UNITED STATES
DEPARTMENT OF LABOR
MINE SAFETY AND HEALTH ADMINISTRATION

COAL MINE SAFETY AND HEALTH

REPORT OF INVESTIGATION

Underground Coal Mine
Inundation of Water
Resulting in Entrapment of Miners
May 9, 2009

Alpha Natural Resources
Cobra Natural Resources, LLC
Mountaineer Alma A Mine
Wharncliffe, Mingo County, West Virginia
ID No. 46-08730

by

Terry L. Bentley
Chief Accident Investigator, MSHA Headquarters, Arlington, VA

Tim Bower
Mining Engineer, District 4, Mt Hope, WV

Robert Brazer
Civil Engineer, Technical Support, Bruceton, PA

Don Kirkwood
Civil Engineer, Technical Support, Bruceton, PA

David Steffey
Mining Engineer, Accident Investigator, District 6, Pikeville, KY

Originating Office
Mine Safety and Health Administration
Coal Mine Safety and Health
1100 Wilson Boulevard
Arlington, Virginia 22209
Kevin G. Stricklin, Administrator

TABLE OF CONTENTS

Clogged Culverts Due to Slide

OVERVIEW

At approximately 5:30 a.m. on Saturday, May 9, 2009, an inundation by water occurred at the Cobra Resources, LLC, Mountaineer Alma A Mine. The water, caused by heavy storm runoff, entered the mine portals and accumulated in a low area, located between the 2nd and 11th crosscuts inby the portals (see maps in Appendix C). The accumulated pool of water underground was roofed completely in portions of all entries between crosscuts 4, 5, 6, 7, and 8 (see Figure C-2), which blocked the egress of seven miners. The miners were trapped for approximately 24 hours until the water was pumped down to allow exit from the mine

The trapped miners were Larry Brandon Cantrell, age 30; Scott Varney, age 39; John Allen Dillon, age 31; Randall Kenneth Townsend, age 22; Robert Wade Canada, age 23; Randy Wayne Atwood, age 36; and Wayne Kennedy, age 54,. During the period their

escape was blocked, none of the trapped miners were injured and they all remained dry. The miners were in constant communication with personnel on the surface of the mine via the mine phone, and were able to call from inside the mine and speak to their family members. The miners had the option to evacuate the mine through an escape capsule, but decided to wait until the water was pumped down to allow exit from the mine through the portal.

The storm runoff water that entered the mine portals was diverted when culverts underneath the portals were blocked by debris, mud, and rock, caused by scouring (removal of sediment by swiftly moving water) and erosion from a mud slide. The slide prevented water flow through the culverts, which caused the water to back up and enter the mine. Another factor that contributed to the accident was the inability of the mine's system of diversion ditches to handle the storm water flow, as designed. The diversion ditches were not maintained or kept cleared of sediment, rocks, or vegetation, such as trees and underbrush. This allowed the runoff water to overtop the diversion ditches, flooding surface areas above the mine portals.

GENERAL INFORMATION

Cobra Natural Resources, LLC's Mountaineer Alma A Mine, I.D. No. 46-08730, is an underground coal mine located near Wharncliffe, West Virginia. Alpha Natural Resources, located in Abingdon, Virginia, is the parent company of Cobra Natural Resources, LLC. The principal officers for the mine at the time of the accident were:

Gregory S. Blankenship	President/Manager
Vaughn R. Groves	President/Treasurer
John W. Pearl	Vice President/Treasurer
Ronald Miller	Superintendent

The mine has five drift openings and four shaft openings into the Alma A Seam. The seam averages 55 inches in height. Two fans, blowing 985,000 cubic feet of air per minute, provide ventilation. Laboratory analysis of return air samples shows a methane liberation rate of zero cubic feet per day through the mine fans.

Employment is provided for 106 miners. A total of 87 underground company miners, fourteen contract miners and 5 surface miners work on two production shifts per day, five days per week. The third shift is designated as a maintenance shift. The mine produces an average of 5,000 tons of raw material daily from two continuous mining machine units. Coal is transported from the faces by shuttle car. It is transported to the surface of the mine by a belt conveyor system.

The Mine Safety and Health Administration (MSHA) completed the last E01 regular safety and health inspection of the mine on March 13, 2009. A regular E01 safety and

health inspection was commenced on April 01, 2009, and was ongoing at the time of the accident. The Non-Fatal Days Lost (NFDL) injury incidence rate for the mine in 2008 was 3.93, compared to a 2008 National NFDL rate of 4.56 for all underground coal mines.

DESCRIPTION OF THE ACCIDENT

Underground Activity

On Friday, May 08, 2009, at approximately 11:00 p.m., seven underground miners on the third shift began their shift. Four miners entered the mine at the start of the shift. These included Randy W. Atwood, General Laborer, John A. Dillon, Move Crew, and Randall K. Townsend, Move Crew. At approximately 3:00 a.m., Larry B. Cantrell, Section Foreman, and Robert W. Canada, General Laborer, entered the mine. Two other miners, Richard Osborne and Scott Loveridge, general laborers, were scheduled to enter the mine with Cantrell and Canada. However, when Osborne and Loveridge heard that severe storms were near their homes, they wanted to leave the mine site to check on their houses. Both were allowed to leave the mine at approximately 3:00 a.m. Scott Varney, Fireboss, entered the mine later with Wayne Kennedy, Electrician; to restart the 3 horsepower (HP) pump, located at crosscut 6, and reenergize power back after it was lost during the electrical storm.

All of the miners entered via the track entry, which also served as the secondary escapeway, and traveled to their designated work locations. The miners proceeded to perform their assigned duties, and work continued in a normal manner until sometime between 5:00 a.m. and 5:30 a.m., when Cantrell contacted by David Staten, Dispatcher. Cantrell was informed that severe storms had been in the area. Staten told Cantrell that he needed to check the area of the 3 HP pump at crosscut 6. Upon arriving at the 3 HP pump, Cantrell discovered that the mine was becoming inundated with storm water. Cantrell then traveled inby to gather his crew. Cantrell met Varney and Kennedy at Number 3 Head. Cantrell and Varney had been contacted by Staten and advised of the situation. Shortly before 6:00 a.m., the miners attempted to evacuate through the portals entering the mine, but found their escape had been cut off by the inrushing surface water. Cantrell then contacted Staten from the mine phone at Number 2 Head and informed him that all the entries leading into the mine had become filled with water, making escape through the mine portal entries impossible.

During the course of the day, the seven trapped miners discussed the possibility of traveling approximately 3,000 feet back through the mine to the Horsepen Air Shaft, where an emergency escape hoist had been set up. Based on their knowledge of the mine conditions, including the distance to the air shaft, the potential for other accumulations of water in low areas, the fact that they were in a safe location, the risks associated with being hoisted, the trapped miners unanimously decided that it would

be safer to stay at 2 Head and wait for the water to be pumped. The miners also expressed concern over the potential to be injured or become separated, if they attempted to travel to the Horsepen Air Shaft.

Surface Rescue Activity

Upon learning the miners were trapped, Staten immediately contacted Ronald B. Miller, Superintendent at the Mountaineer Alpha A Mine, and advised him of the trapped miners. Miller then contacted Greg Blankenship, President of Cobra Natural Resources, and Matt Murray, Safety Supervisor. At approximately 6:00 a.m., Murray called Staten, after learning more of the situation. Murray immediately called the MSHA call center, and the West Virginia Office of Miner's Health, Safety and Training (WVOMHST). Murray also contacted Paul D. Blankenship, Safety Manager at the mine, and informed him of the situation.

Miller and Murray attempted to travel to the mine site. Miller encountered flood waters blocking his route. During his attempt to reach the mine site, he met John Brown, MSHA Coal Mine Safety and Health Inspector, who was also trying to reach the mine site. Finding all routes of travel to the mine cut off, Miller went to Omar, West Virginia, where he boarded the company helicopter. He was flown to Logan, West Virginia and picked up Randy McMillion, Executive Vice President and Chief Operating Officer of Alpha Natural Resources. They proceeded to the mine site, arriving at approximately 10:30 a.m., and joined the rescue operations. They also met Brown, who eventually found a passable alternate route to the mine.

Staten also spoke with Jared Calloway, Section Foreman, who had called from home at approximately 6:00 a.m., to warn the men working at the mine of the flooding in nearby Gilbert, West Virginia. Upon learning of the trapped miners, Calloway began to make his way to the mine site. When Calloway arrived at approximately 6:30 a.m., he met Osborne and Loveridge, who had found their passage to their homes blocked by floodwaters, and had returned to the mine site. They began attempting to divert water away from the portal area.

P. Blankenship immediately began traveling toward the mine from the Logan, WV area by an alternate route to access the Mountaineer Alma A Mine site and arrived by 6:30 a.m. P. Blankenship learned that the men were trapped, but were safe and in constant communication with the surface. He also learned that surface water had inundated the mine, and proceeded to the portal area, where he saw the water entering the drift. He then began to assist Calloway, Osborne, and Loveridge in attempting to divert the water from the portal area. Lenard Davis, Equipment Operator, arrived shortly afterward from an adjacent operation and began to lend assistance in diverting the water from the portal area. Carl Kovar, Electrician, arrived and traveled with P.

Blankenship to restore power to the main mine fan at the portal, the fan on Thacker Branch and several pumps. Power was restored to the sites by 8:55 a.m.

Allen Dupree, Vice President of Safety, arrived at approximately 10:30 a.m. and assumed control of rescue operations. Dupree had initially attempted to drive to the mine, but was transported eventually via company helicopter after he encountered floodwaters blocking the highway. P. Blankenship called Service Pump & Supply, Inc. and requested that additional large capacity pumps and accessories be brought to aid rescue operations. Several other vendors were contacted and additional pumps arrived throughout the day. Nine, 6-inch pumps were running at one point during the rescue operation. The surface personnel also began diverting water from the portal area through the stockpile area. The men on site had already cleaned a ditch behind the fan house at the portal with an excavator to slow the water that was flowing into the mine, due to culverts at the portals that had become blocked from a slide at the outlet in the ditch.

At about 10:30 a.m., Dupree also spoke with Brown. Brown then called and requested the MSHA escape capsule be brought to the Horsepen Air Shaft. The crane and escape capsule arrived at approximately 4:30 p.m., but weather conditions made efforts to reach Horsepen Branch very difficult. After road grading on the air shaft access road, the crane was able to reach the airshaft and was set up and tested for use. Additional personnel arrived throughout the day to assist with the rescue efforts. Pumping operations continued throughout the day and into the early morning hours of Sunday, May 10, 2009. The water underground was finally pumped down to a point where miners were able walk out of the mine, unharmed, at approximately 6:00 a.m. on May 10, 2009.

INVESTIGATION OF THE ACCIDENT

The MSHA Call Center was notified of the accident by James Murray, Safety Supervisor, Cobra Natural Resources, LLC, at 6:03 a.m., on Saturday, May 9, 2009. The Call Center subsequently notified Richard Kline, Assistant District Manager-Technical Programs, District 4 at 6:13 a.m. Kline contacted personnel in the Logan, West Virginia Field Office and John Brown, Coal Mine Safety and Health Inspector, was dispatched to the mine. Brown issued a 103(k) Order upon arrival at the mine.

MSHA and WVOMHST jointly conducted the investigation, with the assistance of the operator and their employees (refer to Appendix A for a list of persons who participated in the investigation). Representatives of MSHA, the WVOMHST, and company officials traveled to the portal area and underground to the area inundated by water. Photographs, sketches, and measurements were taken at the portal area on the surface and underground at the area inundated by water.

Formal interviews with persons trapped underground by the water and persons who had knowledge of the accident (refer to Appendix B) were conducted on May 12 and May 13, 2009 at the office of Cobra Natural Resources, LLC, in Wharncliffe, West Virginia. A total of twelve interviews were conducted. On May 13, the on-site portion of the investigation was completed.

DISCUSSION

Mountaineer Mine Complex Surface Layout

The portals of the Mountaineer Alma A Mine are located at the mouth of a side hollow, near the head of the Lefthand Fork of the Left Fork of Ben Creek, approximately one mile northeast of Hinch, Mingo County, WV. The portals are located at 37° 37′ 01″ north latitude and 81° 59′ 37″west longitude. The side hollow, above the mine portals, is approximately 121 acres. From the mouth of this side hollow, the Lefthand Fork extends almost directly north, ending in two small hollows reaching toward the northwest and northeast. The total area above the side hollow, at the head of Lefthand Fork, is approximately 250 acres.

The mine complex is on two levels. Another mine, the Mountaineer Mine, MSHA I.D. No. 46-06958, was mined in the Lower Cedar Grove coal seam and is about 70 feet higher than the Alma A coal seam. The area in front of the mine portals into the Lower Cedar Grove coal seam has been filled, creating a large flat area where various mine facilities, including offices, bath house, motor shed, warehouse, mine supply yard and parking areas have been placed. For clarity, this upper level, at the Lower Cedar Grove mine portals, is referred to as the Lower Cedar Grove level. The Mountaineer Mine, in the Lower Cedar Grove coal seam, has been abandoned since 2005.

Mountaineer Mine Complex Surface Drainage Design

The design for handling surface water, both on the Alma A level and the Lower Cedar Grove level uses various surface features. Rain that falls in the side hollow, and flows toward the Alma A level, routinely collects in one of two small ponds or depressions. One is the Scalp Rock Pond at the curve of the track housing near the Scalp Rock Storage Area, and the other is the Silo Pond along the west side of the silo (See Appendix C-4).

Rain that falls above the track housing will flow along the track housing and through a pipe underneath, toward the Scalp Rock Pond. Rain that falls on the Scalp Rock Storage Area also flows toward the Scalp Rock Pond. From the small Scalp Rock Pond, water primarily flows through a pipe under the track housing and into a ditch, which follows the hillside down toward the Mountaineer Alma A portals (see Appendix C-3 and C-4). If the runoff exceeds the pipe's ability to carry the flow, water will first run over toward

the track housing and be carried down toward the Silo Pond. If the water in the Scalp Rock Pond continues to rise, it would eventually overflow an area where an access road runs down from the Scalp Rock Storage Area to the Silo Pond. The water would then flow into the Silo Pond.

In addition to any water overflowing the Scalp Rock Storage Area into the Silo Pond, a portion of the watershed between the Raw Coal Stockpile Area and the Scalp Rock Storage Area would also flow to the Silo Pond. Water is carried from the Silo Pond through a pipe, which extends to just above the first Alma A coal seam portal. If the runoff exceeds the pipe's ability to carry the flow, water will back up and overflow along the track housing and out toward a sedimentation pond (Pond No. 2) below the Mountaineer Alma A Mine portals. This overflow water would not flow past the mine portals.

Water flowing down the hillside ditch, which includes rainfall on the hillside above the ditch, pipe flow from the Scalp Rock Pond, and pipe flow from the Silo Pond, flows past the Alma A coal seam portals. There are four small depressions or ponds against the hillside between the portal openings. These ponds are connected by sets of three, approximately parallel, corrugated metal pipe (CMP) culverts which connect the ponds and are buried beneath the portal entrances. The final small pond is between the track and fan entries (Portals No. 4 and 5). Water flows from this small pond flows through three CMP culverts, which extend under the fan housing and into a ditch, and then flows into Pond No. 2.

The drainage design for the Lower Cedar Grove area collects most of the runoff from both side hollows and carries it through ditches and two culverts, toward the road and away from the Alma A level. The only runoff that should normally flow toward the Alma A level is rain that falls on the hillside above the Lower Cedar Grove coal seam portals, and drainage from approximately half of the supply yard and the offices, motor shed, bath house, and parking areas (see Appendix C-1). Most of this water flows through a sedimentation ditch between the hillside and the track housing, through a CMP culvert under the track housing, and down toward the Alma A level and Pond No. 2, through a ditch lined with rock (riprap) that discharges near the outlet of the CMPs draining the small pond between the Alma A coal seam Portals No. 4 and 5. A small portion of the runoff from the motor shed, bath house, offices and parking areas will flow to other riprapped ditches that outlet just above Pond No. 2.

The Storm of May 8-9, 2009

The National Weather Service (NWS) maintains a system of rainfall monitoring stations, some of which record hourly rainfall totals. The closest hourly NWS station to the mine is at Hanover, West Virginia, which is approximately 8 miles away (see Appendix D). The rainfall data from Hanover indicates a total rainfall amount, beginning at

approximately 10:00 p.m. on May 8, 2009 and ending around noon on May 9, 2009 (approximately 14 hours), of 4.54 inches. The most intense period of this rainfall was between 5:00 a.m. and 8:00 a.m., when approximately 2.29 inches of rain fell in three hours, approximately 50.4% of the total rainfall, with the most intense hour having 0.84 inches (18.5% of the total). The Hanover rainfall duration is consistent with the observations at the mine. The rainfall started at the mine sometime between 10:00 p.m. and 11:00 p.m., continuing until late the next morning or early afternoon. The NWS reported that the heaviest rain occurred shortly after 5:00 a.m. Cobra Natural Resources, LLC maintains rainfall gauges at various mine locations, which are read about once every 24 hours. The rainfall gauge at the Ben Creek office measured a total rainfall of 3.38 inches on May 8-9, 2009.

The total rainfall at the mine was believed to have been between a 10 year and 25 year rainfall event, which is the largest rainfall expected to occur on average once every 10 or 25 years. It should be noted that despite the 2.29 inches of rain that fell in three hours in Hanover, a rainfall event typically used for designing critical water conveyance structures, such as a ditch carrying water away from a mine opening, would have a far more severe rainfall intensity distribution. For example, the National Resources Conservation Service's (NRCS) Type II design curve, which is the typical design curve used for this type of analysis, would distribute 59.5% of the rainfall in three hours, with 42.8% of the total rain falling within a single hour.

Failure of the Surface Drainage System

The failure of the surface drainage system at the Mountaineer Mine Complex was the primary cause of the extent of flooding in the Mountaineer Alma A Mine on May 8-9, 2009. At the upper end of the mine supply yard, the ditches and culverts that carry the runoff from a large percentage of the watershed above that point had failed. This failure was in part due to a lack of maintenance. Trees were found growing in a portion of the ditch and the intake end of one of the culverts was completely buried, allowing almost no water to flow through. Consequently, this runoff, which should have flowed away from the Alma A coal seam portal area, instead flowed along the sediment channel between the track housing and the highwall, through the CMP culvert under the track housing, and down toward the Alma A level and the sedimentation pond through a rip rapped ditch that discharges near the outlet of the CMPs draining the small pond between the Alma A coal seam Portals No. 4 and 5. A hydrologic model, using estimated parameters, showed that the failure of this upper ditch resulted in an increase of over 600% in the flow through this culvert. This increased flow resulted in serious scouring in the steep, rip rapped ditch, which extended down from the Lower Cedar Grove level to the Alma A level. This scoured material collected at the bottom of the ditch, covering the outlets and clogging the three culverts draining the area in front of the Alma A coal seam portals. Consequently, much of the runoff which should have

flowed through these culverts, instead backed up into the area in front of the portals and then entered the portals.

Measures to Reduce Inflow into Mine During Storm

By 4:00 a.m. on May 9th, the main streams in the area were overflowing, making many of the roads impassable. Several of the company personnel were shuttled to the mine by helicopter because of the impassable roads.

A number of measures were taken to reduce the amount of water that was flowing into the mine, many while it was still raining. Although significant rain fell between 10:00 p.m., Friday, May 8, and 5:00 a.m., Saturday, May 9, 2009, the heaviest rain fell during the approximate three hour period of 5:00 a.m. to 8:00 a.m. Between 5:00 a.m. and 5:30 a.m., water was noticed flowing into the mine through the portals.

By 6:00 a.m. the outlets to the culverts under the fan housing had already been blocked. An excavator was brought to remove the debris blocking the culverts and restore the outflow from the front of the portals. By 10:00 a.m., these culvert outlets had been cleared and the water started draining from the area in front of the portals.

The first pump was set outside, between the belt and track entry portals some time shortly after 6:30 a.m. Additional pumps were ordered and several small pumps had been added by 10:30 a.m. After the culvert outlets had been cleared by 10 a.m., the water started to recede in front of the portals. Reportedly, approximately 3 inches of water was still flowing into the track entry portal between 10:00 a.m. and 10:30 a.m. At approximately 11 a.m., the suction tube for a diesel pump had been moved underground, into the track entry. The maximum pumping capacity of all pumps, which was estimated to have been approximately 6,000 gallons per minute (GPM), was not in place until early Saturday afternoon.

The inlet of the culvert, draining water flowing in the sedimentation ditch from the Lower Cedar Grove level down to the Alma A level, was blocked by company personnel sometime after 9:00 a.m. This was done to reduce the water flow over the hill, so that the outlets of the culverts under the fan housing could be unblocked. After this culvert was successfully blocked, the inlets for the culverts that drain both the Scalp Rock and Silo Ponds were blocked by company personnel. This reduced the flow of water in front of the portals. Finally, sometime after 10:30 a.m., a ditch was excavated between the track and the raw coal stockpile, reducing the water from flowing into the Silo Pond. At approximately 11:00 a.m. on Saturday, about the time excavation was completed, all flow into the mine portals had stopped. It was also about this time that the trapped miners first noticed that the water was starting to recede underground.

Capacity of Surface Drainage System

Hydrologic models were developed to study the flooding as reported by those at the mine. The model assumed a total rainfall of 3.38 inches, as measured in the rain gauge at the Ben Creek office. Dimensions were scaled from the topographic drawing of the Alma A and Lower Cedar Grove levels. The hydrologic model of the Alma A level was adjusted until it reasonably matched the flooding conditions observed at the mine, including the roughly 7.6 million gallons of surface flow into the underground mine. The model was further adjusted to represent the condition of the three culverts under the fan housing as unclogged, as they would have been before the scoured material clogged their outlets. This model suggests that had the outlets to the culverts not been blocked by the scoured material, no water would have entered the mine through the portals. However, applying this flow model and assuming that the culverts had not been blocked, a 10-year design storm over the mine's surface area would have resulted in water flowing into the portals and a 100-year design storm would have resulted in significant flow into the mine, estimated as 1.2 million gallons.

The hydrologic model of the upper area, the Lower Cedar Grove level, revealed that if the drainage system had been maintained, as designed, it would have been close to being capable of handling the May 8-9, 2009 rainfall event. The capacity of the drainage system might have been exceeded, but not by enough to have caused the type of scour damage that was experienced on the hillside between the Lower Cedar Grove and Alma A levels. A 10-year design storm flood would greatly exceed the capacity of Lower Cedar Grove level drainage system, according to the model. Likewise, the drainage system is not close to being adequate for a 100-year design flood.

Crack in No. 2 Entry

Water was observed flowing from a crack in No. 2 entry on May 9, 2009, by MSHA personnel. The crack is located near the beginning of No. 2 entry and is approximately 10 feet inby Survey Station (Spad) No. 48 on the left rib. The crack is nearly vertical and extends from the mine floor to the mine roof in the coal rib, approximately 5 feet long. The width of the crack ranges from approximately 1/2 inch to 2 inches in the coal rib. The crack extends into the mine roof and across the entry, towards No 3 entry, where it disappears above the coal pillar between No. 2 and No. 3 entries. The crack in the mine roof lines up with the inby rib of the crosscut located between No. 2 and No. 3 entries to a large extent, and is approximately 1/8 inch in width. The crack in the coal rib is located approximately 100 feet from the coal outcrop, as measured perpendicular from the outcrop on the mine map, and runs on an approximate bearing of North 48° East, towards No. 3 Entry.

During the investigation, a flow of clear water exiting the crack was observed from the lower half of the crack in the coal rib and was measured to be approximately 50 GPM.

No water was observed flowing from the crack in the mine roof. The water from the crack normally flows inby on the mine floor down No. 2 entry to a permanently stationed 13 horsepower (HP) pump where it is pumped outside to the surface. The pump is located in the intersection of No. 6 crosscut in No. 2 entry, approximately 90 feet inby Spad No. 53.

According to the operator, the crack and the flow of water have existed since the area was first developed. The flow remains constant normally, and has not been a problem since the pump was installed to control it. Thus, due to the size of the crack and volume of water observed flowing from the crack, it does not appear to have played a significant role in the inundation of the low area at the portal and should have been adequately controlled by the pump stationed in the intersection of No. 6 crosscut in No. 2 entry prior to the loss of electrical power.

ROOT CAUSE ANALYSIS

An analysis was conducted to identify the underlying causes of the accident that were correctable through reasonable management controls. Listed below are root causes identified during the analysis and the corresponding corrective actions implemented to prevent a recurrence of the accident:

1. Root Cause: The mine operator did not regularly monitor and properly maintain the mine's system of diversion ditches, designed to route storm runoff surface water away from the mine portals and into ponds constructed to handle runoff.

Corrective action: The mine operator submitted a plan under 30 CFR, §75.380(e), which, if followed, is designed to assure that storm runoff surface water, will not enter the mine portals.

2. Root Cause: The mine operator failed to monitor the portals of the underground mine where storm runoff surface water entered the portals, accumulated in a low area in the mine and blocked the primary and alternate escapeways.

Corrective action: The mine operator submitted a plan under 30 CFR, §75.380(e), which, if followed, is designed to assure that the mine portals are actively monitored during periods of rainfall and that miners will be evacuated from the underground mine when the plan action levels are reached.

CONCLUSION

The accident occurred because storm runoff water entered the mine portals after being diverted when culverts underneath the portals were blocked by debris, mud, and rock, caused by scouring and erosion from a mud slide. The slide prevented water flow through the culverts, which caused the water to back up and enter the mine. Another factor that contributed to the accident was the inability of the mine's system of diversion ditches to handle the storm water flow, as designed. The diversion ditches were not maintained or kept cleared of sediment, rocks, or vegetation, such as trees and underbrush. This allowed the runoff water to overtop the diversion ditches, flooding surface areas above the mine portals. The mine's escapeways were blocked when the surface water entered the mine, preventing seven miners from exiting the mine and entrapping them for approximately 24 hours.

Approved:

_____ _____

Kevin G. Stricklin Date
Administrator

ENFORCEMENT ACTIONS

1. A 103(k) Order, No. 8083359, was issued to Cobra Natural Resources, LLC, on May 9, 2009, to ensure the safety of persons at the mine until an investigation of the accident can be completed.

2. A 104(a) Citation, No. 7234668, was issued to Cobra Natural Resources, LLC, for a violation of 30 CFR, §75.380(e), stating, The mine operator did not regularly monitor and properly maintain the mine's system of diversion ditches, designed to route storm runoff surface water away from the mine portals and into ponds constructed to handle runoff. Consequently, the operator failed to adequately protect the surface openings at the main portal area to prevent flood water from entering the mine, in that flood waters from the surface entered the mine and inundated the escapeways on the morning of May 9, 2009, around 05:30 hours, making the escapeways impassable. The outlets, of the three 30 inch corrugated metal pipe culverts used to convey water by the fan portal entry, became blocked from sediment due to erosion caused by runoff from a severe storm. The blocked pipe outlets resulted in the runoff water from the storm to backup from the fan housing and run into the mine. The surface water entered the mine and inundated a low area at the main portal in all 10 entries from approximately the No. 2 crosscut inby, through No. 10 crosscut, trapping 7 miners from exiting the mine. The depth of the water ranged from 0 feet to approximately 9 feet deep and was roofed in most areas.

3. A 104(a) Citation, No. 7234667, was issued to Cobra Natural Resources, LLC, for a violation of 30 CFR, §75.380(d)(1), stating, the operator failed to maintain the two separate and distinct escapeways in safe condition to always assure passage of anyone, including disabled persons, in that flood waters from the surface entered the mine and inundated the escapeways on the morning of May 9, 2009, around 05:30 hours, making the escapeways impassable. The flood waters entered the mine and inundated a low area at the main portal in all 10 entries from approximately No. 2 crosscut inby, through No. 10 crosscut, trapping 7 miners from exiting the mine. The depth of the water ranged from 0 feet to approximately 9 feet deep and was roofed in most areas.

APPENDIX A - Persons Participating In the Investigation

The following people provided information and/or were present during the investigation:

Cobra Natural Resources, LLC

Greg Blankenship	President/General Manager
Ronald "Boone" Miller	Superintendent
Paul "Doug" Blankenship	Manager of Safety
James "Matt" Murray	Safety Supervisor
Donna Kelly	Attorney – Dinsmore & Shohl, LLP

Alpha Natural Resources

Allen Dupree	Vice President - Safety

Mine Safety and Health Administration

Terry Bentley	Chief Accident Investigator, Arlington, VA
Tim Bower	Mining Engineer, District 4
Robert Brazer	Civil Engineer, Technical Support-Pittsburgh
Don Kirkwood	Civil Engineer, Technical Support-Pittsburgh
David Steffey	Mining Engineer-Accident Investigator, District 6

West Virginia Office of Miners' Health Safety & Training

Terry Farley	Health & Safety Administrator
Eugene White	Inspector at Large, Region 3
John Kinder	Assistant - Inspector at Large, Region 3
Danny Jarrell	District Inspector, Region 3
Monte Hieb, PE	Chief Engineer

APPENDIX B - Persons Interviewed

The following people were interviewed:

Cobra Natural Resources, LLC

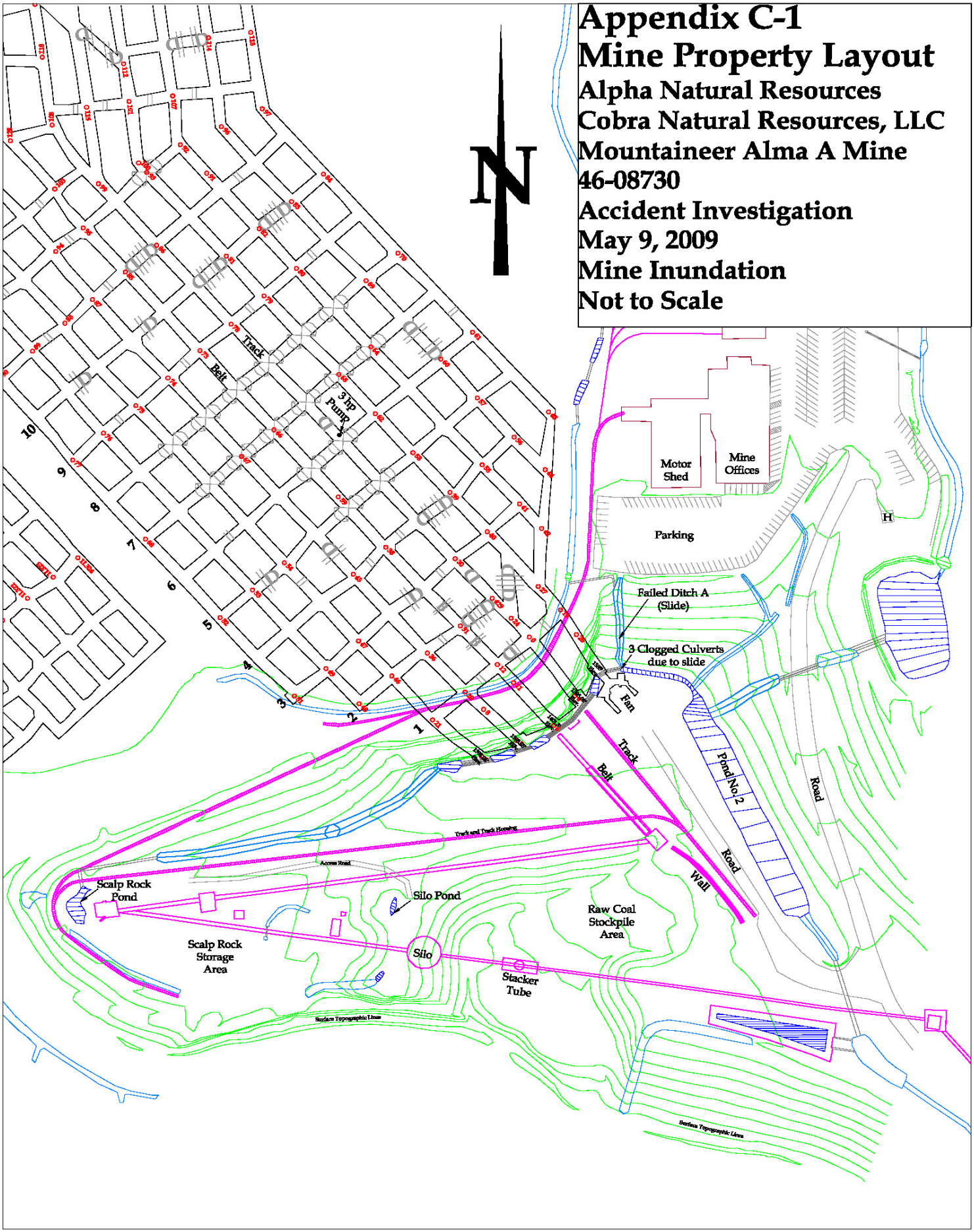
Greg Blankenship	President/General Manager
Ronald "Boone" Miller	Superintendent
Paul "Doug" Blankenship	Manager of Safety
Larry Cantrell	Section Foreman
Scott Varney	Fireboss
Randall Townsend	Move Crew
David Staten	Dispatcher
Jared Calloway	Foreman

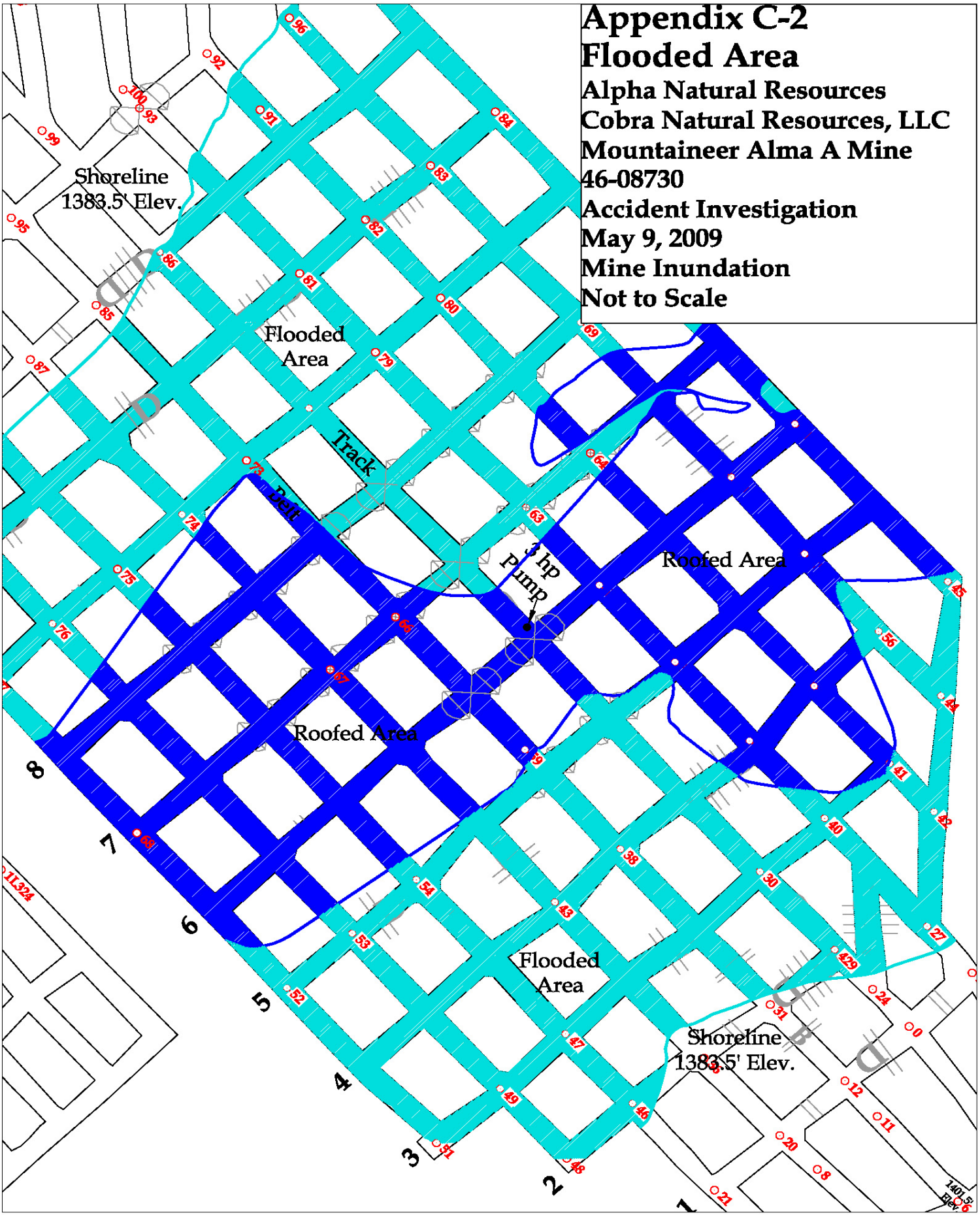
Alpha Natural Resources

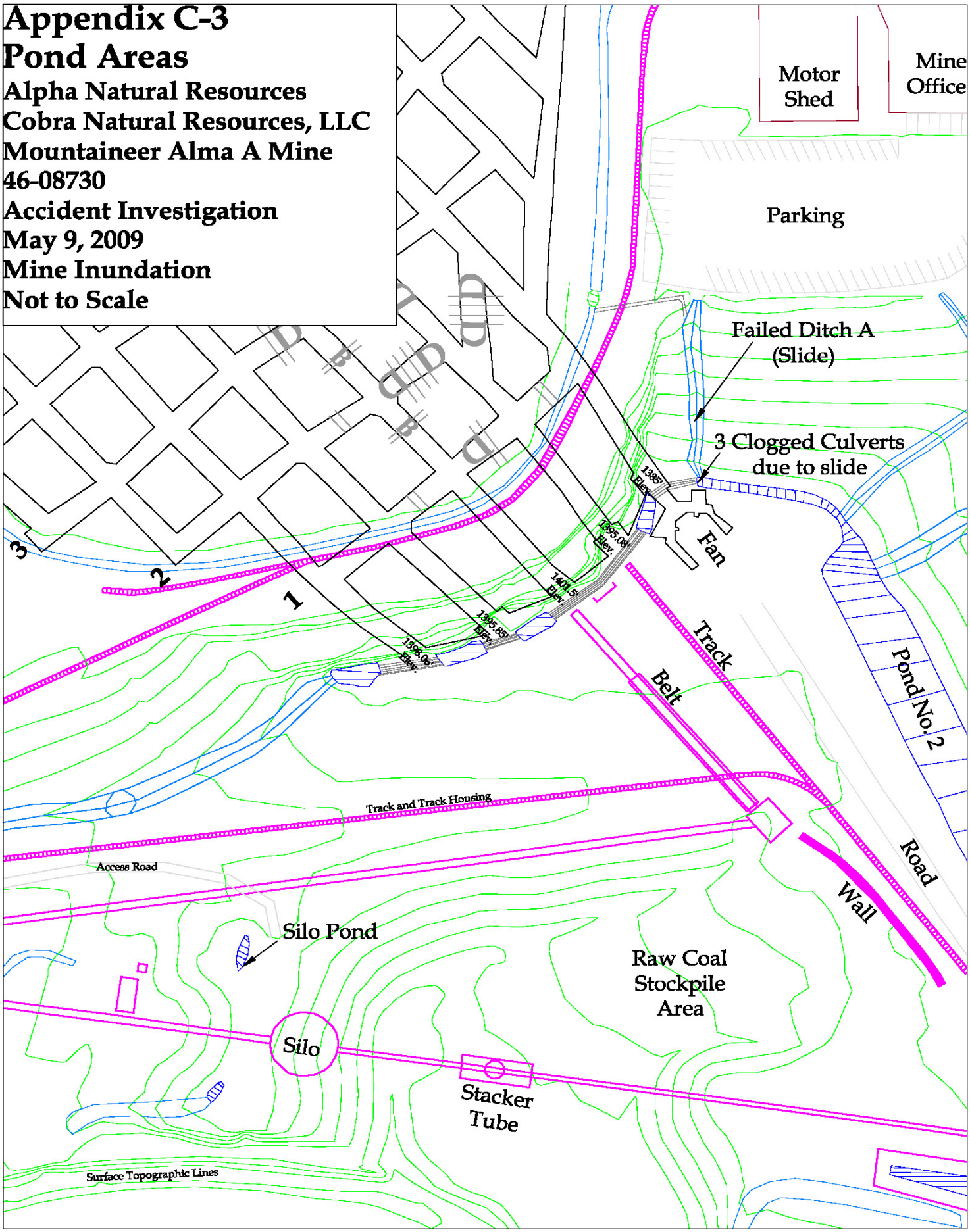
Allen Dupree	Vice President - Safety

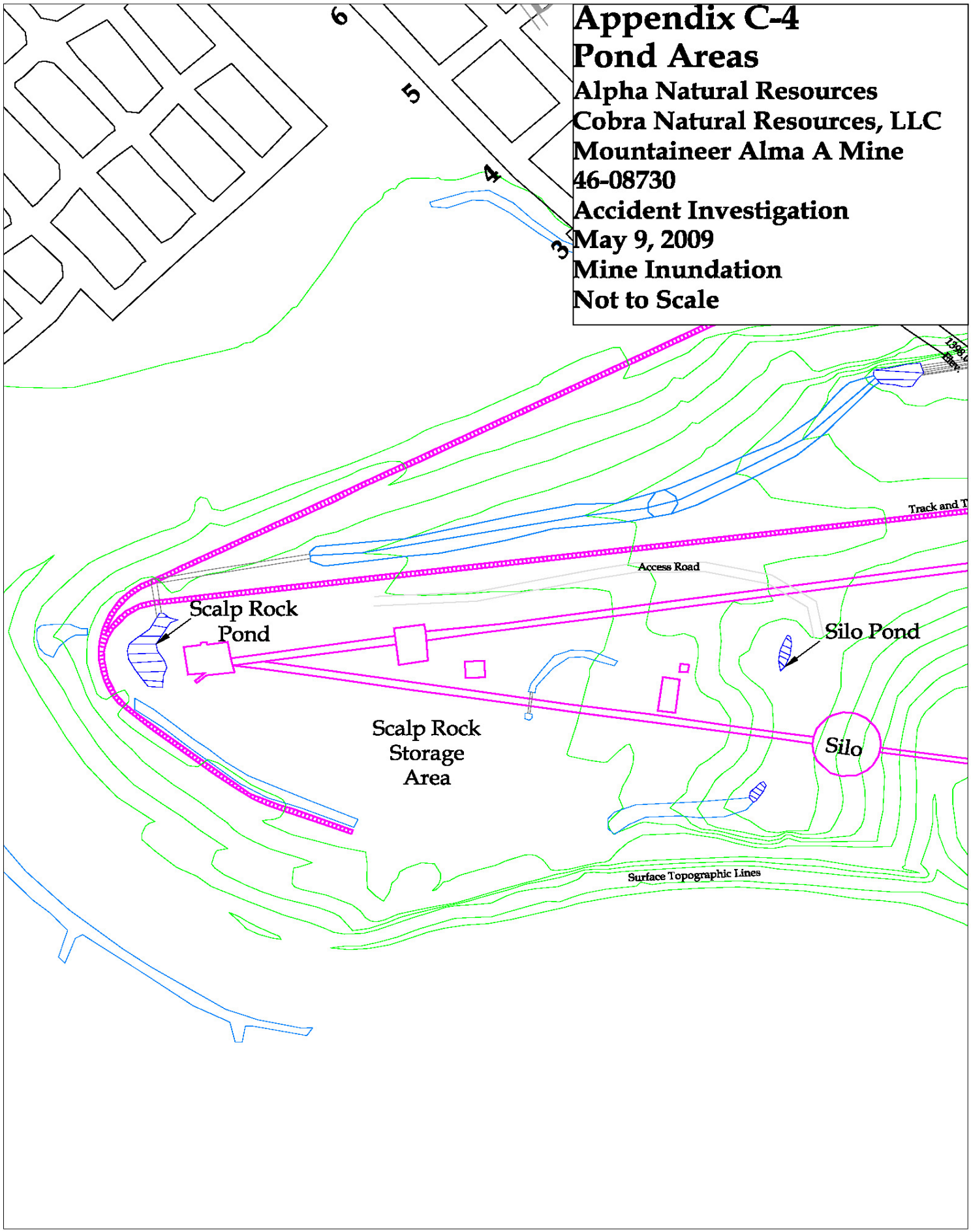
TMK Personnel Services, Inc.

Randy Atwood	General Laborer
Robert Canada	General Laborer
John Dillon	Move Crew

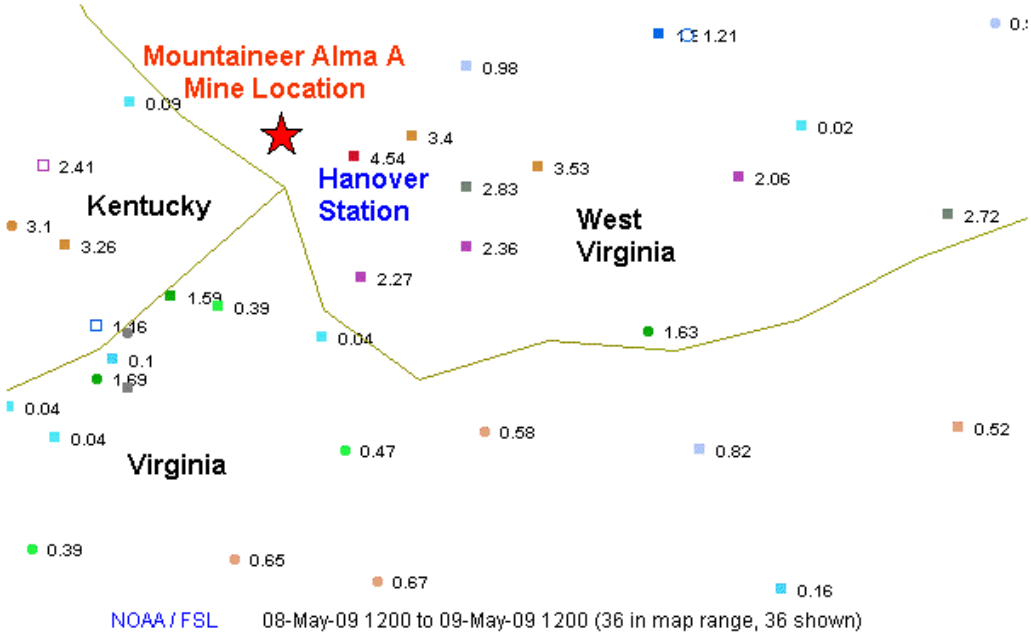

Appendix C-1
Mine Property Layout
Alpha Natural Resources
Cobra Natural Resources, LLC
Mountaineer Alma A Mine
46-08730
Accident Investigation
May 9, 2009
Mine Inundation
Not to Scale
N
Track
Belt
3 hp Pump
10
9
8
7
6
5
4
3
2
1
Motor Shed
Mine Offices
Parking
H
Failed Ditch A (Slide)
3 Clogged Culverts due to slide
Fan
Track
Belt
Pond No. 2
Road
Road
Wall
Track and Track Housing
Access Road
Scalp Rock Pond
Silo Pond
Raw Coal Stockpile Area
Scalp Rock Storage Area
Silo
Stacker Tube
Surface Topographic Lines
Surface Topographic Lines


Appendix C-2
Flooded Area
Alpha Natural Resources
Cobra Natural Resources, LLC
Mountaineer Alma A Mine
46-08730
Accident Investigation
May 9, 2009
Mine Inundation
Not to Scale
Shoreline
1383.5' Elev.
Flooded
Area
Track
Belt
3 hp
Pump
Roofed Area
Roofed Area
Flooded
Area
Shoreline
1383.5' Elev.
8
7
6
5
4
3
2
1

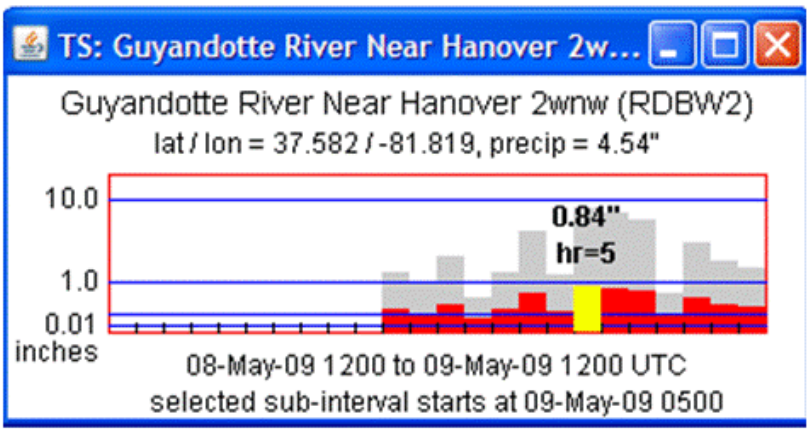

Appendix C-3
Pond Areas
Alpha Natural Resources
Cobra Natural Resources, LLC
Mountaineer Alma A Mine
46-08730
Accident Investigation
May 9, 2009
Mine Inundation
Not to Scale
Motor Shed
Mine Office
Parking
Failed Ditch A (Slide)
3 Clogged Culverts due to slide
1385' Elev.
1395.08' Elev.
1401.5' Elev.
1395.85' Elev.
1398.06' Elev.
Fan
Track
Belt
Pond No. 2
Road
Wall
Track and Track Housing
Access Road
Silo Pond
Raw Coal Stockpile Area
Silo
Stacker Tube
Surface Topographic Lines
1
2
3


Appendix C-4
Pond Areas
Alpha Natural Resources
Cobra Natural Resources, LLC
Mountaineer Alma A Mine
46-08730
Accident Investigation
May 9, 2009
Mine Inundation
Not to Scale
6
5
4
3
Track and T
Access Road
Scalp Rock
Pond
Silo Pond
Scalp Rock
Storage
Area
Silo
Surface Topographic Lines

Appendix D – Hourly Rainfall Data – Noon May 8 to Noon May 9, 20009
(The rainfall starts on the bar chart about 10 pm on May 8th and stops about noon on May 9th)



NWS Hourly Rainfall Recording Stations
Noon May 8 to Noon May 9, 2009 – 24 Hour Totals



Hanover Hourly Rainfall
Noon May 8 to Noon May 9, 2009

APPENDIX E - Culverts at the portals