistic  
best available  
technology



# *Safe-Rescue: Improved Operations*

- Develop and test improvements to exploration & rescue protocols
  - Consider human factors in victim transport
  - Improve advance rate while maintaining team safety
  - Refuge chamber evacuations
- Guidance on new ignition sources such as batteries in communications systems
- Remote Atmospheric Monitoring
  - Tube Bundle System
  - Wireless Technologies





# *Safe-Rescue: Improved Operations*

- Investigate New Technologies:  
Robots for exploration

- “Scout” Robot:

- Military platform, adapted by Sandia National Labs
- Evaluation in 2010



- “Snake” Robot:

- Military Design Concept, being adapted by Raytheon Corp.
- Borehole Deployment
- Delivery/Evaluation 2011



# *Incident Command Improvements*

- Investigate MECS improvements
  - Type and size of training simulations
  - Information management systems
  - Readiness through improved ERP's and identification of necessary support equipment, supplies and services
- Guidance on how to prepare in advance for behavioral health issues:
  - Fatigue, Traumatic Incident Stress, etc



# *Examine the Utility of Full-Scale Drills*

- Value of training on the system of escape, rescue and command at the same time.
- Impact on expectations and trust among the responders and decision makers
- Ability to evaluate equipment & procedures in a safe environment
- Potential to share results across industry, identify needed improvements



# *Questions:*

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The findings and conclusions in this presentation are those of the author and do not necessarily represent the view of NIOSH.

