

**STATEMENT OF KEVIN G. STRICKLIN
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U.S. DEPARTMENT OF LABOR**

BEFORE THE

COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS

UNITED STATES SENATE

October 2, 2007

Chairman Kennedy, Ranking Member Enzi, Members of the Committee, I am pleased to appear before you today.

My name is Kevin Stricklin, and I currently serve as the Administrator for Coal Mine Safety and Health. I have 28 years of experience in mining, including 27 years with the Mine Safety and Health Administration (MSHA).

I am deeply saddened by the tragic accident that occurred at the Crandall Canyon mine on August 6, 2007, which claimed the lives of six miners and by the subsequent accident that claimed the lives of three rescue workers, including one MSHA employee on August 16, 2007. Such losses are always felt deeply by all of us in the mining community, including MSHA.

We will not know the cause of these tragedies until MSHA completes its accident investigation, which is now ongoing. As in every investigation, MSHA has committed to providing a full report to the public when the investigation is complete. A separate investigation of the Agency's role in this matter is being directed by another investigative team headed by experienced mining professionals who are not MSHA employees. That report will also be made public.

Retreat Mining

Retreat mining is a common practice nationwide where coal is mined from coal pillars. When this coal is mined the roof normally falls in a structured manner to relieve the pressure placed on the underground mine workings. Currently, 223 underground coal mines have approved roof control plans that allow for pillar-removal. This represents 48% of all active underground coal mines. When conducted according to properly engineered roof control plans that are developed by mine operators and reviewed and approved by MSHA, retreat mining can be done safely, especially with today's technological advances that include mobile, remote controlled roof supports. Overall, the roof fall fatality rate in U.S. underground mines has averaged 0.001 per 200,000 hours worked (or 1 annually per 100,000 full time miners) in recent years (prior to the Crandall Canyon accident), down significantly from its average in the past. But, while the practice

has become safer, mine operators must follow the approved roof control plans to ensure that the practice is safe.

Retreat Mining at Crandall Canyon Mine

MSHA's records indicate the first plan for retreat mining at Crandall Canyon Mine was approved on September 27, 1989. Prior to Murray Energy taking control of the mine, longwall mining at Crandall Canyon had been completed and the previous ownership was conducting retreat mining at various locations. Since Murray Energy took control of the mine in August 2006, MSHA approved two amendments to the Crandall Canyon roof control plan that allowed for pillar extraction in both the North Barrier of Main West and in the South Barrier of Main West of the mine. The first plan for retreat mining under Murray Energy Corp.'s ownership was submitted on January 3, 2007, and approved on February 2, 2007. The roof-control plan for the mine was amended to allow retreat mining of the North Barrier of the Main West and was signed by the MSHA District Manager Allyn Davis. A second amendment to the roof control plan was approved on June 15, 2007, for retreat mining of the South Barrier of the Main West. The accident on August 6, 2007, occurred in the South Barrier of Main West. Before each of these plan amendments were approved, MSHA technical specialists in the area of roof control support made onsite visits to the mine, reviewed the technical supporting data submitted by the operator and made evaluations of the proposal based on their extensive knowledge of deep mining conditions that prevail in the Rocky Mountain underground coal mines.

As part of the operator's submission for roof control approval of the North Barrier, two geotechnical reports by Agapito Associates, Inc. (Agapito) were provided, upon request, to MSHA for review and consideration. In their reports, Agapito concluded that retreat mining could be conducted safely in that area of the mine. Prior to the approval of the plan, a MSHA roof control supervisor and specialist visited Crandall Canyon to assess the conditions in the North Main Barrier and based on their observations, required amendments to the roof control plan for additional roof supports. The operator subsequently amended the plan to meet the additional MSHA requirements and then the plan was approved.

Mining took place on the North Main Barrier until March 2007, when a mountain bump occurred, but MSHA was not officially notified about this bump or the magnitude. According to Murray Energy this was not a reportable incident because the outburst did not significantly disrupt mining activity, impair ventilation, or impede passage in the area. However, after the bump, mining was abandoned in that section. The accident investigation team will confirm whether the incident was required to be reported to MSHA as part of its work. The operator submitted another amendment to its roof control plan asking for permission to use retreat mining in the South Main Barrier. Murray Energy again commissioned Agapito to evaluate the stability of that section of the mine. While Agapito again concluded that retreat mining could be conducted safely, it also suggested enlarging the dimension of coal pillars that were left to support the roof from 80 by 92 feet to 80 by 129 feet. A MSHA roof control supervisor and a roof control specialist were underground in the South Barrier Section on May 22, 2007, to evaluate

the operator's submitted plan to retreat mine. The retreat mining plan with the increased pillar dimensions was approved by MSHA on June 15, 2007.

MSHA Inspection Activity at Crandall Canyon

Under the Mine Safety and Health Act, MSHA is required to inspect all underground coal mines four times a year. Since the purchase of the Crandall Canyon mine by Murray Energy, MSHA performed 5 regularly scheduled inspections and two spot inspections, responded to a safety complaint from one of the miners, and performed a roof control technical inspection. One of the regularly scheduled inspections was occurring when Murray Energy Corp. purchased the mine.

Mine Bumps

One of the most difficult, longstanding engineering problems associated with mining is the catastrophic failure of mine structures known as bumps. Coal and rock outbursts caused by bumps or bounces have presented serious mining problems for decades in metal, nonmetal, and coal mines. Fatalities and injuries have resulted when these destructive events occur.

Bumps have been categorized as either pressure or shock bumps. A pressure bump occurs when a pillar in a developed area is statically stressed past the failure strength of the pillar. A shock bump is caused by dynamic loading of the pillar through dramatic changes in stress distribution within the overlying strata as the result of breaking of thick, massive strata. In many cases bumps are the result of the combination of both pressure and shock forces. Bumps occur when complex arrangements of geology, topography, *in situ* stress and mining conditions interact to interfere with the orderly dissipation of stress. Strong, stiff roof and floor strata not prone to failing are also contributing factors when combined with deep overburden. Questions about the influence of individual factors and interaction among factors arise, but are difficult to answer owing to the limited experience at a given mine.

Bumps have occurred in all types of mining systems. A United States Bureau of Mines report that reviewed bumps that occurred between 1936 and 1993 found that pillar retreat mining accounted for 35% of the bumps, barrier splitting for 26%, longwall mining for 25%, and development mining for 14%. Longwall mining methods have increasingly replaced pillar retreat mining since the 1960's and would most likely account for a higher percentage of bumps today.

With more mining operations moving into reserves under deeper overburden and/or below previously-mined areas, there is a need to prevent, and, in the event they do occur, to mitigate the consequences of, bumps in such new circumstances. For this reason, MSHA is reviewing operators' ground control plans to ensure operators minimize the dangers associated with bumps, and District 9 has rescinded all room and pillar retreat mining plans in areas with greater than 1,500 feet of cover.

The Crandall Canyon Mine Accident

On August 6, at approximately 2:50 a.m. Mountain Daylight Time, a mine bump occurred at the Crandall Canyon mine, located near Huntington, Utah. The force of this mine bump was registered by seismographs, and the U.S. Geological Survey National Earthquake Information Center initially disclosed that an earthquake with a magnitude of 3.9 on the Richter Scale occurred near the mine. Seismologists with the U.S. Geological Survey National Earthquake Information Center in Colorado and the University of Utah have since stated that the seismic event was a mine collapse, not an earthquake. Inside the mine, the force of this bump was so intense that it blew the ventilation stoppings out through cross-cut 95 – more than a mile from the area where the miners were working. After the event, six miners – Manuel Sanchez, Brandon Phillips, Alonso Hernandez, Don Erickson, Carlos Payan, and Kerry Allred – were missing. The subsequent rescue attempt within the mine moved slowly, because safety dictated the installation of rib supports consisting of 40-ton rock props, chain-link fence and steel cables to protect the rescue workers from further mine bumps. These safety precautions – which were recommended by experts from MSHA and outside the agency – proved not strong enough to prevent a second burst from fatally injuring three rescue workers. At that point, MSHA halted the rescue attempts inside the mine, while continuing the rescue work from the surface.

Crandall Canyon Accident Outline

On the early morning of August 6, 2007, a ground failure occurred at the Crandall Canyon Mine in Huntington, Utah, that, according to the U.S. Geological Survey, registered 3.9 on the Richter Scale, and was initially reported by the Associated Press as an earthquake. MSHA's call center was subsequently notified and MSHA quickly dispatched an inspector to the mine site. Before arriving on site, MSHA issued a section 103(k) order over the phone which required management to evacuate the mine and effectively secure the site. This verbal order was put into writing early on the morning of August 6.

MSHA "(k) orders" are an enforcement tool used to ensure the safety of any person in a mine when accidents occur. The mine operator, in consultation with any appropriate State representatives must, under a (k) order, obtain MSHA's approval of its rescue or recovery plans. The original (k) order issued by MSHA was modified several times in the days following the initial mine collapse. At Crandall Canyon, MSHA modified the (k) order to allow recovery operations to continue in accordance with approved site specific plans. These plans were signed by the senior onsite mine operator's official and by the senior onsite MSHA official prior to their implementation.

Shortly after arriving on site, the MSHA inspector contacted the MSHA Field Office to report that a six-man crew was working in the South Barrier section when a bounce occurred that extensively damaged the mine's ventilation controls. These individuals were unaccounted for, but they were believed to be working approximately four miles from the mine's entrance.

On the afternoon of August 6, 2007, with MSHA's approval, Murray Energy Corp. began removing coal and debris from the Number 4 entry at crosscut 120. Meanwhile, a mine rescue team had breached the Number 1 seal in Main West, hoping to be able to get behind that seal and clear an easier pathway to reach the trapped miners. Unfortunately, the rescue team encountered significant amounts of coal blocking its pathway, and then had to withdraw altogether from the sealed area because another bounce occurred.

Mucking or clearing out the fallen coal from the main entry was a time-consuming process and Murray Energy and MSHA believed that it needed to reach the trapped miners more quickly to save their lives, if they survived the initial collapse. Thus, following the first day of the rescue operation, Murray Energy decided, with MSHA's consultation and approval, to drill bore holes into the mine from the surface in an attempt to establish contact with the miners and to assess the conditions in the area where they were believed to be.

By August 7, drilling had begun on the first borehole, which was a two-inch hole at crosscut 138. The mine operator selected all of the borehole locations with input and approval from MSHA. These locations were based upon the probable locations of the missing miners after the first bounce occurred on August 6. The first set of boreholes was drilled to intersect the mine at the location where the miners were last thought to be working at the time of the accident. Mine survey coordinates were used to pinpoint specific drilling locations.

In all, seven boreholes were drilled (the rest being 8 and 5/8 inches in diameter) but rescuers were not able to determine the location of the miners. In every borehole, rescuers attempted to insert a microphone and camera to either hear or see the trapped miners. Rescue workers also tapped repeatedly on the drill steel to signal to the trapped miners; miners are trained to reply by tapping below the surface. However, none of these communication efforts were successful.

As the rescuers continued to drill boreholes from the mine's surface, another group continued the mucking and clearing efforts in the mine's entry until another bounce occurred on August 16, which claimed the lives of three of the rescuers and injured six others. Because of that bounce, mucking efforts within the mine were suspended indefinitely. Neither MSHA, nor the outside experts brought to the mine site to review the mining conditions and rescue plan could devise a way to stabilize and reenter the mine. MSHA believed the plan it approved for the rescue operations prior to August 16 provided the maximum amount of protection to the rescuers possible, but it was not enough.

MSHA's Communication Response at Crandall Canyon

Immediately after MSHA was notified of the Crandall Canyon accident, MSHA began acting as the primary communicator with the families, policymakers, the public and the media; a responsibility which MSHA takes very seriously after the Sago Mine accident.

On the morning of August 6, 2007, MSHA dispatched three family liaisons to the location where the family members were gathered to begin regularly updating them on the rescue operation. MSHA also provided interpreters for the Spanish speaking families. Clergy and counselors were also available. In the evening of August 6, MSHA began participating in these briefings providing updates and answering family members' questions.

MSHA also acted as the primary communicator with the media. MSHA held regular briefings every day for reporters off of the mine site at the sheriff's command center. During these briefings, we provided detailed updates regarding the rescue effort and answered reporters' questions. MSHA also provided regular updates on the Agency's website regarding the rescue effort and issued media advisories concerning our updates at the mine site.

In addition, MSHA personnel regularly updated Utah's governor and congressional delegation on the status of the rescue operations, both on and off-site. I also briefed the Utah Legislature at an open public forum on August 29, 2007, in Salt Lake City.

Conclusion

Mr. Chairman, thank you for inviting me to testify today to present a technical review of the accident at Crandall Canyon. I look forward to answering any questions you may have.

Appendix 1: Crandall Canyon Roof Control Timeline

In spring 2006, Genwal Resources, Inc. (Genwal) discussed the possibility of pillar mining the Main West barrier pillars. (Robert Murray is the current Controller of Genwal.) MSHA required an adequate justification for this activity.

September 8, 2006

- Genwal provided MSHA with two Agapito geotechnical engineering reports that concluded the Main West barrier pillars could be safely developed and retreat mined.

October 2006

- MSHA reviewed the Agapito geotechnical reports.
- MSHA reviewed accident/injury data for the mine.
- MSHA reviewed retreat mining data from other mine areas.

November 13, 2006

- MSHA received Genwal's site-specific plan to develop North Main West barrier pillar.

November 21, 2006

- MSHA completed its review and approved the 4-entry 3-pillar development of the North Main West barrier pillar.
- MSHA requested additional information regarding the Agapito report data.

December 2006

- MSHA discussed the Agapito report data with mine personnel and clarified outstanding issues.

January 3, 2007

- MSHA received Genwal's site-specific plan to retreat mine North Main West barrier pillar.

January 9, 2007

- MSHA conducted an on-site evaluation of ground conditions in the North Main West barrier pillar development; MSHA then made recommendations for additional bleeder entry support and top coal roof support.

January 18, 2007

- MSHA completed its review and approved a plan revision that allowed top coal in areas of weak immediate roof.

January 31, 2007

- MSHA e-mailed the mine to stipulate the minimum requirements that would provide acceptable support for the bleeder entry.

February 1, 2007

- MSHA received the requested information with bleeder support revisions.

February 2, 2007

- MSHA completed its review and approved the plan to retreat mine the North Main West barrier pillar.

February 23, 2007

- MSHA received Genwal's site-specific plan to develop South Main West barrier pillar.

March 6, 2007

- MSHA received the Agapito report, dated December 8, 2006, on-site visit to North barrier development; in-mine conditions reflected accuracy of computer models.

March 8, 2007

- MSHA completed review and approved the 4-entry 3-pillar development South Main West barrier pillar.

March 12, 2007

- MSHA received information from Genwal that pillar mining in North Main West barrier had stopped due to ground stability problems.

May 15, 2007

- MSHA received the Agapito report containing recommendations for mining the South Main West barrier pillar.

May 17, 2007

- MSHA received the plan to retreat mine the South Main West barrier pillar.

May 22, 2007

- MSHA conducted an on-site evaluation of ground conditions in the South Main West barrier pillar development and made recommendations against mining the eight pillars from crosscut 139 to crosscut 142 to protect the bleeder entry; Genwal agreed with the recommendation.

June 15, 2007

- MSHA completed its review and approved the plan to retreat mine the South West Main barrier pillar.

Appendix 2: Accident Timeline

August 7, 2007

- In the early morning hours, repairs to damaged ventilation systems continued. MSHA's roof control personnel traveled into the mine to evaluate conditions to help determine whether or not clearing this entryway could resume safely.
- The drilling equipment used to drill the first 2 inch borehole was put in place at crosscut 138 approximately where the miners were believed to be the evening before and drilling began.

August 8, 2007

- In the morning, MSHA approved a new mine rescue plan presented by Murray Energy to allow clearing the Number 1 entry, but with extensive rib support.
- In the evening, drilling of the second borehole began. This borehole was drilled with an 8 and 5/8 inch bit.

August 9, 2007

- In the evening, the drill for the first borehole broke through the mine cavity and a microphone was lowered in to determine whether or not any underground activity could be heard. No activity was detected and rescuers continued drilling the second borehole.

August 10, 2007

- An analysis of the atmosphere in the first borehole revealed low oxygen readings, but a 3 ½ foot void was detected in the bored area in the mine.
- In addition, a two-man team tried to advance in the Number 1 entry but to no avail.

August 11, 2007

- Early in the morning, the second borehole (8 and 5/8 inches) broke through the mine cavity, but no communication was detected from underground. A roof height of eight feet was detected and a camera was lowered into the cavity but only wire mesh in the roof was detected.

August 12, 2007

- In the evening, another camera was lowered into the number 2 borehole and compressed air began to be pumped in. No response from the trapped miners was detected.
- In addition, a pad for a third borehole began to be constructed.

August 13, 2007

- Early in the morning a third camera was lowered into the second borehole, and again no sign of the miners was detected.
- In addition, the drilling equipment was moved from the second to the third borehole and drilling began in the evening.

August 14, 2007

- Drilling of the third borehole continued while a drill pad began to be constructed for a fourth borehole.

August 15, 2007

- Mid-morning, the third borehole broke through the mine cavity. A microphone was lowered into the hole but no communication with the trapped miners resulted. Seismic equipment, however, picked up an unidentified vibration that was not heard again. A camera was subsequently lowered into the hole, but nothing of note was seen.

August 16, 2007

- In the early morning, the drilling equipment was moved to the site of the fourth borehole and drilling began.
- Later in the evening, a significant bounce occurred in the mine and several rescuers were covered up by coal. In the end, six rescuers were injured and three were killed, including one MSHA employee.
- As a result, rescue efforts proceeding inside of the mine were halted indefinitely after advancing over 900 feet. These have not resumed because no way to proceed safely has been identified by either MSHA or outside ground control experts.

August 18, 2007

- In the morning, the fourth borehole broke through the mine cavity. No response from the trapped miners was detected.
- In the evening a camera was lowered into the hole and nothing was detected. Nothing was detected with seismic equipment.

August 19, 2007

- In the evening, rescuers began drilling a fifth borehole.

August 22, 2007

- Drilling in the fifth borehole broke through the mine cavity. Rescuers could not, however, get a camera into the hole because the hole became blocked.

August 23, 2007

- Rescuers began drilling a sixth borehole in the evening.

August 25, 2007

- Drilling in the sixth borehole broke through the mine cavity. A camera was lowered into this hole in the early morning of August 26, but there was no sign of the trapped miners. On August 27, rescuers also attempted to lower a robot into this hole, but were unable to complete this task because there was too much debris in the area.

August 28, 2007

- In the early morning, rescuers began drilling a seventh borehole, which broke through the mine cavity on August 30, 2007.

September 1, 2007

- MSHA declared that it exhausted all known options to reach the six miners after 25 days of rescue and recovery operations.

Appendix 3: Inspection Record for Crandall Canyon during Murray Energy's Control

Inspection Code	Inspection Type	Beginning Date	Ending Date	Event Number
E01	Regular Inspection	7/5/2006	9/22/2006	4476247
E01	Regular Inspection	11/2/2006	12/13/2006	4474244
E01	Regular Inspection	12/29/2006	3/29/2007	4476407
E01	Regular Inspection	5/30/2007	7/2/2007	4474428
E01	Regular Inspection	7/5/2007	Present	4474193
E03	Hazard Complaint Investigation	2/1/2007	2/7/2007	4474269
E16	Spot	9/25/2006	10/3/2006	4477639
E16	Spot	4/11/2007	4/11/2007	4474279
E20	RC Technical Investigation	5/22/2007	5/22/2007	4476485