UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION
COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine

Fatal Machinery Accident
Occurred: January 3, 2004
Date of Death: January 4, 2004

SUFCO Mine
Canyon Fuel Company, LLC
I.D. No. 42-00089
Salina, Sevier County, Utah

Accident Investigators

Donald E. Durrant
Coal Mine Safety and Health Inspector

Eugene D. Hennen
Mechanical Engineer

Gary L. Jensen
Coal Mine Safety and Health Roof Control Specialist

Jerry O. D. Lemon
Coal Mine Safety and Health Inspector

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CANYON FUEL COMPANY, LLC
SALINA, SEVIER COUNTY, UTAH
JANUARY 3, 2004

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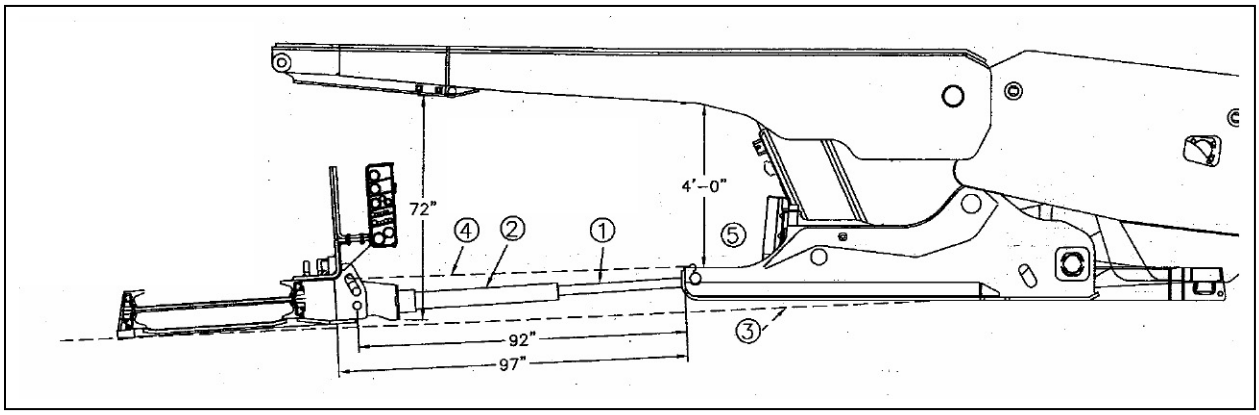
(NOT TO SCALE)



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OVERVIEW

On Saturday, January 3, 2004, at approximately 10:20 p.m., a fatal machinery accident occurred at the SUFCO Mine on the 3 Left Pines East retreating longwall section. The accident occurred while attempts were made to free the No. 49 shield, which was one of about 24 shields that had become “iron bound”. This condition occurred due to significant convergence that occurred while the longwall was mining through a thirty-foot wide setup entry that had been mined for a possible in-panel longwall move.

Numerous attempts were made to free the No. 49 shield, without success. Two-legged chain slings, customarily used during longwall moves, were brought to the section so that a different method could be attempted. A sling assembly was attached from the shield base skids to the face conveyor. The two adjacent shields were then used to push the conveyor and thus pull the No. 49 shield forward with the sling assembly. In addition, the No. 49 shield was used to pull itself toward the conveyor with the double-acting ram. Miners were positioned on each of the three shields to manually operate them. During the attempt to free the shield, the hook attached to the face conveyor broke allowing the remaining part of the hook and the chain sling assembly to recoil. The hook struck the miner who was positioned at No. 49 shield in the head, causing fatal injuries. The victim had 26 years of mining experience.

The direct cause of the accident was the use of the two-legged chain slings in an application where the applied loads exceeded the design strength of the slings and the improper placement of the hook in the slotted hole on the face conveyor which caused tip loading. The hook was not properly engaged in the elongated slot on the conveyor, and could not be, due to the physical characteristics of the hook and slot. These factors resulted in the hook breaking, recoiling, and causing the accident during the attempt to advance No. 49 shield. In addition, the position of the victim on the toe of No. 49 shield, in the “direct line of fire” of the tensioned chain sling, put him in a hazardous location. The failure of management to take corrective actions when a hazardous work practice was observed was a contributing factor to the cause of the accident.

GENERAL INFORMATION

The SUFCO Mine is an underground bituminous coal mine located approximately 30 miles northeast of Salina, Sevier County, Utah. The mine was originally opened in 1941 and was known as the Convulsion Canyon Mine. In 1974, the mine was purchased by Coastal States Energy Company, and a subsidiary, Southern Utah Fuel Company, was created to operate the mine. In 1997, ARCO Uinta Coal Company (ARCO) purchased 65 percent ownership of the property, and Itochu Coal International, Inc. (Itochu) of Japan purchased the remaining 35 percent. At that time, Canyon Fuel Company, LLC (Canyon Fuel) was formed to operate the mine. In 1998, ownership again changed as Arch Western Resources, LLC purchased the 65 percent ownership from ARCO, while Itochu continued its 35 percent ownership.

The mine produced 7.13 million tons of coal in 2003 with 281 employees. Daily production was approximately 28,500 tons. The mine worked two 10-hour production shifts and one overlapping 10—hour maintenance shift per day, five days per week. The mine has one retreating longwall section and two continuous mining machine development sections. The average seam height in the Upper Hiawatha Seam, in which the mine is located, ranges from 8.5 to 13 feet.

The current longwall section is located in the 3 Left Pines East panel, approximately 12 miles from the main portals. The face is 930 feet wide. A Joy 7LS3 shearing machine is used to cut the coal and a DBT PF5/2000/1342 armored face conveyor and stageloader convey the coal to the 60-inch panel belt conveyor. Two-legged Joy 2 x 970 UST shields provide roof support for the face.

The Mine Safety and Health Administration completed the last regular safety and health inspection at the mine on December 31, 2003. The Non-Fatal Days Lost (NFDL) injury rate for the mine through the 3rd Quarter 2003, excluding office workers and contractors, was 1.60 compared to a National NFDL rate of 6.69.

Principal officials at the mine were:

Kenneth E. May	General Manager
Erwin Sass	Production Manager
Allen Robins	Maintenance Manager
Gary Leaming	Safety Supervisor
Craig Hilton	Technical Services Manager

DESCRIPTION OF THE ACCIDENT

On Saturday, January 3, 2004, the afternoon shift crews arrived at the mine to start their 2:30 p.m. shift. The longwall crew accompanied by miners from the continuous mining machine crews and general mine personnel traveled to the 3 Left Pines East longwall section to continue freeing longwall shields that were stuck and "iron bound." These shields had become "iron bound" as a result of the longwall attempting to mine through setup rooms that had been mined for a possible in-panel longwall move. A safety meeting was held at the section kitchen and assignments were given to the miners. Miners were assigned to work in groups along the longwall face to free various shields.

Russell Willden, foreman for a continuous mining machine section, worked on No. 49 shield with several miners assigned to assist him. Various attempts and methods were tried to free the shield, including cleaning under the base skid to provide an open area for movement of the shield support if it were to break free. None of these attempts or methods succeeded.

Russell Crane, longwall shearer operator (victim), arrived after these failed attempts and offered to assist. Crane requested that two-legged chain slings, customarily used during longwall moves, be brought to the section so that another method of rigging could be attempted. The two-legged chain slings were brought to the section and carried from the headgate to No. 49 shield.

Two of the slings were used to connect from the base of No. 49 shield to the face conveyor (see Discussion Item 4 for rigging details). The plan was to utilize the adjacent shields, Nos. 48 and 50, to tension the sling rigging by using the conveyor advance function to push the face conveyor forward and thus have a pulling effect on No. 49 shield. At the same time, the double-acting ram shield advance function on No. 49 shield would be used to pull that shield forward. This would also reduce the tension applied to the chain slings as the adjacent shields pushed the face conveyor forward.

Crane stood on the base skid of No. 49 shield to operate the manual valves to advance the shield. Debris and loose material had been cleaned from under the shield base. Willden was at No. 48 shield and Kirk Jensen, diesel mechanic, was at No. 50 shield to operate the conveyor advance functions of those shields to push the face conveyor forward. Several moments passed as the miners attempted to free No. 49 shield using the aforementioned process. Several of the miners, including

Willden, heard a “pinging” sort of noise just prior to the accident, which they thought was coming from the chain rigging.

As the last attempt was made, the hook on the chain sling attached to the face conveyor broke. This allowed the remaining portion of the hook that was still attached to the chain, to recoil, striking the victim in the left side of the face and head.

After the hook broke, Willden went immediately to No. 49 shield to check on Crane. He and the other coworkers found him bleeding profusely from the left side of his face and head. Phillip Beach, a laborer assisting on No. 49 shield and an EMT, was present when the accident occurred. Beach, Willden, and others attempted to control the bleeding while an alert went out on the section for more help, including a request for a stretcher and first aid equipment. John Allsop, section foreman and EMT, who was working farther down the longwall face, heard the call, and immediately rushed to the area to offer assistance. Allsop, who has many years of experience as an EMT dealing with trauma cases, took over the lead role in caring for Crane. Crane was conscious and responsive for a couple of minutes, but his condition worsened quite rapidly. Emergency treatment was provided for Crane on the section. He was transported to the surface, transferred to the company ambulance, and transported to the Sevier Valley Hospital, located in Richfield, Utah, approximately 50 miles from the mine. Shortly after arriving at the medical facility, Crane was pronounced dead at approximately 12:15 a.m., January 4, 2004.

INVESTIGATION OF THE ACCIDENT

On Saturday, January 3, 2004, at 11:50 p.m., Gary Leaming, Safety Supervisor at the SUFCO Mine, notified James Martin, Acting Supervisor of the MSHA Castle Dale, Utah field office, of a serious accident that had occurred at the mine. Martin traveled to the mine, arriving at approximately 1:40 a.m., January 4, 2004. He issued a section 103(k) order and obtained preliminary information on the accident. Martin, Leaming, Fred Veater, SUFCO Safety Compliance, Phil Barney, Sevier County Sheriff, and Delbert Lloyd, Deputy Sheriff, visited the accident site. Martin conducted a preliminary investigation of the site, which included taking photographs and measurements at the scene. Martin obtained copies of the photographs taken by the mine operator. Sheriff Barney took custody of the chain sling at that time and transported it to the Sheriff’s Office as possible evidence. Due to the urgency to move the longwall before more shields became “iron bound” and create additional hazards,

Martin modified the section 103(k) order to allow the mine operator to continue working on freeing the shields using other techniques, allowing one pass to be made once all shields were freed and advanced.

Donald Durrant, Coal Mine Safety and Health Inspector from Price, Utah; Gary Jensen, Coal Mine Safety and Health Roof Control Specialist from Price, Utah; Jerry O. D. Lemon, Coal Mine Safety and Health Inspector from Price, Utah; Kent Norton, Training Specialist with Educational Field Services from Price, Utah; and Eugene Hennen, Mechanical Engineer with Technical Support from Triadelphia, West Virginia, were assigned to investigate the accident. Durrant was assigned the role of Lead Investigator.

The accident investigation team arrived at the mine on January 4, 2004, at approximately 9:45 a.m. A brief meeting was held with SUFCO management, which included Kenneth E. May, General Manager; Gary Leaming, Safety Supervisor; and Fred Veater, Safety Compliance.

Following the meeting, the accident investigation team traveled to the 3 Left Pines East longwall section, MMU 001-0. Photographs were taken at the accident site, measurements were made, and hydraulic pressures were observed at the pump skids located on the section. These pressures were approximately 320 BAR or 4700 PSI.

Additional MSHA District 9 personnel Allyn C. Davis, District Manager; Billy D. Owens, Roof Control Supervisor; and William G. Denning, Staff Assistant and Accident Investigation Coordinator assisted in the investigation.

On January 5, 2004, the accident scene was again visited to gather additional measurements, pictures, and to observe the roof conditions of the longwall face. Interviews were conducted on the afternoon of January 5 and continued on January 6 and 7, 2004. Interviews conducted on January 5 were somewhat limited, as many of the miners had been scheduled for professional counseling (refer to Appendix B for a list of persons interviewed).

On January 6, 2004, the chain sling was returned to the mine site by the Sevier County Sheriff’s office, and MSHA assumed custody of the sling. A closeout meeting was held at the mine on January 7, 2004.

On January 21, 2004, additional follow-up interviews were conducted at the mine with three different members of the longwall crew and two other miners.

DISCUSSION

1. This item discusses the reasons why in-panel setup rooms were prepared in the 3 Left Pines East (3LPE) longwall panel and why mine officials decided to mine through these rooms.

   The 3LPE panel was located under the East Fork of Box Canyon, a perennial surface stream. The stream channel was located approximately 600 to 800 feet above the coal seam. During the permitting/leasing process, the Resource Recovery and Protection Plan (R2P2), as approved by the Bureau of Land Management (BLM), United States Department of the Interior, required a block of coal to be left in place under the stream channel to prevent subsidence. Leaving this block of coal required an in-panel longwall move to setup rooms mined outby the block.

   During development of the 3LPE gate entries, a sand channel was encountered approximately 1000 feet past the inby end of the block of coal to be left. The sand channel was so extensive that it was uneconomical to mine through it. This shortened the length of the 3LPE panel considerably. Because of this, Canyon Fuel submitted a minor modification of the R2P2 to the BLM to shorten the Left Pines East longwall panels and to allow mining of the blocks under the stream channel. This request was submitted on February 20, 2003. Since the surface area above the longwall panels was part of the Manti-LaSal National Forest, the Forest Service (FS), United States Department of Agriculture, was involved in reviewing the request. The FS objected to approving the request to mine through the blocks due to the impact that subsidence could have on the stream and associated ecosystem.

   Since it appeared that the request might not be approved, Canyon Fuel mined the in-panel setup rooms outby where the block of coal was to be left. These rooms would be used if approval was not granted. However, on July 31, 2003, the BLM approved the request. Since the in-panel setup rooms had already been mined, officials studied whether to make the in-panel longwall move or to mine through the setup rooms. An engineering feasibility study, including review of other companies' experiences in mining through setup rooms, was conducted. It was determined that with proper additional roof support, the setup rooms could be mined through safely.

Mine management decided to mine through the setup rooms rather than make the in-panel longwall move as they determined this to be more economical.

2. The setup rooms were initially supported with 5-foot long resin bolts on 5-foot centers with wire mesh throughout. To mine through the setup rooms, additional support was installed including 12-foot cable bolts on 5-foot centers in rows spaced 7 feet apart. “Monster mats” were installed with the bolts in these rows. Additional 12-foot cable bolts (3 in the setup entry and 2 in other entries) were installed between the rows. Four-foot diameter Minova TEKGROUT 1800 ton capacity cuttable cribs made of cementitious material were installed in all entries. A TEKSET bag with 800-ton strength was set on top of each crib to cushion the crib to the roof. The 30-foot wide setup room had two rows of cribs on 10-foot centers with cribs staggered on 5-foot centers between the rows. All other entries had a single row of cribs installed on 10-foot centers down the middle of the entry. Approval for use of these additional supports was granted by MSHA on November 13, 2003. The additional support materials were installed in all the entries prior to the longwall section retreating through the area (see Appendix L for a drawing showing the additional support).

3. The longwall retreated through the recovery chutes, inby bleeder entry, and connecting crosscuts with little to no trouble. As the longwall entered the setup entry, a significant number of the four-foot diameter Minova cuttable cribs failed, causing convergence of the entry and yielding of the Joy 2 x 970 UST shield supports. Observations during the investigation indicated that the cuttable cribs failed prematurely, well below the design strength of 1800 tons. By the afternoon shift on Thursday, January 1, 2004, production had ceased due to shields being “iron bound”, which prevented further movement of the longwall. By the afternoon shift on Saturday, January 3, 2004, about 24 shields had become “iron bound”, and an additional 27 shields were deemed to be “critical”, as these supports had less than 6 inches of travel remaining on the legs. The working height of the shields ranged from 8 to 14 feet with maximum shield strength at approximately 10 to 11 feet. The shields became “iron bound” at a height of 6 feet.

4. This item discusses the chain sling rigging that was used between No. 49 shield and the DBT PF5/2000/1342 armored longwall conveyor system.

At the time of the accident, an attempt was being made to pull the “iron bound” No. 49 shield by using the ram cylinders on the adjacent shields. The toe of the “iron bound” shield was attached to the face conveyor by the use of two similar two-legged chain slings. Both of the slings were made from Grade 10 chain components and had a reach of 3.5 feet. The main difference between the two chain slings was that one had sling hooks and the other had foundry hooks. Both slings had the same maximum recommended loads. The chain sling with the foundry hooks was connected to the toes of No. 49 shield by placing the hooks into 2 holes in the top of the shield toes. These holes were approximately 49¼ inches apart. The sling with the sling hooks was used as a straight chain with the two chains extending from opposite ends of the master link. One chain was connected to the master link of the other chain by the use of a chocker hitch, which involved wrapping the chain around the master link and hooking the hook to the chain. The other end of the chain was attached to the conveyor pan by placing the hook in the slotted hole used to connect the ram for advancing the longwall. This hole was approximately 2½ inches wide by 4⅜ inches long. The slotted hole was approximately 25 degrees from vertical. The angle between the location where the hook was connected to the face conveyor and where the 2 hooks were connected to the toes of the shield was approximately 84 degrees from vertical. The combination of these angles made the angle between the centerline of the slotted hole and the direction that the chain slings were pulling approximately 109 degrees. At this angle, the effective width of the slotted hole for the hook, which was attached to the face conveyor, was approximately 2⅝ inches.

5. The two-legged chain sling, which broke during the accident, was assembled and distributed by D&M Wire Rope of Grand Junction, Colorado. The D&M serial number on the chain sling was 392339. The chain sling consisted of a master link with two chains attached by the use of quick-alloy coupling links. Each of the chains had eight ¾-inch, Grade 10 welded chain links with a Grade 10 sling type chain hook attached to the end. The chain hooks had clevis type ends, which were used to attach the hooks to the chains. Each of the components of the chain sling had a recommended maximum working strength of 35,300 lbs, when loaded by a straight pull. All of the components in the chain sling had a factor of safety of 4:1, giving these components an average breaking strength of approximately 141,200 lbs during a straight pull. The maximum reach on the chain sling from the inside of the master link to the inside of one of the chain hooks was 3

feet 6 inches. When utilizing both legs of the sling for a pull, the manufacturer recommends a maximum angle of 60 degrees between the two legs of the chain, which provides a working strength of 61,100 pounds and a breaking strength of 244,400 pounds for the sling arrangement. Campbell Chain, owned by Cooper Industries, manufactured all components with the exception of the master link. This was manufactured by Gunnebo Industries AB, a division of Gunnebo Johnson Corporation.

6. When proper rigging procedures are used, the centerline of the hook should be in line with the centerline of the chain. Wear marks on the inside of the hook showed that the hook contacted the edge of the slotted hole approximately 1½ inches from the tip of the hook. Wear marks showed that the outside of the hook contacted the opposite side of the slotted hole. With the hook in this position, there was an angle of approximately 60 degrees between the centerline of the hook and the centerline of the chain. This misalignment caused the inside dimension of the hook to spread from approximately 2½ inches to about 4⅛ inches before it broke. In summary, when the slotted hole was checked for compatibility with the hook used on the rigging configuration, the hook would not properly engage due to the physical characteristics of the hook and the size and bore of the welded ear on the conveyor, thus causing tip loading of the hook. Information from the manufacturer indicated that the recommended working load of a hook when tip loaded would be reduced to 41 percent of the design working load. Thus, the tip loaded hook would have a working load of 14,473 (0.41 times 35,300) pounds and a breaking load of about 57,892 pounds.

7. The double-acting ram on the Joy Mining Machinery 2 x 970 US ton supports was capable of producing the following forces, based on the manufacturer’s data and the pressures (approximately 320 BAR or 4700 PSI) observed during the investigation:

   a. Support advance load of 73.22 US tons, or 146,440 pounds of force each.

   b. Conveyor advance load of 31.96 US tons, or 63,920 pounds of force each.

   Thus, the force applied by the two adjacent shields during conveyor advance loading to the face conveyor and to the chain sling was approximately 127,840 pounds (2 times 63,920

pounds) when the No. 49 shield was not assisting in the process.

8. A summary of the working strengths, breaking strengths, and loading of the chain sling rigging is shown in the following table:

	Working Strength (pounds)	Breaking Strength (pounds) 4:1 Safety Factor	Ratio of Applied Force* to Working Strength	Ratio of Applied Forces* to Breaking Strength
Sling in Straight Pull (sling attached to face conveyor)	35,300	141,200	3.6 to 1	0.9 to 1
Sling at max. 60^{o} 2-chain pull as recommended by manufacturer (sling connected to shield toes)	61,100	244,400	2.1 to 1	0.5 to 1
Tip loaded hook attached to slotted hole on face conveyor	14,473**	57,892	8.8 to 1	2.2 to 1

* The applied force was 127,840 pounds from the two adjacent shields pushing the face conveyor without the force of No. 49 shield assisting.
** Tip loaded hook working strength was 41% of 35,300 pounds.

In summary, the 127,840 pounds of force used to push the conveyor and which was applied to the sling, was 3.6 times greater than the recommended working load of 35,300 pounds for the chain sling assembly when used in a straight pull, and was about 90 percent of the breaking load. Likewise, the applied force was 8.8 times greater than the recommended working load of a tip loaded hook, and 2.2 times greater than the breaking load.

9. At the time of the accident, Willden, Beach, Crane, Joe Hewko, mechanic, Kirk Jensen, diesel mechanic, and Rick Parkins, longwall coordinator for Canyon Fuel's three Utah mines, were in the area. See Appendix K for locations. Willden and Jensen both stated during the investigation that they were very uncomfortable with the chain rigging arrangement. Parkins, who had just traveled past No. 49 shield, cautioned the miners not to trust the chains. He did not give any directions or instructions on using the chain slings or on the work that was being done at No. 49 shield. Parkins claimed that he did not have authority to direct the workforce or assign duties and that he only acted in an advisory capacity to mine management on longwall operations. Statements indicated that Crane was comfortable with the chain sling rigging and that he chose to operate the controls of No. 49 shield.

10. Crane's training records were reviewed and found to be in compliance with MSHA's 30 CFR Part 48 requirements.

11. During interviews conducted on January 21, 2004, it was learned that another sling had failed on the longwall just prior to the January 3, 2004, fatal accident. This failure was at a different location on the longwall face, involved a different group of miners, and did not cause any injuries.

ROOT CAUSE ANALYSIS

A root cause analysis was conducted and the following causal factors were identified, that may have averted the accident entirely or mitigated the severity of the accident:

1. Causal Factor: The failure of the Minova cribs once the longwall entered the setup entry caused significant convergence of the entry, thus creating tremendous loading on the Joy Mining Machinery 2 x 970 UST supports and causing a yield condition of the supports and subsequent "iron bound" condition.

   Corrective Action: Re-evaluate the mine's roof control needs in the future and further evaluate the logistics and practice of longwall retreat mining through previously developed entries. In addition, should future use of poured type concrete cribs be used in a similar situation, testing of the product should be conducted to verify proper mix and that desired strength has been achieved.

2. Causal Factor: Crane's position on No. 49 shield during the process of trying to free the support put him in the direct "line of fire" of the sling rigging in a hazardous location.

   Corrective Action: Additional training was provided for all employees and supervisors about the hazards associated with chain and/or wire rope rigging and safe positioning of persons during rigging processes, especially while these units are tensioned. Management should routinely observe work habits and strictly enforce safe work procedures for proper use of rigging and safe positioning of miners when doing this type of work.

3. Causal Factor: Incorrect rigging and subsequent failure of the two-legged sling between the longwall shield and the face conveyor.

Corrective Action: Following the January 3, 2004 accident, SUFCO management removed all chain slings from service, used other means to free the "iron bound" shields, and conducted training classes regarding chain slings and the rigging process. SUFCO management should have taken a more proactive approach to the initial sling failure that occurred prior to the accident on the section and made all persons aware of that failure. Both the longwall coordinator and the foreman in charge of the work at No. 49 shield had safety concerns with the chain sling rigging that was being used. Management should strictly enforce safe work procedures for proper use of rigging and safe positioning of miners when doing this type of work. The operator should proactively ensure that proper procedures are followed through job observations, task risk analysis, or equivalent means.

CONCLUSION

The direct cause of the accident was the use of the two-legged chain slings in an application where the applied loads exceeded the design strength of the slings and the improper placement of the hook in the slotted hole on the face conveyor which caused tip loading. The hook was not properly engaged in the elongated slot on the conveyor, and could not be, due to the physical characteristics of the hook and slot. These factors resulted in the hook breaking, recoiling, and causing the accident during the attempt to advance No. 49 shield. In addition, the position of the victim on the toe of No. 49 shield, in the "direct line of fire" of the tensioned chain sling, put him in a hazardous location. The failure of management to take corrective actions when a hazardous work practice was observed was a contributing factor to the cause of the accident.

ENFORCEMENT ACTIONS

Section 103(k) Order No. 7634538 was issued on January 4, 2004, to ensure the safety of persons working on the 3 Left Pines East section, MMU001-0, until an investigation of the area and accident site could be completed and the area deemed safe.

Approved by:

_____ _____

Allyn C. Davis Date
District Manager

APPENDIX A

Persons furnishing information and/or present during the accident investigation were:

CANYON FUEL COMPANY LLC OFFICIALS

Richard Pick	President
Kenneth E. May	General Manager
Craig Hilton	Technical Services Manager
Rick Parkins	Longwall Coordinator
Mike Davis	Engineer
Mark Bunnel	Geologist
Gary Leaming	Safety Supervisor
Fred Veater	Safety Compliance
Shannon Heaps	Shift Supervisor
Glenn Lott	Shift Supervisor
Glade Faatz	Longwall Foreman
Shane Huntsman	Longwall Foreman
Jerry Brooks	Section Foreman
Russell Willden	Section Foreman
Jim Carter	Longwall Foreman
John Allsop	Section Foreman & EMT
Kerry Blood	Maintenance Foreman

CANYON FUEL COMPANY LLC EMPLOYEES

Phillip Beach	Laborer & EMT
Mark Christensen	Fireboss
Merlin Durfee	Shearer Operator
Joe Hewko	Mechanic
Kirk Jensen	Diesel Mechanic
Mark Johnson	Shearer Operator
Preston Stieger	Shearer Operator
DeVere Sudwicks	Headgate Operator
Cash Veater	Shearer Operator
Kent Worthington	Supply Man

JACKSON KELLY LAW FIRM

Katherine Shand Larkin	Attorney at Law

SEVIER COUNTY SHERIFF'S OFFICE

Phil Barney	Sheriff
Delbert Lloyd	Deputy Sheriff

MINE SAFETY & HEALTH ADMINISTRATION

Allyn C. Davis	District Manager
William G. Denning	Staff Assistant
Donald E. Durrant	Coal Mine Safety & Health Inspector
Eugene D. Hennen	Mechanical Engineer
Gary L. Jensen	Coal Mine Safety & Health Roof Control Specialist
Jerry O. D. Lemon	Coal Mine Safety & Health Inspector
Kent Norton	Training Specialist
Billy D. Owens	Roof Control Supervisor

APPENDIX B

Persons interviewed during the investigation were:

CANYON FUEL COMPANY LLC SUFCO MINE

John Allsop	Section Foreman & EMT
Phillip Beach	Laborer & EMT
Kerry Blood	Maintenance Foreman
Jerry Brooks	Section Supervisor
Jim Carter	Longwall Foreman
Mark Christensen	Fireboss
Merlin Durfee	Shearer Operator
Glade Faatz	Longwall Foreman
Shannon Heaps	Shift Supervisor
Joe Hewko	Mechanic
Shane Huntsman	Longwall Foreman
Kirk Jensen	Diesel Mechanic
Mark Johnson	Shearer Operator
Glenn Lott	Shift Supervisor
Rick Parkins	Longwall Coordinator
Preston Stieger	Shearer Operator
DeVere Sudwicks	Headgate Operator
Cash Veater	Shearer Operator
Russell Willden	Section Foreman
Kent Worthington	Supply Man

APPENDIX C

BROKEN HOOK THAT STRUCK VICTIM

APPENDIX D

THE TWO 2-LEGGED CHAIN SLINGS AS RIGGED DURING ACCIDENT
THE BROKEN HOOK IS IN FOREGROUND WITH WHITE TAG ATTACHED

APPENDIX E

2-LEGGED CHAIN SLING WITH BROKEN HOOK

APPENDIX F

BROKEN HOOK LAYING ON TOP OF OTHER HOOK FROM 2-LEGGED CHAIN SLING

APPENDIX G

SLING IDENTIFICATION TAG

APPENDIX H

SLOTTED HOLE ON FACE CONVEYOR WHERE HOOK WAS INSERTED

APPENDIX I

RE-ENACTMENT OF HOOK INSERTED INTO SLOTTED HOLE ON FACE CONVEYOR

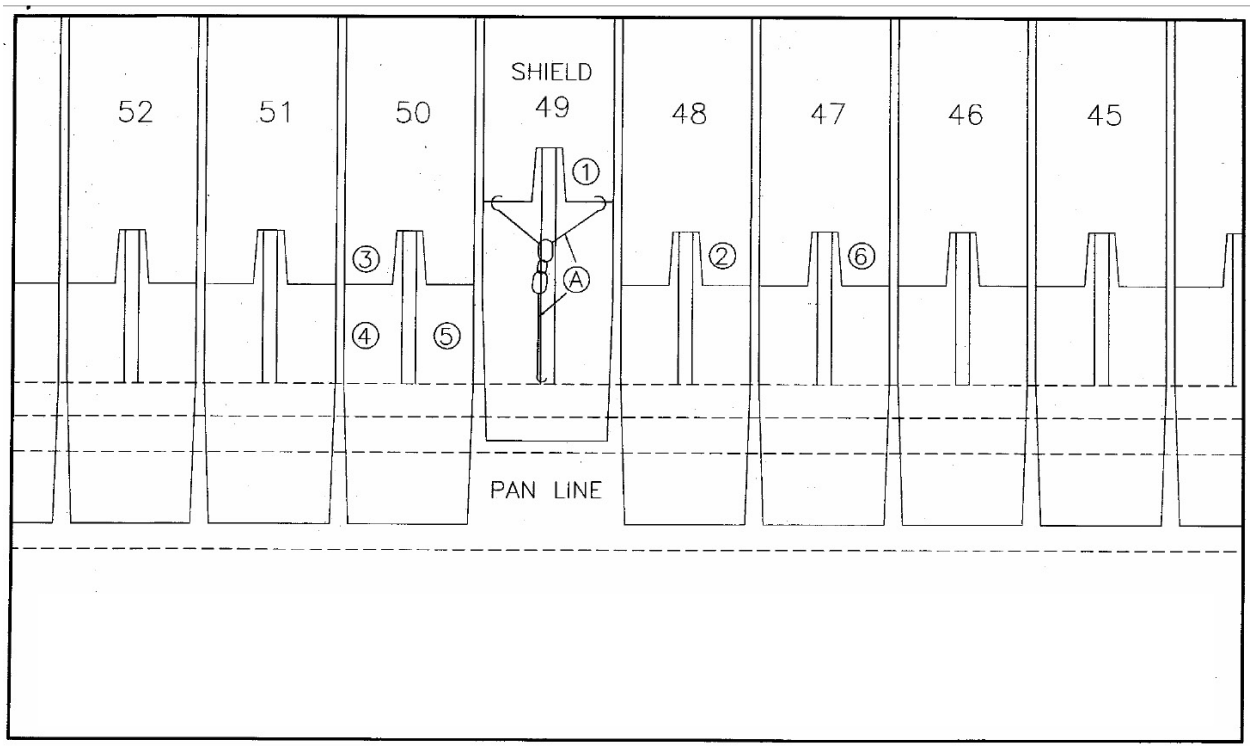
APPENDIX J

RE-ENACTMENT OF SLING ATTACHED TO TOES OF NO. 49 SHIELD VICTIM WAS LOCATED ON THE RIGHT SIDE SHIELD TOE

APPENDIX K

PLAN-VIEW SKETCH OF LONGWALL FACE AREA AND NO. 49 SHIELD
(NOT TO SCALE)

FATAL MACHINERY ACCIDENT
SUFCO MINE, ID NO. 42-00089
CANYON FUEL COMPANY, LLC
SALINA, SEVIER COUNTY, UTAH
JANUARY 3, 2004



1 – RUSSELL CRANE (Victim)
2 – RUSSELL WILLDEN, Supervisor
3 – KIRK JENSEN, Diesel Mechanic
4 – JOE HEWKO, Mechanic
5 – PHILLIP BEACH, Laborer
6 – RICK PARKINS, Longwall Coordinator
A – CHAIN RIGGING BETWEEN SHIELD AND FACE CONVEYOR

APPENDIX L

3LPE SETUP ROOM SUPPORT PLAN

FATAL MACHINERY ACCIDENT
SUFCO MINE, ID NO. 42-00089
CANYON FUEL COMPANY, LLC
SALINA, SEVIER COUNTY, UTAH
JANUARY 3, 2004