

# Crandall Canyon Accident Investigation Summary and Conclusions

On August 6, 2007, six miners were killed in a catastrophic coal outburst when roof-supporting pillars failed and violently ejected coal over a half-mile area. Ten days later, two mine employees and an MSHA inspector perished in a coal outburst during rescue efforts.

- The August 6 catastrophic accident was the result of an inadequate mine design.
  - Flawed engineering analysis by Agapito Associates Inc. (AAI), resulted in an inadequate mine design, with unsafe pillar dimensions, which contributed to the accident.
  - AAI's inadequate engineering management review also contributed to the accident.
  - The mine operator, Genwal Resources Inc. (GRI), submitted a mining plan based on the AAI analysis.
  - GRI failed to revise its mining plan following coal bursts in March and as late as August 3, but rather continued to mine coal in areas with unsafe conditions.
  - GRI's unauthorized mining practices increased geological stress levels in the vicinity of working coal miners.
  - MSHA found no evidence that a naturally occurring earthquake caused the collapse on August 6.
  
- The August 16 coal outburst accident.
  - Any hope of accessing the trapped miners required rescue personnel to remove coal debris that blocked them from the miners.
  - The mine operator withheld information about a recent coal burst which deprived MSHA of a complete picture of underground conditions.
  - The unexpected conditions in the mine caused a robust roof control system to fail during the attempt.

## Genwal Resources Inc. Actions

- GRI misled MSHA about the extent of the March 10 coal burst and failed to immediately inform MSHA about the March 7 and August 3 bursts.
- GRI submitted an inadequate roof control plan based on faulty AAI engineering analyses to MSHA.
- GRI failed to adequately revise its roof control plan to provide better support after the March 7, March 10, and August 3 bursts and continued to expose miners to unsafe conditions.
- GRI violated the approved roof control plan when coal was mined in a prohibited area.

## Agapito Associates Inc. Actions

- AAI failed to recommend safe mining methods and pillar/barrier dimensions

## Fines

- MSHA levies \$1,636,664 in fines against GRI
- MSHA levies \$220,000 against AAI

(over)

# Changes to MSHA Policies and Procedures

## Completed:

- Letter to Mine Operators with Requirements for Roof Control Plan Submittals—June 3, 2008
- Memoranda to District Managers
  - Approval of Complex and/or Non-typical Roof Control Plans and Amendments—June 5, 2008
  - Corrective Measures for Inspection and Investigation Activities Related to Roof Control Plans and Related Miner Training - June 3, 2008
  - Documentation of Roof Control Plan Reviews—June 6, 2008
- Procedure Instruction Letter
  - Technical Support Assistance in Reviewing Roof Control Plans—Effective May 25, 2008
- Memorandum of Understanding (MOU) with the Bureau of Land Management – April 8, 2008
- All Retreat Mining Plans with depths over 1,500 feet in District 9 reexamined - August 2007
- 17 ground control inspections by Technical Support of mines with bump-prone conditions - August 2007 – February 2008
- Developed and posted a list of Best Practices addressing “Ground Control for Deep Cover Coal Mines.” – February 2008
- Program Information Bulletin
  - Precautions for the Use of the Analysis of Retreat Mining Pillar Stability (ARMPS) Computer Program – April 7, 2008

## Pending Actions:

- Future Program Information Bulletins
  - Guidelines for Use of Numerical Modeling, Type of Information to be Provided in Roof Control Plan Submittals
  - Guidelines for Use of LaModel Computer Modeling Program
- Periodic Mine Emergency Response Development (MERD) Exercise and Training
- Legal positions regarding 103 (j) and (k); authority of Primary Communicator and Family Liaison
- Separate assigned persons as Person in Charge, Primary Communicator and Family Liaison
- ERP reviews and updates for non-English speaking families
- Review of MSHA emergency response equipment and deployment procedures
- Wireless communications and tracking guidance.