

EXECUTIVE SUMMARY

On April 5, 2010, at approximately 3:02 p.m., a massive coal dust explosion occurred at the Upper Big Branch Mine-South (UBB), killing 29 miners and injuring two. UBB is operated by Performance Coal Company (PCC), a former subsidiary of Massey Energy Company (Massey) (together PCC/Massey), and is located in Montcoal, West Virginia. This tragic explosion was the largest coal mine disaster in the United States in 40 years.

Immediately following the explosion, President Barack Obama called Secretary of Labor Hilda Solis and Assistant Secretary for Mine Safety and Health Joseph Main to the White House and charged them with conducting the most thorough and comprehensive investigation possible. The President directed Secretary Solis to work with the Justice Department to ensure that the government also investigated any potential criminal activity.

The Department of Labor's Mine Safety and Health Administration (MSHA) conducted its investigation under the authority of the Federal Mine Safety and Health Act of 1977 (Mine Act), which requires that authorized representatives of the Secretary of Labor carry out investigations in mines for the purpose of obtaining, utilizing, and disseminating information relating to the causes of accidents. This report is the product of that investigation, which included a comprehensive underground examination, 269 individuals interviewed, review of some 88,000 pages of documentary evidence, detailed mapping of the mine, inspection and testing of thousands of pieces of physical evidence, and the commissioning of outside experts to study the disastrous explosion. It describes the events leading up to the UBB explosion, rescue and recovery operations, the investigative process, the physical causes of the explosion, the root cause and contributory causes, and the citations and orders issued for safety and health violations. MSHA and the Department of Labor's Office of the Solicitor continue to cooperate with the Department of Justice in the criminal investigation of the tragedy.

MSHA conducted the underground investigation in coordination with the West Virginia Office of Miners' Health Safety and Training (WVOMHST), the Governor's Independent Investigative Panel (GIIP), and PCC/Massey. The United Mine Workers of America (UMWA) participated in the investigation in its capacity as a representative of miners designated pursuant to the Mine Act, as did Moreland & Moreland, I.c.

Many witnesses tragically lost their lives on April 5, 2010. In addition, a number of witnesses exercised their rights under the Fifth Amendment to the U.S. Constitution and declined to be interviewed. Despite the unavailability of their testimony, MSHA has determined the likely causes of the explosion.

Overview of the UBB Accident Investigation Report's Findings

The 29 miners who perished at UBB died in a massive coal dust explosion that started as a methane ignition. The physical conditions that led to the explosion were the result of a series of basic safety violations at UBB and were entirely preventable. PCC/Massey disregarded the resulting hazards. While violations of particular safety standards led to the conditions that caused the explosion, the unlawful policies and practices implemented by PCC/Massey were the root cause of this tragedy. The evidence accumulated during the investigation demonstrates that PCC/Massey promoted and enforced a workplace culture that valued production over safety, including practices calculated to allow it to conduct mining operations in violation of the law.

The investigation also revealed multiple examples of systematic, intentional, and aggressive efforts by PCC/Massey to avoid compliance with safety and health standards, and to thwart detection of that non-compliance by federal and state regulators.

Witness testimony revealed that miners were intimidated by UBB management and were told that raising safety concerns would jeopardize their jobs. As a result, no safety or health complaints and no whistleblower disclosures were made to MSHA from miners working in the UBB mine in the approximately four years preceding the explosion. This is despite an extensive record of PCC/Massey safety and health violations at the UBB mine during this period.

PCC/Massey established a practice of using staff to relay advance notice of health and safety inspections to mine personnel when federal and state inspectors arrived at the mine. The advance notice allowed PCC/Massey employees to conceal violations from enforcement personnel. PCC's chief of security was convicted in federal court for lying to MSHA about whether advance notice was a practice at UBB; the evidence at the trial showed that it indeed was a practice and he had directed UBB personnel to provide advance notice of inspectors' arrival on the mine property. His conviction underscores the extent to which practices designed to hide PCC/Massey safety and health violations were engrained at UBB.

PCC/Massey kept two sets of books with respect to safety and health hazards in the UBB mine. The first set was the required examination book mandated by the Mine Act, which was open for review by MSHA and miners and was required to include in it a complete record of all hazards identified by PCC examiners and other company officials. PCC/Massey also maintained a second set of books that reported on production and maintenance, as well as hazards and violations of law. PCC/Massey noted some hazards in this second set of books that it did not record in the required examination books. PCC/Massey did not make this second set of books available to mine employees or inspectors.

PCC/Massey allowed conditions in the UBB mine to exist that set the stage for a catastrophic mine explosion. The tragedy at UBB began with a methane ignition that transitioned into a small methane explosion that then set off a massive coal dust explosion. If basic safety measures had been in place that prevented any of these three events, there would have been no loss of life at UBB.

PCC/Massey could have prevented the methane ignition and explosion had it maintained its longwall shearer in safe operating condition. A longwall shearer is part of a longwall mining machine and has large rotating cutting drums equipped with bits that cut coal as it moves on a track across the working face. A system of water sprays suppresses dust as well as “hot streaks,” which are smears of metal found on rock when metal is heated to near its melting point from friction caused by the shearer’s bits hitting into layers of rock above or below the coal seam. PCC/Massey operated the shearer at UBB with worn bits and missing water sprays, creating an ignition source for methane on the longwall.

Had PCC/Massey followed basic safety practices, the small methane explosion that set off the dust explosion would have been contained or prevented. PCC/Massey did not take proper measures to detect methane concentrations throughout the mine. PCC/Massey’s failure to comply with UBB’s approved ventilation and roof control plans exacerbated the risk of methane accumulation. The law requires adequate ventilation of underground coal mines to prevent unsafe levels of methane and other dangerous gasses, and provide miners with breathable air. PCC/Massey ventilation practices led to erratic changes in air flow and direction. Its failure to install supplemental roof supports as required by UBB’s plan led to a roof fall in an airway that limited airflow, contributing to the accumulation of methane in the area where the explosion originated.

Finally, PCC/Massey violated fundamental safety standards by permitting significant amounts of float coal dust, coal dust, and loose coal to accumulate in the mine. This became the fuel for the explosion. Sufficient rock dust, used to make coal dust inert and prevent it from catching fire or fueling an explosion, would have prevented a coal dust explosion from occurring. PCC/Massey did not follow the fundamental safety practice of applying rock dust adequately to eliminate this hazard.

PCC/Massey knew or should have known about all of these hazards but failed to take corrective action to prevent a catastrophic accident. For example, UBB’s required examination books showed records of hazards that PCC/Massey did not correct. The examination books also showed that PCC/Massey failed to perform required pre-shift, on-shift, and weekly examinations to find and correct hazards. When the books indicated PCC/Massey examiners did conduct exams, they failed to identify obvious hazards, such as accumulations of loose coal, coal dust, and float coal dust in the area where the explosion occurred.

Specific Accident Investigation Conclusions – PCC/Massey’s Management Practices that Led to the Explosion

PCC/Massey failed to perform required mine examinations adequately and remedy known hazards and violations of law

MSHA regulations require mine operators to examine certain areas of the mine on a weekly basis, as well as before and during each shift, to identify hazardous conditions. MSHA’s accident investigation found that PCC/Massey regularly failed to examine the mine properly for hazards putting miners at risk and directly contributing to the April 5 explosion. At UBB, PCC/Massey examiners often did not travel to areas they were required to inspect or, in some cases, travelled to the areas but did not perform the required inspections and measurements. For example, PCC/Massey conducted no methane examinations on the longwall tailgate, the area of the longwall where the explosion began, in the weeks prior to the explosion. Even when PCC/Massey performed inspections and identified hazards, it frequently did not correct them. Because of these practices, loose coal, coal dust, and float coal dust accumulated to dangerous levels over days, weeks, and months and provided the fuel for the April 5 explosion.

PCC/Massey kept two sets of books, thus concealing hazardous conditions

During the course of the investigation, MSHA discovered that PCC/Massey kept two sets of books at UBB: one set of production and maintenance books for internal use only, and the required examination books that, under the Mine Act, are open to review by MSHA and miners. MSHA regulations mandate that the required examination books contain a record of all hazards. Enforcement personnel must rely on their accuracy and completeness to guide them in conducting their physical inspections.

PCC/Massey often recorded hazards in its internal production and maintenance books, but failed to record the same hazards in the required examination book provided to enforcement personnel to review. Some of the hazards described in the hidden “second set of books” were consistent with conditions that existed at the time of the explosion, including the practice of removing sprays on the longwall shearer. Testimony from miners at UBB revealed they felt pressured by management not to record hazards in the required examination books. Furthermore, even when PCC/Massey recorded hazards in the required examination books – such as belts that needed to be cleaned or rock dusted – it often failed to correct the identified hazards.

In addition to undocumented hazards in the required examination books, PCC/Massey failed to report accident data accurately. MSHA’s post-accident audit revealed that, in 2009, UBB had twice as many accidents as the operator reported to MSHA.

PCC/Massey intimidated miners to prevent MSHA from receiving evidence of safety and health violations and hazards

The Mine Act protects miners if they are fired or subjected to other adverse employment actions because they reported a safety or health hazard. These whistleblower protections give miners a voice in the workplace and allow them to protect themselves when mine operators engage in illegal and dangerous practices. Testimony revealed that UBB's miners were intimidated to prevent them from exercising their whistleblower rights. Production delays to resolve safety-related issues often were met by UBB officials with threats of retaliation and disciplinary actions. On one occasion when a foreman stopped production to fix ventilation problems, Chris Blanchard, PCC's president, was overheard saying: "If you don't start running coal up there, I'm going to bring the whole crew outside and get rid of every one of you." Witness interviews also revealed that a top company official suspended a section foreman who delayed production for one or two hours to make needed safety corrections.

MSHA did not receive a single safety or health complaint relating to underground conditions at UBB for approximately four years preceding the explosion even though MSHA offers a toll-free hotline for miners to make anonymous safety and health complaints. PCC/Massey also had a toll-free number for safety and health complaints, but miners testified that they were reluctant to use it for fear of retaliation.

PCC/Massey failed to provide adequate training for workers

Records and testimony indicate that PCC/Massey inadequately trained their examiners, foremen and miners in mine health and safety. It failed to provide experienced miner training, especially in the area of hazard recognition; failed to provide task training to those performing new job tasks; and failed to provide required annual refresher training. This lack of training left miners unequipped to identify and correct hazards at UBB.

PCC/Massey established a regular practice of giving advance notice of inspections to hide violations and hazards from enforcement personnel

Under the Mine Act, it is illegal for mine operators' employees to give advance notice of an inspection by MSHA enforcement personnel. Despite this statutory prohibition, UBB miners testified that PCC/Massey mine personnel on the surface routinely notified them prior to the arrival of enforcement personnel. Miners and others testified they were instructed by upper management to alert miners underground of the arrival of enforcement personnel so hazardous conditions could be concealed. UBB dispatchers testified they were told to notify miners underground when MSHA inspectors arrived on the property, and if they did not, there would be consequences.

Advance notice gave those underground the opportunity to alter conditions and fix or hide hazards immediately prior to enforcement personnel's arrival on the working section. PCC/Massey also made ventilation changes in the areas where MSHA inspectors planned to travel, concealing actual production conditions from enforcement personnel.

On October 26, 2011, Hughie Elbert Stover, PCC's former head of security for UBB, was found guilty in the United States District Court for the Southern District of West Virginia of a felony count of making false, fictitious and fraudulent statements to MSHA regarding company policy on advance notice. In an interview with the MSHA accident investigation team, Stover testified that Massey had a policy prohibiting security guards from providing advance notice of MSHA inspections; however, the evidence indicated that he had personally directed guards to provide advance notice.

Specific Accident Investigation Conclusions – Physical Causes of the Explosion

A small amount of methane, likely liberated from the mine floor, accumulated in the longwall area due to poor ventilation and roof control practices

Based on physical evidence, the investigation concluded that methane was likely liberated from floor fractures into the mine atmosphere on April 5, the day of the explosion. The investigation team subsequently identified floor fractures with methane liberation at longwall shields (a system of hydraulic jacks that supports the roof as coal is being mined) near the tailgate, the end of the longwall where the explosion began. This methane liberation occurred because PCC/Massey mined into a fault zone that was a reservoir and conduit for methane. MSHA believes that this is the same fault zone associated with methane inundations at UBB in 2003 and 2004, and a 1997 methane explosion.

PCC/Massey's failure to comply with its roof control plan allowed methane to accumulate in the tailgate area. UBB's roof control plan required placement of supplemental supports, in the form of two rows of 8-foot cable bolts or posts, between the primary supports in the longwall tailgate. PCC/Massey installed only one row of these supplemental supports. This lack of roof support contributed to the fall of the tailgate roof, which in turn restricted the airflow leaving the longwall face. The reduced air flow allowed methane to accumulate in the tailgate without being diluted or ventilated from the mine. As a result, an explosive mixture of methane was present in this area.

PCC/Massey failed to maintain the UBB longwall shearer, creating an ignition source for accumulated methane

MSHA has identified the longwall shearer as the likely source of the ignition of the methane accumulated in the tailgate area. PCC/Massey was using the longwall shearer to mine in the area near the tailgate. Evidence showed that methane likely migrated

from behind the longwall shields to the longwall shearer, and that an accumulation of methane developed near the tailgate. Evidence also revealed that the longwall shearer was not properly maintained by PCC/Massey. Two of the cutting bits on the tail drum were worn flat and lost their carbide tips. The dull, worn shearer bits likely created an ignition source by creating hot streaks while cutting sandstone.

Well-maintained longwall shearers, which include sharp bits and effective water spray systems, protect against these kinds of ignitions and also control the dust during the mining process. The water sprays create air pressure to move methane away from the area where the shearer is cutting and prevents ignitions by spraying water to suppress hot streaks on the longwall face. At the time of the accident, PCC/Massey's longwall shearer was cutting through both coal and sandstone with seven water-spray nozzles missing. As a result, the shearer did not have the minimum required water pressure. The ineffective sprays failed to move the methane away from the shearer bits and cool the hot streaks created during the mining process. As a result, methane ignited.

The evidence indicated that the flame from the initial methane ignition then ignited a larger accumulation of methane. However, the ignition of the larger body of methane did not happen immediately. Approximately two minutes elapsed between the ignition and the explosion. The electronically recorded event log indicates the shearer was shut off with the remote control just before 3:00 p.m. MSHA has concluded that the tail shearer operator stopped the shearer shortly after the initial ignition, which continued to burn near the longwall tailgate. Realizing that the ignition could not be controlled, the miners in the tailgate area began evacuating. At approximately 3:02 p.m., the flame encountered a larger methane accumulation in the tailgate area, triggering a localized explosion.

PCC/Massey allowed coal dust to accumulate throughout UBB, providing a fuel source for a massive explosion

The small methane explosion near the tailgate immediately encountered fuel in the form of dangerous accumulations of float coal dust and coal dust, which propagated the explosion beginning in the tailgate entry. The resulting coal dust explosion killed the 29 miners. PCC/Massey records demonstrate that examiners allowed these and other accumulations in the mine to build up over days, weeks, and months. Loose coal, coal dust and float coal dust were abundant in all areas of the mine, including the area affected by the explosion. Many of these accumulations were left from the initial development of this area of the mine, indicating a long-established policy of ignoring basic safety practices.

PCC/Massey failed to rock dust the mine adequately to prevent a coal dust explosion and its propagation through the mine

If the mine had been rock dusted so that the coal dust had contained sufficient quantities of incombustible content, the localized methane explosion would not have propagated, or expanded, any further. According to testimony and other evidence,

PCC/Massey applied grossly inadequate quantities of rock dust. Miners stated that areas were not well dusted, that the walls, roof and floor in areas of the mine were dark-colored – which indicates a lack of rock dust. There is no evidence that during the mining of the longwall, PCC/Massey ever applied rock dust in the tailgate entry -- the entry where the mine's ventilation system carried coal dust from the mining process. The mine's rock dusting equipment frequently failed. As a result of a systematic failure to properly apply rock dust, the coal dust explosion continued to propagate through the mine, killing miners as far as approximately 5,000 feet from the point of ignition.

Rescue and Recovery Efforts at UBB

Intensive rescue activities involving more than 20 rescue teams – including teams from MSHA, PCC/Massey, the WVOMHST, and other mine operators – mobilized and began to search for missing miners soon after the accident occurred on April 5. The presence of combustible gasses in the mine prompted rescue teams to evacuate at least three times during the rescue efforts. On April 9, rescue teams located the last of the victims and determined that none of the 29 miners reported missing had survived. On Tuesday, April 13, the last victim was recovered from the mine.

During rescue and recovery efforts, MSHA family liaisons – pursuant to a program established under the Mine Improvement and New Emergency Response (MINER) Act of 2006 – served as the agency's primary communicators with the families of the missing miners. The liaisons remained with the families continuously from April 5 through April 10. Assistant Secretary Main, Coal Administrator Kevin Stricklin, then-Governor Manchin and, at times, company representatives, gave regular updates to the families on the search for their loved ones.

Specific Accident Investigation Conclusions - Alternate Theories Tested and Found Insufficient

The MSHA accident investigation team carefully considered other possible scenarios to explain the events of April 5, 2010, but a lack of supporting evidence disproved these alternative explanations. One theory tested was that a massive inundation of methane caused the explosion. However, the flame path, pressures generated by the explosion, and the limited quantity of methane detected prior to and after the explosion were inconsistent with that theory. In addition, previous methane inundations at UBB in 2003 and 2004 were localized at the point of gas discharging from fractures in the mine floor and gas release would dissipate within a few days. The volume and pressure of gas and the size of the floor fractures were relatively small. Thus, the volume of gas released from the floor was also small. Similarly, the team could find no evidence to support the theory that the explosion was caused by cutting into a gas well or by a seismic event.

Specific Accident Investigation Conclusions – Citations and Orders Issued

Associated with the issuance of this accident investigation report, MSHA issued 12 citations and orders to PCC/Massey for violations of the Mine Act and its implementing regulations that contributed to the April 5 explosion. MSHA also issued 357 violations of the Mine Act and regulations to PCC/Massey for conditions and practices discovered at UBB that did not directly contribute to the explosion.

MSHA designated 9 of these contributory violations as “flagrant.” Flagrant violations, the most serious violations MSHA can issue, are eligible for the highest penalty possible under the Mine Act. The flagrant violations committed by PCC/Massey are:

- illegally providing advance notice to miners of MSHA inspections (a violation of Section 103(a) of the Mine Act);
- failing to properly conduct required examinations and to identify, record, and correct hazards (4 flagrants for violations of 30 CFR sections 75.360, 75.362, 75.363(a), and 75.364);
- allowing hazardous levels of loose coal, coal dust, and float coal dust to accumulate (violation of 30 CFR section 75.400);
- failing to adequately apply rock dust to the mine (violation of 30 CFR section 75.403);
- failing to comply with the approved ventilation plan by operating the shearer with missing and clogged water sprays (violation of 30 CFR section 75.370(a)(1)); and
- failing to adequately train its miners (violation of 30 CFR part 48.3).

PCC/Massey also committed three contributory violations that were not flagrant:

- failing to maintain the longwall shearer (worn bits) in safe operating condition (violation of 30 CFR 75.1725(a));
- failing to comply with its approved roof control plan in the 1 North Panel tailgate entry, as required by the approved roof control plan (violation of 30 CFR 75.220(a)(1)); and
- failing to maintain the volume and velocity of the air current in the areas where persons work or travel at a sufficient volume and velocity to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes (violation of 30 CFR 75.321(a)(1)).

MSHA also issued two contributory violations to David Stanley Consulting, LLC, a contractor that supplied examiners and other miners to work at the UBB, for its examiner's failure to properly conduct examinations.

MSHA Internal Review

In addition to the accident investigation, a separate internal review is examining MSHA's actions related to UBB prior to the explosion and during the rescue and recovery operation. The internal review will evaluate the quality of MSHA's enforcement activities, including any weaknesses, and the adequacy of regulations, policies and procedures. A report and recommendations will be provided to the Assistant Secretary for appropriate action with the aim of better improving the agency's performance and helping prevent the occurrence of future accidents.