Update on Proximity Detection

- West Virginia Mine Safety Technology Task Force
- Jim Dean Co-Chairman
Remote Control Related Crushing Accidents

- 31 fatalities since 1984
- 14 fatalities since 2000

Source: Remote Control Fatal Accident Analysis Report by Dransite & Huntley
Illinois Fatality October 16, 2008

#3 Unit Face #9 Entry

18' 9" Wide 69" Height

18' 9" Wide 67" Height

Horn

Fatality
Proximity Detection

A safety system that provides automatic proximity detection and machine shutdown when personnel are positioned in a hazardous area close to the machine.

Source: MSHA
Hazardous Body Position Locations
(red crosshatch)
Proximity Detection Areas

- General Zones - Shapes may not be exact
- Monitor Zone - Miner assured that they are being monitored by the system when in this area
Proximity Detection Systems

- Nautilus International "Buddy System" (MSHA Approved) 2nd Generation Approved
  - not including cap light
- Geosteering Mining Services TramGuard® (MSHA Approved) 2nd Generation Approved
  - approval issues with cap light PWD
- Matrix Design Group M³ 1000 System
  MSHA Approved - Not ready to "hand off" for evaluation
Mine Safety Task Force Efforts

- Began review in Late '07/ Early '08
- We set an internal goal to work toward providing a recommendation to the Director of WVOMHS&T regarding regulations requiring PDDs by early 2009.
- During further review and discussion, the following points were determined (in my opinion):
Mine Safety Task Force Efforts

- Prior Testing Underground primarily involved only one Person Wearable Device (PWD)
- Proximity Detection was inactive (shutoff) while the cutterhead motors were engaged
- Mining continued if there was a problem with the PDD, so reliability was difficult to judge
- It was reported that miners short circuited the PDD by moving the CM with the cutterhead on.
Mine Safety Task Force Efforts

- One PDD Manufacturer felt that 80% availability was satisfactory
- From a regulatory standpoint, manufacturer capability is unknown
- There is concern regarding differing state and federal standards with State standards preceding (similar to communications, tracking, shelters)
- There is a concern that implementation of this technology may create additional hazards
Mine Safety Task Force Plan

- Evaluate PDDs on place change (non-bolter) CMs in underground coal mines to assess their performance in terms of functionality with multiple PWDs, reliability, overall performance and investigate manufacturers capabilities
- Reliability of PDDs
- Miner Operator Safety vs. Ability to allow operator to be close in safe areas
- Capability of Manufacturing Resources
Mine Safety Task Force Plan

Partnership Involves:
- Mine Safety Task Force
- MSHA
- NIOSH
- WV Coal Association
- United Mine Workers
- Patriot Energy
- CONSOL Energy
- Arch Coal
- Nautilus
- Geosteering
- Matrix
- Joy
- Bucyrus/DBT
- Others – Alliance, Foundation, ICG, United, Massey
Mine Safety Task Force Plan and Activities

- Meetings in December 08 and January 09 with members from these groups occurred with comments on the draft plan and revisions made.
- NIOSH modification on measurement section sought end of Jan 2009
- NIOSH measurements at Metalcraft - March 2009 – Geosteering – field too large for operational needs – notches discussed – copy of South African approval needed from January 09
Mine Safety Task Force Plan and Activities

- April 09 Matrix stated:
  - Joy would not be able to install the Matrix system on the cm going to Mt Laurel in 3 weeks
  - Joy doesn’t want to install the Matrix system on “a lot” of systems - ~3 installed at that time
  - System has not been tested sufficiently to "hand off".

- April 09 NIOSH provided update to plan/protocol
Mine Safety Task Force Plan and Activities

- May 09 – Idea of Operational notch or silent zone was reported possible by vendors and shared with all
- 7/16/09 – Plan finalized and distributed that included concepts shown.
Where we were in May of '09

- Timing Issues
  - MSHA Approval
  - CM rebuild availability at mine – Easier to install system and provide for surface testing
- Should begin evaluation of Nautilus system at Patriot Energy, Federal #2 Mine near Morgantown, WV in May '09
- Geosteering/CONSOL – May 09 – Delay Issues
- Matrix/Arch – Issues May/June – Delay Issues
Nautilus – Federal #2 Mine

- System installed in mid July 09
- Pre-Evaluation Meeting on July 20, 2009
- Evaluation began 7/28 – stopped 7/28
  - Miner operator was not able to see binders to allow him to leave appropriate head coal – lack of notch
  - Parasitic coupling exhibited 4ft – 13 ft behind boom with cable overhead and looped on the bottom
  - Cm Tram siren activated but the machine wouldn’t move – fix – release tram levers to neutral then tram enable
Nautilus – Federal #2 Mine

- System updates re-installed October 6, 2009
- Remaining issues to be resolved
  - Multiple PWDs
  - Data Storage Device – RAMP has been submitted to MSHA ACC for approval – in XP box
  - November 16th – goal to resume testing, if no issues
  - NIOSH Evaluation commence ~December 1, 2009
Geosteering

- Reported success in South Africa
- MSHA ACC agreed to expedited review in early 09 conditional upon receiving South African testing report – issue with cap light dispersion
- MSHA approval on the machine mounted components in August 2009
- Switched to experimental approval for PWD, each device including batteries, electronics, etc must be inspected prior to testing.
Matrix

- Pattiki Coal – system live Nov 2, 2009, previously scheduled first week in October – “bumps in the road”
- Will share results at December Task Force Meeting
- 12CM planned in future at Mettiki (WV) – will go live pending results at Pattiki
June 13, 2009 Sharpe's Point

- Watzman (NMA) said manufacturers had jumped the gun by claiming the device was ready before adequate field testing had been completed.

- Watzman's comment drew support --- "This is another example of manufacturers driving the system in an unproductive manner," said Jeff Kohler Mine Safety & Health Research Advisory Committee and head of NIOSH's Office of Mine Safety and Health Research.
South Africa - The Right Approach??

- "They decided they were going to do it, and then it was a question of finding the best equipment and go put it on," Frederick said. "If it's got problems, we'll work it out, but we're going to put it on and we're going to stop some of these fatalities."

- Entry Width ~22 feet
Summary

- While adjectives such as "polished" and "perfected" have been used to describe this technology, I believe that there are important issues to be evaluated and resolved. The manufacturers and mines that have brought the technology to this point should be commended.

- I am hopeful that at the end of this evaluation, the questions will have been answered, all parties will be at the same knowledge level and move forward with the implementation of this technology based on its demonstrated performance.
Summary

- To date, in my opinion, proximity detection manufacturers have caused significant delays in this evaluation.

- Are they (manufacturers) waiting for MSHA to require the use of the technology and determine it's required functional capabilities?
Thanks

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Coming together is a beginning, keeping together is progress, working together is success
Information Sources on Prior work and comments on PDDs

- MSHA webpage (PD and Remote Control CM)
- Coal News, Vol 5, #12
- International Longwall News 1/26/09
- Sharpe's Point, Vol 5, #2
- Manufacturer's Web Sites