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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

- 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

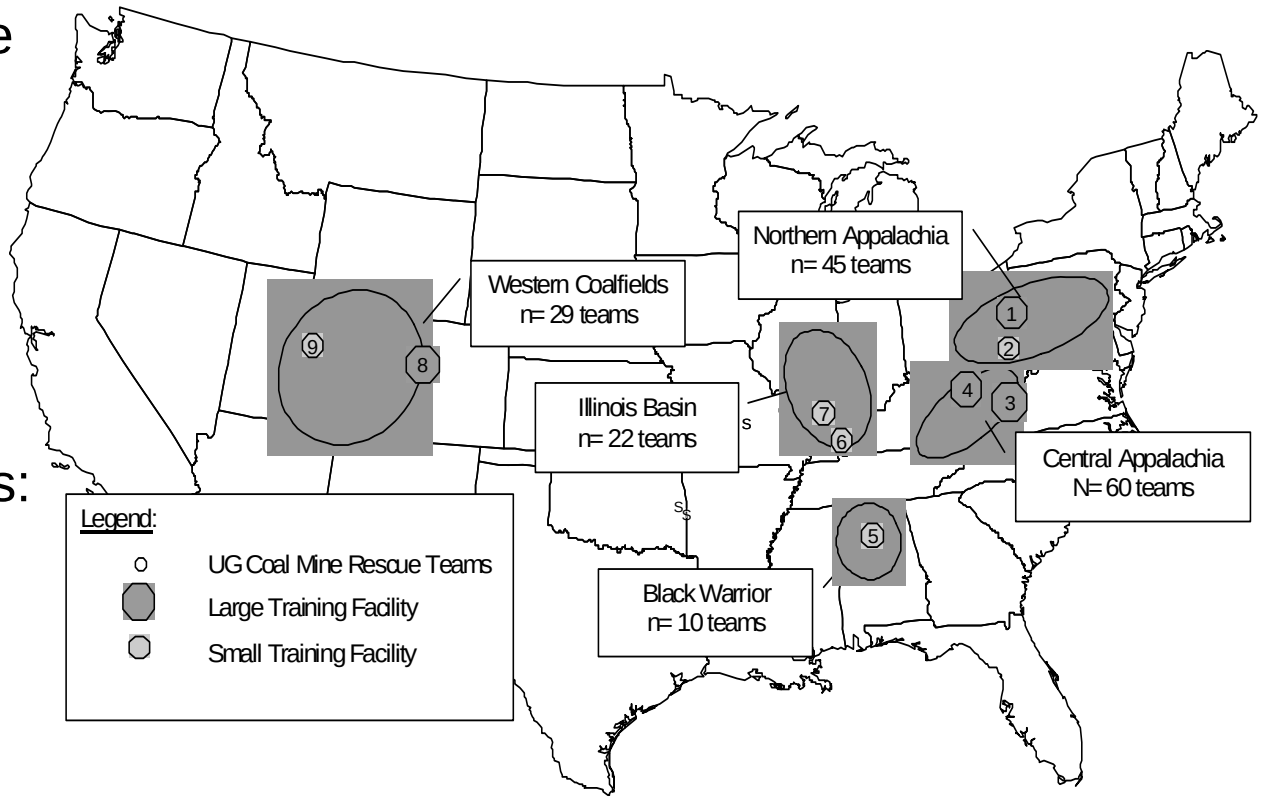
- Overcome disparity in emergency response skills:
  - Evaluate benefits of greater realism
  - Improve inter-team coordination during emergencies
- Develop technologies to improve realism
  - Virtual reality
  - Gas Detector Simulator

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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