

**Internal Review of MSHA's
Actions at the Upper Big Branch Mine-South
Performance Coal Company
Montcoal, Raleigh County, West Virginia**



U.S. Department of Labor
Mine Safety and Health Administration
Program Evaluation and Information Resources

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Dedication

The Internal Review team offers sincere condolences to the families and friends of the miners who lost their lives or were injured in the explosion. While we can not begin to comprehend the pain, sorrow, and anguish that friends and family members have experienced and continue to experience, our efforts are respectfully dedicated to the memory of the 29 miners. We also wish to acknowledge the efforts of the many Company, State, MSHA, and other rescue and recovery personnel who performed selflessly at UBB.

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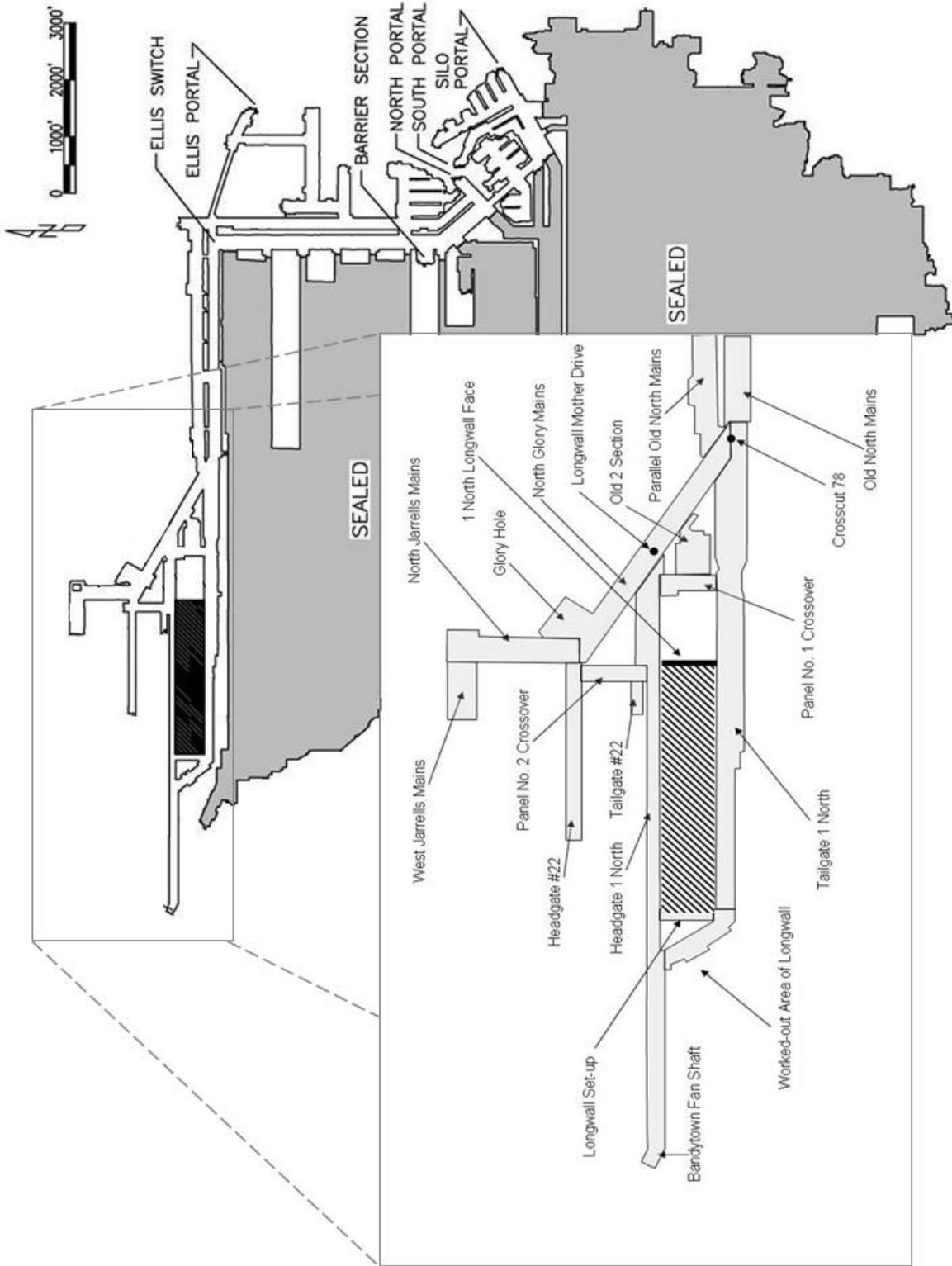


Figure 1 - Map of Upper Big Branch Mine-South, Performance Coal Company, Montcoal, Raleigh County, West Virginia (ID 46-08436)

Executive Summary

MSHA's Mandate

The Federal Mine Safety and Health Act of 1977 (Mine Act) states that mine operators, with the assistance of the miners, have the primary responsibility to prevent unsafe and unhealthful conditions and practices in the nation's mines. MSHA has the responsibility to develop and promulgate mandatory safety and health standards, inspect mines to determine whether there is compliance with those standards, and investigate accidents to determine their causes.

Background

On April 5, 2010, a longwall face methane ignition at the Upper Big Branch Mine-South (UBB or Mine) transitioned into a small methane explosion that propagated into a massive coal dust explosion. Twenty-nine miners were killed and two miners were seriously injured in the most deadly U.S. coal mine disaster in nearly 40 years. The MSHA Accident Investigation team determined that the explosion occurred because Performance Coal Company (Operator) and its parent company, Massey Energy Company (Massey), violated fundamental safety standards and failed to take corrective actions to prevent the catastrophic explosion.

Internal Review Policy and Procedures

MSHA policy requires that an internal review of MSHA's enforcement activities be conducted after each mining accident that results in three or more fatalities. Following the explosion at UBB, the Assistant Secretary for Mine Safety and Health instructed the Director of Program Evaluation and Information Resources (PEIR) to form an Internal Review team. The team was comprised of MSHA employees with various specialties and expertise who did not have current enforcement responsibility in Coal Mine Safety and Health District 4.

This Internal Review evaluates MSHA's actions relative to the explosion and makes recommendations to improve the Agency's performance in order to better protect the nation's miners. It compares MSHA actions with the requirements of the Mine Act, applicable standards and regulations, and MSHA policies and procedures. Where appropriate, the internal review also evaluates the effectiveness of MSHA standards, regulations, policies, and procedures in addressing the hazards that caused or contributed to the explosion.

The Internal Review team primarily focused on MSHA enforcement and plan approval activities during the 18 months preceding the explosion. Where appropriate, the team examined relevant historical information beyond the 18-month review period.

Significant Findings

As detailed in the MSHA Accident Investigation report, Massey, through its subsidiary Performance Coal Company, violated numerous, widely-recognized safety standards and failed to prevent or correct numerous hazards that ultimately caused the catastrophic explosion.

The Operator concealed its highly non-compliant conduct in a number of significant ways. The Operator provided advance notice of MSHA inspections, allowing foremen to correct violations before inspectors arrived underground to detect them. It concealed several occupational injuries by failing to report them to MSHA as required. The Operator recorded hazards in internal production reports rather than in the examination books required by MSHA standards. Finally, it intimidated miners into not reporting hazards to MSHA, compromising miners' ability to participate in the identification and correction of hazards, as provided by the Mine Act. These intentional efforts to evade well-established Mine Act provisions, which are intended to provide MSHA the opportunity to determine operator compliance or designed to make available vital safety and health information, interfered with MSHA's ability to identify and require abatement of hazardous conditions at the Mine.

The Internal Review team found that MSHA inspection and management personnel were dedicated to their work and determined to further the Agency's mission. Although at times limited by their inexperience, inadequate direction, training, and supervision, their primary intent was to protect the health

and safety of miners. Nevertheless, the team identified instances where District 4 did not follow established policies and procedures when carrying out its responsibilities under the Mine Act at UBB. Each shortcoming is identified and discussed in the Internal Review report. Some of the deficiencies currently are being addressed or already have been addressed by the Agency. Where appropriate, this report includes recommendations to enhance MSHA's performance and better promote the safety and health of miners.

While the Internal Review team did not find evidence that the actions of District 4 personnel or inadequacies in MSHA safety and health standards, policies, or procedures caused the explosion, the team found several instances where enforcement efforts at UBB were compromised because MSHA and District 4 did not follow established Agency policies and procedures. The Internal Review team also found inspectors would have benefited if certain policies and procedures had been more clearly drafted and more effectively implemented. The following is an overview of the Internal Review team's significant findings.

- **Inspections** – During the review period, District 4 personnel conducted six regular inspections of UBB. Some portions of the Mine were not inspected during each of these inspections. However, the inspections generally were more complete toward the end of the review period. During the last regular inspection conducted before the explosion, areas not inspected included the Old No. 2 Section and the belt and return entries of Tailgate #22. The MSHA Accident Investigation team determined that the explosion propagated through these and other areas of the Mine. District 4 personnel inspected the longwall tailgate travelway on four occasions after the District Manager approved supplemental roof support requirements for this entry in December 2009. None of these enforcement personnel identified and cited the Operator's failure to install the required level of supplemental roof support in accordance with the approved roof control plan.
- **Use of Elevated Enforcement Tools** – The number and severity of enforcement actions taken by District 4 at UBB were among the highest in the nation. In fiscal year 2009, the Mine was issued more section 104(d) citations and orders than any other mine in the nation. This reflected the inspectors' diligent efforts at a highly non-compliant mine to issue citations and orders in accordance with their understanding of the law and MSHA directives. In the 18 months before the explosion, District 4 personnel identified and cited 684 violations at UBB, and MSHA proposed more than \$1.3 million in civil penalties for these violations. District 4 inspectors determined that 56 of the 684 violations were the result of the Operator's unwarrantable failure to comply with mandatory safety and health standards.

However, MSHA did not effectively use other available elevated enforcement tools. District 4 did not forward eight violations to headquarters for review to determine whether they should be recommended for assessment as "flagrant" violations, even though the violations met the objective criteria for headquarters review. Due to resource limitations, the District did not conduct section 110(c) special investigations in six appropriate situations to determine whether UBB management personnel knowingly violated mandatory standards. On one occasion, due to an error in the MSHA headquarters' computer screening application, UBB was not identified as a mine potentially subject to the Pattern of Violations provisions under section 104(e) of the Mine Act.

- **Float Coal Dust and Rock Dust Sampling** – Inspectors did not identify deficiencies in the Operator's program for cleaning up accumulations of loose coal, coal dust, and float coal dust. They also did not recognize and cite coal dust accumulations in the tailgate entries of the 1 North Longwall and in some other areas identified in the MSHA Accident Investigation report. Inspectors did not effectively use the Operator's examination records to identify the extent of noncompliance with rock dust standards along belt conveyors and to ascertain the Operator's negligence in allowing those accumulations to go uncorrected.

MSHA inspectors did not sample mine dust to determine whether the Operator applied sufficient rock dust in a number of newly-mined areas because inspectors and supervisors continued to

follow superseded rock dust survey procedures. Inspectors did not collect spot samples to determine whether the Operator was maintaining the required incombustible content of mine dust in older portions of the Mine, including areas that previously were identified as too wet to sample. Some of these oversights occurred because MSHA procedures directed inspectors to visually evaluate the adequacy of rock dusting in outby areas rather than collect samples for analysis, a practice that studies have shown to be unreliable. Field office personnel also did not effectively track and re-inspect previously wet areas for sampling.

- **Mine Plans** – Massey engineers failed to develop sound mining plans, and it is apparent they depended on District 4 specialists to correct deficiencies in the plans they submitted to MSHA. The lack of planning and inadequate engineering identified in the MSHA Accident Investigation report were major reasons deficiencies existed in mining plans. While District specialists were able to identify numerous deficiencies in the Operator’s submissions, some significant deficiencies were not identified.
 - **Ventilation Plan.** The District 4 Ventilation Department reviewed two base plans and 75 ventilation plan supplements for UBB during the review period. Of these supplements, the District Manager ultimately approved 37 and denied 24. The remaining 14 had become obsolete, were acknowledged by MSHA, or were withdrawn by the Operator. There was no indication that the District unduly influenced the contents of the Operator’s ventilation plans.

Due to his concerns regarding ventilation at the Mine, the District 4 Ventilation Department supervisor initiated a saturation inspection on March 9, 2010, to simultaneously evaluate the ventilation of the 1 North Longwall, Headgate #22, and Tailgate #22. He also contacted corporate management officials on March 16, 2010, to draw attention to ongoing ventilation problems at UBB that were not being addressed by mine management.

In 2004, MSHA’s Directorate of Technical Support investigated a methane inundation related to floor cracks that developed along a defined geologic zone at UBB. In a follow-up report, Technical Support documented several methods to mitigate inundations that may occur in the future. However, the mine ventilation plan for UBB was not revised to include any of these methods to account for the documented potential for future methane inundations.

When a new base ventilation plan was submitted by the Operator in 2009, plan reviewers were not aware of the potential for methane inundations. The issue was not addressed in the ventilation plan in 2004; thus there were no provisions that could be carried over into the Operator’s plan in effect at the time of the explosion. In addition, the Acting District Manager and Ventilation Department supervisor, who had knowledge of the earlier methane inundations, changed employment in the interim. This left the new District Manager and the new Ventilation Department supervisor without institutional knowledge of the 2004 event. Finally, the 2004 Technical Support reports documenting the inundation potential were not maintained, nor were they required to be maintained, in Ventilation Department files used as a reference by UBB ventilation plan reviewers.

- **Roof Control Plan.** The District 4 Roof Control Department reviewed one base plan and four roof control plan supplements during the review period. Of these, the District Manager ultimately approved three and denied two. The Internal Review team did not find any evidence that the District unduly influenced the contents of the Operator’s roof control plans.

In reviewing the Operator’s roof control plan, District 4 did not identify that the plan failed to provide the pillar stability necessary to maintain the air courses used to ventilate some areas of the Mine affected by the explosion. The plan submitted by the Operator did not provide calculations to demonstrate proposed pillars would provide adequate

stability. District 4 did not recognize and address this deficiency because they did not follow directions issued by the Administrator for Coal Mine Safety and Health (Administrator for Coal). This direction instructed the District to obtain coal pillar stability calculations from the Operator for mines such as UBB with complex and non-typical roof control plans. The memorandum also directed the District to review the Operator's coal pillar stability calculations for adequacy prior to approving the roof control plan. Instead, District 4 required the Operator to demonstrate its ability to perform the calculations, rather than requiring the Operator to provide actual calculations for review. The lack of resources contributed to the District 4 practice of using inspectors rather than specialists to conduct six-month roof control plan reviews for complex mines such as UBB, contrary to direction from the Administrator for Coal.

- **Review and Use of Mine Examination Records** – District 4 personnel did not effectively review the Operator's examination record books. During the four months preceding the explosion, there were hundreds of entries recorded in examination records documenting the amount of time hazards existed without corrective actions. This information could have been used by inspectors to augment their inspection activities. Inspectors also did not always use the examination records when determining the Operator's negligence in allowing identified hazards to continue unabated. Finally, inspectors did not recognize and cite the Operator's failure to implement or record corrective actions taken to abate numerous hazards documented in the examination record books.
- **Respirable Dust** – The Operator took advantage of MSHA procedures to avoid being subject to respirable dust standards reduced to concentrations below 2.0 mg/m³ due to the silica content of the Mine dust. District 4 permitted reduced standards for respirable coal mine dust to be re-established at 2.0 mg/m³ when the Operator simply changed Mechanized Mining Unit (MMU) designations by replacing the continuous mining machine. District 4 personnel also allowed the Operator to significantly delay corrective actions to reduce miners' exposures to unhealthy respirable dust concentrations after overexposures were identified.

Underlying Causes

The following is a list of factors that the Internal Review team believes led to many of the shortcomings identified by this review.

- **Resources** – In the years before the 2006 mine disasters, budgetary constraints beyond MSHA's control resulted in significant reductions in the inspection workforce that compromised the Agency's ability to perform its mission. With increased hiring in 2006, District 4 began to re-establish staffing levels. However, by the time of the explosion, the inspection and supervisory staff in District 4 had not fully regained the level of experience it had lost.

As a result of resource limitations, specialists and special investigators were assigned to assist in completing mandated regular inspections, rather than performing their prescribed duties. This limited the technical assistance and advice available to inspectors, exacerbating the problems related to an inexperienced inspection workforce at a complex mining operation like UBB.

- **Inspector Experience** – Because of the reduction in staffing in the years before 2006, many experienced inspectors left MSHA and could not be replaced. As a result, newly-appointed authorized representatives, some of whom had not completed all of their entry-level training, were directed to mentor trainees and oversee their on-the-job training. Inspector inexperience was evident at UBB; all but one of the lead inspectors assigned to conduct regular inspections were hired by MSHA after the 2006 coal mine disasters. A newly-hired trainee needs approximately two years to complete classroom and on-the-job training to become a journeyman inspector. The most experienced lead inspector at UBB had 52 months of MSHA experience; the least experienced had 13 months.
- **Management Turnover** – While the Agency timely sought to fill positions in accordance with established federal government procedures, vacancies in District 4 management positions were

not promptly filled. The repeated turnover in persons temporarily assigned to the district manager position between June 2003 and July 2004 and the resulting lack of continuity adversely affected some plan approval decisions during that time. As a result, District 4 did not require the Operator to upgrade its ventilation plan to incorporate Technical Support recommendations resulting from a 2004 investigation of a methane inundation on a UBB longwall section.

- **Supervisory and Managerial Oversight** – District 4 supervisors and managers did not provide adequate oversight of inspections and investigations. Supervisors did not adequately review UBB inspection reports and did not identify significant deficiencies or recognize that some portions of the Mine had not been inspected. The rotation of supervisors in the Mt. Hope field office, including untrained acting supervisors, contributed to the inadequate review of inspection reports. The supervisors and managers did not consistently use Agency oversight tools to identify shortcomings or correct sub-par performance.

In addition, technical departments would have benefited from more effective oversight. There were at least three instances where approved plans contained conflicting requirements due to a lack of coordination between District 4 plan review departments.

- **Directives** – MSHA did not consistently use the Agency Directives System to provide its employees with instructions and information necessary to effectively and efficiently implement program and mission-support activities. Furthermore, the volume of information in MSHA directives exceeds that which an employee could reasonably be expected to learn or retain. In some cases, enforcement personnel had to review multiple directives to find all policy and procedures relevant to a single subject. Some policies and procedures were issued directly to district managers and were not maintained in a manner that readily could be referenced by inspectors and specialists. District 4 inspectors, many of whom had limited MSHA experience, were not aware of or did not know where to locate all policies and procedures they were required to follow.
- **Training** – On-the-job training for entry-level inspectors was inadequate, as entry-level trainees were not always required to demonstrate practical competencies in the field. Many District 4 journeyman inspectors did not receive the two-week retraining, implemented through a 1998 Assistant Secretary memorandum, due to the lack of resources necessary to complete mandated inspections. Acting supervisors in the Mt. Hope field office were not trained to perform their assigned duties. Permanently assigned supervisors in the Mt. Hope field office received only one week of training related to the core administrative duties of a field office supervisor and were not fully trained on the technical aspects of supervising coal mine inspectors.
- **Accountability Program** – MSHA's accountability programs and internal reviews have been successful in identifying deficiencies in the Agency's performance. However, the corrective actions MSHA has implemented have not been as successful in eliminating or preventing many of those deficiencies.
- **Use of Agency Data** – MSHA has an extensive set of enforcement, safety, and health data. The Internal Review team identified several instances where MSHA data could have been used more effectively to monitor and oversee MSHA enforcement programs at the national and district levels.

Corrective Actions

Following the explosion, the Assistant Secretary and the Administrator for Coal initiated a number of corrective actions which address the Internal Review team's findings. Some of these corrective actions are highlighted below.

- MSHA issued an Emergency Temporary Standard, which became a final rule on June 21, 2011, that increased the minimum incombustible content of mine dust to at least 80% throughout a coal mine. MSHA also issued a Program Information Bulletin to provide important information regarding accumulation of combustible materials and rock dust requirements. It advised that

areas downwind of belt transfers, the returns of active sections, the tailgates of longwalls, and the bleeder entries often require continuous rock dusting with bulk dusters, trickle dusters or high-pressure rock dusting machines to maintain the required incombustible content levels and suppress float coal dust accumulations.

- MSHA has initiated rulemaking to better protect miner safety and health. One proposed rule would revise the Agency's existing regulations for pattern of violations at 30 CFR Part 104. Another proposed rule would address the continuing risk of miner exposure to respirable coal mine dust. A third proposed rule would require mine operators to examine and take corrective actions for violations of mandatory health or safety standards and to review quarterly with mine examiners all citations and orders issued in areas where examinations are required.
- MSHA divided District 4 into two separate districts in June 2011. The creation of the new District 12 doubled the number of specialist departments and will increase the number of specialists in the region when District 12 is fully staffed.
- The Assistant Secretary has directed appropriate staff to improve access to active MSHA directives, eliminate outdated directives, and update the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* to remove outdated material and incorporate relevant procedural instructions and Coal Mine Safety and Health (CMS&H) memoranda.
- The Assistant Secretary directed the development of a training class for field office supervisors to instruct them in their responsibilities and the duties they must perform, including: Accompanied Activities, Field Activity Reviews, and reviews of inspector evaluations of gravity and negligence associated with cited violations.
- The Assistant Secretary issued an Administrative Policy Letter that established MSHA policies and procedures for continuing education of inspectors and specialists.
- MSHA has begun to implement a plan to provide the National Air and Dust Laboratory with updated computer systems and equipment to facilitate a laboratory information management system integrated into the MSHA database.
- MSHA provided inspectors with a tool on their laptop computers that automatically alerts them when a violation meets the criteria for headquarters' review as a potentially flagrant violation. MSHA also created a flagrant violation oversight report that allows supervisors and managers to identify potentially flagrant violations that have not been reviewed.
- MSHA strengthened its potential pattern of violations (PPOV) review process to hold mine operators to a higher standard. The Agency stiffened the requirements to achieve improvement goals and began monitoring each mine's violation history after the corrective action period. MSHA considers an operator's continued performance in later screenings and enhanced enforcement activities. MSHA also began auditing mines to determine whether they had failed to report injuries that would have affected their PPOV status. Mines that received PPOV notices in 2010 have shown considerable reductions in violation rates and lost-time injury rates since completing the PPOV process.

In addition, through a series of "impact inspections," MSHA has leveraged its authority at mines that merit increased attention and enforcement due to poor compliance histories or particular compliance concerns. As of December 31, 2011, MSHA has conducted 387 impact inspections, identifying and requiring correction of almost 7,700 violations. Impact inspections allow the Agency to immediately and comprehensively identify serious health and safety hazards with a team of experienced personnel and diminish operators' opportunities to hide violative conditions and practices through advance notice of inspection. Impact inspections address some issues that the Internal Review team identified as obstacles to the effective enforcement of the Mine Act at UBB.

Even with the significance of actions already undertaken, more must be done to protect the health and safety of the nation's miners. Accordingly, throughout the report, the Internal Review team has recommended specific corrective actions designed to improve the Agency's administration of the Mine Act. Finally, in the "General Conclusions and Recommendations" section of this report, the Internal Review team provides its thoughts on the fundamental changes that must be embraced to address the root causes of the shortcomings we identified.

The Internal Review team is hopeful that the recommendations in this report, in conjunction with actions already instituted by MSHA following the explosion, will further improve the manner in which the Mine Act is administered in District 4, the newly-formed District 12, and in other MSHA districts. The continued effort, determination, and dedication of MSHA personnel is essential for the Agency to successfully administer the provisions of the Mine Act and enforce compliance with mandatory safety and health standards in the nation's mines.

Background

At approximately 3:02 p.m. on April 5, 2010, a massive coal dust explosion occurred at UBB, resulting in the deaths of 29 miners and injuries to two miners who survived. This tragic event resulted in more fatalities than any other U.S. coal mine disaster in nearly four decades.

At the time of the explosion, UBB was under the jurisdiction of MSHA's Coal Mine Safety and Health District 4 office located in Mt. Hope, West Virginia.¹ A regular safety and health inspection was started on April 5, the day of the explosion. One District 4 inspector was in the Mine that day and inspected a working section in the southern portion of the Mine, approximately four miles from where the explosion originated. The inspector had finished his inspection activities for the day and had left the Mine before the explosion occurred.

After the explosion, MSHA promptly began a comprehensive investigation into its cause. A team of MSHA managers, inspectors, specialists, and technical experts were assigned to conduct the investigation. The team members were not employed in District 4. The investigation included extensive inspection and testing of physical evidence, a review of pertinent documents, and interviews of persons having relevant information.

The MSHA Accident Investigation team determined that methane had accumulated at the tailgate of the longwall. When the shearer cut out at the tailgate, worn shearer bits and missing water sprays created an ignition source for methane on the longwall. Evidence indicated that the flame from the initial methane ignition then ignited a larger accumulation of methane in the tailgate area, triggering a localized explosion. Coal dust, including float coal dust, propagated the explosion throughout the northern area of the Mine.

MSHA's *Report of Investigation, Underground Coal Mine Explosion, April 5, 2010, Upper Big Branch Mine-South, Performance Coal Company, Montcoal, Raleigh County, West Virginia, ID No. 46-08436*, was made available to the public on December 6, 2011.

Purpose, Scope, and Methodology

On April 29, 2010, the Assistant Secretary for Mine Safety and Health instructed the Director of Program Evaluation and Information Resources to conduct an Internal Review of MSHA's actions at UBB. The Internal Review team evaluated MSHA's actions relative to the April 5, 2010, explosion at the Mine and made recommendations to improve the Agency's performance in order to better protect the nation's miners from similar disasters in the future.

¹ MSHA divided District 4 into two separate districts in June 2011. District 4 now oversees field offices in Mt. Hope, Mt. Carbon, Madison, and Summersville. The newly-formed District 12 oversees field offices in Pineville, Logan, and Princeton.

In accordance with MSHA policy for conducting Internal Reviews, this review compared MSHA's performance at UBB with the requirements of the Mine Act, applicable standards and regulations, and MSHA policies and procedures. When appropriate, the Internal Review team also evaluated the adequacy of Agency standards, regulations, and directives related to the hazards which caused or contributed to the explosion.

The Internal Review team primarily focused on MSHA enforcement and plan approval activities during the 18 months preceding the April 5 explosion.² The team also examined Agency actions in conjunction with the rescue and recovery effort immediately following the explosion. When appropriate, the Internal Review team examined relevant historical information before the established review period.

As an integral part of the review, the Internal Review team traveled to UBB and observed conditions underground, including the 1 North Longwall Panel, the Headgate #22 development section, Tailgate 1 North, Headgate 1 North, North Glory Mains, Panel No. 1 Crossover, and Panel No. 2 Crossover. Figure 1 (page iv) is a diagram depicting the areas of the Mine affected by the explosion.

The Internal Review team interviewed 87 MSHA employees with personal knowledge of pertinent events. As noted later in this report, one inspector left the Agency before he could be interviewed and one specialist left the Agency before a follow-up interview could be conducted. One former MSHA employee was also interviewed by the Internal Review team. Bargaining unit employees were afforded the opportunity to have a National Council of Field Labor Locals representative present during their interviews. All persons interviewed cooperated with the review team during their interviews, and no one declined to be interviewed. A list of persons who were interviewed or who provided information to the review team is included in Appendix B.

The Internal Review team examined more than 12,500 pages of documents associated with Agency inspections and investigations at the Mine, District 4 reviews of UBB mining plans, mine examination records, and other relevant documents.

The Internal Review team evaluated 6 section 103(a) (regular) inspections, 46 section 103(i) spot inspections, and 5 other inspections and investigations completed during the review period. The team also evaluated 697 citations and orders and 550 subsequent actions issued at UBB during the review period.

The Internal Review team reviewed all UBB mine plans in effect during the review period and revisions and supplements to mine plans that were submitted, whether approved or denied by District 4.

The Internal Review team evaluated accident and injury, violation, inspection time and activity, and assessment data from MSHA's enterprise information system for UBB, Performance Coal Company, Massey Energy Company, the Mt. Hope Field Office, and District 4. When appropriate the team examined national data as well.

The Internal Review team analyzed several other topics, including respirable dust compliance, pattern of violations, flagrant violations, and possible knowing/willful violation reviews to determine their effect on MSHA's enforcement activities at UBB. The results of the review of these topics are presented in this report.

Other subjects also were analyzed including the section 104(d) tracking system and potential conflicts of interest. The review of these topics indicated they did not affect, influence, or otherwise have a bearing on the effectiveness of MSHA's activities at UBB. Therefore, these subjects are not discussed in this report.

Internal review guidance, which is set forth in the MSHA Administrative Policy and Procedures Manual, states that every allegation of possible misconduct on the part of MSHA employees should be examined. If the internal review team determines that there is credible evidence of possible employee misconduct, the procedures require the team to refer any such allegations to the Administrator of the program area

² The review period covers MSHA enforcement and plan approval activities from October 1, 2008, through April 5, 2010.

being reviewed for appropriate action. During this internal review, issues regarding potential employee misconduct were identified and referred to the appropriate parties for further consideration and investigation. Because a review and analysis of these personnel matters are beyond the scope of the internal review, they are not addressed in this report.

Report Organization

This report is organized into multiple topics, each focusing on issues identified by the review team. These topics were derived from information gathered during the review team's evaluation of relevant documents and data and from interviews of MSHA employees.

Each topic addressed in the report is divided into several sections. "Requirements" describes the relevant provisions of the Mine Act and its implementing standards and regulations. "MSHA Policies and Procedures" describes relevant Agency policies and procedures. "Statement of Facts" presents the facts as found by the review team during its review. "Conclusion" contains the review team's evaluation of the facts. "Corrective Actions Taken" details actions, including new regulations, policies, or procedures, which have already occurred or have been put in place to address identified weaknesses. "Recommendations" contains the review team's recommendations for correcting any deficiencies not already corrected.

In several instances the Internal Review team and the Accident Investigation team identified specific changes to mandatory safety and health standards that would improve mine safety and health. A consolidated list of recommended regulatory changes is included in Appendix C.

On April 16, 2010, the Secretary of Labor asked the Director of the National Institute for Occupational Safety and Health, Dr. John Howard, to identify a team with relevant experience to provide an independent analysis of MSHA's internal review. This independent assessment is intended to assure transparency and accountability and is focused on the policy, process, and outcomes of the MSHA Internal Review. The independent analysis will be available to the public.

After the Assistant Secretary approved the Internal Review report, he transmitted it to the Administrators for Coal and Metal and Nonmetal, the Director of Technical Support, the Director of Educational Policy and Development (EPD), and the Director of PEIR. He directed them to respond to the report's recommendations and to provide completion dates for each corrective action they are implementing. The responses are included in Appendix A.

Overview of District 4

At the time of the explosion, District 4 was responsible for enforcing the requirements of the Mine Act at all coal mines in southern West Virginia. The District was comprised of a District office in Mt. Hope, West Virginia, and seven field offices. There were more coal mines under District 4 jurisdiction than in any other Coal district, accounting for 28% of the nation's underground coal mines and 14% of the nation's surface coal mines and facilities. During the review period, District 4 personnel conducted regular safety and health inspections at 195 underground mines and 242 surface mines and facilities. During that time, these mines and facilities employed approximately 17,000 miners and produced nearly 160 million tons of coal.

District 4 Injury Summary

Table 1 shows the operator-reported Non-Fatal Days Lost (NFDL) injury incidence rates for all underground coal mines, surface coal mines, and coal facilities from October 1, 2008, to March 31, 2010.³ During this period, both longwall and non-longwall underground mines in District 4 had higher operator-reported NFDL injury rates than comparable mines in the other Coal districts while surface mines and facilities in District 4 each had lower operator-reported NFDL rates. Overall, District 4 mines had slightly higher operator-reported NFDL injury rates than mines in other districts.

Table 1 - Operator-Reported Non-Fatal Days Lost (NFDL) Incidence Rates: October 1, 2008 - March 31, 2010

District	UG Longwall Mines	UG Non-Longwall Mines	Surface Mines	Surface Facilities	All Coal Mines
District 4	4.57	4.23	1.16	1.33	2.81
Other Districts	3.53	4.11	1.25	2.03	2.68
All Coal Districts	3.61	4.14	1.24	1.82	2.71

District 4 Enforcement Summary

District 4 personnel logged over 163,000 on-site inspection hours during the review period, the most of any MSHA district. This accounted for over 18% of all on-site inspection hours at coal mines nationwide. District 4 issued over 35,000 citations and orders, accounting for nearly 23% of the total citations and orders and over 34% of the unwarrantable failure citations and orders issued at all coal mines nationwide. Table 2 shows the number of citations and orders issued by type during the review period compared to the other Coal districts.

Table 2 - Number of Citations and Orders Issued by Type: October 1, 2008 - April 5, 2010

District	104(a) Citations	104(d)(1) Citations	104(d)(1) Orders	104(d)(2) Orders	104(b) Orders	104(g)(1) Orders	107(a) Orders	103(j) and 103(k) Orders	Total Citations and Orders
District 4	33,744	106	208	382	205	112	65	224	35,046
Other Districts	114,391	295	412	615	740	612	295	894	118,254
All Coal Districts	148,135	401	620	997	945	724	360	1,118	153,300

*Includes issuances to contractors and excludes those subsequently vacated as of January 2012

Table 3 shows the violation rates for District 4 compared to the other Coal districts during the review period. District 4 had the highest violation rate, significant and substantial (S&S) violation rate, and unwarrantable failure violation rate of any Coal district in the nation. District 4 also had the fourth highest percentage of violations designated as S&S and the fourth highest percentage of violations designated as high negligence or reckless disregard.

Table 3 - Violation Rates: October 1, 2008 – April 5, 2010

District	Total Violations per 100 Inspection Hours	S&S Violations per 100 Inspection Hours	Unwarrantable Failure Violations per 100 Inspection Hours	% S&S	% Elevated Negligence
District 4	21.4	7.0	0.43	33%	4.9%
Other Districts	16.4	5.1	0.18	31%	4.6%
All Coal Districts	17.3	5.4	0.23	32%	4.6%

*Elevated Negligence is defined as high negligence or reckless disregard

Overview of Upper Big Branch Mine-South

Peabody Coal Company opened the Montcoal Eagle Mine on September 1, 1994. Performance Coal Company, a Massey subsidiary, acquired the Mine on October 15, 1994, and began producing coal as the

³ The NFDL injury incidence rate is the number of non-fatal injuries resulting in lost workdays or days of restricted work activity per 200,000 hours worked.

Upper Big Branch Mine-South on November 5, 1994. Both room-and-pillar and longwall mining were conducted in the Mine for several years. From calendar year 1995 through 2005, UBB employed an average of 185 underground and surface miners and produced approximately 3.5 million tons of coal per year.

After the previous longwall panel was completed in 2006, the longwall equipment was removed from the Mine and the southern longwall district was sealed. Performance Coal Company resumed longwall mining in the current panel in the northern mining district in September 2009. The Mine employed 186 underground miners, 4 surface miners, and 16 labor contractors on the day of the explosion. Table 4 summarizes employment and production data for calendar years 2006 through 2009.

Table 4 - Annual Employment and Production Data for UBB, 2006 to 2009⁴

Calendar Year	Number of Miners	Hours Worked	Coal Production (Tons)
2006	166	432,178	658,942
2007	160	414,667	576,672
2008	101	260,951	363,923
2009	179	429,540	1,232,708

UBB Injury Summary

Three fatalities occurred at UBB prior to the explosion, all while the Mine was operated by Performance Coal Company. A laborer, working for an independent contractor, was killed in January 1998 when the overcast he was working under suddenly collapsed; a continuous mining machine operator died as a result of injuries sustained in a roof fall in March 2001; and an electrician was electrocuted in July 2003.

Figure 2 shows the Operator-reported NFDL injury incidence rate at UBB, the amended NFDL rate at UBB, and the national average for all underground bituminous coal mines.⁵ From 1995 to 2001, the Operator-reported NFDL rate at UBB was lower than the national average. However, from 2002 to 2009, the Operator-reported NFDL rate at UBB was higher than the national average in seven of the eight years.

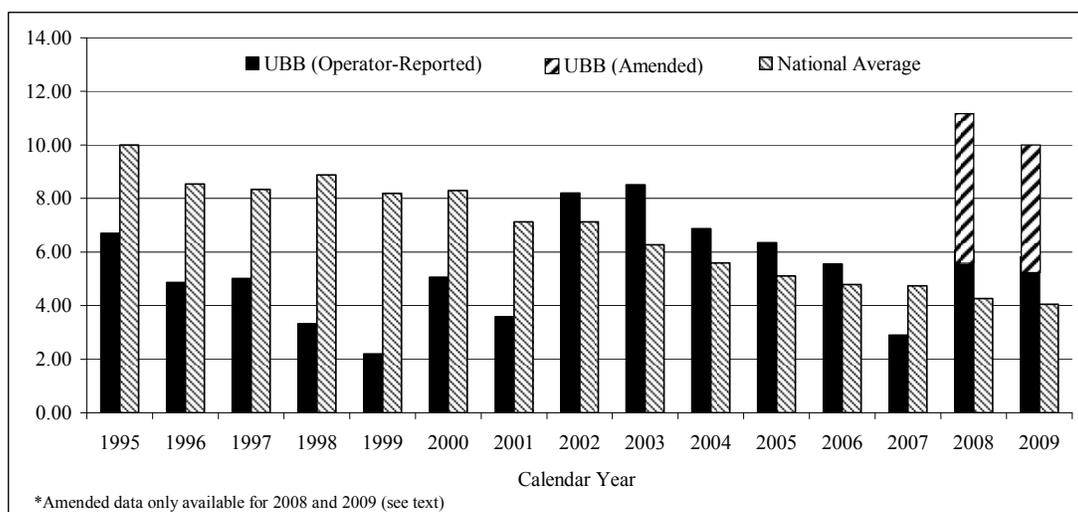


Figure 2 - Non-Fatal Days Lost (NFDL) Incidence Rate (UBB vs. National Average)

⁴ Includes data from amended MSHA Form 7000-2 filings following MSHA's audit of the Operator's Part 50 reporting records, which was conducted after the explosion.

⁵ The amended NFDL rate includes injuries, in addition to those initially reported by the Operator, identified during District 4's audit of the Operator's Part 50 reporting records, which was conducted after the explosion.

A Part 50 Audit conducted by District 4 after the explosion found that the Operator routinely under-reported accidents, injuries, and illnesses at UBB.⁶ The Operator's failure to report critical information regarding accidents impeded MSHA's ability to fully evaluate the working conditions and practices at the Mine. Following the explosion, District 4 personnel issued 41 section 104(a) citations for Part 50 violations at UBB that occurred during 2008 through March 2010. Twenty-one citations were issued for not reporting 18 injuries and 3 illnesses; 12 for errors in the submitted 7000-1 and 7000-2 forms; 5 for reporting non-injury accidents orally instead of filing the required 7000-1 forms; and 3 for exceeding the 10-day allowable timeframe for reporting injuries.⁷

In addition to violations cited as a result of the District 4 Audit, the Accident Investigation team issued 13 non-contributory citations and orders for Part 50 violations. These violations were discovered during the team's review of the Operator's production reports and from information obtained during interviews. The team issued five section 104(a) citations for not reporting four injuries and one illness; five section 104(d)(2) orders for failing to immediately notify MSHA of three roof falls, one water inundation, and one methane ignition; one section 104(d)(2) order for failing to notify MSHA of the April 5 explosion within 15 minutes; one section 104(a) citation for failing to preserve evidence of a roof fall; and one section 104(a) citation for not providing copies of accident investigation reports.

Figure 2 also shows the amended NFDL rate at UBB after factoring in the previously unreported injuries and amendments to the reported employment and production figures.⁸ The amended NFDL rates for 2008 and 2009 were 89% and 76%, respectively, higher than originally reported. This issue is discussed in greater detail in the Enforcement of 30 CFR Part 50 section of Appendix D.

UBB Enforcement Summary

District 4 personnel issued between 141 and 271 citations and orders per year at UBB in calendar years 2000-2008. However, the number of issuances and seriousness of the violations increased dramatically in calendar year 2009. From calendar year 2000 to 2008, District 4 personnel issued a total of 29 section 104(d) citations and orders for unwarrantable failure violations at UBB. In 2009 alone, UBB received 50 citations and orders for unwarrantable failure violations. Table 5 shows the number of citations and orders issued by District 4 personnel at UBB from January 1, 2000, to the time of the explosion on April 5, 2010.

Table 5 - Citations and Orders Issued by District 4 at UBB, January 1, 2000 - April 5, 2010

Calendar Year	104(a) Citations	104(d)(1) Citations	104(d)(1) Orders	104(d)(2) Orders	104(b) Orders	104(g)(1) Orders	107(a) Orders	103(k) & 103(j) Orders	Total Citations & Orders
2000	242	1	-	-	-	-	-	-	243
2001	157	-	-	-	-	-	-	2	159
2002	215	1	3	-	1	-	1	-	221
2003	169	1	1	-	-	-	1	1	173
2004	230	-	-	-	3	-	-	2	235
2005	137	-	-	-	3	-	-	1	141
2006	148	1	11	5	4	-	2	2	173
2007	269	-	-	-	1	-	1	-	271
2008	189	1	1	3	-	1	-	2	197
2009	460	1	1	48	4	1	1	1	517
2010	117	-	-	6	1	-	-	-	124

*Includes issuances to contractors and excludes those subsequently vacated as of January 2012.

⁶ A Part 50 Audit is a thorough examination of a mine's accident, injury, illness, and employment records for compliance with reporting requirements.

⁷ Mine Accident, Injury and Illness Report (MSHA Form 7000-1) and Quarterly Mine Employment and Coal Production Report (MSHA Form 7000-2)

⁸ The Internal Review team was not able to determine whether the four unreported injuries identified by the Accident Investigation team were non-fatal days lost injuries. Therefore, they are not included in Figure 2.

In the six months preceding the explosion, District 4 had jurisdiction over 5 of the 39 active longwall mines in the nation. As shown in Table 6, UBB’s total violation rate, unwarrantable failure violation rate, and percentage of violations designated high negligence or reckless disregard exceeded those of other comparable mines in District 4 and the nation. The number of unwarrantable failure violations per 100 inspection hours at UBB was more than nine times the average of all other active longwall mines in the nation.

**Table 6 - Violation Rates at UBB and Comparable Underground Coal Mines
October 1, 2009 – March 31, 2010**

Active Longwall Mines	Total Violations per 100 Inspection Hours	S&S Violations per 100 Inspection Hours	Unwarrantable Failure Violations per 100 Inspection Hours	% Elevated Negligence
Upper Big Branch Mine-South	19.59	5.4	1.38	11.3%
Other Longwall Mines in District 4	15.78	5.9	0.15	2.0%
All Other Longwall Mines	12.72	4.0	0.15	5.3%

*Elevated Negligence is defined as high negligence or reckless disregard

Inspections and Investigations

This section addresses inspections and investigations conducted by District 4 personnel at UBB during the review period. (See Appendix E for a list of these inspections and investigations.)

During the review period, District 4 personnel conducted 6 regular inspections, 46 section 103(i) spot inspections, 3 accident investigations, 1 technical investigation, and 1 preliminary special investigation at UBB. District 4 enforcement personnel, including supervisors, spent a total of 2,682 hours at UBB during all inspections, and examined miles of air courses and hundreds of units of equipment. Thirty-one District 4 inspectors and specialists issued 692 citations and orders at UBB during the review period.⁹ In fiscal year 2009, the Mine was issued more section 104(d) citations and orders than any other mine in the nation.¹⁰ During two regular inspections, District 4 personnel also conducted ventilation saturation inspections to address continuing problems with mine ventilation.

Section 103(a) Inspections

Requirements: Section 103(a) of the Mine Act provides that authorized representatives of the Secretary (ARs) shall make inspections of each underground mine in its entirety at least four times a year for the purpose of determining whether an imminent danger exists and whether there is compliance with the mandatory health or safety standards or with any citation, order or decision issued under the Mine Act. MSHA refers to these inspections as “regular safety and health inspections” or “regular inspections.”

Title 30 of the Code of Federal Regulations (30 CFR) contains mandatory health and safety standards for the protection of life and prevention of injuries and illnesses in mines. Operators are required to comply with these standards, and MSHA determines operator compliance during inspections.

MSHA Policies and Procedures: As described in the “MSHA Directives System” section of this report, the Internal Review team identified over 4,500 pages of written instructions which apply to Coal enforcement personnel. Due to the volume of this information, only general references to the applicable directives are listed below.

The MSHA *Program Policy Manual* provided Agency interpretations of key requirements of section 103(a) of the Mine Act, including when to conduct regular inspections and the authority to conduct inspections and investigations.

⁹ The 692 citations and orders do not include 5 citations and orders subsequently vacated.

¹⁰ The federal fiscal year extends from October 1 through September 30 of the following year.

MSHA directed its employees to conduct these inspections in accordance with procedures listed in program handbooks and Procedure Instruction Letters (PILs), which augmented the handbooks. These procedures included those intended to provide mandated inspections of mines in their entirety, as well as procedures for enhancing inspection quality. Handbooks and PILs in effect during the review period pertinent to regular inspections included the following:

- *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* (PH-08-V-1) (January 2008)
- *Carbon Monoxide and Atmospheric Monitoring Systems Inspection Procedures Handbook* (PH-08-V-2) (February 2008)
- *Coal Mine Health Inspection Procedures Handbook* (PH89-V-1) (21) (January 2008)
- *Uniform Mine File Procedures Handbook* (PH09-V-1) (July 2009)
- *Coal Mine Safety and Health Supervisor's Handbook* (AH-08-III-1 (2)) (November 2008)
- *Procedure Instruction Letter No. 108-V-06, Weekend E01 Inspections* (November 20, 2008)
- *Procedure Instruction Letter No. 108-V-8, Procedures for Inspection of Seals*, (December 19, 2008)
- *Policy Memoranda 80-27C and 80-14MM, Guidelines for Inspecting Stored Explosives at Mines* (November 26, 1980), which implemented a Memorandum of Understanding between MSHA and the Bureau of Alcohol, Tobacco and Firearms (ATF)

Statement of Facts: The District 4 Mt. Hope Field Office was responsible for inspections at UBB. The office was comprised of two inspector workgroups, each with one supervisor. A lead inspector, with the assistance of other inspectors and specialists, conducted each regular inspection. The workgroups alternated responsibility for UBB on a yearly basis.

District 4 personnel conducted six regular inspections at UBB from October 2008 through March 2010. Enforcement personnel began each regular inspection at UBB soon after the start of each quarter and continued the inspection for the remainder of the quarter. Enforcement personnel were at the Mine on 26 to 47 different days during these inspections. An inspector started another regular inspection on April 5, 2010. He had inspected 4 Section, which was located approximately four miles from the active longwall section, and had left the Mine before the explosion occurred. An overview of these regular inspections is provided in Table 7.

Table 7 - Overview of Regular Inspections Reviewed

Start Date	End Date	104(a) Cit.	104(b) Orders	104(d) Cit./ Orders	104(g) Orders	107(a) Orders	No. ARs	Lead AR MSHA Experience ¹	Total On Site Hrs ²
10/23/08	12/31/08	40			1		3	13 months	210
01/05/09	03/30/09	90		2			6	27 months	266
04/01/09	06/29/09	119	2	14			5	30 months	354
07/06/09 ³	09/30/09	149	1	21	1		8	52 months	529
10/02/09	12/30/09	58	1	7		1	16	38 months	492
01/06/10	03/31/10	101	1	6			10	20 months	420
04/01/10	-	2					1	30 months	8

¹ The value for Lead AR MSHA Experience reflects the inspector's experience with MSHA at the start of the regular inspection.

² Total hours does not include time charged to events by inspector trainees (who were not yet authorized representatives) or by supervisors, unless the supervisors worked toward completion of the event.

³ 1 North longwall began production during this inspection.

As described in the "Management Issues" section of this report, the Agency had experienced a significant decrease in staffing in the years prior to the mine disasters in 2006. All but one of the lead inspectors assigned to conduct regular inspections at UBB had been hired by MSHA as a result of the increased staffing following the disasters. As shown by Table 7, the average MSHA experience of the lead inspectors at UBB was 30 months. This included their time in training before being designated as authorized representatives (ARs). The UBB explosion occurred while these inspectors were still inexperienced in MSHA's policies and procedures.

The Internal Review team evaluated inspection activity during the review period for conformance to Mine Act requirements and MSHA policies and procedures. This evaluation included a review of inspectors' notes, tracking maps, MSHA data, rock dust sample submission forms, gas sample analysis reports, health survey data, Inspection Tracking System (ITS) records, mine records, mine plans, and other pertinent information.¹¹ The Internal Review team also interviewed inspectors, specialists, supervisors, and managers who were responsible for the inspections. This evaluation provided the basis for identifying issues and their root causes discussed throughout this report.

Mandated Inspection Activity

Some areas of the Mine were not inspected as directed by the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* during each of the six regular inspections reviewed. These areas included air courses, non-pillared worked-out areas, seals, bleeder evaluation points, and surface areas. Most areas of UBB that inspectors missed during specific quarters were visited during subsequent inspections. For instance, the 1.5-mile long intake air course located in the Old North Mains No. 2 entry (between Seal Set 13 and Seal Set 15) was not inspected during the first two regular inspections of the review period. During their interviews, Mt. Hope Field Office personnel indicated that they started inspecting this air course after recognizing that it had not been traveled during prior inspections. Indeed, the extent of areas missed declined from miles of air courses early in the review period to a few isolated areas, the largest of which was approximately 1,000 feet in length, during the last inspection before the explosion.

During the second regular inspection for fiscal 2010, the following portions of the Mine within the explosion area were not inspected: a portion of Tailgate #22 belt entry; the Tailgate #22 return air course; the completed entries driven east off the Panel No. 1 Crossover (Old 2 Section); evaluation point EP-65; and the No. 3 entry of evaluation point EP-LW3. By the end of this inspection, the Tailgate #22 entries had been developed approximately 725 feet. Also at that time, the Old 2 Section was 1,000 feet long, up to 7 entries wide, and was ventilated as a single intake air course. However, the explosion occurred only three business days after the end of this inspection. This did not allow the supervisor reasonable time to conduct a thorough review of the inspection report and direct inspectors to correct deficiencies before April 5, 2010.

Evaluation point EP-65 was established, and EP-LW3 was relocated, after inspectors reviewed the Uniform Mine File on January 6, 2010, to begin the second regular inspection of fiscal 2010. EP-65 was established by a mine ventilation plan supplement approved January 22, 2010. Bleeder evaluation point EP-LW3 was relocated in a supplement to the mine ventilation plan approved February 22, 2010. The inspector who traveled to EP-LW3 on March 10, 2010, took two of the three air readings required for that location. In an interview, the inspector indicated that he referred to a copy of a mine map obtained from the Operator, which did not identify the No. 3 entry as a measuring point for EP-LW3.

Because the tracking map used by the inspector also did not identify these evaluation points, the supervisor was not able to identify that the air quantities and qualities at these evaluation points were not documented in the inspection report. There was no established policy or procedure to require supervisors or inspectors to update the tracking map with changes approved and made after the inspection is started.

These are examples of how changing conditions and plan requirements in a mine can affect the apparent completeness of a mine inspection. After a regular inspection is opened, there can be numerous changes in equipment and airways made in a mine throughout the inspection. Once inspectors complete their inspection of a particular area, inspection procedures do not direct them to re-inspect the same area during the same regular inspection solely because a change, such as the installation of a new water pump or addition of an evaluation point, has been made.

¹¹ The Inspection Tracking System is a computer-based checklist of mine-specific inspection tasks, as provided in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. It is designed to enhance MSHA's ability to determine inspection progress and fulfill established inspection procedures by allowing inspectors to document the daily completion of each task on a shared file.

Inspectors track their daily travel through areas outby the working sections on a mine map or line diagram to ensure all areas are inspected. They also log their daily activities in the ITS to determine when they have fulfilled other MSHA procedures intended to enhance inspection quality. At the start of a regular inspection, a well prepared ITS will provide a thorough checklist of items that should be inspected. The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* provides instructions for documenting an inspection activity after it is completed, but does not address how to prepare a new tracking map or ITS at the beginning of an inspection. It also does not address how to maintain the map and ITS to reflect changes in areas or equipment needing inspection, such as when new evaluation points are approved in the ventilation plan.

The Handbook directs inspectors to clearly mark the extent of daily travels of air courses, bleeders, and worked out areas on a mine map, line diagram, or combination thereof. Inspectors often obtain mine maps for such purposes from operators at the start of regular inspections. Line diagrams (often in the form of highlighted projections on the same map) are typically used to show inspection activity in areas mined since the tracking map was printed. MSHA procedures do not address identifying the names and locations of evaluation points or MMUs on such maps.

Inspectors did not list 21 of the 38 approved locations for evaluating worked out areas in the ITS for the second quarter of fiscal 2010. However, of the 21 evaluation points they did not list, they inspected all but two -- EP-65 and a portion of EP-LW3.

The Accident Investigation team cited the Operator for a contributory violation of 30 CFR 75.364 for failing to conduct adequate weekly examinations. This violation referenced the Operator's failure to make required tests and measurements necessary for evaluating the longwall bleeder system, including readings at EP-65. Neither the Accident Investigation team nor the Internal Review team found any record of the Operator taking required measurements at EP-65. Because inspectors were not aware that EP-65 had been established by the Operator, they would not expect to see weekly examinations conducted and recorded for this evaluation point.

During the second regular inspection of fiscal 2010, MMU 029-0 completed mining the Old 2 Section panel and initiated mining the Tailgate #22 entries. During interviews, the inspector indicated that he delayed inspecting 2 Section because MMU 029-0 produced coal sporadically until it was moved to the Tailgate #22 entries. He also indicated that this delay caused time management issues for completing the inspection.

Authority to Conduct Inspections and Investigations

The *Program Policy Manual* states that "Inspections and investigations under the Federal Mine Safety and Health Act of 1977 shall be conducted only by persons who have been authorized by the Secretary to conduct such inspections or investigations." Initially, inspector trainees are issued credentials that limit their authority to the "right of entry" (ROE) into a mine. They are not given credentials as Authorized Representatives of the Secretary (ARs) to inspect mines until they are deemed to be qualified by the District Manager to conduct inspections, but not before completing approximately two-thirds of their Entry-Level Training at the National Mine Health and Safety Academy. A complete discussion of training and qualification of inspectors is contained in the "Management Issues" section of this report.

The Internal Review team determined ROE trainees conducted inspection activity, apart from ARs, for portions of five of the six regular inspections at UBB during the review period. Some District 4 trainees and inspectors stated during interviews that they did not know ROE trainees were prohibited from inspecting the Mine apart from ARs. Others stated that ROE trainees were utilized to inspect areas apart from ARs in order to complete inspections within the required time frames. At UBB, ROE trainees conducted inspections apart from ARs on approximately 2% of the total inspection days. Some of the inspection activities conducted by ROE trainees involved areas mandated by the Mine Act to be inspected by ARs, such as air courses and seals.

A ROE trainee inspected some of the 1 North Longwall face equipment on March 15, 2010, while the AR remained on the headgate side of the longwall panel. This was the only inspection activity in the

explosion area conducted by a ROE trainee during the second regular inspection of fiscal 2010 that was not re-inspected by an AR. However, an AR did re-inspect the shearer on March 23, 2010, during a respirable dust survey. The two violations on the longwall face equipment cited as contributing to the explosion involved the shearer bits and sprays (refer to the sections of this report titled, “Enforcement of 30 CFR 75.1725(a)” and “Enforcement of 30 CFR 75.362”). The Internal Review team determined that District 4 inspectors did not have an opportunity to observe these contributory violations because they occurred after the last inspection of the longwall shearer on March 23, 2010.

Also during the review period, ROE trainees conducted inspections (apart from ARs) of seals, return air courses, a conveyor belt entry, a shop, surface equipment, SCSRs, and explosives storage magazines. In some cases, this activity was clearly documented on the inspection tracking map and in inspector and ROE trainee notes.

District 4 had developed guidance entitled, “Standard Operating Procedures For Authorized Representative Mentoring of Trainee.” Item 3 of the guidance stated: “During any inspection activities at a surface or underground mine, the AR shall make certain that the ROE Trainee is close to him/her at all times.”

The District 4 guidance clearly prohibited ROE trainees from traveling apart from ARs. Supervisors and the Assistant District Managers for Enforcement (ADM-Enforcement) stated that they had provided oral instructions prohibiting trainees from traveling apart from inspectors. Supervisors and the ADM-Enforcement with responsibility for UBB stated they did not know the guidance was not being followed at UBB, although this deficiency was documented in the inspection notes for four of the six regular inspections.

Procedures for Conducting Regular Inspections

The following summarizes the Internal Review team’s assessment of inspectors’ conformance to established procedures when conducting regular inspections at UBB (in addition to those previously discussed in “Mandated Inspection Activity”). MSHA established many of these procedures to enhance the quality and uniformity of its inspections. Accordingly, procedures directed inspections to be conducted in a manner that maximized opportunities to identify all types of violations and hazards that may exist at the time of inspection. These also included administrative tasks intended to familiarize inspectors with mine-specific information and to improve accountability and inspection oversight. Therefore, some procedures are not specifically required by section 103(a) of the Mine Act.

MSHA policy does not clarify the phrase “mine in its entirety,” as referenced in section 103(a) of the Mine Act. Over the years, a daunting list of procedures has been developed in response to internal and external audits and to a growing number of MSHA laws, standards, and regulations. Each new procedure impacts MSHA resources. The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* provides a listing of what an inspector must conduct to complete a regular inspection. Without clarification of this Mine Act requirement, identifying the salient parts of a regular inspection has become increasingly difficult. For instance, section 103(a) does not clearly require inspection of every piece of equipment. An alternative would be to inspect enough of the equipment to determine the operator’s overall compliance with relevant mandatory safety standards. Likewise, less frequent, but more thorough, inspections of mine systems by qualified and properly equipped specialists may be more advantageous to the safety of miners than more generalized regular inspections of system components.

Uniform Mine File.¹² Inspectors review the Uniform Mine File (UMF) to become familiar with all current mine-specific information needed for their inspections, including approved plans, safeguards, petitions for modification, and compliance and recent accident history.

¹² The Uniform Mine File (UMF) System is a compilation of approved plan and other documents intended to provide enforcement personnel with current and complete information for each underground and surface mine. Procedures direct inspectors to review the UMF just prior to conducting an inspection or investigation.

For each regular inspection reviewed by the Internal Review team, one or more inspectors or specialists did not review or did not document reviewing the UMF prior to inspecting at UBB as required by the *Uniform Mine File Procedures Handbook*.¹³ Interviews revealed that inspectors and specialists were aware of the requirements for reviewing the UMF and documenting their reviews. In 27 cases when inspectors and specialists documented reviewing the UMF for a regular inspection, they did not document the specific sections of the file they reviewed as required by the Handbook. None of these inspectors or specialists documented that they reviewed the file in its entirety.

The field office supervisor certified that he conducted the required annual review of the UMF for UBB on March 3, 2009, but did not document deficiencies in the inspectors' reviews of the UMF. An annual review of the UMF had not been documented between the 2009 review and the time of the explosion. The Internal Review team determined that the UMF for the Mine was up-to-date at the time of the explosion.

First Day Arrival. Inspectors arrived at the Mine on the first day of the inspection in advance of the shift's starting time, as directed by the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*, during five of the seven regular inspections started during the review period. The Handbook directed inspectors to document this in the daily inspection notes by including a general statement such as "Arrived first day in advance of mine shift starting time." Inspectors were also directed to document their time of arrival at the mine on the daily cover sheet.

During the first regular inspection of fiscal 2009, an inspector arrived at UBB on a Saturday after the start of the day shift but did not travel underground. Instead, he inspected record books and surface areas of the Mine. In his interview, the inspector stated that he was not at the Mine to start an inspection, but to assist the lead inspector. He stated that this was not the way he normally conducted the first day of his inspections. He did not provide a reason for not traveling underground. Another MSHA inspector did not visit the Mine until 19 days later, when the lead inspector arrived before the start of the shift and traveled underground with the mantrip.

During the first regular inspection of fiscal 2010, the time documented on the daily cover sheet indicated that an electrical specialist and a health specialist arrived at the Mine after the shift's starting time on the first day of the inspection to inspect the AMS and respirable dust parameters. On the second day of this inspection, the lead inspector arrived before the shift began.

Inspection on All Working Shifts. During the review period, UBB operated with three working shifts each day. Inspectors followed the provisions of the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* requiring mine visits on all working shifts during five of the six regular inspections reviewed. During the third regular inspection for fiscal 2009, inspectors did not inspect the Mine on evening shift.

Inspection of Working Sections. Inspectors were present on all active working sections of the Mine during every inspection of the review period. However, they did not consistently conduct or document conducting the following activities as directed by the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*:¹⁴

- Inspect fire protection equipment, first aid equipment, potable water, escapeway maps, and sanitary facilities. In some cases, the ITS indicated that the items had been inspected, but the inspection notes did not.
- Hold health and safety discussions with miners on every working section. During three inspections, inspectors did not conduct or document conducting health and safety discussions on

¹³ During two of these inspections, the inspectors and specialists who did not sign and date the certification form for the regular inspections did sign and date the form for the section 103(i) spot inspections they conducted.

¹⁴ The Internal Review team determined that, at times, inspectors did not conduct required inspection activities. At other times, the team determined that certain documentation requirements were not met. Where the report indicates that inspectors did not conduct or document conducting an activity, the Internal Review team intends to indicate that, if the activity was conducted, the inspector did not document doing so in the inspection notes.

any of the sections. During the other three inspections, inspectors documented conducting these discussions underground on one to four of the working sections. Two inspectors interviewed indicated that they held their health and safety discussions with miners on the surface.

- Check for imminent dangers in working places every time they inspected a working section. Inspectors sometimes went to a section to terminate a citation(s) or to inspect equipment or other items on the section, but they did not check for imminent dangers as directed. Interviews indicated inspectors were aware of the requirement to conduct and document imminent danger checks.
- Observe or document observing the entire mining cycle on some working sections during the first five regular inspections of the review period.
- Document the location of the last open crosscut on the working sections that had advanced since their last inspection visit, even though during interviews they stated they were aware of this requirement.
- Inspect all SCSRs carried or stored on working sections, as follows:
 - Inspect any SCSRs carried by miners on each working section during two of the six inspections. Only some of the SCSRs carried by miners were checked during two other inspections. During one inspection some SCSRs were inspected by a ROE trainee while he was apart from the AR.
 - Inspect the SCSRs stored on the longwall section during the fourth regular inspection for fiscal 2009. However, the longwall did not begin production until the last month of the inspection.
 - Consistently document the manufacturer, model, and serial numbers of SCSRs on working sections. Many inspectors were unaware that procedures directed them to inspect all SCSRs stored or carried by miners on a working section.
 - Evaluate the adequacy of SCSR training by discussing donning procedures with a representative number of individual miners.

Respirable Dust Surveys. Issues related to respirable dust surveys are addressed in the section entitled “Respirable Dust at Upper Big Branch Mine-South.”

Rock Dust Surveys. Issues related to rock dust surveys are addressed in the section entitled “Enforcement of 30 CFR 75.400 and 75.403.”

Equipment. A review of inspection reports disclosed that some equipment was not inspected as directed during each of the six inspections reviewed. Equipment missed included some belt conveyors and water pumps. Inspectors documented inspecting some water pumps during the six regular inspections of the review period. However, not all of these water pumps were entered into the ITS for the first regular inspection of fiscal 2009 and the first and second regular inspections of fiscal 2010 as directed by *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. No water pumps were listed in the ITS for the second, third, and fourth regular inspections of fiscal 2009.

The ITS for the second regular inspection of fiscal 2010 listed 15 water pumps, including four that were identified as “gone” or no longer in use at the Mine. The Operator’s electrical map documented 30 water pumps in the Mine at the time of the explosion. However, after the explosion, MSHA inspectors and investigators determined there were more than 50 water pumps operating in the Mine at that time.

Seals. The Mine seals, none of which had design strength of 120 psi, were inspected during all six regular inspections.¹⁵ However, there were several deficiencies in the way the seals were inspected and the way the inspections were documented. During the first regular inspection of fiscal 2009, four sets of seals

¹⁵ MSHA inspection procedures do not require inspectors to sample the atmosphere behind seals that have a design strength of at least 120 psi overpressure.

were inspected by a ROE trainee who was not accompanied by an AR. During five of the six inspections, inspectors did not sample the atmosphere behind every set of seals as required by the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*.

Inspectors sometimes documented that all seal sets were in-gassing. Some inspectors indicated during interviews that they were not aware of the procedure in *PIL No. I08-V-8* that directed inspectors to sample air from behind seals, regardless of whether the seals were in-gassing. Although sampling equipment was available in the field office, some inspectors stated that they sometimes used the Operator's equipment to sample the atmosphere behind seals.

During five of the six regular inspections inspectors did not test or document testing for methane or oxygen deficiency in the entry nearest each set of seals immediately after the air passed the seals. During the fourth regular inspection of fiscal 2009 and first regular inspection of fiscal 2010, inspectors did not document the number of seals in some sets of seals.

On August 10, 2009, an inspector issued a citation on one seal in Seal Set 3, because the seal had not been repaired where it was "crushing out." The Operator submitted a plan to construct a replacement seal. The citation was terminated on September 21, 2009, after the plan was approved and the Operator constructed the seal. On November 23, 2009, during the next inspection of Seal Set 3, a second inspector cited five additional seals in the set. The Operator submitted a plan to replace only four of the seals. This citation was extended five times, with the last extension to February 24, 2010. No further action was taken until a section 104(b) order was issued on April 13, 2010, eight days after the explosion. The order stated: "The requested four seals are not complete and as of this date, no revision has been submitted to construct seal No. 19."

Review of the inspections conducted after the explosion revealed that four of the seals that were the subject of the section 104(b) order had been built sometime during the second quarter of fiscal 2010. The District did not inspect these seals between the time they were constructed and the time the explosion occurred.

The Operator's Weekly Examination of Seals record books documented that damage to the five cited seals had been recorded by mine examiners since at least September 2008. The inspector who issued the citation on November 23, 2009, stated he did not look in the record book to determine the length of time the seals had been damaged. The inspector who cited the violation on August 10, 2009, left the Agency before the Internal Review team had an opportunity to interview him.

Carbon Monoxide and Atmospheric Monitoring System. During all six regular inspections in the review period, inspectors either did not properly inspect or document inspecting the atmospheric monitoring system or carbon monoxide (CO) monitoring system as directed by the *Carbon Monoxide and Atmospheric Monitoring Systems Inspection Procedures Handbook*. The Internal Review team determined from interviews and inspection documentation that the CO system was not inspected during the first regular inspection of fiscal 2009.

Inspectors did not consistently observe or document observing functional tests and calibration of CO sensors. One inspector stated that he thought calibration gas was only required to be applied to sensors when conducting calibrations, not when conducting functional tests. An electrical specialist demonstrated that he understood how to check the CO monitoring system at UBB (refer to the "Enforcement of 30 CFR 75.351 and 75.352" section in Appendix D).

Outby Self-Contained Self-Rescuers. Inspectors did not consistently follow the procedures in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* for inspecting and documenting outby SCSR storage locations. Identified issues include the following:

- Some outby SCSR storage locations were not inspected during each of the six regular inspections.
- Most inspectors stated during interviews that they did not know how many stored SCSRs they were required to inspect. Some stated they had learned of the requirement after the explosion.

- When inspectors checked SCSRs, they did not consistently inspect a representative number of the units or document the manufacturer, model, or serial numbers.
- Inspection notes did not consistently document that donning procedures were discussed with miners as required.

Travel with Mine Examiners. Inspectors did not travel with or document traveling with at least one preshift, one on-shift, and one weekly examiner as required by the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* during three of the six inspections in the review period. During the first regular inspection for fiscal 2009, inspectors did not travel with or document traveling with a preshift examiner. During the fourth regular inspection for fiscal 2009, inspectors did not document traveling with a preshift or weekly examiner. During the first regular inspection for fiscal 2010, inspectors did not document traveling with an on-shift examiner. While inspectors traveled areas of the Mine with Operator representatives, the inspectors did not document that these persons were conducting examinations or that they were mine examiners.

Inspectors also did not consistently document the examiners' names in their inspection notes as required by the Handbook. During the first regular inspection for fiscal 2009, an inspector did not document the name of the on-shift examiner he accompanied. During the second regular inspection for fiscal 2009, inspectors did not document the names of any of the examiners they accompanied. During the first regular inspection of fiscal 2010, an inspector did not document the name of the preshift examiner he accompanied. The inspector traveling with a preshift examiner during the second regular inspection for fiscal 2010 did not document the examiner's name.

During interviews, most inspectors stated that they knew they were required to travel with all three types of examiners. However, one inspector thought that he was required to travel with either a preshift examiner or an on-shift examiner, but not both. Another inspector believed that he was only required to travel with the weekly and preshift examiners.

Gas Detectors. Inspection notes indicated that inspectors did not always follow the instructions related to gas detectors in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. The inspection notes indicate that District 4 personnel did not inspect a representative number of gas detectors in use at UBB. During the 6 regular inspections of the review period, inspectors documented examining a total of 13 gas detectors at the Mine. Only 3 of the 13 gas detectors examined were being used by mine examiners. Inspectors documented examining four gas detectors during one regular inspection, the most of any inspection in the review period. For the second regular inspection of fiscal 2010, there was no documentation to indicate that any detectors were examined. Inspectors did not always document a means to identify gas detectors, such as the Operator's identification number or manufacturer's serial number.

Some inspectors stated during interviews that they usually inspected gas detectors when they observed them, but they did not inspect all mine examiners' gas detectors. One inspector said that he had not been instructed to check gas detectors or document information about the detectors.

Some inspectors stated they checked to see if gas detectors were calibrated by examining the calibration history within the instrument or written records of calibration. Other inspectors stated they did not check for calibration or could not remember if they checked for calibration. MSHA mandatory safety standards do not require mine operators to maintain records of calibration of hand-held gas detectors.

During the third regular inspection of fiscal 2009, one inspector issued two section 104(a) citations for violations of 30 CFR 75.320(a), which requires gas detectors to be calibrated every 31 days. One citation was issued for a multi-gas detector in a refuge alternative that had not been calibrated in over three months. The second citation was issued for a belt examiner's multi-gas detector that had not been calibrated in over two months. No other violations of 30 CFR 75.320(a) were cited at UBB during the review period.

During the review period, District 4 inspectors also issued four section 104(a) citations for violations of 30 CFR 75.1714-7 because the Operator did not provide multi-gas detectors to groups of miners or to one miner working alone.

Records and Postings. During the second regular inspection for fiscal 2009 and the first regular inspection for fiscal 2010, inspectors properly documented inspecting records and postings on the hard-copy notes checklist, as directed by the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. Inspectors did not document that they examined all required records and postings during the other four regular inspections in the review period. Inspectors would document in their inspection notes their intention to check records and postings, but only a few of the individual records or postings were listed in the notes as having been inspected, as directed. Some inspectors documented in the ITS that they examined several records and postings, but did not document doing so in their notes. One inspector who did not document inspecting individual records stated in his interview that he would write “records and postings” in his notes, but he would remember the specific records he checked in order to complete the ITS.

While inspectors regularly documented inspection of records prior to each inspection shift, the records were not always pertinent to the areas they inspected. As discussed in the report section “Use of Section 104 Enforcement Authority,” inspectors frequently did not review records related to violations they cited each day as directed.

Inspectors were not consistent in their review of past records. Some inspectors stated in their interviews that they knew of the Handbook directive to check records back to the end of the previous regular inspection. Some inspectors and supervisors stated they were not sure about the requirement. Other inspectors stated they would check the record books but only back to the start of the current inspection, to the beginning of the current record book, or for the past few days or weeks.

The ITS for UBB shows that inspectors examined records of the Smoking Program required by 30 CFR 75.1702 during all six of the regular inspections of the review period. However, inspectors only documented reviewing the Smoking Program in their notes for three of the six inspections.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* is internally inconsistent with respect to the use of the hard-copy notes checklist for records and postings. The *Documentation Required* section states: “Each record...shall [emphasis supplied] be reviewed and...documented in the hard-copy notes checklist.” However, the *Documentation* section of the Handbook Appendices states: “The Mine Postings and Records Documentation...should [emphasis supplied] be printed by the AR and used as inspection notes.” It is not clear from the Handbook whether the checklist is required or not.

The records and postings section of the Handbook was not updated to require inspectors to inspect records required by new seal standards at 30 CFR 75.335, 75.336, 75.337, and 75.338, which became effective April 18, 2008. However, *PIL No. I08-V-8*, effective December 19, 2008, instructed inspectors to review these records.

Explosives Storage Facilities. The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* requires inspectors to conduct: “Compliance inspections of explosives storage facilities on mine property... to determine if the facilities meet the requirements of the Commerce in Explosives regulations (27 CFR Part 55, Subpart K - Storage).” A 1980 Memorandum of Understanding between MSHA and the Bureau of Alcohol, Tobacco and Firearms (ATF) gives MSHA the authority to issue citations under ATF Regulations. The 1980 Memorandum was not widely available during the review period, and many District 4 enforcement personnel were not aware of its provisions.

District 4 inspectors did not inspect the UBB explosives storage facilities during the third regular inspection for fiscal 2009. Inspectors did, however, inspect the explosives storage facilities during the other five regular inspections. Inspectors did not complete and submit ATF Form F 5030.5 during any of the six regular inspections as directed by the Handbook. Interviews revealed that some inspectors and supervisors believed that the Form had to be submitted only if they cited a violation(s). Others were not

aware that the Form had to be submitted at all. One inspector stated he had never completed the Form and was not aware of the requirement for completing it. Although the supervisors reviewed the six inspection reports, they did not require the Form to be submitted as directed.

Surface Areas. Inspectors did not consistently inspect or document inspecting some surface items, areas, and equipment in either in their notes or in the listing provided in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. These included communications equipment, electric equipment, haulage equipment, a gear-driven elevator, pumps, firefighting equipment, first-aid equipment, illumination of work areas, sanitary facilities, highwalls, potable water, and mine fan installations.

Inspection Documentation. The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* provides detailed instructions on the information that must be documented in inspection notes. The purpose for documenting activities conducted or areas and equipment inspected is to provide on-site documentation of the inspector's activities and findings and to provide daily documentation for enforcement actions.

The Handbook directs inspectors to document findings concerning the procedural requirements of the handbook in the narrative portion of their field notes. The note-keeping pages, originally approved by *PIL I95-V-7*, are the official record of an inspector's activities. The Handbook permits the inspector to use the appendices included in the Handbook as part of the inspector field notes. Additionally, the Handbook allows the listings in the ITS to be used as hard-copy notes for items inspected on a daily basis. To count as official notes, the inspector must date and initial the pertinent activities conducted or items, areas, or equipment inspected, and must number these appendices or ITS pages. When no hazards or violations are observed, the inspector must include a short statement such as "No Violations Observed" or "NVO" after each activity conducted or item, area, or piece of equipment inspected.

The Inspection Tracking System itself is only a tool for determining inspection progress and fulfilling established inspection procedures. It is not designed to be an official record of an inspection, but to supplement MSHA's ability to determine if a regular inspection is thorough and complete. The inspector must document the inspection activities as directed in the Handbook. Documenting an inspection activity or item, area, or piece of equipment only in the ITS cannot be used to consider that part of a regular inspection as complete.

The Internal Review team determined that inspectors sometimes conducted an inspection activity according to procedures, but failed to document it. In other cases, the team determined that inspection procedures were not completed or followed. While documentation is important to ensure an inspection is complete and thorough, performing the actual inspection or activity to promote the health and safety of miners is the primary purpose and goal of inspection procedures.

During each of the six regular inspections, inspectors did not always comply with the instructions in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* and other Agency directives for documenting in their notes their inspection activities and the areas and equipment they inspected. Required information that inspectors did not always document in their inspection notes includes the following:

- Serial numbers, manufacturer, or model of SCSRs examined
- Serial or company numbers of equipment inspected
- The manufacturer and model of the Atmospheric Monitoring System installed in the longwall belt entry after the longwall began production in September 2009
- Number of seals in each set or the methane and oxygen readings in the entry nearest the seals after the air has passed the seals
- Names of mine examiners accompanied
- Mine records or postings examined
- Some inspection activities and inspection of areas/equipment on working sections and surface areas

- Checking for imminent dangers when inspecting the working places on each working section
- A statement such as “No Violations Observed” or “NVO” after they inspected an area or item and did not observe any violations

Inspectors sometimes did not include a statement such as “No Imminent Dangers Observed” or “NIDO” when they inspected working places and did not observe an imminent danger. Interviews indicated inspectors generally were aware of the requirements in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* to document imminent danger checks and to include statements when no violations were observed; however, they did not consistently comply with the procedures.

Inspectors did not use the Inspection Procedure Header Documentation pages from the Handbook as part of their notes, but completed these pages at the end of each regular inspection, submitting them with the inspection report.¹⁶ All items from these pages were marked with either a “Y” if they were required to be inspected or an “N” if they were not. Had inspectors used the pages as their notes, the Handbook would have required them to identify the date and by whom each item was inspected.

During interviews, at least seven inspectors indicated they were not aware that they could use the listing provided in the Handbook as part of their notes. Other inspectors stated they would use the listing mainly at the end of the inspection to see if they missed anything during the inspection. One supervisor stated he did not know the pages could be used as inspection notes. (See Appendix F for a copy of the Inspection Procedure Header Documentation checklist.)

Many pages of notes were not dated as required. Some notes did not have any dates, while other notes listed incorrect dates. For example, the close-out conference for the third regular inspection for fiscal 2009 was held on June 25, 2009, but the notes were dated April 25, 2009.

The General Information Cover Sheets for three of the six regular inspections were not completed as directed by the Handbook or contained errors. Three of the Cover Sheets had missing or incorrect dates, two had other missing information, and one had an incorrect event number.¹⁷ The Daily Cover Sheet for three days also included the incorrect event number.

Inspectors rarely listed shift and shift type on the Daily Cover Sheet to show the shift during which they were inspecting. The exception to this was during the second regular inspection of fiscal 2010, when the lead inspector consistently complied with this provision of the Handbook. In their interviews, other inspectors stated they were not aware of this provision. MSHA did not update the Form for the Daily Cover Sheet to include a field for this information.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directs inspectors to document certain inspection activities in the appropriate section of the ITS. Some areas and equipment inspected were recorded in the notes but not in the ITS, or alternatively, recorded in the ITS but not in the notes. Sometimes, the serial or company number recorded in the notes did not match what was recorded in the ITS.

Inspectors stated during interviews that it was their responsibility to enter the information in the ITS and make sure it was correct. Supervisors stated they usually checked the ITS at the end of the inspection quarter to ensure it was complete. However, neither the inspectors nor the supervisors identified or corrected all of the inconsistencies. Without accurate and complete inspection notes and ITS records, the supervisors could not determine that a complete inspection had been conducted. Some inspectors and supervisors also stated they were not aware that pages from the ITS could be used as daily inspection notes.

Inspectors also stated during follow-up interviews that they would normally use their notes to update information in the ITS. However, when showed instances where the notes and ITS did not correspond, some stated it was an oversight on their part; others stated they may have tried to enter the information

¹⁶ “Procedure Header” is the term MSHA uses to describe the list of items, areas, equipment, and activities that must be inspected at each mine during a regular inspection.

¹⁷ An event number is a unique identification number assigned to each MSHA inspection or investigation.

from memory; some did not know why they did not match; and some stated they may have entered the wrong information. One supervisor also stated it was an oversight on his part that he did not identify the conflicts during his review of the notes and ITS.

Supervisory Review of Regular Inspections

During the review period, two permanent supervisors and two temporarily promoted acting supervisors in the Mt. Hope Field Office had enforcement responsibility for UBB. One supervisor was responsible for overseeing regular inspections during fiscal 2009. On October 1, 2009, the Mine was assigned to the second workgroup in the field office. There were two acting supervisors in this workgroup during the first quarter of fiscal 2010. Beginning January 2010, a permanent supervisor was reassigned from another field office to supervise the workgroup.

The two permanent supervisors certified that they reviewed the six regular inspection reports for UBB by completing the First-line Supervisor E01 Certification forms as directed in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. The supervisor who had enforcement responsibility for UBB for fiscal 2009 certified the four inspection reports for that year. The other permanent supervisor certified the two inspection reports completed in fiscal 2010. The certification forms were completed 20 days to 28 days into the next quarter for four of the regular inspections. The third regular inspection for fiscal 2009 was certified on the last day of the quarter, the only inspection certified as complete before the next inspection began. The second regular inspection for fiscal 2010 was certified by the supervisor seven days into the next quarter, after the explosion occurred. Neither of these supervisors identified and documented many of the shortcomings found by the Internal Review team, including that the Mine had not been inspected in its entirety during any of the six regular inspections.

When interviewed, these two supervisors indicated they did not remember identifying substantive deficiencies during their review of the inspection reports for UBB. One supervisor stated that he documented deficiencies he found with inspection reports on Field Activity Review (FAR) documentation forms. However, he did not conduct a FAR on the regular inspection reports he reviewed for UBB during the review period. The other supervisor stated he did not have any tracking system other than the ITS to determine if regular inspections were complete.

Inspectors stated during interviews that their supervisors would at times return their inspection notes for corrections. However, the vast majority of deficiencies identified by the supervisors were missing dates, page numbers, and initials on the notes. Six inspectors stated that on rare occasions they received notes back from their supervisors to add information relating to their evaluation of citations and orders. One inspector stated he would get his notes back because they were illegible. Another inspector stated he had notes returned because he had not put the shift type on the Daily Cover Page. The two permanent supervisors stated they returned notes to have inspectors correct wrong citation numbers; illegibility; and missing initials, page numbers, and information related to citations and orders. However, evidence does not indicate inspectors' notes were corrected to conform to documentation guidance in procedural handbooks and other relevant Agency directives.

The *Coal Mine Safety and Health Supervisor's Handbook* directs supervisors to review, on a daily basis, inspector work products which include citations, orders, and inspection notes. However, for the first regular inspection of fiscal 2009, the supervisor did not complete the review of any complete set of the daily inspection notes from UBB until 28 days after the end of the inspection quarter, the same day that he certified the inspection as complete. For the first regular inspection in fiscal 2010, review of inspection notes covering four days was not completed until 20 days into the next quarter, and inspection notes covering two days of this inspection were not initialed as reviewed by the supervisor. By the time these notes were reviewed, the next regular inspections had begun, so the previous inspections could not be reopened for corrective action. For the other four inspections, the supervisors generally reviewed the notes by the time the next regular inspections began.

During the second regular inspection for fiscal 2010, the following were not inspected in the northern area of the Mine affected by the explosion: a portion of Tailgate #22 belt; Tailgate #22 return air course; the

mined-out area between Panel No. 1 Crossover and the North Glory Mains (Old 2 Section); evaluation point EP-65; and the No. 3 entry of evaluation point EP-LW3. While the supervisor initialed inspector notes indicating they were reviewed, he did not document that he reviewed the tracking map. The supervisor did not identify that these areas of the Mine were not inspected. However, the explosion occurred only three business days after the end of this inspection. This did not allow the supervisor reasonable time to conduct a thorough review of the inspection report and direct inspectors to correct deficiencies before April 5, 2010.

During interviews, District 4 field office supervisors stated they were inundated with inspection reports at the end of each quarter. One supervisor stated that it sometimes took the first month of the next quarter for him to complete reviews of the inspection reports from the previous quarter. He stated that, if he found deficiencies or areas not inspected, inspectors would go to those areas during the on-going regular inspection or during a spot inspection; they would not re-open the previous inspection.

District 4 field office supervisors stated they reviewed the ITS as directed by the *Coal Mine Safety and Health Supervisor's Handbook* to make sure the inspection was complete; however, the two Mt. Hope Field Office supervisors did not identify the inconsistencies found by the Internal Review team. Some supervisors stated during follow-up interviews that they would try to compare the ITS to the notes at the end of the inspection, but they did not compare all items because of the time required. A supervisor from another field office stated he would print a copy of the ITS at the beginning of a quarter, mark it off during his review of the inspector notes, then compare it to the ITS turned in by the inspector at the end of the inspection. When shown examples of cases in which the ITS and the inspection notes did not match, one Mt. Hope Field Office supervisor stated it was an oversight on his part.

The permanent supervisor who had enforcement responsibility for UBB during fiscal 2009 had six months experience as a supervisor when the Mine was first assigned to his workgroup. The other permanent supervisor had approximately 29 months experience as a supervisor when he was reassigned to the workgroup with enforcement responsibility for UBB. Both supervisors attended a week-long training session for MSHA managers and supervisors in November 2009. This was the only formal MSHA training on the duties of a field office supervisor they had received before the explosion on April 5, 2010.

The two acting supervisors also reviewed inspection notes to ensure they complied with MSHA policies and procedures. In interviews, the acting supervisors stated they had not received any training on the duties of a supervisor.

Since regular inspection activity continued until the end of each of fiscal quarter during the review period (typical for large, complex mines), field office supervisors could not review some inspection documents for completeness until the next quarter. Given the volume of inspection directives, the inexperience of some inspectors, and the large size of the Mine, some lapses in inspection procedures would have been expected. However, MSHA's strict accounting practices for tracking completion of regular inspections required by the Mine Act discouraged reopening such inspections after the quarter expires, even though section 103(a) of the Mine Act did not confine mandatory inspections to distinct quarters. This created a disincentive for supervisors to document inspection deficiencies and to require inspectors to complete inspection activity missed during the previous quarter.

Conclusion: Although the thoroughness of regular inspections improved during the review period, some areas of the Mine were not inspected during each of the six regular inspections completed during that time. Most areas of UBB that inspectors missed were unrelated to the explosion and were visited during subsequent inspections. However, MSHA did not inspect portions of the longwall bleeder system and some areas developed by 2 Section where contributory violations existed. In those areas that were inspected, inspectors did not always follow established procedures. As a result, MSHA did not identify that the Operator was failing to prevent or correct some of the conditions and practices that contributed to the cause and severity of the explosion. Furthermore, ROE trainees who had not yet been authorized by the Secretary to conduct inspections performed some inspection activities, including inspections of longwall face equipment, seals, belt conveyors, and air courses on approximately 2% of the total inspection days at UBB.

Inspectors missed locations within the explosion area because they did not account for some mining activity conducted and evaluation points approved since the previous inspection of 2 Section or the longwall bleeder system. MSHA procedures did not provide adequate guidance on preparing and maintaining tracking maps and ITS lists. Additionally, inspection procedures were not updated to address new mandatory safety standards. As a result, the tracking map and ITS for UBB did not provide a complete listing of areas, equipment, and records that should be inspected.

MSHA directives do not adequately address those procedures necessary to inspect a “mine in its entirety,” as required by subsections 103(a)(3) and 103(a)(4) of the Mine Act. As a result, regular inspection procedures may incorporate non-mandated activities, some of which should be conducted in a more thorough and systematic manner, or by persons with specialized knowledge and experience. Instead, when conducting regular inspections, enforcement personnel are responsible for completing tasks governed by a volume of information exceeding that which they could reasonably be expected to learn or retain.

Supervisors did not always identify or require corrections to inspection deficiencies. MSHA did not provide a means or incentive to correct inspection deficiencies identified after a fiscal quarter expired. Many inspectors lacked MSHA experience, while those who did, including supervisors, lacked training on the latest inspection procedures.

Documentation of inspection activities is necessary to demonstrate that an inspection activity was performed. However, inspection notes did not include required information specified by inspection documentation procedures. The majority of deficiencies were administrative in nature, such as not documenting shift and shift type. However, some were related to MSHA’s responsibilities under the Mine Act, such as documenting the inspection of seals and air courses. This was a systemic problem in the Mt. Hope Field Office, caused by a lack of training and experience of inspectors and supervisors and by ineffective supervisory oversight.

Documentation of inspection activities in the inspection notes, tracking map, and ITS creates redundancy. The use of all three of these resources in their current form may not be necessary.

Corrective Actions Taken: The Assistant Secretary directed development of a new training program to provide Coal and Metal and Nonmetal field office supervisors with the essential tools to oversee enforcement activities required by the Mine Act. This training was completed October 2011. The training addressed deficiencies identified by accountability audits and internal reviews and was intended to improve oversight of mine inspectors and foster enforcement consistency. MSHA has also secured funding to provide additional training to enforcement supervisors on the findings of the UBB Accident Investigation and Internal Review.

On January 19, 2011, the Assistant Secretary issued *Administrative Policy Letter No. A11-I-01* which established MSHA’s policies and procedures for required continuing education of authorized representatives. The policy letter:

- Stated MSHA’s policy on continuing education requirements for ARs as at least 48 hours for each two-year cycle. New training curriculum is to be developed every two years and provided to all Journeyman ARs;
- Restated management’s responsibility and accountability for ARs meeting their continuing education obligations;
- Stated MSHA’s policy to remove an AR from health or safety inspection activities for failure to timely complete continuing education requirements unless an extension of time is granted; and
- Provided a process for granting extensions of time to complete training requirements.

District 4 began sending inspectors to the bi-annual journeyman inspector retraining sessions in October 2010.

In July 2010, the Assistant Secretary directed the Administrators for Coal and Metal and Nonmetal to establish a detailed plan for the review of all the policies and procedures for conducting inspections. This also included a review of recent internal, independent, and accountability review reports to identify changes necessary to improve the quality and efficiency of inspections. As a result, a consolidated draft inspection procedures handbook was completed in early January 2012. The Assistant Secretary also created a Task Force to review the draft handbook and develop an action plan to train inspectors on its contents. The Task Force also has been charged with identifying and developing changes to MSHA's information technology systems so that the handbook and the forms included in the handbook interact in a seamless, user-friendly fashion.

On February 22, 2012, the Assistant Secretary assigned the Deputy Assistant Secretary for Operations to finalize the draft inspection procedures handbook, and to develop a new centralized administrative review process. This process is to put procedures in place to: coordinate and monitor policy development; evaluate administrative program directives; review and approve all proposed directives; and facilitate the activities of policy coordinators from all MSHA programs. The approval process is to include reviews by the initiating program area, the Associate Solicitor of Labor for MSHA, the Office of Assistant Secretary, and any other program area affected by the policy prior to implementation. When new policies and procedures are implemented, guidance will be developed on the type of distance learning training to be provided, including knowledge checks.

Recommendations: The Administrators for Coal and Metal and Nonmetal should direct the revision of the *Program Policy Manual* to clarify MSHA's interpretation of the phrase "mine in its entirety at least four times a year," as referenced by section 103(a) of the Mine Act.

The Administrator for Coal should direct a complete evaluation of the effectiveness of the ITS. This evaluation should consider the time used to maintain and update the system and the value realized in tracking the progress of an inspection. Continued use of the ITS and possible modifications to the system would be determined from this analysis. Modifications should eliminate areas of duplication, minimize the time required to document complete inspections, and provide enforcement personnel with a useful resource for conducting quality inspections.

The Administrator for Coal should direct the following revisions to the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*:

- Define the salient parts of a regular inspection consistent with the requirements of subsections 103(a)(3) and (4) of the Mine Act.
- Provide instruction on preparing ITS lists at the start of a regular inspection, and update them thereafter, to provide a complete list of salient items that need to be inspected. Inspection activities currently listed only in the Inspection Procedure Header Documentation tables should be incorporated into ITS lists in a manner that permits eliminating the former. The Handbook should explain that the purpose of the ITS includes planning and coordinating inspection activities, rather than proving their completion.
- Provide instruction on obtaining, preparing, and maintaining regular inspection tracking maps. Inspectors should be directed to label MMUs and approved evaluation/measurement point locations on tracking maps. Inspectors should update the map to show the extent of mining when the MMU was inspected. Instruction to show the "extent of daily travels" on the map should be clarified to also direct inspectors to show travel start and stop points, the inspector's initials, and date of inspection. Where possible, the ITS should be streamlined to avoid duplication with the tracking map documentation. Line diagrams should not be used in lieu of tracking maps.
- Define activities that ROE inspector trainees may perform at a mine before they receive their AR credentials.

The Administrator for Coal should direct the revision of the *Coal Mine Safety and Health Supervisor's Handbook* to address correction of inspection deficiencies identified after a fiscal quarter expires, so that

salient inspection activities can be conducted four times a year. Supervisors should direct inspectors responsible for deficiencies to reopen regular inspections and complete deficient activities related to salient parts of regular inspections. Prior to implementation, the Administrator should consult with the Director of PEIR to ensure that other programs or computer-based oversight tools will not be adversely affected when regular inspections are reopened after the end of a fiscal quarter.

The Assistant Secretary should direct the revision of the *Administrative Policy and Procedures Manual* (APPM) to incorporate *Administrative Policy Letter A11-I-01* which established policies and procedures for required continuing education of ARs. In addition, the APPM should be revised to include a permanent requirement for two-week biannual training for field office supervisors. Newly-selected supervisors should be provided this training at the earliest possible date.

The Director of EPD should collaborate with the Administrators for Coal and Metal and Nonmetal to improve the tracking of retraining of supervisors, inspectors, and specialists. The Administrators should provide an annual report to the Assistant Secretary detailing compliance with this policy.

The Administrator for Coal should direct the District 4 and 12 Managers to conduct follow-up reviews of inspection reports to evaluate the effectiveness of training provided and take appropriate corrective actions for any deficiencies identified.

The Administrator for Coal and the Director of EPD should develop a training program for temporarily promoted supervisors to address pertinent parts of the *Coal Mine Safety and Health Supervisor's Handbook*. This training should include a knowledge check. Consideration should be given to utilizing distance learning options. In addition, guidelines should be developed for assistant district managers to provide the level of oversight necessary for work groups with inexperienced acting field office supervisors.

The Administrator for Coal should establish a procedure to update the list of records and postings contained in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* when new regulations require the operator to maintain additional records or postings.

The Assistant Secretary should instruct the Director of PEIR to develop, to the extent possible, fillable forms to be used by inspectors when completing approved forms as part of an inspection or investigation. These fillable forms should be incorporated into the IPAL application to allow the inspector to interact with the directives system in a seamless, user-friendly fashion.

Section 103(i) Spot Inspections

Requirements: Section 103(i) of the Mine Act required MSHA to provide a spot inspection during every 5 working days at irregular intervals at mines: (1) that liberate in excess of 1,000,000 cubic feet of methane per day (cfm); (2) where a methane or other gas ignition or explosion has resulted in death or serious injury during the previous 5 years; or (3) where some other especially hazardous condition exists. This section also required MSHA to provide a spot inspection every 10 or 15 working days at mines that liberate more than 500,000 cfm and 200,000 cfm of methane, respectively.

MSHA Policies and Procedures: The MSHA *Program Policy Manual* stated in pertinent part that a section 103(i) spot inspection: “[s]hall not constitute a part of any other category of inspection, and the inspection is to be directed specifically to the problems, hazards, or conditions under which the mine was classified as a section 103(i) mine. However, this does not prevent another category of inspection or investigation from being conducted during the same visit to the mine.”

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* provided the following guidance regarding section 103(i) spot inspection activity.

No portion of a 103(i) inspection, (including inspection notes, reports, bottle samples, etc.), may be utilized to complete any other type of inspection, including a Regular Safety and Health Inspection....

Unless pre-approved by supervision or management, an entire shift shall be dedicated underground to 103(i) spot inspections. A limited onsite review of mine examination and/or ventilation records is considered essential to 103(i) inspection activities. The inspection shall pertain to the specific reason the mine was selected for a 103(i) inspection. For example, if a mine is included because it liberates excessive quantities of methane, 103(i) inspections should focus on working section ventilation, general mine ventilation, mining activities related to methane liberation, bleeder systems, seals, or other areas where methane is likely to accumulate.

During each fiscal quarter, MSHA determined the total methane liberation (TL) for all active underground coal mines to establish the frequency of spot inspections required by section 103(i). Accordingly, during each regular inspection, the Handbook directed inspectors to measure the air quantity and collect samples of mine air at all locations where air leaves the mine. It also directed inspectors to enter the bottle number and location description of air samples collected for TL into the Inspection Tracking System, and to: “mail air samples within five calendar days after collecting (the five days include Saturday and Sunday).”

The *Coal Mine Safety and Health Supervisor’s Handbook* (an administrative directive) contained the following instruction, which was not reflected in program directives provided to inspectors: “All total methane liberation bottle samples should be collected and submitted for analysis the first month of the inspection quarter at mines that are on mandated 103(i) spot inspections.”

CMS&H Memo No. HQ-01-017-S, issued on April 13, 2001, directed district managers to consider the actual working schedule of the mine when determining the required inspection frequency, recognizing that some mines work seven days per week.

CMS&H Memo No. HQ-08-021-A, issued on March 31, 2008, instructed district managers to implement the following:

1. Supervisors shall set up calendars to track mines that are included in the 103(i) inspection requirements.
2. Full days shall be dedicated to 103(i) spot inspections. This means that a “normal” or standard inspection day (not to exceed an eight hour shift), including travel and related inspection times, will suffice to meet a full day’s requirement. Thereafter, other inspection duties, primarily [regular inspection] activity, may be conducted at the same mine or another mine.
3. While conducting the [section 103(i)] inspection, activities shall pertain to the specific reason the mine was selected for a 103(i) inspection. For example, if a mine is included because it liberates excessive quantities of methane, 103(i) inspections should focus on mining activities, bleeders, and seals. If an evaluation of the active section takes less than a standard day, the remainder of that day should be spent in the bleeder entries, returns, or evaluating seals.
4. Assistant District Managers shall monitor 103(i) inspections to ensure they are being conducted as required as well as ensuring that full days are being dedicated to these mines.

Statement of Facts: MSHA assigned a section 103(i) status in its enterprise database to each underground coal mine according to one of seven classifications derived from the Mine Act: (1) Hazard, (2) Ignition or Explosion, (3) Inspect Once Every 5 Days, (4) Inspect Once Every 10 Days, (5) Inspect Once Every 15 Days, (6) Never Had 103(i) Status, and (7) Removed From 103(i) Status. Classifications 1 and 2, above, required a section 103(i) spot inspection every five working days, regardless of methane liberation. At the time of the explosion, 121 mines nationwide (including UBB) were classified to require section 103(i) inspections, all for liberating excessive quantities of methane (classifications 3-5). The remaining mines either had been removed from section 103(i) status or never

had section 103(i) status. No mines were listed under the Hazard classification, or the Ignition or Explosion classification, at the time of the UBB explosion.

MSHA policy does not provide guidance for determining what “other especially hazardous condition,” as referenced by the Mine Act, would require 5-day section 103(i) spot inspections in the Hazard category. At UBB, hazardous conditions relevant to the disaster included a 1997 methane explosion at the longwall tailgate and methane floor outbursts during longwall mining in 2003 and 2004, any of which could have provided justification for conducting section 103(i) spot inspections in the Hazard category. MSHA Technical Support recommendations in 2004 for mitigating the effect of the floor outbursts would have provided inspectors with a list of specific hazards and practices to check during section 103(i) spot inspections in the Hazard category at UBB.

MSHA policy also did not define a “serious injury” resulting from gas ignitions or explosions, as referenced in the Mine Act, which would require section 103(i) spot inspections. The MSHA database showed that, during the five years prior to the UBB disaster, 11 accidents involving gas ignitions or explosions resulted in lost-time or fatal injuries at ten underground coal mines. None of these mines were placed in Ignition or Explosion section 103(i) status. Nonetheless, all but two were provided with section 103(i) spot inspections after the accidents occurred. Standard MSHA reports did not monitor data to determine if mines where a gas ignition or explosion had resulted in death or serious injury during the previous five years had been placed in Ignition or Explosion section 103(i) status.

The MSHA enterprise database did not contain fields to track the reason mines were placed in section 103(i) status. Inspectors need this information to direct their activities toward the specific hazards that caused a mine to be selected for section 103(i) spot inspections, particularly mines classified in Hazard status or Ignition or Explosion status. Managers also need this information for oversight of spot inspection activities and for determining the appropriateness of continuing inspections in these categories.

Air Sample Analysis

MSHA determined total methane liberation (TL) for all active underground coal mines during each regular inspection to establish the frequency of spot inspections pursuant to section 103(i). This provided quarterly evaluation of section 103(i) status, including for mines not currently receiving such inspections. Inspectors completed and submitted a Mine Atmosphere Sample Record card with each air sample sent to the National Air and Dust Laboratory.¹⁸ This card included a “TL” block that inspectors must check for a sample to be included in the total liberation calculation for a mine.

Of the 84 TL samples collected at UBB during the review period, 35 were collected and submitted after the first month of the inspection quarter. During one inspection at UBB, an inspector collected TL samples during the second month of the inspection and did not submit them for analysis for an additional two months, which delayed calculation of the Mine’s total methane liberation for that quarter. Interviews indicated that this inspector had not been instructed to collect and submit TL samples at section 103(i) mines during the first month of the inspection quarter. Nationally, inspectors submitted 98% of all samples within two weeks of collection. Since MSHA did not incorporate gas analysis information into its enterprise database, standard reports to identify untimely air sample submissions were not available to supervisors and managers.

Outdated computers and software used to control the gas analysis equipment in the Mt. Hope laboratory limited options for updating the lab’s data management system. The DOS-based program for the 40-year old gas chromatograph functioned only on an older computer for which input/output hardware upgrades were not available. Lab personnel had to manually transfer gas analysis results into a local database, from which air sample analysis reports were generated. The local database was not integrated into MSHA’s enterprise database. Lab personnel also manually entered sample collection information that inspectors reported on Mine Atmosphere Sample Record cards into their local air sample database.

¹⁸ The National Air and Dust Laboratory was located in the same facility as the District 4 Office and the Mt. Hope Field Office. The lab operated under District 4’s purview, although it served all MSHA districts.

During the review period, 350 (2.8%) of the 12,691 air analysis reports generated for mines nationwide referenced an incorrect collection date, Mine ID No., or MSHA office. Numerous permutations of individual inspectors' names also existed in the data. Although this did not affect the TL results or enforcement activities at UBB during the review period, automated data-entry rules keyed to MSHA's enterprise database could have eliminated the majority of these errors, as well as reduced data-entry workload.

Lab personnel also generated a quarterly Total Methane Liberation Report directly from the air sample database for all active underground mines in District 4. Field office supervisors and assistant district managers reviewed the report for accuracy and to determine the appropriate spot inspection frequency for the next regular inspection quarter. This report calculated TL for all mines in District 4 at once, so the lab waited until a week after the end of an inspection quarter to run it. This was intended to allow time for all air samples from recently completed regular inspections to be submitted, analyzed, and entered into the database.

Although the quarterly Total Methane Liberation Report was intended for national use, only District 4, which also managed the lab, requested copies of the report. This report was developed after the Administrator for Coal revised procedures for using the Mine Atmosphere Sample Record card in a 1995 Procedure Instruction Letter (*PIL No. I95-V-9*). This PIL stated: "These changes will allow the MSHA laboratory to calculate total methane liberation for a mine and make available information that currently has to be calculated manually." Although procedures for completing the card were later incorporated in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*, procedures for the lab to calculate TL were not institutionalized in any permanent directive. Instead, other districts developed their own methods for calculating TL by re-keying results from air sample analysis reports into nonstandard, standalone applications, which added potential for data-entry errors. Integration of the air sample and MSHA enterprise databases could have eliminated such errors, standardized calculations, and continuously monitored cumulative TL sample results to alert managers as soon as methane liberation exceeded the existing section 103(i) status for a mine.

MSHA directives did not include procedures for entering or maintaining fields in its enterprise database for TL and section 103(i) status. MSHA designed the Mine Information Form to allow district personnel to enter TL values for all active underground mines into the enterprise database on a quarterly basis and update the section 103(i) status as necessary. However, without guidance to direct its use, input procedures varied between districts. For instance, District 4 updated the TL values only when changing section 103(i) status. As a result, only 22% of the TL values in the enterprise database during the first quarter of fiscal 2010 accurately reflected the latest air sample analysis results for methane-liberating mines inspected by the Mt. Hope Field Office. Similarly, the data showed that other districts updated these values an average of once per year, rather than once per quarter. During the first quarter of fiscal 2011, 15% of the section 103(i) status fields (indicating frequency of required spot inspections) did not match the methane liberation values that were input for the corresponding mines. MSHA did not generate oversight reports to monitor the use or accuracy of this data.

Quarterly Total Methane Liberation and Spot Inspection Frequency

The Internal Review team determined that the reported total methane liberation for UBB was not correct for five of the six inspections completed during the review period. Using data available from the TL samples and corrected air volumes determined by the MSHA Accident Investigation team, corrected TL rates were calculated.

Table 8 shows the reported total methane liberation and the corrected values for UBB mine for the review period.

Table 8 - UBB Total Methane Liberation by Inspection Quarter

Air Sample Collection Date	Reported TL (cfid)	Corrected TL (cfid)
First Quarter Fiscal 2009	336,134	361,593
Second Quarter Fiscal 2009	167,429	167,477
Third Quarter Fiscal 2009	925,382	926,534
Fourth Quarter Fiscal 2009	660,118	660,118
First Quarter Fiscal 2010	1,165,800	802,000
Second Quarter Fiscal 2010	1,067,510	885,000

The Internal Review team identified clerical, procedural, and technical errors in determining the total liberation rates. Inspection reports showed minor errors in the TL values determined by District 4 during the first three quarters of the review period, none of which affected the required section 103(i) status. During the first quarter of fiscal 2009, the Total Methane Liberation Report did not include the results of air samples collected at the Silo Portals because the inspector did not check the “TL” box on the Mine Atmosphere Sample Record cards submitted with these samples. A comparison of the Total Methane Liberation Report to the TL sample locations listed in the Inspection Tracking System could have identified this error. Inspectors made mathematical errors when calculating air flow in their notes for two TL samples during each of the following two inspections, resulting in slight under-reporting of total methane liberation.

During the second quarter of fiscal 2009, methane liberation dropped below 200,000 cfd, which eliminated the requirement for conducting spot inspections the following quarter. Nevertheless, enforcement personnel continued to conduct section 103(i) spot inspections within 15-day periods. Although not addressed by national policy or procedures, District 4 typically confirmed drops in methane liberation for an additional inspection quarter before reducing the section 103(i) spot inspection frequency. This strategy proved appropriate, as sections mined into gassier coal reserves at UBB during the third quarter of fiscal 2009, after which, District 4 changed spot inspection frequency to the required 10-day intervals.

Samples collected during the fourth quarter of fiscal 2009 showed that the TL dropped to 660,118 cfd. However, the Operator had made major changes to the ventilation system between sample collection dates, and inspectors did not collect TL samples from the gassier part of the Mine until after both 1 Section and 2 Section were placed in non-producing status. Mining on the longwall section did not begin until after the last TL sample was collected. All of these factors contributed to the lower TL value during this quarter.

After the Operator started using the Bandytown Fan, return air from all the active sections in the gassier northern portion of the Mine, including the longwall section, exited the Mine through the Bandytown Shaft. Therefore, correct air flow measurements for TL samples at this shaft bottom were critical to determine methane liberation during the first and second fiscal quarter inspections of 2010. However, air velocities at the shaft were much higher than typically encountered on working sections (inspectors reported air velocities of up to 1,713 feet per minute at shaft approaches). MSHA procedures did not address best practices for obtaining accurate measurements at such velocities.

There are several factors impacting the accuracy of air velocity measurements made with anemometers and air quantities calculated from these readings.¹⁹ These factors include uneven air flow distribution, high air velocities, failing to account for obstructions and rib sloughage when determining entry areas, the effect of proximity of the anemometer to the body, and calibration of the anemometer. Inspectors’ notes indicated that they made a single traverse across the entire entry width when taking these measurements, which can cause inaccurate measurements where air flow is unevenly distributed across the entry.

¹⁹ Kingery, DS [1960]. Introduction to mine ventilating principles and practices. Washington, USBM Bulletin 589, p 5-6.

Inspectors measured airflow and collected samples from the three approaches immediately adjacent to the Bandytown Shaft, where turbulent air flowed around several sharp turns and obstructions.

Inspectors collected TL samples at the Bandytown Shaft on November 3, 2009, and January 20, 2010. The Operator's fan recording charts showed -4.0 and -4.5 inches water gage for these dates, respectively, which were plotted on a fan performance curve developed by the Accident Investigation team. This curve indicated that the Bandytown Fan quantities on those days were approximately 307,000 and 305,000 cubic feet per minute (cfm), respectively. However, inspectors reported a total of 448,200 cfm and 374,893 cfm, respectively, when they collected the TL samples. Since the bottom of the Bandytown Fan shaft was not accessible after the explosion, the Internal Review team could not determine why air quantities measured by District 4 personnel varied from the Accident Investigation team findings.

The inspector who collected the TL samples at the Bandytown Shaft on November 3, 2009, did not submit them for analysis until January 13, 2010, after realizing that they were not included in the Total Methane Liberation Report. Analysis results for these samples indicated that the TL for UBB was 1,165,800 cfd, which would have required a spot inspection to be conducted during every 5-day period. However, the actual TL calculated by the Internal Review team for this inspection would have been approximately 802,000 cfd after considering the correct Bandytown Fan air quantity. While the reported TL value indicated that the 103(i) status change was necessary, the corrected TL value indicated that a change in status was not required by the Mine Act. Accordingly, the Mine should have remained in 10-day 103(i) status.

The acting field office supervisor with responsibility for overseeing inspections of UBB during the first half of January 2010 attempted to initiate 5-day spot inspections based on the calculations showing the Mine liberated 1,165,800 cfd. However, he was not aware of the procedures for changing a mine's 103(i) status and did not take the necessary steps to do so. These procedures were not included in the MSHA directives system. Furthermore, District 4 did not provide formal training or written material to familiarize inspectors with acting supervisory tasks. Although the corrected TL did not exceed 1,000,000 cfd during sampling at UBB prior to the explosion, the chain of events detailed above exposed vulnerabilities in MSHA procedures for establishing the appropriate frequency of section 103(i) spot inspections.

Inspectors collected and submitted all TL samples for the second quarter fiscal 2010 regular inspection of UBB during January 2010. Also, during the latter half of that month, District 4 transferred an experienced field office supervisor to fill the vacant Mt. Hope Field Office supervisor position. While reviewing inspection records near the end of this quarter, the field office supervisor calculated the TL from the air samples analysis reports. He determined that the Mine liberated 1,067,510 cfd of methane and informed his Assistant District Manager that the spot inspection frequency would be increased. On April 2, 2010, the field office supervisor completed a Mine Information Form to update the TL rate and change the spot inspection frequency to a 5-day schedule. A revised spot inspection schedule was established beginning April 2, 2010. A spot inspection under the revised schedule had not yet been conducted when the fatal explosion occurred. When correcting for the apparent airflow measurement errors at the Bandytown Shaft, the TL was actually 885,000 cfd, in which case the Mine should have remained in 10-day 103(i) status.

Section 103(i) Inspection Procedures

Past internal reviews found that MSHA managers did not always use inspection data to identify deficiencies in spot inspections. To address this issue, MSHA developed the Section 103(i) Key Indicator Report, a monthly national oversight report that detailed inspector time utilization during section 103(i) inspections.²⁰ During the six inspection quarters prior to the explosion at UBB, District 4 managers effectively used this report to ensure that inspectors dedicated full days to spot inspections. District 4

²⁰ Key Indicator Reports are a set of regular MSHA management reports established for monitoring essential enforcement activities.

managers also monitored the quality and timeliness of section 103(i) activities by reviewing spot inspection reports and calendars.

A review of spot inspection calendars, inspection notes, and inspection activity data showed that District 4 conducted spot inspections at UBB within every scheduled period during the review period. Field office supervisors maintained calendars showing blocks of time for each scheduled spot inspection period. For UBB, these calendars included each day of the week to reflect that miners worked seven days per week during the review period. Inspectors recorded their initials and the spot inspection event number on the calendars to show the date that each spot inspection was conducted. Supervisors and inspectors reviewed these calendars frequently to ensure that spot inspections were conducted prior to the end of each scheduled period.

District 4 inspectors conducted 46 section 103(i) spot inspections at UBB during the review period, as summarized in the table in Appendix G. This table shows that District 4 inspectors conducted spot inspections at irregular intervals within the scheduled periods. Inspectors also conducted section 103(i) spot inspections at UBB on varying days of the week, comparable to spot inspections at other mines in District 4 and in the remainder of the country. However, none of these inspections at UBB were conducted on Saturday. Inspectors were contractually required to begin their work week no later than Tuesday. After beginning their work week, inspectors were required to work consecutive days until they worked 40 hours. This limited the opportunities for inspecting on Fridays and Saturdays – particularly at mines remotely located from the field office, such as UBB.

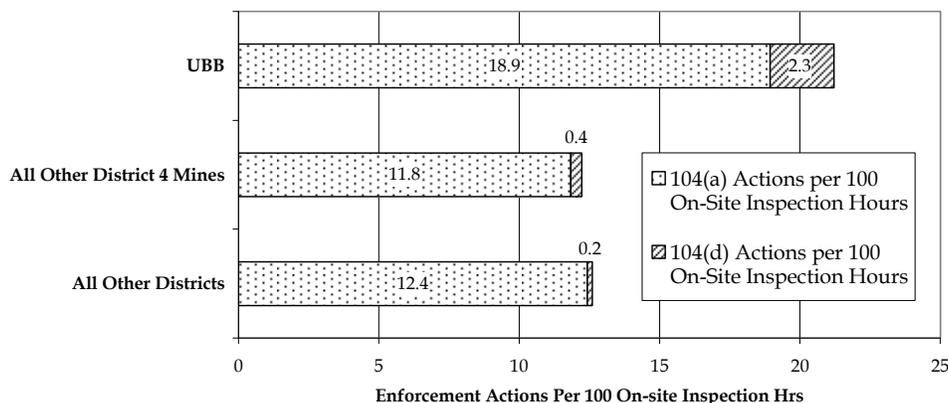
Inspectors dedicated the equivalent of a full day on 103(i) spot inspections at UBB as directed. They reported an average of 9.5 hours per spot inspection at the Mine during the review period, which was slightly higher than the District 4 and national averages of 8.7 and 9.2 hours, respectively. While onsite conducting spot inspections at UBB, inspectors spent 76% of their time underground. This value was consistent with District 4 and national values of 77% and 83%, respectively. In all cases, inspectors spent the majority of onsite time underground during spot inspections. On nine occasions, inspectors also performed regular inspection duties on the same day that they conducted spot inspections. In each case, inspectors documented the equivalent of a full day performing section 103(i) spot inspection activities separate from any other inspection.

Inspectors conducted spot inspections in areas consistent with MSHA guidance for conducting these inspections at mines with excessive methane liberation. They visited working sections during 40 (87%) of these inspections. These inspections were conducted on all working sections, 75% of which were conducted where methane liberation was highest: the continuous mining machine sections and longwall section in the northern part of the Mine.

During seven of the spot inspections conducted on working sections, inspectors also visited appropriate outby areas such as returns and seals after inspecting working sections. Of the six spot inspections conducted entirely in outby areas, four included inspections of returns, the longwall bleeder, or seals; one focused on high spots in the track and belt entries where methane could accumulate; and one was conducted in the longwall belt entry.

As detailed in Appendix H, District 4 inspectors issued 50 section 104(a) citations and 6 section 104(d)(2) orders for violations they observed during the 46 section 103(i) spot inspections conducted during the review period. As shown in Figure 3, the rate of enforcement during 103(i) spot inspections at UBB was 73% higher than at the remaining District 4 mines, which were comparable to those in other districts. Forty of these citations and orders were for violations of standards related to ventilation, fire prevention, and escapeways. Inspectors cited 10 of these violations for defective ventilation controls and 6 for violations of the approved mine ventilation plan. Two enforcement actions were issued during spot inspections for violations of 30 CFR 75.400. Both of these violations were cited on developing sections during the fourth quarter of fiscal 2009.

**Figure 3 - Comparison of Enforcement Rates during 103(i) Spot Inspections
October 1, 2008 – April 5, 2010**



During the review period, six of the spot inspections were conducted on the longwall section, one on the longwall belt, and one in the Tailgate 1 North return air course. According to interviews, two of these eight inspections were conducted by an inspector with previous longwall experience (both by the same inspector during the first quarter of fiscal 2010). Inspection notes and interviews indicated that the remaining six spot inspections were completed by inspectors with little longwall experience. There were 65% fewer citations and orders per spot inspection of the longwall section than on other working sections at UBB. During five of the eight spot inspections of the longwall ventilation system, no enforcement actions were issued. Inspectors visited the longwall tailgate during spot inspections in January, February, and March 2010. None of the inspectors identified dangerous accumulations of coal dust and float coal dust on the longwall tailgate. District 4 inspectors were not familiar with the practice of continuously applying rock dust at the tailgate-end of longwall faces and did not recognize the potential consequences for not doing so. (Refer to “Enforcement of 30 CFR 75.400 and 75.403” section of this report for further discussion and recommendations for this issue.)

Conclusion: Inspectors properly conducted their section 103(i) inspections in areas of UBB typically associated with hazards related to methane liberation, which was the specific reason the Mine was identified for such inspections. District 4 managers effectively used oversight reports to ensure that inspectors dedicated full days to spot inspections. District 4 managers and supervisors also effectively used calendars to ensure that inspectors conducted spot inspections within every scheduled period.

Although the Mine’s history of methane outbursts during longwall mining could have justified placing it in Hazard section 103(i) status, District 4 did not do so because MSHA policy did not address when such inspections should be provided. As a result, section 103(i) spot inspections did not focus on conditions or practices specific to methane floor outburst hazards. This also caused the frequency of these inspections to vary according to the Mine’s total methane liberation, rather than remain at five-day intervals. MSHA policy also did not define a “serious injury” resulting from gas ignitions or explosions, as referenced in the Mine Act, which would require section 103(i) spot inspections. During section 103(i) inspections of the longwall, inspectors did not recognize hazardous conditions and practices related to inadequately inerted coal dust, the effects of which are more adverse in the presence of methane.

District 4 did not always properly obtain or apply information related to TL when utilizing it to establish section 103(i) status at UBB. Inspectors inaccurately determined airflow exiting the Mine when collecting TL air samples, most significantly because MSHA procedures did not address best practices for measuring high air flow velocities.

The administrative directive to submit TL samples for analysis during the first month of the inspection quarter at section 103(i) mines was not communicated to inspectors in a program directive, and its implementation was not monitored or enforced. Procedures also were not in place to ensure that persons in acting supervisory positions were familiar with their temporary duties, including actions for changing a mine’s section 103(i) spot inspection status.

The Agency's ability to monitor and enforce section 103(i) policy and procedures was hindered by inaccurate and incomplete data related to methane liberation and section 103(i) status.

- There was no directive for districts to enter and maintain TL and section 103(i) status in MSHA's enterprise database. As a result, TL data was not updated quarterly for most mines.
- The MSHA enterprise database did not have data quality rules to force consistency between methane liberation and section 103(i) status. As a result, TL data was not always consistent with the section 103(i) inspection status for a mine.
- The gas analysis equipment and functions conducted at the National Air and Dust Laboratory were antiquated and were not integrated with the MSHA enterprise database. This resulted in redundant data entry with inherent opportunities for errors. Automated data-entry rules keyed to MSHA's enterprise database could have eliminated the majority of the errors identified in the air sample database, as well as reduced the data-entry workload.

Corrective Actions Taken: On June 4, 2010, the Administrator for Coal issued *CMS&H Memo No. HQ-10-021-A*, which directed district managers to assure that spot inspection designations are made as soon as the total methane liberation rates are determined.

MSHA has begun to implement a plan to provide the National Air and Dust Laboratory with updated computer systems and equipment to facilitate a laboratory information management system (LIMS) integrated into the MSHA enterprise database. A Local Area Network (LAN) was installed within the laboratory in August 2011, which modernized the laboratory's IT and data handling capabilities. Also, improvements were made to incorporate the laboratory's data systems with the LIMS used by the production laboratories in Pittsburgh. PEIR is also revising the Inspectors' Portable Application for Laptops (IPAL), which provides data-entry validation, to permit inspectors to upload air sample collection data directly to the enterprise database for integration with the LIMS sample analysis results.

PEIR has developed standard oversight reports to monitor and report when the total methane liberation fields in the enterprise database have not been updated at least quarterly. PEIR has also developed a report to identify any mine in which the assigned section 103(i) status is inconsistent with its total methane liberation.

Recommendations: The Administrators for Coal and Metal and Nonmetal should direct the revision of the *Program Policy Manual* to address criteria for determining when section 103(i) inspections will be required for reasons other than methane liberation. Criteria should define when section 103(i) inspections are required at a mine where there exists "some other especially hazardous condition." The PPM also should be revised to define the degree of injury resulting from an ignition or explosion that would require section 103(i) inspections.

The Administrator for Coal should collaborate with the Director of PEIR to revise the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* to:

- Include procedures for inspectors to use the Inspectors' Portable Application for Laptops (IPAL) to upload air sample collection data.
- Define when inspectors are to collect TL air samples, consistent with guidance in the *Coal Mine Safety and Health Supervisor's Handbook*. In addition, guidance should address sample collection timing with respect to coal production and major air changes.
- Define situations where more precise methods are to be used for measuring air velocity and provide instruction on how to take them.
- Include checks for compliance with 30 CFR 75.400 and 75.403 in the listing of inspection activities that can be conducted during section 103(i) spot inspections at mines selected for such inspections due to excessive methane liberation, methane hazards, or ignitions.

- Direct inspectors to review each item on the Mine Information Form for completeness and accuracy during a regular inspection. This should include instructions for when and how to update the form.

The Administrator for Coal should direct the revision of the *Uniform Mine File Procedures Handbook* to include an up-to-date copy of the Mine Information Form generated from MSIS.

The Director of Technical Support should collaborate with the Director of PEIR to complete planned upgrades to the National Air and Dust Laboratory to replace outdated equipment and computer systems and integrate the Laboratory Information Management System (LIMS) into the MSHA enterprise database.

The Director of PEIR should complete revisions to IPAL to provide data-entry validation and permit inspectors to upload air sample collection data directly to the enterprise database for integration with the LIMS.

Other Inspections and Investigations

Requirements: Section 103(a) of the Mine Act authorized MSHA to make frequent inspections and investigations for the purpose of (1) obtaining, utilizing, and disseminating information relating to health and safety conditions, the causes of accidents, and the causes of diseases and physical impairments originating in mines; (2) gathering information with respect to mandatory health or safety standards; (3) determining whether an imminent danger exists; and (4) determining whether there is compliance with the mandatory health or safety standards or with any citation, order, or decision issued under this title or other requirements of this Act.

MSHA Policies and Procedures: The MSHA Handbook Series provided guidance for certain other inspections and investigations to be conducted at applicable mines. These included spot inspections, accident investigations, special investigations, and technical investigations.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated: “Shaft and slope construction operations shall be inspected monthly for compliance with applicable standards and approved plans. The inspection activity shall, to the extent possible, include an observation of all critical phases of the operation such as drilling and shooting, installation of water rings, operation of the hoisting rig lowering and raising materials and employees, etc. The inspector shall determine if adequate training has been given to all workers at these sites and that records of training are available.”

The Handbook also stated, in pertinent part: “The narrative portion of the field notes shall consist of...Daily documentation for enforcement actions; which shall include all facts relevant to the condition or practice cited....”

The MSHA activity code for a Shaft, Slope, or Major Construction spot inspection was E18. The activity code for an Electrical Technical Investigation was E19.

The *Accident/Illness Investigation Procedures Handbook* directed districts to complete applicable 7000-50 forms for all accident investigations. These include a general accident information form, a victim form, an independent contractor form, an ignition/explosion form, a roof fall form, and a continuation form.

Statement of Facts: The Internal Review team evaluated reports of four inspections and investigations other than regular inspections and section 103(i) spot inspections conducted at UBB during the review period. In addition, one preliminary special investigation was conducted (refer to “Possible Knowing/Willful Violation Reviews” section of this report).

Inspectors conducted three non-injury accident investigations of roof falls during the review period. The first investigation was conducted from September 30 through October 1, 2008. A roof fall occurred on 1 Section (029-0 MMU). Two inspectors charged time to the inspection, and mine site visits were made on September 30 and October 1. Enforcement actions taken consisted of a section 103(k) order,

subsequent modifications, and termination. An MSHA Form 7000-50(a) documents the roof fall occurred at 10:20 a.m. on September 30, but the section 103(k) order was issued at 9:50 a.m. on September 30. A supervisor reviewed and initialed the report and order.

The Operator did not report this roof fall on an MSHA Mine Accident, Injury, and Illness Form 7000-1, as required by 30 CFR 50.20. However, MSHA did not identify and cite the violation until a Part 50 Audit conducted following the explosion, at which time MSHA cited UBB for 32 violations of 30 CFR 50.20 (refer to “Enforcement of 30 CFR Part 50” in Appendix D).

The second non-injury accident investigation was conducted due to a roof fall that occurred on 2 Section (040-0 MMU) in November 2008. The investigation was conducted from November 12 through November 27, 2008, with mine site visits on November 12 and 17. Enforcement actions consisted of a section 103(k) order, subsequent modifications, and termination. One inspector, one ventilation specialist, and one roof control specialist charged time to the investigation. The roof control specialist did not travel to the Mine for this inspection; rather, he charged time to off-site citation and order writing for modifying the section 103(k) order to allow the Operator to clean up the roof fall as submitted in a clean up plan. He did not submit notes to document this modification. An MSHA Form 7000-50(a) documents the roof fall occurred on November 13 at 12:01 a.m., but the 103(k) order was issued on November 12 at 11:00 p.m. The order was terminated on November 17. Again, a supervisor reviewed and initialed the report and order. The Operator reported the accident on MSHA Form 7000-1.

The third non-injury accident investigation was conducted for a roof fall that occurred in the No. 2 entry of the longwall headgate on November 24, 2009. The investigation was conducted from November 24 through November 30, 2009, with mine site visits on November 24 and November 29. One inspector charged time to the investigation. The only enforcement actions taken were the section 103(k) order and its subsequent actions. The order was terminated on November 29. The Operator reported the accident on MSHA Form 7000-1.

An electrical specialist conducted an inspection of the Bandytown Fan shaft between July 1 and July 24, 2009. The specialist coded the inspection as an E19 electrical technical investigation. The specialist was on-site for three of the four days on which time was charged to the event. There were no citations or orders issued during this inspection. The inspection notes document that training records were reviewed.

This inspection dealt only with the construction of the Bandytown Fan shaft. As such, the event should have been coded as an E18 inspection, which is the proper code for the inspection of a shaft under construction. The E19 code is used when the event is primarily to inspect electric equipment for compliance. This type of electrical inspection can range from minor in scope to the inspection of all electric equipment in a mine. MSHA uses the E18 code to document monthly inspections at major construction sites.

In this case, all required inspections of the shaft construction site were completed during the times specified in procedures. The shaft was inspected in August 2009 during the on-going regular inspection. The shaft was completed in August 2009.

Conclusion: Other inspections and investigations conducted at UBB were generally in accordance with established procedures. None of the deficiencies identified by the Internal Review team in the review of other inspections were related to the explosion. These deficiencies were administrative errors and did not affect the quality of the inspections or the health and safety of miners.

The inspection of the Bandytown Fan shaft construction should have been coded as an E18 inspection. In two instances, section 103(k) orders were issued before roof falls were documented as having occurred. In addition, one specialist did not submit inspection notes for an enforcement action taken off-site. These discrepancies should have been identified and corrected during supervisory review.

Recommendations: These lapses were consistent with those identified during the Internal Review team’s evaluation of regular inspections. (See “Section 103(a) Inspections” for recommendations and corrective actions taken to address deficiencies identified in inspection activities.)

Inspection Activities Immediately Prior to the Explosion

In the month prior to the explosion, District 4 inspectors and specialists were at the Mine on 29 inspection days for a total of 232 on-site hours.²¹ Enforcement personnel inspected areas affected by the explosion during 16 of these inspection days.

Table 9 provides details on the locations and activities of enforcement personnel during the month before the explosion.²² As shown by the Table, District 4 dedicated significant resources to inspecting UBB in its efforts to ensure compliance and to complete mandated inspections.

Table 9 - Inspection Activities Immediately Prior to the Explosion

Date	Location	Inspection Activities*
April 5	4 Section, Belts	Observed Work Cycle, Checked Dust Parameters, Inspected Belts
March 30	4 Section	Inspected Equipment; Conducted Close-out Conference
March 30	Tailgate #22 Section	Respirable Dust Survey
March 29	Surface, Mine Rescue Station	Inspected Mine Rescue Station
March 25	4 Section	Section 103(i) Spot Inspection
March 24	Surface Magazines, Underground Outby including Longwall Belt	Checked on Outstanding Citations; Respirable Dust Survey on Part 90 Miner
March 23	067 MMU	Respirable Dust Survey
March 23	066 MMU	Respirable Dust Survey
March 23	Longwall Section	Respirable Dust Survey
March 22	Headgate #22 Section	Respirable Dust Survey
March 17	Barrier Section, 062 MMU	Respirable Dust Survey
March 17	Tailgate #22 Section, Headgate #22 Section	Inspected Equipment, Measured Scrubber Parameters
March 16	Surface	Records & Postings, Equipment
March 15	Return Airway off 4 Section, Some Seals	Section 103(i) Spot Inspection
March 15	Headgate #22 Section	Respirable Dust Survey Attempted; Rock Dust Survey
March 14-15*	Longwall Section, Outby Belts	Inspected Equipment, Belts
March 11	Seals	Inspected Seal Sets 6 thru 15
March 11	Longwall Tailgate	Inspected Tailgate, Terminated Order
March 10	Longwall Tailgate	Checked on Outstanding Order
March 10	Longwall Tailgate, EPs	Checked on Outstanding Order, EP LW-3, EP TG-1
March 9	Headgate #22 Section	Ventilation Saturation Inspection (Blitz)
March 9	Tailgate #22 Section, Intake	Ventilation Saturation Inspection (Blitz)
March 9	Longwall Section, Tailgate Entry	Ventilation Saturation Inspection (Blitz); Inspected Longwall Face and Tailgate; Issued Order for Air Reversal in Tailgate
March 9	Outby Areas	Inspected Outby Areas and Equipment
March 8	Headgate #22 Section	Inspected Faces & Equipment
March 4	Longwall Section	Section 103(i) Spot Inspection
March 1-2*	Headgate #22 Section	Inspected Equipment, Issued Order for Insufficient Air Quantity
February 28 – March 1*	3 Section	Inspected Faces & Equipment

Shaded areas denote inspection activity in areas affected by the explosion.

* Denotes split shifts.

During this time frame, District 4 personnel issued 52 section 104(a) citations, one section 104(b) order, and two section 104(d)(2) orders at UBB. Twenty of the section 104(a) citations, the section 104(b) order, and the two section 104(d)(2) orders were issued under standards the Accident Investigation team cited as identifying contributory violations. These are as follows:

- Four section 104(a) citations were issued under 30 CFR 75.220(a)(1) for failure to follow the approved roof control plan.
- Four section 104(a) citations were issued under 30 CFR 75.360 for failure to conduct, certify, or record adequate preshift examinations.
- Five section 104(a) citations and two section 104(d)(2) orders were issued under 30 CFR 75.370(a)(1) for failure to follow the approved ventilation plan.

²¹ To evaluate inspection activities immediately prior to the explosion, the Internal Review team reviewed District 4 inspection activities at UBB from February 28, 2010, to April 5, 2010.

²² Although there were 29 inspection days, the table contains only 28 entries because two inspectors traveled together to the same area on March 30, 2010, to complete the regular inspection.

- Seven section 104(a) citations were issued under 30 CFR 75.400 for failure to clean-up accumulations of combustible material.
- One section 104(b) order was issued for the Operator's failure to timely abate the violation cited in one of the seven citations issued under 30 CFR 75.400.

None of the violations cited by District 4 personnel under 30 CFR 75.220(a)(1) and 75.370(a)(1) were related to the conditions the Accident Investigation team cited under those standards as contributing to the explosion. One of the four violations cited by District 4 personnel under 30 CFR 75.360 involved the Operator's failure to record air quality readings. This was similar to a violation the Accident Investigation team cited in a contributory violation citation issued under that standard. District 4 personnel cited five violations under 30 CFR 75.400 for accumulations of combustible materials along belt entries. Four of these accumulations were in areas affected by the explosion, and the accumulations were similar in nature to those the Accident Investigation team determined to have contributed to the explosion.²³ The section 104(b) order was issued for failure to timely abate accumulations in the longwall belt entry.

On March 9, to address on-going ventilation compliance issues, MSHA ventilation specialists and inspectors simultaneously visited all three sections in the northern portion of the Mine to evaluate ventilation of the working sections. As part of this evaluation, a specialist found that a stopping had been built in place of a regulator in the tailgate which prevented intake air from traveling into the tailgate. This was a violation of 30 CFR 75.370(a)(1) because the Operator made an unapproved ventilation change to redirect intake air from the longwall tailgate to the development sections. The specialist issued a section 104(d)(2) order, and production on the longwall ceased. As a result of the violation, the Operator submitted a supplement to the ventilation plan on March 11, 2010, which was approved by District 4 on the same day. The longwall section did not operate from the day shift on March 9 through the day shift on March 11.

Due to continued concerns regarding ventilation at the Mine, the District 4 Ventilation Department supervisor contacted corporate management officials on March 16, 2010, to draw attention to ongoing ventilation problems at UBB that were not being addressed by mine management.

The manner in which District 4 personnel enforced these and all other contributory violation standards cited by the Accident Investigation team, as well as the Internal Review team's conclusions and recommendations, are more fully described in the "Enforcement of Specific Provisions and Standards – Contributory Violations" section of this report.

Use of Section 104 Enforcement Authority

Section 104 of the Mine Act provides MSHA inspection personnel with progressively stronger enforcement tools to obtain compliance with mandatory safety and health standards. The following subsection discusses section 104 citation and order writing issues for violations cited at UBB during the review period.

Analysis of Citations and Orders Issued under Section 104(a), (b), and (d)

Requirements: Section 104(a) of the Mine Act requires the inspector to issue a citation if he or she determines that a mine operator has violated the Mine Act or any mandatory safety or health standard, rule, order, or regulation promulgated pursuant to the Mine Act. Each citation is required to be in writing and to "describe with particularity the nature of the violation." Citations are also required to be issued with reasonable promptness and specify a reasonable time for the operator to abate the violation.

²³ Two of the 30 CFR 75.400 violations were for combustible material on machinery. These were not conditions that were cited as contributing to the explosion.

If the inspector finds the operator needs more time to abate the violation, the citation may be extended. If the mine operator fails to correct the conditions or practices listed in the citation within the allotted time, and an extension of time is not warranted, the inspector must issue a section 104(b) order of withdrawal.

Under section 104(d)(1), if an inspector finds a violation of a mandatory health or safety standard that is significant and substantial (S&S) and is caused by the mine operator's unwarrantable failure to comply, the inspector must issue a section 104(d)(1) citation. If within 90 days after issuance of a section 104(d)(1) citation an inspector finds another violation caused by the mine operator's unwarrantable failure to comply with a mandatory standard, the inspector must issue a section 104(d)(1) order of withdrawal. If, upon any subsequent inspection following the issuance of a section 104(d)(1) order, an inspector finds a violation caused by the mine operator's unwarrantable failure to comply, the inspector must issue a section 104(d)(2) order of withdrawal.

Section 104(b) and 104(d) orders require the operator to withdraw all persons from the area affected by the violation, except those necessary to correct the condition, until the violation has been abated.

MSHA Policy and Procedures: Volume I of the MSHA *Program Policy Manual* and the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*, dated March 2008, provided guidance for issuing citations and orders during the review period. Note-taking instructions for documenting facts related to violations were provided in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*, dated January 2008.

The *Coal Mine Safety and Health Supervisor's Handbook* directed supervisors to review each enforcement action to determine whether inspectors and specialists properly enforced the provisions of the Mine Act, the MINER Act, MSHA regulations, policies and procedures, approved plans, variances, waivers, and petitions for modification.

Statement of Facts: Prior to the explosion, the level of enforcement at UBB was among the highest in the nation. During the review period, inspectors issued 689 citations and orders pursuant to section 104 for violations at UBB.²⁴ These included the second highest number of section 104(d) citations and orders issued at any coal mine in the nation.²⁵ A breakdown of these enforcement actions by fiscal year and quarter is shown in Table 10.

Table 10 - Section 104 Citations and Orders Issued at UBB

Type Action	Fiscal Year – Quarter							Total
	2009-1	2009-2	2009-3	2009-4	2010-1	2010-2	2010-3*	
104(a) Citations	49	105	133	156	66	115	2	626
104(d)(1) Citations		1						1
104(d)(1) Orders		1						1
104(d)(2) Orders			14	26	8	6		54
104(b) Orders			2	1	1	1		5
104(g)(1) Orders	1			1				2
Total	50	107	149	184	75	122	2	689
% S&S	42%	43%	56%	29%	27%	29%	0%	38%

* Results of a single inspection day (April 5, 2010)

MSHA personnel also issued 550 subsequent actions that extended, modified, terminated, or vacated the underlying citations and orders issued at UBB during the review period. The types of subsequent actions are listed in Table 11.

Table 11 - Subsequent Actions Issued at UBB during Review Period

Number of Extensions Issued*	99
Citations/Orders Modified	71
Separate Terminations	375
Citations/Orders Vacated	5
Total Subsequent Actions	550

* 49 individual citations were extended with some extended more than once

²⁴ This does not include five citations and orders that subsequently were vacated.

²⁵ During fiscal 2009, UBB received the highest number of section 104(d) actions in the nation.

When an inspector issues a citation or order, the inspector completes MSHA Form 7000-3 (Mine Citation/Order Form) and serves the form to the mine operator. A standalone computer application, the Inspectors' Portable Application for Laptops (IPAL), permits inspectors to complete and print this form at the mine site. The inspector enters information on the Mine Citation/Order Form to characterize the nature of the violation, including the inspector's evaluation of gravity and negligence, the termination due date and time, and any area or equipment affected by the violation when applicable. An inspector's ability to properly evaluate gravity and negligence affects the amount of the resulting civil penalty. Supervisory feedback on the appropriateness of these evaluations, including on the thoroughness of facts documented and used to derive them, reinforces and develops this ability. However, as discussed in the "Supervisory Review of Regular Inspections" section, Mt. Hope Field Office inspectors stated during interviews that supervisors rarely required them to make corrections to their notes relating to the evaluation of citations and orders.

The Internal Review team analyzed inspectors' actions for issuing citations and orders, as well as subsequent actions that extended, modified, terminated, or vacated them. All 689 section 104 citations and orders and 550 subsequent actions issued during the review period, as well as the associated inspection reports and notes, were reviewed and evaluated for adherence to these procedures. Inspectors were interviewed to clarify issues that could not be resolved from these documents.

It should be noted that, while the Internal Review team identified situations in which inspectors did not follow citation and order writing procedures, these failures often did not result in an inappropriate level of enforcement. For instance, failure to document the facts related to negligence did not necessarily mean the inspector assigned the wrong level of negligence to the violation.

The Internal Review team's analysis results related to each of the selected citation and order writing procedures follow.

Facts to Establish the Violation

Requirements: Section 104(a) of the Mine Act stated: "Each citation shall be in writing and shall describe with particularity the nature of the violation."

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated: "The citation or order must contain facts sufficient to establish a violation of the standards under the Mine Act." The Handbook also stated that essential elements to be considered in a violation description include: "The conditions and practices causing and constituting the violation of a specific regulation or section of the Mine Act. They must be accurately identified and described."

Findings: Inspectors typically documented sufficient factual information in the *Condition or Practice* section of the Mine Citation/Order Form to establish a violation of a specific standard or provision of the Mine Act. Exceptions included violations of standards that required more than one test to determine compliance. For example, 30 CFR 75.204(f)(7) prohibited anchoring trailing cables to roof bolts, but applied only to tensioned roof bolts installed in the roof support pattern. An inspector cited a violation of this standard where a shuttle car trailing cable was anchored to a permanent roof bolt, but he did not document the type of roof bolt or evidence that it was installed in the roof support pattern. Other examples included violations of approved plans that did not reference the minimum requirements of the plans being cited.

Location of Violation or Hazard

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* states that a citation or order must specify the location or equipment where the violation or hazard exists. The reasons for this requirement are to provide notification to the mine operator for abatement purposes, inform the miners and miners' representative(s) of the exact location of the hazard, and to guide inspectors on abatement visits.

Findings: Inspectors consistently documented factual information in the *Condition or Practice* section of the Mine Citation/Order Form that specifically identified the location where the violation or hazard

existed. An exception included a violation of 30 CFR 75.400 in which an inspector cited the Operator for allowing coal to accumulate along a belt conveyor over a distance of 100 feet. However, the inspector did not document in the *Condition or Practice* where the accumulations were located along the 2,200-foot long belt conveyor. None of the exceptions resulted in failures or delays in abating hazards at UBB because a representative of the Operator typically accompanied inspectors.

Unwarrantable Failure Statement

Requirements: Section 104(d)(1) of the Mine Act required that when an inspector:

...finds that there has been a violation of any mandatory health or safety standard, and if he also finds that, while the conditions created by such violation do not cause imminent danger, such violation is of such nature as could significantly and substantially contribute to the cause and effect of a coal or other mine safety or health hazard, and if he finds such violation to be caused by an unwarrantable failure of such operator to comply with such mandatory health or safety standards, he shall include such finding in any citation given to the operator under this Act.

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated that when issuing a section 104(d) citation or order, the *Condition or Practice* section of the Mine Citation/Order Form shall include the following statement: “This violation is an unwarrantable failure to comply with a mandatory standard.”

Findings: The statement, “This violation is an unwarrantable failure to comply with a mandatory standard,” was not included in the *Condition or Practice* for the majority of section 104(d) citations and orders issued during the review period. However, the Mine Citation/Order Form indirectly provides notice to the operator of such findings by specifying the type of action (e.g., section 104(d)(1) citation). No evidence was found indicating that the Operator was unaware of the implications of these enforcement actions when placed on notice of such findings in this manner.

Type of Hazard - Health/Safety/Other

The Mine Citation/Order Form contains check boxes for inspectors to indicate the type of hazard created by the violation. The inspector’s choices are *Health*, *Safety*, or *Other*.

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated: “Health, Safety, and Other – These blocks are for coal inspectors to use to mark whether the cited hazard relates to health, safety, or other (administrative).”

Findings: Since the Mine Citation/Order Form was developed, MSHA has implemented more sophisticated data querying tools that have made this field obsolete. Accordingly, MSHA has not relied on this information for program operation or oversight.

Section of the Mine Act or 30 CFR Violated

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* directed inspectors to enter the section of the Mine Act or the Part and Section of Title 30 CFR violated, including the subparagraphs of the section violated, in the appropriate fields provided on the Mine Citation/Order Form. Citing an incorrect standard creates problems with producing accurate enforcement statistics and can hamper subsequent legal proceedings related to the citation or order.

Findings: Inspectors generally cited violations under the correct standard or subparagraph. The most common exceptions involved 23 violations cited under 30 CFR 75.360(e) and 75.360(f). These standards were re-designated after a new standard, inserted as 30 CFR 75.360(d), took effect in December 2008. More recent CFR publications have since provided updated references for inspectors to use when citing these standards. Such errors skewed the operator’s violation history for specific standards. MSHA used the number of repeat violations of the same standard as a factor for determining civil penalties, pursuant to 30 CFR 100.3(c)(2).

Gravity

Requirements: 30 CFR 100.3(e) states that: “Gravity is an evaluation of the seriousness of the violation.... Gravity is determined by the likelihood of the occurrence of the event against which a standard is directed; the severity of the illness or injury if the event has occurred or was to occur; and the number of persons potentially affected if the event has occurred or were to occur.” Inspectors report their determinations for each of the above listed gravity factors in appropriate fields on the Mine Citation/Order Form. The Internal Review team’s analyses of inspectors’ determinations are listed separately for each of these factors in the following subsections of this report. MSHA uses inspectors’ determinations for each of these factors to calculate the civil penalties mine operators are assessed for violations.

Policy and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directed inspectors to include the following in their notes: “Daily documentation for enforcement actions; which shall include all facts relevant to the condition or practice cited and information regarding the negligence and gravity determinations.”

The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated that: “The inspector’s evaluation of gravity relative to the citation or order requires a weighing of factors in three general areas: the likelihood of an occurrence of the injury or illness against which the standard is directed; the gravity of the injury or illness if it has occurred or were to occur; and the number of persons affected if the event or injury occurred or were to occur.” Discussion of the factors used to assess gravity follows.

Likelihood of Injury or Illness

Requirements: The “likelihood of the occurrence of the event against which a standard is directed” is the first factor for determining gravity listed in 30 CFR 100.3(e). The Mine Citation/Order Form allows inspectors to select one of five choices to specify likelihood: No Likelihood; Unlikely; Reasonably Likely; Highly Likely; and Occurred.

Policy and Procedures: Volume I of the MSHA *Program Policy Manual* referenced the phrase “reasonable likelihood” in policy for sections 104(d)(1) and 104(e)(1). This guidance was incorporated into discussions of relevant Federal Mine Safety and Health Review Commission (Commission) and United States Courts of Appeals decisions regarding “S&S” determinations.

The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* focused on Commission decisions for determining S&S violations and did not define all of the five levels of likelihood listed on the Mine Citation/Order Form.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directed inspectors to thoroughly document in their notes the facts relating to the following questions: “What is the likelihood that this type accident will occur at this mine? Why?” This Handbook also directed inspectors to document facts related to seven other similar questions for each enforcement action. Each question is intended to guide inspectors to find essential facts to establish the basis of the violation and to properly determine gravity and negligence.

Findings: Inspectors adequately documented facts related to the likelihood of the anticipated injury or illness for just over half of the 684 enforcement actions issued during the review period. For instance, inspectors often provided “answers” in their notes to the eight questions from the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*, rather than “facts related to” the questions that explained their findings. In such cases, their notes for citations listed numbers one through eight, corresponding to the eight questions in the Handbook, with brief answers to each question (e.g., for Likelihood documenting “8. Unlikely”). In these cases, there was no explanation documented in the notes of how or why this determination was made.

MSHA did not provide definitions for each of the five likelihood categories when the Agency revised the Mine Citation/Order Form to incorporate them in 1982. Since that time, MSHA directives have only

addressed the definition of “Reasonably Likely.” In contrast, the 1978 *Coal Mine Health and Safety Manual for Orders, Citations and Report Writing* defined each of the four levels for “the probability of the occurrence of the event,” which included: occurred, imminent, probable, and improbable. Prior to 1982, inspectors also completed an Inspector’s Statement Form (MSHA Form 7000-4) for each violation cited, which provided information related to negligence and gravity to Assessment Officers. The MSHA Form 7000-4 also benefited inspectors by guiding them through a standardized process of documenting and evaluating these factors. Use of the MSHA Form 7000-4 also was discontinued in 1982.

The nature of persons’ exposure to the cited condition is a factor for determining the likelihood that anyone would be injured by the hazard associated with the violation. As the duration and frequency of exposure increases, the likelihood of a person being affected also increases. MSHA directives could better explain that the duration and frequency of exposure should be considered when evaluating the likelihood of illness or injury.

Number of People Exposed

Policy and Procedures: The *Program Policy Manual* contained guidance related to likelihood that included references to exposure. In addition, the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directed inspectors to “thoroughly document” in their notes the facts relating to, “How many people are exposed to the condition/practice?”

Findings: Inspectors adequately described facts related to the number of people exposed to the condition or practice for approximately one-half of the applicable citations and orders issued during the review period. There were several instances where the determined number of persons exposed was not supported by factual information. At other times, many inspectors documented the number of persons affected instead of number of persons exposed. MSHA guidance could be improved to better explain the difference between the number of “people exposed” and the number of “persons affected” to avoid confusion between these two factors. The number of persons exposed is used to determine the likelihood of injury or illness, whereas the number of persons affected (i.e., those who would be expected to be injured if the accident or overexposure were to occur) is used as part of the penalty calculation.

Severity of Injury or Illness Expected

Requirements: The “severity of the illness or injury if the event has occurred or was to occur” is the second factor for determining gravity listed in 30 CFR 100.3(e). The Mine Citation/Order Form allows inspectors to select one of four choices to specify severity: No Lost Workdays; Lost Workdays or Restricted Duty; Permanently Disabling; or Fatal.

Policy and Procedures: Volume I of the MSHA *Program Policy Manual* stated:

The fourth finding required by the “S&S” test, that is, a reasonable likelihood that the injury or illness in question will be of a reasonably serious nature, requires an independent determination that the injury or illness in question would be reasonably serious in the inspectors’ judgment. A determination that the injury or illness is reasonably likely to result in lost workdays or restricted duty and/or be permanently disabling or fatal is consistent with an “S&S” determination.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directed inspectors to thoroughly document in their notes “the facts relating to” the following question: “If an accident should occur because of this type violation, how serious would it be?”

Findings: The inspectors’ notes or the citation or order adequately described and evaluated facts relating to the expected injury or illness for nearly two-thirds of the applicable citations and orders issued during the review period. In at least 23 cases, however, inspectors confused the likelihood of an injury with its severity. For example, an inspector cited the Operator for not maintaining the methane monitor on a continuous mining machine in proper operating condition. The inspector’s notes related to the expected injury or illness indicated, “Lost work days a (sic) ignition source was not found.” The presence of an ignition source was related to the likelihood of the event causing the injury, which was a face ignition.

The notes should have listed facts related to the potential size of an ignition and the severity of injuries expected should an ignition of that size occur.

In another example, an inspector issued a citation for a violation of 30 CFR 75.400 in which float coal dust was allowed to accumulate along a conveyor belt for a distance of 360 feet extending outby from the section tailpiece. The inspector's notes related to the severity of injury expected stated "7. No Lost Days," which provided only an answer to the question in the Handbook, and not facts as to how the determination was made. Facts related to the seriousness of an injury resulting from the violation should have indicated that it contributed to a coal dust explosion hazard and that such explosions have historically resulted in fatal injuries.

Significant and Substantial

Requirements: An S&S violation is described in section 104(d)(1) of the Mine Act as a violation that is of such nature as could significantly and substantially contribute to the cause and effect of a mine safety or health hazard. The inspector is directed to designate on the Mine Citation/Order Form whether or not a violation is Significant and Substantial. This information is necessary for issuing section 104(d)(1) citations and to determine whether a mine operator has established a pattern of S&S violations pursuant to section 104(e) of the Mine Act.

Policy and Procedures: The MSHA *Program Policy Manual* for sections 104(d)(1) and 104(e)(1) contained discussions of relevant Commission and United States Courts of Appeals decisions regarding S&S determinations, including the following:

The Federal Mine Safety and Health Review Commission (Commission) has held that to establish that a violation of a mandatory safety or health standard is S&S the Secretary of Labor must prove: (1) the underlying violation of a mandatory safety or health standard; (2) a discrete safety or health hazard -- that is, a measure of danger to safety or health -- contributed to by the violation; (3) a reasonable likelihood that the hazard contributed to will result in an injury or illness; and (4) a reasonable likelihood that the injury or illness in question will be of a reasonably serious nature. All four of these findings must be made before a violation can be designated as S&S.

This policy also directed inspectors to indicate if a violation was S&S in the Gravity section of the Mine Citation/Order Form, with the following guidance:

If an inspector determines that a violation is "S&S," that determination should be given consistent with information recorded on the Inspector's Evaluation Section of MSHA Form 7000-3, Mine Citation/Order Form.

Finding that an injury or illness has occurred is consistent with an "S&S" finding as long as the injury or illness is the result of the violative condition. If it is not, the inspector must make an independent judgement [sic] as to the reasonable likelihood of an injury or illness resulting from the violative condition.

Finding that an injury illness is "highly likely" to occur or "reasonably likely" to occur is consistent with designating the violation as "S&S."

Finding that the injury or illness can be reasonably be expected to result in "lost workdays or restricted duty," and/or be "permanently disabling" or "fatal" is consistent with designating the violation as "S&S."

The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* contained four pages of relevant guidance listed under two categories: "**S&S**" **CRITERIA** and "**NON-S&S**" **CRITERIA**.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated:

When documenting these facts the inspector must show the finding of a violation for each citation or order... with respect to citations/orders that are designated "significant and

substantial” (S&S) and/or “unwarrantable” the elements of each designation and facts that support the S&S and/or unwarrantable finding for each citation and/or order.

Findings: IPAL contained data entry rules that restricted the issuance of citations or orders designated as S&S to violations of mandatory safety or health standards. IPAL also contained rules that forced the appropriate S&S designation, consistent with MSHA policy. Therefore, the appropriateness of an inspector’s S&S determination was strictly the product of how well he or she determined the likelihood and severity of the injury or illness expected. While policy and procedures explained how to use these findings in S&S determinations, MSHA directives did not clearly explain how to first determine the likelihood and severity of injury or illness expected, as discussed in earlier subsections.

As a result of weaknesses in inspectors’ documentation of facts related to likelihood and severity, S&S determinations made for over one-half of the citations and orders issued during the review period were not supported by the inspectors’ documentation.

Number of Persons Affected

The “number of persons potentially affected if the event [against which a standard is directed] has occurred or were to occur” is the final factor for determining gravity listed in 30 CFR 100.3(e). The Mine Citation/Order Form directs the inspector to enter a number to indicate this value.

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated that the inspector’s evaluation of gravity includes weighing: “the number of persons affected if the event or injury occurred or were to occur. The number of persons affected is the number of persons who would be expected to be injured if an accident or overexposure occurred as a result of the violation.” This Handbook further stated that this number can vary, depending on mining conditions, the hazard, and the area of exposure.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated that the narrative portion of the field notes shall include: “Daily documentation for enforcement actions; which shall include all facts relevant to the condition or practice cited and information regarding the negligence and gravity determinations.”

Findings: On nearly two-thirds of the citations and orders issued at UBB during the review period, inspectors did not adequately state in their notes the facts on which they based their determination regarding the number of persons affected – i.e., the number of persons who would be expected to be injured if an accident or overexposure occurred. MSHA guidance does not clearly explain the difference between the number of “people exposed” and the number of “persons affected.” MSHA directed inspectors to record facts related to the number of people exposed in their notes, but directed them to enter the number of persons affected on the Mine Citation/Order Form. As a result, a common misconception persisted that these two factors were the same.

Negligence

The Mine Citation/Order Form provided five choices for the inspector to specify the mine operator’s negligence related to a violation. The choices were: No Negligence; Low Negligence; Moderate Negligence; High Negligence; and Reckless Disregard.

Requirements: MSHA regulation 30 CFR 100.3(d) stated:

Negligence is conduct, either by commission or omission, which falls below a standard of care established under the Mine Act to protect miners against the risks of harm. Under the Mine Act, an operator is held to a high standard of care. A mine operator is required to be on the alert for conditions and practices in the mine that affect the safety or health of miners and to take steps necessary to correct or prevent hazardous conditions or practices. The failure to exercise a high standard of care constitutes negligence. The negligence criterion assigns penalty points based on the degree to which the operator failed to exercise a high standard of care. When applying this criterion, MSHA considers

mitigating circumstances which may include, but are not limited to, actions taken by the operator to prevent or correct hazardous conditions or practices.

MSHA regulation 30 CFR 100.3(d) also provided the following definitions for each category of negligence.

No negligence (The operator exercised diligence and could not have known of the violative condition or practice.)

Low negligence (The operator knew or should have known of the violative condition or practice but there are considerable mitigating circumstances.)

Moderate negligence (The operator knew or should have known of the violative condition or practice but there are some mitigating circumstances.)

High negligence (The operator knew or should have known of the violative condition or practice and there are no mitigating circumstances.)

Reckless disregard (The operator displayed conduct which exhibits the absence of the slightest degree of care.)

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated the following:

The level of knowledge that mine operators had or should have had regarding conditions or practices that could affect the safety and health of miners, the greater the degree of neglect exhibited by the operator. The facts as documented must support the degree of negligence checked on the Mine Citation/Order Form.

Negligence for unwarrantable failure violations has been defined as aggravated conduct constituting more than ordinary negligence. Further, the MINER Act has defined a flagrant violation as one where there is "...a reckless or repeated failure to make reasonable efforts to eliminate a known violation of a mandatory safety or health standard that substantially and proximately caused, or reasonably could have been expected to cause, death or serious bodily injury."

Mitigating circumstances may include but are not limited to action(s) taken by the operator to prevent or correct hazardous conditions or practices. Mine operators are required to be on alert for conditions or practices in the mine that affect the safety or health of miners and to take the steps necessary to correct or prevent hazardous conditions or practices. The mine operator or contractor might withdraw equipment, personnel and/or immediately proceed to correct the violation but **none** of those actions taken after they have been cited alters the negligence evaluation made by the inspector when the violation was cited [emphasis in original].

This Handbook also repeated the definitions for negligence from 30 CFR 100(d); however, the term "knew or should have known" was replaced with the term "could have known" in the definitions for Low and Moderate negligence.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated that the narrative portion of the field notes shall include:

Daily documentation for enforcement actions; which shall include all facts relevant to the condition or practice cited and information regarding the negligence and gravity determinations.... When documenting these facts the inspector must show the level of negligence (none, low, moderate, high, and reckless disregard); the facts and circumstances that support the negligence level assigned for each citation and/or order.

Findings: Inspectors made negligence determinations for all violations cited. However, inspectors could have better documented facts supporting their negligence determinations in approximately three-fourths of the citations and orders issued during the review period.

Interviews revealed that inspectors and supervisors could benefit from additional training concerning the application of the definitions for the levels of negligence, particularly with respect to the term “mitigating circumstances.” Inspectors frequently noted that the Operator knew or should have known that violative conditions existed, but did not list any mitigating circumstances to explain why they determined negligence was less than “High.”

How Long the Violation Existed

Policy and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System* also directed inspectors to thoroughly document in their notes, “the facts relating to... How long has the violation existed?” The length of time associated with a violation corresponds with an operator’s opportunity to identify and correct the hazard. Thus, the length of time often is relevant in determining an operator’s level of negligence. It was also a factor that inspectors were directed to consider when determining “aggravated conduct.”

Findings: The inspectors’ notes or citations or orders described facts relating to how long the violation existed for approximately one-half of the enforcement actions issued during the review period. The most common deficiency was failing to include facts or an explanation of how the inspector determined the length of time the violation had existed.

Some inspectors concluded that violations occurred since the last examination, based only on the fact that the examiner did not report the hazard associated with the violation. Inspectors often documented the length of time they believed a violation existed, but did not record facts to justify their conclusions.

Aggravated Conduct

Requirements: Section 104(d) of the Mine Act specified enforcement action to be taken when an inspector finds a violation caused by an unwarrantable failure of the operator to comply with a mandatory safety standard.

Policy and Procedures: MSHA policy stated that a violation is caused by an unwarrantable failure if the operator has engaged in “aggravated conduct constituting more than ordinary negligence.” The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated the following:

Factors inspectors should evaluate when determining “aggravated conduct” include one or more of the following:

1. the violative condition or practice was obvious or extensive;
2. the violative condition or practice had existed for a period of time;
3. similar violations have been issued at the mine or to the contractor in the recent past;
4. an agent of the operator or contractor had conducted an examination or had been in the area, or was aware of the existence of the condition;
5. the violative condition or practice had been reported to the operator or contractor who then allowed it to exist, without correcting or adequately addressing the problem, for a period of time;
6. the individual who committed or allowed the condition or practice to exist was a supervisor or an agent of the operator or contractor;
7. reasonable efforts were not made by the mine operator or contractor to correct the violative condition or practice; and
8. other factors, not enumerated above, resulted in a negligence evaluation by the inspector of “high” or “reckless disregard.”

This Handbook also directed inspectors to include the factors that explained how the operator engaged in aggravated conduct in the *Condition or Practice* section of the Mine Citation/Order Form when issuing a section 104(d) citation or order.

Findings: The Internal Review team considered whether inspectors evaluated the aggravated conduct factors when citing violations with high negligence to determine if the violation was also an unwarrantable failure, but only when all other prerequisites for section 104(d) actions had been met. Inspectors typically documented these factors when issuing section 104(d) citations and orders. However, inspectors did not properly evaluate aggravated conduct factors for the majority of these 13 high-negligence section 104(a) citations. In these cases, inspectors documented facts consistent with as many as five aggravated conduct factors. In one case, after an inspector issued an S&S high-negligence section 104(a) citation, nearly two months elapsed before an inspector found another violation with similar gravity and negligence and issued a section 104(d)(1) citation. During the interim, inspectors issued five non-S&S, high-negligence, section 104(a) citations for violations that also could have been evaluated for unwarrantable failure if the earlier action had been issued pursuant to section 104(d)(1).

Review of Mine Records Relevant to Violation

Policy and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directed inspectors to conduct a limited review of the operator's most recent examination records pertinent to the planned inspection activity for that day. The Handbook also directed inspectors to review mine records pertinent to the issuance of a citation, order, or safeguard before placing the enforcement action in writing.

The review of mine records provides inspectors important information related to mine conditions, recorded hazards, and compliance with requisite examinations. MSHA directs inspectors to review mine records pertinent to the issuance of enforcement actions for consideration in negligence evaluations. Such records can indicate when the operator discovered a violative condition, corrective actions taken that could have mitigated their negligence, and/or when the area containing the violation was last examined.

Findings: Inspectors documented that they checked mine records relevant to approximately two-thirds of the applicable citations and orders issued. Inspectors often did not document the specific examination records they reviewed, but rather recorded general statements that applied to multiple records, such as weekly or preshift exams.

The lack of inspectors' references to the Operator's examination records and prevalence of uncorrected and recurring reports of hazardous conditions in these records indicated that inspectors did not fully utilize the records when determining negligence. For example, an inspector issued two citations for violations of 30 CFR 75.400, one on the Longwall Belt and another at the 5 North Belt drive and take-up unit. On the day the citations were issued, the Operator's records of examination reported that the Longwall Belt needed to be spot cleaned and dusted for 11 consecutive shifts with no corrective actions recorded. Examiners also reported that the 5 North Belt Drive take-up needed to be cleaned every shift for the previous 5 days. The inspector documented reviewing the belt examination records but did not use them to determine how long the violations existed. The inspector also noted that the "fireboss should have known" for both violations, instead of documenting evidence that the examiner knew of and reported the cited conditions. Both citations were issued with moderate negligence. Instead of using evidence in the examination records, the inspector estimated that the conditions existed for three and five shifts, respectively, based on the amount of accumulations found. The inspector also did not cite violations for failure to immediately correct the reported hazards.

Area or Equipment

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated: "Area or Equipment - This pertains only to orders of withdrawal and must indicate the area from which employees shall be withdrawn until the dangerous conditions and causes of those conditions have been corrected. Equipment should be identified by manufacturer, model, serial number (if known), color, and name, etc. if it is ordered removed from service."

Findings: Most of the withdrawal orders issued during the review period adequately identified and described the areas from which employees were ordered withdrawn or the equipment that was ordered removed from service. Exceptions included cases where affected areas did not include the full extent of potential hazards for which the violated standards were directed. For example, an inspector issued a section 104(d)(2) order for a violation of 30 CFR 75.370(a)(1) in which the Operator failed to examine two approved locations for evaluating the ventilation of a worked-out area in the southern portion of the Mine. The inspector's notes indicated that this practice could result in the buildup of methane that could result in an ignition. However, the inspector limited the *Area or Equipment* affected to the two evaluation points. In accordance with policy, the order should have required miners to be withdrawn from all areas that could have been affected by the potential ignition or methane explosion.

Termination Due Date and Time

Requirements: Section 104(a) of the Mine Act stated, "the citation shall fix a reasonable time for the abatement of the violation."

Policy and Procedures: The Program Policy Manual stated: "The degree of danger to miners is the first consideration in determining a reasonable time for abatement."

The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated:

The time fixed for abatement of a violation shall be determined, whenever practical, after a discussion with the mine operator or the operator's agent. Inspectors shall give primary consideration to the health and safety of miners in establishing abatement times for all citations.

This Handbook also stated the following:

The termination time for a citation must be specific and provide a reasonable time for mine operators to abate the conditions, practices, or circumstances which caused issuance of the citation. Citation abatement times **shall not** be established for the convenience of the mine operator, or for the inspector, or because the mine operator has filed an appeal with the Federal Mine Safety and Health Review Commission, or because the operator filed a Petition for Modification [emphasis in original].

Findings: Inspector documentation indicates that a reasonable abatement time was initially established for more than three-fourths of the citations issued at UBB during the review period. In the remaining cases, the Internal Review team believes the length of time allowed to abate the violation was longer than appropriate for the documented condition or practice. In one case, the abatement time for a citation for overexposure to respirable dust on MMU 064-0 was set at 33 days. The Internal Review team found the typical termination due dates for similar citations in District 4 allowed 7 days for abatement.

Action to Terminate

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* directed inspectors to:

Describe in detail the specific action(s) taken to correct the cited condition(s) or practice(s) which justifies termination. Do not write terms like "The condition was corrected."

Findings: The *Action to Terminate* adequately described in detail the specific action(s) taken to correct the cited condition(s) or practice(s) which justified termination for the majority of citations and orders issued during the review period. Most exceptions included cases where inspectors documented that the violation was abated, but did not include the specific action taken to correct the cited condition. For instance, an inspector terminated a violation for inadequate airflow by stating that, "the operator has the required air." The specific action the Operator took to restore airflow could have provided important facts related to the cause, and therefore the negligence level related to the violation.

Basis for Extending Termination Due Dates and Times

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* stated: “This handbook is intended to provide guidance for all enforcement personnel ... in writing clear justification for extensions and modifications of citations and orders.” The Handbook also directed inspectors to:

...review the circumstances when the time fixed for a citation’s abatement has expired. In determining whether to issue a Section 104(b) order, the inspector must determine whether there is a reasonable basis for extending the abatement date. If an extension of time is not justified and the cited condition or practice is not abated, the inspector must issue a Section 104(b) order of withdrawal. Upon abatement of the condition or practice cited in the original citation, the order can be terminated.

Granting an extension establishes a new abatement due time. Accordingly, the primary consideration in selecting the new termination due time should continue to be the health and safety of the miners. The Handbook directed that:

Citation abatement times **shall not** be established for the convenience of the mine operator, or for the inspector, or because the mine operator has filed an appeal with the Federal Mine Safety and Health Review Commission, or because the operator filed a Petition for Modification [emphasis in original].

Findings: Inspectors required abatement within the original termination due time for 578 of the 627 citations issued during the review period. In 45 of the 49 instances when inspectors extended termination due times, they did not document a reasonable basis for the extension or they allowed an excessive amount of time based on the documentation. In 22 of the 49 instances, the violations were determined to be S&S.

There were at least 12 instances where citations were extended for the convenience of MSHA, including five citations that were extended because an inspector was injured. Multiple citations were extended to allow time for MSHA to review ventilation plan submittals, including six citations issued for non-compliance with respirable dust standards which required a plan revision. These extensions, which effectively set a new termination due date, did not show that the primary consideration was the health and safety of the miners.

In his interview, the Assistant District Manager with responsibility for the Mt. Hope Field Office stated that he monitored weekly oversight reports of past due citations. He indicated that inspectors were directed to provide him a memorandum explaining why any citation was not terminated within 15 days of its due date. MSHA Headquarters also generated quarterly oversight reports that listed “Citations Past 30 Days Due When Terminated.” Such oversight was intended to ensure timely abatement of known violations and associated hazards. However, the system allows inspectors to prevent un-terminated citations from being listed on the oversight reports by issuing extensions.

Circumstances for Vacating Citations and Orders

Policy and Procedures: Volume I of the *MSHA Program Policy Manual* directed that:

When vacating a citation or order, Form 7000-3a [Mine Citation/Order Continuation Form] must be completed, stating the reason for vacating the prior enforcement action. If possible, the authorized representative who issued the citation or order should be the person to issue the subsequent corrective action. Both the inspector and the supervisor must file, with the inspection report, notes which describe in detail the reasons and circumstances involved. Copies of the citation or order, along with the subsequent corrective action and notes, shall be sent to the appropriate district manager.

The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* included the following: “Vacated citations and orders must be included with inspection or investigation reports as they are part of the inspection record.” This Handbook further stated that “Inspectors shall state the specific

reason for vacating the citation or order on that form. Copies of all vacated citations and orders shall be forwarded to the District Office separate from the inspection report.”

Findings: There were five enforcement actions at UBB vacated during the review period. Inspectors provided adequate documentation for vacating two of the five enforcement actions. In one case, an inspector vacated a citation with a justification that indicated that, after consulting with an MSHA ventilation specialist, it was decided that this citation was issued in error. The inspector did not explain the reason provided by the specialist. None of the supervisors and only one inspector documented the reasons and circumstances for vacating the enforcement actions. None of the vacated enforcement actions were included in the inspection reports, contrary to both policy and procedures.

Other Items on Mine Citation/Order Form

Policy and Procedures: The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* provided various other procedures for completing the Mine Citation/Order Form. This category of the Internal Review team’s analysis included errors, omissions, and/or incorrect usage of items on the Form that did not apply to the other categories evaluated.

Findings: Other items on the Mine Citation/Order Form were properly completed on the vast majority of citations and orders. The few exceptions included administrative errors, primarily affecting data integrity rather than conditions or practices at the Mine. Examples included handwritten corrections to the Mine Citation/Order Form without issuing a subsequent action to modify the enforcement action. As a result, the revised information was not uploaded into the MSHA enterprise database.

Conclusion: The level of enforcement at UBB was among the highest in the nation. This reflected the inspectors’ diligent efforts at a highly non-compliant mine to issue citations and orders in accordance with their understanding of the law and MSHA directives. As a result, inspectors forced the Operator to correct hundreds of hazards at UBB. However, nine of the twelve procedural categories that needed the greatest improvement were related to documentation of gravity and negligence evaluations. Appropriate evaluation of the gravity and negligence is critical to the issuance of enforcement actions that address hazards identified at a mine.

Lower than appropriate determinations of gravity and negligence result in lower penalties proposed for violations cited and reduce the incentive for operators to comply. Conversely, determinations that are higher than warranted result in higher penalties and increase the incentive for operators to contest more citations and orders. Corrective actions for similar issues identified in past Internal Reviews did not sufficiently address root causes of problems related to effective citation and order writing.

The Internal Review team found the following issues with the manner in which factual information related to negligence and gravity was determined, documented, or evaluated:

- Most inspectors and supervisors interviewed did not demonstrate an understanding for the term “mitigating circumstances,” which is used in the definition of degrees of negligence in 30 CFR 100.3(d).
- Inspectors did not always evaluate aggravated conduct factors when citing high-negligence violations.
- Inspectors frequently did not utilize the Mine Operator’s records of examinations when determining negligence.
- MSHA directives have not provided a clear process for evaluating negligence and gravity since the Mine Citation/Order Form was revised in 1982 to include the inspector’s evaluation of these factors. Directives did not include definitions for all degrees of likelihood. Inspectors confused the likelihood of an injury or illness with its expected severity because instructions related to these factors were commingled with discussions of legal decisions regarding S&S. Procedures and definitions related to the number of “People Exposed” and “Persons Affected” were not listed in the same Handbook.

- For many years, note-taking instructions for citations and orders have been in the form of questions. This likely caused some inspectors to simply record answers to these questions, rather than include the relevant facts used to derive their conclusions.
- The statement “This violation is an unwarrantable failure to comply with a mandatory standard” was not included in the Condition or Practice for the majority of section 104(d) actions.

Inspectors did not always determine the specific actions the Operator took to abate violations, which also could have provided facts relevant to the Operator’s negligence and the causes of violations.

In those cases where inspectors extended and vacated citations, they often did not document appropriate reasons for the actions. Some extensions were granted for the convenience of MSHA, which allowed prolonged periods for the Operator to take corrective actions.

The Health/Safety/Other field on the Mine Citation/Order Form has become unnecessary for program operation and oversight.

Information obtained in this evaluation of the citations and orders issued at UBB during the review period illustrates a clear need for changes to the MSHA Directives System, improved supervisory and managerial oversight, and enhanced training.

Corrective Actions Taken: The Assistant Secretary directed development of a new training program to provide Coal and Metal and Nonmetal field office supervisors with the essential tools to oversee enforcement activities required by the Mine Act. This training was completed October 2011. The training addressed deficiencies identified by accountability audits and internal reviews and was intended to improve oversight of mine inspectors and foster enforcement consistency. The training included the evaluation of the gravity and negligence of violations. MSHA has also secured funding to provide additional training to enforcement supervisors on the findings of the UBB Accident Investigation and Internal Review.

Recommendations: The Administrators for Coal and Metal and Nonmetal should collaborate with the Office of the Solicitor, Mine Safety and Health Division (SOL) to revise the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* to provide a clear evaluation process for inspectors to determine gravity and negligence for each relevant item on the Mine Citation/Order Form. This direction should include definitions for each level of likelihood listed on the Form. The revised Handbook also should incorporate definitions for the levels of negligence that are consistent with those listed in 30 CFR Part 100 and clearly incorporate the meaning of “mitigating circumstances.”

The Administrators for Coal and Metal and Nonmetal should direct the revision of their general inspection procedure handbooks to move note-taking instructions related to enforcement actions to the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*. The Handbook should direct inspectors to document both the facts necessary for evaluating compliance, gravity, and negligence and the logic for deriving conclusions from the facts. Inspectors should identify in their notes the records (specific to the record type, dates, and relevant information from such records) used as a factor to determine negligence for each violation.

The Administrator for Coal should direct the revision of the *Coal Mine Safety and Health Supervisor’s Handbook* to provide supervisors with a list of fundamental procedures for reviewing enforcement actions. The Handbook also should direct assistant district managers to routinely review a representative number of enforcement actions for conformity to these procedures. Managers should review a representative number of extensions to citations to ensure that inspectors provide specific reasons for extending termination due times that give primary consideration to the health and safety of miners and are not for the convenience of the mine operator or MSHA.

The Director of EPD should direct the revision of training programs for citation and order writing to reflect changes in policies and procedures. The training should be provided to all enforcement personnel, supervisors, and managers. Knowledge checks should be used to determine the effectiveness of the training.

The Administrator for Coal should consider removing the Health/Safety/Other block from the Mine Citation/Order Form. The Administrator also should consider revising the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* to remove the direction for Coal inspectors to complete this field. The Director of PEIR should make corresponding changes to the Inspectors' Portable Application for Laptops (IPAL) data input screen.

The Director of PEIR should direct modifications to IPAL to automatically insert the following statement into the *Condition or Practice* for each section 104(d) action: "This violation is an unwarrantable failure to comply with a mandatory standard."

The Assistant Secretary should consider rulemaking to modify the provisions of 30 CFR Parts 100 and 104 to minimize the effect of the more subjective gravity and negligence determinations on penalty proposals and pattern of violation determinations, without reducing the incentive for operators to comply with standards and regulations.

Section 104(e) Pattern of Violations

Requirements: Section 104(e) of the Mine Act requires MSHA to issue a written notice to the mine operator if a mine has a pattern of violations of mandatory standards that could significantly and substantially contribute to health or safety hazards at the mine. Once a section 104(e) pattern notice is issued, any MSHA inspection within 90 days that reveals another S&S violation results in a withdrawal order until the violation is abated. Withdrawal orders continue to be issued for subsequent S&S violations until an inspection of the entire mine reveals no S&S violations. A withdrawal order requires all miners to be removed from the area affected by the violation and prohibits entry into the area, with the exception of persons assigned by the operator to eliminate the violation.

MSHA regulations at 30 CFR Part 104 establish the criteria and procedures for determining whether a mine operator has established a pattern of S&S violations at a mine.

Statement of Facts: In Spring 2007, MSHA implemented a standard model based on quantitative data for screening and monitoring mines for a potential pattern of violations (PPOV). A computer application was used to implement this model and identify mines with a PPOV.

On September 30, 2007, MSHA conducted the second screening using the standard model to identify mines with a PPOV. The screening identified UBB as having a PPOV based in part on the rate of S&S violations cited at the Mine during the previous 24 months. The UBB S&S rate for the period was 11.6, while all underground coal mines had an S&S rate of 6.19. Based on the screening, the District 4 Manager notified Performance Coal Company in a letter dated December 6, 2007, that a PPOV existed at the Mine. The letter required UBB to reduce its S&S rate by 30% during the January through March 2008 inspection period in order to avoid receiving a POV notice pursuant to section 104(e) of the Mine Act.

During the January through March 2008 inspection period, District 4 enforcement personnel logged 280.25 inspection hours and issued 16 S&S citations at UBB. This resulted in an S&S rate of 5.7, a reduction of 51% from the baseline S&S rate of 11.6. Since UBB reduced its S&S rate by more than 30% during this period, it did not receive a POV notice.

The fifth cycle of screenings using the standard model covered a 24-month period ending August 31, 2009. This screening did not identify UBB as a potential POV mine.

Seven days after the April 5, 2010, explosion, the Director of the MSHA Office of Assessments discovered an error in the computer application that had prevented eight citations issued to the Mine from being included in the fifth cycle screening process. This error was immediately corrected. Had these eight citations been considered in the screening process, the Mine would have been included on the list of PPOV mines, absent a finding of mitigating circumstances.

MSHA reported the error to the public the following day, and the Department of Labor Office of Inspector General (OIG) initiated an audit of MSHA's implementation of section 104(e). The audit report, published on September 29, 2010, concluded that MSHA had not successfully exercised its POV authority since passage of the Mine Act in 1977.

The OIG identified nine deficiencies in MSHA's POV process and made recommendations to the MSHA Assistant Secretary for addressing these deficiencies. The Assistant Secretary agreed with the OIG recommendations and committed to developing and implementing corrective actions. MSHA has implemented each of the OIG recommendations related to the POV process.²⁶

In April 2011, MSHA issued a notice of a pattern of violations to two coal mining operations under Section 104(e) of the Mine Act. They became the first mines in the history of the Mine Act to be subject to the full effect of this enforcement action.

Conclusion: The OIG comprehensively addressed the issues with MSHA's POV program in its audit report, and MSHA has taken appropriate corrective actions.

Corrective Actions Taken: MSHA strengthened its PPOV review process to hold mine operators to a higher standard. The Agency stiffened the requirements to achieve improvement goals and began monitoring each mine's violation history after the corrective action period. MSHA considers an operator's continued performance after it meets the short-term goals in later screenings and enhanced enforcement activities. MSHA also began auditing mines to determine whether they had failed to report injuries that would have affected their PPOV status. Mines that received PPOV notices in 2010 have shown considerable reductions in violation rates and lost-time injury rates since completing the PPOV process.

MSHA is engaged in rulemaking to revise the Agency's existing regulation for pattern of violations contained in 30 CFR Part 104. The final rule would reflect statutory intent, simplify the pattern of violations criteria, and improve consistency in applying the patterns of violations criteria. Notice of the Final Rule was published in the Federal Register as part of the Agency's Fall Regulatory Agenda in January 2012. It is expected that the Final Rule will be published in April 2012.

On February 12, 2012, the Office of Assessments became the Office of Assessments, Accountability, Special Enforcement and Investigations (OAASEI) establishing within a single office the management, support and coordination of both routine and special assessments, the agency's headquarters accountability functions, and special enforcement strategies. The office will provide centralized oversight of special investigations and special enforcement activities such as the POV and impact inspection programs and manage the evaluation and development of strategies to improve the use of other enforcement tools, such as flagrant violations and special assessments. It will also conduct quantitative analyses to monitor mine operators' performance and continue to develop and refine special enforcement strategies that improve the health and safety of miners.

Recommendations: None

Proposed Assessment of Civil Penalties

Section 110 of the Mine Act requires MSHA to propose, and the Federal Mine Safety and Health Review Commission to assess, a civil penalty for every Mine Act violation. The Internal Review team did not find any issues with civil penalties proposed under 30 CFR 100.3 (regular assessments) and 30 CFR 100.4 (unwarrantable failure and immediate notification assessments), proposed special assessments, or the collection of civil penalties assessed for violations at UBB. Therefore, this section of the Report

²⁶ One recommendation, to use system development life cycle techniques to reduce the risk of errors in any POV-related computer application, has been resolved by the OIG but has not been closed pending verification of MSHA's corrective action.

addresses only civil penalties pursuant to 30 CFR 100.5(e) (proposed penalties for flagrant violations) and the review of possible knowing and willful violations.

Penalties Proposed Pursuant to 30 CFR 100.5(e) – Flagrant Violations

Requirements: Section 110(b)(2) of the Mine Act, as amended by the MINER Act, stated:

Violations under this section that are deemed to be flagrant may be assessed a civil penalty of not more than \$220,000. For purposes of the preceding sentence, the term ‘flagrant’ with respect to a violation means a reckless or repeated failure to make reasonable efforts to eliminate a known violation of a mandatory health or safety standard that substantially and proximately caused, or reasonably could have been expected to cause death or serious bodily injury.

MSHA Policies and Procedures: *Procedure Instruction Letter (PIL) No. I06-III-04*, effective October 26, 2006, established procedures for district personnel to identify violations of mandatory safety and health standards as potentially flagrant violations. In pertinent parts, the PIL stated:

1) Flagrant violations cited by Mine Safety and Health Administration (MSHA) inspectors must meet the following evaluation criteria for reckless failure or repeated failure violations:

For violations that are the result of **reckless failure** [emphasis in original] to make reasonable efforts to eliminate a known violation -

1. Citation or order is evaluated as significant and substantial,
2. Injury or illness is evaluated as at least permanently disabling,
3. Citation or order is evaluated as an unwarrantable failure, and
4. Negligence is evaluated as reckless disregard.

For violations that are the result of **repeated failure** [emphasis in original] to make reasonable efforts to eliminate a known violation -

1. Citation or order is evaluated as significant and substantial,
2. Injury or illness is evaluated as at least permanently disabling,
3. Type of action is evaluated as an unwarrantable failure, and
4. At least two prior “unwarrantable failure” violations of the same safety or health standard have been cited within the past 15 months.

In addition, if the violation meets the above criteria it must also be evaluated to determine if it proximately caused, or could have reasonably been expected to cause death or serious bodily injury. A proximate cause is one which directly produces the injury or death and without which the injury or death would not have occurred...

2) All flagrant violations will be specially assessed. To initiate the special assessment process, the inspector must complete a SAR Form for each proposed flagrant violation cited, clearly identifying it as potentially flagrant. The above criteria must be addressed on the form. The SAR Form has been revised to include a check box to be used to identify violations as flagrant. Inspectors and higher level reviewers must consider all factors and circumstances and check the “flagrant violation” box in their respective section (section 10 through 13) of the SAR Form before forwarding the SAR Form to the appropriate Administrator for review.²⁷ All SAR Forms for violations that meet the numbered objective criteria outlined above must be submitted to the Administrator even if the District Manager does not recommend a flagrant violation special assessment because of the absence of proximate cause or the presence of mitigating factors....

²⁷ SAR is an acronym for “Special Assessment Review.”

MSHA reissued *PIL 106-III-04* without substantive change as *PIL 108-III-02* on May 29, 2008.

The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* (March 2008) adopted the criteria from *PIL 106-III-04* for identifying violations of mandatory safety and health standards as potentially flagrant violations, and, among other things, also included the following:

For repeat failure evaluations, prior citations must be violations of the same safety or health standard citing the same subsections (e.g., citing 56/57.14201(a) and 56/57.14201(b) do not meet the criteria for flagrant repeat violation consideration), and have been cited as 104(d)(1) or 104(d)(2) enforcement actions. Prior violations do not have to have been evaluated as significant and substantial [emphasis on original]...

Inspectors should send to the District Office a packet that includes: the completed Possible Knowing/Willful Violation Review Form; a copy of the Legal Identity Report; a copy of the relevant general field notes; a copy of the citation/order notes; photographs if available; a copy of relevant citation(s) or order(s); and a copy of all modifications. This packet shall be submitted to the District Office in a timely manner or as directed by the District Manager.

Statement of Facts: *Procedure Instruction Letter 106-III-04* implemented a revised Special Assessment Review (SAR) Form to initiate the special assessment process for “proposed” flagrant violations. While the PIL clearly instructed inspectors to use the SAR Form when proposing a violation as flagrant, it did not specifically direct inspectors to complete a SAR Form for each violation that met the “numbered objective criteria” for potentially flagrant violations. Although counter to MSHA’s intent, this could be interpreted to give inspectors discretion as to whether a violation was flagrant when determining if an SAR should be submitted.

Coal Mine Safety and Health implemented a Standard Operating Procedure (SOP) for evaluating potential flagrant violations. The SOP required that district personnel work with the Regional Solicitor of Labor (RSOL) to review a violation identified as potentially flagrant and any accompanying documentation. After consultation with the RSOL, the district manager was to forward a summary memorandum with his recommendation, RSOL’s written legal opinion, and other relevant documentation to the Administrator for Coal. If the Administrator determined that the violation was flagrant, he was to send the package to the Office of Assessments for assessment as a flagrant violation. If the Administrator determined that the violation was not flagrant, he was to forward the package to the Office of Assessments for processing as a non-flagrant, specially-assessed violation.

The Internal Review team reviewed all violations cited at UBB during the review period to determine whether District 4 personnel followed procedures for evaluating potentially flagrant violations. District 4 inspectors issued eight section 104(d)(2) orders for violations at UBB that met the “numbered objective criteria” outlined in *PIL 108-III-02* for special assessment as potentially flagrant violations. All eight orders involved the Operator’s failure to follow the approved ventilation plan. Seven orders met the criteria for the “repeated failure” to make reasonable efforts to eliminate known violations, and one met both the “repeated failure” and “reckless failure” criteria. However, District 4 personnel did not review any of the eight orders as potentially flagrant violations. As a result, none of the eight orders were submitted to the Administrator for Coal for him to determine whether the violations were flagrant.²⁸ The eight orders are described in Table 12.

²⁸ While not assessed as flagrant, the Office of Assessments proposed civil penalties in excess of \$240,000 for these violations in light of the inspectors’ negligence and gravity determinations and other relevant factors.

Table 12 - Violations Cited at UBB That Met the Objective Flagrant Violation Criteria

Violation No.	Date Issued	S&S	Injury / Illness	Negligence	Reckless Failure?	Repeated Failure?
8082700	04/07/2009	Y	Permanent	High	No	Yes
8090855	06/17/2009	Y	Permanent	High	No	Yes
8090856	06/17/2009	Y	Permanent	High	No	Yes
8084966	07/29/2009	Y	Permanent	High	No	Yes
8080094	10/21/2009	Y	Permanent	High	No	Yes
8087709	01/07/2010	Y	Fatal	Reckless	Yes	Yes
8087710	01/07/2010	Y	Fatal	High	No	Yes
8087744	03/02/2010	Y	Fatal	High	No	Yes

The Internal Review team interviewed a number of District 4 personnel regarding the criteria and procedures for evaluating potentially flagrant violations. The District 4 Manager, Assistant District Managers, and one inspector demonstrated a comprehensive understanding of MSHA procedures regarding flagrant violations. Most other interviewees recalled flagrant violations being discussed during training or staff meetings, but they displayed limited or no knowledge of the criteria or procedures for evaluating them.

In District 4, at least 137 violations met the “numbered objective criteria” outlined in *PIL 108-III-02* for review as potentially flagrant violations.²⁹ The District 4 Manager sent ten potentially flagrant violations involving four different mines to the Administrator for Coal for final determination. One of the ten violations ultimately was specially-assessed as a flagrant violation. For six of the other nine violations, both the District 4 Manager and the Arlington RSOL agreed that the violations should not be assessed as flagrant violations. In the other three cases, the District 4 Manager recommended flagrant designations but the RSOL disagreed.

Nationally, including District 4, at least 318 violations cited at coal mines during the review period met the “numbered objective criteria” outlined in *PIL 108-III-02* for review as potentially flagrant violations.³⁰ Coal district offices reviewed and forwarded 84 (26%) of these violations to the Administrator for Coal for final determination. The Administrator forwarded 33 violations to the Office of Assessments for proposed assessment as flagrant violations. The remaining 51 violations were determined not to be flagrant and were sent to the Office of Assessments to be specially-assessed as non-flagrant violations.

Forty-four of the 51 violations were given non-flagrant recommendations because the Administrator for Coal, district manager, and/or RSOL determined that they should not be pursued. Seven violations were given non-flagrant designations because they originally did not meet the “numbered objective criteria” outlined in *PIL 108-III-02* for assessment as flagrant or because the citations or orders had been modified prior to the Administrator’s review.

Figure 4 provides a diagram showing the status of the 318 violations cited at all coal mines during the review period that met the “numbered objective criteria” outlined in *PIL 108-III-02* for review as potentially flagrant violations.

The “reckless failure” criteria for flagrant violations are easily recognizable as they relate only to the cited violation, and the determination is apparent during the citation or order writing process. In contrast, the “repeated failure” criteria require the inspector to have knowledge of the unwarrantable failure violation history at the mine for the previous 15 months. At the time of the April 5 explosion, MSHA did not have an automated tool to alert enforcement personnel that certain violations should be reviewed as potential flagrant violations.

²⁹ It is difficult to calculate the exact number of violations that met the flagrant criteria because several unwarrantable failure violations, including violations cited in the previous 15 months as predicate violations, have since been modified through contest.

³⁰ Of the 318 violations, 60% met the repeated failure criteria, 32% met the reckless failure criteria, and 8% met both criteria.

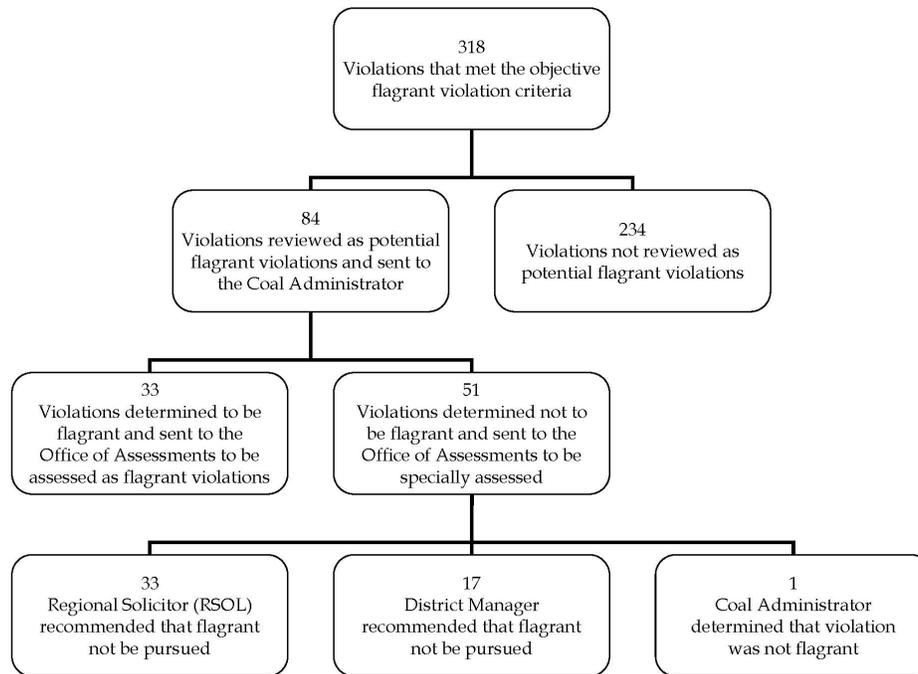


Figure 4 - National Violations Cited in Review Period Meeting Flagrant Violation Review Criteria

The Internal Review team determined that SOL’s Mine Safety and Health Division had not provided formal written guidance to RSOLs on the manner in which to analyze flagrant violations. SOL orally provided informal guidance concerning the flagrant penalty provision to some RSOLs, on a case-by-case basis, in response to inquiries concerning specific violations. Not all RSOLs received the same information.

Procedure Instruction Letter No. I08-III-02 expired on March 31, 2010. As such, the PIL provision instructing district managers to forward all SAR Forms for violations that meet the numbered objective flagrant criteria to the Administrator, regardless of the district manager’s recommendation, no longer was current MSHA policy. In October 2010, MSHA revised Volume III of the *Program Policy Manual* in part to address flagrant violations. Unlike the PIL provision, the *Program Policy Manual* stated: “For a violation recommended for assessment under the flagrant violation provision of the Mine Act, the District Manager must submit the SAR package to the Administrator for review and approval.” This could be interpreted to require district managers to submit to the Administrator only those SAR packages for violations that they were recommending for assessment as flagrant. The revised PPM also provided a list of violations “required to be **reviewed** for special assessment” [emphasis on original], which did not include potentially flagrant violations. The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* was not updated to include applicable provisions from the expired PIL, including instructions for inspectors to include a completed SAR Form in the packet to be sent the District Office for each violation they cited that met the objective criteria for review as a potentially flagrant violation.

Conclusion: The Internal Review team recognizes that each potentially flagrant violation must undergo a comprehensive review process before the Agency can propose a civil penalty commensurate with a flagrant violation. Thus, appropriate implementation of the flagrant review process at the district level does not necessarily result in a designation of a violation as flagrant.

However, more violations likely would have been reviewed for assessment as flagrant violations if procedures had clearly directed inspectors to submit SAR Forms for all violations meeting the objective criteria listed in *PIL I08-III-02* and oversight reports been developed and used to identify them. During the review period, 137 violations cited at mines in District 4 met the “numbered objective criteria” for potentially flagrant penalty proposal, but were not forwarded to the Administrator for Coal for final

determination. Of these, inspectors did not complete SAR Forms for eight potentially flagrant violations cited at UBB for the District 4 Manager to submit to the Administrator.

Some provisions listed in the now-expired *PIL I08-III-02* were not incorporated into permanent MSHA directives. MSHA also may have more effectively used the flagrant violation enforcement provision had the Agency and SOL developed and provided additional written guidance for analyzing and processing potentially flagrant violations.

Corrective Actions Taken: In April 2011, MSHA provided inspectors with a tool on their laptop computers that automatically alerts them when a violation they have cited meets the objective criteria in the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* for review as a potential flagrant violation.

In June 2011 PEIR deployed the “Potential Flagrant Violations Not Assessed” oversight report, which incorporates the criteria used to identify flagrant violations. This report was developed separately from the laptop computer enhancement to provide a tool for supervisors, managers, and non-enforcement personnel to identify potential flagrant violations.

The new Office of Assessments, Accountability, Special Enforcement and Investigations will manage the evaluation and development of strategies to improve the use of other enforcement tools, such as flagrant violations and special assessments. It will also conduct quantitative analyses to monitor mine operators’ performance and continue to develop and refine special enforcement strategies that improve the health and safety of miners.

On February 24, 2012, the Assistant Secretary assigned the Deputy Assistant Secretary for Operations to direct the Coal and Metal and Nonmetal Administrators to instruct District personnel to look broadly at violations that may be considered for flagrant designations in light of the criteria in the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*. The Administrators also are directed to instruct District personnel that all SAR Forms for all potentially flagrant violations must be submitted to them for review, even if the district manager does not recommend a flagrant violation special assessment due to the absence of proximate cause or the presence of mitigating factors.

Recommendations: The Administrators for Coal and Metal and Nonmetal should collaborate with the Office of the Solicitor, Mine Safety and Health Division (SOL) to revise the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* to incorporate applicable provisions from *PIL I08-III-02*. The Handbook should:

- Define the term “substantial and proximate cause” and explain the inspector’s role, if any, in its evaluation.
- Include instructions that clearly direct inspectors and specialists to complete a SAR Form for each violation that meets the “numbered objective criteria” for screening potentially flagrant violations. The second scenario in the “Flagrant Citations and Orders” chapter of the Handbook should reference whether the example should be reviewed as a potentially flagrant violation.
- Direct inspectors and specialists to include a SAR Form in the packet to be sent to the District Office for each violation meeting the “numbered objective criteria.”

The Administrators for Coal and Metal and Nonmetal should collaborate with SOL and the Director of OAASEI to revise Volume III of the *Program Policy Manual* to:

- Define a “potentially flagrant violation” using the numbered objective criteria referenced in the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*.
- Add “potentially flagrant violations” to the list of violations that are required to be reviewed for special assessment. The matrix that follows this list also should be clarified to include “potentially flagrant violations.”

- Explicitly require that all SAR Forms for potentially flagrant violations be submitted to the Administrator along with supporting documentation, even if the District Manager does not recommend a flagrant violation special assessment because of the perceived absence of substantial and proximate cause or the presence of mitigating factors.
- Include the “Potential Flagrant Violations Not Assessed” oversight report with the reference to the “Assessable Violations Not Marked Report” (R-119 Report) for regular review by district personnel.
- Update guidance on legal requirements for implementing assessments of flagrant violations, including whether repeat flagrant violations must be related to the same distinct hazard.

Possible Knowing/Willful Violation Reviews

Requirements: Section 110(c) of the Mine Act contains provisions for civil and criminal penalties against a director, officer, or agent of a corporate operator who knowingly orders, authorizes, or carries out a violation of the Mine Act or a mandatory safety or health standard. Under section 110(d) of the Mine Act, the Agency may pursue criminal proceedings against an operator who willfully violates the Mine Act or a mandatory safety or health standard.

MSHA Policies and Procedures: Volume I of the MSHA *Program Policy Manual* and the *Special Investigations Procedures Handbook* both directed that the following types of citations and orders be reviewed to determine if they are possible knowing and/or willful violations:

- Each section 104(a) citation that contributed to the issuance of a section 107(a) imminent danger order of withdrawal
- Each section 104(d) citation or order that is identified as being significant and substantial (S&S) and the negligence has been marked “High” or “Reckless Disregard”
- Each citation issued for working in violation of an order of withdrawal

The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* directed inspectors to complete a Possible Knowing/Willful Violation Review (PKW) Form for the following enforcement actions:

- Section 107(a) orders with section 104(a) and 104(d) citations
- Section 107(a) orders with section 104(d) orders
- “S&S” section 104(d) citations and orders with an evaluation of at least "high" for negligence
- Section 104(e) orders with an evaluation of at least “high” for negligence
- Flagrant violations
- Citations issued for working in violation of an order

The instructions for determining which citations and orders must be reviewed for Possible Knowing and Willful Violations differ between the *Program Policy Manual*, the *Special Investigations Procedures Handbook*, and the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*. Since the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* is the more recent document, the Internal Review team used this Handbook as the governing directive.

The *Special Investigations Procedures Handbook* provided detailed instructions for inspectors to follow when completing Possible Knowing/Willful Violation Review (PKW) Forms (MSHA Form 7000-20). Based on information entered on the Form, the inspector checks a box indicating whether he or she believes the violation was a possible knowing and/or willful violation. However, this Handbook is not a resource inspectors are expected to consult in the course of their duties.

The Handbook also established procedures for the review of PKW Forms by the inspector’s supervisor, the assistant district manager, and the supervisory special investigator (SSI). The Handbook directed each person in the review chain to document on the Form whether they agree or disagree with the inspector’s

conclusion and the reason for their decision. The district manager will decide to either conduct a special investigation or take no further action. The Handbook stated:

After a determination has been made by the DM as to what action will be taken, the appropriate copy of each completed Form 7000-20 shall be sent to TCIO, along with a copy of the citation/order and supporting documentation justifying the action taken. A memorandum to the file will be distributed to all persons involved in the review documenting the reasons for not initiating an investigation.³¹

Where the decision of the district manager is to take no further action and there was disagreement among the reviewers, the supervisory SSI is directed to prepare a memorandum to the file detailing the reasons for not conducting the special investigation. All documentation is required to be maintained by the SSI.

Finally, the Handbook stated that: “Miner discrimination complaints are given priority over all other SI cases. All available special investigation resources, including SSIs, will be used to ensure the timely initiation and completion of Section 105(c) investigations.”

Statement of Facts: District 4 inspectors completed 51 PKW Forms for violations cited at UBB during the review period. Of these, 49 PKW Forms were submitted for section 104(d) citations and orders, one for a section 104(g)(1) order associated with a section 107(a) order, and one for a section 104(a) citation associated with a section 107(a) order.³² Additionally, one section 104(d) order issued during this timeframe was evaluated as S&S, but was not reviewed as a possible knowing and/or willful violation, as directed in the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*. This order also met the “numbered objective criteria” outlined in *PIL I08-III-02* for review as a potentially flagrant violation.

The Internal Review team evaluated these 51 PKW Forms, together with the associated citations, orders, and inspection notes, for compliance with the Handbook. The issuing inspector, supervisor, and the Assistant District Manager for Enforcement (ADM-Enforcement) recommended that a special investigation be conducted for six of the 51 violations. The six cases involved section 104(d) citations and orders citing violations of 30 CFR 75.370(a)(1) (failure to follow the approved ventilation plan); 30 CFR 75.400 (accumulation of combustible materials); and 30 CFR 75.333(b)(1) (ventilation controls). Three of the violations also met the objective criteria to be evaluated as potential flagrant violations.

The SSI indicated in his interview with the Internal Review team that the Special Investigation workgroup first conducts a Preliminary Special Investigation when an inspector determines that a section 104(d) violation is “Highly Likely” to result in a permanently disabling injury or illness. After that review, the SSI recommends whether to proceed with a full section 110(c) investigation. Even though the SSI stated he began using this process in 2009, the Internal Review team determined that only one Preliminary Special Investigation was conducted for a violation cited at UBB during the review period.

The section 104(d)(1) citation investigated was issued under 30 CFR 75.370(a)(1) when an inspector found that a UBB section foreman failed to maintain proper ventilation on the No. 3 section. The inspector listed eight instances of improper ventilation simultaneously present at various locations across the working section. The inspector, supervisor, and ADM-Enforcement recommended a special investigation be conducted. The SSI sent a memorandum to the District 4 Manager reporting the results of the Preliminary Special Investigation. The memorandum provides “mitigating circumstance” information but does not document any recommendation. Neither the SSI nor the District 4 Manager documented any recommendation on the PKW Form. No further action or investigation was pursued by District 4 personnel.

³¹ The Technical Compliance and Investigations Office (TCIO) at MSHA Headquarters was established to oversee the Agency’s Special Investigation program.

³² Twenty of the 49 section 104(d) citations and orders were non-S&S and therefore did not meet the objective criteria in the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* to be reviewed as possible knowing and/or willful violations.

In each of the other five cases, the issuing inspector found that the violation was highly likely to result in a permanently disabling injury or illness and the negligence level was high. In each case, the SSI rejected the recommendations of the inspectors, supervisors, and the ADM-Enforcement, and the District 4 Manager concurred with the SSI. The special investigation files provided by District 4 did not contain required memoranda detailing the reasons for not conducting the investigations.

An example of an order designated by the SSI for no further action is a section 104(d)(2) order issued July 9, 2009, for a violation of 30 CFR 75.400, which reads as follows:

The operator is failing to properly maintain the 029 – 040 MMU section. Loose coal has been allowed to accumulate in several locations of the section. The No. 4 entry has coal measuring 1 inch to 24 inches deep for a distance of 112 feet on both ribs and the roadway. The 3 right cross-cut has coal accumulations measuring 1 inch to 24 inches deep on both ribs and the roadway. The 2 left cross-cut has coal accumulations measuring 1 inch to 15 inches deep on both ribs and the roadway for a distance of 40 feet.

With the citation issued on 7/08/2009 citing over 2% methane in the same location and the problems encountered today with excessive methane, the above conditions create a hazard.

This violation is an unwarrantable failure to comply with a mandatory standard.

The inspector found that the violation was highly likely to result in a permanently disabling injury or illness, the negligence level was high, and the violation affected ten persons. These facts were documented on the citation form and in the inspector's notes. The inspector's notes documented 2.90% methane detected in the No. 3 entry.

On July 8, 2009, another inspector's notes documented methane detected in four separate entries on the section. The inspector's methane readings ranged up to 2.35% in the No. 3 entry. The inspector's notes document that the Mine's preshift examiner recorded 0% methane. The inspector issued a section 104(a) citation under 30 CFR 75.325(b) for an inadequate quantity of air reaching the last open crosscut: 5,347 cfm instead of the required 9,000 cfm. The inspector's notes also document that the Operator was not able to establish the required 9,000 cfm of air during this shift.

On the PKW Form for the section 104(d)(2) order related to the coal accumulations, the SSI wrote that: "This condition does not meet the criteria for a 110 investigation. The condition existed for about 8 hours, and did not pose a high degree of risk." The SSI and the District 4 Manager recommended "no further action."

During his interview, the SSI stated that the SI workgroup lacked adequate staffing since January 2008 and that the personnel shortage still existed at the time of the interview in January 2011. The SSI explained that he was the only special investigator with credentials to conduct investigations from January 2008 until June 2008. He also indicated that, because of staffing limitations, the SI workgroup was not investigating some section 110 cases that appeared to have merit.

The District 4 Manager confirmed in his interview that there was a shortage of personnel within the SI workgroup. He stated that in order to complete mandatory mine inspections, SI personnel were assigned inspection duties during each fiscal quarter. This reassignment reduced the time available to conduct section 110(c) special investigations. However, District 4 SIs did investigate 35 section 105(c) miner discrimination cases during the review period. This was consistent with the instruction that special investigation resources be allocated to ensure timely initiation and completion of section 105(c) investigations.

Table 13 shows the breakdown of available time for the three full-time employees in the District 4 SI workgroup during the review period.

Table 13 - Available Time for Full-Time Employees in the SI Workgroup

SI Job	105(c) Hrs	110(c), 110(d) Hrs	Prelim. SI Hrs	Total SI Hrs	Total Regular Insp. Hrs	Total Other Enf. Hrs	Total Non-Enf. Hrs ¹	Total Available Hrs ²	Percent of Time Spent on SI Activity ¹	Percent of Time Spent on Regular Insp.
SSI	94	87	5	186	67	12	2,369	2,634	88%	3%
SI #1	544	1,359	101	2,004	201	35	547	2,787	72%	7%
SI #2	452	1,027	339	1,818	376	30	589	2,812	65%	13%

¹Includes supervisory hours

²Excludes leave

Conclusion: The decision not to pursue six section 110(c) investigations at UBB was driven by resource considerations rather than by the merits of the cases. The District 4 Special Investigations workgroup did not have sufficient staff to conduct a full range of investigations. This limited the District's ability to use all of the enforcement tools provided by the Mine Act. Moreover, the *Special Investigations Procedures Handbook* directed that the 35 section 105(c) discrimination complaints investigated during the review period be given resource priority over section 110(c) cases. Resource limitations also forced the District Manager to redirect SI personnel to assure that mandated inspections were completed.

Six section 104(d) citations and orders issued at UBB addressed conduct for which it would be appropriate to open section 110(c) Special Investigations, or at minimum to conduct Preliminary Special Investigations. However, the Special Investigations workgroup conducted only one Preliminary Special Investigation, and neither the SSI nor the District 4 Manager documented any recommendation for further action on the PKW Form. A special investigation was not pursued.

In the other five cases, the SSI disagreed with the inspectors' gravity determinations. The District 4 Manager concurred with the SSI's decision, and investigations were not conducted. The Internal Review team believes that sufficient evidence was provided to document a high degree of risk to miners for each of these violations. The issuing inspectors' notes combined with the *Condition or Practice* section of the orders supported the inspectors' gravity determinations. The supervisory special investigator did not properly document the reasons for not conducting the special investigations.

As three of the six section 104(d) citations and orders also met the criteria for evaluation as potentially flagrant violations, District 4 did not take advantage of opportunities to apply two separate elevated enforcement tools to address three serious violations at UBB.

The sections of the *Program Policy Manual* and the *Special Investigations Procedures Handbook* regarding those citations and orders that must be reviewed to determine if they are possible knowing and/or willful violations are inconsistent with the corresponding provisions of the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*. Furthermore, the instructions for completing MSHA Form 7000-20 are contained in the *Special Investigations Procedures Handbook*. This Handbook is not a resource inspectors are expected to consult in the course of their duties.

Corrective Actions Taken: Since the explosion, Coal increased its overall SI staff from 44 to 49 persons (from 11 SSI positions, 16 SI positions, and 17 collateral duty SI positions to 12 SSI positions, 15 SI positions, and 22 collateral duty SI positions by the end of 2011).

Recommendations: The Administrator for Coal should consult with district managers to determine whether the additional staffing is sufficient to address section 110(c) special investigation demands, particularly at highly noncompliant mines.

The Administrators for Coal and Metal and Nonmetal, the Director of OAASEI, and the Director of PEIR should collaborate in developing a management tool to monitor the resources districts devote to special investigations.

The Administrator for Coal should direct the District 4 and District 12 managers to require their SSIs to prepare and maintain a memorandum detailing the reasons for not conducting a special investigation in

cases where the district manager decides to take no further action, in accordance with the *Special Investigations Procedures Handbook*.

The Administrators for Coal and Metal and Nonmetal and the Director of OAASEI should revise the *Program Policy Manual* and the *Special Investigations Procedures Handbook* to be consistent with the procedures and instructions contained in the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* pertaining to possible knowing and/or willful violation reviews. Instructions for completing MSHA Form 7000-20 should be included in the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*.

Alternative Case Resolution

MSHA developed the Alternative Case Resolution (ACR) program in 1994 with the Department of Labor Office of the Solicitor (SOL) to address mine operator requests for resolution of issues associated with MSHA citations and orders. The ACR program affords mine operators the opportunity to request safety and health conferences under 30 CFR 100.6 to informally address aspects of MSHA citations and orders, including gravity and negligence designations. Conference Litigation Representatives (CLRs) are trained to represent the Secretary of Labor in safety and health conferences.

Mine operators also are entitled to formally contest MSHA enforcement actions before the Federal Mine Safety and Health Review Commission (Commission). All CLRs are trained to perform contested case work prior to a hearing. Before 1994, cases were litigated solely by SOL attorneys. Since that time, some CLRs have also been trained and certified to appear before the Commission.

Requirements: In accordance with section 105(a) of the Mine Act, 30 CFR 100.7(b) established the timing and process for a party to formally contest a violation. The regulation stated:

Upon receipt of the notice of proposed penalty, the party charged shall have 30 days to...[n]otify MSHA in writing of the intention to contest the proposed penalty. When MSHA receives the notice of contest, it advises the Federal Mine Safety and Health Review Commission (Commission) of such notice.

In pertinent part, 30 CFR 100.6(a) stated: “[I]t is within the sole discretion of MSHA to grant a request for a conference and to determine the nature of the conference.”

MSHA Policies and Procedures: *The Alternative Case Resolution Handbook*, AH08-III-3, revised March 2008, contained detailed procedures for CLRs to follow when processing contested violations.

Procedure Instruction Letter No. 08-III-01, issued on February 4, 2008, addressed the district managers’ broad discretion to limit the nature and number of safety and health conferences and provided that safety and health conferences may be limited to unwarrantable failure and high negligence violations. Conferences for all other violations were to be held at the district managers’ discretion and conducted by CLRs or other MSHA personnel assigned to conduct safety and health conferences. The PIL also provided that conference requests that had been already granted and did not involve unwarrantable failure and high negligence violations should be cancelled.

Procedure Instruction Letter No. 109-III-3, issued on March 27, 2009, superseded *PIL No. 108-III-01*. The later PIL stated that, while district managers have ultimate discretion, safety and health conferences generally should be held after MSHA has proposed penalties for the underlying violations, so that facts related to the violations and the proposed penalties might be resolved during a single conference. The PIL instructed CLRs to request a 90-day extension for filing Petitions for Assessment of Civil Penalty with the Commission. During the 90-day period, CLRs were instructed to attempt to settle all aspects of the dispute with the operator and to file the necessary settlement documentation requesting Commission settlement approval, if the parties reached a resolution.

CLR Case Management

Statement of Facts: After March 18, 2008, Performance Coal Company did not request safety and health conferences for any violations cited at UBB. Thus, District 4 CLRs did not conduct conferences concerning UBB violations cited during the review period.

However, six dockets (cases) involving 23 contested violations cited at UBB were processed by District 4 CLRs during the review period. The Internal Review team examined the six cases and found that they were processed in accordance with MSHA contested case procedures contained in the *Alternative Case Resolution Handbook*. Moreover, the settlements were consistent with Agency policies and procedures.

Three other cases involving 19 violations cited at another mine were reviewed for control and comparison purposes. The Internal Review team found that District 4 CLRs also processed these cases in accordance with Agency policy and procedures.

Conclusion: District 4 CLRs followed MSHA policies and procedures in handling the six UBB cases during the review period.

Recommendations: None

Backlog of Contested Cases

Statement of Facts: The percentage of violations contested by coal mine operators increased from 9% in calendar year 2006 to 31% in 2010, prior to the explosion. In District 4, the contest rate rose from 14% to 41%. During this period, Massey's contest rate rose from 29% to 37% and UBB's from 21% to 41%. Table 14 depicts the escalation in the rate of contested violations.

Table 14 - Percentage of Violations Contested

Calendar Year Cited	All Coal Mines	District 4	Massey Energy Company	UBB
2006	9%	14%	29%	21%
2007	26%	38%	45%	41%
2008	28%	34%	35%	48%
2009	32%	41%	35%	35%
2010*	31%	41%	37%	41%

Excludes miner and contractor violations

*As of April 5, 2010

Operators were even more likely to contest violations with relatively high proposed penalties. The percentage of proposed penalty dollars contested by coal mine operators increased from 46% in 2006 to 71% in 2010, prior to the explosion. In District 4, the contest rate rose from 53% to 79%. During this period, Massey's contest rate rose from 66% to 83% and UBB's from 76% to 92%. Table 15 depicts the escalation in the percentage of proposed penalties contested.

Table 15 - Percentage of Proposed Penalty Dollars Contested

Calendar Year Cited	All Coal Mines	District 4	Massey Energy Company	UBB
2006	46%	53%	66%	76%
2007	72%	81%	87%	79%
2008	70%	76%	81%	82%
2009	71%	78%	76%	67%
2010*	71%	79%	83%	92%

Excludes miner and contractor violations

*As of April 5, 2010

The Internal Review team identified the following factors that may have contributed to the increase in contested violations:

- On April 23, 2007, MSHA issued a final rule revising its existing civil penalty assessment regulations and implementing the civil penalty provisions of the Mine Improvement and New Emergency Response (MINER) Act of 2006. The rule increased civil penalties for Mine Act violations. In accordance with the rule, MSHA's proposed penalties for coal mine operators increased 260% from about \$30 million in calendar year 2006 to more than \$108 million in calendar year 2010.
- The total number of citations and orders issued to coal mine operators increased 25% from approximately 77,600 in calendar year 2006 to approximately 97,000 in calendar year 2010.
- MSHA formally began to exercise its Pattern of Violations (POV) authority under section 104(e) of the Mine Act. In the spring of 2007, MSHA conducted the first formal screening to identify mines with a potential POV. As of January 2012, MSHA had conducted a total of 7 screenings and issued 94 potential POV notices to 80 mine operators. Ultimately, 2 of the 80 coal mine operators were issued POV Notices.³³ Since the current screening criteria rely on final S&S violations, operators may have additional incentive to challenge these types of violations and avoid the POV process. Further discussion of POV is contained in the "Section 104(e) Pattern of Violations" section of this report.
- *PIL No. 08-III-01*, issued on February 4, 2008, recognized district managers' discretion to limit the violations subject to conferencing to effectively manage the increasing number of requests for safety and health conferences. However, limiting operators' ability to informally resolve issues associated with violations may have resulted in an additional number of violations going through the contested case process.

In response to the increased number of contested violations, MSHA and SOL developed procedures to divide responsibility for handling contested cases between CLRs and SOL. SOL generally was tasked with litigating significant enforcement actions – including cases involving accident-related violations, flagrant violations, pattern of violations, and statutory violations, while MSHA CLRs were assigned to handle a significant number (approximately 96%) of the remaining enforcement actions. Despite the increased number of contested violations, the District 4 CLR staff remained at three from 2006 until the time of the explosion.

In addition, MSHA issued *PIL No. 109-III-03*, which was intended to allow resolution of the facts related to the violations and the proposed penalties during a single "enhanced" conference. However, the PIL, which directed CLRs to request a 90-day extension for filing a formal Petition, had the unintended consequence of creating additional work for CLRs. By 2007, there was a significant backlog of contested cases pending before the Commission. The number of violations contested by coal mine operators in District 4 pending before the Commission rose from 339 in January 2006 to 19,618 by April 2010. Nationally, pending contested violations for all coal mine operators rose from 2,181 in January 2006 to 58,157 by April 2010. During this period, sufficient resources were not available to MSHA, SOL, or the Commission to keep pace with the rising number of contests.

During that time, CLRs generally managed the backlog by addressing cases in chronological order, thus prioritizing older matters. However, with the implementation of the enhanced conferencing process, the more recently contested cases were addressed first to meet the 90-day deadline for settlement. With limited resources, CLRs were not able to simultaneously handle both the 90-day cases and the older cases in a timely manner. This often prompted orders from Commission Administrative Law Judges mandating CLRs attempt to resolve the older cases within timeframes specified in the orders. As a result, CLRs

³³ An additional POV notice was issued to a mine in 2008, but it was vacated by the Commission after the operator requested a hearing and successfully challenged a sufficient number of predicate S&S violations.

were unable to consistently address either category of contested cases, and additional delays resulted from the inherent inefficiency.

During an interview, the District 4 Supervisory CLR stated that these procedures caused extra work, did not streamline the contested case process, and caused confusion. He stated the procedures might have worked if adequate staff were available but that the enhanced conferencing process was based on a mistaken assumption that resources were available to implement the changes. He further stated that the number of CLRs in place in District 4 was not sufficient to effectively manage and process the increased volume of contested cases.

The following charts depict the growing number of violations in District 4 and in all Coal districts awaiting resolution before the Commission by April 2010, the month of the UBB explosion. During the review period, the number of contested violations had nearly doubled from approximately 10,000 violations to approximately 20,000 violations, as shown in Figure 5. As shown in Figure 6, a similar pattern existed in all Coal districts. CLRs handled the vast majority of these violations, yet CLR staffing in District 4 did not increase.

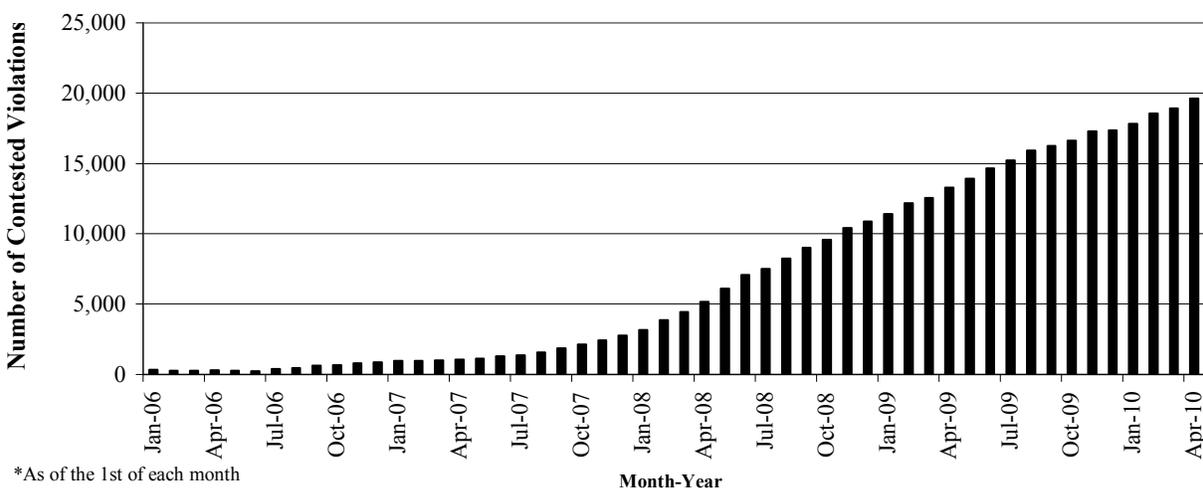


Figure 5 - District 4 - Number of Contested Violations, January 2006 - April 2010

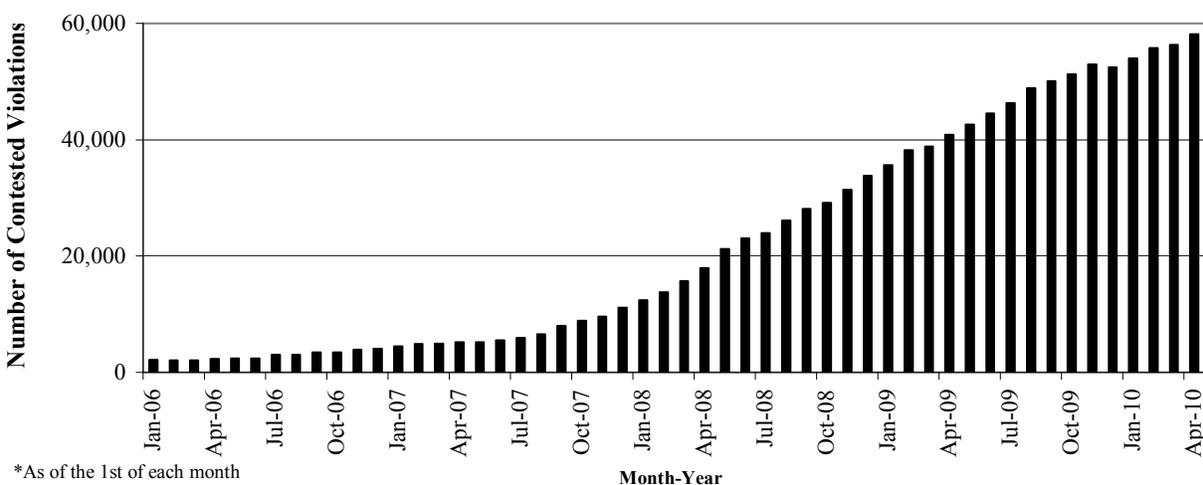


Figure 6 - All Coal - Number of Contested Violations, January 2006 - April 2010

The number of violations cited at UBB awaiting resolution before the Commission, and the associated proposed penalties, increased significantly in the two years preceding the April 5 explosion. Figure 7 depicts the growth in contested, pending UBB violations and the associated proposed penalties.

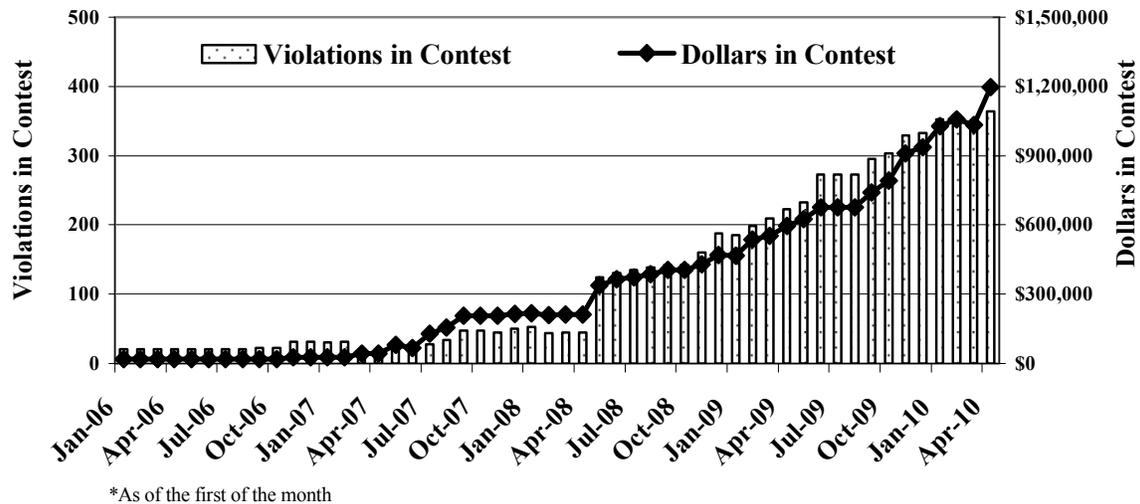


Figure 7 - UBB Pending Contested Violations and Dollars by Month

During the 18-month review period, Performance Coal Company paid \$239,907 in civil penalties for 353 violations cited at UBB. However, 366 violations cited at UBB totaling nearly \$1.2 million in proposed penalties were pending before the Commission on the day of the explosion. This included violations cited as far back as June 2006.

On April 5, 2010, 33.7% of the coal mine contested case backlog was in District 4, while the District had approximately 10% of the 29 CLRs in all Coal districts. During the review period, more contested dockets and violations were resolved in District 4 than any other district. District 4 received Administrative Law Judge decisions approving settlement for 711 contested case dockets that contained 4,529 violations. Even with this level of output, the number of new contested case dockets exceeded the number resolved.

With insufficient resources to accomplish all of the work, District 4 CLRs had to prioritize their tasks. CLRs chose to devote their time to the most imminent matters, such as pre-hearing orders from Administrative Law Judges. Other requisite duties, such as filing Petitions for Assessment of Civil Penalty, were postponed. Thus, Notices of Contest accumulated, and some Petitions were not timely filed.

District 4 CLRs stated in their interviews, and provided supporting documentation, that the District 4 Manager was kept informed about the need for additional resources to handle the growing number of contested cases. However, adequate resources were not available for the District 4 CLR program to manage the increased workload.

Conclusion: Coal mine operators, including those in District 4, contested an increased number and percentage of violations after 2006. District 4 lacked the resources needed to fully address the increasing contested case workload while simultaneously performing other functions essential to the administration of the Mine Act.

During the review period, the average time to resolve contested cases significantly increased, thus delaying final assessment and payment of civil penalties. Many contested violations remained unresolved years after the underlying violations were cited. As the Senate Committee on Human Resources noted in a 1977 report, a reasonably close proximity in time between the occurrence of a violation and the payment of civil penalties is necessary to constitute an effective inducement to compliance with the Mine Act.³⁴

The Internal Review team did not find any evidence that the backlog of contested violations had a negative effect on the manner in which District 4 personnel conducted inspections and cited violations at

³⁴ Report of the Committee on Human Resources, Report No. 95-181, US Senate (95th Congress, May 16, 1977), pg. 15-16 (Legislative History of the Mine Act, pg. 603-04).

UBB. However, the delay impeded MSHA's ability to use all of its elevated enforcement authority, such as pattern of violations, against non-compliant and unsafe operations.

Corrective Actions Taken: On July 29, 2010, Congress appropriated \$18.2 million to the Department of Labor to be used for one year from the date of enactment to reduce the backlog of contested cases before the Commission and to offset costs associated with the UBB investigation. On September 7, 2010, DOL and the Commission entered into a joint operating plan to address the case backlog. As part of the plan, SOL and MSHA created five regional SOL backlog offices to handle approximately 66,000 citations that were contested by both Coal and Metal and Nonmetal operators between October 1, 2007, and February 28, 2010 (called the "targeted backlog"). The plan later was amended so that the funds also could be used for non-targeted backlog cases, which are those cases filed before October 1, 2007, and after February 28, 2010. Congress provided funding to continue the project through the end of fiscal 2011, and also appropriated funding to continue the project through fiscal 2012.

Using Congressionally-appropriated funds, MSHA, SOL, and the Commission made substantial progress to reduce the targeted backlog. The targeted backlog declined from approximately 66,000 violations to approximately 15,000 violations as of November 30, 2011. In addition, the trend of the growing caseload has been reversed, and from April 2011 through November 2011, the total case inventory has continued to drop. As of November 30, 2011, the total case inventory had dropped from a peak of approximately 89,000 in December 2010 to approximately 66,500.

In addition to the targeted backlog effort, MSHA has taken other actions, both independently and in conjunction with SOL, to address the total volume of contested cases. For example, MSHA and SOL have provided CLR's additional training, materials, and assistance to more efficiently and effectively manage their significant caseloads, including annual CLR training in March 2011 and training for new CLR's in November 2011. Also, the Agency divided District 4 into two districts, which more than doubled the CLR staff in southern West Virginia. Nationally, as of January 2012, 50 CLR's were assigned to the 12 Coal districts, 31 of which were full-time CLR's. This increased the number of full-time CLR's since the time of the explosion by two. Three technical specialists were also assigned to help CLR's prepare the technical aspects of contested cases.

In August 2010, MSHA launched a 90-day pilot program in Coal Districts 2 and 6 and the Metal and Nonmetal Southeastern District aimed at providing operators the opportunity to request pre-assessment conferences for all violations. The conference procedures used in the pilot program were based on the MSHA safety and health conference criteria in effect prior to the changes implemented in 2008. The Assistant Secretary directed PEIR to conduct an evaluation of the pilot program, which showed that pre-assessment conferences have the potential to reduce the number of contested violations by 17%.

Based on the results of the study, the Assistant Secretary directed that MSHA Districts could begin to implement new pre-assessment conferencing procedures in January 2012. Under the procedures in most MSHA districts, a mine operator and miners' representative may request a conference regarding a contested citation or order before MSHA proposes a penalty assessment. This new conferencing process should help reduce the backlog of cases before the Commission by resolving disputes without resorting to litigation.

On two occasions in 2011, MSHA committed extra staff to file late petitions, primarily those in Districts 4 and 12. Also on September 19, 2011, the Assistant Secretary sent a Memorandum to the Administrators for Coal and Metal and Nonmetal instructing them to inform District Managers that all petitions in contested cases must be filed within 45 days, in accordance with the Commission's rule. The Memorandum also put in place a process for ensuring that petitions were filed timely.

In September 2011, MSHA held a District Manager's meeting at the National Mine Health and Safety Academy where SOL delivered a presentation on global and holistic settlements. At the meeting, the District Managers were encouraged to identify violations that were amenable to global settlements, and to enter into those settlements. In addition, MSHA organized a task force to identify violations (and operators) for holistic settlements. The mission of this task force has expanded, and in addition to identifying holistic (and, in some cases, global) settlements, this group is reallocating contested cases

among the Districts, Backlog Attorneys, and the Regional Solicitors to more effectively distribute the workload among and between CLRs and SOL attorneys.

During October and November 2011, two attorneys from the Backlog Project and a former experienced CLR met with Districts 4 and 12 to assess the CLR program in each of those districts, as well as to provide training, support, and guidance to the CLRs and clerical staff in those districts.

In December 2011, Alpha Natural Resources Inc. (Alpha), which acquired Massey after the explosion, agreed to make payment for pending violations and associated assessments for conditions that existed and conduct that occurred at former Massey mines. This formed part of the \$209 million settlement reached on December 6, 2011, with the U.S. Attorney's Office for the Southern District of West Virginia and the U.S. Department of Justice. The settlement, which involves Alpha making a number of health and safety improvements, contains Alpha's agreement to withdraw its contest of approximately 6,500 violations, or almost 10% of the total backlog of contested violations, and its contest of the accompanying proposed penalty assessments calculated at \$19,855,483. In addition, Alpha agreed not to contest proposed penalties of up to \$1,250,000 for approximately 100 violations that had been issued to the former Massey mines, but which had not been assessed, when the settlement was executed.

Recommendations: None.

Enforcement of Specific Provisions and Standards – Contributory Violations

This section addresses the enforcement of Mine Act provisions and mandatory safety standards associated with advance notice of inspections, training of miners, compliance with the approved roof control plan, mine examinations, correcting hazardous conditions, compliance with the approved ventilation plan, accumulations of combustible materials, incombustible content of rock dust, and maintenance and operation of equipment. The MSHA Accident Investigation team determined that violations of these provisions and mandatory safety standards contributed to the cause and severity of the fatal explosion.

Enforcement of Section 103(a) of the Mine Act

Advance Notice as Interference with an Inspection

Requirements: Section 103(a) of the Mine Act required authorized representatives to make frequent inspections and investigations in mines. In part, the section stated: "In carrying out the requirements of this subsection, no advance notice of an inspection shall be provided to any person, except that in carrying out the requirements of clauses (1) and (2) of this subsection, the Secretary of Health [and Human Services] may give advance notice of inspections." The exceptions included accident investigations and gathering information with respect to mandatory health and safety standards. An operator may be assessed a civil penalty under section 110(a) of the Mine Act for violating any provision of the Mine Act, including section 103(a).

Section 108(a)(1)(B) of the Mine Act authorized the Secretary of Labor to initiate a civil action in a United States District Court for relief, including a permanent or temporary injunction, a restraining order, or other appropriate order, for operator actions that interfere with, hinder, or delay MSHA's ability to carry out the provisions of the Mine Act.

Section 110(e) of the Mine Act established criminal penalties for any person who gives advance notice of any inspection to be conducted under the Mine Act.

MSHA Policies and Procedures: The MSHA *Program Policy Manual* stated: "Section 103(a) of the Act prohibits giving advance notice of inspections conducted by an authorized representative of the Secretary of Labor." It also states: "Any information relating to inspection and investigation schedules, including an inspector's mine assignments, shall be restricted solely to MSHA personnel who have need of such knowledge."

The *Special Investigations Procedures Handbook*, PH05-I-4, August 2005, stated in pertinent part that a district manager may request an action for injunctive relief when “an operator ... gives advance notice of MSHA’s presence on mine property to outlying surface and underground facilities with the intent to impede an investigation/inspection.”

Statement of Facts: The MSHA Accident Investigation team determined that the Operator engaged in a regular practice of providing advance notice to persons underground that an inspector was present on the surface. This advance notice prevented MSHA inspectors from observing actual conditions to which miners were being exposed. Unannounced inspections are a key part of MSHA’s effort to identify unsafe and unhealthy conditions in mines. By providing advanced notice of inspections, the Operator interfered with inspectors in their attempts to inspect the Mine. The Accident Investigation team issued a section 104(a) citation (No. 8431853) for the Operator’s failure to comply with section 103(a) of the Mine Act.

Many people provided testimony to the Accident Investigation team regarding advance notice of inspections at UBB. Miners, dispatchers, and security personnel provided details of how miners underground were notified of an inspector on the Mine property and the measures taken to alter conditions and fix hazards before the inspector arrived at the working sections.³⁵

The Accident Investigation report stated ventilation changes were made in advance of the inspector’s arrival on the section, redirecting air from one area in the Mine and sending it to the section where the inspector was headed. Testimony provided during a subsequent criminal proceeding showed that Performance Coal Company officials intentionally hid or corrected hazardous conditions and applied rock dust to areas in the Mine as MSHA inspectors traveled to inspect those areas. In some cases, when miners were unable to timely correct hazards, the foreman shut down the working section. As a result, the MSHA inspector would not observe safety and/or health violations during production operations. The Accident Investigation team determined that, by providing advance notice of inspection, the Operator limited inspectors’ ability to observe the manner in which the Mine typically was operated.

During an interview with the Internal Review team, an MSHA employee, who formerly was employed as a contract security officer at UBB, stated that, when at UBB, he was instructed to use the mine phone to announce every person who came on Mine property and their affiliation. When asked if he would do that in the presence of MSHA inspectors, he stated he would wait until the inspectors had passed through the gate. An MSHA inspector, who formerly was a Massey employee, stated that, based on his experience, it was a general practice for Massey subsidiaries to announce the presence of MSHA inspectors on mine property.

While four inspectors who were interviewed stated they had reason to suspect that guards were announcing their arrivals on Mine property, only two inspectors stated they actually heard a guard announce MSHA’s presence at UBB.³⁶ One of these inspectors was reviewing mine examination record books when he heard a guard announce that an MSHA inspector was at the Mine over a CB radio -- “MSHA on property.” The inspector presumed that the announcement referred to another MSHA inspector who had more recently arrived to inspect surface mining areas. The inspector did not consider enforcement action because an MSHA specialist also heard the communication, and the specialist notified District 4 supervisors. However, the inspector and the specialist told a guard he was not allowed to notify mine personnel of MSHA’s presence at the Mine. When asked whether he had gotten instruction from District 4 supervisory personnel about actions that constitute advance notice, the inspector stated he was informed that advance notice was a violation of the Mine Act but that whether an operator’s actions constituted advance notice often depended on facts specific to the situation. A second inspector stated

³⁵ Performance employees acknowledged these actions months after the explosion, and the Internal Review team recognizes that these individuals likely would have been far less willing to acknowledge these communications prior to the explosion.

³⁶ A number of inspectors also stated they either suspected or experienced similar activity at other mines they had inspected.

that he had heard UBB personnel generally announce “federal inspector on mine property,” but he was not asked directly, and he did not state, whether he had taken any action in response to the announcement.

Five inspectors stated they had reason to suspect that UBB personnel were communicating with miners underground to provide warning of impending MSHA inspection activities. However, none of the inspectors issued a citation under section 103(a) for advance notice of an inspection activity.

District 4 efforts to detect, document, and cite advance notice appear consistent with enforcement practices in other district offices. Nationwide, during the review period, MSHA cited coal mine operators three times for violations of section 103(a) of the Mine Act in situations where mine operators provided advance notice of an MSHA inspection. None of these were issued by District 4 inspectors. During the five years prior to the explosion, MSHA issued eleven citations pursuant to section 103(a) in situations where mine operators provided advance notice of an MSHA inspection. In as many as 10 of these cases, the operator was explicitly instructed to refrain from providing advance notice of the inspection before the citation was issued.

Section 103(a) of the Mine Act and related policy direct MSHA personnel not to provide advance notice of inspections. The phrase preceding the advance notice prohibition in section 103(a), “[i]n carrying out the requirements of this subsection,” unequivocally applies to the Secretaries’ authorized representatives who conduct inspections and investigations pursuant to section 103(a)(3) and (4). However, MSHA policy in the *Program Policy Manual* does not explain how section 103(a) is to be applied to persons, such as guards and surface personnel, who are not “carrying out” inspections, does not detail specific operator actions that constitute advance notice, and does not address the broader application of section 110(e). Furthermore, MSHA policy and procedures did not explicitly direct inspectors to attempt to determine whether an operator’s personnel engage in such practices during their inspections.

Conclusion: MSHA inspection policy addressed actions that MSHA personnel should take to avoid providing advance notice. However, MSHA inspection policy provided no guidance concerning specific operator actions that constitute a violation of section 103(a) of the Mine Act.

Corrective Actions Taken: On August 26, 2010, MSHA issued *PIB No. P10-15* to remind mine operators, miners’ representatives, MSHA personnel, and other interested persons that section 103(a) of the Mine Act prohibits an operator from providing advance notice of MSHA inspection activity. The PIB also addressed potential criminal sanctions and section 110(c) civil sanctions for persons providing advance notice of MSHA inspections.

On October 20, 2010, the Administrator for Coal issued *PIL No. I10-V-18* authorizing a District Manager to permit an inspector to refuse to be tracked electronically while inspecting underground portions of a mine in order to achieve important inspection objectives that may be compromised by electronic tracking of the inspection party.

Recommendations: The Administrators for Coal and Metal and Nonmetal should consult with the Office of the Solicitor, Mine Safety and Health Division, to revise the *Program Policy Manual* to address actions by operators, their agents, or their employees that constitute advance notice of inspections for the purposes of section 103(a). The Manual explicitly should instruct that section 103(a) is violated when an operator impedes an inspection by giving advance notice of MSHA’s presence on mine property to outlying surface and underground facilities, regardless of whether the inspection already has commenced or whether the inspector explicitly has warned the operator against providing such notice.

The Administrators for Coal and Metal and Nonmetal should direct the revision of their general inspection procedures handbooks to be consistent with the recommended revisions of the *Program Policy Manual* regarding enforcement of section 103(a).

Enforcement of 30 CFR 48.3

Training Plans

Requirements: Section 104(g)(1) of the Mine Act required any miner who has not received required training as determined under section 115 of the Mine Act to be immediately withdrawn from the mine until such miner has received the required training. Section 115(a) of the Mine Act required each operator of a coal or other mine to have a health and safety training program that is approved by MSHA.

Training for miners was required under 30 CFR Part 48. Under 30 CFR 48.3(a), mine operators were required to have an MSHA-approved plan containing programs for training new miners, training experienced miners, training miners for new tasks, annual refresher training, and hazard training for miners. Requirements for experienced miner training, task training and annual retraining were specified in 30 CFR 48.6, 48.7, and 48.8, respectively. Records of training were addressed in 30 CFR 48.9.

Under 30 CFR 48.3(c)(3), training plans must contain a list of MSHA-approved instructors with whom the operator proposes to make arrangements to teach the courses.

Mandatory safety standard 30 CFR 75.338(a) specifies training certified persons must receive to conduct sampling of the atmosphere behind seals. This training must be completed before they conduct sampling and annually thereafter. The mine operator must certify the date of training provided to certified persons.

Mandatory safety standard 30 CFR 75.350(b)(2) requires miners to be trained annually in the basic operating principles of the Atmospheric Monitoring System (AMS). This training must be conducted prior to working underground in a mine that uses belt air to ventilate working sections. It must be conducted as part of a miner's 30 CFR Part 48 new miner training (30 CFR 48.5), experienced miner training (30 CFR 48.6), or annual refresher training (30 CFR 48.8).

Mandatory safety standards at 30 CFR 75.1501 and its subparagraphs specify training and training record requirements for responsible persons.

MSHA Policies and Procedures: The MSHA *Program Policy Manual* and the *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* provided that, for underground mines, 30 CFR paragraphs 48.5, 48.6, 48.7, 48.8, and 48.11 are the only standards which may be cited under 104(g)(1) for untrained miners.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* required inspectors to examine training records of miners during each regular inspection.

The *Education and Training Procedures Handbook* (Handbook Number PH03-III-1) stated "As resources permit, EFS and the Districts should monitor as many MSHA approved instructors and competent persons as feasible. Monitoring provides the opportunity to help with training materials; to enhance skills, knowledge, and abilities; and make recommendations." The Handbook further listed several criteria to observe while monitoring instructors.

CMS&H Memo No. HQ-08-055-A, entitled *Corrective Measures for Inspection and Investigation Activities Related to Roof Control Plans and Related Miner Training*, was issued June 3, 2008, as a corrective action to address an issue related to the 2007 Crandall Canyon mine disaster. One provision of the memo directed inspectors to "question the miners to determine whether their training with respect to the roof control plans is completed and is adequate, focusing especially on training with respect to retreat mining activities." The memo requires the inspectors to document the information derived from the miners.

Procedure Instruction Letter No. I08-V-8, effective December 19, 2008, directed inspectors to confirm that the certified persons conducting sampling of the atmosphere of sealed areas have been trained in the use of the sampling equipment and sampling procedures and to check the required training records and certifications under 30 CFR 75.338. This PIL has not been incorporated in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*.

Statement of Facts: The MSHA Accident Investigation team determined that Performance Coal Company failed to comply with the approved underground mine training plan in effect at UBB. They determined that:

- Approximately 112 miners either did not receive experienced miner training or that the experienced miner training they received was incomplete;
- Approximately 42 miners did not receive required task training;
- Approximately 21 miners did not receive required annual refresher training; and
- Approximately 22 miners received experienced miner training from individuals who were not MSHA-approved instructors.

The Accident Investigation team determined that the underground conditions at the Mine, including the extensive accumulations of loose coal, coal dust, and float coal dust, the lack of adequate rock dusting, and the poor condition of the longwall shearer, were present in part because the Operator failed to provide adequate training on identifying and correcting these hazardous conditions. The Accident Investigation team issued section 104(d)(2) Order No. 8256726 for this unwarrantable failure to comply with 30 CFR 48.3. The Accident Investigation team also determined this violation contributed to the deaths of the 29 miners at UBB. The Accident Investigation team did not cite any non-contributory violations of this standard.

In most cases, operator training plans address the training requirements of the Mine Act and its implementing regulations. This is evidenced by the few violations cited for inadequate training plans. Nationally, coal mine inspectors issued eight citations and orders for violations of 30 CFR 48.3 or 48.3(a) during the review period. District 4 personnel issued one section 104(d)(2) order for a violation of 30 CFR 48.3 at UBB and one section 104(a) citation for a violation of 30 CFR 48.3(a) at another mine during the review period. Because operator training plans historically have been adequate, inspectors have focused on whether training has been completed as required.

Mine operators are responsible for providing the required training to the appropriate personnel. It is MSHA's duty to review training plans and to inspect mines to determine if the operators are complying with the Mine Act and its implementing regulations. The Internal Review team identified deficiencies in District 4's enforcement regarding the Operator's compliance with its approved training plan.

Training Plan Review

The training plan in effect for UBB at the time of the explosion was approved by the District 4 Manager on March 29, 2007. Thereafter, the District 4 Manager approved all supplements submitted by the Operator for the UBB training plan.

A plan supplement approved on September 24, 2009, addressed training for miners in the Atmospheric Monitoring System (AMS) used at the Mine. In addition to reviewing the supplement, District 4 reviewed the entire UBB training plan for adequacy. The District found deficiencies in previously approved portions of the plan, and on September 25, 2009, sent a letter to the Operator stating that:

- The Training Plan Cover Sheet was not adequately updated and did not include each instructor's MSHA Individual Identification Number (MIIN).
- Sections 48.7 and 48.27 of the base plan were not adequately updated.

The letter required the Operator to submit updated information within 10 days from receipt.

District 4 correctly identified these deficiencies and properly notified the Operator. However, as of April 5, 2010, the Operator had not submitted the information as required. When asked why District 4 had not followed up, the then-District 4 Staff Assistant, who was responsible for the oversight of training plans, stated he did not know.

At the time of the explosion, UBB was operating pursuant to a section 101(c) Petition for Modification, Docket No. M-95-101-C, which provided stipulations to permit mining through oil and gas wells.³⁷ MSHA granted this Petition on October 16, 1995. Item (t) on pages 7 and 8 of the granted Petition required the Operator to submit, within 60 days after the Proposed Decision and Order became final, revisions for their approved 30 CFR Part 48 training plan to the District Manager. The proposed revisions were to include initial and refresher training requirements regarding compliance with the terms and conditions stated in the Petition. These revisions never were submitted and were not a part of the training plan when the explosion occurred.

Miner Training Issues

Inspectors examined the miners' training records at UBB during all six regular inspections of the review period. They issued one citation and three orders addressing training deficiencies. One order was issued during the first regular inspection for fiscal 2009, and the citation and two orders were issued during the fourth regular inspection for fiscal 2009. Table 16 details the training citation and orders.

Table 16 - Training Violations Cited at UBB (October 1, 2008 – April 5, 2010)

Citation/Order Number	Type of Issuance	30 CFR	Date Issued
8069177	104(g)(1) Order	48.9(a)	12/23/2008
8090961	104(d)(2) Order	48.3	09/24/2009
8090962	104(g)(1) Order	75.350(b)(2)	09/24/2009
8090963	104(a) Citation	48.9	09/28/2009

During a regular inspection, procedures require inspectors to determine if miners are trained. Procedures, however, are not specific on how many of the miners' training records are required to be examined. Interviews with District 4 personnel who inspected UBB's training program during the review period revealed that one inspector checked all the training records during one of the two times he inspected the records. Others stated that they examined a representative number of the training records. However, even when inspection procedures were followed, inspectors did not identify that some of the miners at UBB had received experienced miner training from nine non-MSHA approved instructors, or that more than 100 miners were untrained or inadequately trained. The Internal Review team recognizes that a thorough review of training records for a large mine is a time-consuming exercise that requires specialized knowledge of training requirements. Indeed, while some violations should have been apparent to inspectors, an MSHA Educational Field Services (EFS) training specialist assigned to the Accident Investigation team identified the full extent of these training violations after an exhaustive review of the Operator's training records.

District 4 inspectors also did not identify that many miners were inadequately trained. The Accident Investigation team determined that two independent contractors who trained and provided contract miners to work at the Mine did not conduct the training according to the approved training plan. The independent contractors did not have copies of or provide training on:

- Mine Ventilation Plans
- Roof Control Plans
- Clean Up/Rock Dusting Plans
- Mine Maps
- Mine Transportation and Communications
- Health and Safety of the Task to which the New Miner would be Assigned
- Escapeway Maps
- First Aid Manuals or Equipment

³⁷ A granted 101(c) petition for modification remains in effect at the subject mine until it is either withdrawn by the operator or revoked by MSHA. A granted petition has the same effect as a mandatory safety standard at the subject mine. The *Citation and Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines* provides that when a violation of one or more of the conditions specified in granted petitions for modification is found, the inspector shall cite the safety standard for which the petition for modification was granted.

One of the contractors also did not have any training models of the CSE SR 100 self-contained self-rescuer. The training plan required hands-on training with this type of self-rescuer.

District 4 inspectors did not have the opportunity to determine that the independent contractors did not provide adequate training. There is no requirement that MSHA inspectors monitor operator training classes. While the *Education and Training Procedures Handbook* suggests that monitoring should be conducted on a discretionary basis, it also recognizes that resource constraints limit the ability to monitor operator training. District 4 personnel, during interviews, stated that they do not monitor training classes due to the time constraints of ensuring that regular inspections are completed. Interviews with EFS personnel revealed that they occasionally monitor training classes, but only a very small percentage.

On December 23, 2008, an inspector issued a section 104(g)(1) order because current certificates of training could not be found for 10 of the employees at UBB. The standard cited, 30 CFR 48.9(a), requires operators to record and certify that training has been conducted, and to make such training records available for inspection. Because section 48.9(a) is a record-keeping standard, the inspector appropriately identified a violation. However, this order conflicted with MSHA policy concerning the issuance of section 104(g)(1) orders for underground mines, which is that 30 CFR 48.5, 48.6, 48.7, 48.8, and 48.11 are the only standards which may be cited under 104(g)(1) for untrained miners.

On September 24, 2009, an inspector issued a section 104(d)(2) order under 30 CFR 48.3 for the Operator failing to provide AMS training to 36 miners working on the longwall and 4 AMS operators working on the surface. Miners were ordered to withdraw from the Mine until the training plan was updated and training was provided. To abate the 104(d)(2) order, the operator submitted a supplement to the training plan, which District 4 reviewed and approved the same day.

In conjunction with the section 104(d)(2) order, the inspector issued a section 104(g)(1) order for a violation of 30 CFR 75.350(b)(2). While the inspector appropriately took enforcement action for this violation, the issuance of a section 104(g)(1) order under this standard conflicted with MSHA policy and procedures that limited issuance of such orders to violations of 30 CFR Part 48.

The Accident Investigation team also determined that the Operator did not allot sufficient time in the annual refresher training or provide equipment necessary to adequately train the AMS personnel. During his interview, the inspector stated he did not question anyone on how the training was given. He stated training forms had been completed for the affected miners. He terminated the orders based on the completion of the training records.

During interviews, three District 4 inspectors stated they checked training records for AMS operators. Five other inspectors stated they either did not check the AMS operators' training records according to inspection procedures or did not recall whether they checked these records.

The Accident Investigation team determined that only two of seven persons at UBB who signed the seal examination books certifying they had sampled the seals had received training required by 30 CFR 75.338(a). The team cited the Operator for this non-contributory violation. This safety standard requires certified persons conducting sampling of the sealed mine atmosphere to receive comprehensive training on the appropriate sampling equipment and procedures for collecting gas samples from the sealed area, as well as retraining on an annual basis. This training is not required to be included in the training plan required by 30 CFR Part 48. These records were also not listed in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* as records required to be inspected during a regular inspection. However, *PIL No. I08-V-8* directed inspectors to examine these seal training records. District 4 personnel who examined training records during the review period stated during interviews that they either did not check the records to determine if seal examiners had been trained or checked training records for only a couple of the examiners.

The Accident Investigation team cited the Operator for a non-contributory violation for not providing the persons listed as responsible persons under 30 CFR 75.1501(a) with the training required by 30 CFR 75.1501(a)(2) and recorded under 30 CFR 75.1501(a)(3). Ten persons were designated as responsible

persons, but there were no training records certifying that any of these persons had received the required training.

During their interviews, one inspector who checked training records at UBB stated the records for responsible persons were inspected. However, the inspector did not identify that training records were not provided for any of the ten responsible persons identified at UBB. Most inspectors who checked training records at UBB indicated that they did not check training records for responsible persons when examining the training records or believed the topic was covered as part of other approved training. This training was not outlined in the training plan; rather, it is a separate program of training solely for responsible persons. However, the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* was never updated to direct the training records required by 30 CFR 75.1501(a)(3) to be inspected during a regular inspection.

The Accident Investigation team also determined that Performance Coal Company failed to train miners in the content of ventilation and roof control plans. Inspection notes did not document that inspectors questioned the miners to determine whether their training with respect to the roof control plans was complete and adequate as directed by MSHA procedures. This procedure was a corrective action to address an issue related to the 2007 Crandall Canyon mine disaster. However, there is no similar Agency directive for inspectors to question miners on training related to ventilation plans.

Conclusion: District 4 personnel examined training records during all six regular inspections of the review period. They did not identify the training deficiencies cited by the Accident Investigation team with respect to this violation of 30 CFR 48.3, including the lack of annual, experienced miner, and task training for several miners. They also did not recognize that some miners had received experienced miner training from non-MSHA approved instructors. Some inspectors did not check training records required for AMS operators, responsible persons, and persons who sampled atmospheres behind seals. An effective review of all required training records would have identified many of these deficiencies. However, Agency procedure does not clearly state how many training records are to be inspected during a regular inspection, nor does it address when to request assistance from EFS training specialists.

District 4 inspectors identified and cited four violations of the Operator's training program during their inspections at UBB. However, they issued two section 104(g)(1) training orders for standards that MSHA procedures do not recognize as appropriate for issuing training orders. District 4 supervision and management did not identify this inconsistency.

District 4 properly identified two issues with the Operator's approved training plan and notified the Operator to update the plan. Although District 4 identified these issues in September 2009, it did not follow up on the request to update the training plan before the explosion occurred.

District 4 did not require the Operator to update its training plan to include provisions stipulated in a section 101(c) petition that was in effect during the review period.

Many miners trained by independent contractors did not receive required training under Part 48. MSHA did not monitor any of these training classes to determine if the required training was given. However, there is no requirement to monitor these types of training classes. Additionally, MSHA lacks the resources needed to regularly monitor contractor training while simultaneously performing other functions essential to the administration of the Mine Act.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* was not updated when 30 CFR 75.338(a) and 30 CFR 75.1501(a)(3) became effective to direct inspectors to review pertinent records during a regular inspection. This may have resulted in some inspectors not examining these training records.

Inspectors did not question or document if they questioned the miners at UBB to determine whether they were trained on the contents of the roof control and ventilation plans. However, there are no procedures that direct inspectors to question miners about their training related to ventilation plans. Therefore, the inspectors had no requirement to do so. Additionally, the direction to question miners regarding their training on roof control plans and documenting this information in their notes is in a Coal Mine Safety

and Health memorandum and not in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. As such, it is probable that many inspectors were not aware of this requirement.

Recommendations: The Administrator for Coal should collaborate with the Director of EPD to update the training programs for entry-level and journeyman inspectors to emphasize the value of a purposeful examination of training records and to guide inspectors on how to effectively determine compliance with Part 48 and other training requirements. The guidance in *CMS&H Memo No. HQ-08-055-A* that directs inspectors to question miners on their training related to roof control plans and document such information should also be addressed in this training.

The Administrator for Coal should direct that District 4 and 12 managers reinforce MSHA policy and procedure concerning standards that can be cited as section 104(g)(1) training orders and on records that must be inspected to ensure that an operator is providing all required training.

The Director of PEIR should collaborate with the Administrator for Coal to revise the Mine Plan Approval (MPA) database system to track operator responses to MSHA requests for plan revisions. The Administrator should direct district managers to use MPA to identify overdue responses from operators and take appropriate actions.

The Director of EPD should evaluate the feasibility of requiring a representative number of independent contractor training classes to be monitored by EFS. The Assistant Secretary should consider making some EFS specialists authorized representatives to assist in the inspection of training records and establish protocol for coordinating with district managers to provide these services when needed.

The Administrator for Coal should direct revisions to the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* to:

- Identify training records required by 30 CFR 75.338(a) and 75.1501(a)(3) as records that are to be inspected during a regular inspection, as well as any records of any other training required by MSHA regulations.
- Specify the percentage of miners for which training records are to be inspected during a regular inspection.
- Include the requirements of *CMS&H Memo No. HQ-08-055-A* that direct inspectors to question miners on their training related to roof control plans and document such information. The Administrator also should consider similar guidance regarding training related to ventilation plans.

Enforcement of 30 CFR 75.220(a)(1)

Roof Control Plan

Requirements: Mandatory safety standard 30 CFR 75.220(a)(1) stated: “Each mine operator shall develop and follow a roof control plan, approved by the District Manager, that is suitable to the prevailing geological conditions, and the mining system to be used at the mine. Additional measures shall be taken to protect persons if unusual hazards are encountered.”

MSHA Policies and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated, in pertinent part, “A Regular Safety and Health Inspection is one in which a mine is inspected...to ascertain compliance with mandatory health and safety standards [and] approved plans (including suitability to current mine conditions).” Additionally, the Handbook stated “Longwall tailgate travelways shall be inspected in their entirety for compliance with applicable standards and approved plans.”

Statement of Facts: The MSHA Accident Investigation team determined that Performance Coal Company failed to comply with its approved roof control plan in the 1 North Panel tailgate entry. The Operator failed to install the required supplemental supports in the tailgate entry. Page 19 of the 2009

base plan stipulated that, in longwall development entries of initial longwall panels, the tailgate entry will have supplemental support in the form of either two rows of 8-foot cable bolts or two rows of posts installed between primary supports, to be maintained 1,000 feet outby the longwall face at all times. The Accident Investigation team determined the Operator did not install any cable bolts and had installed only one row of posts in the tailgate entry, and that the failure to comply would have been very evident to weekly examiners, preshift and on-shift examiners, and the longwall coordinator. The failure to maintain the required supports in the tailgate entry prevented examiners from conducting required examinations.

The Accident Investigation team also determined that the roof of the tailgate entry had already caved at crosscut 49 prior to the face reaching crosscut 48, as evidenced by observations of soot, coal dust, and debris on the fall rubble. Roof failure in crosscut 49 severely restricted airflow traveling inby from the face, resulting in a stagnant area that would have restricted ventilation of the tailgate. The failure to maintain the required tailgate support contributed to the inability to properly ventilate the explosive mixture of gas accumulation on the tailgate and contributed to the explosion that occurred on April 5, 2010. The Accident Investigation team issued a section 104(d)(2) order (No. 8250014) for this unwarrantable failure of the Operator to comply with mandatory safety standard 30 CFR 75.220(a)(1).

A complete discussion of the roof control plan is included in the “Mine Plan Approvals” section of this report.

The Accident Investigation team also cited two non-contributory violations under this standard. A section 104(a) citation (No. 8244551) was issued for the Operator’s failure to revise the roof control plan to address the ground control conditions in the 1 North Headgate. A section 104(a) citation (No. 8405574) was issued for the Operator’s failure to store supplemental roof support supplies on a continuous mining machine section.

During the review period, District 4 inspectors cited this standard a total of 1,037 times throughout the District: 985 section 104(a) citations, 18 section 104(d)(1) citations, 9 section 104(d)(1) orders, and 25 section 104(d)(2) orders.

At UBB, 29 violations of 30 CFR 75.220(a)(1) were cited: 28 section 104(a) citations and 1 section 104(d)(2) order. The District also cited UBB for two violations of 30 CFR 75.220(a) during the review period, one section 104(a) citation and one section 104(d)(2) order. None of the issuances at UBB involved the tailgate entry of the 1 North Longwall. After the explosion and through the end of calendar year 2010, teams of MSHA inspectors from outside District 4 issued 15 section 104(a) citations, one section 104(b) order, and one section 104(d)(2) order under this standard.

The Internal Review team conducted interviews with District 4 personnel concerning enforcement of the roof control plan. Enforcement personnel interviewed stated the training they received on enforcement of the roof control plans was adequate. Several inspectors stated they would carry copies of the roof control plan underground to determine compliance.

The 1 North Longwall section began production on September 10, 2009, in the last month of the inspection quarter. At this time, the roof control plan in effect was the base plan approved in October 2005. This plan stipulated that the tailgate entry of the first longwall panel was to have supplemental support in the form of a single row of posts on 5-foot centers or a double row of staggered posts on 8-foot centers for its entirety before mining commenced. The Operator submitted a new base roof control plan on October 27, 2009, which was approved by the District 4 Manager on December 23, 2009. This plan required the tailgate entry of initial longwall panels to have supplemental support in the form of two rows of 8-foot long cable bolts or two rows of posts on 4-foot centers installed in the middle of the entry between primary supports. This supplemental support was required to be maintained 1,000 feet outby the longwall face at all times.

The Accident Investigation team found that the number of posts in the tailgate entry was not sufficient to install more than one row of supplemental support in the tailgate travelway. Many of these posts were lying on the mine floor. The Accident Investigation team did not determine whether the posts had been dislodged as a result of the explosion or whether they had ever been installed. The single row of posts

would have complied with the 2005 roof control plan tailgate travelway requirement, but not with the requirement in the 2009 approved plan in effect at the time of the explosion.

The longwall tailgate was inspected on October 7, 2009, during the first regular inspection for fiscal 2010. The inspector did not cite any violations of the roof control plan during this inspection. When asked during an interview if there was supplemental support installed in the tailgate entry, he stated, "It seemed like they did." When asked how many rows of supplemental support were installed or how far out such support extended from the face, the inspector stated he could not remember. The tailgate entry was not inspected again during this inspection after the new roof control plan was approved.

The tailgate entry was traveled at least four times during the second regular inspection for fiscal 2010. On March 9, 2010, a ventilation specialist and a field office supervisor inspected the tailgate. The Operator's longwall production report for that day indicates that supplemental support required by the December 23, 2009, approved plan should have extended to a point 400 feet outby the location of the face at the time of the explosion. While the specialist and field office supervisor identified a serious violation of the ventilation plan and issued an order for that condition, they did not cite any violations of the roof control plan. The specialist left the Agency before he could be interviewed about the roof support in the tailgate entry.

The specialist commented on the Inspector's Certification Form (MSHA Form 2000-137) in the Uniform Mine File that he only reviewed the mine ventilation plan before traveling to UBB that day. Reviewing a complete UMF is difficult for specialists because their duties can place them at a different mine every day. Because of the time required to review the complete UMF, procedures allowed specialists to review only those sections of the file pertinent to their inspection.

The field office supervisor had been assigned the enforcement responsibility for UBB in January 2010. He documented that he reviewed the Uniform Mine File on January 28, 2010, before accompanying an inspector who was conducting a section 103(i) spot inspection at UBB. He believed the Mine was in compliance with all provisions of the approved plan, but stated that he could not recall if posts or cable bolts had been installed in the tailgate entry.

On March 10, an inspector traveled the 1 North Longwall tailgate travelway on the day shift and the same specialist who issued the order on the previous day traveled the tailgate on the evening shift. Neither the inspector nor the specialist documented any roof control plan violations during these shifts. The inspector certified reviewing the UMF for the regular inspection on January 6, 2010, one day after clerical personnel had filed the roof control plan approved on December 23, 2009, in the UMF.

On March 11, the same inspector was in the tailgate travelway to terminate the order for the violation of the ventilation plan. According to the inspection tracking map, he traveled the entire tailgate travelway. The inspector did not cite a violation of the roof control plan that day and stated in his interview that he did not recall inspecting the travelway for compliance with the roof control plan. Since he counted this inspection toward completion of the regular inspection of the tailgate travelway, inspection procedures required him to examine the travelway for compliance with the roof control plan. This was the last time MSHA inspected the tailgate before the explosion.

The start of this regular inspection was the first time the inspector inspected underground areas at UBB. He had approximately 22 months of total experience with MSHA during his March 11 inspection of the longwall. He had experience on longwall mining sections prior to being employed by MSHA, but had never been on the UBB longwall tailgate before this inspection.

Conclusion: District 4 personnel inspected the tailgate entry of the longwall on four occasions after the supplemental roof support requirements were approved by the District Manager in December 2009. None of these enforcement personnel identified and cited the Operator's failure to install the required level of supplemental roof support in accordance with the approved roof control plan.

The MSHA procedure allowing only parts of the UMF pertinent to the specialist's inspection on March 9 to be reviewed contributed to an inadequate inspection. The procedure did not provide clear guidance to specialists conducting portions of a regular inspection.

Corrective Actions Taken: The Administrator for Coal directed district managers to focus on the longwall tailgates during their visits to longwall sections beginning in January of 2012, with emphasis on determining whether the correct roof support was installed in the tailgate entry.

Recommendations: The Administrator for Coal should direct the revision of the *Uniform Mine File Procedures Handbook* to clarify what sections of the UMF that inspectors and specialists must review for a “limited inspection” as described in the Handbook. At a minimum, the roof control and ventilation plans and any other plans pertinent to that inspection should be reviewed. This revision should also clarify what constitutes a “limited inspection” as described in the Handbook.

Enforcement of 30 CFR 75.321(a)(1)

Air Quality

Requirements: Mandatory safety standard 30 CFR 75.321(a)(1) stated, in pertinent part:

The air in areas where persons work or travel...shall contain at least 19.5 percent oxygen and not more than 0.5 percent carbon dioxide, and the volume and velocity of the air current in these areas shall be sufficient to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes.

MSHA Policies and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated: “A Regular Safety and Health Inspection is one in which a mine is inspected... to ascertain compliance with mandatory health and safety standards [and] approved plans (including suitability to current mine conditions).”

The Handbook also stated: “The direction and quantity of airflow shall be determined and tests for the presence of methane and oxygen deficiency shall be made at...each end of the longwall or shortwall face at the locations specified in the approved ventilation plan.”

Statement of Facts: The MSHA Accident Investigation team issued a section 104(a) citation (No. 8227560) for the Operator’s failure to comply with mandatory safety standard 30 CFR 75.321(a)(1). The Condition or Practice cited included the following:

The air current at the Longwall tail (Tailgate 1 North, crosscut 48) was not sufficient to dilute, and render harmless, and carry away flammable, explosive, noxious and harmful gases, dusts, smoke, and fumes. An explosive mixture of gases was allowed to accumulate in the vicinity of the shearer which was located at the tailgate end of the longwall. An ignition of this mixture resulted in a mine explosion on 4/5/2010 and propagated throughout areas of the mine including the longwall, HG 22, and TG 22 sections. This explosion resulted in the deaths of 29 miners, disabling injuries to one miner, and serious injuries to another miner.

During the review period, District 4 personnel issued ten section 104(a) citations and one section 104(d)(2) order for violations of 30 CFR 75.321(a)(1). None of these were issued for violations identified at longwall tailgates, and none were issued at UBB.

The Accident Investigation team also determined that the Mine had a history of methane incidents in prior longwall panels. These incidents put the Operator on notice for methane hazards on the longwall face and are discussed in greater detail in the “Mine Ventilation Plan” section of this report.

District 4 personnel documented 16 inspection visits to the producing longwall face during the review period. Six of these inspections were during section 103(i) spot inspections, while ten were conducted during regular inspections.³⁸ Prior to the explosion, MSHA’s last inspection of the longwall face was conducted on March 23, 2010. All inspectors utilized their MSHA-issued equipment (multi-gas detectors

³⁸ An additional inspection of the longwall face was conducted during a section 103(i) spot inspection on 7/22/2009 before the longwall began production. This inspection was not counted in the Internal Review team’s analysis.

and anemometers) to determine compliance with the standard. During these visits, the highest amount of methane detected was 0.10% and the velocity of air across the longwall face was in compliance with the approved ventilation plan.

During interviews, ten inspectors and one inspector trainee who participated in inspections of UBB during the review period were specifically questioned about their understanding of the application of 30 CFR 75.321(a)(1). Inspectors demonstrated a working knowledge for practical application of this standard. The inspectors did not recall receiving any post-entry level training related to 30 CFR 75.321(a)(1).

Inspectors at UBB demonstrated they recognized violations involving excessive methane levels. On two separate occasions inspectors identified excessive methane levels on a continuous mining machine section and took enforcement action under standards other than 30 CFR 75.321(a)(1).

Conclusion: District 4 inspectors did not have the opportunity to identify this contributory violation as their last presence on the UBB longwall was March 23, 2010. Additionally, the Internal Review team determined the inspectors possessed an adequate working knowledge of 30 CFR 75.321(a)(1). Past inspection activity demonstrated that they would have taken appropriate enforcement action if they had encountered a violation of this standard.

Recommendations: None

Enforcement of 30 CFR 75.360, 75.362, 75.363, and 75.364

Hazardous conditions; posting, correcting, and recording; preshift, on-shift, and weekly examinations

Requirements: Preshift examinations are required to be made by a certified person in all underground coal mines as specified in 30 CFR 75.360. In addition to making the examinations, certified persons must certify that the examinations have been conducted and record the examination results, including hazardous conditions found, results and locations of air and methane measurements, and actions taken to correct hazardous conditions. Mandatory safety standard 30 CFR 75.360(a)(1) stated, in pertinent part:

Except as provided in paragraph (a)(2) of this section, a certified person designated by the operator must make a preshift examination within 3 hours preceding the beginning of any 8-hour interval during which any person is scheduled to work or travel underground. No person other than certified examiners may enter or remain in any underground area unless a preshift examination has been completed for the established 8-hour interval.

Mandatory safety standards 30 CFR 75.360(a)(2) through 75.360(g) specified locations where the preshift examinations must be conducted, for what the operator must examine, and how the operator is to certify and record such examinations.

Mandatory safety standard 30 CFR 75.362 and its subparagraphs required a certified person designated by the operator to conduct at least once during each shift an on-shift examination of each working section to check for hazardous conditions, test for methane and oxygen deficiency, and determine if the air is moving in its proper direction. A person designated by the operator must also conduct an examination to assure compliance with the respirable dust control parameters specified in the mine ventilation plan. Tests for methane are required to be made at 20-minute intervals, or more often if required in the approved ventilation plan, at specific locations during the operation of equipment in the working place. When a longwall mining system is used, these methane tests shall be made at the shearer.

Mandatory safety standard 30 CFR 75.363(a) required hazardous conditions found by certified mine examiners designated by the mine operator to be posted with a conspicuous danger sign where anyone entering the areas would pass. A hazardous condition shall be corrected immediately or the area shall remain posted until the condition is corrected.

Mandatory safety standard 30 CFR 75.363(b) required that a record be made by the completion of the shift on which the hazardous condition was found. The record shall include the nature and location of the

condition, as well as the corrective action taken, and shall be countersigned by the mine foreman or equivalent mine official.

Mandatory safety standard 30 CFR 75.364 and its subparagraphs required that weekly examinations be made at least every seven days by a certified person in all underground coal mines. In addition to making the examinations, certified persons must provide dates, times, and initials at locations within the examination area. Results of examinations including hazardous conditions found, results and locations of air and methane measurements, and any actions taken to correct hazardous conditions must be recorded.

MSHA Policies and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* included the following guidance applicable to any inspection or investigation:

Before physically inspecting an area of a mine, the inspector shall conduct a limited review of the operator's most recent examination records pertinent to the planned inspection activity for that day.... If additional areas are inspected (other than those planned at the start of the shift), examination records related to those areas shall also be examined prior to leaving the mine property. In all cases, mine records pertinent to the issuance of a citation, order, or safeguard shall be reviewed prior to placing the enforcement action in writing.... The inspector shall document the records inspected on the daily cover sheet or in the narrative portion of the hard-copy notes....

During each regular inspection, the Handbook directed inspectors to inspect all records required by 30 CFR 75.360 through 75.364, in addition to the following guidance:

Before the inspection is completed, records shall be reviewed back in time to the ending date of the previous Regular Safety and Health inspection.... During all onsite enforcement activities, inspectors shall compare the results of their record and posting reviews to actual observations in or at the mine. The appropriate citation or order shall be issued when non-compliance has been determined during these reviews or observations....

The inspector shall travel with and evaluate at least one preshift, one on-shift, and one weekly examiner to determine if adequate examinations are being conducted. Observations should be made of the examiner's equipment to determine that it is appropriate for the measurements and tests required on these examinations and that calibrations are current when such calibration is required....

When an inspector observes gas detectors in use at the mine, they should physically examine a representative number of the instruments to determine whether the detector(s) function properly and assess the workers knowledge concerning their use.... The inspector shall include an identifier and location of use for each gas detector examined in their inspection notes.

During each regular inspection, the Handbook directed inspections of intake and return air courses, bleeder entries, working sections, worked-out areas, and evaluation points established in the approved ventilation plan. The Handbook directed enforcement personnel to conduct some of the same ventilation tests and measurements during regular inspections that examiners were required to conduct during preshift, on-shift, or weekly examinations. These included determining the direction and quantity of airflow and testing for the presence of methane and oxygen deficiency at the following pertinent locations specified in the Handbook:

- In the intake entry or entries at the intake end of the longwall;
- At each end of the longwall face at the locations specified in the approved ventilation plan;
- Where air enters the mine at each main intake;
- In each intake split that ventilates a working section;
- In the return of each split of air that ventilates a working section, immediately before it enters the main returns;

- Where the air leaves the main returns;
- The point where bleeder air enters a return; and
- At the measurement points specified in the mine ventilation plan for evaluating bleeder systems and worked-out areas, including where air enters and leaves the worked-out areas.

Relevant to on-shift examinations, the Handbook specified the following for underground working sections during each regular inspection:

Dust controls used on the section shall be inspected to determine compliance with applicable standards and the approved mine ventilation plan. A representative number of miners shall be polled to determine if conditions observed represent normal mining conditions.

Chapter 1 of the *Coal Mine Health Inspection Procedures Handbook* stated, in pertinent part, that the objective of respirable dust sampling inspections is to determine whether the operator is complying with the on-shift examination requirements and the dust control provisions of the approved mine ventilation plan. The Handbook further stated the following:

During each inspection or investigation activity being conducted on a producing mechanized mining unit (MMU) the inspector shall determine if the coal mine operator conducted the required on-shift examination of the dust control parameters stipulated in the mine ventilation plan. This determination should be made as soon as practical after the working places are checked for imminent dangers.

Enforcement of 30 CFR 75.360

Statement of Facts: The MSHA Accident Investigation team determined that Performance Coal Company and David Stanley Consultants, a contractor for the Operator, failed to conduct adequate preshift examinations in the north area of the Mine between January 1 and April 5, 2010, thus allowing numerous hazardous conditions to remain uncorrected.

The team issued a section 104(d)(2) order (No. 8431838) to Performance Coal Company for the unwarrantable failure to comply with 30 CFR 75.360. The order specified violations of subparagraphs (a)(1), (b), (c)(2), and (g).

- Under subparagraph (a)(1), the Operator was cited for allowing miners to enter the Mine prior to the completion of preshift examinations. Between March 18 and April 5, 2010, UBB Examiner Jeremy Burghduff failed to conduct preshift examinations before miners entered the work area. Additionally, he was found to have conducted examinations with his gas detector turned off. On April 4, 2010, examiner John Skaggs failed to examine the entire length of the longwall face prior to the maintenance shift. The examination encompassed only the stage loader area of the longwall section.
- Under subparagraph (b), the Operator was cited for failing to conduct adequate examinations. Some examples of deficiencies in the examinations included: very obvious accumulations of loose coal, coal dust, and float coal dust present throughout the explosion area and the travelways to this area, and the Operator's failure to follow the roof control plan requirements regarding entry widths in 16 locations.
- Under subparagraph (c)(2), the Operator regularly failed to accurately measure the air quantity in the intake entries at the intake end of the longwall immediately outby the face.
- Under subparagraph (g), the Operator was cited because examiners did not sign preshift examination records.

The order also stated the Operator recorded hazardous conditions in separate production record books and did not record them in the preshift record books. The production records were not available to MSHA inspectors. This practice concealed hazardous conditions from MSHA inspectors and hindered their ability to take appropriate enforcement actions.

The Accident Investigation team found David Stanley Consultants (Contractor) established a practice of failing to conduct adequate preshift examinations for several months prior to the explosion. The team issued a section 104(d)(1) citation (No. 8431839) to the Contractor for an unwarrantable failure to comply with 30 CFR 75.360. The citation specified violations of subparagraphs (b) and (g).

- Under subparagraph (b), the Contractor was cited for conducting inadequate examinations along the travelways from the Ellis Portal to the northern active sections. Some examples of deficiencies in the examinations included: very obvious accumulations of loose coal, coal dust, and float coal dust present throughout the explosion area, and the Operator's failure to follow the roof control plan requirements regarding entry widths in at least 16 locations.
- Under subparagraph (g), the Contractor was cited for failing to record the results of required air quality measurements.

Information obtained during interviews with District 4 inspectors assigned to UBB during the review period and supervisors from the Mt. Hope Field Office demonstrated that those individuals had been trained in and understood the requirements of 30 CFR 75.360. Inspectors cited 30 CFR 75.360 and its subparagraphs 772 times during the review period for all mines in District 4. Thirty-seven of the citations and orders, including four section 104(d)(2) orders, were issued at UBB. During the second quarter of fiscal 2010, District 4 inspectors assigned to UBB issued seven section 104(a) citations for violations of various subparagraphs of 30 CFR 75.360.

Inspectors traveled with the preshift examiner during the second regular inspection of fiscal 2010. However, inspectors did not travel or did not document that they traveled with a preshift examiner on two of the other five regular inspections conducted during the review period. During interviews, most inspectors stated that they knew they were required to accompany at least one preshift examiner during each inspection. However, one inspector believed that he was required to travel with either a preshift examiner or an on-shift examiner, but not both.

MSHA procedures do not require inspectors to travel with specific preshift examiners. Inspectors did not document traveling with:

- Examiner Burghduff between March 18 and April 5, 2010
- Examiner Skaggs on April 4, 2010
- The examiner for David Stanley Consultants during the several months prior to the explosion

Accordingly, they did not have an opportunity to observe any of these examiners conducting a preshift examination. When inspectors were asked during interviews about the inspection of handheld gas detectors, they were aware of the instructions in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. Most stated that they inspected handheld detectors at all mines and that they never found one that was not turned on. However, inspector notes did not document inspecting handheld gas detectors carried by examiners or other miners at UBB during the regular inspection completed just prior to the explosion. Additionally, District 4 personnel documented inspecting gas detectors carried by only three mine examiners at UBB during the entire review period. There was no indication that an inspector had the opportunity to examine the multi-gas detector identified in the order issued by the Accident Investigation team to the Operator.

Inspectors cited the Operator for violations of 30 CFR 75.400 that related to accumulations of float dust, coal dust, and loose coal 30 times during the review period, including eight times during the second inspection of fiscal 2010. Inspectors did not cite the very obvious accumulation hazards identified by the Accident Investigation team in the contributory violation. An inspector cited the Operator for failure to conduct an adequate preshift examination in conjunction with a violation of 30 CFR 75.400 once during the review period.

Inspectors cited the Operator for violations of 30 CFR 75.203(e) six times during the review period, including two times during the second regular inspection for fiscal 2010. This standard required additional roof support to be installed where the width of the mine opening specified in the roof control

plan was exceeded by more than 12 inches for a distance of more than five feet. Inspectors traveled the track entry from the North Portal to the northern areas of the Mine at least 22 times during the second regular inspection of fiscal 2010. However, they did not issue citations where entry widths exceeded the width allowed in the approved roof control plan for any of the 16 areas cited by the Accident Investigation team. Inspectors also did not cite the Operator for failure to conduct an adequate preshift examination in conjunction with any of the 30 CFR 75.203(e) violations they cited.

The order issued by the Accident Investigation team addressed the Operator's practice of failing to record identified hazardous conditions in required examination record books. Instead, the Operator recorded these identified hazards in production reports, which are not subject to review by MSHA inspectors

The order also stated the Operator regularly failed to accurately measure the air quantity in the intake entries of the longwall section. The Internal Review team found that District 4 inspectors were not consistent in measuring the intake air quantity delivered to the longwall. Some measured the belt air course volume, while others did not. To determine the net intake volume, examiners and inspectors must account for the volume and direction of airflow in the belt air course. As further discussed in the "Mine Ventilation Plan" section of this report, examiners measured the air quantity in the intake escapeway and did not consider the contribution of the air used from the belt air course to ventilate the section.

Finally, the order identified three dates in March 2010 where preshift examination records were not certified by the examiners. Two of these violations occurred after MSHA inspected these examination records. However, inspectors did not cite the Operator's failure to certify the preshift examination records in the remaining case.

Conclusion: During the second regular inspection for fiscal 2010, a District 4 inspector documented traveling with a preshift examiner as required by MSHA inspection procedures. However, for the following reasons, they were not aware of some of the conditions cited by the Accident Investigation team in the two contributory violations:

- Some hazardous conditions identified by the Operator were recorded in production reports rather than in the examination record books required by MSHA regulations. The production reports were not available to District 4 inspectors. This practice by the Operator concealed the existence of multiple hazardous conditions and length of time the conditions existed.
- Inspectors met the procedural requirement to travel with a preshift examiner during the second regular inspection for fiscal 2010. However, inspectors are not required to travel with specific preshift examiners and did not travel with mine examiner Burghduff between March 18 and April 5, 2010. Therefore, they did not have an opportunity to examine his gas detector for proper use.
- Similarly, inspectors did not travel with the preshift examiner employed by David Stanley Consultants during the several months identified in the contributory violation. While the Accident Investigation team determined the preshift examiner failed to conduct adequate preshift examinations, inspectors were not aware of the deficiencies in the examinations.
- Inspectors were not at the Mine on April 4, 2010, and thus were not aware of the deficiencies in the preshift examination of the longwall performed by mine examiner Skaggs.

Performance Coal Company effectively concealed hazardous conditions from District 4 inspectors by recording the hazards in internal production reports rather than required examination books. This practice interfered with MSHA's ability to take appropriate enforcement actions. However, the Operator could not have concealed the physical hazards cited in the contributory violations of 30 CFR 75.360. District 4 personnel did not identify and cite accumulations of combustible materials and wide entries described by the Accident Investigation team when citing the two contributory violations. Consequently, they did not recognize that examiners were not conducting adequate preshift examinations in the north area of the Mine.

Inspectors did not travel with preshift examiners on two of the five regular inspections conducted before January 1, 2010. The supervisory oversight for the inexperienced inspectors at UBB was not adequate to identify this shortcoming.

Enforcement of 30 CFR 75.362

Statement of Facts: The MSHA Accident Investigation team determined the Operator engaged in a practice of failing to conduct adequate on-shift examinations in the north area of the Mine.³⁹ The practice includes the following violations of 30 CFR 75.362 and its subparagraphs:

- 30 CFR 75.362(a)(1) - The Operator engaged in a practice of failing to identify obvious accumulations of loose coal, coal dust, and float coal dust that were present in various locations in the entries and crosscuts of the travelways for HG 22, TG 22, and Longwall sections and on the sections. These hazardous conditions existed over several shifts and should have been observed, recorded and corrected by examiners.
- 30 CFR 75.362(a)(2) - The Operator engaged in a practice of failing to conduct adequate on-shift examinations of the longwall equipment within one hour of the shift change or before production begins to ensure compliance with the respirable dust control parameters. Numerous deficiencies on the longwall equipment were cited in non-contributory Citation No. 8227552 and contributory Order No. 8227558.
- 30 CFR 75.362(d)(1)(iii) - The Operator had a practice of failing to test for methane at 20-minute intervals during the operation of the shearer. On the day of the explosion six required tests were not conducted.

The Accident Investigation team concluded the Operator's practice of failing to conduct adequate on-shift examinations exposed miners to ongoing hazards, and that this practice contributed to the occurrence and severity of the explosion. The Accident Investigation team issued a section 104(d)(2) order (No. 8227550) for the Operator's unwarrantable failure to comply with this mandatory standard.

At mines throughout District 4 during the review period, enforcement personnel issued 47 section 104(a) citations, one section 104(d)(1) citation, seven section 104(d)(1) orders, and 12 section 104(d)(2) orders for violations of 30 CFR 75.362 and its subparagraphs cited in the contributory violation. Two of the section 104(d)(2) orders were issued at UBB for failing to conduct a complete examination of the dust control parameters on continuous mining machines. There were no violations cited at UBB on the longwall related to on-shift examinations or for failure to take 20-minute gas checks at the longwall shearer.

At UBB during the review period, District 4 inspectors cited many violations for accumulations of combustible materials and documented in their related notes that examiners should have been aware of these hazardous conditions. During their interviews, eight inspectors who inspected the Mine during the review period indicated they understood the requirements for on-shift examinations and knew how to enforce the standard. However, none of these inspectors cited any violations at UBB for failing to conduct on-shift examinations or for conducting inadequate on-shift examinations. As discussed in the "Section 103(a) Inspections" section of this report, supervisors reviewing inspectors' work products did not identify and correct these types of oversights. The inspector who cited the two violations on the continuous mining machine MMUs left the Agency before he could be interviewed.

The Operator's on-shift examination records did not reflect the extent of accumulations identified by the Accident Investigation team on the sections or in the travelways for the sections which were considered to have existed for several shifts. The examination records also did not document missing and clogged water sprays on the longwall shearer. This violation of 30 CFR 75.370(a)(1) also was cited by the Accident Investigation team as contributing to the explosion (Order No. 8227558).

³⁹ The results of the preshift and on-shift examinations of working sections at UBB were recorded in the same record book. For this section, the Internal Review team generally will refer to the on-shift records.

The Operator began production on the 1 North Longwall in September 2009. An inspector checked the longwall equipment for permissibility and compliance with applicable standards and approved plans on September 27, 2009. The inspector did not document that he determined whether the equipment was operated in compliance with the dust control parameters or that he determined whether the Operator conducted an on-shift examination. He did not cite the Operator for any violations of the ventilation plan's dust control parameters or for an inadequate on-shift examination. This inspector left the Agency before he could be interviewed.

During two other inspections of the longwall section equipment, the inspector did not examine dust control parameters or determine whether the Operator conducted an on-shift examination. During interviews, the inspector who conducted these inspections stated this was because the section was not producing and an on-shift examination was not conducted while he was present.

On November 10, 2009, an inspector conducted a respirable dust survey on the longwall section. He documented in his notes checking the number of water sprays and water pressure. During his interview he could not remember if he checked the water pressure at the sprays or if he just checked the water pressure gauge on the shearer. When asked if he observed the Operator's on-shift examination, he believed he did, but could not remember the details of the examination. He believed the Operator changed water sprays during this inspection. He did not cite any violations related to the dust control parameters or on-shift examination that day.

On March 23, 2010, an inspector conducted a respirable dust survey on the longwall. This inspector checked the dust control parameters prior to and while conducting MSHA dust sampling. When interviewed, the inspector stated he did not observe the Operator conduct an on-shift examination of the dust control parameters. No violations related to the dust control parameters were identified that day. This was the last MSHA presence on the longwall prior to the explosion, which occurred 13 days later.

The Internal Review team determined inspectors traveled with an on-shift examiner during five of the six regular inspections completed during the review period. During the first regular inspection of fiscal 2010, inspectors did not document traveling with an on-shift examiner. During interviews, most inspectors stated that they knew they were required to travel with at least one preshift, one on-shift, and one weekly examiner during each regular inspection. However, one inspector thought that he was required to travel with either a preshift examiner or an on-shift examiner, but not both. Another inspector believed he was only required to travel with the weekly and preshift examiners.

When District 4 inspectors traveled with and observed on-shift examiners at UBB, the travel was documented in their notes. However, none of these examiners were conducting examinations of the longwall section. District 4 supervisors did not travel with the inspectors when they examined the UBB longwall section for permissibility or compliance with the ventilation plan, or when they conducted respirable dust surveys.

Based on UBB employee interviews and a review of company records, the Accident Investigation team determined that the shearer was sometimes operated with water sprays removed from the shearer drums. District 4 inspectors conducted two respirable dust surveys on the longwall section during the review period. On both occasions, the inspectors checked the water sprays on the longwall shearer and determined there were no missing or clogged sprays.

The Accident Investigation team also concluded the Operator did not conduct some 20-minute methane tests required by 30 CFR 75.362(d)(1)(iii) on the longwall face on the day of the explosion. The handheld methane detector in use was examined and was found to be turned off for two hours during the shift so that six required 20-minute tests could not have been conducted. However, MSHA personnel were not on the longwall section on April 5 and did not have the opportunity to observe this violation.

During interviews, inspectors indicated that all gas detectors they examined at UBB that were carried by miners were turned on. However, as discussed in the "Section 103(a) Inspections" section of this report, District 4 inspectors did not inspect a representative number of gas detectors in use at UBB. District 4 personnel documented inspecting gas detectors carried by only three mine examiners at UBB during the

entire review period, although procedures state inspectors should observe the equipment used by all examiners with whom they travel. The handheld gas detectors being used on the longwall face at UBB were not among those checked by inspectors during the review period. However, inspection procedures did not specify that these detectors be checked.

Conclusion: During the review period, District 4 inspectors indicated in their notes that accumulations of combustible materials should have been observed by on-shift examiners. However, the inspectors did not recognize this constituted a violation of 30 CFR 75.362(a)(1) for failing to conduct an adequate examination. Inexperienced and acting supervisors did not provide adequate oversight after reviewing inspectors' work products.

District 4 inspectors did not follow Agency procedures for assessing the quality of on-shift examinations at UBB. District 4 inspectors did not consistently determine whether on-shift examinations of the dust control parameters on the longwall were conducted. Inspectors did not travel with an on-shift examiner during the first regular inspection conducted at UBB for fiscal 2010.

During respirable dust surveys on the longwall, inspectors checked the water pressure and number of sprays. The missing water sprays and low water pressure cited by the Accident Investigation team were not observed by inspectors and were not recorded by the Operator in the on-shift examination record books. Therefore, inspectors were never aware of the Operator's practice of mining with sprays removed from the shearer drum.

District 4 inspectors did not have an opportunity to observe the handheld gas detector used on the longwall face that was turned off on April 5. During the review period, all handheld gas detectors in use at UBB observed by inspectors were turned on.

Enforcement of 30 CFR 75.363

Statement of Facts: The MSHA Accident Investigation team determined the Operator failed to immediately correct or post with conspicuous "Danger" signs hazardous conditions observed and recorded during the on-shift examinations of the belt conveyor systems in the north area of the Mine. From March 1, 2010, through April 5, 2010, the Operator's on-shift examination records identified approximately 982 hazardous conditions, of which approximately 937 were listed as accumulations of coal and/or lack of rock dusting. The preshift and on-shift records do not indicate that corrective actions were taken to correct most of these conditions.

The Accident Investigation team determined that this violation contributed to the severity of the explosion and issued a section 104(d)(2) order (No. 4900578) for Performance Coal Company's unwarrantable failure to comply with 30 CFR 75.363(a). Additionally, the MSHA Accident Investigation team determined that certified examiner William Campbell, an employee of David Stanley Consultants, LLC, an independent contractor (Contractor) hired by Performance Coal Company, failed to immediately correct or post with a conspicuous danger sign hazardous conditions he observed and recorded during on-shift examinations of the belt conveyor systems. A section 104(a) citation (No. 4900615) was issued to the Contractor for failure to comply with 30 CFR 75.363(a).

The Internal Review team compared UBB's on-shift belt examination record books and MSHA inspection reports to determine how District 4 personnel addressed hazardous conditions identified and recorded by UBB certified examiners. In particular, the review was concerned with the enforcement of 30 CFR 75.363. During the review period, two violations at UBB were cited under this standard. During the same period, the number of citations and orders issued for violations of 30 CFR 75.363 throughout District 4 was as follows:

- 75.363(a) – 10 issued, one as a section 104(d)(2) Order
- 75.363(b) – 14 issued, one as a section 104(d)(2) Order
- 75.363(c) – 11 issued, one as a section 104(d)(1) Order

Information obtained during interviews of District 4 inspectors assigned to UBB during the review period and supervisors from the Mt. Hope Field Office confirm they were aware that failure to correct hazards

constituted a violation of 30 CFR 75.363(a). However, many inspectors were not aware that failure to record corrections to hazards identified in the examination books constituted a violation of 30 CFR 75.363(b). In accordance with section 104 of the Mine Act, at least 21 (48%) of the 44 violations of 30 CFR 75.400 (combustible accumulations) should have had accompanying violations of 30 CFR 75.363(a) cited for failure to correct or post the accumulation hazards.

The Internal Review team examined UBB's record books for the North Area Belts (area affected by the explosion) titled, *Examination of Belt Conveyors* for the period December 6, 2009, to April 5, 2010.⁴⁰ The team examined 8 record books, containing a total of 335 on-shift belt examinations conducted by certified persons employed by the Operator. A total of 2,194 entries describing uncorrected hazards were recorded for this period. The Operator's records of examinations indicated that hazardous conditions became more prevalent after March 30, the last day before the explosion that MSHA inspected in the northern portion of the mine. Reports for the last nine shifts before the explosion repeatedly list the Ellis #4 and #5 belts, North #4, #5, #6, and #7 belts, Longwall belt, Tailgate 22 #1 belt, and Headgate 22 #1 belt as needing either rock-dusted, or cleaned and rock-dusted. Similar findings were observed for records of belt conveyor examinations made in areas of the Mine not affected by the explosion.

The Internal Review team reviewed the available belt examination record books for each day that inspections of belt flights were conducted by District 4 enforcement personnel. The team compared MSHA inspections of belt conveyors to conditions identified in the Operator's belt examination books. The results of this comparison are included in Appendix N. The appendix shows: if the Operator recorded hazards and corrective actions; comments, including the length of time the Operator acknowledged the hazards existed; if the inspector cited any hazards; and if the inspector cited the failure to record corrective actions.

Inspectors inspected belt flights 19 times on shifts where examination records indicated that the area needed rock dusted or cleaned. In addition to these accumulation hazards, the Operator recorded three other hazards. Corrective actions were recorded for only 2 of the 19 accumulations. When inspectors examined these belts, they cited accumulations along the belt on six occasions and other hazards on eight occasions. There were no violations cited for the Operator's or the Contractor's failure to record corrective actions during these inspections.

Conclusion: The Operator's examination records showed widespread and continued non-compliance with clean-up and rock dusting standards along belt conveyors. Although examiners reported hazards in examination record books, the Operator failed to take corrective actions. In cases where corrective actions may have been taken, the corrective actions were not recorded in the examination record books. While inspectors documented reviews of examination books, the evidence indicates they did not follow established inspection procedures to take appropriate actions to address the number and magnitude of hazardous conditions identified by the Operator and the Contractor.

The majority of the 2,194 total entries in the North Belt Examination books documenting uncorrected hazards suggest that violations of 30 CFR 75.400 and 30 CFR 75.363(a) existed and should have been cited. Inspectors did not recognize that repeated entries in the examination books of belt entries needing cleaned and dusted represented a serious hazard that they should address.

Evidence indicates that effective examinations of the North Belt Examination books by District 4 inspectors also would have resulted in the identification of numerous violations of 30 CFR 75.363(b) for the Operator's and the Contractor's failure to list corrective actions for hazards recorded in the books. Many inspectors did not cite of these violations because they were not aware that failure to record corrections to hazards identified in the examination books constituted a violation of 30 CFR 75.363(b).

By failing to effectively inspect the Operator's belt examination record books and cite identifiable violations of 30 CFR 75.363(a) and 30 CFR 75.363(b), inspectors did not comply with the procedural requirement of the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*.

⁴⁰ These records were not available for the entire review period. All available records were reviewed by the Internal Review team.

Enforcement of 30 CFR 75.364

Statement of Facts: The MSHA Accident Investigation team determined that Performance Coal Company engaged in a practice of failing to conduct adequate weekly examinations in the north area of the Mine from January 1, 2010, until the time of the explosion. Weekly examinations conducted during this period failed to identify and correct obvious hazardous conditions, including accumulations of combustible materials, and failed to effectively evaluate the performance of the Mine ventilation system. The cited practice includes violations of six subparagraphs of 30 CFR 75.364.

The Accident Investigation team determined that this violation contributed to the explosion, and issued a section 104(d)(2) order (No. 8431855) for the Operator's unwarrantable failure to comply with the requirements of 30 CFR 75.364. The Accident Investigation team determined that the Operator engaged in aggravated conduct constituting more than ordinary negligence.

The practices cited by the Accident Investigation team include the following:

- 30 CFR 75.364(a) - The Operator did not examine specific evaluation points and worked out areas every seven days. Examination records indicate the mine operator did not make measurements of the air quality and/or quantity at seven evaluation and measuring points around the longwall. One examiner conducted weekly examinations in the affected area with his multi-gas detector turned off from March 18 to the date of the explosion.
- 30 CFR 75.364(b) - The Operator did not examine one return and three intake air courses for hazards every seven days.
- 30 CFR 75.364(c) - The Operator did not determine air quality and quantity for 13 intake air splits and five return air splits.
- 30 CFR 75.364(d) - The Operator did not immediately correct obvious hazardous conditions in ten air courses and two bleeders and did not list corrective actions in weekly examination records. The hazardous conditions included loose coal, coal dust, float coal dust, and excessive entry widths.
- 30 CFR 75.364(f) - From March 16, 2010, until the time of the explosion, the Operator allowed miners to enter the Mine although the Mine had not been examined in its entirety. The Operator's examination record book indicated that EP-LW1 was blocked by water and could not be examined.
- 30 CFR 75.364(h) - On various dates from January 1, 2010, until the time of the explosion and for various locations, the Operator did not record results of weekly examinations and corrective actions in the examination record books.

During the review period, District 4 inspectors and specialists issued 13 section 104(a) citations and five section 104(d)(2) orders for violations of 30 CFR 75.364 and its subparagraphs at UBB. Ten violations were related to conditions that prevented examination of air courses. Four were for failing to conduct weekly examinations; two were for failing to record examinations; and two were for failing to post dates, times, and initials underground during examinations. Inspectors did not cite any violations of 30 CFR 75.364(h) for the Operator's failure to record corrective actions in the weekly examination record books.

During the second regular inspection for fiscal 2010, District 4 personnel documented examining the Operator's weekly examination record books at least 14 times from January 11 to March 16. The inspector who examined the weekly record books on March 16 documented in the ITS that he examined the books to comply with instructions in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. None of the inspectors identified the violations of 30 CFR 75.364 indicated in the Operator's weekly examination records that were cited by the Accident Investigation team in the section 104(d)(2) order issued to the Operator.

In their interviews, Mt. Hope Field Office inspectors stated that they generally understood most requirements of 30 CFR 75.364 and related inspection procedures. They demonstrated that they were

aware of the inspection procedure to review pertinent record books prior to going underground. They also were aware of the Operator's responsibility to identify hazardous conditions in the records, and the inspectors' responsibility for citing the Operator for conducting inadequate examinations when the inspectors found unreported hazardous conditions underground. However, during interviews, only one inspector indicated that a citation should be issued for failing to record corrective actions. During the review period, none of the inspectors in the Mt. Hope Field Office cited a violation of 30 CFR 75.364(h) for failure to record corrective actions.

Inspectors documented traveling with a weekly examiner during all but one of the regular inspections of the review period - the fourth regular inspection for fiscal 2009. During the second regular inspection for fiscal 2010 at UBB, District 4 inspectors traveled with weekly examiners four times. On January 27, 2010, one inspector observed the weekly examiner conduct the required examination of intake and return air courses in North and West Jarrells Mains and North Glory Mains. These air courses were in the affected area identified in the contributory violation of 30 CFR 75.364. The inspector issued a section 104(a) citation for a violation of 30 CFR 75.364(b) because the intake air course could not be traveled for a distance of 90 feet due to a water accumulation. The inspector did not observe any other violations related to 30 CFR 75.364 or its subparagraphs, and none of the conditions or practices described in the contributory violation were in the areas traveled by the inspector on this date.

When inspectors were asked during interviews about the inspection of handheld gas detectors, they were aware of the instructions in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*. Most stated that they inspected handheld detectors at all mines, and that they never found one that was not turned on. However, inspector notes did not document inspecting handheld gas detectors carried by examiners or other miners at UBB during the regular inspection completed just prior to the explosion. Additionally, District 4 personnel documented inspecting gas detectors carried by only three mine examiners at UBB during the entire review period. There was no indication that an inspector had the opportunity to examine the multi-gas detector identified in the contributory violation.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directs the inspector to review all records pertinent to the mine being inspected during a regular inspection back in time to the ending date of the previous regular inspection. The Handbook also directs the inspector to review pertinent record books before issuing a citation, order, or safeguard. Finally, the Handbook instructs inspectors to compare the results of their reviews to actual observations at the mine during all onsite enforcement activities. However, the Handbook does not explain the purpose of the review of record books, how the information recorded can be used to determine or support enforcement actions, or how to evaluate the information to determine if mines are being adequately ventilated and fully examined.

Conclusion: Although District 4 inspectors and specialists examined the weekly examination record books, they did not recognize that the Operator's records of weekly examinations indicated that complete examinations were not always conducted as required by 30 CFR 75.364. These incomplete examinations included the Operator's failure to take and record required air quantity and air quality measurements sufficient to evaluate the longwall bleeder system during the second quarter of fiscal 2010.

Several Mt. Hope Field Office inspectors did not understand the requirement for mine operators to record corrective actions in weekly examination record books. As a result, they did not identify and cite the Operator's failure to comply with this provision of 30 CFR 75.364(h). The Mt. Hope Field Office supervisors understood the requirements to record corrective actions. However, they were limited in their ability to provide oversight of the inspectors' review of mine examination records as they could only evaluate the inspectors' review of such records when they accompanied inspectors to a mine.

The inspectors' reviews of the weekly examination books were cursory and lacked purpose. The inspectors did not recognize the value of a purposeful examination of record books or how this information could be effectively applied to inspection activities. The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* does not clearly explain the purpose of reviewing weekly examination records, how the information recorded can be used to determine or support

enforcement actions, or how to evaluate the information to determine if mines are being adequately ventilated and fully examined.

Inspectors did not comply with the procedural requirement to travel with at least one weekly examiner during the fourth regular inspection for fiscal 2009. Inspectors did, however, document they traveled with weekly examiners during the last regular inspection completed prior to the explosion as required. While inspectors stated they inspected and observed the use and operation of handheld gas detectors, they did not document examining gas detectors during the last regular inspection prior to the explosion. However, there was no indication that enforcement personnel had an opportunity to inspect the detector carried by the examiner identified in the contributory section 104(d) order issued by the Accident Investigation team to the Operator.

Corrective Actions Taken: The Administrator for Coal held all-employee meetings with District 4 and 12 personnel stressing the importance of conforming to inspection procedures for determining operator compliance with examination standards, including checking examination records for required air measurements.

On December 27, 2010, MSHA published a proposed rule on “Examination of Work Areas in Underground Coal Mines for Violations of Mandatory Health or Safety Standards” that would require operators to conduct examinations for violations of mandatory health or safety standards, in addition to hazardous conditions. The proposed rule also would require operators to record violations of mandatory health or safety standards and their locations found by examiners, as well as actions taken to correct them. Notice of the Final Rule was published as part of MSHA’s Fall Regulatory Agenda in January 2012. The rule is expected to be finalized in March 2012.

Recommendations: The Administrator for Coal should collaborate with the Director of EPD to revise the curriculum at the National Mine Health and Safety Academy regarding inspection procedures for evaluating operator compliance with examination standards. The training should explain the purpose and utilization of an inspector’s review of mine examination records. This training should be provided to entry-level inspectors, journeyman inspectors, specialists, supervisors, and assistant district managers. The training should provide instructions on:

- determining whether adequate examinations have been conducted;
- determining whether the operator has recorded in the examination book the specific corrective action taken to eliminate the hazard;
- identifying incomplete records of examinations, including missing air quantities and air quality measurements;
- using examination records to aid in the enforcement of 30 CFR 75.360, 75.362, 75.363, and 75.364;
- traveling with and evaluating at least one preshift examiner, one on-shift examiner, and one weekly examiner during each regular inspection;
- determining whether the operator conducted on-shift examinations of dust control parameters; and
- using examination records in the evaluation of the operator’s negligence for violations of other safety and health standards.

The Administrator for Coal should direct the revision of the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* to describe the purpose of an inspector’s review of the operators’ examination records, and how the review should be utilized during inspections. The revised procedures should also identify specific items that should be checked when reviewing mine examination records, such as whether:

- examinations have been conducted at required intervals;
- examination records indicate violations of mandatory safety or health standards;
- hazardous conditions have been properly recorded;
- records of violations or hazardous conditions indicate a need for inspectors to follow up;

- corrective actions have been recorded for reported hazardous conditions; and
- ventilation of worked out and outby areas have been evaluated properly.

The Administrator for Coal should direct the revision of the *Coal Mine Safety and Health Supervisor's Handbook* to provide guidance to supervisors on methods they can use during Accompanied Activities to determine if inspectors are reviewing the mine operators' examination records and using information in the records in accordance with inspection procedures.

Enforcement of 30 CFR 75.370(a)(1)

Mine Ventilation Plan; Submission and Approval

Requirements: Mandatory safety standard 30 CFR 370(a)(1) stated "The operator shall develop and follow a ventilation plan approved by the district manager. The plan shall be designed to control methane and respirable dust and shall be suitable to the conditions and mining system at the mine."

MSHA Policies and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated "Dust controls used on the section shall be inspected to determine compliance with applicable standards and the approved mine ventilation plan. A representative number of miners shall be polled to determine if conditions observed represent normal mining conditions."

The *Coal Mine Health Inspection Procedures Handbook* stated "At least twice during the sampling shift, the inspector will verify that all dust control parameters stipulated in the approved ventilation plan are in place and functioning properly...."

Statement of Facts: The MSHA Accident Investigation team determined that Performance Coal Company failed to comply with the methane and dust control plan portion of the ventilation plan approved on June 15, 2009, for the 050-0 MMU. The plan required that the longwall shearer be equipped with 109 water sprays, with 43 water sprays on each drum. The plan further specified that these sprays operate at a minimum of 90 psi at each spray block.

The Accident Investigation team determined that the shearer was being operated with seven sprays missing on the tailgate drum and with other sprays clogged. As a result of the missing sprays, the pressure at the remaining sprays was reduced significantly below the 90 psi requirement.

One function of the water sprays is to prevent a potential ignition source from frictional heat generated by the shearer bits striking rock. Such frictional heat from bits striking rock was identified as the most likely source of the ignition that ultimately caused the explosion. The Accident Investigation team determined that the missing sprays would have been obvious to casual observation while the shearer was operating. Testimony and company records indicate that it was a practice at the Mine to operate the shearer with missing sprays.

The Accident Investigation team determined that this violation contributed to the explosion. A section 104(d)(2) order (No. 8227558) was issued for the Operator's unwarrantable failure to comply with 30 CFR 75.370(a)(1).

Inspectors cite 30 CFR 75.370(a)(1) when they determine that an operator is not complying with a provision of its approved ventilation plan. At UBB, District 4 cited this standard 55 times during the internal review period: 40 section 104(a) citations, 1 section 104(d)(1) citation, and 14 section 104(d)(2) orders. In addition, one of these violations resulted in the issuance of a section 104(b) order. Of these violations, two were for a number of inoperative water sprays, one for less than the minimum required spray pressure, and two for not recording scrubber air measurement. During the review period there were no violations cited for failing to maintain respirable dust control parameters on the longwall section.

District 4 personnel documented 16 inspection visits to the longwall face during the review period. Six of these visits were made on section 103(i) spot inspections, while ten were made during regular inspections. The last inspection of the longwall section by an MSHA inspector was conducted on March 23, 2010, during a respirable dust survey. This was the last inspection conducted on the longwall face prior to the

explosion. On this date the inspector measured the water pressure on two occasions at the sprays and recorded 100 psi and 105 psi in his notes. The inspector also noted 109 sprays on the shearer. There were no violations cited on this shift.

Interviews with enforcement personnel revealed that they were aware of their responsibility to conduct examinations of the respirable dust control parameters specified in the methane and dust control portion of the mine ventilation plans. The inspectors stated that they had been issued equipment needed to check water pressures at the sprays.

Several inspectors stated they had observed mine operators conduct required on-shift examinations of respirable dust control parameters. However, only one inspector indicated that he had observed the Operator conducting the on-shift examinations of the respirable dust control parameters on the longwall shearer at UBB.

All inspectors interviewed were aware that, in District 4, methane and dust control plans contain requirements for the number of sprays on mining machines and the minimum number of operating sprays. Many inspectors stated they have issued citations for less than the minimum number of operating sprays, insufficient spray pressure, and a missing water spray block at other mines in District 4.

In interviews, ten inspectors and one ROE trainee who participated in inspections at UBB during the review period were questioned to determine their understanding of the application of 30 CFR 75.370(a)(1). Almost all inspectors stated they did not recall receiving any additional formal training related to 30 CFR 75.370(a)(1) since their entry-level training at the National Mine Health and Safety Academy. Some inspectors stated that they received additional on-the-job training such as discussions and travel with other inspectors and their supervisors during the course of their inspections. One inspector told the Internal Review team that the Health Department supervisor provided some training at a District 4 staff meeting.

Conclusion: The missing and clogged water sprays discovered by the Accident Investigation team were not observed by District 4 enforcement personnel. During the last inspection conducted on the longwall face, the inspector documented all water sprays were in place and operating, and the water pressure exceeded the minimum required by the approved ventilation plan. As the Accident Investigation team noted, missing sprays would have been obvious to casual observation while the shearer was operating.

The Internal Review team determined that inspectors were aware of the respirable dust control parameters approved in the methane and dust control plan portion of the mine ventilation plan, which included the Operator's responsibility to examine the respirable dust control parameters.

Recommendations: None.

Enforcement of 30 CFR 75.400 and 75.403

Combustible Materials and Rock Dusting

Requirements: Mandatory safety standard 30 CFR 75.400 required, in relevant part, that "Coal dust, including float coal dust deposited on rock dusted surfaces, loose coal, and other combustible materials, shall be cleaned up and not be permitted to accumulate in active workings." The operator was required by 30 CFR 75.400-2 to establish and maintain a "program for regular cleanup and removal of accumulations of coal and float coal dusts, loose coal, and other combustibles."

Mandatory safety standard 30 CFR 75.402 required all underground areas of a coal mine, except those areas in which the dust is too wet or too high in incombustible content to propagate an explosion, to be rock dusted to within 40 feet of all working faces, unless such areas are inaccessible or unsafe to enter. All crosscuts that are less than 40 feet from a working face also were required to be rock dusted.

At the time of the explosion, mandatory safety standard 30 CFR 75.403 required rock dust to be distributed upon the top, floor, and sides of all underground areas of a coal mine and maintained in such quantities that the incombustible content of the combined coal dust, rock dust, and other dust was not less

than 65%. The incombustible content in the return air courses was to be no less than 80%. Where methane was present, the per centum of incombustible content of such combined dusts was to be increased 1.0% and 0.4% for each 0.1% of methane where 65% and 80%, respectively, of incombustibles were required. Moisture contained in the combined mine dust was considered part of its incombustible content, pursuant to 30 CFR 75.403-1.

MSHA Policies and Procedures: The MSHA *Program Policy Manual* (PPM) contained guidance regarding 30 CFR 75.400, 75.400-2, and 75.402, portions of which are referenced in this section. Policy in the PPM regarding 30 CFR 75.403 only addressed the application of wet rock dust, an optional procedure which was not utilized at UBB.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directed inspectors to observe the complete mining cycle on each active producing working section during regular inspections, including an evaluation of cleanup and rock dusting. This Handbook also directed inspectors to review the operator's cleanup program and compare it to their observations in the mine.

The Handbook directed inspectors to conduct a rock dust survey to within 50 feet outby the section dumping point on each advancing active working section in the mine during regular inspections. It also stated: "Rock dust surveys shall also be conducted in previously mined active areas. Locations where samples were not previously collected due to wet conditions shall be tracked and inspected for a period of one year." Chapter V of the Handbook provided extensive guidance on the methodology for collecting and submitting rock dust samples.

The *Coal Mine Safety and Health Supervisor's Handbook* directed supervisors to determine that the specific samples or tests required for each event were collected and properly documented. It also stated that required rock dust surveys should be collected and submitted for analysis as early in the inspection activity as practical to allow for results to be returned timely.

Statement of Facts: The MSHA Accident Investigation team found that a localized methane explosion near the longwall tailgate transitioned into a coal dust explosion when it suspended and ignited coal dust accumulated in the tailgate entries. Dangerous float coal dust accumulations and insufficient rock dusting caused the explosion to propagate throughout the northern portion of UBB. Accordingly, the MSHA Accident Investigation team issued section 104(d)(2) orders (Nos. 8226115 and 8226116) for the unwarrantable failure of the Operator to comply with 30 CFR 75.400 and 75.403 throughout the explosion area. The Accident Investigation team also cited six non-contributory violations of these standards in the explosion area.

Frequent application of rock dust downwind of coal dust generating sources, such as longwall shearers and belt conveyor transfers, is necessary to maintain compliance with 30 CFR 75.400 and 75.403. When properly performed, this practice provides the dual protection of preventing float coal dust from accumulating on top of rock dusted surfaces and maintaining the incombustible content of the combined mine dust.

Enforcement of 30 CFR 75.400

The MSHA Accident Investigation team issued a section 104(d)(2) order (No.8226115) for the unwarrantable failure to comply with 30 CFR 75.400 throughout the explosion area. The observed coal accumulations in the explosion area that ranged from a thin observable layer of float coal dust on elevated surfaces to as much as four feet deep in travelways. Many of these accumulations were created during the initial development stages of the mining process. Concurrent with the accident investigation, MSHA also issued 24 citations and orders for similar conditions in the Mine outby the explosion area.

Over the life of the Mine, UBB received more citations and orders for violations of 30 CFR 75.400 than for any other standard. On December 6, 2007, MSHA notified the Operator that a potential pattern of violations existed at UBB based on the recurrence of S&S violations of 30 CFR 75.400. Lower S&S rates during the subsequent inspection quarter removed the Mine from consideration for section 104(e) enforcement actions, but the number of violations of this standard remained consistent through

fiscal 2008. Inspectors issued a similar number of citations and orders for violations of 30 CFR 75.400 during the regular inspection preceding the explosion.

As shown in Table 17, MSHA issued 30 citations and orders during the review period for accumulations of loose coal, coal dust, or float coal dust at UBB. Of these, 25 involved accumulations along conveyor belts, one of which resulted in a section 104(b) order. Inspectors also cited this standard on 14 occasions (not shown in Table 17) for violations involving accumulations of combustible materials other than coal, such as oil, grease, or trash.

Table 17 - Citations and Orders Issued for Coal Accumulations at UBB

FY-Quarter	104(a) Citations	104(d) Orders	Total	Accumulations in Belt Entries
2009-1	1		1	
2009-2	2		2	1
2009-3	8		8	7
2009-4	6	3	9	7
2010-1	2		2	2
2010-2	8		8	8
Total	27	3	30	25

During the four months preceding the explosion, the Operator’s examination records showed hundreds of occasions when conveyor belts needed rock dusted or cleaned, with no subsequent corrective actions recorded by the Operator. As also discussed in the “Enforcement of 30 CFR 75.363” section of this report, such hazards were reported during preshift examinations conducted immediately before 19 of the 25 MSHA inspections of conveyor belts during that time. Inspectors cited violations of 30 CFR 75.400 on 6 of these 19 occasions. On two of these six occasions, inspectors cited two violations of 30 CFR 75.400 on the same belt flight. Records indicated that the Operator allowed these cited conditions to remain uncorrected for days before MSHA discovered them, but inspectors did not list this information in their notes or reference it in their negligence evaluations.

MSHA policy provided guidance for evaluating gravity when issuing a violation of 30 CFR 75.400 in active belt entries and on working sections. The PPM stated that “Experience and tests have shown that accumulations of coal dust can contribute greatly to the propagation and severity of mine explosions. ...float coal dust, loose coal and/or coal dust deposited near working faces and in active haulage entries, where sources of ignition are likely to be, are more hazardous than similar deposits in back entries.”

As discussed in the section of this report titled “Use of Section 104 Enforcement Authority,” inspectors did not always properly identify and consider facts relevant to negligence and gravity when citing violations of 30 CFR 75.400. Ignitions are even more likely on longwall faces than on developing sections. A national review of 202 face ignitions during the five years before the explosion revealed that, while longwalls represented only 5% of the active MMUs, they accounted for 69 (34%) of reported face ignitions. Factors relevant to the likelihood of ignitions at UBB included the 1997 methane explosion at the tailgate-end of the longwall face, methane inundations in 2003 and 2004, and the practice of cutting sandstone during longwall mining.

Continuous rock-dusting at the tailgate-end of longwall faces has proven necessary to prevent the accumulation of float coal dust generated by shearers at mines throughout the country. However, MSHA policy and procedures did not address this practice, and District 4 inspectors stated that they were unfamiliar with it. The Accident Investigation team found that the Operator did not reapply rock dust in the tailgate entry during longwall mining. Inspectors did not cite any violations of 30 CFR 75.400 in the tailgate entry at UBB.

Recovery of the first panel in a new longwall district, such as the 1 North Longwall Panel at UBB, presents unique hazards related to coal dust explosions. The entry immediately adjacent to the tailgate travelway and gob, such as that where the coal dust explosion originated, is more likely to remain open on the first panel than on subsequent panels. In most cases, air from the longwall face deposits dust in this entry, where it may mix with potentially high methane concentrations from the gob. If not properly controlled, this can create a large continuous area where float coal dust can accumulate in the presence of

potentially high concentrations of methane near likely ignition sources. As was the case at UBB, the tailgate entry immediately adjacent to the gob is typically considered part of a worked out area and can not always be maintained for safe travel in its entirety. Accordingly, the Operator's ventilation plan established evaluation points as an alternative to traveling these entries during weekly examinations. Therefore, District 4 enforcement personnel were not required to inspect the tailgate entries within the worked out area, nor did they do so.

Cleanup Program

The cleanup program posted by the Operator at UBB only addressed systematic cleanup and rock dusting of working places on development sections. It did not address the control of dangers from float dust, dust and loose coal along beltways, and dust and loose coal in the area between the face and loading point. MSHA policy for 30 CFR 75.400-2 specifically indicated that these factors were to be considered when determining program adequacy. Also, the Operator's cleanup program did not address precautions necessary to control float coal dust in tailgate entries. MSHA policy for 30 CFR 75.400-2 has never specifically referenced tailgate entries on longwall sections.

The PPM stated that: "observance of quantities of inadequately inerted loose coal or coal dust throughout various areas of the mine during a single inspection, or from shift to shift, or from day to day, should be taken into consideration and is a strong indication that a systematic and effective cleanup program is not in operation." In each of the 30 cases where MSHA cited coal accumulations at UBB during the review period, the cited conditions existed along belt conveyors or between the face and section loading point. Also, examiners repeatedly reported that belts needed cleaned and dusted. These factors should have indicated the Operator's cleanup program was ineffective. However, 30 CFR 75.400-2 did not require the Operator to submit the plan to MSHA for approval. Also, since 1978, MSHA policy has stated that inspectors were not to cite this standard. This policy did not explain how inspectors could require operators to revise deficient programs or what enforcement incentives (other than to cite the accumulations under 30 CFR 75.400) should be used when operators fail to comply with their programs.

Mine Dust Sample Collection Method

During the review period, MSHA inspection procedures directed inspectors to collect samples of mine dust to determine compliance with 30 CFR 75.403 using a band sample method established by the U.S. Bureau of Mines prior to the Coal Mine Health and Safety Act of 1969. This method requires collecting a sample from the mine floor one inch in depth for analysis. However, MSHA sampling procedures did not include collecting dust from structures within the mine opening.⁴¹ Elevated surfaces in the explosion area included conveyor belt structure, wire mesh, pipes, and cables. Dust on elevated surfaces would have been dispersed by the explosion wind much more readily than dust on the floor.⁴²

Recent research suggests that only the uppermost fraction of an inch of mine dust from the floor contributes to initial explosion propagation. Researchers have suggested that a sample depth of less than one inch would better detect potential deficiencies in rock dusting.⁴² However, samples collected at UBB after the explosion showed noncompliant incombustible content of mine dust throughout the Mine. This suggested that, for enforcement purposes, sample depth was not a factor at UBB.

Rock Dust Survey Data

MSHA directs inspectors to submit rock dust samples as either spot or survey samples. Inspectors collect rock dust survey samples on uniform grids in areas mined since the previous inspection, which provides an objective measure of an operator's initial rock dust application practices. Inspectors submit all other

⁴¹ The 1960, USBM-sponsored, American Standard Practice for Rock-Dusting Underground Bituminous-Coal and Lignite Mines to Prevent Coal-Dust Explosions (ASA standard M13.1-1960, UDC 622.81) recommended sampling from elevated structures within the mine opening.

⁴² Harris, et al. (2010), Rock dusting considerations in underground coal mines. In *Proceedings of the 13th U.S./North American Mine Ventilation Symposium*, (Sudbury, Ontario, Canada, June 13-16, 2010).

rock dust samples as spot samples, which often represent areas where observations indicate violations of 30 CFR 75.403 may exist.

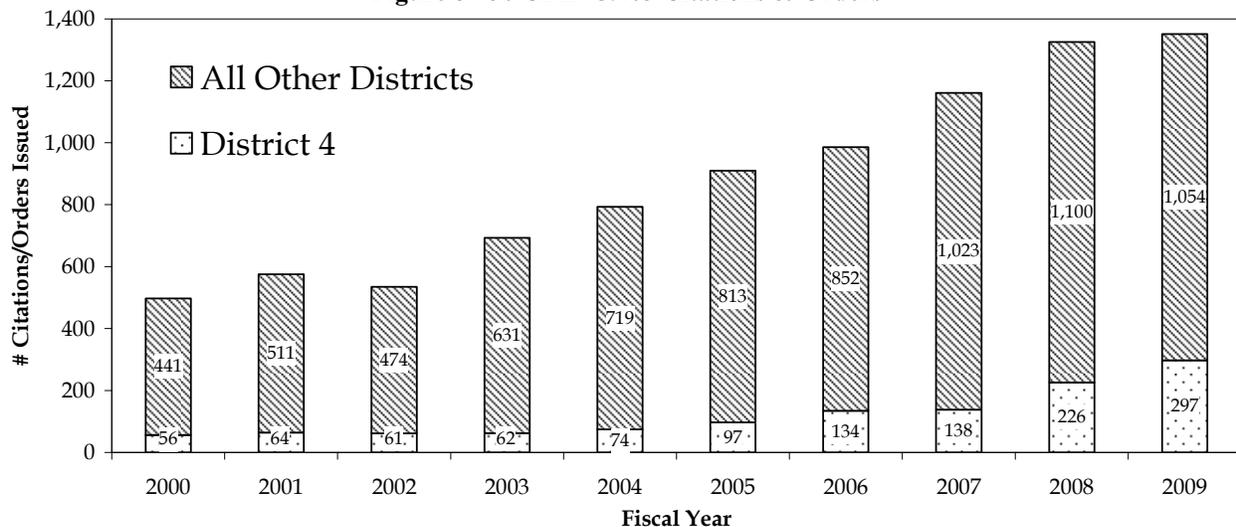
Since most rock dust data relates to surveys, particularly at UBB, much of this report section focuses on survey samples. However, it is important to note that coal dust contamination of previously rock-dusted surfaces is inherent to mining processes, making re-dusting programs critical to maintaining compliance with both 30 CFR 75.400 and 75.403. This is particularly true during retreat mining where the working faces progressively mine into older areas with potentially more contaminated rock dust applications. Therefore, it should not be assumed that rock dust survey sampling results from newly-mined areas reflect conditions in the same areas after an extended period of time.

MSHA integrated rock dust sample analysis results into its enterprise database after an internal review report, released in January 2003, found that inspectors did not always cite violations for non-compliant rock dust surveys at the Jim Walter Resources, Inc., No. 5 Mine (JWR5). Beginning in October 2004, inspectors uploaded rock dust sample collection data to the enterprise database using the Rock Dust Sample Submission (RDSS) computer application. MSHA technicians at the National Air and Dust Laboratory added sample analysis results to the database and e-mailed the results to the collecting inspectors, clerical staff, and the inspectors' supervisors. These e-mails included statements notifying the recipients of survey compliance, as well as the percent of non-compliant samples within the survey. Surveys that contain 10% or more non-compliant samples are considered non-compliant.

After receiving analysis results, inspectors entered citation and order numbers of violations cited for non-compliant rock dust surveys into RDSS. Oversight reports notified supervisors and managers of all non-compliant surveys without associated citation or order numbers.

District 4 effectively used these tools to ensure that inspectors issued citations for all 17 non-compliant surveys conducted at UBB between the system's implementation and the fatal explosion. Nationally, enforcement actions for violations of 30 CFR 75.403 increased each year since the JWR5 Internal Review report was released, as shown in Figure 8.

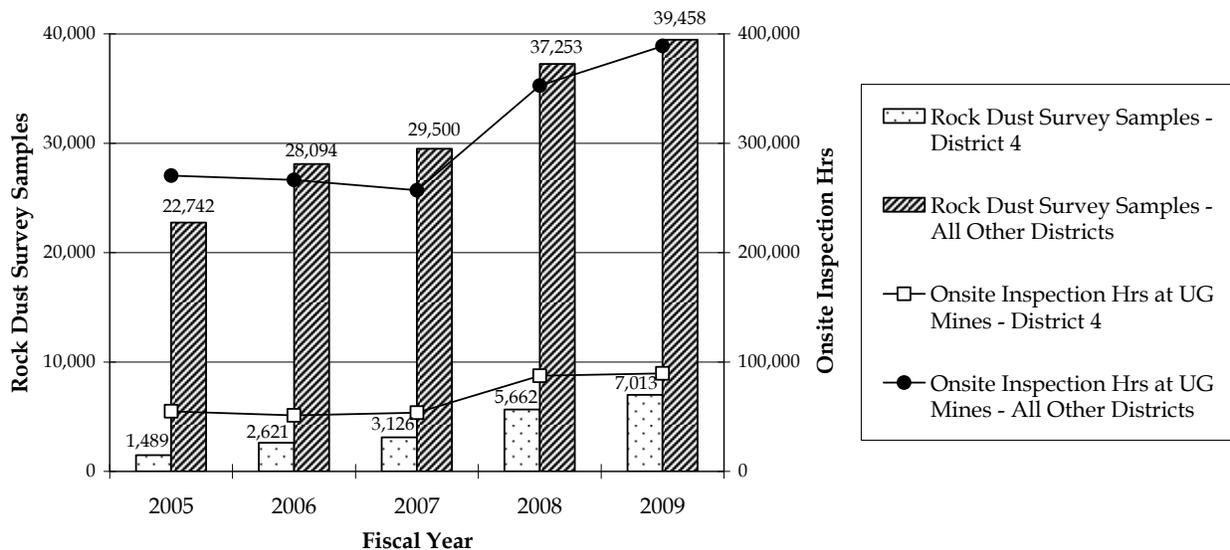
Figure 8 - 30 CFR 75.403 Citations & Orders



MSHA data revealed that the number of survey samples collected by inspectors (excluding sample locations reported as too wet to survey) increased each year since 2005. As shown in Figure 9, survey sampling increased 371% in District 4 from 2005 through 2009, while increasing 74% in the remaining districts. The most significant increases in sampling coincided with the implementation of the revised rock dust sample collection procedures in 2006 and 2008 that were intended to achieve this result. Sample collection also increased as new inspectors, hired with supplemental funding provided by

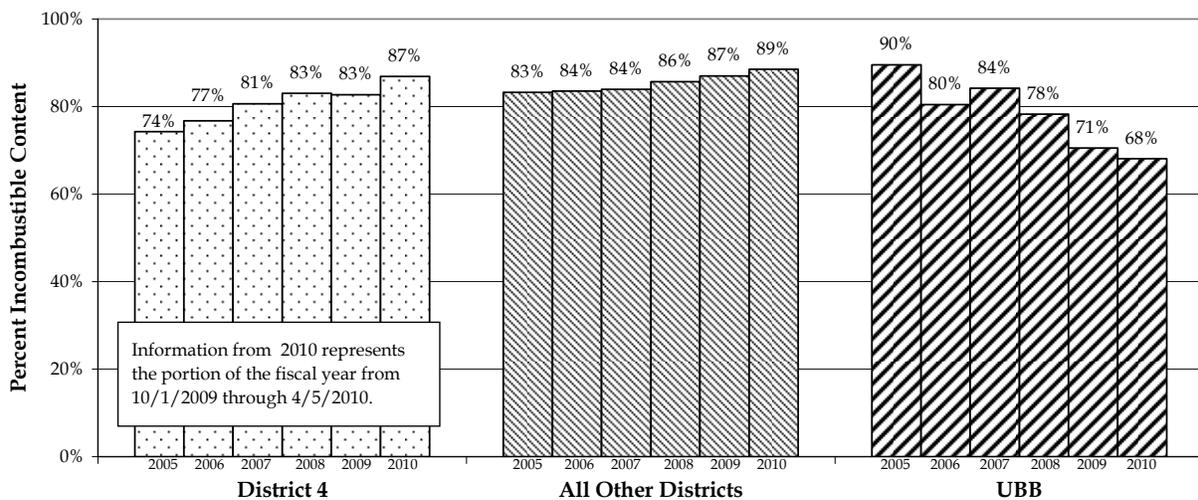
Congress in 2006 and 2007, became authorized to inspect mines in 2008.⁴³ Between 2005 and 2009, the ratio of 30 CFR 75.403 citations and orders issued per rock dust sample analyzed decreased nationally and in District 4 by 25% and 41%, respectively.

Figure 9 - Survey Samples Collected vs. Inspection Hours at Underground Coal Mines



To measure the effect of increased sampling and enforcement on actual mine conditions, the average incombustible content (% IC) of survey samples were plotted over time. As shown in Figure 10, this value trended upward, both nationally and in District 4, which indicated that most operators increased their rock dust application rates each year during this period. However, the average % IC of rock dust samples declined at UBB from 90% in fiscal 2005 to 68% during the first two quarters of fiscal 2010.

Figure 10 - Average Incombustible Content of Rock Dust Survey Samples by Fiscal Year



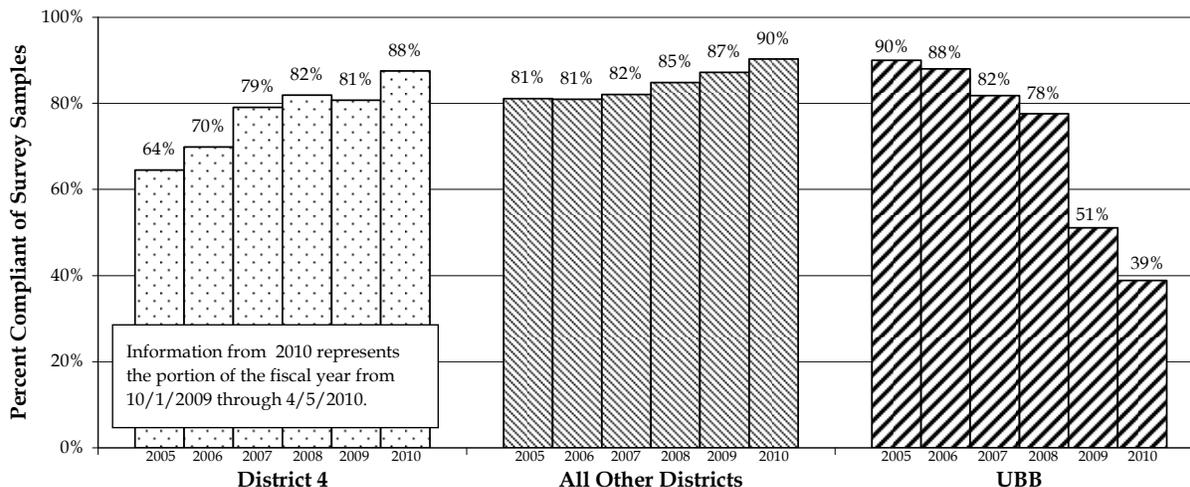
Nationally, prior to the explosion, samples collected during compliant surveys averaged 91% IC and the non-compliant surveys averaged 77% IC. The % IC at UBB during fiscal years 2009 and 2010 averaged well below levels expected to result in compliant surveys.

Trends in rock dust application correlated to that of individual rock dust sample compliance. As shown in Figure 11, the percentage of compliant rock dust samples collected during surveys increased both

⁴³ Enacted on June 15, 2006, P.L. 109-234, the *Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery*, provided supplemental funding through fiscal 2007 for the training and equipping of inspectors.

nationally and in District 4. However, the percentage of compliant samples at UBB dropped from 90% to 39% during fiscals 2005 to 2010.

Figure 11 - Percent Compliant Rock Dust Survey Samples by Fiscal Year



The preceding charts demonstrate that MSHA rock dust data, after being incorporated into effective inspection and oversight tools, significantly improved national enforcement of, and compliance with, 30 CFR 75.403 in recently mined areas. These charts also showed that MSHA rock dust data could be used to identify mines with substandard or declining rock-dusting practices, including UBB. However, national reports to alert supervisors and managers of mines with declining rock-dusting practices have not been developed.

Enforcement of 30 CFR 75.403

The MSHA Accident Investigation team issued a section 104(d)(2) order (No. 8226116) for the unwarrantable failure of the Operator to comply with 30 CFR 75.403 throughout much of the explosion area. During the review period, inspectors issued eight section 104(a) citations at UBB for failure to maintain the required incombustible content of mine dust required by 30 CFR 75.403. An inspector with five months inspection experience as an AR erroneously issued two of these citations as violations of 30 CFR 75.402. The field office supervisor reviewed and initialed both citations, but did not require the inspector to modify them to reflect the correct standard.

During the review period, an average of one month elapsed between sample collection and enforcement action for non-compliant surveys at UBB, 20 days of which were due to lab processing. During interviews, lab personnel stated that problems with robotics caused some of the backlog, but surges in workload during winter months led to most delays.

Inspectors did not cite these violations of 30 CFR 75.403 until after receiving rock dust analysis results, at which time they generated notes to accompany the enforcement actions or merely attached a copy of the analysis report. MSHA procedures did not direct inspectors to document the facts related to gravity and negligence of potential 30 CFR 75.403 violations when collecting rock dust samples. As a result, inspectors did not always have facts necessary to evaluate gravity and negligence when citing these violations.

Inadequate rock dusting has contributed to numerous coal dust explosions that resulted in multiple fatalities. However, inspectors evaluated the expected injury as “No Lost Work Days” with only one person affected on four of the eight 30 CFR 75.403 violations cited at UBB during the review period. Although sample analyses indicated that the Operator’s rock-dusting efforts declined during that time, negligence was evaluated as “low” for two of these violations and “moderate” for the remaining six violations. During the year following the disaster, inspectors cited 42 violations of this standard outby the explosion area at UBB, half of which were designated as unwarrantable failures to comply with the mandatory standard.

Without the proper evaluation of negligence and gravity or the enforcement of reasonable abatement times, the penalties associated with the citations provided little financial incentive for the Operator to prevent violations of 30 CFR 75.403. For the eight violations cited under this standard during the review period at UBB, the Operator paid penalties of \$100 each for two of the citations, \$127 each for two others, and \$3,143 each for the remaining four.

An average of 15 days elapsed from issuance of 30 CFR 75.403 violations at UBB until termination, due in part to extended termination due dates. One citation was extended 18 days past the original termination due date because of an “injury of the inspector.” Another citation was extended ten days past the original termination due date because of “mechanical failure of the rockduster.”

In the past, some mine operators conducted their own rock dust sampling program to prevent violations of 30 CFR 75.403, since visual observations could not reliably determine the incombustible content of mine dust. Such practices were consistent with the intent of the Mine Act, which charged mine operators with the primary responsibility to prevent unsafe conditions, such as those related to inadequate rock-dusting. Mandatory safety standards did not require operators to sample mine dust for incombustible content. The MSHA Accident Investigation team found that the Operator never sampled UBB to determine compliance with the rock dust regulations.

Since 30 CFR 75.403 allowed a lower IC of mine dust in intake air, the Operator needed to apply additional rock dust at some locations before converting intake air courses to returns. Prior to the disaster, MSHA collected at least 28 compliant rock dust samples from intake air courses that contained between 65% and 79.9% IC, but which the Operator later ventilated with return air. Twenty-two of these samples were collected from areas where propagation of the explosion later occurred. However, inspectors did not resample the mine dust at these locations until after the explosion, nor did MSHA procedures direct them to do so.

After the explosion, MSHA issued an Emergency Temporary Standard (ETS) revising 30 CFR 75.403 that required mine dust to be maintained at or above 80% IC throughout the mine. The revised standard reflected research findings by the National Institute for Occupational Safety and Health (NIOSH) that showed modern mining methods and equipment generate finer, and therefore more explosive, coal dust particles in intake airways than when the original standard was formulated.⁴⁴ Once in compliance with the new standard, operators no longer needed to consider variable IC requirements, other than to make adjustments for increased methane concentrations, when making ventilation changes. The MSHA database showed that a total of 67 originally compliant intake samples collected at UBB prior to the disaster, including the 28 samples later ventilated by return air, contained between 65% and 79.9% IC. Of these, 46 were located within the explosion area. Samples collected during the accident investigation indicated that subsequent coal dust contamination had lowered the IC of mine dust well below 65% throughout the explosion area.

Thoroughness of Rock Dust Survey Sampling

The Operator developed the portions of the Mine through which the explosion propagated between 2005 and 2010, a period which corresponded to available data from 55 rock dust surveys. To evaluate the thoroughness of rock dust sampling at UBB, the Internal Review team plotted sample locations and analysis results from the database onto a mine map.

Measurements from this map showed that MSHA conducted rock dust surveys in 67% of the explosion area and 64% of all other areas developed since the first quarter of fiscal 2005. Areas where MSHA did not conduct rock dust surveys were scattered throughout the Mine.⁴⁵ These included: areas mined since the previous rock dust survey; areas not sampled to within 50 feet of the loading point; retreating sections; areas where advancing MMUs had been removed between surveys; and crosscuts.

⁴⁴ NIOSH Report of Investigations 9679 (Cashdollar et al. 2010), “*Recommendations for a New Rock Dusting Standard to Prevent Coal Dust Explosions in Intake Airways.*”

⁴⁵ MSHA procedures did not direct inspectors to conduct rock dust surveys in many of these areas prior to 2008.

Areas mined since the previous rock dust surveys. Advancing sections inevitably create newly mined areas that MSHA has not surveyed between inspections. MSHA procedures allowed for such areas to be sampled during the next quarterly inspection. At the time of the explosion, such areas at UBB included 1,150 feet of entries at the inby end of Headgate #22 (refer to Figure 12) and the entire 800 feet of Tailgate #22. Samples collected after the explosion averaged 48.9% IC in these sections and 60.4% IC in similar areas outside the explosion area.

MSHA procedures directed inspectors to make visual observations of rock dust application adequacy when inspecting sections between surveys. However, accurate visual estimation of mine dust IC was not reliable. In January 2010, District 4 managers provided additional guidance for determining compliance with rock dusting requirements on working sections when they instructed inspectors to collect spot samples of mine dust inby section loading points during each regular inspection. During interviews, District 4 managers stated that these instructions were intended to stress the requirement to rock dust within 40 feet of working faces, as well as to improve compliance with clean-up programs. An inspector collected one spot sample in accordance with this guidance at UBB, which was compliant, on March 17, 2010, on 4 Section (Barrier Section).

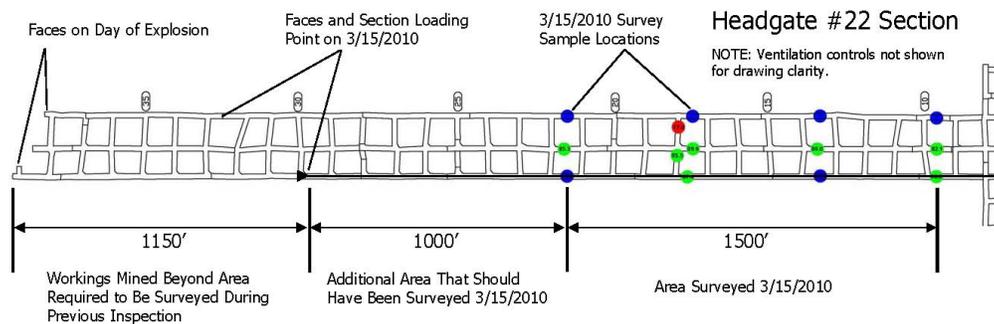


Figure 12 - Headgate #22 Section showing faces at time of explosion relevant to face and belt locations during March 15, 2010, rock dust survey.

Active sections not surveyed to within 50 feet of the loading point. MSHA procedures direct inspectors to conduct a rock dust survey to within 50 feet outby the section dumping point on each advancing active working section. However, these procedures did not direct inspectors to document the location of the section loading point when conducting rock dust surveys. Thus, supervisors could not verify that inspectors sampled to within 50 feet of the loading point. Failure to follow this directive resulted in two un-surveyed zones within the explosion area.

On March 15, 2010, MSHA conducted the last survey on Headgate #22 prior to the explosion. The inspector ended the survey 1,000 feet outby the section loading point (refer to Figure 12), as evidenced by UBB production reports. At least two additional sample rows were needed to extend the survey to within 50 feet of the section loading point. Results from the survey samples indicated marginal non-compliance at that time, with only one non-compliant sample (77% IC). However, post-explosion samples indicated that considerable coal dust contamination occurred throughout this area after March 15.

In another case, an inspector uploaded data for a September 30, 2008, rock dust survey during development of Tailgate 1 North. However, he did not provide a zero point that precisely identified the sampling area so it could be located on the mine map. The inspector listed two rows of samples rather than the five rows of samples needed to survey the area mined since the last inspection (see Figure 13). He also listed all of the survey sample locations as being too wet to sample. With no way to map these wet sample locations, subsequent inspectors could not accurately determine where to begin the next survey or to collect samples if the area dried out.

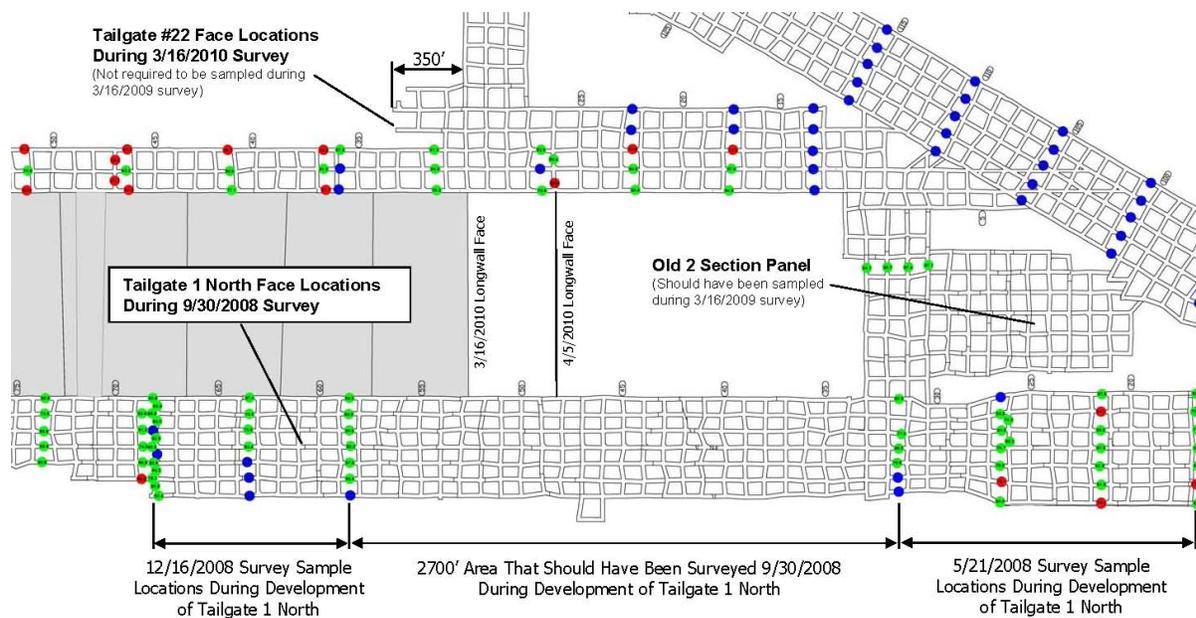


Figure 13 - Survey samples collected near the 1 North Longwall Panel.

On December 16, 2008, another inspector started the next rock dust survey in Tailgate 1 North at Crosscut 58, which would have corresponded to the section loading point at the time of the previous survey. However, deficiencies in documentation for the September 30 survey and lack of sampling at previously wet locations resulted in a 2,700-foot long area where MSHA did not collect rock dust samples. At the time of the explosion, this unsampled area extended from 1,000 feet inby to 1,700 feet outby the longwall face.

During retreat mining, ventilation maps showed that the Operator coursed air from the longwall face through the Tailgate 1 North entries, as would be typical for longwall mining. Ventilation currents would have transported any float coal dust from the tailgate end of the longwall face through much of this unsampled area, contaminating previously rock dusted surfaces. Consequently, the incombustible content of mine dust in this area at the time of the explosion would have been expected to be lower than that measured during the 2008 surveys.

Retreating sections. In general, operators must routinely apply rock dust outby advancing faces to create a barrier of fresh rock dust between the working faces, where most methane ignitions occur, and the rest of the mine. It is this moving barrier of fresh rock dust nearest to the section that MSHA samples during rock dust surveys. To achieve the same protection between a retreating longwall face and the rest of the mine, operators also must routinely reapply rock dust to the gate entries outby the retreating face. Otherwise, the retreating longwall face cuts into increasingly older and potentially more contaminated rock dust applications. However, District 4 did not collect rock dust samples in the longwall gate entries at UBB after the longwall began production, nor did MSHA procedures specifically direct them to do so.

During the review period, MSHA procedures directed inspectors to conduct rock dust surveys on retreating sections only for those areas outby the faces that were not surveyed during advance mining. Prior to January 2008, MSHA procedures did not provide for any survey sampling on retreating sections. Interview statements indicated that, as a result, some enforcement personnel did not conduct surveys in these areas.

The Operator conducted pillar retreat mining in two panels during the review period, both of which were mined outside the explosion area by 3 Section. During development of the first panel, an inspector collected samples indicating a noncompliant survey. He terminated the resulting citation because “[t]he cited area is no longer accessible due to pillaring in the affected area.” Inspection notes showed that 11 crosscuts outby the pillar line were still accessible for rock-dusting when the citation was issued.

An adjacent panel was developed prior to the next survey. After the Operator started retreat mining of this panel, an inspector filed a Rock Dust Sample Submission Form showing a survey that contained no samples. However, the inspector’s notes indicated that five crosscuts were accessible outby the pillar line for sampling. The inspector commented on the form that “this section is pillaring.”

The field office supervisor initialed documents related to these surveys and required no corrections. During interviews, the supervisor indicated he believed that MSHA procedures did not provide for rock dust surveys on retreating sections. This showed that some inspectors and supervisors continued to follow superseded rock dust survey procedures on retreating sections, which included longwalls, after the procedures were changed in 2008 and through the year preceding the explosion.

MSHA provided a lecture-style presentation to supervisors and managers regarding the new procedures implemented in January 2008. District 4 managers trained inspectors on these topics in staff meetings. However, interviews indicated that experienced Mt. Hope inspectors did not receive adequate training.

Active areas where advancing MMUs had been removed between surveys. Prior to 2008, MSHA procedures directed inspectors to conduct rock dust surveys only on advancing sections. At that time, inspectors typically collected samples only from the advancing set of entries in which the MMU was actively mining during the survey. As a result, inspectors frequently did not collect samples at the inby ends of panels or main entries where mining was completed between surveys. The areas where inspectors did not survey the inby ends of main entries within or near the explosion area (all of which were mined before 2008), included: Old North, Parallel Old North, North Glory, North Jarrells, and West Jarrells Mains.

After MSHA implemented the revised inspection procedures in 2008, some inspectors continued to sample only the set of entries being mined at the time of the survey. On December 29, 2009, an inspector documented conducting a survey for 1 Section in which he did not collect any samples, reporting a single location as “No Sample.” The inspector commented on the Rock Dust Sample Submission Form, “The mine operator has mined less than 500 feet since last survey area.” However, since the prior rock dust survey for 1 Section, it had mined the last 500 feet of Headgate 1 North (Bandytown Shaft bottom area), the entire 1,400-foot long Panel No. 2 Crossover, and the first 250 feet of Headgate #22 (refer to the Figure 14). The April 5 explosion propagated through the two latter areas.

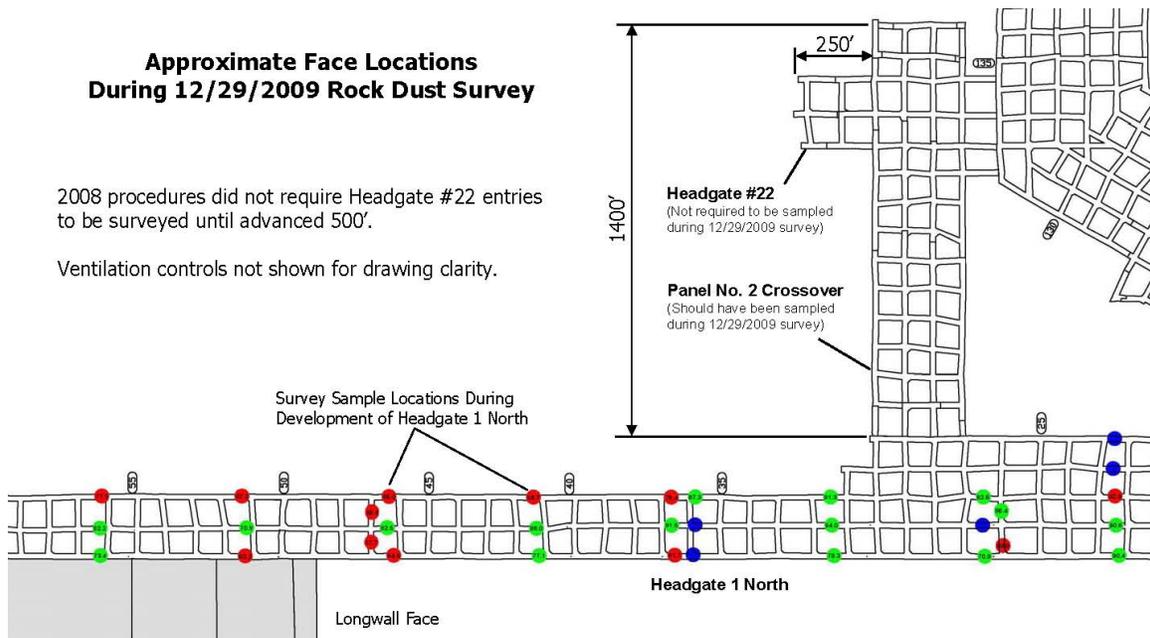


Figure 14 - Face locations at time of December 29, 2009, rock dust survey for MMU 029-0.

During interviews, the inspector stated that he did not conduct a rock dust survey in Headgate #22 because the distance from the mouth of the section to the tailpiece was less than 500 feet. While MSHA procedures did not direct him to sample Headgate #22 entries at that time, he did not consider surveying the two areas from which the MMU was removed. He also stated that he primarily learned how to conduct surveys by traveling with other inspectors. The only National Mine Health and Safety Academy training he remembered was the instruction to take samples every 500 feet and how to collect band samples. This further demonstrated that at least some inspectors continued to follow superseded procedures, passed on by more experienced inspectors and supervisors, regardless of training to the contrary. As a result, MSHA did not collect survey samples before the explosion in the Bandytown Shaft bottom area and the Panel No. 2 Crossover.

During the second regular inspection for fiscal 2010, another inspector submitted two rock dust surveys with no samples collected. In both cases, the inspector documented on the Rock Dust Sample Submission Forms that the “section has not advanced 500 feet from last survey.” As in the previous example, the inspector did not consider areas from which the MMUs had been removed since the previous survey. As a result, panels from which two MMUs had recently been removed remained un-sampled prior to the explosion. This included the Old 2 Section panel, which was the only non-pillared panel in the explosion area (refer to Figure 13). Since the Operator often mined entire panels at UBB in less than two months, sections frequently moved between inspections and the panels remained un-sampled for the reasons listed above. Before the explosion, MSHA conducted surveys in only 3 of the 17 non-pillared panels in active workings at UBB. Samples collected after the explosion in previously un-sampled panels averaged 49.1% IC outside the explosion area and 52.2% IC in the recently completed Old 2 Section panel.

Between 2004 and April 5, 2010, inspectors in eight of the ten bituminous coal districts had submitted a total of 1,217 rock dust surveys to the database containing all “No Sample” locations, of which 35% were in District 4. MSHA did not develop standard oversight reports for managers to monitor the appropriateness of these surveys, nor did procedures address how to document them.

Inspectors did not upload data for at least five UBB rock dust surveys into the MSHA enterprise database prior to the explosion. In each case, inspectors recorded only a single survey sample location, with the Sample Type field listed as “No Sample,” on a Rock Dust Sample Submission Form. They included the completed forms in the inspection reports, but did not upload them to the database at that time. Forty-two days after the explosion, two of these survey forms (dated February 18 and March 16, 2010) were uploaded to the database.

Supervisors could not determine if an inspector submitted the form to the database by reviewing the printed form unless it contained sample analysis results, because RDSS reports did not distinguish between submitted and draft forms. In particular, Rock Dust Sample Submission Forms listing all sample locations as “Wet” or “No Sample” would not indicate whether the inspector failed to upload the data. Rock Dust Data Retrieval system (RDDR) reports could not track wet sample locations for re-inspection unless the original survey forms containing such locations were uploaded to the database. Also, MSHA could not develop accurate oversight reports to monitor surveys with no samples collected without a means to ensure that inspectors uploaded all forms to the database.

Crosscut Samples. The Handbook states normally no more than three rows of samples will be collected without including dust samples from the crosscuts. Approximately half of the surveys conducted at UBB during the review period contained less than three rows of samples. MSHA procedures did not clearly direct inspectors to collect crosscut samples during consecutive surveys in the same set of entries. Alternate mining between panels and mains on 3 Section advanced each set of entries so slowly that inspectors could have followed procedures without sampling crosscuts since October 2008. MSHA rock dust data showed that inspectors collected only 35 survey samples from crosscuts at UBB since October 1, 2004, of which 54% were compliant. Inspectors reported 90 such locations as too wet to sample.

Locations Reported as Too Wet to Sample during Rock Dust Surveys

Data showed that District 4 reported more locations as too wet to sample than the other districts. For fiscal 2008-2009, inspectors identified 67% of the all sampling locations in District 4 as being too wet to sample; in the other bituminous coal districts, inspectors identified 27% of locations as being too wet to sample.

Prior to the explosion, inspectors conducted 55 rock dust surveys at UBB since the start of fiscal 2005, of which 22 (40%) consisted entirely of wet sample locations. During these 55 surveys, inspectors documented attempts to collect rock dust samples from 1,048 locations, of which 114 were invalid “wet sample” locations and 13 were invalid “no sample” locations. Of the remaining 921 valid sample locations, inspectors reported 599 as too wet to sample, collecting samples from only 322 locations. This equated to sample collection in 35% of the area surveyed. Multiplying this value by the percentage of the Mine surveyed (64%) revealed that MSHA collected valid samples from only 22% of the areas that were developed since October 1, 2004.

The Internal Review team could not plot the 114 invalid wet sample locations on a mine map because they were outside mining limits or lacked accurate reference to a permanent starting point (such as those described in the 1 North Tailgate entries, above). The 22 surveys that consisted entirely of wet sample locations (ten of which were conducted during the review period) accounted for 110 of the 114 locations that could not be plotted. These surveys also contained other errors such as combined sample locations. In one case, an inspector submitted an all-wet survey for an area that was under citation for non-compliant survey samples collected by another inspector during the previous quarter.

During interviews, an inspector stated that he would note when an entire air course was wet after traveling through it, without specifying each location in his notes. Through the review period, inspectors did not properly document sample locations in their notes for nine of the ten all-wet surveys. These wet survey sample locations could not be tracked or re-inspected at a later date because there was insufficient information to effectively locate them on a mine map.

Elevations on the mine map showed that advancing sections generally mined down-dip, particularly in the explosion area. Any water produced in the advancing gate entries would tend to flow toward the working faces. This was consistent with the inspectors’ findings that newly mined areas were too wet to sample. Observations after the explosion showed that advancing working sections in the explosion area remained wet, but the majority of areas outby these sections had sufficiently dried for sampling. However, prior to the explosion, inspectors had not collected spot rock dust samples from any of the locations reported as too wet to sample during surveys.

After the explosion, MSHA inspected 422 locations originally reported as too wet to sample. Mine conditions had sufficiently dried to permit sampling in 355 (84%) of these locations. Sample results for previously wet areas averaged 69% IC, which was consistent with samples collected at UBB during the six months prior to the explosion. Of these, 162 samples (46%) did not comply with the requirements of 30 CFR 75.403.

In 2006, the Administrator for Coal issued *CMS&H Memo No. HQ-06-053-A*, which implemented the computer-based Rock Dust Data Retrieval System (RDDR). The RDDR application improved access to rock dust data and generated MSHA Form 2000-210 (Rock Dust Survey Wet Locations Tracking Form). This form listed locations where samples were not collected due to wet conditions during the previous year, which inspectors could use to determine areas that needed to be re-inspected each quarter. The memorandum directed enforcement personnel to file this form with each regular inspection report to verify that previously wet areas were re-inspected. However, MSHA did not include this instruction in the revised *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* released in January 2008. MSHA also revised the RDSS application for inspectors to report previously wet locations that had been sampled or had become inaccessible. Doing so ensured that such locations would be appropriately omitted from the next Rock Dust Survey Wet Locations Tracking Form.

The MSHA enterprise database showed that inspectors in the Mt. Hope and Princeton Field Offices did not use RDSS to report collecting any samples from previously wet locations at any mine before the explosion. The remaining District 4 field offices reported collecting 1,566 samples from previously wet locations during that time, which accounted for 34% of the national total.

During the review period, inspectors filed a Rock Dust Survey Wet Locations Tracking Form with only two of the UBB regular inspection reports -- during inspections for the fourth quarter fiscal 2009 and second quarter fiscal 2010. These forms respectively listed 132 and 202 wet sample locations that needed to be re-inspected. Supervisors initialed both forms which showed that all of the listed areas had either remained wet or were inaccessible. According to interviews, District 4 managers did not direct Mt. Hope Field Office inspectors to use the form until March 2010. The inspector who completed the form that quarter reported difficulty identifying previously wet locations from information on the form. Since he was not directed to use the form until near the end of the inspection, he completed the form retroactively, instead of referencing it as a guide to areas that needed sampling. MSHA provided an RDSS users' guide to inspectors, but did not incorporate its instructions into the MSHA directives system.

During interviews, a supervisor confirmed that the Mt. Hope Field Office did not use maps to track rock dust surveys or wet sample locations. He also indicated that plotting surveys on a mine map provided the best means for planning and tracking subsequent rock dust surveys or abatement actions, based on his experience in another field office. The Internal Review team also found that plotting sample locations on a scaled map, in a manner that distinguished locations sampled from those too wet to sample, was essential for determining survey and spot sample locations. Inspection procedures stated "a careful review of the mine map shall be made to assure that all active areas of the mine have been surveyed," but did not specify plotting sample locations on a mine map to track and monitor the status of rock dust surveys.

Maintenance of Rock Dust in Outby Areas

"To achieve full benefits, rock dust must be applied properly and be maintained satisfactorily."⁴⁶ MSHA surveys evaluate whether rock dust has been applied properly in newly mined areas, but procedures do not require re-sampling to determine if rock dust has been maintained satisfactorily in older areas of the mine. Coal dust contamination from subsequent production, coal haulage, mobile equipment, and ground deterioration can reduce the % IC of mine dust when operators fail to adequately apply additional rock dust in outby areas.

MSHA procedures specify that outby areas be inspected for "compliance with applicable standards," which includes 30 CFR 75.403. Absent a sampling requirement, this implies that MSHA expects inspectors to make visual estimations of rock dust adequacy during each regular inspection of all underground active workings, including each working section, air course, tailgate travelway, bleeder, and unsealed worked out area. MSHA procedures also allow inspectors to terminate 30 CFR 75.403 violations based on visual observations of rock dust application. The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* directs inspectors to collect samples "when any doubt exists concerning adequacy of rock dust applications in the active workings of the mine." However, the MSHA database showed that inspectors did not collect any spot samples at UBB to determine compliance in older workings or terminate violations of 30 CFR 75.403 prior to the explosion.

Coal dust, including float coal dust, and loose coal accumulated on previously rock dusted surfaces is a violation of 30 CFR 75.400 and can be cited based on an inspector's observation of the condition without sampling. During the review period, inspectors cited the Operator for 24 violations of 30 CFR 75.400 in areas outby the working sections at UBB. The Operator abated these violations by cleaning up the accumulations, re-dusting, and/or raking float dust into existing rock dust.

After the explosion, MSHA collected rock dust samples at UBB from areas where 38 surveys had been conducted since October 2004, 23 of which were outside the explosion area. Analysis results showed that

⁴⁶ ASA standard M13.1-1960, UDC 622.81, IC 8001, (U. S. Dept. of the Interior, Bureau of Mines 1960), Forward section

none of the original survey areas had remained in full compliance with 30 CFR 75.403. These areas included both originally non-compliant surveys (after which additional rock dust was applied for violation abatement) and ten originally compliant surveys. MSHA issued 42 citations and orders for violations of 30 CFR 75.403 at UBB outby the explosion area during the year following the disaster. This indicated that inspectors did not visually recognize many situations in which contamination of previously rock-dusted areas reduced the incombustible content of mine dust below that required by the standard.

During interviews, inspectors indicated that they had been surprised by rock dust sample analysis results that were inconsistent with their visual evaluations. Prior to the ETS, procedures also directed inspectors to visually determine rock dust compliance at two thresholds, 65% IC in intake air and 80% IC in return air, which further increased the difficulty of this task. In their interviews, inspectors indicated that they lacked confidence in their abilities during the review period to visually determine the incombustible content of mine dust.

The above findings were consistent with past studies which showed that visual estimation of the incombustible content of mine dust cannot be done with a reasonable degree of accuracy except for identifying gross deficiencies or excessive concentrations of incombustible material. Moisture content, contaminants, lighting, experience, particle size, and inherent color of materials markedly affected visual judgment.⁴⁷ At UBB, complete reliance on visual estimation of the incombustible content of mine dust in older workings failed to identify, and mandate correction of, the Operator's deficient re-dusting program. Regardless of the adequacy of the initial rock dust application, the Operator's failure to adequately re-dust older workings resulted in non-compliance with 30 CFR 75.403 throughout significant portions of the Mine.

Coal Dust Explosibility Meter

Beginning in November 2009, MSHA field-tested a NIOSH-developed Coal Dust Explosibility Meter (CDEM), during which inspectors determined mine dust explosibility using the CDEM while collecting rock dust samples. The prototype hand-held instrument did not provide a percent value for IC; rather, it indicated whether samples contained sufficient rock dust to prevent flame propagation.

As part of the joint MSHA-NIOSH field testing of the CDEM, District 4 used the prototype instrument to test samples from the last three surveys conducted at UBB before the explosion. The CDEM showed 100% agreement with lab analysis results for the compliant survey conducted December 28, 2009, in the Panel No. 1 Crossover and for the non-compliant survey conducted January 26, 2010, on 3 Section. However, the CDEM showed that six of the eight samples collected during the March 15, 2010, survey in the Headgate #22 entries would not ensure against flame propagation. In contrast, the lab analysis results showed only one non-compliant sample. Lab analysis results of the five compliant samples that the CDEM indicated needed additional rock dust contained between 82.1% and 89.9% IC.

Although research showed that the CDEM provided a true measure of potential mine dust explosibility, MSHA would have difficulty using it to cite violations of 30 CFR 75.403 because it measures different parameters from those used to define compliance with the standard. The CDEM determines sample explosibility based on a dried coal dust and rock dust mixture. In doing so, the CDEM accounts for potential drying of the mine dust, such as that which occurred at UBB; but, MSHA analysis includes moisture as part of the incombustible content of samples in accordance with 30 CFR 75.403-1. The CDEM also bases explosibility on particle size. However, the CDEM could provide operators a reliable tool to test for compliance with 30 CFR 75.403. More importantly, it would allow operators to immediately detect and correct potentially hazardous coal and rock dust mixtures that cannot be visually identified by examiners.

Conclusion: Recently revised inspection procedures and oversight tools significantly improved national enforcement of 30 CFR 75.403. District 4 successfully used these tools to ensure that inspectors issued citations for all non-compliant rock dust surveys conducted at UBB. Analysis of MSHA rock dust

⁴⁷ Budenaers, et al., including reference to USBM RI 5054, 1982, p 5-6

sampling data showed that these tools can be further developed to identify mines with substandard or declining rock-dusting practices, such as UBB.

Inspectors did not identify deficiencies in the Operator's cleanup program or cite violations of 30 CFR 75.400 in the longwall tailgate entries.

- Policy for rock dusting standards, including cleanup programs, did not address best practices for inerting float coal dust generated by longwall mining. Such best practices include the continuous application of rock dust to the air stream at the tailgate end of the longwall face.
- Policy did not provide strategies for requiring operators to revise deficient cleanup programs or identify other enforcement incentives that can be used when operators fail to comply with their programs.

District 4 inspectors did not determine whether the incombustible content of the mine dust was maintained in accordance with 30 CFR 75.403 in numerous areas of the Mine.

- Inspectors did not recognize violations of 30 CFR 75.403 while inspecting older mine workings because MSHA procedures permitted them to visually evaluate the adequacy of rock dust, a practice which studies have shown to be inaccurate.
- Inspectors did not collect any rock dust samples in older mine workings to test the adequacy of the Operator's re-dusting program because MSHA procedures did not direct them to do so unless they believed a violation existed.
- Inspectors did not always collect rock dust samples where MMUs had been recently removed, including the Old 2 Section Panel and the Panel No. 2 Crossover, because District 4 did not effectively implement revised rock dust survey procedures. As a result, experienced inspectors and supervisors continued to employ superseded rock dust survey procedures that only required surveys on currently advancing sections. Without proper on-the-job training and supervisory feedback, oversight, and direction, new inspectors also adopted outdated procedures practiced by their mentors.
- Inspectors did not identify violations of 30 CFR 75.403 at previously wet survey locations because the Mt. Hope Field Office did not effectively track and re-inspect these areas for sampling. MSHA procedures did not direct inspectors to use mine maps or the Rock Dust Survey Wet Locations Tracking Form to identify and track the re-inspection of these areas. Inspectors did not collect any spot samples from previously wet areas at UBB, many of which had sufficiently dried for sampling prior to the explosion. Monitoring rock dust data would have indicated that inspectors in some field offices, including those in Mt. Hope, had not been reporting sample collection from previously wet locations.

Inspectors often evaluated gravity and negligence lower than warranted by conditions and practices at UBB for violations of 30 CFR 75.400 and 75.403. This was due, in part, to issues addressed in the section of this report titled, "Use of Section 104 Enforcement Authority," including inadequate reference to the Operator's examination records. In addition, enforcement actions did not reflect the repeated nature of the Operator's noncompliance with these standards. Inspectors did not cite violations of 30 CFR 75.403 at the time of sampling because they could not determine compliance until receiving the sample analysis results from the lab. However, procedures did not require inspectors to document in their notes the facts needed to evaluate negligence and gravity of potential 30 CFR 75.403 violations when collecting rock dust samples.

While mine operators are not currently required to determine incombustible content of mine dust, the Internal Review team believes this should be a component of an operator's rock-dusting program. As an alternative to lab analysis of samples, new technology (CDEM) provides a screening tool to help manage daily rock dusting operations and to help mitigate the potential for explosion by immediately identifying

areas where additional rock dust is warranted. There is no industry standard for collecting samples of mine dust.

Corrective Actions Taken: On September 21, 2010, MSHA issued *Program Information Bulletin No. P10-18* to provide important information regarding accumulation of combustible materials and rock dust requirements. It advised that areas downwind of belt transfers, the returns of active sections, the tailgates of longwalls, and the bleeder entries often require continuous rock dusting with bulk dusters, trickle dusters or high-pressure rock dusting machines to maintain the required incombustible content levels and suppress float coal dust accumulations.

On September 23, 2010, MSHA issued an Emergency temporary standard (ETS), which became a final rule on June 21, 2011, that increased the minimum incombustible content of mine dust to at least 80% throughout a mine. The final rule further requires that the incombustible content of such combined dust be increased 0.4 percent for each 0.1 percent of methane present.

On October 14, 2010, the Administrator for Coal issued *Procedure Instruction Letter No. I10-V-16*, which provided guidance to enforcement personnel regarding implementation of the ETS. District personnel were advised to review mine operators' cleanup programs and the enforcement history for 30 CFR 75.400. It directed inspectors to collect spot rock dust samples in older areas of mines to determine whether the operator is maintaining the 80% IC requirements of the ETS. Inspection personnel were also advised to consider changes to the cleanup program which would require the use of bulk dusters, trickle dusters or high-pressure rock dusting machines to continuously rock dust the areas downwind of belt transfers, the returns of active sections, the tailgates of longwalls, and the bleeder entries.

The Assistant Secretary directed rock dust spot samples be collected between June 1 and September 8, 2011, and that the results of laboratory analyses be sent to the MSHA headquarters office. Both rock dust surveys and spot sampling were conducted by MSHA enforcement personnel. Of the 41 MMUs either developing longwall gate entries or mining longwall panels, sample results were not available for nine units. Of the 32 MMUs sampled, 11 were found to have incombustible contents less than 80% IC. These 11 mine operators were issued citations for the conditions. Only one of the MMUs sampled less than 70% IC (48.1% IC) with 9 of 10 samples collected in a rock dust survey found to be noncompliant. In each case, corrective actions were taken by the mine operators to raise the incombustible content to abate the citations. The Administrator for Coal also directed inspectors to sample mine dust in all active longwall tailgate entries for compliance with 30 CFR 75.403 in January 2012.

MSHA has improved its performance standard for timeliness for analysis of rock dust by shortening the process by 5 days. MSHA has repaired an out-of-service robot and hired an additional three contract employees for the lab who began work in January and March 2011. Additionally, a full time chemist was hired in October 2011.

Some instrumentation and equipment was purchased for the laboratory, including an ash furnace and two manual weighing stations for rock dust, which were installed in June 2011. Two additional furnaces have been purchased. These instruments will be installed after ongoing building modifications have been completed.

Recommendations: The Assistant Secretary should consider rulemaking to revise 30 CFR 75.402 to require the use of:

- high-pressure rock-dusting machines to continuously apply rock dust into the air stream at the tailgate end of the longwall face whenever cutting coal;
- rock-dusting machines to regularly apply rock dust at the outby edges of active pillar lines on retreating continuous mining machine sections; and
- rock-dusting machines to regularly apply rock dust at approaches to other inaccessible areas downwind of coal dust-generating sources.

The Administrator for Coal should direct the revision of the *Program Policy Manual* for 30 CFR 75.400-2 to clarify that the cleanup program required by this standard also applies to methods for preventing accumulations of coal and float coal dust on retreating sections, including longwalls. Policy should provide strategies for requiring operators to revise deficient cleanup programs or identify other enforcement incentives that can be used when operators fail to comply with their programs.

The Assistant Secretary should consider rulemaking to require mine operators to regularly determine the adequacy of rock dusting using a method approved by the Secretary. This could be achieved by requiring mine operators to sample mine dust for analysis or conduct CDEM testing at sufficient locations and intervals to determine if any area of the mine needs re-dusting. The rule should consider requirements for certification, recordkeeping (including a map of sample locations), and corrective actions similar to examination standards. During the interim, the Administrator for Coal should issue a Program Information Bulletin advising operators of the need for them to sample or test mine dust to ensure compliance with 30 CFR 75.403. Upon implementation of such rule, the Administrator should consider revising inspection procedures to replace tracking of wet sample locations with a spot sampling program in outby areas sufficient to evaluate the operators' sampling program.

The Administrator for Coal should collaborate with the Director of Technical Support and NIOSH to develop a standard method for collecting mine dust samples for operators and inspectors to use to determine compliance with 30 CFR 75.403. The Agency should consider recent research regarding sample collection methodology, including that related to sample depth and elevated surfaces.

The Administrator for Coal should direct the revision of the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* to improve planning, tracking, and oversight of rock dust sampling.

- Inspectors should be directed to evaluate the adequacy of rock dust maintenance by collecting spot samples from a representative number of locations in outby areas. Sampling strategies should provide analysis results ahead of second mining, including longwall gate entries.
- Inspectors should be directed to plot rock dust sample locations on regular inspection tracking maps. Sample collection dates and locations too wet to sample should be specified on the map.
- Consideration should be given to replacing the Rock Dust Survey Wet Locations Tracking Form with tracking maps, or provide instruction to use the Form in the Handbook. If retained, the Form should be modified to include documentation of the inspector's name and date that the wet area was re-inspected. Also, the sample location status options on the Form should match those available on the computer application.
- Inspectors should be directed to document in their notes the locations of section loading points and the last row of samples collected during rock dust surveys.
- When collecting rock dust samples, inspectors should be directed to document in their notes the facts needed to evaluate negligence and gravity of potential 30 CFR 75.403 violations.
- Inspectors should be directed to collect crosscut samples in the first row of each rock dust survey and in each third row thereafter.
- Inspectors should be directed to resample non-compliant locations after re-dusting and before terminating any related enforcement actions.
- Enforcement procedures should ensure re-dusting at all noncompliant sample locations, even if the survey was compliant.

The Director of PEIR should provide the following to enhance enforcement of 30 CFR 75.403 and minimize rock dust data input errors.

- The RDSS and RDDR applications should be incorporated into IPAL and MSIS.

- The Rock Dust Sample Submission Form and the MSHA enterprise database should be modified to include fields to document the location of the last row of samples collected during rock dust surveys.
- Lab analysis reports should be modified to include surveys where no samples were submitted for analysis (e.g., all wet sample locations) to confirm data transfer. Such documents should be included in inspection reports, consistent with current MSHA inspection procedures, rather than Rock Dust Sample Submission Forms.
- Standard oversight reports should be developed and distributed to headquarters, district, and field offices to monitor:
 - Rock dust surveys with no samples collected, including surveys containing all “No Sample” or “Wet” locations.
 - Sample collection rates from previously wet locations for each underground bituminous coal mine.
 - Non-compliant spot rock dust samples with no subsequent enforcement actions. This may require additional fields on the Rock Dust Sample Submission Form showing the purpose for collecting a spot sample (i.e., previously wet sample location, violation abatement sample, or compliance sample).

The Administrator for Coal should direct that training be provided to supervisors on using standard oversight reports to ensure inspectors have valid reasons for not collecting samples, including visiting some areas that inspectors indicated were too wet to sample.

Enforcement of 30 CFR 75.1725(a)

Machinery and equipment; operation and maintenance

Requirements: Mandatory safety standard 30 CFR 75.1725(a) stated “Mobile and stationary machinery and equipment shall be maintained in safe operating condition and machinery or equipment in unsafe condition shall be removed from service immediately.”

MSHA Policies and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated, “Each piece of in-service section equipment shall be inspected to determine compliance with applicable standards.”

Statement of Facts: The MSHA Accident Investigation team determined that Performance Coal Company failed to maintain the longwall shearer in safe operating condition. At least two worn bits were found on the outby bit ring on the tail drum. Both bits were clearly missing the carbide tips. These bits had noticeably large wear flats on them. Frictional heat from the worn bits striking rock is the most likely source of the ignition for the April 5, 2010, explosion. The Accident Investigation team determined this violation contributed to the explosion and issued a section 104(a) citation (No. 8227549) for the Operator’s failure to comply with 30 CFR 75.1725(a).

The Accident Investigation team also issued eight non-contributory section 104(a) citations under 30 CFR 75.1725(a) during the accident investigation. Inspection teams from outside District 4 issued five additional section 104(a) citations under this standard during other inspections conducted at UBB in 2010 after the explosion. None of these other citations involved worn bits on the longwall shearer cutting drums.

During the review period, there were a total of 584 violations cited under this standard at District 4 mines. These included 570 section 104(a) citations, four section 104(d)(1) citations, six section 104(d)(1) orders, and four section 104(d)(2) orders. Fifteen of the section 104(a) citations were issued at UBB. None of these 15 citations were issued for worn bits on the longwall shearer cutting drums or on continuous mining machine cutting heads.

District 4 personnel were interviewed to determine their understanding of 30 CFR 75.1725(a) in relation to worn, damaged, or missing bits. Three persons interviewed stated worn, damaged, or missing bits would be a violation of 30 CFR 75.1725(a). Four other persons stated this could be a violation of the UBB methane and dust control plan. Eight more persons stated that this could be a violation of either the plan or the standard.

The District 4 Standard Operating Procedures for methane and dust control plans states: "...all MMU plans will contain the following as additional information or provisions required by the District Manager under the authority of 75.371." One of the provisions was: "... at least 90 percent of the cutting bits will be maintained with carbon inserts intact and missing or damaged bit blocks or bit lugs will be replaced within 24 hours."

The Internal Review team learned that District 4 included this provision in the methane and dust control plans for MMUs utilizing continuous mining machines. However, this stipulation was not included in the methane and dust control plan for the longwall section at UBB. Three District 4 managers indicated in their interviews that bit wear should be enforced in the same manner for longwall shearers and continuous mining machines. No explanation was given by the managers as to why this provision was not contained in longwall section methane and dust control plans.

During the review period, District 4 inspectors cited ten violations of operators' methane and dust control plans in situations in which the bits on the cutting heads of continuous mining machines were not maintained in accordance with the plans. None of these violations were cited at Mt. Hope Field Office mines.

District 4 personnel documented conducting inspections on the longwall face at UBB on 16 occasions during the review period. During five inspections, inspectors examined the longwall shearer and cutting drums. Inspectors documented bits being replaced during two other visits. In these 16 inspections, none of the inspectors cited a violation of 30 CFR 75.1725(a) for worn bits.

Inspection notes show that MSHA first inspected the longwall equipment, including the shearer, on September 27, 2009. The inspection notes do not mention anything about the bits on the cutting drums. The inspector documented that no violations were observed on the shearer. This inspector left the Agency before he could be interviewed by the Internal Review team.

Another inspector conducted an inspection of the longwall equipment on December 29, 2009. When interviewed, the inspector who conducted this inspection stated he did not check the bits on the cutting drums because the section was not producing. He stated, "If it'd been running I probably would have checked that..." He added, "That would have been checked when they ran dust," referring to the required respirable dust surveys. He also stated that he would probably cite worn bits as a violation of the methane and dust control plan rather than 30 CFR 75.1725(a).

The longwall equipment and shearer were inspected on March 15, 2010, as part of the second regular inspection for fiscal 2010. The inspection notes documented that no violations were observed on the shearer. The notes do not mention bits. A ROE trainee traveled with the inspector on this date. The Internal Review team learned during interviews that the trainee conducted the inspection on some of the longwall equipment along the face, including the shearer, while the inspector remained on the headgate side of the longwall panel. When asked if he checked the shearer for worn or missing bits, the trainee answered, "No."

District 4 personnel conducted two respirable dust surveys on the longwall section. The first of these respirable dust surveys was conducted on November 10, 2009. The inspector documented checking the shearer in his notes. When asked if he recalled checking the bits, he stated, "They were - a lot of them were changed out..." He did not cite any violations during that day's inspection. When asked if he believed that worn or missing bits would be a violation of 30 CFR 75.1725(a), he stated, "I never heard of it being issued under 1725(a)." He believed this condition was addressed by the methane and dust control plan.

A different inspector conducted the second respirable dust survey on the longwall section on March 23, 2010. He documented inspecting the shearer and observing the crew “set bits” in his notes. During an interview, when asked if he checked for bit wear, he answered: “The best I can remember when they went to the tail - when they arrived at the tail, they changed bits; when they arrived at the head, they changed bits in between. I mean every pass that they made, but to actually stop the shearers and say lift your bits, no.” When asked if worn or missing bits could be cited under 30 CFR 75.1725(a), he answered, “I’m aware of that standard, but not I guess citing it under this standard.” He also thought it was a methane and dust control plan requirement. This inspector did not issue any citations or orders on this day.

This was the last MSHA presence on the longwall prior to the explosion, which occurred 13 days later. The bits on the shearer would have been changed out several times between this date and the time of the explosion.

Conclusion: Because the last District 4 inspection of the 1 North Longwall face was conducted on March 23, there was no opportunity for an inspector to observe the two worn bits cited in the contributory violation. However, District 4 personnel did not always conduct an adequate inspection of the longwall shearer. When the shearer was not operating, inspectors did not examine the bits to determine if they were maintained in safe operating condition.

District 4 personnel understood the requirements of 30 CFR 75.1725(a). However, not all District 4 personnel knew or believed that worn or missing bits on the longwall shearer would be a violation of 30 CFR 75.1725(a). This may have resulted from approving methane and dust control plans which allowed continuous mining machines to be operated with up to 10% of the cutting bits missing the carbon inserts. Missing or damaged bit lugs and bit lug inserts were allowed to be replaced within 24 hours, indicating the continuous mining machine could continue to operate until repairs were completed. The UBB longwall methane and dust control plan did not contain these provisions.

District 4’s practice of allowing the Operator to continue producing coal with up to 10% of the cutting bits missing the carbon inserts on continuous mining machines is not always consistent with provisions of 30 CFR 75.1725(a).

Recommendations: The Administrator for Coal should direct the revision of the *Program Policy Manual* to establish policy for determining compliance with 30 CFR 75.1725(a) as it relates to damaged or missing cutting bits, bit lugs, or bit lug inserts on continuous mining machines and longwall shearers.

Enforcement of Specific Standards – Non-Contributory Violations

This section of the report addresses other enforcement issues examined by the Internal Review team. These issues are not related to MSHA enforcement of the specific safety standards that were cited by the MSHA Accident Investigation team as contributing to or causing the April 5, 2010, explosion, but are germane to MSHA activities at UBB prior to the accident. In total, the Accident Investigation team cited 360 non-contributory violations in the explosion area. A detailed discussion of significant non-contributory violations is contained in Appendix D.

Mine Plan Approvals

This section addresses general procedures for review and approval of mine plans and supplements to mine plans. The Internal Review team obtained copies of all plans and supplements submitted by Performance Coal Company for UBB during the review period, and the documentation maintained by District 4 for reviews of these plans and supplements. Interviews were conducted with personnel from the District technical departments, inspectors, supervisors, and managers. In addition, the Internal Review team considered pertinent information from previous years in order to address and consider historical documentation related to specific mine plans. These documents included: plans and plan supplements reviewed by the District; mine maps; inspection reports; citations and orders; the MSHA Standardized

Information System (MSIS) data; Agency directives; accident reports; and technical studies. The information collected was used to determine whether the approval or disapproval decisions made by the District 4 Manager with respect to the mine plans for UBB were in accordance with the provisions of the Mine Act and MSHA regulations, policies, and procedures.

Mine Ventilation Plan

Submittal and Approval Process

Requirements: Mandatory safety standard 30 CFR 75.370 addressed requirements related to the submittal and approval of mine ventilation plans.

Subparagraph (a)(1) required that each operator develop and follow a ventilation plan designed to control methane and respirable dust and that the plan be suitable to the conditions and mining system at the mine.

Subparagraph (a)(2) required that the proposed ventilation plan and any revision to the plan be submitted in writing to the district manager.

Subparagraph (c)(1) and (2) required the district manager to make written notifications of plan approvals and denials to the mine operators. If the district manager denies approval, the deficiencies of the plan or revision shall be specified in writing and the operator will be provided an opportunity to discuss the deficiencies with the district manager.

Subparagraph (d) specified that no proposed ventilation plan shall be implemented before it is approved by the district manager.

Subparagraph (g) required that the ventilation plan for each mine be reviewed every 6 months by an authorized representative of the Secretary to assure that it is suitable to current conditions in the mine.

Mandatory safety standard 30 CFR 75.371 listed the contents required to be included in the ventilation plan submitted by the operator. There were 51 separate subparagraphs of this standard, many containing multiple requirements, which must be reviewed by district personnel.

Mandatory safety standard 30 CFR 75.372 listed the information required to be shown on the mine ventilation map. There were 20 subparagraphs of this standard, many containing multiple requirements, which must be reviewed by district personnel.

MSHA Policies and Procedures: The *Program Policy Manual* outlined basic principles to be applied in administering each district's mine plan approval responsibilities. If a revision to a plan is denied, Volume V, V.G-4 states the operator could notify the District that, as of a certain date, the mine's existing approved plan is no longer adopted by the operator, and that the operator intends to adopt the proposed change which was not approved. On that date, a section 104(a) citation, technical in nature, would be issued for the operator's failure to have and adopt an approved plan. Abatement would be achieved by the operator promptly adopting the provisions of the most recently approved plan for the mine.

The case of a new mine plan with a provision that cannot be approved could be handled in a similar manner. The operator could indicate that mining operations will begin on a particular date, using the plan that contains the provision which is not approved. On the date indicated for starting operations, a citation would be issued for failure to adopt and follow an approved plan, as required by the applicable standard. Abatement would be achieved by the operator promptly adopting provisions that satisfy MSHA's previously documented concerns.

In each of these cases, the operator would have the option of contesting the citation issued and presenting to an administrative law judge the reasons why the disputed plan provision should have been approved. Likewise, MSHA would be able to present reasons for revoking or denying approval.

The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated that during each regular inspection, the inspector shall “ascertain compliance with mandatory health and safety standards [and] approved plans (including suitability to current mine conditions).”

The *Mine Ventilation Plan Approval Procedures Handbook*, PH92-V-6, established guidelines and instructions for evaluating, processing, and reviewing mine ventilation plans. The plans submitted by the mine operators are to be critically reviewed to ensure: plans contain the information required by 30 CFR 75.371; mine maps include all of the basic information required by 30 CFR 75.372; and plans do not contain any statements which are inconsistent with existing mandatory regulations. After a thorough review of a proposed plan or revision, the operator must be notified in writing whether the proposed plan or revision is acceptable.

If a plan or supplement is acceptable, 30 CFR 75.370(c)(1) requires the district manager to send written notification to the operator that approval is granted. If a separate standard or a provision of a ventilation plan has been determined by MSHA to be unsuitable to the particular conditions at the mine, the district manager may require revisions by the operator. MSHA will advise the operator of the deficiencies of the proposed plan or supplement for which approval is denied. The operator is then given an opportunity to discuss with the district manager the problems identified and potential solutions. If provision(s) cannot be approved, MSHA procedures established in the Program Policy Manual, Volume V, V.G-4 may be applied.

The Handbook included guidance for using the MSHA Form 2000-204 (Plan Review Form) to document the completion of a 6-month ventilation plan review conducted by regular inspectors and to permit comment by the inspectors on the adequacy of the plan. The Handbook also directed that:

Each 6-month review should include a physical inspection of the mine ventilation system by either a ventilation specialist or regular inspector... Regular inspectors assigned to conduct ventilation reviews should schedule sufficient underground activities to evaluate the application and adequacy of the ventilation plan.

Procedure Instruction Letter No. I09-V-03, issued June 18, 2009 (Reissue of *I06-V-01*), stated:

Only one roof control plan or mine ventilation plan with plan addenda can be approved for each mine (working section) at any given time. The number of plan addenda should be limited and fully revised plans requested when needed to clarify what constitutes the approved plan. Mine operators cannot be required to submit separate dust control plans.... Where a ventilation plan and a dust control plan have been submitted and approved separately... those separate plans are to be consolidated into a single plan subject to a single review date.

The *Uniform Mine File Procedures Handbook*, PH09-V-01, last revised in July 2009, provided guidelines and procedures to Coal personnel for reviewing and maintaining orderly and complete mine information files.

Statement of Facts: MSIS data indicated that mine operators submitted 1,702 proposed ventilation plans and revisions to District 4 for approval during the review period. As shown in Table 18, District 4 received 19% of all such plans nationwide during that time.

Table 18 - Ventilation Plans and Addenda Submitted per District (October 1, 2008 - March 31, 2010)

District	1	2	3	4	5	6	7	8	9	10	11
Vent. Plan Submittals	58	1,296	894	1,702	867	1,310	935	650	802	352	242
Percent of National	1%	14%	10%	19%	9%	14%	10%	7%	9%	4%	3%

Based on interviews, the Ventilation and Health Departments had a considerable backlog of plans and supplements due to inadequate staffing and the number of plans submitted by mine operators. As staffing was increased in each department, the backlog of plans decreased. However, District 4 management believed that staffing levels were inadequate to eliminate the backlogs.

District 4 divided responsibility for reviewing portions of the ventilation plan between its Ventilation and Health Departments. In addition to ventilation plans, the Ventilation Department processed plans submitted by mine operators for: alternative borehole patterns described in 30 CFR 75.388(g); mining into inaccessible areas described in 30 CFR 75.389; the ventilation portion of slope and shaft sinking plans described in 30 CFR 77.1900; gas and oil well permits described in 30 CFR 75.1700; and plans for reopening abandoned mines described in 30 CFR 75.1721. During the review period, the Ventilation Department received and processed 175 of these other plans.

In District 4, mine operators submitted portions of their ventilation plans related to respirable dust control as separate plans. Collectively referenced by District 4 as “methane and dust control plans,” these included the following for each mine: (1) General Respirable Dust Control Plan; (2) Mechanized Mining Unit (MMU) Plan(s); (3) Designated Area (DA) Sampling Plan(s); and (4) Mine Wide Construction Plan. The District 4 Health Department reviewed “methane and dust control plans” and supplements for adequacy and made recommendations to the District 4 Manager regarding their approval. The District 4 Ventilation Department reviewed all other material submitted pursuant to 30 CFR 75.370(a)(1), collectively referred to by District 4 as “ventilation plans.”

The Health Department standard operating procedure (SOP) stated that: “District 4 has methane and dust control plans for each mine routed separate from the ventilation plan.” Accordingly, each type of plan or supplement was processed, tracked, approved, and filed separately. Requiring operators to submit separate methane and dust control plans that were subject to different review dates conflicted with MSHA guidance specified in *Procedure Instruction Letter No. I09-V-03*.

During interviews, District 4 personnel stated that they did not know when the longstanding practice of reviewing and approving methane and dust control plans separately from the remainder of the ventilation plan started, but it existed for decades. Most of them recalled receiving *PIL No. I09-V-03* and its plan consolidation requirements; however, they deferred to the District 4 Health Department SOP that continued to require separate plan review and approval.

District 4 personnel also indicated that separating the methane and dust control portion of the plan from the mine ventilation plan had several advantages. These included providing less cumbersome documentation for the inspectors and specialists in the field and placing a greater emphasis on controlling respirable dust and quartz on individual MMUs. However, specialist groups did not always coordinate reviews. The following are examples of discrepancies found between approved plans:

- The methane and dust control plan (MMU plan) for the 1 North Longwall (MMU 050-0), approved on June 15, 2009, required 40,000 cfm of intake air for the section. However, Performance Coal Company later submitted a ventilation plan supplement, approved on August 6, 2009, that included a map showing a minimum longwall intake quantity of 30,000 cfm. In interviews, the District Ventilation Department personnel indicated that approving 30,000 cfm was an oversight.
- The ventilation plan contained four drawings illustrating ventilation on working sections, none of which addressed mining with two continuous mining machines simultaneously. Some of the approved MMU plans contained section drawings with a statement that specifically stated that only one continuous mining machine could operate at a time when utilizing “split” ventilation. The roof control plan, approved December 23, 2009, stated: “When using split-type ventilation, both continuous miners may mine coal at the same time.” Two working sections were ventilated with split-type ventilation, where two continuous mining machines operated simultaneously.
- The MMU 050-0 plan, approved June 15, 2009, contained a drawing that did not show stoppings separating the active longwall tailgate travelway from the adjacent pillared area. This MMU plan also did not show stoppings separating the belt from the No. 2 headgate entry on the active longwall panel. The ventilation plan approved September 11, 2009, required stoppings at these locations. Additionally, the MMU plan showed the No. 3 entry providing intake air to the

longwall face, but the ventilation plan showed this entry being used as a return for a development section.

The Health Department SOP specified acceptable provisions and dust control parameters for recommending MMU plans for approval. These guidelines were included as minimum requirements on plan approval checklists for the specialists' use when reviewing plans. Plans that met the minimum guidance in the checklists were recommended for approval. When proposed plans involved deep cuts, specialists also conducted in-mine evaluations.⁴⁸

The Health Department SOP further stated that: "If the plan submitted by the operator does not meet minimum controls required by these SOPs, the Inspection Division Health Specialist shall arrange for correction of the plan with the mine operator or his agent. Written documentation of these changes shall be maintained with the plan." The Ventilation Department SOP did not contain a similar requirement. In interviews, personnel from the District 4 Health and Ventilation Departments explained that they did not always maintain documentation (e.g., e-mails, faxes, etc.) with the plan review files that provided instructions and authorizations from operators to replace the original pages of their submittals with subsequently updated or corrected pages.

As provided in the SOPs, plans and supplements were routed through the respective field office supervisor, the Assistant District Manager for Enforcement (ADM-Enforcement), and the ADM-Technical for input and concurrence. The SOPs directed all persons reviewing the individual plans to initial and date a "Plan Approval Cover Sheet" prior to forwarding the plan with a recommendation to the District Manager. Once the District Manager approved or denied approval of the plan, a letter was sent to the operator notifying the operator of the final decision. Under the *Mine Ventilation Plan Approval Procedures Handbook*, the ADM-Technical was responsible for coordination and timeliness of the plan review process. However, the District 4 SOPs did not direct proposed plans to be routed to specialist departments responsible for reviewing other plans that could be affected by the proposed stipulations. The PPM states the following:

There are some fundamental management system controls necessary for proper administration of the plan and program approval process which must be developed and written for each District. These controls should accomplish...[c]oordination of the progress of the plan through the approval procedures by a supervisory technical specialist or engineer to ensure that...cross-communication with other plan approval groups occurs when appropriate.

In June 2008, two ventilation specialists and a supervisor were assigned to the District 4 Ventilation Department. The Administrator for Coal temporarily assigned personnel from other districts to assist the District 4 Ventilation Department in the review of ventilation plans and supplements. In December 2010, the Ventilation Department had grown to six ventilation specialists and a supervisor. There were one or two inspectors stationed in each of the field offices designated as "ventilation specialists," but due to the inspection workload they were not utilized to conduct specialist duties.

At the beginning of the review period, the District 4 Health Department was comprised of two health specialists and a supervisor. There was one additional inspector designated as a "health specialist" stationed in four of the seven field offices. In May 2009, a third health specialist was added to the District staff and health specialists were stationed in two additional field offices. The health specialists in the district office were primarily responsible for reviewing plans. They also conducted in-mine evaluations of proposed deep cut plans and supplements. When time permitted, they conducted follow-up respirable dust sampling on non-compliant MMUs. The field office specialists primarily conducted respirable dust sampling at the mines in conjunction with the regular inspections and were supervised by the respective field office supervisor.

⁴⁸ A deep cut (or extended cut) is defined as any cut in which the on-board manual controls of the continuous mining machine are advanced in by the last row of permanent roof supports or any cut in which the mining machine is advanced more than 20 feet in by the last row of permanent roof supports. This measurement is made from the last fully completed row of undisturbed roof bolts to the point of deepest penetration of the working face.

In fiscal 2009, District 4 received 695 ventilation plans and supplements, including 44 from UBB. The average time for processing (including review and approval, disapproval, acknowledgement, or termination) was 36 days. In fiscal 2010 (until March 31, 2010), District 4 received 412 ventilation plans and supplements, including 34 from UBB. The average time for processing was 27 days. During the review period, 18 of 78 ventilation plan reviews for UBB (23%) exceeded the 45 calendar days allowed for completing plan reviews, as specified in the *Mine Ventilation Plan Approval Procedures Handbook*.

In fiscal 2009, District 4 received 339 MMU plans and supplements, including 15 for UBB. The average time for processing was 37 days. In fiscal 2010 (until March 31, 2010), District 4 received 256 MMU plans and supplements, including 7 from UBB. The average time for processing was 37 days. During the review period, 10 of 22 MMU plan reviews for UBB (46%) exceeded the 45-day time frame, as specified in the Handbook.

Regarding the MMU plan backlog and the amount of time spent processing MMU plans for UBB, the Health Department supervisor stated in his interview that:

You've got to understand who I'm dealing with. I'm not being sarcastic, but Massey is like -- this plan with them is like pulling teeth.... What we do, we go through the plan approval process and just like we give a certain time to submit this plan, then they won't submit the plan until right up to the last minute to keep from getting a (b) order.... So they send the plan the last minute and then you go and it's sitting over here amongst -- during this time, I'm talking 80 and 90 plans that we're sitting on, trying to get approved, so it goes back in the bottom of the pile and then by the time it comes time to work on it again, well, the -- the citations is due so we've got to extend it again. There again, it's because of the manpower and the amount of plans that we've been dealing with.

The District 4 ADM-Technical indicated in his interview that he instructed the department supervisors to ensure the quality of the plans. While the departments were aware of their requirement to meet the 45-day time frame to process plans, it was considered a secondary goal to attaining quality plans.

At the time of the explosion, 14 approved MMU plans were in effect for UBB. There were 13 plans for continuous mining machine MMUs and one for the longwall mining machine MMU. Three of the continuous mining machine MMUs (029-0, 040-0, and 062-0) and the longwall MMU (050-0) were in a "producing" status.

District 4 provided the Internal Review team with a General Dust Control Plan for the Peabody Coal Company, Montcoal Eagle Mine, approved on October 5, 1994, which addressed dust control at dumps, crushers, transfer points, and haulageways, as required by 30 CFR 75.371(u). Performance Coal Company acquired the Mine on October 15, 1994. The plan was not updated by the new Operator.

On November 18, 2009, a District 4 inspector issued a citation under 30 CFR 75.371(t) for the Operator's failure to update its Designated Area (DA) plan. The latest DA plan was approved February 29, 2008, and was in effect prior to the startup of the 1 North Longwall panel (MMU 050-0). The plan did not include a DA for the longwall belt tailpiece. The citation listed the termination due date as December 1, 2009. As a result of the citation, the Operator submitted an updated DA plan. However, the updated DA plan was not received until December 14, 2009, 13 days after termination of the citation was due. On December 16, 2009, the citation was extended until January 1, 2010, to allow additional time for review of the revised plan. The citation again was extended on January 11 until January 31, 2010, to allow additional time for review. The plan was approved on January 22, 2010. The citation was terminated on February 11, 2010, 85 days after it was issued.

The plan identified the DA for the longwall belt tailpiece as "850-0" with an associated 1.0 mg/m³ respirable dust standard. The longwall section commenced mining on September 10, 2009. By the time the Operator took a respirable dust sample at this location on February 26, 2010, for the February – March 2010 bimonthly sampling period, the longwall had operated for over five months. At that time, approximately 50% of the coal had been mined from the longwall panel.

The Health Department supervisor stated that occasionally mine operators will use a continuous mining machine to cut overcasts or to grade mine floor, and dust migrates downwind toward the miners. District 4 requires the mine operator to submit a mine-wide construction plan to address necessary dust control parameters for protection of the affected miners on these occasions. At the time of the explosion, there were no mine-wide construction plans in effect for UBB.

On February 16, 2010, the Operator submitted a six-phase ventilation plan supplement which proposed various ventilation changes in the Lower Big Branch section of the mine in order to develop entries, set up a longwall panel, and commence mining the new panel. Phase two of the plan indicated the construction of two overcasts near the “Ellis 5 Head Construction Area.” During the regular inspection conducted after the explosion, inspectors found that two continuous mining machines (from MMU 042-0 and 043-0) had been used to cut two overcasts in this area. A mine-wide construction plan had not been submitted by the Operator for this activity.

Conclusion: District 4 did not follow national guidance outlined in *PIL No. 109-V-03*, which specified separate ventilation and dust control plans were to be consolidated into a single mine ventilation plan subject to a single review date. Mine operators continued to submit separate plans and supplements to the District, a practice that had existed for decades. However, this did not appear to have an impact on the quality of the methane and dust control plans approved during the review period.

The ADM-Technical did not establish procedures to provide sufficient coordination between the technical departments under his direction during the plan review process. Specialist departments did not effectively communicate to ensure that the requirements of the various plans and supplements were consistent. This resulted in inconsistencies between the roof control plan, dust control plan, and ventilation plan that had the potential to adversely affect the safety and health of the miners at UBB.

The average time to process methane and dust control plans and supplements for all mines in District 4 during the review period was within the 45-day period specified in the *Mine Ventilation Plan Approval Procedures Handbook*. However, 18 (23%) of 78 ventilation plan reviews and 10 (46%) of 22 MMU plan reviews for UBB exceeded the 45-day time frame. The Internal Review team believes that, in significant part, the additional time needed to process MMU plans for UBB was the result of the Operator’s failure to address plan deficiencies in a timely manner, understaffing, and the large volume of plans submitted.

The MMU plans did not always reflect current conditions in the Mine. The General Dust Control Plan was outdated, the DA plan was not updated to include the longwall belt tailpiece, and the Operator had not submitted a mine-wide construction plan for the construction activities in the Lower Big Branch portion of the Mine.

Specialists did not always maintain a record of written correspondence with mine operators regarding proposed plan reviews, particularly regarding changes to proposed plans submitted by operators during the review process.

Corrective Actions Taken: The Administrator for Coal directed District 4 and 12 Managers to consolidate the ventilation plan and the methane and dust control plans into a single mine ventilation plan subject to a single review date.

Recommendations: The Administrator for Coal should direct staff to audit the District 4 and 12 ventilation plans to determine whether the methane and dust control plans have been incorporated into the mine ventilation plans, subject to a single review date.

The Administrator for Coal should direct the District 4 and 12 Managers to revise the technical department SOPs to provide for the review of each proposed plan or revision by appropriate technical departments to check for consistency with other plans approved for the mine. A method for documenting this process should be established. These SOPs should direct specialists to maintain a record of all written correspondence with mine operators regarding proposed plan reviews, particularly regarding changes to proposed plans submitted by operators during the review process.

The Director of PEIR should collaborate with the Administrator for Coal to revise the Mine Plan Approval (MPA) database system to track the time required to process ventilation plans and supplements. The Administrator should direct district managers to use MPA to monitor the time required to process plans and take appropriate administrative actions when necessary.

Six-month Reviews of the Mine Ventilation Plan

Statement of Facts: On three occasions during the review period, ventilation specialists visited UBB to evaluate the ventilation system. Additionally, field office inspectors were credited, although unknowingly, with conducting the in-mine portion of six-month plan reviews when they conducted the physical inspection of the Mine. However, inspection notes and interviews indicated the field office inspectors did not conduct their reviews in accordance with the *Mine Ventilation Plan Approval Procedures Handbook*, because inspectors were not trained in the procedures for conducting six-month reviews.

At the end of each regular inspection conducted at UBB during the review period, a field office inspector completed a Plan Review Form (MSHA 2000-204), which District 4 used to document completion of the six-month ventilation plan review required by 30 CFR 75.370(g). The forms were used by the District 4 Ventilation Department to satisfy the six-month review requirement for an in-mine physical inspection of the mine ventilation.

In all but one case, regular inspectors indicated on the Plan Review Form that the ventilation plan was adequate. The form, dated July 20, 2009, indicated deficiencies in the methane and dust control plans for two continuous mining machine sections (MMUs 029-0 and 040-0). The form indicated: "...this plan does not require a minimum cfm in idled faces to dilute and carry away harmful gases and dust. Methane has been found in idled faces that range from 0.3% to 0.8%." To address the inspector's concerns, the Operator revised both MMU plans by adding the following statement: "A minimum of 3,000 cfm will be maintained in all idle faces." The plans were subsequently approved on January 26, 2010.

While the ventilation system was evaluated by a number of inspectors and specialists during the course of regular inspections, only the lead inspectors signed the completed Plan Review Forms. During interviews, Mt. Hope Field Office inspectors indicated that they were not trained in or aware of procedures for conducting six-month ventilation plan reviews. Furthermore, these inspectors were not aware that their inspections and completed Plan Review Forms were being used to satisfy the six-month review requirement for an in-mine physical inspection of the mine ventilation system.

In accordance with the *Mine Ventilation Plan Approval Procedures Handbook*, District 4 sent correspondence to the Operator for all but one of the six-month plan reviews during the review period. However, none of the letters identified the material which constituted the complete approved plan, as specified in the Handbook. This issue also was identified by the Internal Review of MSHA's actions at the Aracoma Alma Mine #1 (Aracoma).

The Health Department did not participate in the six-month mine ventilation plan reviews conducted by the Ventilation Department. Instead, the Health Department SOP stated that:

Reviews of Methane and Dust Control Plans (as a portion of the approved Ventilation Plan) will be completed quarterly by an authorized representative of the Secretary to assure that the plans are suitable to current conditions in the mine. The inspector assigned to the mine will complete an in-depth 2000-86 form each E01 inspection for all producing MMUs. The information on the 2000-86 forms will be used to satisfy the MMU portion(s) of the approved ventilation plan as required by 30 CFR 75.370(g).

Accordingly, inspectors and specialists completed an MSHA Form 2000-86 during regular inspections when they conducted respirable dust sampling for each producing MMU and concurrently reviewed the corresponding methane and dust control plan. This procedure satisfied the Handbook provision for conducting an in-mine visit to observe the methane and dust control parameters used on each producing MMU. However, this portion of the review was not referenced in any correspondence to the Operator identifying the material constituting the complete approved plan.

Conclusion: While District 4 sent letters to the Operator after six-month reviews, the letters did not identify the materials that constituted complete approved mine ventilation plans. However, the Operator was sent copies of the individual plans and supplements after they were approved.

District 4 inspectors were not properly trained on the procedures outlined in the *Mine Ventilation Plan Approval Procedures Handbook* regarding six-month plan reviews. They were not aware that their inspections and completed MSHA 2000-204 forms were used to satisfy the six-month review requirement for an in-mine physical inspection of the mine ventilation system. The Internal Review team found several deficiencies in the mine ventilation plans which should have been identified and addressed as a result of six-month plan reviews.

The Health Department did not provide input to correspondence to the Operator prepared by the Ventilation Department after each six-month plan review. Although District 4 considered the approved methane and dust control plans to be part of the mine ventilation plan, the letters sent to the Operator did not identify these plans as part of the complete approved mine ventilation plans. However, the Operator was sent copies of the individual plans and supplements after they were approved.

Recommendations: The Administrator for Coal should direct the Districts 4 and 12 Managers to provide inspectors and specialists with training to ensure that six-month reviews are conducted and documented in accordance with the *Mine Ventilation Plan Approval Procedures Handbook*. District managers should monitor the six-month reviews after the training is completed to verify its effectiveness and take follow-up corrective action if necessary.

The Administrator for Coal should direct the revision of the *Mine Ventilation Plan Approval Procedures Handbook* to specify that ventilation specialists conduct the physical inspection portion of six-month ventilation plan reviews for mines with complex ventilation systems, such as those with longwall mining.

The Administrator for Coal should direct the District 4 and 12 Managers to revise SOPs to ensure that both the Health and Ventilation Departments contribute to the correspondence sent to mine operators after each six-month ventilation plan review.

Ventilation Base Plans and Annual Mine Ventilation Maps

Statement of Facts: The ventilation base plan in effect at the start of the review period (designated by MSHA as B-4) was approved on April 14, 2005, and remained in effect until September 11, 2009. During this time, Performance Coal Company submitted 96 supplements and two additional base plans. The B-4 base plan contained numerous deficiencies. The majority of these were corrected in the subsequently approved B-6 base plan.

The mine ventilation map in effect at the start of the review period was received by MSHA on April 30, 2007. The Operator later submitted a revised map to meet the annual filing requirements of 30 CFR 75.372(a)(1), which District 4 received on June 6, 2008. However, MSHA did not complete its review of the map until November 17, 2008, 165 days after receipt. The Ventilation Department did not explain why this review exceeded 45 days on either the ventilation plan review cover sheet or in MSIS data, as specified in their SOP. The Operator continued to propose inadequate corrections to address deficiencies identified by the Ventilation Department, prolonging the review process.

District 4 ventilation specialists did not issue a citation, as required by section 104 of the Mine Act, when they determined that the Operator failed to submit information required by 30 CFR 75.372(b). Instead, the District Manager sent a letter to the Operator which contained the following statement: “An accurate and acceptable ventilation map, addressing the deficiencies noted on the attached map, should be resubmitted to this office within 10 days, after receipt of this letter, or be subject to appropriate enforcement action.”

If District 4 had issued a citation for the 30 CFR 75.372(b) violation, a 10-day termination due date could have been established for the Operator to submit a corrected map. Instead, District 4 did not receive an updated map from the Operator in response to this request until 28 days later, on December 15, 2008. District 4 completed their review of this map a month later, again finding that it did not meet the

requirements of 30 CFR 75.372(b), finally issuing a citation on January 15, 2009. The Operator submitted a revised map the next day, which District 4 reviewed and approved on February 6, 2009.

On April 29, 2009, District 4 received a revised base plan (B-5) from Performance Coal Company. Some of the information required by 30 CFR 75.371 was shown on a mine ventilation map submitted in conjunction with this plan, pursuant to 30 CFR 75.372. The Ventilation Department determined that this plan did not contain all of the information required by 30 CFR 75.371 and 75.372. Examples of deficiencies identified by the Ventilation Department included: a description of the bleeder system design was not provided; the use of belt air was not addressed; the means for adequately maintaining bleeder entries free of obstructions such as standing water that would obstruct air flow was not addressed; new drawings for both longwall development and retreat mining were not included; and ventilation controls on section drawings were not clear. Deficiencies identified on the corresponding map included: primary and secondary escapeways were each shown with paths leading to two different mine openings; ventilation controls were not clearly marked; and air quantities were not provided for various regulators at split points. On July 1, 2009, the District Manager sent a letter to the Operator denying approval of the proposed B-5 base plan, with an attached copy of the plan and the mine map, each marked to show the deficiencies identified.

A new ventilation base plan (B-6) was received by District 4 on August 18, 2009. The B-6 approval letter, dated September 11, 2009, included four previously approved supplements to the B-4 base plan. MSIS indicated that six additional B-4 base plan supplements were not identified in the letter but also remained in effect. After approval, an additional 38 supplements to the ventilation plan were submitted by Performance Coal Company. The District Manager approved 18 and denied 13 of these proposed plan supplements. Two others did not contain information requiring approval and were acknowledged. Five supplements were pending District 4 review at the time of the explosion.

The Internal Review team determined that the B-6 base plan did not address some of the requirements of 30 CFR 75.371, and the following deficiencies were identified.

- The base plan did not address a minimum air quantity and a location for measuring the air quantity during installation and recovery of longwall mining equipment.
- The base plan did not specify the means for adequately maintaining bleeder entries free of roof fall obstructions. The ventilation plan referred to the roof support system in the approved roof control plan. However, the roof control plan did not address this issue, nor did roof control plan standards require roof control plans to address bleeder entry roof supports.
- The base plan did not specify locations where air quantities were to be measured to ensure no more than 50% of the total intake air was delivered to the working section from the belt air course.
- The base plan stated that “CO monitors [sensors] will be spaced at maximum 2,000 foot spacing.” This distance was not consistent with 30 CFR 75.351(e)(1)(iii) and 30 CFR 75.1103-4(a)(1)(iii) of the 2008 Final Rule which requires that spacing between CO sensors not exceed 1,000 feet.⁴⁹ The plan should have been revised to remove the statement since the standard specifies the required spacing.

The Internal Review team determined that the approved B-6 base plan map did not address some of the requirements of 30 CFR 75.372, including the following:

- The map did not contain the name of the person responsible for information on the map, other than ventilation controls, as required by 30 CFR 75.372.
- A two-part overlay was included with the base plan map. Each part showed several mines located in the seven seams above UBB. The mining in each seam was color-coded and identified

⁴⁹ Final Rule for Flame-Resistant Conveyor Belt, Fire Prevention and Detection, and Use of Air From the Belt Entry, December 31, 2008

by a legend, and included the interburden distances for all of the seams. The scale of the map was 500 feet to the inch. The small scale and the number of mines shown made it impossible to use the map as a ventilation plan review tool. In addition, neither part was certified by a registered engineer or a registered surveyor.

- The alternate escapeway for the MMU 040-0 section mining the No. 1 Crossover was shown directed to the North Portals. Standard 30 CFR 75.380(d)(5) required escapeways to follow the most direct, safe and practical route to the nearest mine opening suitable for the safe evacuation of miners. In this case, the shortest direct route was to the Ellis Portal. District 4 personnel identified this deficiency during their review of the B-5 base plan and it was not corrected in the B-6 base plan submittal. Additionally, refuge alternatives were not shown on the map.
- The quantity of air entering and leaving each split was not provided on the map at many locations throughout the mine.
- There were at least 14 locations on the map where the distance between the identifiable locations of the CO sensors exceeded 1,000 feet. These distances ranged from 1,300 to 2,500 feet. Either additional sensors were required to comply with 30 CFR 75.351 and 30 CFR 75.1103-4, or not all sensors were shown on the map.
- At the intersection of East Mains and South Portal Entries, an inlet was not provided to allow air to enter the center “secondary intake air” or haulage entries (belt and track). A stopping line and a set of air lock doors did not permit ventilation of entries No. 3 and No. 4 to the surface.
- Near crosscut 13 of the 1 North Belt entry, return air from two continuous mining machine sections (MMUs 063-0 and 062-0) and the worked out area flowed across the overcast and into the main return. When a single equipment door was opened, secondary intake air can short circuit to the return air entry. In the same area near the mouth of No. 1 North main belt along Seal Set 4, the track entry was shown to be located in the return air entry.
- Along the North Portal entries a single equipment door was shown in No. 2 entry between the first and second crosscut inby the surface mine opening. When opened, it would not maintain separation between the air courses as required. Equipment doors must be installed in pairs as required by 30 CFR 75.333(d)(3).
- The combined air quantities ventilating an area of old workings to the East of the Parallel North Mains, evaluated at EP-8 inlet and EP-1, EP-4, and EP-7 outlets, did not balance. The total inlet quantity was 36,300 cfm, and the total outlet quantity was 16,827 cfm, a difference of 19,473 cfm (53%) showing the air quantities did not balance.

Conclusion: The Internal Review team identified several deficiencies in the approved mine ventilation base plans in effect at UBB during the review period. Many of the deficiencies in the B-4 base plan were corrected in the B-6 base plan. Some of the deficiencies were related to District 4 not following established policy and procedures while other deficiencies resulted from the lack of coordination between the District technical departments.

District 4 did not always enforce the provisions of 30 CFR 75.372(a) or (b) for the Operator’s failure to submit up-to-date and complete mine ventilation maps. Enforcement of this standard may have provided incentive for the Operator to submit adequate plans and maps, which would have reduced the time needed for the District 4 Ventilation Department to review them. In addition, the Operator continued the process of submitting plans and supplements with numerous deficiencies, which increased the time needed to approve adequate plans.

Recommendations: The Administrator for Coal should direct the revision of the *Program Policy Manual* to provide guidance on when it is appropriate to cite an operator for a violation of 30 CFR 75.372(a) or (b) when it fails to submit an up-to-date and complete mine ventilation map. The Administrator should also direct the revision of the *Mine Ventilation Plan Approval Procedures Handbook* to implement the revised policy.

Ventilation Plan Supplements

Statement of Facts: Between September 11, 2009, and April 5, 2010, the Operator submitted 38 proposed supplements to the B-6 base plan. District 4 denied 13 of these proposed revisions to the ventilation plan. Five of these supplements were pending review at the time of the explosion; two were received on March 5 and three on March 25, 2010. District 4 sent letters to the Operator on July 22, 2010, stating that it would be inappropriate to review these five supplements until a new base ventilation plan was submitted after completion of the explosion investigation and termination of the section 103(k) order. The District based this decision on the destruction of ventilation controls caused by the explosion.

Interviews with District 4 managers and Ventilation Department personnel indicated that the denials were recommended because the Operator's proposed revisions did not comply with existing regulations or conform to MSHA policies and procedures. As part of the Internal Review, each denial was evaluated to determine if District 4 was consistent in its logic and actions when denying proposed ventilation plan supplements, and if District 4 followed existing policies and procedures. The following is a summary of denied proposed supplements to the B-6 base plan submitted to District 4.

- District 4 denied two plan supplements because the Operator proposed allowing shuttle cars to run through face ventilation curtains without precautions that would prevent disruptions to face ventilation. This practice could immediately impact face ventilation and cause methane levels to rise rapidly at the working place. District 4 approved a plan revision after the Operator added a safety precaution to prohibit shuttle cars from running through face curtains.
- District 4 denied four plan supplements because the Operator proposed to use belt air to ventilate the longwall section, but did not provide the justification to do so, as required by 30 CFR 75.350(b). District 4 later approved a plan revision to allow the use of belt air to ventilate the longwall section on December 23, 2009. However, justification to continue the use of belt air was still not provided by the Operator at that time.
- District 4 denied seven plan supplements because the Operator submitted inaccurate information and errors on attached mine maps. Four of these denied supplements were later approved after errors were corrected and resubmitted by the Operator. One denied supplement was resubmitted but was not yet reviewed at the time of the explosion.

For each denial, District 4 provided written notification to the Operator that specified deficiencies in the proposed plan or revision, as required by 30 CFR 75.370(c)(2). District 4 Ventilation Department staff stated in interviews that the Operator occasionally opted to meet with them to discuss proposed plans after such denials. This was consistent with the provisions of 30 CFR 75.370(c)(2). Seven of the thirteen denials were resubmitted by the Operator after correcting deficiencies identified by District 4. These seven supplements were ultimately approved.

In one of these denial letters, District 4 specifically requested that a statement be added to a map, which the Operator included with their proposed plan revision, to indicate a 6-foot opening would be maintained in the primary escapeway. Although escapeway clearance is specified under 30 CFR 75.380(d)(4), District 4 requested the statement be added to remind the Operator of the regulatory requirement. The Internal Review team believes this particular item should not have been identified as a deficiency, as regulatory requirements such as this are not to be included in the ventilation plan according to Chapter 3 section (C)(2) of the *Mine Ventilation Plan Approval Procedures Handbook*. The statement, however, was included by the Operator in the supplement approved on January 19, but was not contrary to or more than the regulation required.

Conclusion: District 4 appropriately denied proposed ventilation plan supplements in a manner consistent with the requirements of 30 CFR 75.370(c). District 4 based these denials on deficiencies that included inconsistencies with regulations or other provisions in the approved mine ventilation plan. District 4 appropriately notified the Operator in writing when the District Manager denied proposed plan supplements by letters and attachments specifying the deficiencies. Plan deficiencies discussed with the Operator during meetings were also provided to the Operator in writing.

Contrary to the guidelines of the *Mine Ventilation Plan Approval Procedures Handbook*, District 4 attempted to include a regulatory requirement for escapeway clearance in the October 15, 2009, supplement. However, the provision was not inconsistent with the mandatory safety standard.

The Internal Review team examined the five pending ventilation plan supplements and found each was logged into the tracking system in a timely manner. Based on interviews it was determined that these supplements were part of the backlog of reviews not completed prior to the explosion. The Internal Review team determined had these pending supplements been processed, whether approved or not, they would have had no bearing on the explosion.

Recommendations: None

Written Documentation of Plan Denials

Mandatory safety standard 30 CFR 75.370(c)(1) states that the district manager will notify the operator in writing of the approval or denial of a proposed ventilation plan or proposed supplement. Subparagraph (c)(2) states that, if the district manager denies approval of a proposed plan or supplement, the deficiencies shall be specified in writing and the operator will be provided an opportunity to discuss the deficiencies with the district manager.

Massey alleged that MSHA effectively dictated what was submitted and approved in ventilation plans, and contended that the Ventilation Department in District 4, to avoid responsibility for the plan requirements, intentionally did not provide written documentation of deficiencies in mine ventilation plans.

As discussed in the previous sections, the District 4 Ventilation Department recommended denial of proposed plans and supplements when the Operator's submittals did not comply with mandatory safety standards or conform to MSHA policies and procedures. Plan deficiencies were identified and communicated to the Operator in letters denying approval pursuant to MSHA plan approval procedures and standards. During their interviews, District 4 ventilation specialists indicated that, after Performance Coal Company revised its proposed plans to address identified deficiencies, its proposed plans met the minimum requirements of 30 CFR Part 75, Subpart D, and were approved by the District Manager.

At the request of the Operator, MSHA met with UBB and Massey officials on several occasions to discuss the Mine ventilation system and related plans. Notes taken by District 4 personnel during these meetings were consistent with the subjects addressed in written responses to the Operator.

Furthermore, MSHA policy provided a means to obtain relief in cases where operators believed plan denials were improperly determined. This policy permitted the option to request a technical violation and litigate the district manager's determination whenever a district manager refuses to approve a plan or supplement. Performance Coal Company never challenged the District 4 Manager's determinations for any of the denied plans or amendments during the review period. In addition, seven of the denied supplements were approved after technical issues identified by District 4 were corrected by the Operator.

Conclusion: The Massey allegation that provisions of the approved mine ventilation plan were forced upon the Operator by MSHA was not corroborated by information examined by the Internal Review team. The deficiencies that District 4 identified in plans and proposed supplements were failures to comply with existing regulatory requirements, not the personal preferences of MSHA reviewers.

Recommendations: None

Longwall 050-0 MMU Plan – Specific Issues

Statement of Facts: A non-fatal methane explosion occurred in January 1997 on the tailgate-end of the longwall section (MMU 031-0) at UBB. The Operator reported the explosion to MSHA, and District 4 investigated the accident. The MSHA investigators determined that the explosion occurred when a flammable methane/air mixture was ignited by heat and/or sparks generated by a fall of the sandstone/shale roof in the gob behind the longwall shields. At District 4's request, Technical Support

conducted a partial mine ventilation pressure/air quantity survey at the UBB longwall panel. The results of that survey were reported in a March 3, 1997, memorandum.

On July 3, 2003, a methane inundation from a floor fracture occurred on the longwall section. Following the Operator's notification to MSHA, District 4 personnel investigated the inundation and reported their findings on a set of MSHA 7000-50 forms. The District did not request assistance from Technical Support during this investigation.

On February 18, 2004, the longwall section experienced another methane inundation from a floor fracture behind the longwall shields in the Headgate 17 Longwall Panel. The Operator notified MSHA of the event, and District 4 personnel conducted an investigation. This time, the acting District 4 Manager requested that Technical Support investigate the cause of the inundation. In an e-mail, the acting District 4 Manager asked "that Tech Support's Ground Control group come in and look at the situation at Upper Big Branch." He "requested general overview since this was the second occurrence and they may be able to provide some suggestions to prevent future occurrences."

Following its evaluation, a Technical Support geologist authored a March 4, 2004, memorandum to the acting District 4 Manager (refer to Appendix M). The memo identified several factors that may have contributed to the floor fractures from which natural gas was released in July 2003 and February 2004. The memo stated that UBB personnel had indicated that degasification wells were planned for the next longwall panel in an effort to bleed off any gas prior to encroachment of the longwall face. The memo also stated that this was a reasonable plan to reduce the future occurrences of floor bursts but would not mitigate the floor fracturing that might be due to other controls. To more efficiently direct the placement of the degasification wells, the report suggested that the Operator construct a "hazard map," which might reveal problem areas or areas best suited for methane drainage holes.

In a May 3, 2004, meeting with District 4, the Operator requested help in locating degasification holes or for suggestions for preventing future outbursts. The following day, District 4 requested Technical Support to assist in this endeavor. On May 26, 2004, Technical Support and District 4 personnel met with UBB officials and discussed options for mitigating a future outburst. The details of this meeting, and specific items for consideration, were forwarded to District 4 in a draft memorandum on May 27 and a final memorandum on July 15, 2004 (refer to Appendix M). It is Technical Support's practice to provide an extra copy of an investigative report to the district, allowing the district to provide the copy to the mine operator. The Internal Review team was unable to determine if the Operator received a copy of the Technical Support memoranda.

The July 15 memorandum included the following:

Locating and degassing floor methane zones through a drilling program was highly problematic. The fracture zones are not visible underground and their position can only be ascertained as generalized trends. The locations of the gas zones are revealed by methane released from fractures produced by disturbance of the extracted longwall panel. Gas well stimulation programs may not be effective if the well is not located in the exact area of the gas zone.

Consequently, the historical means for handling the situation relies on contingency plans to mitigate such an event.

This memorandum also included eight actions to be considered. UBB did not drill degasification holes and did not implement the measures Technical Support suggested in 2004. Furthermore, District 4 did not require changes to the mine ventilation plan, including the methane and dust control parameters approved in the MMU plan, after any of these three accidents. While increased air quantity requirements were often made for various MMUs following failures to attain compliance with respirable dust standards, there were no increases required to address methane liberation rates.

When significant quartz issues were encountered on the longwall section (MMU 031-0) in 2006, the approved MMU plan required a minimum intake air quantity of 60,000 cfm. The District 4 Manager requested assistance from Technical Support to assess the respirable dust controls used on the longwall,

and an underground investigation was conducted. Technical Support provided their findings to the District 4 Manager in a report of investigation dated April 20, 2006. At the time of the investigation, the measured intake air quantity to the longwall was 71,600 cfm, and the face workers' average respirable dust exposures (1.95 mg/m^3) exceeded the applicable standard (1.7 mg/m^3). With limited production during the study (700 tons actual vs. 3,500 tons average), the investigators concluded that the measured intake air quantity for the longwall was not sufficient to adequately control respirable dust at the face. Accordingly, the Operator revised its MMU plan to increase the minimum intake air quantity to 104,000 cfm, and upgraded a number of other dust control parameters and operating procedures to attain compliance.

At the time of the April 5, 2010, explosion, the documents pertaining to the previous accidents and respirable dust study were not readily available in the UBB active mine files maintained by the technical departments or the Uniform Mine File (UMF).⁵⁰ According to interviews, copies of the 2004 memoranda were found after the explosion, packed in box left by a former MSHA employee who was Ventilation Department supervisor from December 28, 2003, to April 3, 2008. At the time of the explosion, the former supervisor was employed by Massey and declined an interview with the Accident Investigation team. The reports were not readily available to specialists to reference during mine ventilation plan reviews.

Many District 4 managers and supervisors were new to their positions after 2004, and they had no knowledge of the accidents or of the documents published as a result of the accidents. An analysis of District 4 management staffing is included in the "Effect of Unfilled Positions and Temporary Assignments" section of this report. Of the supervisors and managers with responsibility for plan approvals, the only individual who still occupied the same position between the 1997 and 2010 explosions at UBB was the ADM-Technical. He received and initialed one of the Technical Support memoranda regarding the methane inundations. He stated in his interview that in hindsight, District 4 should have required an increase in the minimum quantity of air in the ventilation plan due to the potential for methane inundations, but could not remember why it was not done.

On September 7, 2006, the Operator deactivated MMU 031-0 and removed the associated longwall equipment from the Mine. On January 31, 2008, the District 4 Manager sent a letter to the Operator stating that, because the longwall unit had been deactivated for over one year, the MMU had been placed in an "abandoned" status. In this letter, the District 4 Manager also stated that reactivation of a longwall unit in the mine would require approval of a revised ventilation plan and a revised methane and dust control plan.⁵¹

In 2008, Performance Coal Company prepared plans to resume longwall mining at UBB in a section designated as the 1 North Longwall panel. The Operator submitted a revised ventilation plan and a separate MMU plan for the longwall mining section, designated as MMU 050-0. District 4 received the MMU plan on December 19, 2008, which the District Manager approved on June 15, 2009.

The initial MMU plan proposed by the Operator and subsequently approved by District 4 for longwall 050-0 was significantly less stringent than the final MMU plan for the previous longwall 031-0. The approved MMU plan for longwall 050-0 required an intake air quantity of 40,000 cfm and many of the previously required methane and dust control parameters were either relaxed or omitted. A comparison of the approved MMU plan requirements for the two longwall sections is contained in Appendix I.

During interviews, District 4 personnel indicated approval of the reduced ventilation parameters on the new longwall were justified due to a significant difference in the mining conditions from previous panels. However, each longwall MMU utilized the same manufacturer and model shearer to extract coal from the face; a significant amount of roof and floor strata was mined during each pass; and each MMU (continuous miner unit or longwall panel) in the Mine eventually ended up on a reduced respirable dust

⁵⁰ The existing retention schedule dictates that accident reports are to be discarded from the mine file after one year and the retention of technical investigation reports is not addressed.

⁵¹ There is no existing policy addressing the time frame for changing the status of an MMU to "abandoned," once the mine operator places the MMU in non-producing status.

standard, including the two continuous mining machine MMUs (029-0 at 0.4 mg/m³ and 040-0 at 0.9 mg/m³) that developed the headgate and tailgate entries of 1 North Longwall.

The last respirable dust standard for the previous longwall (MMU 031-0) was 1.7 mg/m³. Longwall MMU 050-0 started production on September 10, 2009, with a 2.0 mg/m³ respirable dust standard. On March 23, 2010, the respirable dust standard was reduced to 1.3 mg/m³. This subject is discussed in detail in the “Respirable Dust at Upper Big Branch Mine-South” section of this report.

In interviews, the Internal Review team learned that total mine methane liberation and face methane liberation were not considered when reviewing MMU plans. The District 4 Health Department specialist who reviewed the Longwall MMU 050-0 plan acknowledged that he was not aware of documents regarding past ignition and methane inundations from floor cracks on the previous longwall panels. There was no procedure in place to review MMU plans from previous longwall units to compare methane or dust control parameters.

The initial minimum intake air quantity approved for the 1 North Longwall was 40,000 cfm. Performance Coal Company submitted a ventilation plan supplement which reduced the minimum air quantity to 30,000 cfm. While District 4 approved this supplement, subsequent intake air quantity measurements taken by the Operator and MSHA were never less than 40,000 cfm.

The MSHA Accident Investigation report ruled out the occurrence of a massive methane inundation on April 5, 2010. Evidence indicated the volume of methane involved in the initial methane explosion was approximately 300 cubic feet, and that there were no explosive quantities of methane along the longwall face. Methane monitors on the longwall shearer and on the tailgate did not de-energize power to the face, which would have occurred at 2.0% methane. Handheld detectors found on the face did not indicate elevated methane concentrations prior to the explosion.

Conclusion: The Operator failed to submit a plan designed to adequately control methane and respirable dust suitable to the conditions and mining system at the Mine. Performance Coal Company and Massey officials were aware of the potential for methane outbursts and the history of respirable dust overexposures on previous longwall panels. The Operator failed to account for these conditions when proposing minimum intake air quantity and necessary methane and dust control parameters for the 1 North Longwall (MMU 050-0).

The *Ventilation Plan Approval Procedures Handbook* does not specify that past accident reports and technical studies be reviewed during the plan approval process. The methane inundations, face ignition history, and respirable dust compliance history were not used by District 4 when the June 15, 2009, longwall MMU plan and the September 11, 2009, ventilation base plan were approved. While these documents were issued five years or more prior to the April 5 explosion, and specialists reviewing plans were not part of the plan review process at that time, they contained critical information regarding the geology and unique conditions at UBB.

Considering the information available to the Internal Review team, a minimum air quantity of 40,000 cfm was not sufficient to control respirable coal mine dust and mitigate methane outbursts at the mine. In addition, many of the enhanced dust control parameters included in the MMU plan for longwall 031-0 should have been considered for inclusion in the longwall 050-0 plan. Finally, when the longwall 050-0 plan was approved, District 4 should have considered placing the section on a 1.7 mg/m³ reduced respirable dust standard as was established on the previous longwall section.

The Internal Review team found that District 4 did not ensure that the plans recommended for approval by the technical departments were consistent and reflected previously approved plans, mine accidents, methane liberation, and respirable dust compliance history. District 4 did not maintain accident and technical investigation records readily available for reference during plan reviews. MSHA procedures did not require this information be maintained in the active mine file for more than one year.

In particular, the documentation of methane inundations emanating from floor cracks was not readily available to all persons responsible for reviewing UBB ventilation plans. As discussed in the “Management Issues” section of this report, the ADM-Technical was in his position during the time the

methane outbursts occurred; received a copy of the memorandum addressing the MSHA Technical Support investigation; and received and initialed the memorandum regarding the UBB request for assistance in determining the proper location for drilling degasification holes. After review by the District, if provisions of a mine plan are identified as unsuitable to the particular conditions at the mine, the PPM directs the District Manager to initiate changes are needed. However, neither the ADM-Technical nor the District manager initiated modifications to the ventilation plan in 2004 to mitigate the hazards associated with methane floor outbursts.

Although copies of the Technical Support memoranda regarding methane released from floor outbursts may not have been provided to the Operator, the findings in the documents were discussed with the Operator prior to their publication. The Internal Review team could not identify any mine plan submissions which included provisions to address implementation of any of the Technical Support recommendations.

Corrective Actions Taken: On February 16, 2012, MSHA issued a Procedure Instruction Letter directing timely transmittal of recommendations from on-site Technical Support investigations to mine operators and miners' representatives. The PIL included direction for district managers to transmit these reports to the mine operator and miners' representatives, document delivery, and place a copy in the mine file.

Recommendations: The Administrator for Coal should direct the revision of the *Program Policy Manual* to apply reduced respirable dust standards, including those from deactivated MMUs, to other MMUs working in the same section of the mine with similar mining equipment, until sampling establishes a new standard.

The Administrator for Coal should direct the revision of the *Mine Ventilation Plan Approval Procedures Handbook* to require pertinent accident reports and technical studies to be maintained in the appropriate department active mine files to ensure that relevant historical information is available to specialists and supervisors. Consideration should also be given to including this information in the active mine file of other mines with similar seam and geological conditions.⁵²

The Administrator for Coal should direct the revision of the *Uniform Mine File Procedures Handbook* to require pertinent accident reports and technical studies to be maintained in the Uniform Mine File for the subject mine.

The Administrator for Coal should direct that training be provided to appropriate Coal personnel on the Agency policy requiring reduced standards on deactivated MMUs to be continued with newly-activated MMUs. The training should include instruction on the revised guidelines of the *Mine Ventilation Plan Approval Procedures Handbook*.

Belt Entry Ventilation

On December 31, 2008, the Final Rule *Flame-Resistant Conveyor Belt, Fire Prevention and Detection, and Use of Air From the Belt Entry* was published in the Federal Register. The final rule required mine operators to submit a revised ventilation plan by March 2, 2009, justifying the use of belt air to ventilate working sections, or discontinue its use.

The mine ventilation plan for UBB approved by District 4 on April 14, 2005, permitted the use of belt air to ventilate all sections, including development sections and the longwall section. This plan was in effect at the time the Final Rule was published.

The Operator did not submit a revised ventilation plan by March 2, 2009, to continue using belt air on working sections. At this time there was no longwall section operating and, according to information obtained in interviews, the development sections were not using belt air at that time.

⁵² District 4 required a ventilation plan revision that increased the minimum intake air quantity for a longwall section after methane outbursts occurred in January 2011 at another mine. This mine, like UBB, operates in the Eagle Seam.

Prior to starting the longwall section, the Operator submitted a ventilation plan supplement which included a face print indicating the longwall section would use belt air. District 4 approved the supplement on June 15, 2009. The base ventilation plan approved on September 11, 2009, also permitted the use of belt air on the 1 North Longwall section. Both of these approvals were granted without requiring the Operator to justify the use of belt air as required by 30 CFR 75.350(b). The District encouraged the Operator to submit justification in subsequent ventilation plans and supplements, but the Operator failed to do so. According to District 4 supervisors and managers, they did not initially require UBB to provide justification for the use of belt air to ventilate working sections because they believed sufficient guidance was not provided to the District and to the Operator.

The preamble to the Final Rule explained the process mine operators and MSHA enforcement offices were to follow to continue the approved use of belt air. On January 26, 2009, the Administrator for Coal provided additional guidance for evaluating the use of belt air to MSHA enforcement personnel in *CMS&H Memo No. HQ-08-017-S*. It directed MSHA district managers to evaluate the hazardous condition to be addressed by the use of belt air, evaluate how the hazardous condition would be mitigated, review the technology and safety measures to be implemented, and determine if the use of belt air would afford at least the same measure of protection as where belt air is not used to ventilate the working section. In addition, MSHA posted a *Compliance Guide* (Guide) on its Website on April 30, 2009, to provide answers to common questions regarding the Final Rule. The Guide provided mine operators with additional information regarding documentation required to continue the use of belt air to ventilate working sections.

District 4 subsequently requested on several occasions that justification to use belt air be provided by the Operator in the ventilation plan. A meeting with Performance Coal Company officials was held at the District 4 office on December 11, 2009, which included a discussion on eliminating the use of belt air at UBB. A plan supplement specifying the use of belt air to ventilate the 1 North Longwall section would be discontinued was submitted by Performance Coal Company, and was approved on December 18, 2009.

The Operator attempted to discontinue the use of belt air on the longwall section, but found the influence of the Bandytown Fan would not allow the air direction to be reversed. The Operator submitted another supplement to the ventilation plan requesting the continued use of belt air on the longwall section. The supplement was approved on December 23, 2009. The Operator committed to providing within 30 days a plan to show a long-term solution for eliminating the use of belt air to ventilate the longwall working section. The use of belt air was approved at the time of the explosion. The MSHA Accident Investigation report stated: "A majority of witnesses indicated that prior to the accident, the belt air was being directed to the longwall face, and although no air quantity measurements were recorded for the belt entry, testimony indicated that the belt air quantity was approximately 10,000 cfm." The Operator was aware that methane inundations were possible at the Mine, but failed to supply this information to District 4 as justification for continued use of belt air.

A review of the Operator's available examination records showed that the methane levels in the belt entry and on the longwall section were at or near 0.0% for all examinations. There was only one record of an air quantity measurement made in the belt entry by the UBB examiners, which indicated air from the belt air course was used to ventilate the longwall section. On March 15, 2010, an MSHA inspector conducted an inspection on the longwall section just four days after the section 104(d)(2) order was terminated and changes to the ventilation system were made to abate the violation. As part of the inspection, measurements of significant air splits were made and recorded. The recorded air velocity measurements on the longwall face were similar to preshift/on-shift measurements recorded by the Operator, as was the intake to the longwall section as shown in Table 19. However, the MSHA inspector also measured a significant air quantity traveling to the longwall section from the belt entry. While the Operator's records indicated the section intake was 78,204 cfm, MSHA air measurements showed a total section intake of 116,600 cfm which included over 44,000 cfm from the belt air course.

Table 19 - Longwall Section Air Measurements from March 15, 2010

Location	Operator Record	MSHA Inspector
Longwall Intake Quantity	78,204 cfm	72,150 cfm
Belt Intake Quantity	No Record	44,457 cfm
Shield No. 9 Velocity	929 fpm	1,020 fpm
Shield No. 160 Velocity	652 fpm	625 fpm

The District 4 Manager approved the use of air from the belt air course to ventilate the longwall section in June and September 2009 without requiring justification in the ventilation plan. These approvals did not meet the intent of the final rule. Although District 4 requested the Operator to provide the justification after approval, the justification required by 30 CFR 75.350(b) was not submitted. Operator records of methane levels measured during examinations indicate the belt air did not appreciably contribute to the methane levels on the 1 North Longwall section. The quantity of intake air supplied to the longwall section from the belt air course could not be determined from Operator's examination records due to a lack of air quantity measurements recorded for the belt entry.

Conclusion: In June and September 2009, District 4 approved the use of belt air to ventilate the longwall section. These approvals were made without requiring justification for its use being documented by the Operator in the approved mine ventilation plan. Performance Coal Company failed to address the requirements of the 2008 final rule, and when requested by District 4 to provide the required justification, the Operator ignored these requests. Due to a lack of air readings for the belt air course, the amount of air used on the longwall section from the belt air course could not be determined.

Recommendations: The Administrator for Coal should direct staff to monitor the implementation of new regulations to ensure districts enforce the provisions of final rules within the effective dates specified.

Overcasts and Equipment Doors

A complete discussion on the use of equipment doors and overcasts is included in the "Enforcement of 30 CFR 75.333" section of Appendix D. The Accident Investigation team issued two non-contributory section 104(a) citations regarding the installation of equipment doors.

Statement of Facts: Performance Coal Company used equipment doors in lieu of stoppings at many locations in UBB, primarily to allow movement of mobile equipment between air courses without disrupting ventilation.

The Accident Investigation team completed computer simulations to determine the potential effects of opening equipment doors to defeat the separation between the air courses. In particular, a simulation was made of the effect of leaving open the equipment doors near 78 switch in 6 North. The results from the simulation indicated that there would not have been a significant effect on the longwall and TG 22 section air quantities and a small increase in air quantity (approximately 7%) in HG 22 from the change. Simulations with equipment doors at HG 22 open likewise did not significantly affect the longwall air quantity.

Conclusions: The Accident Investigation team determined that major changes in section ventilation at UBB would not have been expected if airlock doors were improperly used in 6 North. The Internal Review team believes that, under other conditions, the potential exists for significant and rapid changes in face ventilation when equipment doors in critical locations are not properly operated and maintained.

Recommendations: The Administrator for Coal should direct that training be provided to enforcement personnel, including supervisors and managers, to apply the policy during inspections of haulage ventilation controls.

The Assistant Secretary should consider rulemaking to require the use of equipment doors in lieu of permanent stoppings, or to control ventilation within an air course, be subject to approval in the mine ventilation plan. This regulation also should consider a provision which would require all equipment doors installed in travelways utilize an interlock system to ensure only one door can be opened at any time to maintain the separation of air courses.

Evaluation of Bleeder Systems

Requirements: Mandatory safety standard 30 CFR 75.364 requires that weekly examinations are to be made by a certified person in all underground coal mines. In addition to making the examinations, certified persons must provide certification and make records of the results of examinations including hazardous conditions found, results and locations of air and methane measurements, and any corrective actions taken to correct conditions.

Mandatory safety standard 30 CFR 75.371(z) stated that the mine ventilation plan shall contain: “The locations where measurements of methane and oxygen concentrations and air quantities and tests to determine whether the air is moving in the proper direction will be made to evaluate the ventilation of non-pillared worked-out areas....”

MSHA Policies and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* contained guidance for inspectors on the requirements for a regular inspection. Pertinent portions of the Handbook specified inspections of intake and return air courses, bleeder entries and worked-out areas. The Handbook provided direction on where to take air quantity and quality measurements, determining compliance with the approved mine ventilation plan, and reviewing operator’s most recent pertinent examination records.

The Handbook also stated: “At least one entry in each set of bleeder entries shall be inspected in its entirety or to evaluation points approved in the mine ventilation plan to determine compliance with applicable standards and approved plans.”

Statement of Facts: In addition to the procedures listed above, MSHA provided guidance to district managers, ventilation department supervisors and specialists, and inspectors on bleeder and gob ventilation in a special ventilation training course developed in 1996. A comprehensive instruction guide was prepared for use in the ventilation training courses offered by MSHA. The Agency encouraged copying and dissemination of the information contained in the instruction guide to interested parties for use in future bleeder and gob evaluation matters.

Measuring and recording air quantities, qualities, and directions at properly located evaluation points are essential to evaluating the effectiveness of bleeder systems. Without this information, the mine operator is unable to determine when adjustments to the system are needed to address conditions such as excessive methane levels and oxygen deficiencies.

To fully evaluate a bleeder system, evaluation points should be located to quantify air flow into and out of the worked out area, as well as to determine how airflow is distributed through and around the pillared area. The air quantity, quality, and direction at each evaluation point needs to be determined and analyzed to show airflow distribution throughout the system. Measurements and analyses should account for leakage through stoppings isolating worked out areas from air courses, which can significantly affect air flow within the system. Although not addressed by regulations, determining pressure differentials on ventilation controls isolating the worked out area and within the bleeder system also provide a measure of the system’s reserve capacity to dilute and move methane-air mixtures away from active workings. To determine if the operator is conducting weekly evaluations of the bleeder system, inspections of examiners’ certifications and records are also necessary.

Assembling the data from the mine operator’s examination records for a longwall ventilation system and inspecting the evaluation points underground are complex and time consuming activities that cannot always be accomplished by a single inspector. An evaluation of a typical longwall bleeder system can require significant travel while examining hundreds of ventilation controls and taking dozens of air measurements.

Before the 1 North Longwall started production, the Operator submitted a method to evaluate the bleeder system for the longwall panel in a ventilation plan supplement approved by the District 4 Manager on August 6, 2009. The supplement was later incorporated into a new base ventilation plan approved on September 11, 2009. The approval included a mine map with the evaluation points (EPs) identified. A section of that map is shown in Figure 15.

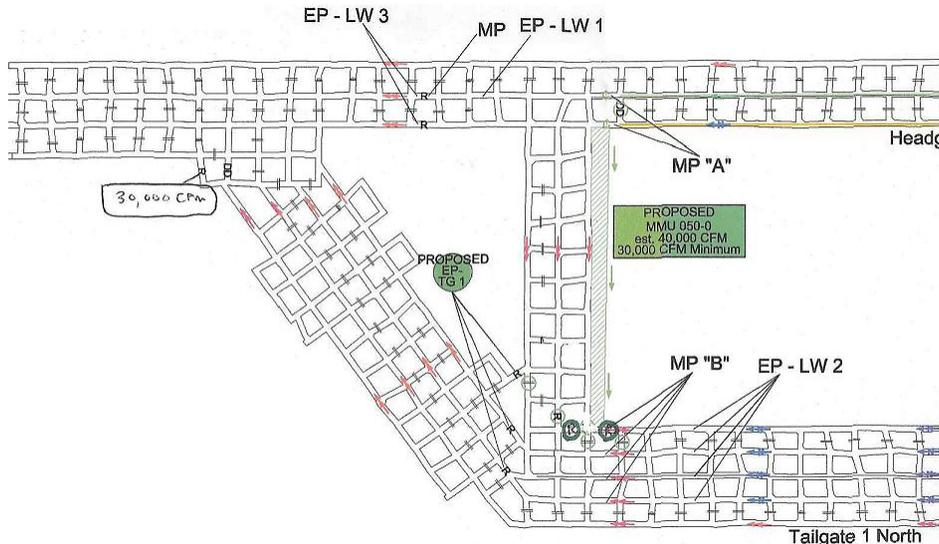


Figure 15 - Original evaluation point locations approved September 11, 2009, in mine ventilation plan

Inlet and outlet evaluation points established by the Operator for the system were identified in the approved base ventilation plan. The No. 1 entry of the 1 North Longwall tailgate and the No. 3 entry of the longwall headgate were maintained as isolated development section returns. Air flow into the worked-out area from these splits was limited to leakage. Therefore the initial evaluation points established did not need to account for airflow in these air courses.

The Operator submitted a ventilation plan supplement on December 14, 2009, that provided for stoppings to be removed at intervals of at least every 600 feet between the No. 3 and No. 2 longwall Headgate entries. As a result, the No. 3 and No. 2 longwall headgate entries became common, with the No. 3 entry becoming part of the worked-out area. The supplement specified these stoppings would be reconstructed to isolate the future tailgate entry prior to mining the adjacent longwall panel. The supplement also established an additional measuring point where intake air entered the worked out area in the No. 3 entry of the headgate, identified as MP-C in Figure 16.

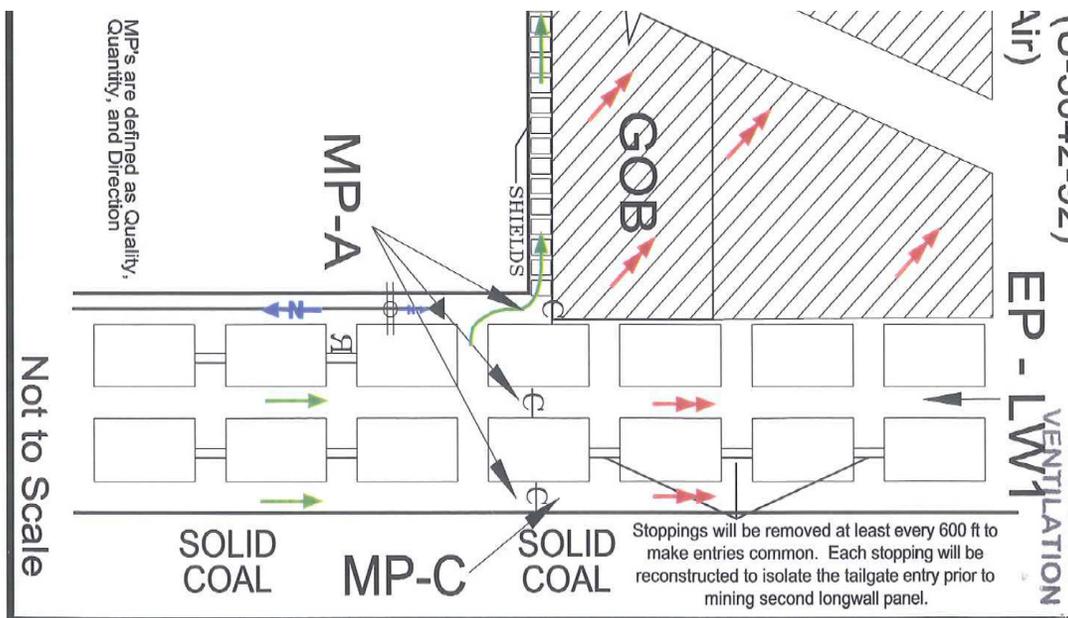


Figure 16 - Portion of drawing from ventilation plan supplement approved December 18, 2009

In addition, an evaluation point was established in the No. 3 entry at EP-LW3 behind the longwall panel. This EP was needed since air was exiting the worked-out area at this location, and would have been necessary to properly evaluate the bleeder system. In a ventilation plan supplement approved on February 22, 2010, this EP was relocated from crosscut 85 to crosscut 90 due to a water accumulation. (See Figure 17.)

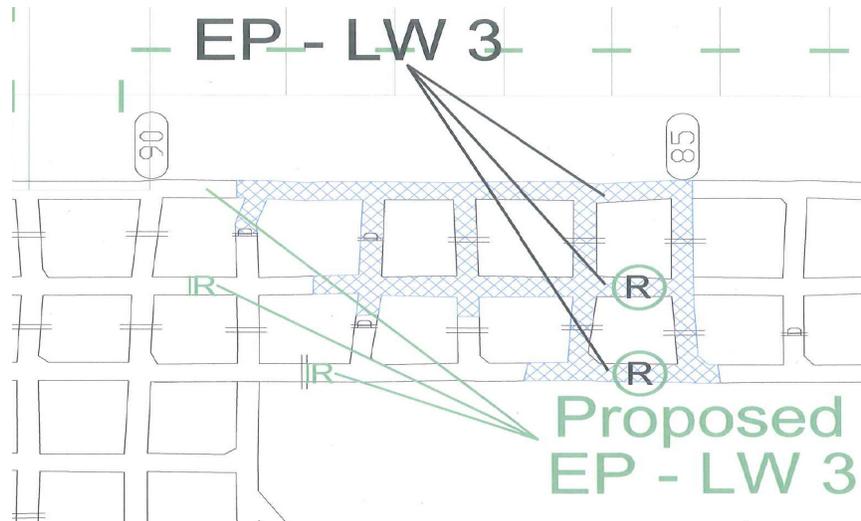


Figure 17 - Drawing of evaluation points from supplement approved February 22, 2010

In the ventilation plan supplement approved January 22, 2010, a temporary evaluation point (EP-65) was added (See Figure 18) to account for the return air split from Headgate #22 section which entered the worked out area. The Operator specified that the EP would move outby with the 1 North Longwall face until it reached the regulator at crosscut 31. Once the longwall face reached crosscut 31, the EP would become permanently established at the regulator installed in this crosscut. This evaluation point was critical in determining the effectiveness of ventilation on the headgate side of the worked out area. However, there was no record of an air reading being taken at this EP by either MSHA inspectors or UBB examiners.

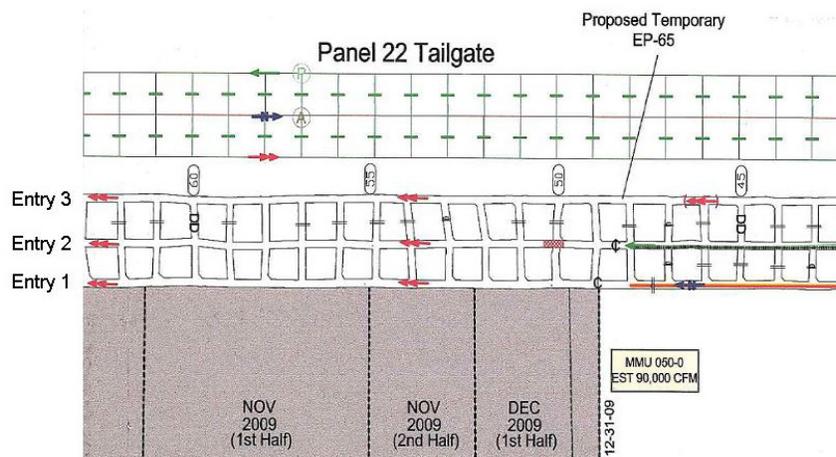


Figure 18 - Portion of ventilation plan supplement approved January 22, 2010, showing EP-65

The Internal Review team learned from interviews that two copies of approved ventilation plans and supplements are sent to the respective field office. One copy is to be filed in the Uniform Mine File and the second copy is to be provided to the lead inspector conducting the regular inspection. By doing this, the lead inspectors are made aware of changes to the approved ventilation plan in a timely manner.

The record of preshift examinations conducted by the Operator showed that the air quantity entering the bleeder system on the longwall tailgate, as measured at MP-B, ranged from 15,000 cfm to 35,000 cfm. However, at other times, the air quantity at MP-B was either too low to measure or was not being measured by the Operator. On numerous occasions, the Operator's record of examinations described the air quantity as "movement to gob." This variation may have been indicative of problems with the ventilation system that were not identified by the Operator or MSHA.

Conclusion: Weekly examination records indicated the air quantities, qualities, and directions were not recorded by the Operator for some established evaluation points, and information was not available to fully evaluate the bleeder system as required by 30 CFR 75.364(a)(2). MSHA inspectors did not address the lack of weekly records of air readings at established bleeder evaluation points at UBB. Without these records, the Operator was not able to properly evaluate the bleeder system for the 1 North Longwall panel.

Recommendations: The Administrator for Coal should collaborate with the Director of EPD to provide instruction on bleeder system evaluations during biannual retraining of all underground enforcement personnel and supervisors.

Permits for Mining under Bodies of Water

Requirements: Mandatory safety standard 30 CFR 75.372(b)(4) required the locations of all known mine workings underlying and overlying the mine property and the distance between the mine workings to be included on the mine ventilation map.

Mandatory safety standard 30 CFR 75.1200 required mine operators to maintain an accurate and up-to-date map of the mine. Paragraphs (d) and (e) required the map to show "contour lines of all elevations" and "elevations of all main and cross or side entries," respectively. Paragraphs (i) and (j) required this map to show "mines above or below" and "water pools above," respectively. Paragraph (l) required the operator to show on the mine map "such other information as the Secretary may require."

Mandatory safety standard 30 CFR 75.1203 stated: "The coal mine map and any revision and supplement thereof shall be available for inspection by the Secretary or his authorized representative, by coal mine inspectors of the State in which the mine is located, by miners in the mine and their representatives and by operators of adjacent coal mines and by persons owning, leasing, or residing on surface areas of such mines or areas adjacent to such mines."

Mandatory safety standard 30 CFR 75.1716 required mine operators to obtain a permit from the District Manager before mining "under any river, stream, lake, or other body of water" that is "sufficiently large to constitute a hazard to miners." To provide the district manager with information necessary to make such determinations, 30 CFR 75.1716-1 required operators to notify the district manager prior to mining beneath any body of water. If the district manager determines from such notification that the proposed mining constitutes a hazard to miners, 30 CFR 75.1716-2 required MSHA to promptly notify the operator that a permit is required. When applying for a permit, the operator was required to provide information listed in 30 CFR 75.1716-3.

Mandatory safety standard 30 CFR 50.10 required mine operators to immediately contact MSHA upon learning of an accident. Under 30 CFR 50.2(h)(4), an unplanned inundation of a mine by a liquid or gas was defined as an accident.

MSHA Policies and Procedures: For 30 CFR 75.1203, the *Program Policy Manual* directed MSHA to require the operator to furnish to the Coal Mine Safety and Health district manager of the district in which the mine is located two copies of the mine map and any revision and supplement thereof on or before the first day of March of each year unless otherwise specified by the district manager. Such copies shall show all the required information, as posted on the mine map on or after the first day of January of each year. MSHA policy did not address 30 CFR 75.372(b)(4) or 30 CFR 75.1716-1 through 75.1716-3.

The *Coal General Inspection Procedures and Inspection Tracking System* handbook directed inspectors to evaluate the operator's compliance with permits obtained under 30 CFR 75.1716.

Statement of Facts: There were at least two incidents when water from a mine(s) located above UBB entered the active workings. The Operator did not notify the District 4 Manager that they planned to mine under a body of water that existed in a mine above UBB before developing either of the affected areas.

The first incident occurred on March 12, 2006, when water from an overlying mine entered UBB through the pilot drill hole for a raise-bored shaft (Glory Hole). The Operator reported this inundation as an accident, which was investigated by District 4.

A second incident occurred on November 16, 2009, when longwall retreat mining fractured the interburden between UBB and an overlying mine. This allowed water from the overlying mine to inundate the headgate entries, restricting air flow to the Bandytown Fan through the headgate entries, including the bleeder system and return air course for Headgate #22 Section, by increasing the air flow resistance in these entries. The 1 North Longwall panel was shut down for a period of time while water was pumped out due to the restrictive effect on the ventilation system between the longwall face and Bandytown Fan. In addition, a potential would exist to reduce the air quantity available to dilute, render harmless, and carry away flammable, explosive, noxious, and harmful gases, dusts, smoke, and fumes from the Headgate #22 working places since the No. 3 entry of the headgate entries was the return air course for the section.

During this event, two MSHA ventilation specialists indicated in their inspection notes that water blocking the headgate entries originated from an overlying mine, but neither recognized this as an inundation pursuant to 30 CFR 50.2(h)(4). The Operator failed to report the accident as required by 30 CFR 50.10. Additional details regarding the November 2009 inundation are provided in Appendix J.

Prior to the explosion, District 4 inspectors had not cited the Operator for a violation of 30 CFR 75.1716. During the review period, District 4 inspectors issued one citation at another mine for mining beneath a body of water without a permit. They also issued three violations for failure to comply with permits issued at other mines.

MSHA has not issued policy to provide guidance that "other bodies of water," as referenced in 30 CFR 75.1716, includes water pools in overlying mines. Furthermore, neither MSHA policy nor procedures addressed the manner in which an operator was required to notify the district manager of projected mining beneath bodies of water, as referenced in 30 CFR 75.1716-1. Failure by an operator to identify and provide notice of projected mining under all bodies of water limits a district manager's ability to determine if a permit is needed to safely conduct mining operations.

Mandatory safety standard 30 CFR 75.1200(i) and (j) required the Operator to show mines and water pools, respectively, located above UBB on their accurate and up-to-date 30 CFR 75.1200 map (1200 map). The UBB 1200 map obtained by the Internal Review team was dated October 31, 2009. This map did not show overlying mines and, as a result, water pools in those mines.

The mine map required by 30 CFR 75.1200 was not used by the Operator to provide the information required by 30 CFR 75.372. Interviews with District 4 ventilation specialists and the Ventilation Department supervisor indicated that the District did not request a 1200 map from the mine operator. Under the authority provided in 30 CFR 75.1203, the District 4 Manager could have requested a copy of the 1200 map, which is required to show the locations of the overlying bodies of water both on the surface and in overlying mines. Information required by 30 CFR 75.1200 regarding water pools above UBB, if shown, could have been useful in determining whether the Operator was planning to mine under bodies of water and whether the body of water constituted a potential hazard to miners. However, if the ventilation map is used in conjunction with the 1200 map to identify where bodies of water may exist in relationship to mining projections, both maps should be updated on the same date to permit reliable location of water bodies. Additionally, there was no MSHA policy to instruct district personnel to request that the Operator show elevations, where available, in the overlying mines on maps required by 30 CFR 75.1200 to evaluate the potential for bodies of water above mining projections.

Information contemplated by 30 CFR 75.372 and its subparagraphs also could have been useful in determining compliance with 30 CFR 75.1716, but this standard did not specify that the Operator show overlying bodies of water on mine ventilation maps. However, in the Federal Register preamble discussion of 30 CFR 75.372(b)(4), which required mine ventilation maps to show overlying and underlying mines and the distance between the mine workings, MSHA stated, “Overlying workings can present serious hazards. Water can accumulate in such areas and inundate underlying active workings if a roof fall or similar event occurs.” A two-part overlay for the UBB mine ventilation map showed the mine workings in the seams above UBB, but did not show any bodies of water within those mines. MSHA policy did not reflect the guidance provided in the preamble for 30 CFR 75.372(b)(4).

The District 4 Impoundment Department processed permits for mining under bodies of water. In July 2006, District 4 established an SOP that provided guidance for processing these permits. This SOP directed specialists to reference criteria in *Information Circular 8741, Results of Research to Develop Guidelines for Mining Near Surface and Underground Bodies of Water*,⁵³ to evaluate whether the proposed mining operations under the body of water can be safely conducted and, if so, to determine the conditions necessary to protect the safety of mines prior to granting the permit. Ventilation specialists’ and inspectors’ opinions varied as to whether showing a body of water on the annual mine ventilation map submitted to MSHA would constitute notification of the operator’s intent to mine under a body of water and fulfill the operator’s obligation under 30 CFR 75.1716-1. Based on the experience of Internal Review team members, this has been an issue dating back to the Federal Coal Mine Health and Safety Act of 1969.

The District 4 Impoundment Department conducted a review to determine if a permit was necessary to mine under a body of water only when an operator fulfilled its obligation to provide notice by written request for a permit or when enforcement personnel identified the potential for mining under a body of water. During the review period, the Operator did not provide notice to District 4 that it was planning to mine under any bodies of water, including water accumulations in overlying mines.

Conclusion: MSHA policy did not specify the manner in which an operator is to “give notice” to the district manager of projected mining beneath bodies of water, as required by 30 CFR 75.1716-1. As a result, District 4 personnel did not have a clear understanding of requirements for complying with this standard. Had the Operator provided District 4 notice of bodies of water located in mines above UBB, the information could have been forwarded to the Impoundment Department for further evaluation. Additional information could have been obtained from the Operator to determine whether mining could be conducted safely, and if so, whether additional safety precautions would be necessary.

MSHA policy did not address whether identifying overlying bodies of water on the mine ventilation map or on the 1200 map constitutes notice to the district manager. Policy also did not specify that the term “water pools above” referenced in 30 CFR 75.1200(j) applied to water accumulated in overlying mines. Finally, MSHA policy under 30 CFR 75.372(b)(4) did not reflect the preamble’s recognition of the importance to identify pools of water in overlying mines on the mine ventilation map.

Since neither the UBB mine ventilation map nor the 30 CFR 75.1200 map showed bodies of water in overlying mines, District 4 personnel were significantly hampered in their ability to determine whether the Operator had mined, or was planning to mine, under a body of water. However, even after water from an overlying mine(s) inundated a portion of the Mine in 2006 and the Operator reported it as an accident, District 4 did not require Performance Coal Company to obtain a permit pursuant to 30 CFR 75.1716.

MSHA policy did not instruct district personnel to request that the Operator show elevations, where available, in the overlying mines on maps required by 30 CFR 75.1200 to evaluate the potential for bodies of water above mining projections.

In November 2009, District 4 personnel did not recognize that the water accumulation in the 1 North Longwall Headgate was an inundation the Operator was required to report as an accident pursuant to 30 CFR 50.10.

⁵³ United States Department of the Interior, Bureau of Mines, 1977.

Recommendations: The Administrator for Coal should direct revision of the *Program Policy Manual* to:

- Establish policy for 30 CFR 75.1716-1 to define the manner in which mine operators must provide notice to the district manager prior to the commencement of mining operations when planning to mine under any river, stream, lake, or other body of water. The policy also should state explicitly that “other body of water,” includes water pools in overlying mines.
- Clearly state the Agency’s interpretation of “water pools above,” as referenced in 30 CFR 75.1200(j), by explicitly stating that the phrase “water pools above” includes water pools in overlying mines.
- Instruct district personnel to request that an operator identify pools of water in overlying mines where applicable when submitting mine ventilation maps.
- Clarify the detail to be shown on mine ventilation maps to include elevations on 10-foot contours in overlying and underlying mines when elevations are available on overlying or underlying mine maps.
- Direct district managers to exercise their authority under 30 CFR 75.1203 to require that operators furnish a current 75.1200 map at the same time the annual mine ventilation map is submitted. Both maps should be updated as of the same date.

Roof Control Plan

Requirements: Mandatory safety standard 30 CFR 75.203(a) stated: “The method of mining shall not expose any person to hazards caused by excessive widths of rooms, crosscuts and entries, or faulty pillar recovery methods. Pillar dimensions shall be compatible with effective control of the roof, face and ribs and coal or rock bursts.”

Mandatory safety standard 30 CFR 75.220(a)(1) stated: “Each mine operator shall develop and follow a roof control plan, approved by the District Manager, that is suitable to the prevailing geological conditions, and the mining system to be used at the mine. Additional measures shall be taken to protect persons if unusual hazards are encountered.”

Mandatory safety standard 30 CFR 75.220(b)(2) stated: “When approval of a proposed plan or revision is denied, the deficiencies of the plan or revision and recommended changes will be specified and the mine operator will be afforded an opportunity to discuss the deficiencies and changes with the District Manager.”

Mandatory safety standard 30 CFR 75.222 specified that roof control plan-approval criteria be considered on a mine-by-mine basis in the formulation and approval of roof control plans and revisions.

Mandatory safety standard 30 CFR 75.223(a) stated: “Revisions of the roof control plan shall be proposed by the operator - (1) When conditions indicate that the plan is not suitable for controlling the roof, face, ribs, or coal or rock bursts; or (2) When accident and injury experience at the mine indicates the plan is inadequate. The accident and injury experience at each mine shall be reviewed at least every six months.”

Mandatory safety standard 30 CFR 75.223(d) stated: “The roof control plan for each mine shall be reviewed every six months by an authorized representative of the Secretary. This review shall take into consideration any falls of the roof, face and ribs and the adequacy of the support systems used at the time.”

MSHA Policies and Procedures: The *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* stated, in relevant part, that inspectors were to ascertain compliance with mandatory health and safety standards and approved plans (including suitability to current mine conditions). Inspectors were directed to carefully evaluate the physical condition of working sections, including roof and rib conditions and compliance with approved plans during inspection activities.

On June 3, 2008, the Administrator for Coal issued *CMS&H Memo No. HQ-08-055-A*.⁵⁴ The purpose of the memo was to strengthen inspection efforts to ascertain the adequacy of roof control plans, and to determine the effectiveness of miner training concerning roof control plans.

On June 5, 2008, the Administrator for Coal issued *CMS&H Memo HQ-08-058-A* which provided guidance for review and approval of complex and non-typical roof control plans and amendments. The Administrator defined complex plans to include those for “mining of high stress areas created by multiple seam interaction, or active mining below longwall panels or isolated remnant pillars.” It specified: “MSHA shall not approve the proposed plan or amendment until the operator has provided the data and evaluation supporting the proposal and a confirming evaluation(s) has been completed.” In pertinent part, the memorandum required the mine operator to submit the following with any complex or non-typical plan proposal:

- A risk assessment specific to the particular mining operation that includes depth of overburden, coal strength, pillar recovery method and development and retreat stability factors. The risk assessment will contain a statement detailing the basis on which the operator has determined that the plan is appropriate and suitable to the mining conditions.
- Data from currently available tools such as ARMPS [Analysis of Retreat Mining Pillar Stability], ALPS [Analysis of Longwall Pillar Stability], LAMODEL [Stress and Displacement Calculations], Rocscience [software tool for rock and soil], or other applicable software.
- MSHA shall not approve the proposed plan or amendment until the operator has provided the data and evaluation supporting the proposal and a confirming evaluation(s) has been completed.

On June 6, 2008, the Administrator for Coal issued *CMS&H Memo HQ-08-059-A*⁵⁵ with 29 pages of attached checklists for aiding MSHA personnel in the review of roof control plans. The form was to be used by inspectors and specialists for reviewing roof control plans and revisions, as well as six-month and quarterly roof control plan reviews. This memorandum also included the following statement: “The regular inspector should conduct six month reviews of the less complex mines in the District with assistance provided by the roof control specialist as needed. The roof control specialist should conduct the six-month reviews of the more complex mines in the District.”

Four finalized checklists were released in December 2008. They were sent by a Coal headquarters staff employee to district managers and assistant district managers via electronic mail on January 27, 2009. The correspondence specified that Coal required the use of the checklists during the next plan review. The following is a list of the checklists.

- MSHA Form 2000-226, Roof Control Plan Approval Process
- MSHA Form 2000-227, Roof Control Plan Review Checklist – 6-Month Review
- MSHA Form 2000-228, Roof Control Plan Review Checklist – New Submittal
- MSHA Form 2000-229, Roof Control Plan Review Checklist – Plan Revisions

Program Information Bulletin No. P09-03, issued March 16, 2009, provided: “the mining community with general guidelines when utilizing numerical modeling to evaluate ground control aspects of proposed mining plans.” The Bulletin discussed the Analysis of Retreat Mining Pillar Stability (ARMPS) computer program, and the Analysis of Longwall Pillar Stability (ALPS) program.

The *Program Policy Manual* provided that each Coal district develop fundamental management system controls, implemented in writing, to properly administer the approval process for all types of plans. This policy listed 20 objectives that these controls should accomplish. Accordingly, District 4 developed a written SOP for each type of plan processed by the District.

⁵⁴ *CMS&H Memo Nos. HQ-08-055-A* and *HQ-08-058-A* were written in 2008 to address the recommendations of an OIG audit report completed following the Crandall Canyon disaster.

⁵⁵ *Ibid.*

Chapter 400 of the *Department of Labor Manual Series*, Volume 1, contained policy regarding the retention of electronic mail (e-mail). Employees were directed to retain e-mail messages in accordance with the established office file plan and the DOL records retention schedules. The exact length of time varied depending on the activity that the message documents, which ranged from 30 days to permanent. Employees were directed to delete e-mail messages that were not records when they were no longer of use.

Policy also required e-mail records to be stored in an approved recordkeeping system which must:

- logically relate or group records in accordance with the office file plan;
- ensure the records are accessible to authorized persons throughout their life;
- support retention of the records for as long as required;
- facilitate destruction of records on schedule; and
- enable transfer of those records which will not be destroyed to the National Archives.

Statement of Facts: District 4 established a SOP for reviewing and processing roof control plans in September 2006. The SOP addressed tracking operator submittals, quarterly reviews of approved plans using MSHA 2000-204 Form (Plan Review Form), and periodic review of the Uniform Mine File by field office supervisors. In 2008, following the Crandall Canyon disaster, the Department of Labor Office of Inspector General examined roof control plan review SOPs in each District. The report indicated 4 of the 20 objectives for plan review management system controls listed in the PPM were not covered in the District 4 SOP. The four deficiencies identified by the OIG for the District 4 SOP were:

- Check that required information is submitted;
- Check for communication with other plan approval groups, when appropriate;
- Designated MSHA personnel contact operator for additional information; and
- Discuss results of on-site evaluation with operator and identified miners' representatives.

However, District 4 did not revise their roof control plan review SOP after the OIG report was released. At the time of the explosion, the 2006 SOP was still in use. The SOP specified that the entire plan approval process should normally not exceed 30 days, and if exceeded, required that an explanation be made in the review record. During the review period, District 4 did not complete reviews of four proposed UBB roof control plans or supplements within 30 days of receipt. The time spent in review varied according to the complexity of the plan or supplement. According to the Roof Control Department supervisor, the 30-day requirement could not be met due to a backlog of plan reviews, and some plan reviews did not begin for weeks after receipt. The SOP also included a routing sheet for attachment to each proposed roof control plan or supplement for tracking through the review and approval process. However, tracking sheets were not maintained in the Roof Control Department working files for some of the UBB submissions during the review period. Therefore, the plan review records could not be used to evaluate plan approval processing times for all UBB plans and supplements.

The Roof Control supervisor explained in an interview that the 30-day turn-around for all plans was not realistic. In cases where plans were sent to MSHA Technical Support for review, the 30-day timeframe was typically exceeded. Many times correspondence between mine operators and the Roof Control Department alone caused the time in review to exceed 30 days.

Following the Crandall Canyon mine disaster, the Administrator for Coal issued *CMS&H Memos HQ-08-058-A* and *HQ-08-059-A*. Due to the required implementation process for MSHA forms, use of the attached checklists was initially specified for roof control department supervisors only. The District 4 Roof Control Department supervisor indicated in his interviews that he began using the checklists for plan reviews immediately after receipt. However, copies of the completed checklists were not included in the District records provided to the Internal Review team for the six-month plan reviews or for the December 2009 base plan review as directed by the memorandum.

District 4 also developed seven checklists and other documents for guidance when reviewing initial roof control plans and supplements, general safety precautions to be included in roof control plans, deep cut minimum precautions, retreat mining precautions, and safety precautions for mobile roof supports. While

the SOP for plan reviews did not require these checklists to be used, the plan reviewers all stated that they used checklists to assist in completing roof control plan reviews. These checklists were not those developed by the Headquarters office for use in the field.

In a comparison of the checklists, the Internal Review team found the checklists used by District 4 included most of the considerations listed in the Headquarters checklists, and in some cases included additional considerations. Some items on the checklists were identical. The District 4 checklist included a requirement that the mine operator calculations for pillar stability be attached to, but not part of, the roof control plan. However, it did not specify that the calculations would be verified by the District.

When District 4 specialists identified deficiencies in roof control plans and supplements, they communicated their findings to the operator, who was then given the opportunity to make corrections or otherwise address the issues. District 4 roof control specialists often sent their findings and received corrections to proposed plans directly from the operator by e-mail. The specialist reviewing the proposed plan retained the e-mail, electronically, and did not always print a copy for inclusion in the working files maintained by the Roof Control Department. According to interviews, specialists eventually deleted some e-mail correspondence with operators when they determined they were no longer needed.

Roof Control Base Plans

The Operator developed the northern longwall district, including the 1 North Longwall Headgate and Tailgate entries, between April 30, 2008, and March 15, 2009, using the base roof control plan approved October 25, 2005, and subsequent supplements. This plan required coal pillars to be designed using the Bieniawski Formula or equivalent, with safety factors of 1.5 in mains and 1.3 in rooms and panels with 6-month or less mining. In interviews, District 4 Roof Control Department personnel stated that this provision applied to retreat mining sections using continuous mining equipment. They also stated that because longwall gate pillar stability is addressed by existing 30 CFR 75.203(a), it was not necessary to specify a method for determining pillar stability in the plan. The plan specified that longwall tailgate crosscuts would be spaced at least 100 feet apart, as measured between centerlines.

The October 2005 roof control base plan contained provisions specifically addressing longwall mining systems. Among other items, page 6 specified the type of supplemental roof supports that was to be installed in the first longwall panel tailgate entry. Supplemental support to be installed in the tailgate entry of the first panel included a row of posts installed on 5-foot centers or a double row of staggered posts on 8-foot centers for the entire length of the entry. The support was to be installed before mining commenced. In addition, on pages 18-20, the plan showed supplemental roof support requirements for adjacent tailgate entries with gob on one side. The requirements stipulated various supports, depending on conditions that could be used including cable bolts, trusses, Propsetter™ supports, or four-point cribs that would be maintained 50 feet outby the retreating longwall face. When the overburden depth was 1,000 feet or greater, spacing and pattern requirements were tightened.

The Operator submitted an updated base plan on May 19, 2008. By that time, District 4 had approved four supplements to the 2005 base plan, even though the roof control plan approval SOP stated that “no more than three supplements will be permitted on an approved plan before they are incorporated into an updated plan.” District 4 reviewed the proposed base plan for nearly nine months before denying approval on February 17, 2009. During that time, District 4 approved three additional supplements to the October 2005 base plan. These site-specific supplements included the following:

- On July 14, 2008, District 4 approved a supplement for shearing coal pillars in the North Glory Mains to facilitate installation of a longwall belt. The submittal included a computer analysis of pillar stability designated as virgin block ARMPS. The results of the analysis showed the load-bearing capacity of the pillars exceeded the calculated load.
- On September 30, 2008, the Operator submitted a supplement to the roof control plan in response to a roof fall on the Headgate 1 North development section. This proposed supplement added a safety precaution for additional supplemental support (cable bolts) in the Headgate 1 North No. 1 entry at all intersections and at every other row of roof bolts installed as primary support.

District 4 approved this supplement on October 1, 2008. The approval letter informed the Operator that no additional supplements would be approved until the roof control plan was updated, even though a consolidated plan had been in the District plan approval process for 4-½ months without a written response.

- On November 13, 2008, the Operator submitted a supplement to the roof control plan in response to another roof fall on the Headgate 1 North development section. The Operator proposed adding a safety precaution requiring test holes to be drilled, and supplemental roof support installed where such drilling detects a rider seam that was associated with the roof fall. District 4 approved the supplement on November 14, 2008.

District 4 records did not include a tracking sheet attached to the 2008 proposed base plan or explain why it took more than 30 days to review. Also, a completed checklist was not included in the file to indicate the reviewer considered all of the plan review requirements. In addition to identifying twelve deficiencies in the proposed plan, the denial letter informed the Operator that “no additional supplements will be allowed until an updated roof control plan is approved.” These deficiencies were corrected in the subsequent roof control base plan approved on December 23, 2009.

On October 14, 2009, District 4 received a supplement to the roof control plan which proposed a block shearing plan for Headgate 2 North in North Glory Mains. District 4 denied approval of the supplement on October 16 because of their outstanding requests for the Operator to consolidate the plan and to address deficiencies previously identified in February. The denial letter did not identify deficiencies specific to the submission. The District also indicated that enforcement action would be taken unless the deficiencies were addressed, and again requested a response within 10 days of receipt.

The Operator submitted an updated base plan on October 27, 2009, which District 4 approved on December 23. Item 14(d) of the Roof Control Plan Review Checklist – Plan Revisions (MSHA 2000-229 Form) required the plan reviewer to compare the submittal to the existing plan to ensure that the submittal maintains at least the same degree of safety. The Internal Review team identified differences between the 2005 and 2009 base plans.

- The operator identified an updated computer model to be used to evaluate pillar stability for retreat mining systems in the 2009 plan. However, neither plan addressed pillar stability for multiple-seam mining or longwall gate entries.
- The minimum longwall tailgate crosscut center value was reduced from 100 feet to 80 feet.
- The supplemental roof support requirements for the initial longwall tailgate entry in the December 2009 roof control plan were modified from the October 2005 plan requirements. In 2005, the supplemental support requirement was to install one row of posts on 5-foot centers or a double row of staggered posts on 8-foot centers for the length of the entire entry. Page 19 of the 2009 plan showed two rows of cable bolts or two rows of posts to be installed on 4-foot centers between the previously installed roof supports, to be maintained 1,000 feet outby the face at all times.⁵⁶
- Provisions covered by existing regulations in the 2005 plan were appropriately removed from the 2009 plan, and several safety precautions were added or enhanced in the 2009 plan. An entire section on safety precautions for pillar recovery was added to the 2009 plan.

Although the review took more than 30 days to complete, there was no reason recorded on the plan tracking sheet as required by the District 4 SOP. In the information provided by District 4 to the Internal Review team, there was no documentation indicating that a checklist was used in the plan review. However, the SOP did not require the Roof Control Department to maintain this documentation.

⁵⁶ Using data provided by Technical Support, it was determined that the 2009 supplemental support provided 60% more support capacity as compared to the 2005 plan requirements.

District 4 personnel stated during interviews that meeting the minimum crosscut center value was not the only consideration for determining the adequacy of the roof control plan parameter. The actual minimum pillar size depended on the location within the mine and physical factors including overburden distance and multiple seam mining, which would be reflected in the pillar stability calculations. The position of District 4 was that even if the pillar stability calculations would indicate crosscut spacing of less than 80 feet would be acceptable, the Mine could not develop the gate entries with crosscut centers less than 80 feet.

Pillar Stability Analysis

District 4 approved the 2009 base roof control plan without requiring the Operator to submit a risk assessment specific to the particular mining operation, including the submission of data and evaluation supporting the proposal, as directed by *CMS&H Memo No. HQ-08-058-A*. In particular, the Operator did not provide information detailing the basis on which the plan was determined to be appropriate and suitable, such as a pillar stability analysis.

Interviews with District 4 personnel revealed that they did not always request the pillar stability analysis from mine operators as directed by *CMS&H Memo HQ-08-058-A*. MSHA intended for roof control specialists to review operators' ground control analyses to ensure that operators accurately calculated and applied these factors in all aspects of their mine design. Instead, District 4 roof control specialists indicated that they requested examples of pillar stability analyses from operators to demonstrate their ability to use the appropriate software. The Roof Control Department supervisor also stated he did not receive a copy of *CMS&H Memo HQ-08-058-A*. The Administrator for Coal addressed this memorandum to all district managers and assistant district managers, without using MSHA's formal directives system for implementing program procedures.

District technical department staff stated that they would at times request stability analyses from operators for the purpose of reviewing plan supplements to assure the proper engineering calculations were being completed. For conventional stability factor determinations, District 4 staff indicated that they were confident in their own ability to run computer modeling programs to determine the suitability of pillar system designs, and did not always need to consult with Technical Support for assistance. For special cases, including instances described and specified in *Procedure Instruction Letter No. I08-V-02*, District 4 would send plans to Technical Support for review. Interviews also indicated that Technical Support was regularly consulted by the Roof Control Department for assistance.

The UBB 2009 plan submitted by the Operator was not forwarded to MSHA Technical Support for review, even though the conditions met the guidelines specified in *Procedure Instruction Letter No. I08-V-02*. These conditions included plans where minimum safety criteria did not meet or exceed computer models, and complex, non-typical plans presenting unique or novel situations such as special undermining situations.

The MSHA Accident Investigation team concluded in their report that the Operator's 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. As discussed in the accident report, supplemental tailgate supports required in the latest roof control plan were not installed. The report states:

PCC failed to either set two rows of posts or install two 8' cable bolts down the tailgate entry. Prior to the explosion, the roof of the tailgate entry caved in by the face, restricting the airway through the next inby crosscut, referred to in ventilation terms as the T-split. This failure to install required support contributed to a roof fall in the tailgate entry behind the shields that allowed methane from the floor feeder to accumulate. The tailgate roof fall in by the face restricted airflow to the extent that it was not possible to dilute the additional gas inflow behind shields 160 through 171. On April 5, a small portion of this gas volume ignited, most likely on the fringe of a gas body, providing the initial

explosive energy to suspend float coal dust in the tailgate entries that allowed transition to a coal dust explosion.

The MSHA Accident Investigation report states the gateroad design was not robust enough to meet the recommended stability factors beneath the deepest overburden in combination with Powellton gateroad crossings. The Accident Investigation team determined that the minimum crosscut and entry centers should have been 125 feet to meet the NIOSH-suggested pillar stability factor.

When ground control conditions in the 1 North Longwall headgate deteriorated in 2009, the Ventilation Department supervisor was concerned about the suitability of the 1 North headgate for future mining. In particular, these entries were to be used as the tailgate of the subsequent longwall panel, and they would require significant rehabilitation to meet mandatory safety standard requirements. Due to these concerns, the Ventilation Department supervisor requested that the Roof Control Department complete an Analysis of Longwall Pillar Stability (ALPS) and Analysis of Multiple Seam Stability (AMSS) for pillars at two locations: near crosscut 72 in the headgate, and crosscut 95 in the tailgate. The two locations were nearly opposite each other across the longwall panel.

For the headgate location, which would become the tailgate for the next longwall panel, the District 4 analysis indicated the pillar stability factor was adequate for development. However, the stability factor was less than the recommended value for tailgate pillars, and indicated that the pillar design may be inadequate to prevent a major multiple seam interaction. The analysis suggested that rib instability was likely, and that a major interaction should be considered likely unless a pattern of supplemental roof support was installed. The analysis also suggested the likelihood of interaction could have been reduced by increasing pillar dimensions.

For the tailgate location, the analysis again indicated that the tailgate pillar stability factor was less than the recommended value for tailgate pillars, and that the pillar design may be inadequate to prevent a major multiple seam interaction. The program suggested that rib instability was likely, and that a major interaction should be considered likely unless a pattern of supplemental roof support was installed. The program also suggested the likelihood of interaction could have been reduced by increasing pillar dimensions.

There was no pillar stability analysis submitted by Performance Coal Company with the October 2009 plan update. A note was affixed to the roof control plan tracking sheet by the ADM-Technical that stated District 4 would “still look at the [longwall] gate pillars – later.” At the time the plan was approved, *CMS&H Memo HQ-08-058-A* specified MSHA would not approve new plans or supplements until the operator provided data and evaluation supporting the proposal and confirming evaluations had been completed. There was no documentation provided by the District to indicate pillar stability was evaluated as suggested by the ADM-Technical.

Inspectors and specialists told the Roof Control Department that there was some floor heave and rib sloughage in the longwall headgate and stoppings were crushing out between entries in the headgate at UBB. However, according to the Roof Control Department supervisor, these issues are not uncommon for any longwall section, and potential pillar failure was not reported or indicated by the reports from other MSHA personnel.

The Internal Review team requested the Technical Support Roof Control Division (RCD) to conduct pillar stability analyses at UBB. The areas of analysis also included pillar designs on the current 1 North Longwall headgate and tailgate, Longwall Tailgate 11, Headgate 11, Headgate 12, Headgate 14, Headgate 15, and Headgate 16. RCD used the ALPS and AMMS software version available during the review period to perform these analyses.

The Technical Support report on the analyses is included as Appendix K to this report. The results of the analyses indicated the 1 North tailgate did not meet the pillar stability factor criteria suggested for a bleeder, and the 1 North headgate pillar stability factor did not meet the criteria for a future longwall tailgate.

Six-month Reviews of Roof Control Plan

In accordance with the District 4 SOP, inspectors conducted six-month reviews of the roof control plan required by 30 CFR 75.223(d) during regular inspections each quarter. However, several inspectors told the Internal Review team that they were not aware that they were conducting six-month reviews of the plans, and that they had not received training on how to conduct the reviews.

Inspectors completed a MSHA 2000-204 Form (Plan Review Form) to document their evaluation of the plan adequacy during each regular inspection. The District 4 SOP required the inspector to record on the form the names of mine officials and miner representative who participated in the review discussion. However, the signed Plan Review Forms did not always include the names of mine officials who participated in the review discussion as directed by the District 4 SOP, although the inspection notes frequently did include these names. Field office personnel entered information from these forms into MSHA's Mine Plan Approval tracking system every quarter. If the Plan Review Form indicated a deficiency or change was needed, the form was to be sent to the District Roof Control Department supervisor for evaluation.

There was one deficiency in the roof control plan for UBB which was documented on the Plan Review Form completed for the fourth regular inspection of fiscal 2009. The inspector noted that the plan did not contain a provision to address roof support in an entry wider than 20 feet. In the letter sent to Performance Coal Company on August 21, 2009, District 4 notified the Operator of the deficiency and requested a response within ten days of receipt, or appropriate enforcement action may be taken. The letter also reiterated the deficiencies previously identified in the May 2008 submittal.

District 4 staff stated in interviews that six-month reviews of roof control plans for complex mines were not being completed by roof control specialists, as directed by *CMS&H Memo HQ-08-059-A*. The Roof Control Department supervisor stated this policy was not followed due to a shortage in human resources, because roof control specialists were being assigned to conduct regular inspections. Roof control specialists reported spending approximately 20% of their time conducting regular inspections.

District 4 inspectors conducted in-mine evaluations of the roof control plan after the issuance of HQ-08-059-A and prior to the mining of the UBB longwall gate entries in the area where pillar stability was inadequate. These reviews were conducted on July 1 and October 1, 2008, by inspectors conducting regular inspections, and not by roof control specialists. Inspectors documented that the roof control plan was adequate during these reviews. Issues with pillar instability became evident to MSHA when longwall retreat mining caused ground failures in November 2009.

Conclusion: Deficiencies in roof control plans and supplements were identified by District 4 and provided to the Operator for revisions. However, the Roof Control Department did not always adhere to established policies and procedures. Some deficiencies were recordkeeping issues that did not affect the substantive portion of roof control plan reviews.

- Checklists used by the Roof Control Department varied slightly from the checklists specified for use by *CMS&H Memo HQ-08-059-A*.
- Tracking sheets and checklists used were not always retained to document compliance with policies and procedures established as part of the roof control plan review, such as completion of plan reviews within 30 days.
- By decreasing the minimum longwall tailgate crosscut center distance from 100 feet to 80 feet, the 2009 base plan did not maintain the same degree of safety as the 2005 base plan.
- District 4 approved the December 2009 roof control plan without requiring the submission of pillar stability data and evaluation by the Operator as directed by *CMS&H Memo HQ-08-058-A*. However, this memo was addressed to district managers and assistant district managers, and was not provided to the Roof Control Department supervisor.
- Inspectors, rather than roof control specialists, conducted the six-month reviews of the roof control plans, which was contrary to *CMS&H Memo HQ-08-059-A*. This was due at least in part

to a lack of resources because roof control specialists were assigned to conduct regular inspections.

The directives related to roof control plan approval were scattered among the *Program Policy Manual*, Procedure Instruction Letters, Program Information Bulletins, and CMS&H memoranda. The disorganized directives may have led to the failure to follow the procedure requiring that pillar stability analysis calculations be submitted by the Operator with the roof control plan.

The Operator would have identified the inadequate pillar design if it had conducted a proper analysis prior to developing the gate entries. However, the Operator's inadequate pillar design was not identified until the District 4 Ventilation Department supervisor requested that the Roof Control Department conduct a computer analysis following ground failures in the headgate during retreat mining.

The District 4 roof control plan approval SOP was not revised following the 2008 OIG report to comply with the *Program Policy Manual*. UBB plans consistently included three of the four controls identified as missing by the report. The one control which was not regularly followed was to check for communication with other plan approval groups when appropriate. (Refer to "Mine Ventilation Plan" section of this report.)

District 4 checklists for reviewing roof control plans were adequate to ensure the plans submitted by Performance Coal Company included the required information. Inspectors conducting six-month reviews of plans were instructed to discuss findings of the plan reviews with the Operator and to document the discussions in their notes. MSHA personnel contacted the Operator for additional information as required.

Electronic communications between the Operator and District 4 plan reviewers were appropriate. However, the records of correspondence were not stored in the active mine files maintained by the Roof Control Department. It could not be determined from interviews if the records were accessible to authorized persons throughout their life, or if the records were stored for as long as required.

Recommendations: The Administrator for Coal should direct that a Roof Control Plan Approval Handbook be developed to consolidate the numerous PILs, PIBs, and CMS&H memoranda. This will provide plan reviewers with a discrete set of guidelines and instructions for evaluating and processing roof control plans. The handbook should specify that correspondence between the coal operators and plan reviewers be maintained as part of the plan approval record. This should include procedures for tracking responses due from operators following MSHA requests for plan revisions.

The Director of PEIR should collaborate with the Administrator for Coal to revise the Mine Plan Approval (MPA) database system to track operator responses to MSHA requests for plan revisions. The Administrator should direct district managers to use MPA to identify overdue responses from operators and take appropriate actions.

The Administrator for Coal should direct the District 4 and 12 Managers to revise the roof control plan SOP to comply with the established *Program Policy Manual* requirements as identified by the OIG report.

The Administrator for Coal should direct the District 4 and 12 Managers to provide training to inspectors and specialists regarding the use of the required checklists and proper documentation of six-month plan reviews.

The Administrator for Coal should direct the District 4 and 12 Managers to ensure that the six-month reviews of roof control plans for complex mines be conducted by roof control specialists. When deemed appropriate, complex mine plans should continue to be forwarded to Technical Support for evaluation.

Emergency Response Plan

Requirements: The Mine Improvement and New Emergency Response Act of 2006 (MINER Act), which amended the Mine Act, mandated that each underground coal mine operator develop and adopt a

written accident response plan -- i.e., an “Emergency Response Plan” (ERP). Each ERP must provide for the evacuation of all individuals endangered by an emergency and the maintenance of individuals trapped underground in the event that miners are not able to evacuate the mine. At minimum, ERPs must provide for: (1) post-accident communications, including a redundant means of communication between surface and underground personnel, such as a secondary telephone; (2) post-accident tracking, such that above-ground personnel can determine the current, or immediately pre-accident, location of all underground personnel; (3) post-accident breathable air; (4) post-accident lifelines; (5) training; and (6) local coordination. District managers must approve an ERP prior to implementation and periodically review approved ERPs.

Recognizing technological advances, the MINER Act also provided that, by June 15, 2009, each ERP must provide wireless two-way communication and electronic tracking capability. In situations in which such systems could not be implemented, operators were required to implement systems that approximated, “as closely as possible the degree of functional utility and safety protection provided by” wireless two-way communication and electronic tracking systems.

With respect to post-accident breathable air, each ERP must provide emergency supplies of breathable air sufficient to maintain individuals trapped underground for a sustained period of time, as well as caches of self-contained self-rescuers (SCSRs) to provide miners breathable air as they attempt to escape from the mine.

The MINER Act also established provisions for post-accident lifelines to assist miners evacuating a mine. In addition, the MINER Act provided for miner training, as well as local coordination between the operator, mine rescue teams, and local emergency response personnel, to improve the effectiveness of evacuation efforts and rescue operations.

MSHA’s *Emergency Mine Evacuation* final rule, issued December 8, 2006, revised the Agency’s prior Emergency Temporary Standard. The final rule included requirements for increased availability and storage of SCSRs; improved emergency evacuation drills and SCSR training; and the installation and maintenance of lifelines in underground coal mines.

On December 31, 2008, MSHA issued the *Refuge Alternatives for Underground Coal Mines* final rule, which established provisions for the approval of refuge alternative components and established mandatory standards to address the use, examination, and maintenance of refuge alternatives, as well as miner training on their use and deployment.

MSHA Policies and Procedures: Following the enactment of the MINER Act, MSHA issued a number of Program Policy Letters, Procedure Instruction Letters, and Program Information Bulletins to provide guidance to MSHA personnel, miners, mine operators, and other parties with respect to the development, review, implementation, and inspection of provisions contained in ERPs.

To address the requirement that operators revise ERPs by June 15, 2009, MSHA issued *Program Policy Letter (PPL) No. P09-V-01, Guidance for Compliance with Post-Accident Two-Way Communications and Electronic Tracking Requirements of the Mine Improvement and New Emergency Response Act (MINER Act)*, on January 16, 2009. This PPL provided mine operators guidance in implementing alternatives to fully wireless post-accident two-way communication between underground and surface personnel and electronic tracking systems. While not mandating design or manner of installation, the PPL discussed general aspects of the communication and tracking systems that the Agency considered important for compliance with the MINER Act.

Statement of Facts: On October 9, 2009, Performance Coal Company submitted to District 4 the ERP that was in effect at UBB on April 5, 2010. After reviewing the ERP, the District Manager approved it on January 25, 2010. In accordance with MINER Act provisions and mandatory standards, the ERP addressed: (1) post-accident communications, (2) post-accident tracking, (3) post-accident breathable air,

(4) post-accident lifelines, (5) training, and (6) local coordination. The ERP also contained the 30 CFR 75.1502 Mine Emergency Evacuation and Firefighting Program of Instruction.⁵⁷

Performance Coal Company addressed the post-accident communication requirements of the MINER Act by providing two independent hard-wired mine pager communication systems between surface and underground personnel, which would be maintained at all times. At least one of the communication systems was to be located in the primary escapeway, with a secondary communication system in an alternative entry. Post-accident tracking was provided by implementing a zone tracking system under which the Mine was divided into zones and workers communicated their current locations to a person on the surface as they entered a new zone. The person on the surface maintained a written log providing a record of each miner's current or immediate pre-accident location.

As required by the MINER Act, Performance Coal Company's January 25, 2010, approved ERP contained provisions for upgrading the Mine's communication and tracking systems to provide wireless communication systems, or the closest equivalent, and electronic tracking systems. Both of these more advanced systems were in the process of being installed on April 5, 2010. Neither the wireless communication system nor the electronic tracking system had been installed on the working sections to provide the coverage detailed in the ERP when the explosion occurred. In addition, the Accident Investigation report indicated that portions of the system that had been installed prior to the explosion were not communicating and tracking from underground locations to surface facilities.⁵⁸ Thus, as detailed in the MSHA Accident Investigation report, these systems did not provide critical information concerning the locations of missing miners nor were they capable of providing the necessary communications capability following the explosion.

While an electronic tracking system may have assisted mine rescue personnel in locating the victims of the explosion, neither this system nor wireless communication systems had been installed at a significant percentage of underground mines throughout the nation at that time, because they were not commercially available to the majority of underground coal mine operators until months after the explosion. (See *Program Information Bulletin No P10-22, Emergency Response Plan (ERP) Reviews of Post-Accident Communication and Electronic Tracking Systems*, December 14, 2010.) Thus, at the time of the explosion, most operators continued to use the hard-wired communication systems and the manual tracking systems established in their initial ERPs.

Performance Coal Company addressed the requirements of the *Refuge Alternatives* Final Rule by providing prefabricated refuge units on the working sections. These units were designed to maintain up to 24 persons for at least 96 hours. For miners in outby areas, the ERP provided for pre-constructed refuge alternatives consisting of stoppings constructed of 8x16-inch solid block, within which oxygen, carbon dioxide scrubbing devices, food, water, and other provisions required to maintain up to 10 persons for at least 96 hours would be stored.

Following the explosion, the Accident Investigation team requested an examination of the prefabricated refuge units that were located in 1 North Longwall, Headgate #22, and Tailgate #22 areas. While the three refuge units were not removed from the mine for extensive testing, the team concluded that each of the refuge units inflated as designed and that oxygen systems and carbon dioxide scrubbing systems both functioned during the period that they were tested. In addition, supplies inside the units remained intact.

Both MSHA and District 4 have devoted significant resources toward the implementation of the ERP provisions in Section 2 of the MINER Act. The Agency has promulgated rules to address the breathable air, lifeline, and evacuation training provisions of the MINER Act. In addition, with significant input

⁵⁷ While UBB included the Mine Emergency Evacuation and Firefighting Program of Instruction as a part of its ERP in accordance with District 4 policy, most mine operators have independent ERPs and Mine Emergency Evacuation and Firefighting Programs of Instruction.

⁵⁸ During interviews, the Internal Review team learned that, during inspections of updated communication and tracking systems conducted months after the explosion, District 4 inspectors identified similar problems at other mines. District 4 personnel worked with manufacturers and mine operators to address technical deficiencies in order that the communication and tracking systems provide the capability defined in the mines' approved ERPs.

from NIOSH and MSHA's Directorate of Technical Support, the Agency has issued a significant number of guidance documents to assist operators and miners in the installation and use of refuge alternatives, SCSRs, communication systems, tracking systems, and other facets of ERPs. District offices have reviewed ERPs for more than 550 underground coal mines and have worked with operators to modify the plans, when appropriate, to provide the level of protection mandated by the Mine Act and existing mandatory standards.⁵⁹ Once approved, district managers periodically have reviewed ERPs to assure that they continue to provide miners the degree of protection available in light of advancements in science and technology so as to better assist miners in an emergency.

MSHA district offices have issued numerous citations to operators for failure to comply with the provisions of an ERP or applicable standards. With respect to UBB, District 4 issued 55 citations and orders for ERP-related violations during the review period.⁶⁰ These violations addressed deficiencies related to communication systems (8), tracking systems (1), refuge units (11), lifelines (33), mine evacuation (1), and SCSRs (1).

The Accident Investigation team determined that Performance Coal Company failed to comply with the manual tracking provisions of its January 25, 2010, ERP following the April 5, 2010, explosion. The violation addressed tracking failures that occurred on the day of the explosion. The Accident Investigation team also identified numerous instances in which Performance Coal Company failed to provide mine emergency and evacuation training and drills required pursuant to the Mine Emergency Evacuation and Firefighting Program of Instruction and 30 CFR 75.1504. The Operator's significant failures were identified during a review of certified training records and miner interviews; thus, some of these failures could have been identified during the review period. Finally, the Accident Investigation team cited 24 additional violations for conditions related to ERP provisions – 5 related to the location and/or use of refuge alternatives or SCSRs; 18 related to installation and maintenance of lifelines, and 1 related to communication systems. However, based on the description of the violations, many of these conditions may not have existed or may not have been readily observable during the second regular inspection of fiscal 2010.

Conclusion: MSHA and District 4 have devoted significant resources toward the implementation of the ERP provisions in Section 2 of the MINER Act. The approved ERP for UBB that was in effect on April 5, 2010, appropriately addressed each of the statutorily mandated ERP provisions. Lifelines, SCSRs, and refuge units were available for use in an emergency at UBB. Wireless two-way communication systems and electronic tracking systems were addressed in the approved ERP and were being installed at UBB when the explosion occurred. As a result, the Operator and mine rescuers were forced to rely on less sophisticated hard-wired communication systems and manual tracking systems. Moreover, the Operator was not complying fully with the manual tracking provisions in its ERP on April 5, 2010. Refuge units examined following the explosion were located in the working sections and were determined to be in operable condition.

During the review period, MSHA inspectors cited 55 violations for the Operator's failure to comply with its ERP and related mandatory standards. The Accident Investigation team identified 26 additional violations related to the Operator's ERP provisions. Based on the description of these violations, many of the conditions may not have existed or have been readily observable during the second regular inspection of fiscal 2010.

Corrective Actions Taken: MSHA has taken actions to assure compliance with the current Mine Act communication and tracking ERP provisions. Upon determining that a sufficient number of wireless, two-way communication systems and electronic tracking systems were commercially available to allow

⁵⁹ For example, the District 4 Manager refused to approve, absent modification, a revised ERP that Performance Coal Company submitted on September 4, 2007, because the plan did not address the means for using barricading material to establish an isolated environment prior to the time that the Operator received and installed prefabricated refuge units that ultimately would be used to provide emergency shelter.

⁶⁰ In addition, an inspector issued a section 104(b) order for the Operator's failure to timely repair a secondary communication system (see Order No. 8082711).

all underground coal mines to install such systems, MSHA systematically inspected all underground coal mines and took appropriate enforcement actions where mine operators had not acted diligently and in good faith to timely install compliant systems. On June 7, 2011, MSHA issued *Procedure Instruction Letter No.-III-V-6, Inspection of Post-Accident Communication and Electronic Tracking Systems*, to provide coal mine inspectors with comprehensive guidance for inspecting communication and tracking systems to determine whether they provide the capabilities specified in an operators' ERPs and whether they provide the requisite level of miner protection.

Recommendations: None

Respirable Dust at Upper Big Branch Mine-South

Due to evidence of dust-related lung disease identified from autopsies of the explosion victims, the Internal Review team reviewed District 4's enforcement of the respirable dust standards in 30 CFR Part 70. A complete analysis is contained in Appendix O.

The Internal Review team reached the following conclusions based on information in Appendix O:

- Most of the UBB victims exhibited signs of dust-related lung disease. The contribution that respirable dust exposures at UBB made to the incidence of lung disease is unclear. The majority of the victims had more than 10 years of mining experience and most worked less than 5 years at UBB. Employment history indicated four of the victims worked only at UBB during their mining careers, one of whom was diagnosed with simple CWP.
- By replacing MMUs and manipulating the operating status of existing MMUs, the Operator exploited "loopholes" in MSHA policy and procedures in order to avoid complying with reduced respirable dust standards.
- The MSHA respirable dust database could not be used to track changes made by mine operators on specific sections or MMUs by the serial number of the continuous mining machine(s) or by a reference to the section or location in the mine. Using data alone, it is difficult to identify mine operators deactivating and relocating units to avoid reduced dust standards, as opposed to deactivations and relocations for legitimate reasons.
- District 4 Health Department personnel did not clearly understand MSHA policy regarding the implementation and maintenance of reduced respirable dust standards. The lack of direction in existing policy and procedures led to inconsistency in enforcing respirable dust standards. In addition, Block 7C of MSHA Form 2000-142 was misleading because, contrary to the *Coal Mine Health Procedures Handbook*, it indicated that only Headquarters could administratively adjust the applicable dust standard.
- The Operator failed to submit respirable dust samples as required for 19 of 58 bimonthly cycles during the review period. District 4 specialists cited the Operator three times for failure to comply with 30 CFR 70.207(a). MMUs for 14 of the 19 bimonthly surveys were on a reduced respirable dust standard. In 16 of the 19 cases, the MMUs were not in active status for at least 45 days, which was the benchmark used by District 4 to determine compliance with the standard. This approach was developed in response to earlier legal precedent vacating MSHA citations that were issued to operators who had not produced coal during some or all periods of the bi-monthly cycle.
- In 31 of 35 instances during the review period, District 4 inspectors and specialists collected valid respirable dust samples on an operating MMU at the Mine as directed by the *Coal Mine Health Inspection Procedures Handbook*. However, the inspectors and specialists did not properly complete the associated MSHA Form 2000-86 for each of these valid sampling shifts. Additionally, inspectors and specialists did not comply with some procedures for conducting respirable dust surveys.

- The *Program Policy Manual, Volume I*, under Section I.103-4 Respirable Dust Sampling at Underground Coal Mines states: “MSHA does not take respirable dust samples during each of the four annual coal mine underground inspections.” This guidance conflicts with Chapter 1 of the *Coal Mine Health Inspection Procedures Handbook* which directs inspectors to sample all underground entities on a quarterly basis, including each producing MMU. This sampling is conducted during quarterly underground inspections.
- On average, it took 124 days for an excessive respirable dust citation to be terminated. The average time to abate violations of 30 CFR 70.100(a) and 30 CFR 70.101 at UBB was consistent with the average time to abate similar violations at other mines in District 4. However, the average time to abate violations of these respirable dust standards in District 4 was almost three times the average for all other districts.

Compliance with respirable dust standards is based initially on determining the minimum dust control parameters that effectively can control respirable dust. Reliably and consistently keeping exposures below applicable limits depends on an operator maintaining these minimum parameters.

As discussed in other sections of this report, the Operator failed to take actions necessary to maintain dust control parameters sufficient to protect miners from harmful dust exposure. For example, the Operator failed to maintain the shearer drum water sprays, a crucial means of controlling dust on the 1 North Longwall section. In addition, District 4 inspectors found and cited several violations for the Operator’s failure to comply with dust control provisions in its approved mine ventilation plan. These conditions increased the concentrations of respirable coal mine dust at UBB.

Corrective Actions Taken: During multiple national health supervisor meetings, training was provided to all District Health Supervisors on conducting, documenting, and reviewing respirable dust surveys.

On October 19, 2010, MSHA published a notice of proposed rulemaking to address continued risk to coal miners’ exposure to respirable coal mine dust, which includes lowering the permissible level of exposure and addressing the use of Continuous Personal Dust Monitors. This regulatory action is part of MSHA’s comprehensive strategy for reducing miners’ exposure to respirable coal mine dust. The Agency published notice of the final rule in January 2012. It was anticipated that the final rule would be published in Spring 2012.

Recommendations: The Administrator for Coal should direct the revision of the *Program Policy Manual* to:

- Clarify when it is appropriate to establish a new MMU number, including situations when mining equipment is replaced with similar machinery. Policy should clearly explain procedures for assigning respirable dust standards when a new MMU is approved to account for the mine’s history of reduced respirable dust standards and expected geological conditions.
- Clarify application of 30 CFR 70.207(a) as it relates to the collection of bimonthly samples by mine operators and provide training on the revised policy. This policy should provide guidance on when an MMU has operated a sufficient number of days during a bimonthly period to warrant operator sampling.
- Establish criteria for determining abatement times for citations issued for excessive respirable dust concentrations.
- Provide consistent guidance between Section I.103-4 of the *Program Policy Manual* and the *Coal Mine Health Inspection Procedures Handbook*. Revisions should clarify when MSHA will collect respirable dust samples on each operating MMU and state that invalid or voided samples do not count for fulfilling this obligation.

The Administrator for Coal should direct revisions to MSHA Form 2000-142 to eliminate the reference “Headquarters Only” for Item 7C and to require the serial number of the mining machine(s) and an

explicit reference to the section or location in the mine for each MMU to be recorded for Item 11 (Remarks).

The Administrator for Coal should collaborate with the Director of EPD to provide training on the revised policies for District Health Department Supervisors, Assistant District Managers–Technical, and other appropriate Coal personnel. This training should also include procedures for using the revised MSHA Form 2000-142.

The Administrator for Coal should consider whether it is appropriate to store serial numbers and the section/location designations for each MMU in the MSHA enterprise database.

The Administrator for Coal should direct that training be provided to District 4 and 12 inspectors, specialists, supervisors, assistant district managers, and other appropriate personnel on proper procedures for conducting, documenting, and reviewing MSHA respirable dust surveys.

The Director of PEIR should develop and implement a standard report to track abatement times for respirable dust violations, and the Administrator for Coal should direct the Health Division to use the report to monitor district performance.

Mine Rescue and Recovery

In order to evaluate the rescue and recovery operations at UBB, the Internal Review team reviewed command center logs; interview transcripts; section 103(j) and 103(k) orders, including subsequent modifications and plans; reports associated with the explosion by the MSHA Accident Investigation team, the Governor’s Independent Investigation Panel, and the United Mine Workers of America; and other relevant documents. After careful examination of the documents and interviews of MSHA employees, the Internal Review team believes the following account is an accurate portrayal of events that occurred during the rescue and recovery operations at UBB.

Requirements: Sections 103(j) and 103(k) of the Mine Act, as amended by the MINER Act, authorized MSHA to take action to protect the health and safety of miners during rescue and recovery operations.

Section 7 of the MINER Act directed the Secretary of Labor to establish policy that “requires the temporary assignment of an individual Department of Labor official to be a liaison between the Department and the families of victims of mine tragedies involving multiple deaths.” It also required MSHA to “serve as the primary communicator with the operator, miners’ families, the press and the public.”

With respect to mine rescue teams, 30 CFR 49.18(b) stated in pertinent part that “Upon completion of the initial training, all team members shall receive at least 96 hours of refresher training annually, which shall include participation in local mine rescue contests and training at the covered mine. Training shall be given at least 8 hours every 2 months and shall consist of... [a]dvanced mine rescue training and procedures, as prescribed by MSHA’s Office of Educational Policy and Development”

MSHA Policies and Procedures: *Program Policy Letter No. P09-V-03*, and Attachment 2 to the Letter, issued June 18, 2009, established policy for the Family Liaison and Primary Communicator. Attachment 2 stated “The Liaison will maintain a written log that documents all significant events.”⁶¹

Program Policy Letter P09-V-09, issued August 12, 2009, provided guidance and establishes a uniform policy regarding the issuance of section 103(j) and 103(k) orders under the Mine Act.

Mine Rescue Guidance: MSHA’s Office of Educational Policy and Development published the Mine Rescue Instructional Guide Series to help mine operators meet mine rescue team training requirements under 30 CFR Part 49. The MSHA *Mine Rescue Instruction Guide 3028* (Guide) was a compilation of

⁶¹ The PPL was in effect at the time of the explosion. It was incorporated into the *Headquarters Mine Emergency Response Guidelines* handbook in June 2010 and into the *Accident/Illness Investigations Procedures* handbook in June 2011.

established procedures and protocols for rescue and recovery operations based on years of mine rescue experience. While the Guide clarifies that these techniques are not rules and are fairly flexible, they are standard techniques and procedures to use during mine emergencies. MSHA Mine Emergency Unit members are trained to follow the procedures specified in this Guide. Key provisions of the Guide include the following:

- All decisions concerning the mine rescue teams (scheduling, assignments, tracking, rotations, and methods of exploration or firefighting) are made by the Command Center, which is a group generally comprised of mine management personnel, federal and state officials, and union representatives.
- Barefaced exploration should stop at any point where disruptions in ventilation are found, or when gas tests indicate the presence of any CO or other noxious gases, elevated readings of explosive gases, elevated methane (CH₄) readings, or oxygen (O₂) deficiency. A barefaced crew should also stop exploration when they encounter smoke or damage.
- The fresh air base (FAB) is the base of operations from which rescue and recovery work advances into irrespirable atmospheres. This is where apparatus crews begin their exploration of the affected area. The fresh air base also functions as a base of communications for the operation linking the team, the command center, and all support personnel.
- A fresh air base is usually established at the point where conditions no longer permit barefaced exploration. Because the area has already been explored, rescue team members and backup personnel are then free to travel to and from the fresh air base without apparatus. Teams equipped with apparatus continue exploration from the fresh air base.⁶²
- During exploration, the rescue team travels in areas containing potential roof, rib, and atmospheric hazards. As the team progresses through the mine, team members make gas tests and assess conditions. The team also searches for clues as to where survivors may be located, and locates fires. All these findings are mapped and reported to the fresh air base as the team proceeds.
- As teams explore, they must keep in mind that the first priority is team safety. The rescue of survivors comes second. The third priority is the recovery of the mine.
- Some toxic gases are harmful to inhale. A self-contained breathing apparatus (SCBA) will protect the wearer from such gases, as long as the face-to-facepiece seal is tight.
- As the team advances, it is essential to stay in close contact with the fresh air base to report progress and to receive further instructions.
- During exploration, teams will work according to a rotation schedule. One team, for example, will be scheduled to work inby. A second team will be stationed at the fresh air base as the “backup team,” and a third team, known as the “standby team,” will be ready and waiting on the surface. The rotation schedule should be designed so there is a clear working order and backup teams are always available.
- A standard exploration procedure for ensuring the safety of mine rescue personnel is to “tie in” during advance. “Tying in” ensures that there is never any unexplored area between the rescue team and the fresh air base. Even though a team knows or thinks it knows where survivors are located, it is absolutely essential for the team to tie in as it advances.
- If it will be necessary to test samples of the mine air during the rescue and recovery operation, a laboratory with suitable air analysis equipment should be set up at the mine for testing such air. Chemical analysis is generally a more time-consuming process than testing with a portable

⁶² Hazardous atmospheres may be encountered at any time inby the fresh air base, and events such as secondary explosions or roof falls may force irrespirable air into areas where the rescue teams are located.

device, but its advantage is accuracy. It tells exactly what gases the sample contains, and in precisely what amounts. A complete chemical analysis can also reveal the presence of gases that portable detectors are not designed to detect.

- The objective of reestablishing ventilation after an explosion is to rid the mine of explosive or potentially explosive gas mixtures and restore normal ventilation and normal amounts of oxygen to all workings without propagating another explosion.

The District 4 *Mine Emergency Response Plan* (MERP), dated October 2004, sets forth the procedures to be followed by District 4 managers, supervisors, and employees in responding to a full-scale mine emergency.⁶³ The Agency's primary responsibilities under the plan are: protecting the safety of persons conducting rescue and recovery operations; aiding the recovery of trapped or missing miners; conducting a thorough, objective investigation into the cause of the accident; and taking appropriate enforcement actions.

Statement of Facts: The MSHA Accident Investigation team determined that the President of Performance Coal Company called the Safety Director for the Massey Marfork Coal Company at 3:27 p.m. and asked him to report an occurrence at UBB to MSHA. At 3:30 p.m., the Safety Director called the Department of Labor National Contact Center (MSHA Hotline). The Contact Center operator documented: "The caller is calling to report a hazardous inundation of carbon monoxide gas. The caller indicated there is 50 to 100 parts per million. There is an air reversal on the beltline at the Ellis Portal. The cause of the build up of gas is unknown and the mine is being evacuated." The Contact Center relayed the information to the District 4 Manager's administrative assistant at 3:42 p.m. A section 103(j) order was issued to the Operator over the telephone at 4:00 p.m. The order prohibited all activity in the underground areas of the Mine except to rescue and recover miners.

District employees began mobilizing their response in accordance with the District 4 MERP. The District Manager and his Staff Assistant immediately departed for UBB. Several additional District 4 employees departed for the Mine soon thereafter.

At approximately 5:00 p.m. the District Manager and Staff Assistant arrived at UBB and, after receiving a briefing from Massey personnel, organized MSHA's response to the explosion. The District Manager reduced the section 103(j) order to writing and then modified it to a section 103(k) order at 5:20 p.m. as directed by Agency policy. This order was subsequently modified several times during the rescue and recovery operation to allow implementation of plans developed by the Mine Operator and approved by command center representatives.

A command center was established at the main office near the North and South Mine portals and was staffed with personnel from Massey, MSHA, and the West Virginia Office of Miners' Health, Safety, and Training (WVOMHST). A staging area for mine rescue teams was established in a building near the portals.

The Administrator for Coal was en route to eastern Kentucky on official business. He received notification of the explosion upon arrival at the Charleston, WV, airport. He immediately traveled to the Mine, arriving soon after the District 4 Manager.

The MSHA Chief of Mine Emergency Operations (MEO) was en route to Missouri on official business when he was notified of the explosion at about 4:15 p.m. He immediately headed to UBB and mobilized other members of the Technical Support MEO group. Members of the MSHA mine rescue team, or Mine Emergency Unit (MEU), also were deployed to the Mine, including four team members who were employees of District 4.

Members of the MEO group began arriving at UBB soon after the first District 4 personnel and continued to arrive throughout the first night. The Technical Support gas analysis equipment arrived at UBB at about 1:30 a.m. on April 6. During mine emergencies, the MEO group provides assistance in the on-site

⁶³ Each enforcement district has adopted its own MERP, which was developed using guidance from MSHA Headquarters and tailored according to the specifications of the district.

analysis of gas samples, equipment for real-time gas sample monitoring at remote locations, and graphs and charts of sample analysis results to aid in decision making in the command center.

The Technical Support response was coordinated by the Chief of MEO, who assumes the role of Mine Emergency Response Coordinator (MERC) during a mine emergency response. The MERC provides technical interpretation of gas sample data to senior MSHA officials and other parties represented in the command center.

Exploration

When MSHA personnel arrived at the Mine at approximately 5:00 p.m., they learned that Massey employees already had been underground and that some were still underground. Mine managers had located the nine Tailgate #22 crew members just outby 78 switch and removed them from the Mine. Two of these miners survived the explosion and were hospitalized. Seven were pronounced dead after arriving on the surface.

Two Performance Coal Company managers remained underground and six Massey mine rescue team members traveled underground shortly thereafter to search for missing miners. The Massey mine rescue team members established a fresh air base near the intersection of the Old North Mains and the North Glory Mains (crosscut 78). The location of the fresh air base was approved in the third modification to the section 103(k) order at 6:15 p.m. By 7:05 p.m., there were 13 mine rescue teams on mine property, including 4 WVOMHST teams and several members of the MSHA MEU.

At 7:57 p.m., the District 4 Manager modified the section 103(k) order: “to allow four mine rescue team[s] to enter the mine and travel to the fresh air base at crosscut 78 and explore inby with two teams.” Two Massey teams had been briefed and sent underground, accompanied by two West Virginia State inspectors, two MSHA MEU members, and a District 4 field office supervisor who was not an MEU member. The field office supervisor was assigned to remain at the fresh air base to assist in communicating with the command center. The West Virginia Northern and Southern State mine rescue teams were briefed, and started underground around 8:15 p.m., approximately 30 to 45 minutes after the Massey teams.

At approximately 8:30 p.m., the two Massey mine rescue teams, accompanied by State and MSHA employees, arrived at the fresh air base at crosscut 78. They found a Performance Coal Company manager on the mine phone and learned that Massey rescue team members were exploring inby the fresh air base without a backup team at the fresh air base. One MEU member told the Internal Review team that this particular employee stated he was the backup for those inby the fresh air base. However, this employee did not have the proper equipment to perform as backup, nor can a single person backup a team of rescuers.

The MSHA MEU members also discovered that Massey personnel, including some rescue team members, had been exploring areas inby the fresh air base without self-contained breathing apparatus (SCBA).⁶⁴ This became apparent when two Massey rescue team members who had left their breathing apparatus at the fresh air base while inby came back to get them after the MEU members arrived at the fresh air base. Additionally, the two Performance Coal Company managers, who were not rescue team members and did not have SCBA, had donned SCSRs and explored affected areas of the Mine before mine rescue teams established a fresh air base at crosscut 78. After the two managers returned to the fresh air base, the command center directed them to stay in that location. However, command center logs show that one of

⁶⁴ Self-contained breathing apparatus are used to protect persons from irrespirable atmospheres. Unlike a self-contained self-rescuer (SCSR), a SCBA has a full face piece that ensures the wearer is not exposed to dangerous atmospheres. A SCBA provides a minimum of four hours of breathable air. A SCSR is a portable breathing device designed to provide a one-hour supply of breathable air to miners who need to escape a mine or get to a refuge alternative after a fire or explosions occurs. It is not designed to serve the same purpose as a SCBA that mine rescue team members are required to wear.

the managers again traveled inby the fresh air base, accompanying a mine rescue team as they searched for missing miners.

The senior Massey representative in the command center directed the additional mine rescue teams to explore inby the fresh air base. One of the MEU members expressed concern that there would not be backup for the mine rescue teams inby the fresh air base. This MEU member informed the Internal Review team that the senior Massey representative in the command center told him, “we’re not playing by mine rescue rules.” This was confirmed in the MSHA command center log which included the entry: “Need to find 16 people not play MR.”

During an interview, this MEU member stated that the team he traveled with underground was needed to back-up the other team that went into the Mine at the same time. He stated, “I said, I’m backup to [name redacted]. I was supposed to be backup -- my whole team was supposed to be backing up [name redacted] because he had sent him inby somewhere.”

After this discussion with the senior Massey official, the MEU member asked to talk to the District 4 Manager, who was the senior MSHA official in the command center. The MEU member stated that the District 4 Manager also told him to take his team inby the fresh air base and explore. He recalled the following conversation with the District 4 Manager: “I don’t have no backup, I’m backing up [name redacted]. I said I got people running around up here that are not even mine rescue wearers. He said we have to go. I said I don’t have any backup. He said they’re on the way. I said but they’re not here. He said we have to go. I said you the boss. So we went.”

During his interview with the Internal Review team, the District 4 Manager disagreed with the MEU member’s statements about the lack of any backup teams at the fresh air base. The District Manager recalled the following discussion with the MEU member: “I asked him straight out, ‘Do you have a backup team there?’ He said, ‘Yes.’ And I said, ‘if you have your backup team there, then, and you can account for them there at your location, [name redacted], they need to advance.’”

The 7:57 p.m. modification to the section 103(k) order indicated that two teams would explore inby while two teams remained at the fresh air base. The MSHA command center log also documented at approximately 8:25 p.m. that “next teams that comes to LW – Knox Creek and KY – 1 team stay FAB.” When discussing the lack of back-up teams at the fresh air base, the District Manager stated: “I’m not aware that that ever occurred. In fact, if it did occur it was, it wasn’t voiced to me. I mean, I am not aware. I can say this; that at any time we sent mine rescue teams underground from the command center, we had an equal backup in the line for those folks.”

The District Manager believed he had the assurance necessary to instruct the MEU team member to proceed with his team inby the fresh air base. However, other interviews and command center logs confirmed that there were an insufficient number of backup teams at the fresh air base during the early hours of the rescue operation. The MSHA command center log reflects that at 8:52 p.m., there were 5 people at the fresh air base backing up 15 or more mine rescue personnel. In interviews with the Accident Investigation team, the West Virginia State team members indicated that when they arrived at crosscut 78, they found that the fresh air base had been moved up. The teams followed the phone line up to the new fresh air base near crosscut 98, arriving there at approximately 9:30 p.m. A captain of one of the State teams stated that the only persons at this new fresh air base were the two Performance Coal Company managers and the District 4 supervisor. He stated that all the other teams underground at that time were inby the fresh air base.

The Southern West Virginia State team advanced inby the fresh air base while the Northern State team remained at the fresh air base as their backup. At this time, there were four teams inby the fresh air base with only one team serving as backup. According to the command center log, additional mine rescue teams did not arrive at the new fresh air base near crosscut 98 until approximately 10:55 p.m.

Log entries and interviews indicated that mine rescue teams did not maintain constant communications with the fresh air base while exploring inby the fresh air base during the early part of the rescue operation. An entry in the MSHA command center log at 8:28 p.m. noted that the command center asked the fresh

air base for the location of the mine rescue team, and the fresh air base replied that they were trying to get them on the radio. A note in the WVOMHST log at 8:29 p.m. stated the mine rescue team was advancing to the longwall without communication, and that they were to report back in 30 minutes. Another entry in the MSHA log at 10:04 p.m. noted that the Massey Knox Creek team had not been in contact since they were two crosscuts inby the Glory Hole. The log reflects that the fresh air base could not communicate with the Knox Creek team until approximately 10:22 p.m.

In the early hours of the rescue effort, Massey could not provide the command center an accurate number of persons underground. The Accident Investigation team determined that Massey failed to designate a responsible person to oversee the evacuation of the Mine and the mine rescue effort. Combined with the fact that personnel entered the Mine from multiple portals, it was difficult to determine the exact number of persons underground. The first two MEU members who went into the Mine stated during interviews that they did not know how many people were inby the fresh air base on the first evening of the operation. They did not know where the rescuers were, nor did they have any communication with them. One MEU member who accompanied a mine rescue team inby the fresh air base on April 5 stated that when he returned to the established fresh air base, no one was present, and he did not know where the backup teams were.

On the first night of the rescue operation, mine rescue teams explored the Headgate 1 North and the 1 North Longwall face and found 12 victims. Teams explored the Tailgate 1 North and the area around the Glory Hole shaft, but did not find any missing miners in those locations. Teams also explored the Panel No. 2 Crossover and into the Headgate #22 section. The command center logs indicate six more victims were found in a mantrip 22 crosscuts inby the section switch. Four miners were still missing.

A mine rescue team continued to advance into the Headgate #22 section in an attempt to examine the section's refuge alternative to determine if any of the missing miners were at that location.⁶⁵ At 12:37 a.m. on April 6, the team encountered heavy smoke and explosive levels of gasses one crosscut inby where the six victims were found in the mantrip. At 12:45 a.m., the command center withdrew all personnel from the Mine.

Shortly after the command center was established, one exploratory drill rig and three bulldozers were mobilized to assist in the rescue operation. Additional equipment was later requested by the command center. After the Mine was evacuated, the command center determined specific locations for drilling boreholes into the mine to obtain gas samples. In total, the command center identified fifteen borehole locations. At least four drill rigs were utilized at various times during the mine rescue and recovery effort.

Evaluation of Mine Atmosphere via Boreholes

The first boreholes were started on April 6 above Headgate #22. On April 7, Borehole No. 1A intersected the Mine approximately three crosscuts from the faces of Headgate #22. This was the only borehole to intersect the Mine prior to recovery of the last victim. Other boreholes either failed to intersect the Mine or were not completed prior to the recovery of the victims. Failure to intersect the Mine was attributed to drill bits being misdirected when encountering difficult strata and overlying mine voids.

Rescue and recovery operations often rely on mine atmospheric sampling and analysis. After rescue teams were evacuated from the Mine on April 6, the decision to re-enter the Mine was based in part on samples collected from two locations in the area affected by the explosion – the Bandytown Fan and Borehole No. 1A. Samples were collected from the Bandytown Fan beginning on April 5 and from Borehole No. 1A beginning on April 7.

⁶⁵ Title 30 CFR 7.502 defines a refuge alternative to be “a protected, secure space with an isolated atmosphere and integrated components that create a life-sustaining environment for persons trapped in an underground coal mine.” Title 30 CFR Part 7 and 30 CFR 75.1506 detail the requirements for refuge alternatives. Requirements include a 96-hour supply of breathable air for the maximum number miners who can be expected to use the refuge alternative.

The initial Borehole No. 1A samples indicated lethal concentrations of CO (in excess of 1%) and CH₄ levels in excess of 3%. With high levels of other combustible gases such as hydrogen, the mixture contained effective combustible levels between 4 and 5% with sufficient oxygen to support combustion⁶⁶. These gas sample results also indicated that if any miners had survived the explosion, they would have had to enter a refuge alternative to survive after their SCSRs were depleted.

Command center logs between April 6 and April 8 indicate the command center had two primary concerns: the safety of mine rescue teams and the possibility there were survivors in the refuge alternative on Headgate #22. In the early morning hours of April 8, the atmosphere at the bottom of Borehole No. 1A was relatively stable. A sample collected at 1:00 a.m. indicated that the atmosphere was just within the explosive range, but samples collected over the next 2 ½-hour period showed the atmosphere was not explosive with a small margin of safety. Bandytown Fan samples collected during that period indicated stable methane levels and steadily falling CO levels. At this time the command center decided to send rescue teams back into the Mine.

Mine rescue teams re-entered the Mine at 4:55 a.m. on April 8 and explored in the direction of the 1 North Longwall. While still searching for survivors, the teams intended to advance the phone line inby and establish a new fresh air base closer to the longwall. As teams were exploring and advancing underground, air samples collected from Borehole No. 1A indicated the atmosphere had again become explosive. The command center ordered the teams to evacuate the Mine at 9:29 a.m. on April 8. The teams arrived on the surface at 10:55 a.m.

Gas samples were collected every 30 minutes from Borehole No. 1A and analyzed to track the conditions in Headgate #22. The effective combustible level was very close to, or in, the explosive range until after 8:00 p.m. on April 8. In anticipation of possible re-entry, the sampling frequency at Borehole No. 1A was increased to once every 15 minutes to provide a higher level of safety to the rescue teams. Samples indicated a trend of decreasing combustibility for several hours. The effective combustible level decreased to less than 4.0% just after midnight and the command center again decided to send rescue teams into the Mine.

At 12:42 a.m. on April 9, mine rescue teams started back into the Mine and again explored in the direction of the 1 North Longwall. Approximately 81 hours had passed since the explosion. At about 4:30 a.m., the mine rescue teams encountered smoke underground. Borehole samples indicated the effective combustible level was increasing, and the command center ordered the teams to evacuate the Mine at 4:44 a.m. After evacuating the mine, the command center approved a plan to inject nitrogen into Headgate #22 in an attempt to eliminate the potential explosion hazard by displacing the explosive gases and oxygen in the area.

While evacuating the Mine, rescue teams requested approval to recover a victim on their way out of the Mine at 5:11 a.m. The command center denied the request. The mine rescue log indicates the teams were told to withdraw due to a potential explosion hazard and a likely fire. The WVOMHST command center log noted: "Safety of MR [mine rescue] team a priority." At several other points in the mine rescue operation, teams requested permission to remove victims from the Mine. Prioritizing the safety of rescuers, command center representatives denied the requests.

Some MSHA employees and MEU members were concerned that mine rescue teams were exposed to unnecessary risk by being sent into the Mine to search for survivors without sufficient information regarding mine atmosphere explosibility. One MEU member indicated as the window for finding survivors was closing, decision-making in the command center seemed to be affected. Many indicated the tone of the rescue operation was influenced by sources outside of the command center.

⁶⁶ The effective combustible level for a gas mixture was evaluated for the concentrations of constituent gases with varying lower explosive limits (LEL) using the Zabetakis method of determining explosibility (BOM IC 7901).

Nitrogen Injection

Shortly after 9:00 a.m. on April 9, the Operator began injecting nitrogen into the Mine through Borehole No. 1A from refrigerated tanker trucks. The injection from the tankers was completed at approximately 2:32 p.m. on April 9. When the tanker trucks were empty, a nitrogen generator was connected to the borehole until after all the victims were recovered from the Mine. Thus, Borehole No. 1A was not used for sampling again until after April 13.

The command center planned to evaluate the effectiveness of the nitrogen injection by collecting samples from Borehole No. 5B (outby the section in Headgate #22), which had not yet been completed. However, this borehole ultimately did not intersect the Mine, precluding its use in evaluating the effectiveness of the nitrogen injection.

According to interview statements, there was not sufficient time to drill another borehole to be used as an evaluation point for the nitrogen injection. One MSHA official stated: “Typically, when you inject nitrogen, you have another means to determine the effectiveness, a second borehole that you can monitor. Because we were in a rescue effort and we’re getting close to the 96-hour time period which the refuge chambers are still usable, we had to come up with a method to assure ourselves that that nitrogen would be effective.”

It is also common to establish a waiting period following inert gas injection to allow the atmosphere to stabilize prior to re-entering a mine. Moving displaced explosive gases over an ignition source could have caused a subsequent explosion in adjacent areas of the Mine, and a waiting period would have provided a greater level of safety. The length of the waiting period ultimately depends on a number of factors, including the purpose of the inert gas injection, the size of the area being inerted, and the stability of the atmosphere within the area. There was no waiting period pre-established by the command center for this gas injection operation.⁶⁷

At 1:50 p.m. on April 9, while nitrogen was still being injected, a plan was approved to permit two mine rescue teams to re-enter the Mine and explore Headgate #22. The modification of the section 103(k) order stated that the approval was, “...based on the non-explosive analytical results of the mine atmosphere from monitoring points.” The only monitoring point available at that time was the Bandytown Fan. Gas samples from this location did not represent the atmosphere in the unventilated Headgate #22, and Borehole 5B had not intersected the Mine.

Lacking a second borehole to evaluate the effect of the nitrogen injection on Headgate #22, the command center compared the calculated volume of Headgate #22 to the volume of nitrogen injected. They concluded the nitrogen likely had displaced the explosive mine atmosphere in the area because the volume of nitrogen injected was twice the volume of Headgate #22.

With stable readings indicated at the Bandytown Fan, the command center decided to send rescue teams back into the Mine. Rescue teams re-entered the Mine at 4:15 p.m. on April 9 to resume exploration. The success of the nitrogen injection was apparent after rescue teams arrived at the mouth of Headgate #22. During re-entry, gas concentrations in this area indicated 0.5% CH₄ and 39 ppm CO. The command center then allowed two additional teams to enter the Mine at 7:28 p.m. As teams advanced toward the faces, the highest CH₄ and CO concentrations were found near crosscut 14 in Headgate #22 - 2.5% and 140 ppm, respectively.

Several MSHA personnel interviewed expressed reservations about the command center’s decision to send mine rescue teams underground immediately after the nitrogen injection. Their primary concern was the inability to evaluate the effects of the nitrogen injection to better ensure the safety of the mine rescue teams. One MSHA official indicated in his interview that additional sample data would have been preferred, but that since there was still hope that survivors would be found in a refuge alternative, and time was of the essence, the command center made the decision to send teams into the Mine.

⁶⁷ One hour and 45 minutes passed from the time nitrogen injection from tankers stopped and rescue teams entered the Mine.

When teams explored up into the Headgate #22 section they found three victims between 10:10 p.m. and 10:18 p.m. The teams then advanced to the refuge alternative in hope of finding the last missing miner. They found the refuge alternative had not been deployed, so they traveled back out of the section to the 1 North Longwall. At approximately 11:20 p.m. on April 9, the last victim was found along the longwall face.

Refuge Alternatives

Completion of the nitrogen injection coincided with the end of the 96-hour minimum period that refuge alternatives are required to provide breathable air. Assuming miners were able to don their SCRSs and enter a refuge alternative within one hour of the explosion, the 96-hour mark would have been approximately 4:00 p.m. on April 9.

This was the first major explosion to occur in a U.S. coal mine since refuge alternatives were required. Protocol had not been developed to address how and when to reach refuge alternatives during a mine rescue operation. Because of the requirement to provide 96 hours of breathable air, family members and the public may have believed that, if rescuers failed to reach the refuge alternatives within 96 hours, persons inside the refuge would run out of breathable air.

This perception was not accurate, given the circumstances at UBB. Refuge alternatives are designed to provide at least 96 hours (4 days) of breathable air for a fixed number of persons. The refuge alternative located on Headgate #22 was designed to shelter 24 persons. On April 9, MSHA headquarters requested Technical Support to contact Strata Products Worldwide, LLC (Strata), the manufacturer of the refuge alternatives in use at UBB, to determine the estimated breathable air for use by 4 persons. Strata reported to MSHA that theoretically there would have been approximately 700 hours (29 days) of oxygen available for four miners if they had reached the refuge alternative.

Strata personnel also indicated the life of the scrubbers used to remove carbon dioxide would be more limited. With only four miners in the refuge alternative, the performance of the carbon dioxide scrubbers would be reduced beginning at 138 hours but could theoretically sustain four miners for 576 hours (24 days), significantly more than the 96 hours that many people believed the miners could survive in the refuge alternative.

A follow-up interview with the District 4 Manager revealed the command center was aware that there would be more than 96 hours of breathable air for the four missing miners if they had made it to a refuge alternative. He stated that the 96-hour breathable air requirement did not influence the decision to send mine rescue teams underground at that time.

Recovery of Victims

Once the mine rescue teams located all of the victims, the effort shifted to a recovery operation. The command center made the decision to recover the remaining 22 victims before some areas of the Mine affected by the explosion were explored and re-ventilated. The recovery of the 13 victims from Headgate 1 North and the Longwall began at approximately 12:45 a.m. on April 10. The last of these victims arrived on the surface at approximately 5:00 a.m. on April 11. That left nine victims remaining in the Mine, all in Headgate #22.

On April 10, a plan was approved to permit mine rescue teams to re-establish ventilation to within two crosscuts of the faces of Headgate #22. The plan also provided for the exploration of the "8 North Panel" (North Jarrells Mains and West Jarrells Mains) and the installation of curtains across this area. A mine rescue team explored the North Jarrells Mains and West Jarrells Mains by traveling one entry to within eleven crosscuts of the faces and then following the same entry back out of the area. The highest CH₄ and CO levels measured in this exploration were 2.0% and 3,043 ppm, respectively. At the deepest point of exploration, the teams measured 1.0% CH₄ and 2,775 ppm CO. These concentrations were determined

using handheld gas detectors. The team had to retreat out of this area due to low oxygen reserves in their apparatus.

On April 11, another mine rescue team explored the North Jarrells Mains and West Jarrells Mains to the butts of the West Jarrells Mains at crosscut 167. Here the teams found 2,830 ppm CO and 1.3% CH₄. This mine rescue team explored only one entry, which was the same entry traveled by the previous team.

The exploration plan was modified on April 11 to permit the mine rescue teams to construct temporary seals across the North Jarrells Mains. This approved plan required a five-hour waiting period to allow the atmosphere to stabilize. During this time, no underground activity was permitted. Rescue teams were removed from the mine at 11:00 p.m. on April 11, and did not return underground until after 5:00 a.m. on April 12.

The teams that explored the North Jarrells Mains and West Jarrells Mains and some other areas outby the temporary seals did not follow the standard exploration procedure by “tying in.” Until each entry and crosscut is explored, teams have no way of knowing exactly what the conditions are in these areas. However, the command center decided the results of the limited exploration in the Jarrells Mains areas provided sufficient assurance that the recovery of victims could continue.

In anticipation of recovery of the victims in Headgate #22, a sampling line was extended from the fresh air side of the temporary seals across North Jarrells Mains into the area behind the seals. As teams approached the mouth of Headgate #22, the nitrogen generator on the surface was shut down. A manned air-monitoring station was established outby the seals to continuously monitor the area inby the temporary seals while the recovery continued. An additional sampling line was installed to monitor the return air at the mouth of Headgate #22 from the intake side of the ventilation controls.

A plan approved at 7:00 p.m. on April 12 modified the April 10 plan to permit mine rescue teams to build temporary ventilation controls between crosscuts 18 and 19 on Headgate #22, approximately 10 crosscuts from the face. As teams advanced in Headgate #22, all three entries were explored up to crosscut 18. Check curtains were installed across all three entries inby crosscut 18. Gas concentrations inby the checks were 1.5% CH₄, 17.2% O₂, and 70 ppm CO.

Since there was no functional mobile equipment available inby crosscut 78 to transport the victims, they had to be carried by the rescue team members. Nineteen mine rescue teams were needed to recover the nine victims from the Headgate #22 section. The rescue teams were spaced along the travel route at intervals, and the victims were carried from team to team. This was continued until the victims were carried to the end of the track, where they were placed on rail-mounted equipment and transported out of the Mine. According to interviews, the use of breathing apparatus was not required for the recovery of any victims.

The recovery of the last nine victims began at 8:05 p.m. on April 12, and the final victim was placed on a mantrip at 11:55 p.m. on April 12. These victims arrived on the surface of the Mine at 12:57 a.m. on April 13.

MEU Team Member Concerns during Recovery Operations

During interviews, some MEU team members expressed concern that established mine rescue and recovery protocols were not followed during recovery of the victims. The team members believed that failing to follow established protocols exposed them to unnecessary risk. Their concerns included:

- There were not enough backup teams underground and standby teams on the surface.
- There was insufficient gas sampling to determine the condition of the atmosphere within the Mine.
- Accessible areas potentially affecting the recovery operation were left unventilated.
- Accessible areas potentially affecting the recovery operation were not all systematically explored.

Concern about the lack of backup and standby teams was expressed by a number of MEU members during interviews. At least 19 mine rescue teams were underground and involved in the recovery of the 9 victims from Headgate #22 on April 12. Many interviewees reported that while it was normal to have standby teams ready on the surface in case of emergency, there were an insufficient number of standby personnel available on the surface during the final recovery of the victims. According to the MERC, there were nine rescue teams located on the surface during the recovery of victims while nineteen teams were working to recover the victims.

The command center believed there were a sufficient number of backup and standby teams during the recovery of victims. Because ventilation had been established into Headgate #22, the command center believed that would be the location of the fresh air base. The nine teams that were still on the surface were serving as standby teams, and the nineteen teams underground were enough to respond to problems if necessary.

Many MEU members believed they were subjected to increased risk when instructed to recover the victims when there was insufficient gas sample data to indicate that it was safe to do so. The concern was later reflected in command center decisions to resume nitrogen gas injection in Headgate #22 immediately after recovery of the victims was completed, and in the decision to inject nitrogen into the West Jarrells mains to make the Mine safe prior to recovering the Mine. The underground portion of the accident investigation was delayed for several weeks until additional boreholes were completed and atmospheric sampling data indicated the Mine atmosphere was stable. Gas sample data indicated it was not safe for mine rescue teams to re-enter the Mine until May 27, 2010. On June 2, 2010, the section 103(k) order was modified to allow the company to implement a re-entry plan to assess conditions on the longwall.

The objective of re-establishing ventilation is to rid a mine of explosive or potentially explosive gas mixtures and reduce the possibility of a subsequent ignition. Rather than fully exploring and re-ventilating the North Jarrells Mains and West Jarrells Mains prior to conducting the recovery operation, the command center decided to isolate the area from the recovery area using temporary ventilation controls. This was intended to keep the contaminants, including high levels of CO, behind the temporary seals and not allow them to migrate toward recovery operations in Headgate #22. Monitoring of the atmosphere on both sides of the ventilation controls was conducted to provide an increased level of safety.

The air split used to ventilate these temporary controls also was used to ventilate Headgate #22. Concentrations of CO behind the temporary seals during the recovery operation on April 12 were in excess of 1,500 ppm. Since many recovery personnel were working in the Headgate #22 area bare-faced, they were at risk if an event were to damage or destroy these controls.

Some areas of the Mine were not fully explored for potentially explosive gases and ignition sources prior to recovery of the victims. When asked which areas had not been explored prior to recovering victims, one MSHA official stated:

And at that point, we had not explored the tailgate of the longwall. We had not explored the headgate of the longwall inby the longwall face. We had not explored all the entries in the Glory Hole mains. We had not explored all the entries in 8 North. We had not even explored all the entries inby 22 Headgate where we put the curtains. There was still about four of them, crosscuts that had not been explored. So -- and there was a good area of the mine that had not been explored. And then the ventilation would have been questionable in some of those areas.

Only one entry (No. 3 entry) of the North Jarrells Mains and West Jarrells Mains had been explored prior to the recovery of the victims. There also were areas inby the 1 North Longwall that were not accessible for exploration; however, these areas were evaluated by monitoring the air quality at the Bandytown Fan.

Several MSHA personnel indicated that recovering victims prior to re-ventilating the Mine unacceptably increased the risk to mine rescue teams due to hazards created by potential accumulations of dangerous and explosive gases and potential ignition sources. There were mixed responses from MEU members

regarding re-ventilation. However, some MEU members indicated they were concerned that areas inby the recovery area were not re-ventilated and were only partially explored.

When one MEU member was asked if he felt that rescue teams were placed at risk during the operation, he stated: "Well, in any, any of these events, you know, it's, there's risk involved. And I feel like it's -- we try to make calculated risks. And I've got a lot of trust and faith in... the guys in the command center making those decisions. And they try to relay to us where, where they got the basis for making what decisions they made. I didn't have any problems."

There was disagreement among MSHA officials involved in the recovery operation about whether the decision to immediately recover the victims exposed the rescue teams to undue risk. When asked specifically about the risk to mine rescue teams, there were varying opinions provided to the Internal Review team in interviews. One senior MEU official indicated that disagreements were due to varying levels of acceptable risk: "My particular assessment of risk is lower than some other folks' assessment of risk. To them, that was an acceptable risk. In my opinion, it may not have been an acceptable risk." Some of the MSHA persons in charge of the operation at UBB stated that there are always risks to team members during rescue and recovery operations, but that the level of risk was acceptable during the recovery effort. Others believed that rescue teams were exposed to unacceptable risk during the recovery effort because the entire Mine had not been explored and re-ventilated.

At least two situations highlighted MEU team members' concerns. The first was recorded in the command center log at 5:36 p.m. on April 12, when smoke and a small hot spot was discovered at crosscut 116 in the North Glory Mains in an area that had not been systematically explored during the initial rescue effort. It was smothered to extinguish the combustion and was attended to ensure it would not rekindle.

The second event occurred at approximately 6:40 p.m. on April 12 while preparations were being made to recover the last victims from Headgate #22. There was a momentary change in ventilation which caused the line curtain at the fresh air base to become limp, and then return to its original tautness. One MEU member described the curtain as "waffling." The command center initiated an investigation of the event but could not determine the cause. The Bandytown Fan was checked for changes in fan pressure and CO levels, and outby ventilation controls were examined. There were no changes at the fan to suggest an explosion had occurred.

Some MEU members underground at the time believed this event should have initiated an evacuation of the Mine. Interviews with MSHA officials in the command center indicated the event was of extreme concern. Some people interviewed thought the event may have been an explosion. Others indicated the disruption could have been caused by a roof fall. To speed up the recovery of the victims and get the teams out of the Mine as soon as possible, the recovery plan was modified after the event to reduce the area of Headgate #22 that was to be re-ventilated prior to recovering the remaining victims.

When discussing the events of the recovery, one MEU member who was underground was extremely upset about the circumstances under which the teams recovered the victims. His main concerns included not being made aware of conditions affecting his team, especially the discovery of a small fire outby the teams, as well as the waffling of the curtains. When the operation was completed, though admittedly upset, he was relieved that there were no rescue personnel injured during the recovery.

There was a potential for small fires or ignition sources in the Mine which could have resulted in a second explosion. This was evidenced by a number of discoveries made during the accident investigation which began on June 2. A hot spot was identified in North Glory Mains during the accident investigation which required water to be pumped down Borehole No. 15B to cool the area. Eight additional hot spots were identified in the North Glory Mains and the Tailgate 1 North areas. Finally, at crosscut 31 in Headgate #22, inby a location where an explosive mixture of methane was found in a roof cavity, smoke was found rising out of a personnel carrier battery. Mine rescue team members submerged the battery in water to isolate the potential ignition source.

Several MSHA employees and MEU team members stated in their interviews that there was a sense that political pressure and news media coverage played a part in the decisions made regarding recovery of the victims prior to exploring and re-ventilating the mine. An item in the MSHA command center log at approximately 12:30 a.m. on April 9 indicates: “Governor concerned over victim removal. Will be removed as soon as possible.” When asked about this perceived influence, command center personnel stated that, although the Governor tried to influence the command center into hastening the rescue and recovery operation, they did not believe the Governor had any impact on their decisions.

Concerns were also expressed that individuals who had personal contact with the families of the missing miners had access to the command center and the ability to influence decisions concerning the rescue and recovery operation. They believed that, as a result, command center decisions could be influenced by emotions and pressure from the families. While no one believed that these persons intentionally would put mine rescue teams in a dangerous situation, they believed these persons should not be involved in command center decisions. Rather, these decisions should be based on mine rescue protocols and scientific data, without the potential for emotional influence.

This was not the first review of a rescue and recovery operation where participants questioned whether officials who have personal contact with family members should be involved in the decision-making process in the command center. An Independent Review team (IRT) was assigned to investigate the Crandall Canyon disaster that occurred in 2007. The Crandall Canyon Independent Review concluded: “The MSHA person-in-charge of the Crandall Canyon Mine rescue operation regularly briefed and interacted with family members. Even though the IRT found no indication that, by interacting with family members, the person-in-charge made decisions which were emotionally driven, there is potential for that to occur.”

When asked about the need to follow established protocol in mine rescue and recovery work, the District 4 Manager stated that there are circumstances that preclude command center personnel from taking a “cookie cutter” approach to mine rescue operations. He stated: “I think the situation at hand, you try to address it as safely as you can and protect the people there who are in there on the teams.” In addition, he stated: “I wouldn’t wish it on anyone to be responsible for making those decisions. Now, you know, there’s protocol you don’t vary from. You don’t let non-apparatus wearers in by the fresh air base. You don’t put people in by the fresh air base without a backup team. There are things that you don’t deviate from.”

Family Liaison and Primary Communicator

On the evening of April 5, the Family Center was set up in the UBB Safety Office on mine property approximately 1.5 miles from the command center. A media briefing site was set up off mine property at the nearby Marsh Fork elementary school, 3.6 miles south of the Mine. MSHA Family Liaisons were brought to the Mine and assigned to the Family Center on an around-the-clock basis. The first Liaison was on-site on the night of the explosion, arriving at the Family Center at approximately 9:40 p.m. The Liaisons answered questions from family members and generally assisted them by attending to their needs.

Only one Liaison kept a log of the events that occurred on his shift. In their interviews, other Liaisons stated they did not keep any record of the events because they did not have time to take notes or did not want to lose the families’ trust if family members saw them writing notes that may reflect the families’ personal feelings.

During the rescue and recovery operations MSHA, WVOMHST, and Massey personnel held several briefings. These briefings were provided to families first to ensure they received any new information before the media and the public. These meetings were held more often during the early days of the rescue and recovery operations as information from underground was being provided to the command center at a faster pace. The Governor of West Virginia was on site for much of the rescue and recovery operations, and often would participate in the meetings. MSHA’s Assistant Secretary and Administrator for Coal

acted as the Primary Communicators during the rescue operation until all the missing miners had been located. After that, all formal communications with the families, media, and other sources were handled or coordinated through MSHA headquarters.

Interviews with MSHA personnel revealed that the Family Liaisons and the Primary Communicators worked well in providing assistance to the families and information to the families, media, and the public. Family liaisons continued to make contact and provide assistance and information to families long after the recovery operation concluded.

Conclusion: Each mine rescue and recovery operation is different in its scope and magnitude. While hazards encountered during rescue and recovery operations often are similar in nature, the manner in which they must be addressed is unique. The mine rescue teams involved in the UBB rescue and recovery effort completed a very difficult task under some of the most extreme conditions imaginable. Their dedication to mine rescue is unsurpassed, and their service to the mining community is invaluable. Similarly, command center officials along with numerous support personnel from WVOMHST, MSHA, and Massey commendably fulfilled their responsibilities under extremely demanding conditions.

Mine rescue and recovery is a specialized and highly technical endeavor. The top priority of mine rescue is the safety of the mine rescue and recovery teams. The level of acceptable risk to mine rescue personnel understandably is greater when the potential for locating survivors is high. Conversely, when the possibility of finding survivors is low, the level of acceptable risk diminishes. All parties must understand that it is never acceptable to expose mine rescue teams to unnecessary risk to recover victims. Command center officials cannot succumb to pressure from any source to take actions which may unduly compromise the safety of mine rescue and recovery personnel.

Command center logs, interviews with MSHA officials, and many of the decisions made by the command center demonstrate that command center representatives made a conscientious effort to minimize the risks to rescuers. Nevertheless, the Internal Review team believes some command center decisions deviated from established mine rescue protocol and exposed mine rescuers to unnecessary risks. These decisions include the following:

- Not all accessible areas of the Mine were systematically explored during the mine rescue effort. This exposed rescue teams to potentially dangerous conditions.
- The command center did not require a waiting period to be established in the recovery plan following the nitrogen injection on April 9. It would have been safer to establish a waiting period in the mine rescue and recovery plan to ensure the Mine atmosphere had stabilized following the injection period. Conversely, the command center did establish a waiting period of five hours after installing temporary seals across the North Jarrells Mains prior to recovering victims. During this time, all personnel were removed from the Mine while the atmosphere stabilized.
- The manner in which victims were recovered caused concern to rescuers and other MSHA personnel. The decision to recover the victims before the Mine had been systematically explored and re-ventilated was a concern that was expressed to the Internal Review team by a significant number of MSHA personnel. Many indicated it would have been prudent to explore and re-ventilate accessible areas of the Mine prior to undertaking efforts to recover victims. Others expressed a concern over the lack of standby teams on the surface.

The Internal Review team believes the recovery of the victims should have been delayed at least until the command center took actions to determine that explosion and fire hazards did not exist in accessible areas of the mine. The source of CO in the North and West Jarrells Mains was not determined and could have been a residual from the explosion or from an active fire. These areas should have been fully explored to eliminate potential ignition sources. The exploration of a single entry was not adequate to ensure the level of risk to recovery personnel was sufficiently low. Carbon monoxide levels in excess of 3,000 ppm

were known to exist in the area, which was outby the bare-faced rescuers.⁶⁸ Had this air been inadvertently directed into Headgate #22, rescuers would have been needlessly exposed to the hazard.

The Internal Review team also believes the following command center and/or mine rescuers' decisions deviated from established protocol, exposing mine rescuers to unnecessary risks:

- During the first night of the rescue operation, backup mine rescue teams were not at the fresh air base at all times while teams were working or exploring inby. Rescue and recovery plans approved by the command center required backup mine rescue teams to be at the fresh air base, and the District Manager stated that he believed adequate backup teams were available. However, interviews with mine rescue personnel and entries in command center logs indicate that teams were sent inby the fresh air base without adequate backup.
- Communication was not regularly maintained with rescue teams working inby the fresh air base. In some cases the teams extended exploration beyond the range of their communication equipment.

Mine rescue protocol has not been developed to address the use of refuge alternatives in coal mines. This was the first major explosion to occur in a U.S. coal mine since refuge alternatives have been required. The Internal Review team believes the 96-hour breathable air requirement for refuge alternatives influenced the decision to send mine rescue teams into the Mine so soon after the nitrogen injection on April 9.

As in the Crandall Canyon disaster in 2007, some MSHA, State, and Company officials who met with and briefed the families also participated in the command center decision-making process. These persons experienced the anguish of family members who had lost loved ones or whose loved ones were still missing. While the Internal Review team recognizes that senior officials are responsible to the public and often possess experience and expertise that may be valuable to rescue and recovery efforts, there also is a potential for their contact with family members to adversely affect the command center's ability to effectively evaluate information and make objective, fact-based judgments. Similarly, there is a potential for personal relationships among other decision makers to affect decisions made in the command center. Indeed, family and coworker relationships may be even more likely to affect the decision-making judgment of the command center. Decisions based on emotional reactions, rather than logical deductions, can create dangerous situations for the rescue and recovery operation.

MSHA's response to the explosion was timely. MSHA's Family Liaisons and Primary Communicators performed their duties in accordance with established policies and procedures, except that only one of the assigned liaisons kept a log of significant events. However, the Internal Review team recognizes that this deviation may have been driven by the nature of the interaction with the families at the Family Center.

Corrective Actions Taken: While not in response to the UBB disaster, MSHA had taken steps before April 5, 2010, to address shortcomings in both MSHA's and the coal industry's mine rescue preparedness and response capabilities.

MSHA's Assistant Secretary held a meeting on February 5, 2010, that focused on a "gap analysis" for MSHA's mine emergency preparedness and response. Some topics discussed in the meeting were:

- Development of advanced training course for Coal district managers, assistant district managers, and mine rescue specialists from all districts
- Development of a training course to be held twice a year that includes: Gas Analysis & Interpretation, Sampling, Incident Command System, Command Center Operations, Briefing & Debriefing, Mine Rescue Best Practices, and SOPs for entering mines (go/no-go)
- Designation of who is in charge at mine emergencies
- Development of Mine Emergency Response Development (MERD) exercises for districts

⁶⁸ The carbon monoxide level listed in the 1972 Threshold Limit Values as immediately dangerous to health and life is 1,200 ppm.

- Training for emergency response decision-making and command center protocol
- Development of competency assessment for persons involved in mine rescue responses
- Development of an MSHA Procedure Instruction Letter (PIL) that addresses procedures for mine rescue teams to enter refuge alternatives

Some of the “gaps” that were identified were the need to:

- Promote training in mine emergency command system
- Develop a plan to deal with retirements or turnover among mine rescue personnel
- Develop a Succession Plan/Apprenticeship for MEO and district personnel with mine rescue knowledge
- Establish best practices for mine rescue team and command center procedures;
- Conduct annual learning conferences for mine rescue with mine rescue teams and trainers and other stakeholders
- Develop a Job Task Analysis for command centers utilizing the Mine Emergency Command System
- Develop procedures for rescue teams to enter refuge chambers

On April 2, 2010, three days before the explosion, MSHA sent a letter to stakeholders advertising an April 27, 2010, MSHA-sponsored, public meeting. The letter stated the “objective in holding this meeting is to share and exchange information in order to better understand the challenges of improving overall mine emergency preparedness and response.” It further stated that “emergencies requiring mine rescue have exposed shortcomings and highlighted the need...to improve our mine emergency preparedness and response capabilities. In addition, recent mine safety improvements such as refuge alternatives add new challenges in responding to mine emergencies.”

This letter to stakeholders showed that MSHA was making an effort to be proactive in sharing information and improving the response to mine emergencies. MSHA also recognized the need to develop procedures to address refuge alternatives.

Due to the explosion at UBB, the meeting was postponed and later held on May 11, 2010, at the National Mine Health and Safety Academy. This meeting focused on providing stakeholders with information to use to determine whether their mines or mine rescue teams were prepared to respond to a mine emergency. The following topics were discussed:

- Competency assessments for the mine’s Responsible Persons
- Training for Responsible Persons and Command and Control Personnel
- Training in emergency response decision-making
- Back-up plans for situations in which boreholes miss the mine crosscuts and entries
- New issues faced due to the introduction of refuge alternatives, including how to extract miners from a refuge alternative
- Identifying who is in charge of the command center

Finally, as a direct corrective action resulting from the UBB explosion, MSHA held a meeting with Mine Rescue Stakeholders on October 6, 2011, to further discuss issues related to mine rescue response. Many of the topics discussed were issues identified by this Internal Review. These topics included:

- Command Center operations, including
 - Communications with fresh air base
 - Backup capabilities
- Training of Command Center and mine rescue team personnel
- Dealing with refuge alternatives, including mine rescue procedures relating to the alternatives
- Need for revision of mine rescue manual(s)
- Need for a national mine rescue summit

Also on May 11, 2011, MSHA signed a Memorandum of Understanding (MOU) with the Interstate Mining Compact Commission (IMCC) to facilitate coordinated and timely communications that promote and protect the mining industry's most precious resource, its miners. A provision of this MOU stated that to "achieve a higher level of coordination on key governmental functions, the member States of the IMCC and MSHA may enter into supplemental memoranda of understanding at the District or Headquarters levels." Two of these functions were "Emergency notification and response" and "Mine rescue teams and training."

Recommendations: The Assistant Secretary should convene a panel of mine rescue experts from industry, state and federal government, labor, and academia to review, refine, and develop mine rescue and recovery protocol to address lessons learned from the UBB disaster. The panel should also consider the conditions and events surrounding other recent mine accidents, including events occurring in other countries. The panel should include mine rescue team members or trainers. The focus of the panel should include:

- Rescue team safety during mine emergency operations when there are known survivors, possible survivors, or no survivors. This should include the use of all relevant available information to evaluate the level of acceptable risk to rescuers given the nature of the goal and the likelihood of a successful outcome.
- Identify circumstances which would allow command centers to deviate from existing mine rescue and recovery protocols. Further, identify specific procedures and protocols that cannot be deviated from under any circumstance.
- Use of inert gas, including methods to evaluate the effectiveness of the injection and to determine an appropriate waiting period before re-entry by teams.
- Post-accident evaluation of the mine environment, including the potential use of AMS and tube-bundle systems.
- Rescue operations involving possible survivors in refuge alternatives or rescue chambers, including the number of survivors and the duration of breathable air.
- Methods to ensure that future rescue and recovery operations are conducted in accordance with accident-specific factors and not disproportionately driven by experience from previous mine emergency responses.

The Administrator for Coal with the assistance of the Chief of Mine Emergency Operations should modify the existing MERD program to train appropriate MSHA personnel in command center duties and responsibilities and established mine rescue protocols. This training should include: how to evaluate the level of acceptable risk to mine rescue teams using all available relevant information; the use of back-up and standby teams; systematic exploration, including "tying in" areas of the mine; communications between mine rescue teams and the fresh air base; re-ventilation of areas affected by explosions; use and evaluation of inert gases; and possible survivors in refuge alternatives.

The Administrators for Coal and Metal and Nonmetal should direct the revision of the *Mine Rescue Instruction Guide* to require a "firewall" to prevent personnel who have had personal contact with family members from participating in command center decisions.

As outlined in the May 11, 2011, MOU with the IMCC, the Assistant Secretary should continue to pursue MOUs with states having enforcement agencies or state-sponsored mine rescue teams for the mining industry. These MOUs should focus on the cooperation of federal and state agencies during a mine emergency operation, including an agreement that the agencies will not act independently.

The Administrators for Coal and Metal and Nonmetal should re-instruct Family Liaisons to keep a log of significant events. The Administrators should direct revisions to the instructions in the *Headquarters Mine Emergency Response Guidelines* and the *Accident/Illness Investigations Procedures* Handbooks to

clarify that notes should be recorded privately away from the areas where families are gathered and at a time that does not disrupt the interaction between the liaisons and the family members.

Management Issues

This section discusses several issues related to the management, staffing, and training of personnel in District 4 and staffing in the MSHA Headquarters office. This section also addresses recurring issues that have been identified in previous Internal Review reports, accountability reviews, and OIG reports.

MSHA Directives System

Directives are written communications that provide MSHA employees with information or instructions needed to carry out their assigned responsibilities or that set guidelines or provide information for members of the mining community. These instructions, policies, and procedures provided guidance to enforcement, plan approval, and management personnel in their core responsibilities.

MSHA Policy and Procedures: Volume II, Chapter 100, of the *Administrative Policy and Procedures Manual* (APPM) outlined the MSHA Directives System. This chapter detailed the purpose, responsibilities, structure, and procedures involved in the formulation, distribution, and maintenance of directives within the Agency. It provided for technical, administrative, and legal reviews of proposed directives.

The APPM stated that the MSHA Directives System was designed to meet the following objectives: (1) provide MSHA managers with an orderly and effective channel of written communications through which to direct and coordinate Agency activities; (2) provide MSHA employees with instructions and information to effectively and efficiently implement MSHA programs and mission support activities; (3) make available to members of the mining community and other interested parties information and policy about the Federal Mine Safety and Health Act of 1977 and its implementing regulations, as well as other pertinent information; (4) provide each originating office with adequate control over those policies and procedures which it has established and for which it is responsible; (5) provide a method for central management and oversight of the directives process within the Agency; (6) provide easy reference and retrieval of directives; and (7) provide guidelines for producing directives that are easy to read, understand, and implement.

The APPM stated that “only the national office will approve and issue directives” and assigned responsibilities for the Directives System. It specified that Administrators and Directors are responsible for the following:

- supporting the Directives System and ensuring compliance with it by their employees;
- keeping directives current and revising or canceling those that are not;
- avoiding duplication of Agency-wide directives;
- developing new directives that pertain to their functional responsibilities;
- obtaining approval from the Assistant Secretary when required;
- submitting all program directives to the Directorate of Program Evaluation and Information Resources for content evaluation by the Office of Program Policy Evaluation (OPPE) and administrative review by the Records Management Group (RM);
- submitting directives that warrant legal review to the Associate Solicitor for Mine Safety and Health (SOL); and
- designating a top-level staff person to serve as the policy coordinator and liaison for their program.

Policy Coordinators, representing each program area, are responsible for:

- monitoring and coordinating policy development and policy update activities within their office;
- keeping the program head informed of the status of directives-related activity in their program area;
- ensuring that directives developed in their program area conform to Agency-wide standards and instructions prescribed in this chapter; and
- meeting with other policy coordinators and designated individuals as necessary to assess the status of directives activity.

The APPM also stated that MSHA managers and employees are to become familiar with the directives system and comply with instructions that apply to their assigned responsibilities. If policy needs clarification or modification, field managers should bring it to the attention of the appropriate Administrator or Director. National office managers will consult with field managers before issuing policy that significantly impacts the functions or effectiveness of field programs. Field managers may issue local administrative instructions for the effective management of their offices.

The APPM stated that MSHA directives are classified as temporary or permanent. Within each of these categories there are both administrative and program directives. APPM Volume 2, Paragraph 110 illustrated the structure of these categories as shown in Table 20.

Table 20 - Directives System Structure

Type	Administrative Directives	Program Directives
Permanent Directives	APPM – Administrative Policy and Procedures Manual	PPM – Program Policy Manual
	Procedure Handbooks	Procedure Handbooks
Temporary Directives	APL – Administrative Policy Letters	PPL – Program Policy Letters
	AIB – Administrative Information Bulletins	PIBs – Program Information Bulletins
		PILs – Procedure Instruction Letters

Statement of Facts: The Internal Review team identified over 6,800 pages of written instructions for MSHA employees, of which over 4,500 apply to Coal enforcement personnel. The APPM chapter that contained policy and procedures for the MSHA Directives System had not been updated since 1998. Since then, MSHA has changed its primary means for distributing directives from mailing printed material to electronic distribution.

The *Program Policy Manual* (PPM) contains policy concerning the technical and enforcement programs of the Agency, including interpretations for compliance with the Mine Act and MSHA regulations. This information is intended for all members of the mining community, including MSHA employees, operators, miners, and product manufacturers. The PPM compiles MSHA’s enforcement-related policies, but is not intended to contain procedures. The PPM is supplemented between updates by Program Policy Letters (PPLs) that transmit new or revised policy to MSHA employees and other interested parties.

Procedure handbooks provide instructions for MSHA employees to carry out inspections and other program or administrative activities. These include 18 program handbooks, 14 of which apply to coal mine inspections and investigations. Handbooks are supplemented between updates by Procedure Instruction Letters (PILs) that transmit new or revised procedures to MSHA employees.

The APPM provides for periodic revalidation of directives to ensure the currency of their text. As temporary directives, each PPL and PIL expires no later than 27 months following its effective date. The APPM directs each program area to review each temporary directive, shortly before its expiration date, to determine whether it should be incorporated into a permanent directive, canceled, or reissued. The APPM specifies that every effort should be made to avoid reissuing PPLs. However, at the time of the explosion, 29 PPLs and 24 PILs had been in effect for an average of 2.8 and 5.8 years, respectively. Nineteen of the 24 PILs had been reissued at least once, sometimes revised from older versions. MSHA reissued three of these PILs five times, one of which was originally issued in 1993. Also, an average of 260 days elapsed

between the expiration of these temporary directives and their re-issuance. Based on interviews with District 4 employees, the Internal Review team determined that field personnel continued referencing expired directives under the assumption that they would be reissued. Furthermore, as the number of temporary directives in effect increased, permanent directives became less reliable.

MSHA did not always update directives when new regulations became effective. For instance, the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook* was not revised to direct inspectors to examine and document training records for responsible persons required by 30 CFR 75.1501(a)(3), which became effective on February 8, 2008.

The APPM provides for manuals and handbooks to be revalidated and revised, if necessary, every two years. This schedule was based, in part, on the practicality of reprinting and distributing paper documents. However, MSHA now delivers directives electronically. MSHA posts program directives on its internet site and maintains current copies of program directives in a local folder on inspectors' laptop computers for their reference while offline at mine sites. Temporary directives are provided to inspectors in subfolders by year of issuance and then by type of directive. However, during interviews with District 4 personnel, most supervisors and inspectors could not explain the difference between the various types of temporary directives. Without knowledge of the year and type of temporary directive being sought, inspectors have to search through over two dozen folders for guidance.

Publication software and electronic distribution technology, now used by MSHA, could permit handbooks and manuals to be revised, posted, and distributed immediately upon issuance of a PPL or PIL. Revising the APPM to take full advantage of this technology would eliminate the need for inspectors to reference temporary directives. This also would reduce the number of reissued temporary directives.

The MSHA Directives System also provides for the issuance of Program Information Bulletins (PIBs) to disseminate information or announcements of immediate interest to Agency employees, mine operators, and other parties. These documents can cover a broad range of topics, but are typically used to raise awareness of potential hazards associated with certain mining practices or equipment. PIBs are temporary directives that remain in effect only as long as they are relevant, but are not subject to periodic review. The APPM also specifies that they are not to contain policy, procedures, or instructions. In 2008 and 2009, MSHA issued 62 PIBs.

Some directives contained information more appropriate to, or duplicated in, another type of directive. At the time of the explosion, 7 PILs and 19 PIBs contained statements that effectively established policy. Similarly, two PPLs and five PIBs referenced procedures for conducting inspections or other MSHA activities. Proper classification of a temporary directive is necessary for interested persons to locate the information and for MSHA to include it in subsequent updates of permanent directives.

As MSHA increased the number of handbooks, the Directives System became more complex, the volume of information became harder to remember, and documents were created that contained conflicting guidance. The APPM does not establish a structure for the scope of handbook topics, resulting in overlapping guidance between handbooks. Handbooks for petitions for modification, general inspection procedures, and citation and order writing are organized at the same tier, each addressing procedures specific to single or related sections of the Mine Act. However, other handbooks are focused on specific mining hazards, such as *Haul Road Inspection*, *Dump Point Safety*, and *Health Inspection Procedures Handbooks*, all of which could be considered subcategories of topics covered in the *General Coal Mine Inspection Procedures and Inspection Tracking System Handbook*.

MSHA typically assembled committees of field personnel to author or revise program handbooks, while Headquarters personnel typically authored PILs. Since field personnel often lacked experience with Directives System policy, they relied on Headquarters personnel to review draft handbooks for potential conflicts with other directives. Headquarters also was responsible for providing a list of related PILs that should be incorporated in the handbooks. However, over the past decade, key Headquarters personnel, who had institutional and program knowledge related to the Directives System, have retired or left the Agency. Some of their responsibilities, which included reviewing directives for duplicate or conflicting

information, were reassigned to program areas other than those specified in the APPM. MSHA no longer has top-level staff persons serving as policy coordinators for program areas.

MSHA management sometimes established guidance that significantly impacted the functions or effectiveness of field programs without using the Directives System. Such guidance was often distributed in internal memoranda issued by the Administrator for Coal (CMS&H Memos) or in e-mails from supervisors and managers at all levels. This practice conflicted with the APPM, which stated that “manuals and handbooks will be the primary means of conveying written policy, procedures, and program direction.” It also bypassed the formal review and approval process in the interest of expediency, instead of using the Quick Release Procedure as provided by the Directives System. E-mails are particularly problematic, because they could be sent by supervisors and managers at all levels, without approval or adequate review for accuracy, legal sufficiency, and consistency with other directives.

Unlike formal directives, information contained in CMS&H Memos or e-mails were not universally accessible to all affected persons. For example, a memorandum establishing procedures for reviewing and approving complex and/or non-typical roof control plans was addressed to district managers and assistant district managers, but not to roof control department supervisors and specialists responsible for plan reviews, or to inspectors responsible for conducting six-month plan reviews. National Mine Health and Safety Academy instructors, MSHA technical experts, inspectors acting as supervisors, and other interested parties were not on the distribution lists for some CMS&H Memos.

The Internal Review team examined 199 CMS&H Memos dating back to 2004. Because there was no formal system for maintaining access to these documents, they were difficult to find and the Internal Review team obtained only a portion of those issued. Of the 199 memoranda reviewed, 69 provided interpretations of regulations or other policy-related information and 76 provided procedural guidance. Some contained obsolete information, but there was no established procedure for revalidating or rescinding these memoranda. Furthermore, there was no system for institutionalizing memoranda guidance by incorporating it into the PPM or procedure handbooks.

Because the memoranda were not institutionalized, retrieval was difficult for experienced MSHA personnel who may have had some prior exposure to the contents of the documents. Moreover, entry-level trainees would have limited exposure. For example, a trainee hired in 2009 may not know about memos issued in 2008, and would not be trained at the National Mine Health and Safety Academy on the requirements because the memoranda were not consistently distributed to Academy instructors. Based on the experience of the Internal Review team and interviews with District 4 personnel, the complexity and unreliability of available information sometimes made it easier for inspectors to ask peers or supervisors for inspection guidance, rather than to reference directives. This resulted in occasional failure to implement new policies and procedures, such as when inspectors continued to follow outdated rock dust survey procedures. (See the “Enforcement of 30 CFR 75.400 and 75.403” section of this report.)

Conclusion: Compliance with MSHA Directives System procedures initially permitted the creation and dissemination of written communications to Agency employees and other interested parties in an efficient and organized manner. Departure from these procedures over the past decade has resulted in inaccurate and outdated manuals and handbooks. The volume of information in MSHA directives exceeds that which an employee could reasonably be expected to learn or retain. Therefore, it is essential that the MSHA Directives System be reinstated and updated to provide employees with ready access to accurate and up-to-date information, as needed.

Managers and supervisors provided instructions intended to establish procedures or policy interpretations in memoranda or e-mail that were not fully vetted through, or retained within, the Directives System. As a result, documents essential for inspectors to reference policies and procedures were incomplete and difficult to use. This caused inconsistencies in a broad range of administrative and program activities, including inspections and investigations, plan reviews, supervisory oversight, and enforcement actions.

Policies and procedures that MSHA employees were required to follow are spread out over many different types of directives. In some cases, multiple directives must be reviewed to find all policy and procedures for a single subject. District 4 inspectors, many of whom had limited MSHA experience, were

not aware of or did not know where to locate all policy and procedures they were required to follow. This was especially true for CMS&H memoranda, which were not institutionalized in a manner where they could be readily accessed.

Corrective Actions Taken: In July 2010, the Assistant Secretary directed the Administrators for Coal and Metal and Nonmetal to establish a detailed plan for the review of all the policies and procedures for conducting inspections. This also included a review of recent internal, independent, and accountability review reports to identify changes necessary to improve the quality and efficiency of inspections. As a result, a consolidated draft inspection procedures handbook was completed in early January 2012. The Assistant Secretary also created a Task Force to review the draft handbook and develop an action plan to train inspectors on its contents. The Task Force also has been charged with identifying and developing changes to MSHA's information technology systems so that the handbook and the forms included in the handbook interact in a seamless, user-friendly fashion.

On February 22, 2012, the Assistant Secretary assigned the Deputy Assistant Secretary for Operations to finalize the draft inspection procedures handbook, and to develop a new centralized administrative review process. This process is to put procedures in place to: coordinate and monitor policy development; evaluate administrative program directives; review and approve all proposed directives; and facilitate the activities of policy coordinators from all MSHA programs. The approval process is to include reviews by the initiating program area, the Associate Solicitor of Labor for MSHA, the Office of Assistant Secretary, and any other program area affected by the policy prior to implementation. When new policies and procedures are implemented, guidance will be developed on the type of distance learning training to be provided, including knowledge checks.

Recommendations: The Assistant Secretary should reestablish the functionality and improve the utility of the MSHA Directives System by:

- Directing Administrators and Directors to use the MSHA Directives System when establishing policies or procedures, with emphasis that memoranda and e-mail should not be used to establish policies or procedures.
- Appointing an Agency Policy Coordinator to evaluate the content and oversee consistent preparation, communication, and implementation of MSHA directives. The Agency Policy Coordinator should be assigned the responsibility for monitoring compliance with Directives System policy and reporting discrepancies to the Assistant Secretary.
- Directing staff to update Volume II, Chapter 100 of the APPM to reflect digital distribution of Agency directives, including simultaneous updates to manuals and handbooks when policy and procedure instruction letters are issued.
- Directing that training be provided to appropriate MSHA employees on their responsibilities within the Directives System.

Effect of Unfilled Positions and Temporary Assignments

Prior to the explosion, employees were temporarily assigned to fill a number of vacant positions within the national and district MSHA offices. In response to a Congressional request, the Internal Review team attempted to determine if vacancies and acting positions at the district and national level may have played a role in the Agency's ability to detect and prevent the problems identified in the MSHA Accident Investigation report on the UBB explosion.

Headquarters Positions

Relevant national-level positions of particular Congressional concern were:

- Deputy Administrator for Coal Mine Safety and Health
- Chief, Accident Investigation Division

- Director of Technical Support
- Associate Solicitor for Mine Safety and Health

The Deputy Administrator for Coal left the Agency on November 21, 2008. The position, a Senior Executive Service (SES) position, was advertised on December 8, 2008. However, a Department of Labor moratorium placed on filling SES positions delayed the appointment of a permanent replacement. An Acting Deputy Administrator was assigned in April 2009. That individual held the acting position until October 3, 2010, when he was permanently selected for the position. There was no indication that the time it took to permanently fill this position affected any of the issues identified at UBB.

The position of Chief of the Accident Investigation Division has been filled with acting staff since August 2008, when the permanent chief retired. The Internal Review team found the lack of a permanent Chief did not hinder the UBB investigation because established accident investigation procedures governed the formation and operation of the Accident Investigation team.⁶⁹

The Director of Technical Support retired in July 2009. At that time, the Deputy Director was temporarily reassigned to the Director position and remained in the position until September 2011, when she was permanently assigned to the position. The Deputy Director position was temporarily filled with managers and technical experts from Headquarters and the two Technical Support Centers in Pittsburgh, Pennsylvania, and Triadelphia, West Virginia. This provided an opportunity for field employees to become familiar with the operations of the Headquarters office. There was no break in the continuity of operations in Technical Support identified by the Internal Review team, and no effect on the events at UBB.

The Associate Solicitor for Mine Safety and Health retired in May 2009. Upon his retirement, the Deputy Associate Solicitor served as acting Associate Solicitor until November 2010, when she was permanently selected for that position. The Internal Review team identified no disruption in the services provided to MSHA by the Office of the Solicitor, and there was no effect on any of the issues identified at UBB.

District Managers

The District 4 Manager position was difficult to fill after it was vacated in 2003. Repeated attempts made to recruit qualified persons to permanently fill the position were unsuccessful. As a result, District 4 was headed by six different district managers between June 2003 and 2006. A list of the managers and dates of service follows:

- Allen Dupree – Acting District Manager from June 5, 2003 to October 5, 2003
- William Crocco – Acting District Manager from October 5, 2003, to January 17, 2004
- John Pyles – Acting District Manager from January 11, 2004, to June 10, 2004
- Stephen Gigliotti – Acting District Manager from June 10, 2004, to July 10, 2004
- Jesse Cole – District Manager from July 11, 2004, to August 3, 2006
- Robert Hardman - Acting District Manager from August through September 2006; permanently assigned October 1, 2006

The turnover in persons assigned to the Acting District 4 Manager position between June 2003 and July 2004 contributed to a lack of continuity in management vital to making decisions regarding enforcement and plan approvals. An example of management issues due to lack of continuity in the District 4 Manager position involved the 2004 methane floor outburst that occurred at UBB.

On February 19, 2004, Acting District Manager John Pyles requested that MSHA Technical Support conduct an evaluation of a floor outburst at UBB that occurred on February 18, 2004, and provide recommendations for preventing future occurrences. Technical Support personnel visited the Mine on February 24 and provided a memorandum to Pyles on March 4, 2004, which he forwarded to the District 4 ADM-Technical and the Ventilation and Roof Control Department supervisors. The memorandum identified several factors that may have influenced methane floor outbursts at UBB.

⁶⁹ The Administrator for Coal initiated the formation of the UBB Accident Investigation team on April 5, 2010.

The Operator later requested assistance from District 4 in determining locations for methane drainage boreholes. A meeting between Operator, District 4, and Technical Support personnel was held on May 26 to discuss the methane outbursts and considerations for mitigating future outbursts. Pyles left District 4 and returned to District 7 on June 10, 2004. Stephen Gigliotti replaced Pyles as Acting District Manager the same day.

On July 15, 2004, Technical Support provided documentation regarding this meeting in another memorandum addressed to Gigliotti. However, Gigliotti left District 4 on July 10, 2004, and was not aware of the memorandum until after the explosion. Jesse Cole was permanently assigned as District Manager on July 11, 2004. When contacted by the Internal Review team, Cole stated that he was not aware of the Technical Support memoranda. He indicated that, given the seriousness of the floor outbursts, he certainly would have taken action had he known about the memoranda.

The July 15, 2004, Technical Support memorandum was initialed by the ADM-Technical. The two Technical Support memoranda were not maintained in the Ventilation Department files used as reference by plan reviewers. The Internal Review team could not determine if MSHA provided copies of these memoranda to the Operator. (See “Longwall 050-0 MMU Plan – Specific Issues.”)

The District 4 ADM-Technical confirmed in an interview that District 4 managers did not require Performance Coal Company to upgrade its mining plans to incorporate the Technical Support considerations. During interviews, the District 4 Manager, Ventilation Department supervisor, and ventilation specialists stated that they were not aware of these memoranda until after the explosion.

Assistant District Managers

The District 4 ADM-Technical was permanently assigned in 1995. The two District 4 Enforcement ADMs were permanently assigned in 2001 and 2004, respectively. There were no extended periods where any of the ADM positions were vacant.

Mt. Hope Field Office Supervisors

Workgroup 1 in the Mt. Hope Field Office was responsible for inspecting UBB from October 1, 2008, through September 30, 2009. This workgroup had one permanent supervisor during the entire review period. During periods of short duration, five inspectors intermittently assumed supervisory responsibilities for Workgroup 1, such as reviewing inspection notes and other work products.

Workgroup 2 assumed responsibility for inspecting UBB beginning on October 1, 2009. This workgroup had two temporarily promoted supervisors to oversee inspection activities from October 1, 2009, until January 2010, when a permanent supervisor was selected. The position could not be permanently filled prior to January 2010 because it was encumbered by a supervisor who was absent on approved leave from May 2009 until he retired.

Evidence indicates that the individuals who were not temporarily promoted during this timeframe were reviewing and initialing inspector work products (reports, notes, citations, etc.), but were not conducting other oversight duties such as accompanied activities and field activity reviews. During the time these individuals were acting, the Internal Review team determined that the supervisory oversight did not identify many deficiencies in the inspection activities of the Mt. Hope Field Office, which are discussed elsewhere in this report.

Conclusion: The Internal Review team found no evidence that the vacant MSHA Headquarters management positions impacted the inspection of UBB or played a role in MSHA’s ability to detect or prevent the problems that led to the explosion at UBB.

The rotation of assignments to the District Manager position between June 2003 and July 2004 resulted in a lack of an appropriate response to the Technical Support considerations regarding methane outbursts at UBB.

The lack of permanent supervisors in the Mt. Hope Field Office caused inadequate oversight of inspectors in the workgroup with responsibility for inspecting UBB. The lack of training and oversight at the field

office supervisor level impacted the guidance provided to inspectors and allowed inspection lapses to go uncorrected. Acting supervisors were not adequately trained to carry out the responsibilities of the position. Many of the inspectors were hired after 2006. While these relatively new inspectors had formal training, they still required significant supervision and had not yet gained the experience needed to address adequately the many complex issues that existed at UBB.

Recommendations: The Administrator for Coal should investigate and resolve issues surrounding double-encumbering temporarily vacant positions to improve oversight and to maintain an experienced staff of enforcement personnel.

Recommendations for training supervisors and acting supervisors are contained in the report section entitled “Section 103(a) Inspections.”

Supervisory & Managerial Oversight

MSHA Policy and Procedures: The *Coal Mine Safety & Health Supervisor’s Handbook* set forth general procedures for supervisory oversight of inspections and investigations to ensure work products and field activities are complete, thorough, and comply with Agency policies and procedures.

The Handbook stated “Field Office supervisors shall accompany inspectors on mine visits an average of 12 times per quarter and specialist supervisors shall accompany specialists on mine visits an average of 5 times per quarter.”⁷⁰ The supervisors must document general mine conditions and whether approved plans, education and training activities, etc. are adequate for the mine during these mine visits. The Handbook also stated: “At an underground mine, a supervisor traveling with an inspector or specialist shall spend sufficient time in active underground working areas (working sections), and/or outby areas (such as seals, travelways, roadways, track and belt conveyor entries, returns, bleeders, etc.), where problem conditions may exist.” Each underground mine visit must include inspection of a portion of an underground belt entry.

Supervisors were required to document a Field Activity Review (FAR) conducted on a completed inspection assignment for each inspector and/or specialist during the first and second half of each fiscal year. Supervisors were to conduct FARs by reviewing all work products and documents related to a completed inspection to ensure that it was conducted according to MSHA policies and procedures. Supervisors used FARs to evaluate the overall performance of inspectors.

Supervisors were required to document an Accompanied Activity (AA) for each of their inspectors and specialists at least twice during both the first and second half of each fiscal year. An AA required a supervisor to accompany an inspector during an inspection to determine if the inspector conducted activities according to Agency policies and procedures.

Procedures permitted an AA to be conducted in conjunction with a FAR. A FAR or an AA may be on one or more assigned field activities. At least one FAR and one AA were required to be conducted on a spot inspection if the workgroup has mines in section 103(i) status. Supervisors were required to document their observations and findings.

The Handbook required each Assistant District Manager to conduct a second Level Review of at least one FAR and one AA from each supervisor during the first and second half of each fiscal year. The Handbook directed ADMs to review all work products including notes, inspection reports, citations and orders, and any other work product related to the activity. The review was to include the supervisor’s notes concerning the general mine conditions and the adequacy of approved plans, education and training activities, etc. ADMs were required to document their findings. The District Manager was required to sign the second Level Review.

⁷⁰ CMS&H Memorandum No. HQ-11-023-A, issued on July 12, 2011, decreased the average number of mine visits required to be conducted by a field office supervisor from 12 to 10 per quarter.

Statement of Facts: The Internal Review team requested all documentation for District 4 supervisory FARs and AAs conducted for inspections and investigations performed out of the Mt. Hope Field Office, including relevant second level reviews. The District submitted documentation for 45 AAs, 36 FARs, 20 supervisor/manager mine visits not conducted as part of an Accompanied Activity, and nine second level reviews, some of which were related to activities in field offices other than Mt. Hope. These documents were evaluated by the Internal Review team for compliance with policy and procedures.

Accompanied Activities and Field Activity Reviews

Based on the number of authorized representatives, the Mt. Hope Field Office supervisors were required to conduct 78 AAs and 39 FARs during the review period. In response to two requests, District 4 submitted documentation for 32 AAs and 23 FARs relating to Mt. Hope Field Office inspectors. Eight of these AAs and six of the FARs were related to UBB. If additional AAs and FARs were conducted by Mt. Hope Field Office supervisors, the Internal Review team did not receive documentation of these activities.

Supervisors did not document required information on many of the AA and FAR forms. Some supervisors did not document the correct event activity code on the forms, the dates of Uniform Mine File reviews, or the dates when inspectors were debriefed. One acting supervisor documented conducting five combined AAs and FARs during the review period. He did not fully complete any of the forms, and did not sign four of the forms. During interviews, acting supervisors stated they were not trained to perform the supervisory duties they were assigned. While there was no requirement for acting supervisors to be trained in these duties, they stated that such training would have been beneficial.

Some supervisors did not observe inspectors' complete activities but still submitted documentation indicating they had conducted AAs with those inspectors. Supervisors documented going to other areas of the mine to travel with another inspector or to independently conduct part of the inspection. On one occasion, a supervisor only traveled to the mine for a close-out conference. These occasions were still documented as Accompanied Activities. When interviewed, ADMs stated these particular mine visits should not have been credited as AAs. The ADMs further stated that supervisors generally conducted more AAs than required, so they still would meet the requirements of the *Coal Mine Safety and Health Supervisor's Handbook*. However documentation provided by District 4 indicated that the Mt. Hope Field Office did not meet the requirements.

Twenty-eight FARs (which included some from Technical Division work groups) were conducted on incomplete inspections. During interviews, supervisors stated that they were aware that FARs had to be conducted on completed events. One specialist supervisor indicated it would be difficult to conduct a FAR on a completed event because his specialists usually did not conduct complete events. Another specialist supervisor stated he had never thought about doing a FAR on a completed event. Interviews also revealed that most supervisors were not aware of all of the elements required to be evaluated during a FAR. Some supervisors confused the requirements for conducting FARs with the requirements for conducting AAs.

Supervisory Mine Visits

During the review period, each Mt. Hope Field Office workgroup supervisor was required to accompany inspectors on an average of 12 mine visits per quarter, or at least 48 mine visits during a fiscal year. Workgroup 2 had a full-time supervisor for only the first eight months of fiscal 2009 and acting supervisors for the remaining four months. Collectively, the Workgroup 2 supervisors recorded making 45 of the required 48 mine visits during fiscal 2009. The Workgroup 1 supervisor documented making 58 mine visits in fiscal 2009, which exceeded the Handbook requirement.

Supervisors for three of the other ten workgroups in District 4 recorded less than the required 48 mine visits in fiscal 2009. The supervisors in the three workgroups recorded a total of 42, 44, and 46 mine visits.

The supervisors of both Mt. Hope Field Office workgroups exceeded this requirement during the first two quarters of fiscal 2010. Each conducted more than 25 mine visits that met the criteria and purposes listed in the *Coal Mine Safety and Health Supervisor's Handbook*.

For 15 of the documented underground mine visits reviewed by the Internal Review team (either during AAs or other visits), supervisors did not document visiting a portion of an underground belt. During interviews, some supervisors stated they were not aware of this requirement. One supervisor stated he would visit a belt on his first visit to a mine, but not always on subsequent visits.

District 4 had created a form entitled "Supervisor/Manager Mine Visit." The District required this form to be completed for each mine visit by a supervisor or manager, regardless of whether it was an Accompanied Activity. The form contained space for the supervisor or manager to provide information pertinent to each mine visit. The form did not provide space for the supervisor or manager to document the general conditions of the mine and whether the approved plans or the education and training activities were adequate for the mine as required by the *Coal Mine Safety and Health Supervisor's Handbook*. Sometimes this information was included in the supervisors' or managers' notes that accompanied the forms. However, this information was not documented for 14 of the mine visits provided to the Internal Review team.

Second Level Reviews

District 4 provided documentation for nine second level reviews. Five of these were conducted for the Mt. Hope Field Office. Two of the second level reviews were well documented. However, managers did not follow Handbook directions for the remaining three reviews. For example, an ADM did not identify that one of the FARs was conducted on an incomplete event. One of the second level reviews was not signed by the District Manager. In addition, one of the second level reviews did not identify that two AAs were conducted on the same day for the same inspector.

When interviewed, District 4 ADMs were aware of the requirements for second level reviews. The ADMs acknowledged that both they and the supervisors missed deficiencies in the AAs and FARs.

Conclusions: District 4 supervisors were not aware of and did not always follow procedures outlined in the *Coal Mine Safety & Health Supervisor's Handbook* when:

- documenting required information for AAs and FARs;
- visiting a portion of an underground belt entry during underground mine visits;
- making the required number of mine visits;
- documenting general conditions of the mine, and whether approved plans and education and training activities were adequate for the mine; and
- conducting FARs on completed inspections.

These lapses occurred because supervisors and acting supervisors did not receive training on how to conduct and document FARs and AAs. Also, the Supervisor/Manager Mine Visit form created by District 4 did not provide for documentation of some information as directed by the *Coal Mine Safety & Health Supervisor's Handbook*. The ADMs did not identify some deficiencies in the FARs or AAs during second level reviews.

The deficiencies that the Internal Review team identified in its evaluations of the FARs, AAs, and supervisory visits conducted for UBB were consistent with the deficiencies identified for other mines for which FARs, AAs, and supervisory visits were conducted. Oversight provided by properly conducted AAs, FARs, and second level reviews is particularly important to the development of inexperienced inspectors and supervisors.

Corrective Actions Taken: The Assistant Secretary directed development of a new training program to provide Coal and Metal and Nonmetal field office supervisors with the essential tools to oversee enforcement activities required by the Mine Act. This training was completed October 2011. The training addressed deficiencies identified by accountability audits and internal reviews and was intended to improve oversight of mine inspectors and foster enforcement consistency. MSHA has also secured

funding to provide additional training to enforcement supervisors on the findings of the UBB Accident Investigation and Internal Review. This training included responsibilities and the duties regarding conducting and documenting AAs, FARs and mine visits.

Recommendations: The Administrator for Coal should direct the revision of the *Coal Mine Safety and Health Supervisor's Handbook* to instruct managers and supervisors on methods for tracking Field Activity Reviews, Accompanied Activities, and mine visits to ensure that they are properly completed and documented.

The Administrator for Coal and the Director of EPD should develop a training program for temporarily promoted supervisors to address pertinent parts of the *Coal Mine Safety and Health Supervisor's Handbook*. This training should include a knowledge check. Consideration should be given to utilizing distance learning options. In addition, guidelines should be developed for assistant district managers to provide the level of oversight necessary for work groups with inexperienced acting field office supervisors.

Staffing

Statement of Facts: A newly-hired trainee needs approximately two years to complete classroom and on-the-job training to become a journeyman inspector. New inspectors gain competency through experience, mentoring by seasoned inspectors, and effective oversight by supervisors. Managing hiring for systematic replacement of inspectors who leave the Agency ensures a competent, experienced, well-trained staff is maintained to fulfill statutory mandates.

MSHA could not always fill vacancies created by attrition due to budgetary constraints. This created a shortage of personnel needed to effectively staff the Agency. Following three mine disasters in 2006, Congress provided supplemental funding for hiring, training, and equipping new inspectors. By that time, however, the pool of experienced inspectors in District 4 was so depleted that newly-hired ROE trainees were mentored by ARs with little inspection experience. In one instance, during a section 103(i) spot inspection in March 2010, an inspector and a ROE trainee observed the UBB longwall coordinator demonstrate the operation of the longwall face equipment. At the time, the inspector had been an AR since October 25, 2009, and had completed five of the six Entry-Level Training modules at the National Mine Health and Safety Academy.

In 1982, the number of Coal enforcement personnel was at its peak with 1,226 inspectors, specialists, and inspector trainees. Attrition and budget cuts gradually eroded the number of enforcement personnel to 584 by the end of fiscal 2005. Following three major mining accidents in fiscal 2006, Congress enacted P.L. 109-234 which provided additional funding that enabled MSHA to increase the number of Coal enforcement personnel by 162, or 28% over the fiscal 2005 level. On March 31, 2010, Coal had 748 enforcement personnel, with 12 vacancies.

The increase in enforcement personnel allowed MSHA to increase the District 4 enforcement staff by 37 (36%) over the 2005 level. Table 21 shows District 4 enforcement personnel levels from fiscal 2005 to March 31, 2010. The table also highlights the sharp increase in the number of inspector trainees resulting from hiring enabled by the 2006 funding increase, as well as the significant decrease in the average experience of District 4 enforcement personnel. Five of the six lead inspectors assigned to conduct regular inspections at UBB during the review period were hired by MSHA after 2006.

Table 21 - District 4 Enforcement Staffing (FY 2005 – 3/31/2010)

Fiscal Year	Mines Requiring Inspection	No. of AR Enforcement Personnel	No. of Non AR Enforcement (ROE Trainees)	Total No. of Enforcement Personnel	Avg. Years Experience as AR of Enforcement Personnel
2005	406	85	17	102	12.3
2006	421	89	23	112	10.4
2007	429	88	44	132	8.4
2008	450	112	19	131	5.5
2009	444	114	25	139	5.6
2010	431	127	12	139	5.2

As a result of having to complete mandated regular inspections, the District 4 Manager permanently reassigned technical specialists located in remote field offices to inspection work groups in October 2004. Specialists were given regular inspection duties outside their specialties. Although beneficial for the completion of mandated inspections, these reassignments reduced the availability of specialized technical expertise within each field office. In District 4, specialist staffing in technical departments (e.g., ventilation, roof control, electrical) and special investigations was held to a minimum. In his interview, the District 4 Manager indicated inspection assignments and the hiring of personnel focused on completing mandatory inspections.

Even utilizing specialists, District 4 was unable to complete all regular inspections required by the Mine Act. In fiscal 2006, the regular inspection completion rate in District 4 fell to 82.4%. In response, the new District Manager directed inspectors to conduct “Enhanced Spot Inspections” to allow District 4 to maintain some inspector presence at all mines.

An example of the lack of available technical inspection resources was the shortage of electrical specialists within the District. The Electrical Department supervisor stated during his interview with the Internal Review team that he estimated that as many as 25 new high-voltage substations were put online in District 4 without being inspected by electrical specialists. This issue is discussed in more detail in the sections of Appendix D regarding enforcement of electrical standards.

Six-month reviews of roof control plans for complex mines were not being completed by roof control specialists, as recommended by *CMS&H Memo HQ-08-059-A*. Due to a shortage in staff, roof control specialists were being utilized to conduct regular inspections. As this was a similar situation in the Ventilation Department, a backlog of plan reviews ensued.

Conclusion: Prioritizing the completion of mandatory regular inspections above all other activities dominated allocation of resources within District 4. Budgetary constraints resulted in reductions in the inspection workforce that compromised the Agency’s ability to perform its mission. Even with increased hiring in 2006, the depleted inspection force in District 4 did not have time to recover and regain the experience it had lost. The lack of experienced inspectors and supervisors assigned to UBB contributed to enforcement deficiencies discussed in various sections of this report.

Specialists and special investigators were assigned to assist with regular inspections, rather than perform the prescribed functions and duties of their positions. This resulted in delays in reviewing ventilation plans and roof control plans. Furthermore, the shortage of specialists limited technical assistance and advice for inspectors. This exacerbated the problems related to an inexperienced inspection workforce, especially at complex mining operations such as UBB.

Corrective Actions Taken: MSHA divided District 4 into two separate districts in June 2011. District 4 now oversees field offices in Mt. Hope, Mt. Carbon, Madison, and Summersville. The newly-formed District 12 oversees field offices in Pineville, Logan, and Princeton. The creation of the new District 12 doubled the number of specialist departments and supervisors, CLR’s, special investigators, and ADMs-Technical in the region.

Recommendations: The Assistant Secretary should direct the completion and implementation of his succession plan already in development. The plan should address required staffing levels and projected attrition to ensure that the Agency can effectively fulfill its enforcement responsibilities under the Mine Act. The plan also should identify the level of staffing necessary to maintain a core of fully trained and experienced inspectors. This plan should explore the feasibility of double-encumbering enforcement positions.

Training and Development of Entry-Level and Journeyman Inspectors

Requirements: Section 505 of the Mine Act provided that persons appointed as Authorized Representatives “shall be adequately trained by the Secretary. The Secretary shall develop programs with educational institutions and operators designed to enable persons to qualify for positions in the administration of this Act.”

MSHA Policies and Procedures: In June 1998, the Assistant Secretary for Mine Safety and Health issued a memorandum implementing the MSHA Training Committee recommendation that all MSHA employees be required to attend one week of training per year, or two weeks every other year.

In response to deficiencies identified by internal reviews of MSHA’s actions at the Darby Mine No. 1 and Aracoma Alma Mine #1 in 2006, the Administrator for Coal issued *CMS&H Memo No. HQ-07-099-A* which stated:

To ensure personnel are familiar with these procedures, CMS&H will conduct training of all inspection personnel. All Coal Mine Inspector (CMI) trainees will receive instruction on preparing citations and orders while attending CMI training at the Academy. All inspection personnel (including trainees) will receive annual training covering citation and order writing in their respective districts.

Statement of Facts: MSHA CMIs currently receive training and retraining through a combination of classroom instruction, online training, and supervised on-the-job training. The initial Entry-Level Training (ELT) consists of 21 weeks of classroom instruction divided into six modules at the National Mine Health and Safety Academy supplemented by 18 online training classes. Students generally alternate 3-4 weeks of classroom instruction with On-the-Job-Training (OJT) instruction in the field. Students meeting specific requirements may be considered for AR status after successfully completing the fourth module of classroom training and a majority of the OJT requirements.

The 1998 memorandum established that journeyman inspectors would complete two weeks of retraining every two years. Specialists were expected to complete one week of specialized training annually. However, the memorandum was not incorporated into the Directives System. It also did not establish a requirement or system for tracking attendance or consequences for not attending.

On March 30, 2010, the Office of Inspector General–Office of Audit (OIG) released the results of an audit of MSHA journeyman training. This report was entitled *Journeyman Mine Inspectors Do Not Receive Required Periodic Retraining*. In pertinent part, the OIG Report stated the following:

During fiscal years (FY) 2007-2008, MSHA increased the number of inspectors by 26 percent and provided initial training to more than 350 entry level inspectors. However, 56 percent of the 102 journeymen inspectors we sampled had not completed MSHA’s required retraining during the FY 2006-2007 training cycle.

The Internal Review team reviewed the training records for 68 District 4 inspectors, specialists, supervisors, and managers who had some form of enforcement or plan approval responsibility for UBB during the review period. Records indicate that 63 of these District 4 personnel completed their entry-level training, OJT assignments, and online classes before graduating the National Mine Health and Safety Academy.

Sixteen of the 68 employees evaluated would have been subject to the two-week retraining requirement. Of these 16, seven were not due for retraining because they had less than two years on the job since graduating the National Mine Health and Safety Academy. Of the remaining nine inspectors, none had attended Journeyman retraining in the two years prior to the explosion. Four inspectors were less than one year overdue. Five of the inspectors had gone more than four years without retraining. These findings of the Internal Review team in their review of District 4 were consistent with the OIG findings nationwide.

Specialists who conducted regular inspections were not required to complete the two weeks of retraining provided to journeymen inspectors. However, they are expected to complete annual retraining in their specialty. A review of National Mine Health and Safety Academy training records for District 4 specialists indicates that they regularly attended specialist training.

According to National Mine Health and Safety Academy records, journeyman inspector retraining was scheduled and later cancelled on five occasions during 2008 and 2009 due to insufficient enrollment from all districts. During interviews with District 4 personnel, most stated that retraining often had to be cancelled or rescheduled. They further stated that limited resources and the statutory requirement to complete regular inspections made it difficult for inspectors to attend retraining while simultaneously completing these inspections.

A portion of the 2008 and 2009 journeyman retraining curriculum focused on Internal Review findings associated with the Sago, Darby, and Aracoma mine accidents. This Internal Review team identified that several of these issues were recurring in District 4. However, the 2008 retraining was cancelled and the 2009 journeyman retraining was not attended by any District 4 inspectors.

Conclusion: The 1998 memorandum implementing the MSHA Training Committee recommendations for retraining MSHA employees was not institutionalized as a permanent directive and did not provide for tracking or accountability.

During fiscal 2008 and 2009, District 4 enforcement personnel did not participate in journeyman retraining because, had they attended training, the District would have been unable to complete regular inspections required by the Mine Act.

Corrective Actions Taken: On January 19, 2011, the Assistant Secretary issued *Administrative Policy Letter No. A11-I-01* which established MSHA's policies and procedures for required continuing education of authorized representatives. The policy letter:

- Stated MSHA policy on continuing education requirements for ARs as at least 48 hours for each two-year cycle. New training curriculum is to be developed every two years and provided to all journeyman ARs;
- Restated management's responsibility and accountability for ARs meeting their continuing education obligations;
- Stated MSHA's policy to remove an AR from health or safety inspection activities for failure to timely complete continuing education requirements unless an extension of time is granted; and
- Provided a process for granting extensions of time to complete training requirements.

District 4 began sending inspectors to the bi-annual journeyman inspector retraining sessions in October 2010.

The topic of Accountability Issues was incorporated in the fiscal 2011-2012 training cycle for Coal Journeyman Retraining.

Recommendations: The Assistant Secretary should direct the revision of the *Administrative Policy and Procedures Manual* (APPM) to incorporate *Administrative Policy Letter A11-I-01* which established policies and procedures for required continuing education of ARs. In addition, the APPM should be

revised to include a permanent requirement for two-week biannual training for field office supervisors. Newly-selected supervisors should be provided this training at the earliest possible date.

The Director of EPD should collaborate with the Administrators for Coal and Metal and Nonmetal to improve the tracking of retraining of supervisors, inspectors, and specialists. The Administrators should provide an annual report to the Assistant Secretary detailing compliance with this policy.

On-the-Job Training (OJT)

Policy and Procedures: The MSHA On-the-Job training program was outlined in a document entitled *OJT Responsibilities* and included the following guidance:

Under the close supervision of a journeyman inspector, the trainee should be allowed to perform all the duties normally completed during an inspection. Let the trainee prepare and present safety talks, pre-inspection conferences, and close-out briefings. Allow the Entry Level Inspector (ELI) to perform work area examinations, identify hazards, keep notes, sample for noise and dust, determine appropriate standards, write draft citations and orders, and complete any other paperwork necessary.

The *On-The-Job Training Modules for Underground Coal Mine Inspection* booklet (OJT Booklet) was designed to document completion of OJT tasks. It was integrated with the respective classroom-training modules the trainee attends at the National Mine Health and Safety Academy.

Statement of Facts: The *OJT Responsibilities* document outlined the responsibilities of Headquarters, District Managers, OJT Coordinators, supervisors, journeyman inspectors, and trainees related to entry-level inspector training. This document was not part of the MSHA Directives System. During their interviews, National Mine Health and Safety Academy personnel stated that the *OJT Responsibilities* document and OJT materials were developed in 2003 and 2004. Representatives of the Academy stated they provided instruction at district manager meetings, supervisors meetings, training committee meetings, and district office visits. However, during their interviews, some District 4 managers, supervisors, and inspectors stated that they were not aware of the *OJT Responsibilities* document.

Entry-level inspector training is documented in the OJT Booklet. The booklet covers 45 subject areas and lists 683 tasks to be completed by entry-level inspectors. The booklet includes columns for Task, Completion Date, and Supervisor Comments.

The Internal Review team reviewed OJT Booklets for seven District 4 entry-level inspectors and identified the following issues. The OJT Booklet does not distinguish between tasks that should be completed in the field and topics that should be covered through classroom instruction. The Internal Review team identified 281 (41%) of these “tasks” which actually are completed through classroom instruction or online training. The trainees initialed items in the booklet as complete after attending the National Mine Health and Safety Academy module in which the topics were taught. However, some skills that needed to be demonstrated in the field were marked complete following classroom instruction.

During their interviews, supervisors and journeyman inspectors were confused about their responsibilities under the program. In order for an OJT task to be considered complete, the trainee needed to perform the task under the close observation of a journeyman inspector. Instead, some OJT tasks were marked as completed when the trainee observed a journeyman inspector performing the task.

Conclusion: The OJT Responsibilities guidelines were not issued as a formal directive and were not communicated effectively to the districts.

OJT Booklets do not distinguish between OJT tasks and classroom instruction. As a result, entry-level trainees regularly substituted classroom instruction for demonstration of practical competency in the field.

Recommendations: The Director of EPD should collaborate with the Administrators for Coal and Metal and Nonmetal to:

- Revise the APPM to include the *OJT Responsibilities* guidance.
- Incorporate OJT responsibilities into journeyman inspector and supervisor training and develop and provide training for District OJT Coordinators.
- Revise the OJT Booklet to include only practical competency skills that need to be demonstrated in the field. The National Mine Health and Safety Academy should track the academic components of entry level training; demonstration of OJT tasks should be tracked by field personnel.

Accountability Program

MSHA Policies and Procedures: The *Accountability Program Handbook*, AH08-III-4, stated in pertinent part:

This accountability program is intended to provide **reasonable assurance** that Agency policies, procedures, and guidance are being complied with consistently and that the mission critical enforcement activities are accomplished [emphasis on original].

Therefore, beyond the identification of deficiencies, the purpose of this accountability program is to prevent the **recurrence** of deficiencies by addressing their **root causes**. Rigorous follow-up and monitoring of past problems will therefore be essential. MSHA personnel are not expected to be flawless. However, they will be expected to learn from mistakes identified by accountability reviews – and to implement effective corrective actions [emphasis on original].

The Handbook also described procedures for conducting accountability audits, including a detailed list of subjects to be reviewed.

Statements of Facts: The Internal Review team evaluated the accountability reviews conducted in District 4 between October 1, 2008, and April 5, 2010. Deficiencies common to these reviews and the UBB Internal Review are provided in Appendix L. A summary of each review follows.

Office of Accountability

The MSHA Office of Accountability (OA) conducted two audits in District 4 during the review period. From May 4-8, 2009, the OA audited enforcement activities at a preparation plant and a surface mine. The audits revealed deficiencies in several categories that required corrective actions. The report did not list the root causes of the deficiencies.

For both OA audits, the corrective action to prevent deficiencies from recurring consisted of training conducted via a District-wide online meeting on October 5, 2009.

Headquarters Reviews

A headquarters accountability review of MSHA enforcement activities at a District 4 underground mine (not UBB) was conducted from November 2-6, 2008. The audit identified deficiencies in several categories that required corrective actions.

The Audit team determined that root causes of the deficiencies included:

- Inadequate understanding of inspection procedures and requirements
- Inadequate understanding of the *Citation & Order Writing Handbook for Coal Mines and Metal and Nonmetal Mines*
- Lack of oversight and coaching by the field office supervisor responsible for reviewing the inspectors' work products
- Lack of understanding due to inadequate training

The audit report stated: “This... has the potential to be systemic in District 4 as well as in other districts due to high numbers of new inspectors entering the workforce. The possibility exists that additional training is needed on inspection requirements, citation and order writing, and use of ITS.”

To address deficiencies found during the Headquarters Review, an instructional presentation was sent to District 4 supervisors and reviewed in staff meetings. Each field office sent confirmation to the District office when the training was completed.

An April 7, 2010, memorandum from the Administrators for both Coal and Metal and Nonmetal to the Deputy Assistant Secretary for Operations addressed changes in the *Accountability Program Handbook*. It stated that the Headquarters reviews would be conducted by the Office of Accountability. The Handbook was revised in June 2011 to include this change in procedure.

District Level Reviews

A District level accountability review of inspection activities at an underground mine (not UBB) was conducted June 22-25, 2009. The review revealed several issues that required corrective actions.

In order to address the deficiencies found, another instructional presentation was sent to District 4 supervisors and reviewed in staff meetings. Each field office sent confirmation to the District office when the training was completed.

Conclusion: The MSHA Accountability Program as implemented in District 4 did not always result in effective corrective actions. There has been inadequate emphasis placed on identification and implementation of effective corrective actions.

Corrective Actions Taken: The new Office of Assessments, Accountability, Special Enforcement and Investigations (OAASEI) will incorporate current headquarters accountability functions as carried out by the Office of Accountability within the OAASEI. By establishing headquarters accountability functions within the OAASEI, MSHA expects to enhance the management, administrative and analytical support for the Accountability program while retaining its independence from the mine inspection program areas.

Recommendations: The Director of OAASEI should collaborate with the Administrators for Coal and Metal and Nonmetal to revise the *Accountability Program Handbook* to:

- Remove references to accountability reviews led by MSHA Headquarters.
- Provide for evaluation of the effectiveness of corrective actions. Where practical, these evaluations should include objective measurements of results and effects of the corrective actions. In cases where training is identified as a corrective action, knowledge checks or equivalent means should be conducted to ensure an adequate understanding of the material.

Recurring Issues from Previous Internal and Independent Review Reports

The Internal Review team examined the four internal review reports and the one independent review report (review reports) issued after mine accidents that occurred between September 23, 2001 and August 17, 2007.⁷¹ One of the review reports involved the January 2006 Aracoma Alma Mine #1 (Aracoma) mine fire. This mine was operated by a Massey subsidiary and inspected by the District 4 Logan Field Office.

In response to these review findings, MSHA implemented corrective actions, including: training for Coal district personnel regarding identified deficiencies, revising the Performance Management System to hold appropriate personnel accountable, and issuing new and revising existing directives.

⁷¹ Following the August 2007 accidents at the Crandall Canyon Mine, the Secretary of Labor appointed an independent review team to evaluate MSHA's actions. Although the independent review followed procedures similar to those used in the four internal reviews, two former MSHA managers, with no ties to the Agency, supervised a team of MSHA personnel in conducting the independent review.

The Internal Review team found District 4 improved its performance in many areas following the January 2006 Aracoma fire. For example, the Aracoma review report identified many deficiencies associated with section 103(i) inspections at Aracoma. However, District 4 correctly conducted all 46 required section 103(i) inspections at UBB during the review period. Additionally, the District did not identify any section 104(d) violations at Aracoma between June 20, 2001, and January 19, 2006, the date of the fatal fire. In contrast, the District identified more section 104(d) violations at UBB during fiscal 2009 than at any other mine in the nation.

Table 22 identifies significant deficiencies common to the five previous review reports. As shown in the table, the Internal Review team identified three deficiencies common to all five of the previous review reports.⁷² These were:

- Incomplete or Inadequate Inspections and Documentation
- Inadequate Supervisory/Managerial Oversight
- Failure to Identify Mine Operators' Deviations from their Approved Mining Plans

Table 22 - Issues at UBB Common with Prior Internal Reviews

Issue	Jim Walter Resources	Sago	Aracoma	Darby	Crandall Canyon
Incomplete or Inadequate Inspections and Documentation	X	X	X	X	X
Rock Dust Sampling	X	X		X	
Inspection of AMS/Carbon Monoxide System			X		
Travel with Mine Examiners		X			
Effective Use of Enforcement Tools	X	X	X	X	
Inadequate Supervisory/Managerial Oversight	X	X	X	X	X
Mine Rescue and Recovery		X		X	X
Inadequate Response to District Level (Peer) Reviews	X	X	X	X	
Examination of Record Books	X	X		X	X
Excessive Abatement Time				X	
Lack of Valid Respirable Dust Surveys					X
Plan Review Issues		X			X
Failure to Identify Mine Operators' Deviations from their Approved Mining Plans	X	X	X	X	X
Inadequate Standards and Directives		X	X	X	

Some deficiencies identified in one or more of the previous review reports were not identified during the internal review following the UBB explosion. Some deficiencies identified in these review reports could be not be compared in a consistent manner. For example, an AMS was not used in each of the five mines, so it was not possible to evaluate the manner in which MSHA inspected the AMS at some of the mines.

In identifying these deficiencies, the Internal Review team is aware that they relate to broad categories of duties, involving complex procedures. Thus, it is not unreasonable to expect that a comprehensive internal review of District 4 inspections at a large underground mine (such as UBB) over an 18-month period would identify some deficiencies in the manner inspections were conducted and documented. Likewise, given the breadth of supervisory and managerial responsibilities, and the number of complex issues addressed in approved mining plans, it is not surprising that the Internal Review team also identified some deficiencies in these areas. Moreover, the identification of a recurring issue does not

⁷² Table 22 cannot be used to compare MSHA's performance at the respective mines prior to the accidents. While listing issues identified during the UBB internal review that also had been identified in five preceding review reports, the table does not list issues identified in the preceding review reports that were not found to exist with respect to UBB. Moreover, the table does not quantify the extent of, nor precisely qualify the nature of, the issues at the respective mines.

evidence a failure to take corrective action. As addressed above, District 4 made significant improvements in the manner in which it conducted section 103(i) inspections and used enforcement tools during the years following the Aracoma fire. Moreover, a number of important regulations and policies have been implemented since 2006 in response to the accidents that occurred at the Sago, Aracoma, Darby, and Crandall Canyon mines. New rules included: *Sealing of Abandoned Areas; Emergency Mine Evacuation; and Flame-Resistant Conveyor Belt, Fire Prevention and Detection, and Use of Air From the Belt Entry.*

Conclusion: MSHA's accountability programs and internal reviews have been successful in identifying deficiencies in the Agency's or the associated District's performance. To correct these deficiencies, MSHA revised its directives and performance management system and provided training to enforcement personnel. However, the corrective actions MSHA has implemented have not been as successful in eliminating or preventing many of those deficiencies.

Recommendations: The Administrator for Coal should collaborate with the Director of OAASEI to provide a means for evaluation of the effectiveness of corrective actions for deficiencies identified in this report and in future accountability reviews. Where practical, these evaluations should include objective measurements of results and effects of the corrective actions. In cases where training is identified as a corrective action, knowledge checks or equivalent means should be conducted to ensure an adequate understanding of the material. In the "General Conclusions and Recommendations" section of the report, the Internal Review team has outlined an approach that could be used for evaluating the effectiveness of corrective actions implemented to address identified deficiencies.

The Assistant Secretary should direct the Office of Assessments, Accountability, Special Enforcement and Investigations to evaluate implementation of corrective actions resulting from internal reviews during each annual District Review.

General Conclusions and Recommendations

Over the years, the mining community has taken great strides to reduce the number of fatal mining accidents. A historically low number of mine fatalities occurred nationwide in fiscal 2009, followed by another historically low number in fiscal 2011. However, as the explosion at UBB demonstrates, tragedy can strike whenever an operator fails to act diligently to protect the safety and health of miners.

District 4 personnel were dedicated in their efforts to enforce provisions of the Mine Act at UBB. In the months before the explosion, they identified hundreds of hazardous conditions and violations, issued citations and orders, and followed up to ensure conditions and violations were corrected. However, the Accident Investigation team identified multiple examples of the Operator's systematic, intentional, and aggressive efforts to avoid compliance with mandatory safety and health standards and to thwart MSHA detection of that noncompliance. These actions to evade well-established Mine Act provisions, which are intended to provide MSHA the opportunity to determine operator compliance or designed to make available vital safety and health information, interfered with MSHA's ability to identify and require abatement of hazardous conditions at the Mine. Thus, despite the efforts of District 4, the Operator's failure to comply with fundamental mandatory safety standards caused the catastrophic explosion.

The Internal Review team did not find evidence that the actions of MSHA employees caused this tragedy. Nevertheless, the Internal Review team identified instances where enforcement efforts were compromised because MSHA personnel did not follow certain Agency policies and procedures. District 4 personnel did not inspect some areas of the Mine during each of the six regular inspections reviewed, including some areas within the explosion area. District 4 personnel did not comply with all policies and procedures applicable to MSHA inspections, investigations, and mine plan reviews. In most cases, this was due to inspectors' lack of MSHA experience, insufficient training, or inadequate supervisory and managerial oversight. In other cases, Agency directives were unclear or improperly implemented.

District 4 enforcement personnel did not identify several of the contributory violations cited by the MSHA Accident Investigation team. Some violations occurred after the last MSHA inspection of areas

where they ultimately were identified. However, some violations likely existed during the last MSHA inspection. In some cases, District 4 personnel did not recognize the violations. In other cases, District 4 personnel did not inspect the areas where these violations were ultimately identified.

MSHA headquarters could have been more effective in providing oversight and direction to the districts. MSHA has effectively addressed some deficiencies in performance identified in past accountability and internal reviews. However, headquarters did not follow up to ensure that other deficiencies were corrected. Many of these deficiencies have continued to be identified during subsequent accountability and internal reviews. MSHA program areas also did not properly administer and maintain the established MSHA directives system. In many instances, Coal issued directions for all field staff using memoranda and e-mails, bypassing the directives system. In some cases, this resulted in field staff being directed by unclear, redundant, and conflicting instructions for carrying out their enforcement responsibilities.

Since the explosion, MSHA has implemented several corrective actions to address shortcomings related to the Agency's actions with respect to UBB. These corrective actions are detailed throughout this report. The Internal Review team recommends additional measures that the Agency should implement to further improve its ability to administer the Mine Act. These recommendations generally fall into the following core categories:

- **Set attainable expectations for inspectors.** Clearly define the salient parts of a regular inspection based on the specific provisions of section 103(a) of the Mine Act. Provide inspectors with the tools, training, and oversight needed to increase the effectiveness and efficiency of their inspection activities.
- **Improve direction and guidance to the workforce.** Assign an Agency policy coordinator to ensure the internal consistency, accessibility, and currency of MSHA directives. Use the MSHA directives system and maintain all policy and procedural guidance within that system. Consolidate policies and procedures and eliminate outdated directives to reduce the volume of material enforcement personnel must know and follow. Issue new or revise existing policy and procedures to provide clear and consistent guidance with respect to inspection, plan review, and respirable dust compliance issues identified in this report.
- **Provide additional training for inspectors, supervisors, and managers.** Train inspectors, specialists, and supervisors on inspecting mine examination books and training records, inspecting longwall operations, evaluating bleeder systems, conducting rock dust surveys, taking spot rock dust samples, properly evaluating violations for gravity and negligence, and responding to mine emergencies. Provide comprehensive training and re-training, including training on enforcement policies and procedures and providing effective oversight, to supervisors and managers.
- **Oversee inspection and mine plan review activities more effectively.** Conduct more comprehensive and timely reviews of inspector work products, including inspection notes, inspection tracking maps, ITS, and enforcement actions. Monitor respirable dust and rock dust sampling activities to determine whether they are conducted in accordance with established policies and procedures. Conduct effective Field Activity Reviews, Accompanied Activities, mine visit activities, and 2nd level reviews. Monitor the review of mine plans and supplements to determine if they are conducted accurately and within timeframes.
- **Use technology more effectively to enhance the quality of inspections and the application of enforcement tools.** Implement Inspectors' Portable Application for Laptops revisions to allow inspectors to upload air sample collection data directly into the MSHA Standardized Information System for integration with the Mt. Hope laboratory, eliminating several layers of redundant data entry. Develop standard oversight reports to monitor rock dust surveys with no samples collected or surveys containing all "Wet" locations. Deploy an oversight report to ensure that all potentially flagrant violations are reviewed for special assessment. Use automated tools to track abatement times for respirable dust violations.

- **Use Agency resources more effectively.** Use Educational Field Service personnel to assist in reviewing operator training records and conducting Part 50 audits. To the extent resources are available, use MSHA specialists and special investigators to conduct those portions of inspections and investigations that are within their technical specialties. Specialists should conduct: electrical inspections; in-mine evaluations of ventilation plans at mines with complex ventilation systems; and in-mine reviews of roof control plans at more complex mines such as those with overlying mines.
- **Consider regulatory changes to more effectively address discrete mine hazards.** Consider rulemaking to require the use of high pressure rock dust machines to continuously apply rock dust at the tailgate end of the longwall face while cutting coal; require mine operators to determine the adequacy of rock dusting using a method approved by the Secretary; increase penalties for failure to report accidents, injuries and illnesses; and require the use of equipment doors to control ventilation within an air course to be approved in the mine ventilation plan.

As demonstrated by the number of recurring issues described in this report, MSHA has had difficulty in correcting certain weaknesses identified by past internal reviews and accountability reviews. Similarly, the Agency's success in implementing new or revised policies and procedures also has been mixed. In District 4 for example, inspectors continued to conduct rock dust surveys using procedures that were superseded in 2008. The District also continued to separately approve ventilation plans and methane and dust control plans, even though a 2006 Procedure Instruction Letter required these plans to be consolidated.

In the past, MSHA more evenly divided inspection responsibilities among inspectors and specialists. Specialists were assigned tasks related to their area of expertise and were also expected to take enforcement actions for all violations they observed. Specialization limited the number of procedures and regulations that any one employee needed know and increased proficiency through familiarity. However, personnel shortages during the past decade caused MSHA managers to reallocate specialists to conduct regular inspections. Inspection activities that had been conducted by specialists were then incorporated into procedures for conducting regular inspections. New regulations, as well as directives developed in part in response to internal and external audits, added to the volume of information that inspectors were expected to master. As a result, the extent of directives related to conducting a regular inspection of a large complex coal mine, such as UBB, now exceeds that which an individual could reasonably be expected to learn or retain. Therefore, the Internal Review team believes that defining the salient parts of a regular inspection and reallocating responsibilities between inspectors and specialists are essential prerequisites for correcting many of the deficiencies identified in this report.

Achieving the degree of change contemplated by this Internal Review will be difficult and may require additional resources. In the interest of realizing lasting and effective resolution of the shortcomings identified in this report, the Assistant Secretary should take the following actions for overseeing the implementation of corrective actions to address the Internal Review team's recommendations:

- Assign responsibility for implementing corrective actions to appropriate program area administrators and directors
- Require the program area administrators and directors to set achievable deadlines for completing the corrective actions within their purview
- Hold program area administrators and directors accountable for timely implementation of corrective actions within their purview
- Assign responsibility for monitoring the implementation of corrective actions and require regular updates on that progress
- Require subordinate managers to certify to their program area administrators and directors that corrective actions within their purview have been fully implemented

- Require program area administrators and directors to certify that the corrective actions within their purview have been fully implemented
- Assign responsibility for measuring the outcomes of corrective actions, that is, whether the corrective action(s) addressed the identified shortcoming(s) without adverse unintended consequences
- Make adjustments when audits, evaluations, and other information indicate that corrective actions are failing to achieve the desired outcomes

Given the existing demands on MSHA inspectors and supervisors, the Internal Review team believes that corrective actions must be implemented in a manner that does not increase the burden already placed on MSHA personnel. Indeed, the Internal Review team believes that many of the recommendations, once implemented, will increase the quality of inspections, plan reviews, and supervisory functions while reducing burden by reallocating resources, consolidating directives, and improving the use of technology to increase efficiency.

In order to fulfill its mission effectively, MSHA regularly must reassess the implementation and effect of Agency policies, procedures, and regulations and make adjustments when appropriate. The manner in which MSHA administers the Mine Act must evolve with changes in the mining industry, technology, experience, and technical information to most effectively further the Mine Act's safety and health goals. The critical importance of the Agency's mission – protecting the safety and health of the nation's miners – demands nothing less.

Signature Page

This report is submitted in response to your request that the Directorate of Program Evaluation and Information Resources conduct an internal review of MSHA's actions at the Performance Coal Company Upper Big Branch Mine-South.

Respectfully submitted,

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Glossary of Terms

The terminology and definitions below are from A Dictionary of Mining, Mineral, and Related Terms, U.S. Bureau of Mines, U.S. Department of The Interior, Second Edition (1996); Code of Federal Regulations, Title 30; MSHA program handbooks and publications; and persons having knowledge of the systems and/or procedures.

AA - Accompanied Activity – a procedure that requires a supervisor to accompany an inspector during an inspection to determine if the inspector is conducting activities according to MSHA regulations, policies and procedures.

ADM-Enforcement – Assistant District Manager who oversees regular inspections and other field office work group activities.

ADM-Technical - Assistant District Manager who oversees plan reviews and other technical specialist work group functions.

AIB – Administrative Information Bulletin

ALJ – Administrative Law Judge of the Federal Mine Safety and Health Review Commission

Alternative Case Resolution (ACR) Program – A program developed by MSHA and the Department of Labor Office of the Solicitor to address cases in which mine operators seek formal and informal resolution of citation and orders issued by MSHA.

AMS – See Atmospheric Monitoring System

Analysis of Longwall Pillar Stability (ALPS) – A computer program used for providing estimates of the relative stability of different longwall pillar designs during all stages of their service life.

Analysis of Multiple Seam Stability (AMSS) – A computer program used to help identify the location and likely severity of overmining and undermining hazards. Mine planners can use this program to adjust the roof support, pillar design, or mine layout to minimize the hazards.

Analysis of Retreat Mining Pillar Stability (ARMPS) – Computer software for designing pillars for room-and-pillar retreat mining.

Anemometer – An instrument used for measuring air velocity in a mine. A small bladed vane, normally 4 inches (10.1 cm) in diameter is rotated by the air current. By simple gearing, the number of revolutions of the vane is converted to a linear distance which is visible on dials on the face of the instrument. When the anemometer is operated for a specific time period, the velocity of air can be calculated by dividing the linear distance by the time, typically yielding a velocity in feet per minute.

APL – Administrative Policy Letter

APPM – Administrative Policy and Procedures Manual

AR – Authorized representative; an MSHA inspector authorized by the Secretary of Labor under the Mine Act to conduct inspections and investigations of coal and other mines and to issue citations and orders for violations of the Mine Act.

Atmospheric Monitoring System (AMS) – A network consisting of hardware and software meeting the requirements of Title 30 CFR 75.351 and 75.1103-2 and capable of: measuring atmospheric parameters; transmitting the measurements to a designated surface location; providing alert and alarm signals; processing and cataloging atmospheric data; and providing reports.

Bandytown Fan – The main exhaust fan at UBB, west of the 1 North Longwall Panel, to which all return air from active sections in the explosion area was being exhausted.

Belt Drive – Refers to the electrical/mechanical unit that drives the conveyor.

Bieniawski Formula – A formula used for determining coal pillar strength based on pillar shape effect, dimension and laboratory testing of coal.

Bleeder – Special air courses developed and maintained as part of the mine ventilation system and designed to continuously move air-methane mixtures away from the active workings and into mine-return air courses.

BOM – Bureau of Mines, United States Department of the Interior

Bottle Samples – Air samples, usually collected in 10-milliliter vacuum bottles for analysis by gas chromatography.

Brattice – A partition constructed of reinforced plastic canvas, this is a temporary ventilation control typically used to direct air flow in a mine. Brattice material is also attached to wooden frames to construct temporary stoppings during mine rescue operations.

Carbon Monoxide – (CO) A colorless, odorless, very toxic gas that is formed as a product of the incomplete combustion of carbon. This gas is formed during mine fires and after explosions.

CDEM – Coal Dust Explosibility Meter is a device which provides the user with an estimate of the explosibility of a mine dust sample.

cfm – See Cubic Feet per Day.

cfm – See Cubic Feet per Minute.

CFR – Code of Federal Regulations

CLR – See Conference/Litigation Representative.

CMI – Coal Mine Inspector

CMS&H – MSHA Coal Mine Safety and Health is responsible for enforcement of safety and health regulations at all surface and underground coal mines in the United States.

Coal Dust – Particles of coal that can pass through a No. 20 sieve.

CO Monitor – A gas sensor used for fire detection. Conducts continuous monitoring of the atmosphere in a mine, and initiates an alarm when the designated gas threshold is exceeded.

Conference/Litigation Representative (CLR) – an MSHA official responsible for: (1) conducting safety and health conferences and/or (2) conducting subsequent settlement conferences and appearing before ALJs of the Commission in contested cases.

Continuous Mining Machine – A mining machine designed to cut and gather coal from the working face, and to load that coal into cars or conveyors. Often referred to as a “continuous miner.”

Conveyor Belt – The belt, which, in conveyor mining, moves coal from the rooms and entries of a mine to a discharge point or to the surface.

Crib – A roof support of prop timbers or ties, laid in alternate cross-layers, log-cabin style.

Crosscuts – A passageway typically driven at right angles to the main entry to connect it with a parallel entry or air course.

Cubic Feet per Day (cfm) – Unit used to describe the volume of methane liberated from a mine during a 24-hour period; volumetric flow rate of methane per unit time.

Cubic Feet per Minute (cfm) – A measurement of the quantity of air moving through a mine entry; volumetric flow rate of air per unit time.

Cutting bits – Conical, carbide-tipped bits used on a longwall shearer drum, or a continuous mining machine drum, to cut coal from the coal face.

Deep Cut – See Extended Cut

Dispatcher – A responsible person designated by the operator who controls or keeps track of the traffic on haulageways.

DOL – United States Department of Labor

DTI – Dates, Times and Initials – Company mine examiners are required to certify with dates, times and initials that the required examinations were conducted.

Effective Combustible – A value calculated for a mixture of combustible gases with different lower explosive limits to represent the lower explosive limit of the mixture. For coal mine fires and explosions, the value is compared to the methane lower explosive limit (5.0 percent).

EFS – Educational Field Services

Elevated Enforcement Action – An MSHA citation or order issued under Section 104(b), 104(d), 104(e), 104(g), or 107(a) of the Mine Act that causes, or potentially causes, miners to be withdrawn from, and/or production to cease in, an area affected by the violative condition.

Ellis Mains – The northern most set of main entries on the eastern side of Upper Big Branch.

Ellis Portal – Mine entrance located at the end of Ellis Mains.

EPD – Educational Policy and Development

ERP – Emergency Response Plan

Escapeways – Refers to a least two separate and distinct travelable passageways provided from each working section, and each area where mechanized mining equipment is being installed or removed, continuous to the surface escape drift opening or continuous to the escape shaft or slope facilities to the surface.

ETS – Emergency Temporary Standard

Extended Cut – An extended cut (deep cut) is defined as any cut in which the on-board manual controls of the continuous mining machine are advanced in by the last row of permanent roof supports or any cut in which the mining machine is advanced more than 20 feet in by the last row of permanent roof supports. This measurement is made from the last fully completed row of undisturbed roof bolts to the point of deepest penetration of the working face.

FAB – Fresh Air Base – An underground station, located in the intake airway, used by rescue and recovery teams during underground fires and rescue and recovery operations. This is the base of operations from which the rescue and recovery teams can advance into irrespirable atmospheres. This base should be adequately ventilated, and in constant communication with the surface by telephone.

Face – The surface of an unbroken coal bed at the advancing end of the working place where coal is being removed.

FAR – Field Activity Review – a supervisor's review of a completed inspection assignment to determine compliance with MSHA regulations, policies and procedures.

Feet per Minute (fpm) – A measurement of the velocity of air moving through the mine; linear flow rate of air per unit time.

Fire Boss – A state-certified mine official who conducts preshift examinations. In some states, it is used loosely to designate assistant or section foreman.

Float Coal Dust – The coal dust consisting of extremely fine particles of coal that can pass through a No. 200 sieve. When suspended in air, it can become extremely explosive.

Gob – A pile of loose waste in a mine. Normally used to describe the area behind the longwall face shields where coal has been extracted and the roof has fallen in.

Headgate – The set of entries on the side of a longwall panel that gives primary access for personnel and supplies provides intake air used to ventilate a longwall face, and houses the conveyor belt, electric and hydraulic power equipment, and other equipment necessary for longwall mining operations.

Headgate #22 – The three-entry headgate development section at Upper Big Branch north of the active Longwall Panel.

Headgate Entry – An entry accessing the longwall section, typically on the side of the longwall panel containing the section conveyor belt.

IMCC – Interstate Mining Compact Commission

Imminent Danger – The existence of any condition or practice in a coal or other mine which could reasonably be expected to cause death or serious physical harm before such condition or practice can be abated.

Inby – Toward the working face, or interior, of the mine; away from the shaft or entrance.

Inerted – Any combination of coal dust, rock dust, and other dust in a mine entry suspended in the mine environment that will not explode. Also refers to the incombustible property of a gas mixture.

In-Gas – A resulting effect due to increasing atmospheric pressures where air from the active area of the mine will tend to migrate or “in-gas” towards sealed areas and into gobs potentially introducing oxygen into an area in the explosive range of methane.

Inspection Tracking System (ITS) – is a set of shared network files, one for each mine, listing items to be inspected during each regular inspection. Inspectors document completion of each inspection activity on this file to track inspection progress and coordinate activity among multiple inspectors.

Intake Air – The primary fresh, uncontaminated air coursed through a mine and provided to a working coal face; or, air that has not yet ventilated the last working place on any split of any working section, or any worked-out area, whether pillared or non-pillared.

Interburden – The rock strata located between two coal seams.

IPAL – Inspectors’ Portable Application for Laptops

LIMS – Laboratory Information Management System

Longwall mining – A type of underground mining in which a shearer (sometimes called a cutting head) moves back and forth across a panel of coal (typically 1,000 feet or more in width) cutting slices approximately 3.5 feet deep. The cut coal then falls onto a flexible conveyor for removal. Longwall mining is performed under hydraulic roof supports (called shields) that are advanced as a seam is cut.

Longwall Panel – A panel or section set up through development mining that arranges a long wall of coal, or face, often in excess of 1000 feet, to be mined using a longwall shearer and other equipment running parallel to the face.

Longwall Shearer – The extraction machine on a longwall face, equipped with two ranging drums, one on the headgate side and one on the tailgate side, so that coal can be cut in either direction.

LW – Longwall

Mandoors – Personnel doors constructed of noncombustible material and used to maintain separation and permit travel between air courses. The distance between personnel doors shall be no more than 300 feet in seam heights below 48 inches and 600 feet in seam heights 48 inches or higher.

Mantrip – The method of conveyance for miners, normally to and from the working section.

Methane – A colorless, odorless, flammable gas that is the simplest hydrocarbon. It is the major constituent of natural gas and is released during the decomposition of plant or other organic compounds, as in marshes and coal mines.

MEO – Mine Emergency Operations

MERC – Mine Emergency Response Coordinator

MERD – Mine Emergency Response Development

MERP – Mine Emergency Response Plan

MEU – Mine Emergency Unit

MIIN – MSHA Individual Identification Number

Mine Act – Federal Mine Safety and Health Act of 1977 – Legislation requiring MSHA to inspect surface mines and underground mines; investigate mine accidents, complaints, and violations; develop safety and health standards; propose and collect monetary penalties for violation of these standards; expand educational programs related to mine safety; and approve mining, education, and training plans.

Mine Rescue Team – Specially trained unit of miners organized to search for miners missing during mine accidents, utilizing special breathing and communication equipment.

Mine Safety and Health Division (MSH Division) – Office of the Solicitor, Mine Safety and Health Division, United States Department of Labor

MSHA – Mine Safety and Health Administration

Mine Improvement and New Emergency Response Act of 2006 (MINER Act) – 2006 amendment to the Mine Act to improve safety and health in mines in part by means of improved accident preparedness.

MMU – Mechanized Mining Unit

MOU – Memorandum of Understanding

MPA – Mine Plan Approval database system, which MSHA uses to track plan approvals and reviews in the districts and to monitor district activity at the national level.

MSIS – MSHA Standardized Information System – is a computer system that collects and maintains information about mines, mine operations, miner and instructor qualifications and certifications, mine inspections, coal dust sampling management, infractions of mandatory safety and health standards, in accordance with mandatory standards, and provides information to assess alleged violations against mine operators and independent contractors. The application is accessible to many of the MSHA program area offices via agency's intranet.

NFDL – Non-Fatal Days Lost

NIDO – (**No Imminent Dangers Observed**) – When inspecting a working section, an inspector is required to check all working places for imminent dangers as soon as practical after arrival on the section and before examining equipment or observing any cycle of operation. The Inspector is required to document this inspection in his hard copy notes with the term “No Imminent dangers observed” or “NIDO”

NIOSH – National Institute for Occupational Safety and Health, United States Department of Health and Human Services

Non-S&S Violation – MSHA category for a violation that is deemed “not reasonably likely to cause reasonably serious injury”

NVO – No Violations Observed – This term is used by an inspector to document that he has conducted the required inspection activity and did not observe any violations.

OAASEI – MSHA's Office of Assessments, Accountability, Special Enforcement and Investigations.

On-Shift Examination – An examination by an agent of the mine operator of areas to identify hazards conducted during the working shift. May also be used to comply with preshift examination requirements under certain restrictions.

OIG – Office of Inspector General, United States Department of Labor

OJT – On-The-Job Training

Operator – Any owner, lessee, or other person who operates, controls, or supervises a coal or other mine or any independent contractor performing services or construction at such mine.

OPPE – Office of Program Policy Evaluation

Order of Withdrawal – An order in which the operator is required to remove all persons from the area affected, except those persons necessary to correct the violation as referenced in Section 104(c), until the violation is abated.

Outby – Nearer to the shaft or portal, and therefore away from the face, toward the pit bottom or surface; toward the mine entrance. The opposite of inby.

Out-Gas – A resulting effect due to decreasing atmospheric pressures where gobs or sealed areas containing methane and low oxygen concentrations will migrate or “out-gas” toward the active areas of the mine.

Overburden – Designates material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials, ores, or coal

Overcast – An enclosed ventilation structure that permits an air current to pass over another one without interruption.

PKW – Possible Knowing/Willful Violation – A review of an enforcement action issued by MSHA to determine whether the actions of an operator or his agent may constitute violations of section 110(c) or section 110(d) of the Mine Act for knowingly or willfully violating a section of the law.

Pillar – An area of coal left to support the overlying strata in an underground mine, sometimes left permanently to support surface structures.

Pounds per Square Inch (psi) – A unit of pressure or of stress based on avoirdupois units. It is the pressure resulting from a force of one pound-force applied to an area of one square inch.

PIB – Program Information Bulletin

PEIR – Program Evaluation and Information Resources

PIL – Procedure Instruction Letter

Portal – The surface entrance to a drift, tunnel, adit, or entry. Normally used to identify locations where miners enter the mine.

POV – Pattern of Violations

PPL – Program Policy Letter

PPOV – Potential Pattern of Violations

Preshift Examination – An examination required to be made to identify and correct hazards in areas where miners will work or travel on the upcoming work shift.

RCD – Technical Support Roof Control Division

RDDR – Rock Dust Data Retrieval System

RDSS – Rock Dust Sample Submission

Regular Inspection – Inspection conducted under authority of section 103(a) of Mine Act. Normally conducted over several weeks, the mine is inspected in its entirety. Underground mines must be inspected 4 times per year, surface mines and facilities 2 times per year.

Return Air – Air that has ventilated the last working place on any split of any working section or any worked-out area whether pillared or nonpillared.

RM – Records Management Group

Rib – The side of a pillar or the wall of an entry.

Respirable Dust – Dust of less than 10 microns which is capable of penetrating deep into the alveoli of the human lung.

Rock dusting – The application of inert dust, typically crushed limestone, to the surfaces of an underground mine. When properly applied, rock dust will prevent the propagation of a coal dust explosion.

ROE Trainee – An inspector trainee who has the Right of Entry assigned by the Secretary, who is in the process of receiving mandatory training for inspecting mines, but has not yet been authorized to conduct inspections.

Roof Bolting – A system of roof support in mines. Holes usually from 3 to 12 feet (1 to 4 m) long are drilled upward in the roof, and bolts of 5/8 to 1 inch (2 to 2.5 cm) or more in diameter are inserted into the holes and anchored at the top by a split cone, mechanical anchor, or resin grout. The bolts are put up in a defined pattern according to the approved roof control plan. Several roof beds are clamped together to form a composite beam with strength considerably greater than the sum of the individual beds acting separately.

Roof Control Plan – A plan developed by the mine operator subject to approval by MSHA that shows the methods for supporting the roof of the coal mine.

RSOL – Regional Solicitor of Labor, Office of the Solicitor, United States Department of Labor

RTD – Resistance thermometers, also called resistance temperature detectors or resistive thermal devices (RTDs), are sensors used to measure temperature by correlating the resistance of the RTD element with temperature. Most RTD elements consist of a length of fine coiled wire wrapped around a ceramic or glass core.

SAR – Special Assessment Review

S&S Violation (significant and substantial) – In writing each citation or order, the MSHA inspector determines whether or not the violation is S&S. An S&S violation is one that is reasonably likely to result in a reasonable serious injury or illness.

Scrubbers – Air filtration equipment on mining machines used in some situations to reduce the amount of coal dust in the air and also to reduce respirable dust exposures in the area where miners are working.

Seal – Ventilation control used to isolate areas of the mine from active workings.

Self-Contained Breathing Apparatus (SCBA) – A self-sufficient breathing unit that permits freedom of movement. It offers the wearer respiratory protection in atmospheres that are either oxygen-deficient or too highly toxic to permit the use of gas masks or respirators.

Self-Contained Self-Rescuer (SCSR) – A respiratory device used by miners for the purpose of escape during mine fires and explosions; it provides the wearer a closed-circuit supply of oxygen for a minimum of 10 min and up to 1 hour.

Shearer – See Longwall Shearer.

Shearer Drum – A cylindrical rim-type of wheel around which cutting bits are attached. The rotating drum cuts coal from the longwall face.

Shields – A safety device; specifically, in longwall mining, a series of steel canopies used along the face to protect the miners who work beneath them. Shields are sequentially moved forward as mining progresses.

Sloughage – Fragmentary rock material that has naturally spalled off of the sides of a mine pillar or coal rib.

SOL – Office of the Solicitor, United States Department of Labor

Special Investigator (SI) – An MSHA employee who is specially trained to conduct investigations of discrimination complaints pursuant to section 105(c) and special investigations pursuant to section 110 or section 108 of the Mine Act.

Stopping – Commonly a masonry wall erected across mine entries and crosscuts to separate air courses and direct the ventilating air current.

Supervisory Special Investigator (SSI) – The SSI is responsible for the daily management of the special investigations program in the district. The SSI reports directly to the District Manager.

Super section – Two sets of mining equipment operating simultaneously and sharing a common dumping point on the same section with each set being ventilated by a separate split of intake air.

Tailgate – In longwall mining, the side opposite the headgate. It is typically where air used to ventilate the longwall exits the face area.

Tailgate #22 – The three-entry development section at Upper Big Branch north of the active Longwall Panel which would have been the tailgate for the subsequent longwall section.

Tailpiece – The terminal end of a belt conveyor which does not impel the belt, and houses the tail pulley of a belt conveyor.

T&A – Time and Activity Report

TCIO – Technical Compliance and Investigations Office (TCIO) at MSHA Headquarters which oversees the Agency's Special Investigation program.

UBB – Upper Big Branch Mine-South

UG – Underground

Uniform Mine File (UMF) – A compilation of mine plans and pertinent mine information to assist an inspector or specialist in the inspection of a mine. Maintained in the MSHA field office.

USBM – United States Bureau of Mines

Ventilation – The provision of a directed flow of fresh and return air along all underground roadways, traveling roads, workings, and service parts.

Ventilation Curtains – Also brattice cloth. Typically reinforced plastic curtain installed in a manner to ventilate an area of a mine. In coal mines, it is used to ventilate working places or other locations where methane may accumulate.

Ventilation Plan – A plan developed by the mine operator subject to approval by the District Manager, which shows the ventilation air currents in a mine and the means of controlling those currents.

Water Spray – A mechanism which uses water under pressure to produce a pattern of water droplets or mist for the control of dust and cooling of cutting bits on mining machines.

WVOMHST – West Virginia Office of Miners' Health Safety and Training

XP – Explosion-proof. Typically describes an enclosure that will prevent the propagation of flame to the exterior environment.