Internal Review of MSHA's Actions at the Darby Mine No. 1 Kentucky Darby LLC Holmes Mill, Harlan County, Kentucky

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U.S. Department of Labor
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Executive Summary

The purpose of this internal review is to evaluate the actions of the Mine Safety and Health Administration (MSHA) prior to the fatal explosion at the Kentucky Darby LLC, Kentucky Darby Mine No. 1 (Darby Mine) and to make recommendations to improve MSHA's enforcement process to better protect our nation's miners. The internal review compared MSHA's actions with the requirements of the *Federal Mine Safety and Health Act of 1977 (Mine Act)*, its standards and implementing regulations, and with MSHA policies and procedures. The internal review team examined inspection records, traveled underground to the accident area, and interviewed MSHA employees with personal knowledge of pertinent events.

Through enforcement of the Mine Act, District 7 personnel recognized numerous hazardous conditions at the Darby Mine and required the operator to take corrective actions in an attempt to achieve a safer and healthier work environment. Their continued dedication to these tasks will be critical to MSHA's mission of improving mine safety and health.

The MSHA accident investigation team determined that the failure of Kentucky Darby LLC to comply with mandatory safety standards contributed to the cause and severity of the May 20, 2006, explosion. The mine operator did not observe basic mine safety practices and critical safety standards were violated. Mine management failed to ensure that proper seal construction procedures were utilized in building the seals at the A Left Section. Mine management also failed to ensure that safe work procedures were used while employees attempted to make corrections to an improperly constructed seal. Furthermore, mine management failed to adequately train miners in proper SCSR usage and escapeway routes.

Although the internal review team identified significant deficiencies in MSHA's actions at the Darby Mine, the team did not find any evidence that these deficiencies caused or contributed to the fatal explosion. Nevertheless, the identified deficiencies in MSHA's enforcement performance must be corrected. Accordingly, the internal review team conducted a "Root Cause Analysis" of each deficiency to identify the root causes and to provide recommendations for eliminating recurrence of each deficiency. Principal findings of the root cause analysis are summarized below.

- The failure of inspectors and specialists to follow established inspection procedures coupled with weak supervisory, managerial, and headquarters oversight resulted in many of the deficiencies identified in this report.

- Ineffective use of the Performance Management System permitted poor performance to continue uncorrected at all levels in District 7.

- MSHA's Accountability Program has fundamental flaws. The program effectively identifies weaknesses in MSHA's enforcement activities, but does not adequately identify root causes and eliminate recurrence of those weaknesses. Despite its name, the Accountability Program does not hold employees accountable for correcting and eliminating deficiencies.

- Following the Sago Mine explosion, MSHA recognized a problem with the 20 pounds per square inch pressure criteria used for the approval of alternative seals and has taken steps to address the problem.

- Prior to the Darby explosion, MSHA did not address the potential for significant problems with faulty seal construction. Previous investigations determined some alternative seals had failed for this reason.

- Defects in the construction of alternative seals were not always identified by MSHA during inspections. The intake seals in the Darby Mine were not constructed as approved in the mine ventilation plan, and had been inspected by Harlan field office personnel a number of times.

- The Alternative Case Resolution (ACR) Program continues to have an adverse effect on the level of enforcement applied by inspectors. Evaluations of gravity and negligence made by District 7 inspectors were adversely influenced by decisions made by Conference Litigation Representatives (CLRs) in prior safety and health conferences.

- MSHA's mine emergency response capabilities and procedures can be improved. Existing procedures need to be evaluated and new procedures should be established.

The issues identified in each of these areas are specifically addressed and documented in this report. Some of the deficiencies are currently being addressed or have already been addressed by the Agency or through legislation. Where appropriate, this report includes recommendations to enhance MSHA's performance and to better protect all miners.

Deficiencies related to the Alternative Case Resolution and Accountability programs are not new. Similar deficiencies were documented in the Jim Walter Resources internal review report, released January 24, 2003, as well as in the recent Sago Mine internal review report.

With design improvements to the inspection process, effective supervision and management, refinement of the ACR and Accountability Programs, and proper training of personnel, the review team believes that District 7 will fully exercise its authority and

discharge its responsibilities. These corrective measures, implemented more broadly, should improve the inspection process nationwide to better effectuate the Mine Act's goal of protecting the nation's miners.

Background

The 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. The Mine Safety and Health Administration has the responsibility to develop and promulgate mandatory safety and health standards, to inspect mines to determine whether there is compliance with these standards, and to investigate accidents to determine their causes.

On Saturday, May 20, 2006, an explosion occurred at approximately 1:00 a.m. in the sealed A Left Section of the Kentucky Darby, LLC, Darby Mine No. 1, resulting in fatal injuries to five miners and injuries to one miner. At the time of the explosion, six miners were underground during a non-producing shift.

The Darby Mine was under the jurisdiction of Coal Mine Safety and Health (CMS&H) District 7, which is headquartered in Barbourville, Kentucky. Inspectors assigned to the Darby Mine worked out of the Harlan, Kentucky, field office. A regular safety and health inspection was started on April 17, 2006, and was ongoing at the time of the fatal explosion. The last underground MSHA inspection presence at the Darby Mine prior to the explosion was on May 17, 2006.

Immediately after the explosion, MSHA began an investigation into its causes. A team independent of District 7 conducted the accident investigation. The accident investigation included a physical examination of the mine, a review of pertinent documents, and interviews of persons having relevant information.

MSHA's accident investigation team determined that at the time of the explosion, six miners were underground during a non-producing shift. Prior to the explosion, four miners were on the B Left Section preparing to perform routine maintenance work on equipment. Two miners from the B Left Section who had worked the afternoon shift remained after their shift and traveled to the seals which were constructed to isolate the abandoned A Left Section from the active areas of the mine. The two miners rode a non-permissible battery powered personnel carrier (buggy) down the return airway with a set of oxygen and acetylene torches for the purpose of removing metal roof straps from the roof that intersected the No. 1 and No. 3 Seals. One of these miners was the afternoon shift section foreman. A methane explosion occurred behind the seals at A Left, which was caused by the cutting of a metal roof strap that passed through the No. 3 Seal. The forces from the explosion resulted in fatal injuries to the two miners and

complete destruction of the seals. Forces from the explosion also damaged conveyor belt structure, roof supports, and ventilation controls.

After hearing the explosion, the four miners working in the B Left Section attempted to evacuate and encountered thick smoke approximately four crosscuts outby the section power center. At this point they donned their CSE SR-100 self-contained self-rescue (SCSR) devices and attempted to continue their evacuation. During the evacuation, at least two of the miners intermittently removed their SCSR mouthpieces to communicate. The miners eventually became separated from each other. One miner survived and three died due to carbon monoxide poisoning with smoke and soot inhalation.

MSHA's accident investigation team determined that the fatal explosion occurred because the mine operator did not observe basic mine safety practices and violated critical safety standards. Mine management failed to ensure that proper construction procedures were utilized in building the seals at the A Left Section. Mine management also failed to ensure that safe work procedures were used while employees attempted to make corrections to an improperly constructed seal. Furthermore, mine management failed to adequately train miners in proper SCSR usage and escapeway routes.

MSHA's official *Report of Investigation, Fatal Underground Coal Mine Explosion, May 20, 2006, Darby Mine No.1, Kentucky Darby LLC, Holmes Mill, Harlan County, Kentucky, ID No. 15-18185* was made available to the public on April 12, 2007.

Purpose, Scope, and Methodology

The Acting Assistant Secretary for Mine Safety and Health Administration instructed the Director of Program Evaluation and Information Resources to conduct an internal review of MSHA's actions at the Darby Mine. The purpose of the review is to evaluate MSHA's actions prior to the fatal explosion at the Darby Mine and to make recommendations for improvements where appropriate.

This review compares MSHA's actions with the requirements of the Mine Act, its standards and implementing regulations, as well as MSHA policies and procedures. The review team examined inspection records, mine plans, the accident investigation report, and pertinent data from MSHA's Standardized Information System (MSIS). The team traveled to the mine site and observed conditions underground. The review team also interviewed MSHA employees who had personal knowledge of pertinent events. Bargaining unit employees were afforded the opportunity to have a union representative present during their interviews. All persons interviewed cooperated fully with the review team during their interviews. A list of persons who were interviewed or provided information is included in Appendix A.

In addition to the issues addressed in this internal review report, the review team conducted an in-depth analysis of several other subjects, including special investigations, assessment and collection of civil penalties, and conflict of interest. The review indicated that these subject areas did not affect, influence, or otherwise have a bearing on the effectiveness of MSHA's activities at the Darby Mine. Therefore, these subjects are not discussed in this report.

Internal review policy and procedures require that every allegation of possible misconduct on the part of MSHA employees 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 for appropriate action to the Administrator of the program area being reviewed. 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.

This report is in no way intended to denigrate the actions of the dedicated District 7 personnel who have devoted thousands of hours to conducting inspections. Through enforcement of the Mine Act, these personnel recognized numerous hazardous conditions and required mine operators to take corrective actions in an attempt to achieve a safer and healthier work environment for miners. Their continued dedication will be critical to MSHA's mission of improving mine safety and health.

Report Organization

This report is organized into several categories, each focusing on issues identified by the review team. The categories are as follows: Enforcement Activities; Background Information on Alternative Seals; Enforcement of Specific Safety Standards (Contributory Violations); Enforcement of Specific Safety Standards (Noncontributory Violations); Mine Rescue and Recovery Operations; Plan Approvals; Management Issues; and Root Cause Analysis. These issues were derived from information gathered during the review team's evaluation of relevant documents and data and interviews of MSHA employees. Root cause analysis was performed on all identified deficiencies.

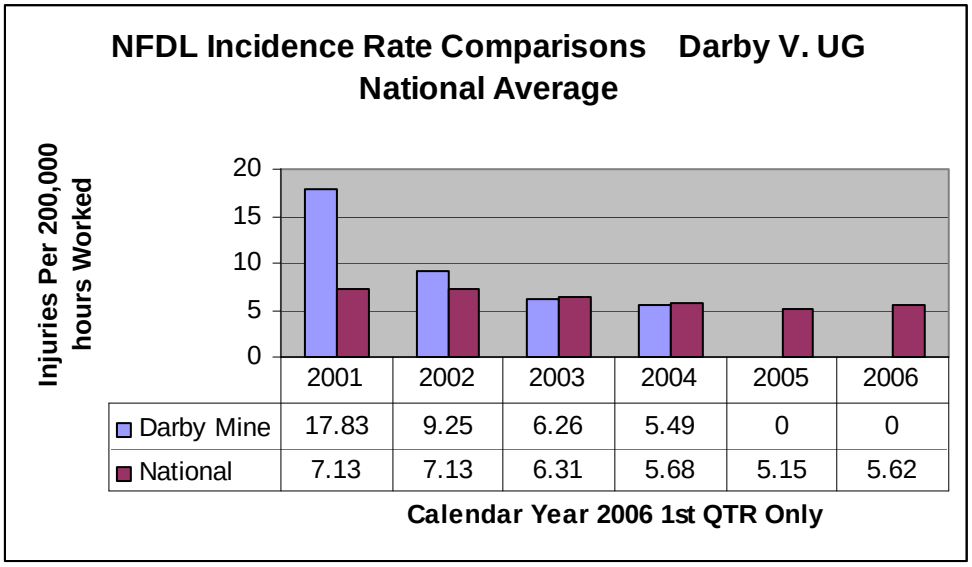
Each issue described in the report is divided into several sections. The "Requirement" section describes the relevant provisions of the Mine Act, its standards and implementing regulations. The "MSHA Policies and Procedures" section describes the pertinent provisions of MSHA policies and procedures. The "Statement of Facts" presents the facts as found by the review team during its review. The "Conclusion" contains the review team's analysis of the facts. The "Statement of Facts" presents the

facts as found by the review team. The "Conclusion" contains the review team's analysis of the facts. A Root Cause Analysis was performed to determine the source or origin of the deficiency and provide recommendations to eliminate the problems.

After the Assistant Secretary approved the internal review report, he transmitted the report to the CMS&H Administrator and directed the Administrator to respond to the report's recommendations. The Administrator's response is included in Appendix B.

Injury Incidence Rates for the Darby Mine

The review team examined the nonfatal, days-lost (NFDL) injury incidence rates for the Darby Mine from 2001 through the 1st quarter of 2006. In 2001, the NFDL injury incidence rate for Darby Mine was significantly above the national average for underground coal mines. The NFDL injury incidence rate for the first quarter of 2006 was 0.00 for the Darby Mine and 5.62 for the nation.



Enforcement Activities

This section addresses inspections and investigations conducted under section 103(a) of the Mine Act, the use of enforcement tools provided by section 104 of the Mine Act, and the Alternative Case Resolution Program. Appendix C includes a list of all inspections and investigations conducted at the Darby Mine during the review period (April 1, 2004, through May 19, 2006). Refer to Appendix D for a list of MSHA citations and orders (enforcement actions) at the Darby Mine during the review period.

Section 103(a) Inspections

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

MSHA Policies and Procedures: The MSHA *Program Policy Manual* (PPM) is a compilation of Agency policies on the implementation and enforcement of the Mine Act and *Title 30 of the Code of Federal Regulations* (30 CFR) and supporting programs. The manual also contains procedural instructions related to conducting inspections.

The *Coal General Inspection Procedures Handbook*[1] outlines procedures for conducting inspections of coal mines. Relevant provisions of this handbook state that inspectors are to complete the following activities during each inspection of an underground coal mine:

- Inspect the mine in its entirety including air courses, escapeways, first aid equipment, ventilation facilities, communication installations, roof and rib conditions, fire protection, and availability of potable water.

- Inspect the surface areas of the mine in their entirety including hoisting equipment, first aid equipment, ventilation facilities, communication installations, ground control conditions, fire protection, availability of potable water, and availability of sanitary facilities.

- Inspect all face equipment (diesel and electric), electric installations, and all mobile equipment as encountered, and document the equipment examined by company number, serial number, or some other means.

- Examine all record books required by the Mine Act and regulations. Any record books examined should be listed in the inspection notes.

- Examine at least the preshift and on-shift record books before going underground, paying particular attention to record book entries concerning conditions in an area of the mine that may identify a serious or potentially

[1] *Coal General Inspection Procedures Handbook, (PH95-V-6), September 1995, including subsequent revisions up to the time of the accident.*

hazardous condition. The inspector should proceed to this area(s) immediately. Any record books examined should be listed in the inspection notes.

- Selectively travel (at least once each regular inspection) with the person(s) who performs the preshift, on-shift, and weekly examinations to evaluate the thoroughness and completeness of such examinations.

- Evaluate the adequacy of SCSR training by discussing donning procedures with a representative number of individual miners to determine their understanding of how to use their SCSRs.

- Observe searches for smoking materials to ensure that the searches are done as prescribed in the mine's search program, determine whether an adequate search program exists by reviewing the records, and interview a number of miners concerning the search program.

- Collect samples of the mine air for analysis to determine the quality of the air with respect to noxious or explosive gases and oxygen content, collect samples of dust for analysis to determine incombustible content, and conduct noise surveys.

- Routinely collect air samples in main return(s) at or near the point where the return is vented to the surface to measure the quantity of methane liberation.

- Make uniform rock dust surveys in each advancing section. Also, areas not sampled during prior regular inspections because of wet conditions shall be identified. Locations where two or more consecutive samples were not collected shall be inspected and samples collected when conditions permit.

- Conduct compliance inspections of explosives storage facilities on mine property to determine if the facilities meet or exceed the requirements of 27 CFR 55, Subpart K – Storage. This inspection is documented on ATF Form F5030.5.

- Include all required notes and documentation from the inspection in the final report.

District 7 had not implemented the new Inspection Tracking System. Therefore the *General Coal Mine Inspection Procedures Handbook* (PH06-V-1), February 2006, was not in effect in District 7 during the review period.

Statement of Facts: MSHA's practice is to conduct one regular inspection each quarter at every underground mine. For purposes of conducting inspections with available resources, it was the practice of District 7 to assign mines to its inspectors based on the

number of working sections. An inspector assigned to the Darby Mine which had one working section was expected to inspect other mines during the quarter.

Workgroup 1 in the Harlan, Kentucky, field office of District 7 was responsible for inspecting the Darby Mine. Regular inspection responsibilities for the Darby Mine were normally assigned to a different lead inspector every 6 months. Additional inspectors and specialists assisted the lead inspectors in completing regular inspections of the Darby Mine when assistance was needed. One inspector had the lead inspection responsibilities for the 4th quarter of calendar year 2005 and 1st quarter 2006. He also helped to complete the regular inspection for the 3rd quarter of 2005.

District 7 personnel conducted eight regular inspections of the Darby Mine from April 1, 2004, through March 30, 2006. A ninth regular inspection was started on April 17, 2006, and was ongoing when the fatal explosion occurred on May 20, 2006.

The internal review team reviewed the inspection data for the eight regular inspections as well as the ongoing inspection that preceded the explosion. The team's review included an evaluation of the inspection notes, citations and orders, subsequent actions, and associated paperwork. An interview was conducted with each inspector to assist the review team in determining adherence to MSHA polices and procedures. Using their inspection notes and tracking maps inspectors identified areas examined during their inspections on a mine map. The review team's findings regarding the eight regular inspections and the ongoing inspection follow.

Regular Inspection, April – June 2004

This inspection was conducted from April 1, 2004, through June 3, 2004, by two Harlan field office inspectors. The inspection encompassed 18 on-site inspection days[2]. During this inspection, 17 citations[3] were issued.

A review of the inspection notes for this regular inspection revealed that the inspectors checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. The inspector documented that an inspection was made of the intake seals; however, no deficiencies were noted.

There was no documentation in the inspection notes for the inspection of the rooms driven more than 20 feet deep inby the tail roller of the No. 6 belt and there was nothing

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[2] *Inspection days may reflect multiple inspectors present at the mine on the same day (for example, two inspectors present at the mine on the same day is equivalent to two inspection days).*

[3] *Unless otherwise noted, the term "citation" refers to a citation issued under section 104(a) of the Mine Act.*

noted in the company preshift examination records that this area was receiving preshift inspections. The inspectors also did not document inspection of emergency roof supplies, the welder, and tanks and torches. Additionally, there was no documentation of oxygen and methane readings on beltlines or observing the mantrip out of the mine.

Regular Inspection, July – Sept 2004
This inspection was conducted from July 1, 2004, through September 22, 2004, by a Harlan field office inspector. The inspection encompassed 21 on-site inspection days. During this inspection, the inspector issued 18 citations.

A review of the inspection notes for this regular inspection revealed that the inspector checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. The inspector documented that an inspection was made of the intake seals; however, no deficiencies were noted.

There was no documentation in the inspection notes for the inspection of the rooms driven more than 20 feet deep inby the tail roller of the No. 6 belt and there was nothing noted in the preshift examination books that this area was receiving preshift inspections. The inspector did not document inspection of emergency roof supplies. MSHA Form 2000-204 (Plan Review Form) was not in the inspection file.

Regular Inspection, October – December 2004
This inspection was conducted from October 5, 2004, through December 30, 2004, by a Harlan field office inspector. The inspection encompassed 9 on-site inspection days. During this inspection, the inspector issued 11 citations.

A review of the inspection notes for this regular inspection revealed that the inspector checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. The inspector documented that an inspection was made of the intake seals; however, no deficiencies were noted.

There was no documentation in the inspection notes for traveling with the on-shift and weekly examiner, observing the mantrip out of the mine, and inspecting emergency roof supplies and four of the six outby water pumps in the mine.

Regular Inspection, January 2005 – March 2005
This inspection was conducted from January 4, 2005, through March 28, 2005, by two Harlan field office inspectors. The inspection encompassed 11 on-site inspection days. During this inspection, the inspectors issued 13 citations.

A review of the inspection notes for this regular inspection revealed that inspectors checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. An inspector documented that an inspection was made of the intake seals; however, no deficiencies were noted.

There was no documentation in the inspection notes for traveling with the weekly examiner, observing the mantrip out of the mine, and inspecting emergency roof supplies, section power center, section battery charger, and outby battery charger.

Regular Inspection, April 2005 - June 2005
This inspection was conducted from April 6, 2005, through June 30, 2005, by a Harlan field office inspector. Six specialists from the District office also participated in the inspection. The inspection encompassed 29 on-site inspection days. During this inspection, District 7 personnel issued 31 section 104(a) citations, 1 section 104(b) order, and one section 314(b) notice to provide safeguards.

A review of the inspection notes for this regular inspection revealed that inspectors checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. The inspector documented that an inspection was made of the intake seals; however, no deficiencies were noted.

The inspector's notes did not document inspection of emergency roof supplies, the section feeder, and outby pumps.

Regular Inspection, July 2005 – September 2005
This inspection was conducted from July 6, 2005, through September 30, 2005, and encompassed 7 on-site inspection days. During this inspection, District 7 personnel issued 12 citations.

The regular inspector assigned to the Darby Mine visited the mine on July 11, 14, and 21, 2005. When he was unable to finish the inspection, three inspectors from the Harlan field office and a specialist from the District 7 office completed the inspection.

A review of the inspection notes for this regular inspection revealed that inspectors checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit.

Inspection of the following areas and items were not documented in the inspection notes:

- No. 5 and No. 6 belt conveyors

- Intake air courses from the second cut through connecting the mains to the parallel mains inby toward the active working section back to the second cut through
- Intake seals
- Travel with the weekly or the on-shift examiner
- Training records
- Emergency roof supplies
- Scoop chargers and outby pumps
- Five of the six units of outby mobile equipment
- Close out conference

A rock dust survey was not conducted, and the line diagram for tracking the inspection and the ATF form were not in the inspection report.

Regular Inspection, October 2005 – December 2005
This inspection was conducted from October 7, 2005, through December 1, 2005, by a Harlan field office inspector. The inspection encompassed 8 on-site inspection days. During this inspection, the inspector issued 10 citations.

A review of the inspector's notes for this regular inspection revealed that the inspector checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. The inspector documented that an inspection was made of the intake seals; however, no deficiencies were noted.

The following areas or items were not documented in the inspection notes during this inspection:

- Review of the mine map
- Travel with the weekly examiner
- Section battery charger
- Battery scoop, Serial No. 601-1059
- Welder, tanks, and torches
- Emergency roof support materials
- Outby mobile equipment
- Outby pumps

Regular Inspection, January 2006 – March 2006
This inspection was conducted from January 17, 2006, through March 30, 2006, by a Harlan field office inspector. The inspection encompassed 9 on-site inspection days. During this inspection, the inspector issued 7 citations.

A review of the inspection notes for this regular inspection revealed that the inspector checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. The inspector documented inspecting the intake seals on a supplementary winter alert form that was not dated; however, no deficiencies were noted. See the section of this report entitled "Inspection Activities Immediately Prior to the Explosion" for a detailed description of the inspector's activities during this inspection.

The following areas or items were not documented in the inspection notes during this inspection:

- Travel with the preshift, on-shift, and weekly examiners
- Electrical map and electrical examination records
- Emergency roof supplies
- Section power center
- Tanks, torches, and welder
- Outby mobile equipment
- Pumps and belt transformers

The inspector conducted a rock dust survey in the A Left panel but he did not include the rooms driven off the A Left panel.

Regular Inspection, April 2006 – June 2006

This inspection was started on April 17 and was ongoing at the time of the explosion on May 20, 2006. This inspection encompassed 5 on-site inspection days prior to the explosion. During this period, a Harlan field office inspector issued 21 citations. The inspector documented that an inspection was made of the intake seals; however, no deficiencies were noted. See the section of this report entitled "Inspection Activities Immediately Prior to the Explosion" for a detailed description of the inspector's activities during this inspection.

After the explosion, an inspection team was assembled to resume the inspection. The inspection required an additional 23 on site inspection days to complete. This inspection team issued an additional 47 citations. Eighteen citations were later modified; 1 section 104(a) citation was modified to a section 104(d)(1) citation and 17 section 104(a) citations were modified to section 104(d)(1) orders.

A total of 68 citations and orders were issued during the inspection. The inspection ended on July 11, 2006, and encompassed a total of 28 on site inspection days.

Inspection Documentation

Inspection documentation for the nine regular inspections was generally descriptive of violations and conditions observed. Inspectors always documented checking required

records and postings on the bulletin board, conducting imminent danger inspections, and checking preshift and on-shift records each visit.

Emergency roof support supplies were never documented as having been inspected. There was no documentation that the intake seals were inspected during the regular inspection conducted in the 3rd quarter of calendar year 2005. The inspection notes rarely documented air quality readings at the seals. The inspectors did not always document in their inspection notes or tracking maps that they had traveled into room necks driven more than 20 feet off entries without connecting crosscuts.

Inspectors did not always document inspection of mobile equipment and electrical installations as encountered. The Darby Mine had six personnel carriers, one section scoop, and one outby scoop. In the inspection notes, the inspectors described riding all or most of the carriers into the mine during their regular inspection activities and observing the operator making pre-operational checks, yet the personnel carriers were never documented as being inspected. Some water pumps and belt transformers located in areas required to be traveled during the regular inspections were not documented as having been inspected.

District 7 inspectors did not always document that they selectively traveled with the persons who performed preshift, on-shift, and weekly examinations to evaluate the thoroughness and completeness of the examinations. Inspectors stated that they traveled with preshift, on-shift, and weekly examiners during the course of their regular inspections but often did not document this activity.

Violations Not Cited

A review of the citations and orders issued during the investigation of the fatal explosion, interviews with District 7 inspectors, and a review of inspection notes indicated that the inspectors did not recognize and cite several violations that existed during one or more inspections. These violations included the following:

- The Approved Roof Control Plan was not followed on the B Left Section when mining was conducted on 50' x 50' centers and the overburden ranged from 825 feet to 840 feet, a violation of 30 CFR 75.220(a)(1).

- Doors used for equipment to travel between air courses are required to be installed in pairs to form an airlock. At the time of the explosion, there were 10 single equipment doors in the Darby Mine, a violation of 30 CFR 75.333(d)(3).

- Line brattices were not installed to provide adequate ventilation in rooms advanced more than 20 feet from the inby rib, a violation of 30 CFR 75.333(g).

- It was a common practice that only belt drives and transfer points were examined during the preshift examination of the belts even though personnel were assigned to travel and work along the conveyor belt system daily, a violation of 75.360(a)(1).

- The mine operator failed to conduct an on-shift examination for the afternoon shift on the conveyor belts for the 11-month period preceding the explosion, a violation of 30 CFR 75.362(b).

- District 7 inspectors documented inspecting six seals located approximately 1,000 feet inby the No. 5 portal (intake seals) during seven of the eight complete regular inspections prior to the explosion. The seals were not constructed in accordance with the approved ventilation plan (undersized pilasters), a violation of 30 CFR 75.370(a)(1).

- The mine maps for the Darby Mine did not show the locations of all permanent ventilation controls as required by 30 CFR 75.372 and 75.1202.

- The alternate escapeway (belt entry) was not maintained in a safe condition to insure passage of anyone, including disabled persons, and the escapeway was not adequately marked, a violation of 30 CFR 75.380(d).

- During the first inspection of the review period, an inspector found a battery charging station in the primary escapeway at crosscut 2, survey station 15. The charging station was not necessary to maintain the escapeway in a safe, travelable condition. On May 20, 2004, the inspector issued a citation under 30 CFR 75.340(a), to require the charging station to be housed in a noncombustible structure. The violation should have been cited under 30 CFR 75.380(f)(3)(iii) to require the battery charging station to be removed from the primary escapeway. Inspectors did not recognize this primary escapeway violation during the two year review period. This violation was cited on July 5, 2006.

- The escapeway maps provided on the surface and on the B Left Working section were not kept up to date as required by 30 CFR 75.383(a).

- The 90-day practice escapeway drills were not systematically rotated so that the alternate escapeway was traveled by all miners as required by 30 CFR 75.383(b)(1).

- The 6-week practice escapeway drills were not systematically rotated so that all miners participated in the drills. Escapeways were not alternated so that the alternate escapeway was traveled by miners as required by 30 CFR 75.383(b)(2).

- There were several violations involving fire protection for the belt conveyors. The heat sensors (point–type sensors) were not always located at or above the elevation of the top belt and installed at the beginning and end of each belt flight, and at the belt drive. The heat sensors exceeded the maximum 125 feet distance between sensors at different locations along each belt flight, a violation of 30 CFR 75.1103-4(a)(1). Fire hose outlets with valves were not always provided at 300-foot intervals along each belt conveyor and at tailpieces, a violation of 30 CFR 75.1100-2(b). Fire suppression systems at the belt drives did not cover the belt discharge heads as required by 30 CFR 75.1103-9(d). During the first regular inspection of calendar year 2006, an MSHA inspector documented inspecting the four belt conveyors in the Darby Mine as part of the District 7 Winter Alert initiative. The initiative required the inspector to inspect all belts (including looking at any potential ignition source(s), fire suppression and water supplies, and firefighting capability). There were no citations issued at the Darby Mine as a result of the Winter Alert initiative.

- A clear travel way at least 24 inches wide was not maintained along the No. 1 conveyor belt, a violation of 30 CFR 75.1403-5(g).[4]

Inspection Procedures

Inspectors assigned to inspect the Darby Mine checked all required records and postings on the bulletin board, conducted all imminent danger inspections, and checked preshift and on-shift records each visit. Inspectors stated that they traveled with preshift, on-shift, and weekly examiners during the course of their regular inspections but often did not document this activity. Following are some of the omissions during one or more of the eight regular inspections preceding the fatal explosion:

- Deficiencies existed in the following required record books: preshift and on-shift examination book, belt inspection report; weekly examination for methane and hazardous conditions book; weekly and monthly electrical books (both surface and underground); daily and monthly examination of ventilation equipment book; examination of emergency escapeways and facilities, smokers' articles; and fire drill record book. The belt book entries poorly documented the record of conditions. The entries were barely legible and made review difficult. This may have contributed to enforcement deficiencies.

- Inspectors did not always examine cap lamps and chargers, outby pumps, scoop chargers, potable water, and sanitary facilities during regular inspections.

[4] A Notice to Provide Safeguards had been issued under 30 CFR 75.1403-5(g) on July 7, 2003.

- Inspectors conducted rock dust surveys in the Darby Mine during seven of the eight complete regular inspections before the explosion, but did not effectively track the rock dust surveys on a mine map. Rock dust surveys were not conducted in worked out rooms, the cut through area of the parallel mains, one section of the mains, and the rooms off the A Left panel. See Appendix E for mine map that illustrates the locations of rock dust surveys conducted during the review period.

- Inspectors did not determine if the miners performing methane checks were qualified or if the methane detectors had been properly calibrated.

- Inspectors did not determine whether the operator properly conducted the required maintenance and testing of self-contained self-rescuers (SCSRs).

- Inspectors' notes listed records as being examined, yet the belt book did not contain any second shift entries for an 11-month period. Preshift and on-shift books were listed as being examined daily yet inspections after the explosion found several deficiencies for incomplete examinations, examinations not being made within the required time intervals, and deficient documentation of required air quality and quantity readings. Fan examination records, fire and escapeway drill records, and electrical records were also deficient.

- In some cases, inspection reports did not contain all required forms and documentation.

- Inspectors only traveled the outside entries of the worked out area from the No. 5 tailpiece to the deepest point of mining because they considered the center entries common with the outside entries. Ventilation controls had been removed from several locations in this area in an attempt to make the ventilating air common. However, the ventilation controls were not removed at intervals of 600 feet or less to meet the criteria for common entries. During interviews with the review team, inspectors indicated that they were not aware of the *Commission Decision*[5] defining "air course." During the fourth regular inspection for calendar year 2005 and the first regular inspection for calendar year 2006, only one of three air courses in the mains, and only two of three air courses from the No. 5 belt tail to the deepest penetration of the mine were examined by inspectors.

Accountability Program

A headquarters Program Accountability Review of District 7, conducted November 29, 2005, through December 2, 2005, identified some of the same issues as the internal

[5] *Lodestar Energy, INC., 24 FMSHRC 689,692–94 (July 2002).*

review team. The issues were identified at another field office in District 7 and included the following:

- There were no rock dust surveys taken.
- The tracking maps did not identify start and stop locations.
- There was no documentation that the surface areas of the underground mine were inspected.
- The ATF form was not maintained in the inspection file.
- There was no documentation the mine fans were examined.
- There were two areas of a mine not inspected.
- There was minimal supervisory oversight of the inspection.

Similar issues were identified in District 7 Peer Reviews conducted during 2005.

District 7 managers developed an action plan to address the findings of the 2005 headquarters Program Accountability Review. Methods were developed to measure the effectiveness of the corrective actions. A timeline was established for implementation of the corrective actions. The timeline required training to begin by February 1, 2006, and continue until July 1, 2006. More comprehensive supervisory and management level reviews would begin February 1, 2006. The internal review team found that District 7 had implemented their action plan and was progressing with their scheduled timelines at the time of the explosion.

Conclusion: During the review period, District 7 inspectors conducted the required number of regular inspections at the Darby Mine. Inspection documentation for the nine regular inspections was generally descriptive of violations and conditions observed, but less descriptive of areas traveled and equipment inspected. The notes did not always identify mobile equipment and electrical installations as encountered. Outby water pumps located in areas the inspector traveled were not documented as inspected. There was no documentation that the Intake Seals were inspected during the regular inspection conducted in the 3rd quarter of calendar year 2005. Inspection of emergency roof supplies was not documented during the eight regular inspections reviewed. The inspectors did not identify and cite several violations that were identified by the accident investigation team. The violations existed during one or more inspections prior to the accident.

Many of the deficiencies were caused by not following established inspection procedures. District 7 supervisors and managers did not provide adequate oversight and guidance and their reviews of inspection reports did not identify and correct these deficiencies.

A Headquarters Program Accountability Review of District 7, conducted November 2005 through December 2005, identified some of the same issues identified by this internal review. While the internal review team found that District 7 had implemented their action plan and was progressing with their scheduled timelines, some of the issues remained uncorrected at the time of the explosion at the Darby Mine.

Use of Sections 104(a) and 104(b)

Requirement: Section 104 of the Mine Act provides MSHA inspectors with a method of progressively stronger enforcement actions to obtain compliance with mandatory safety and health standards.

Section 104(a) provides that an inspector shall issue a citation if the inspector believes that an operator has violated the Mine Act, or any mandatory safety or health standard, rule, order, or regulation promulgated pursuant to the Mine Act. The inspector shall also specify a reasonable time for the operator to abate the violation.

Section 104(b) provides that, if upon any follow-up inspection, an inspector finds that a cited violation has not been abated within the period of time as originally fixed therein or as subsequently extended, and that the period of time for the abatement should not be further extended, the inspector shall determine the extent of the area affected and shall issue a withdrawal order.

Section 104(d) creates a chain of increasingly severe sanctions that serve as an incentive for operator compliance. Under section 104(d)(1), if an inspector finds a violation of a mandatory health and safety standard that is significant and substantial (but is not an imminent danger) and is caused by the mine operator's unwarrantable failure, the inspector shall issue a section 104(d)(1) citation. If, during the same inspection or any subsequent inspection within 90 days after issuance of the predicate section 104(d)(1) citation, the inspector finds another violation caused by unwarrantable failure to comply with such mandatory standard, the inspector shall issue a section 104(d)(1) order. If, upon any subsequent inspection pursuant to the issuance of a section 104(d)(1) order, an inspector finds a violation caused by an unwarrantable failure, the inspector shall issue a section 104(d)(2) order.

Section 104(b) and 104(d) orders require the operator to cause all persons in the area affected by the violation, except those necessary to correct the condition, to be

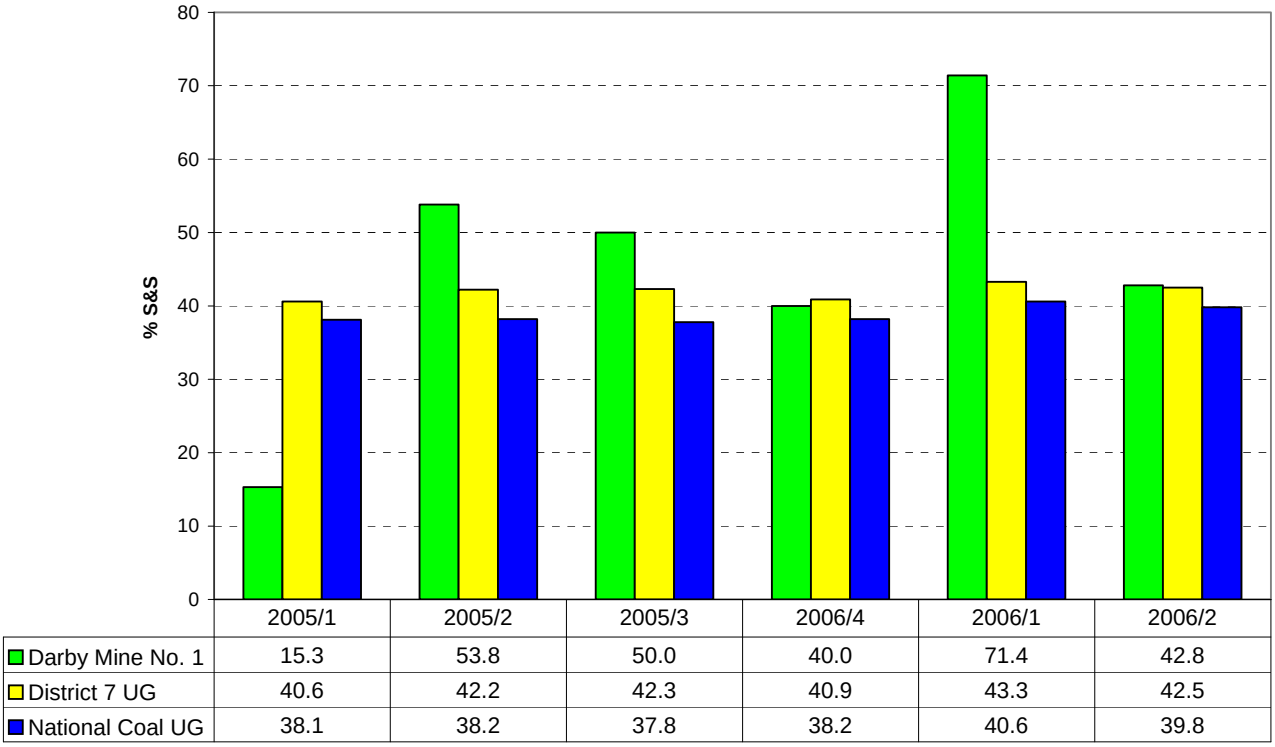
withdrawn from and prohibited from entering such area until the inspector determines that the violation has been abated.

Statement of Facts: During the review period, District 7 enforcement personnel issued 1 section 103(k) order, 146 section 104(a) citations, 1 section 104(b) order, and 1 section 314(b) safeguard. Of these 149 enforcement actions, only the 146 section 104(a) citations required that inspectors make determinations of gravity and negligence. The following sections address the manner in which District 7 enforcement personnel made gravity and negligence determinations, as well as setting the time for abatement of violations.

Gravity Determinations (S&S and Number of Persons Affected)
"Gravity" is defined in 30 CFR 100.3(e) as an evaluation of the seriousness of the violation as measured 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 occurred or were to occur, and the number of persons potentially affected.

Volume I of the MSHA *Program Policy Manual* contains guidelines for evaluating whether a violation is significant and substantial (S&S). In determining whether a violation could "significantly and substantially contribute to the cause and effect of a mine safety or health hazard," the inspector must be able to 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. Additional guidance on S&S determinations is provided in Chapter 8 of the *Coal General Inspection Procedures Handbook*.

The following chart compares the S&S rates for citations issued at the Darby Mine with the S&S rates for all underground mines in District 7 and the nation from January 1, 2005, through May 19, 2006, by inspection quarter. The last inspection quarter 2006-2 was ongoing at the time of the fatal explosion.



	2005/1	2005/2	2005/3	2006/4	2006/1	2006/2
Darby Mine No. 1	15.3	53.8	50.0	40.0	71.4	42.8
District 7 UG	40.6	42.2	42.3	40.9	43.3	42.5
National Coal UG	38.1	38.2	37.8	38.2	40.6	39.8

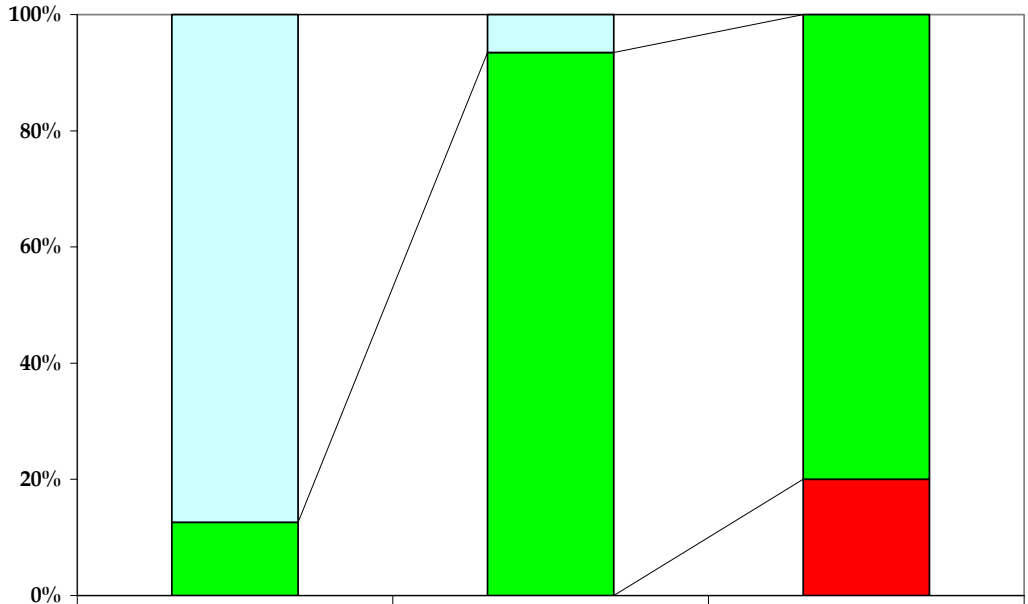
During the review period, Harlan field office inspectors issued 11 citations for violations of 30 CFR 75.503 at the Darby Mine. This mandatory safety standard requires mine operators to maintain electric face equipment in permissible condition. All 11 violations were designated non-S&S and "no lost work days." Some inspectors and the supervisor stated that exposure (persons physically present) to a hazard must currently exist in order to designate a violation as S&S, and that a permissibility violation could only be designated as S&S when methane was present at the time the violation was observed. They did not consider this hazard in the context of continued normal mining operations as decided by the Federal Mine Safety and Health Review Commission (Commission)[6].

During the review period, inspectors issued 25 section 104(a) citations for accumulations of combustible materials in the Darby Mine. Inspectors designated 24 percent of these violations as S&S. In interviews with the review team, some Harlan field office inspectors indicated that an ignition source must be observed in order to designate a violation for accumulations of float coal dust as S&S. Even when potential

[6] *U.S. Steel Mining Co., Inc., 6 FMSHRC 1573, 1574 (July 1984)*

ignition sources were present, inspectors designated several violations cited for accumulations of float coal dust in belt entries as non-S&S.

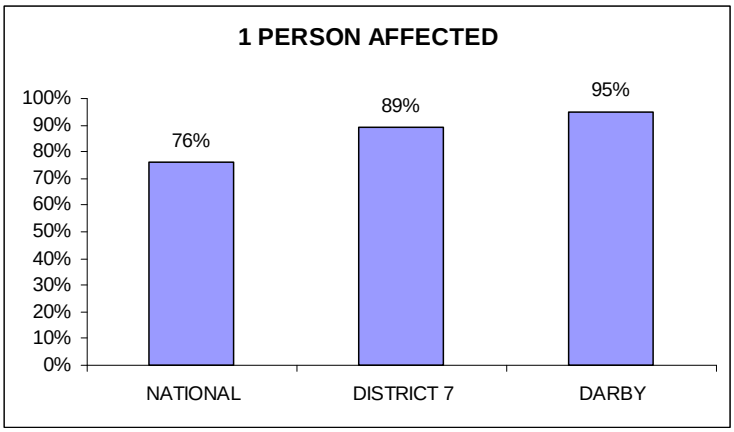
During the review period, only 5 citations out of 146 issued at the Darby Mine were designated with an anticipated injury exceeding "lost workdays or restricted duty." In their interviews with the review team, several inspectors indicated that determinations of likelihood of injury or illness and the expected injury or illness are interrelated. For example, inspectors believed that if the injury was "unlikely" to occur, the expected injury could not be "fatal." Similarly, inspectors believed that if an injury or illness would be "reasonably likely" to occur it most likely would result in "lost workdays or restricted duty." The inspectors' opinion was shared by District 7 conference and litigation representatives. The following chart illustrates the results of the perceived nexus between the likelihood of occurrence and the anticipated injury or illness. Eighty-seven percent of the citations issued at the Darby Mine during the review period followed this pattern.



	No Lost Workdays	Lost Workdays or Restricted Duty	Permanently Disabling
Unlikely	83	3	0
Reasonably Likely	12	43	4
Highly Likely	0	0	1

Interviews with instructors and a review of training materials at the National Mine Health and Safety Academy (Academy) showed a lack of specific guidance in training material for evaluating the two elements of gravity, likelihood of occurrence and anticipated injury.

Of the 146 section 104(a) citations issued at the Darby Mine during the review period, 139 (95 percent) indicated only one person affected. In District 7, 89 percent of all citations and orders issued at underground mines during the review period indicated one person affected. The following chart compares determinations of the number persons affected at the Darby Mine with all underground mines in District 7 and the nation.



A review of enforcement documents for the Darby Mine revealed several instances where enforcement personnel made questionable determinations for number of persons affected. Three examples follow.

- On April 11, 2005, a citation (7549043) was issued because the mine operator was not complying with the Approved Mine Emergency Evacuation and Firefighting Program of Instruction. The last recorded date of instruction for firefighting drills for the first shift was January 7, 2005, 4 days past due. The last date recorded for the second shift miners was December 27, 2004, 15 days past due. The last recorded date for the third shift miners was November 18, 2004, 64 days past due. The inspector indicated 1 person affected. A designation of 10 persons affected, the number of miners underground each shift, would have been more appropriate.

- On May 11, 2005, a citation (7549083) was issued because the fire suppression system provided for the Joy 14-10 CM continuous mining machine on the active 001 MMU was not being maintained in a usable and operative condition. When tested the fire suppression system would not function at all. The inspector indicated 1 person affected. A designation of 8 to 10 persons affected, the number of miners on the section, would have been more appropriate.

- On November 11, 2004, a citation (7539528) was issued for combustible materials in the form of float coal dust present on previously rock dusted surfaces along the main return beginning at crosscut No. 111 and extending inby to the 001 MMU. Wooden pallets, glue boxes, water boxes, and empty oil buckets also were present

along the same area of the return. The inspector indicated 1 person affected and did not consider other miners who were working inby.

Of the 146 citations reviewed, 63 (43 percent) involved violations of the following standards: 30 CFR 75 Subpart L and 30 CFR 75.400, 75.503, and 75.370(a)(1). Historically, the hazards addressed by these standards are most likely to affect more than one person. Nevertheless, inspectors determined that only 3 of the 63 violations would affect more than one person.

During interviews, some District 7 personnel stated that they would consider only persons who were present in or examining the immediate vicinity of the violation as potentially affected by the condition cited. Often, the only person considered affected by extensive float coal dust accumulations in a section air course would be the mine examiner. Inspectors also stated that permissibility violations were not usually evaluated as affecting other miners working on the section.

Negligence Determinations

Subsection (d) of 30 CFR 100.3 defines "negligence" as committed or omitted conduct which falls below a standard of care established under the Mine Act to protect persons against the risks of harm. The standard of care established under the Mine Act is that the operator of a mine owes a high degree of care to the miners. A mine operator is required to be on the alert for conditions and hazards in the mine which affect the safety or health of the employees and to take the steps necessary to correct or prevent such conditions or practices. Failure to do so is negligence on the part of the operator.

The negligence criterion gives appropriate consideration to the factors relating to an operator's failure to exercise a high degree of care to protect miners from safety or health hazards. When applying this criterion, MSHA considers actions taken by the operator to prevent or correct conditions or practices which caused or allowed the violation to exist. In determining the operator's diligence in protecting miners in any given hazardous situation, due recognition is given to mitigating circumstances which explain the operator's conduct in minimizing or eliminating a hazardous condition. Mitigating circumstances may include, but are not limited to, actions which an operator has taken to prevent, correct, or limit exposure to mine hazards.

Chapter 8 of the *Coal General Inspection Procedures Handbook* instructs inspectors to evaluate the negligence of the mine operator using one of the following categories:

- None – The operator exercised diligence and could not have known of the violative condition or practice.

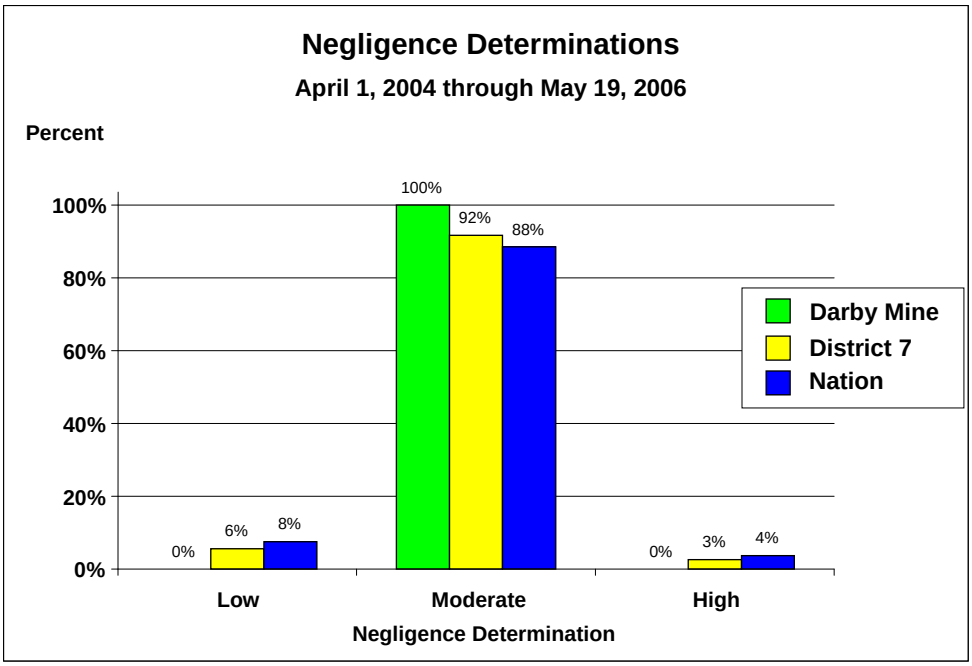
- Low – The operator knew or should have known of the violative condition or practice, but there are considerable mitigating circumstances.

- Moderate – The operator knew or should have known of the violative condition or practice, and there are mitigating circumstances.

- High – 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 that exhibits the absence of even the slightest degree of care.

The following chart shows a comparison of negligence determinations at the Darby Mine, District 7 underground mines, and underground coal mines nationwide during the review period.



Every citation issued at the Darby Mine during the review period was evaluated as "moderate" negligence. During the review period, District 7 personnel issued 25 section 104(a) citations for accumulations of combustible materials in the Darby Mine. The negligence evaluation for all 25 citations was "moderate." On several occasions, however, mine examiners had previously recorded the accumulations in record books as shown in the following examples:

- On October 31, 2005, a citation (7553141) was issued because loose coal up to 4-inches deep had been allowed to accumulate around and under the No. 2 belt

conveyor for a distance of approximately 10 crosscuts starting at the tail piece and extending toward the head drive. This area was also black in color. The inspector indicated "moderate" negligence. The area cited was recorded in the mine operator's belt examination book 16 times from September 25 through October 29 and no corrective action was noted. The operator was clearly aware of the accumulations and there were no mitigating circumstances identified. A determination of "high" negligence would have been more appropriate.

- On May 9, 2005, a citation (7549079) was issued because combustible materials in the form of loose coal and coal dust had been allowed to accumulate on previously rock dusted surfaces at intermittent locations along the entire length of the No. 3 belt conveyor entry. The accumulations ranged from 1 inch in depth up to 6 inches in depth. The inspector indicated "moderate" negligence. The area cited was recorded in the mine operator's belt examination book 10 times from April 27 through May 6 and no corrective action was noted. The operator was clearly aware of the accumulations and there were no mitigating circumstances identified. A determination of "high" negligence would have been more appropriate.

The internal review team determined that the mine operator had documented numerous hazardous conditions in the records of belt examinations. These hazards were often carried in the record book for weeks without corrective action being noted. During the review period, the maximum number of days that hazards were carried in the record book for belt examinations is reflected in the following table:

Belt	Number of Days	Beginning On
No. 1	76	06/10/2005
No. 2	45	06/10/2005
No. 3	54	09/01/2005
No. 4	70	05/17/2005
No. 5	66	06/10/2005
No. 6	21	05/27/2005
No. 7	34	05/05/2005
No. 8	57	07/26/2004

The foregoing table reflects maximum time periods. The belt book indicated numerous other instances where hazardous conditions were repeatedly carried. For instance, there were five other periods on Belt No. 1 where hazards were carried in the book for more than 28 days before being corrected. The other belts showed similar problems. It is apparent that inspectors did not use the operator's belt examination records in determining negligence.

In their interviews with the review team, inspectors stated that they considered past violation history when determining negligence. Some inspectors stated that they reviewed the violation history for the past 6 months, while others stated they went back a year. However, none of the inspectors interviewed were aware that 25 violations for accumulations of combustible materials had been cited at the Darby Mine during the 2-year review period. Some inspectors stated that they did not use the 2-year violation history feature built into the Inspectors Portable Application for Laptops (IPAL).

The Commission[7] has recognized that past discussions with MSHA about an accumulation problem serve to put an operator on heightened scrutiny that it must increase its efforts to comply with the standard. The Commission[8] has also determined that a high number of past violations of 30 CFR 75.400 serve to put an operator on notice that it has a recurring safety problem in need of correction and the violation history may be relevant in determining the operator's degree of negligence. The Commission[9] has also determined that recent citations further serve to place an operator on notice of the need to increase its efforts to come into compliance.

Timely Abatement

Section 104(a) of the Mine Act requires the inspector to specify a reasonable time for the operator to abate a violation.

The MSHA *Program Policy Manual* states that the time for abatement should be determined, whenever practical, after a discussion with the mine operator or the operator's agent. The degree of danger to the miners is the first consideration in determining a reasonable time for abatement. Upon expiration of the time fixed for abatement, the inspector should review the circumstances, and if circumstances so justify, extend the abatement period. If no extension of time is justified, and the violation is unabated, the inspector shall issue a withdrawal order under section 104(b). Upon abatement of the violation, the section 104(b) withdrawal order will be terminated.

The *Coal General Inspection Procedures Handbook* states that the inspector should make every effort to re-inspect the area as soon as the time has expired.

The internal review team examined data for citations issued during the review period and terminated before the fatal explosion occurred on May 20, 2006. District 7 inspectors at the Darby Mine set the time for abatement at 2 days or less for 56 percent of the citations. However, District 7 enforcement personnel did not follow up on a significant number of citations on the abatement due dates. Forty-four percent of the

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[7] *Enlow Fork Mining Co., 19 FMSHRC 5, 16 (Jan. 1997)*
[8] *Peabody Coal Co., 14 FMSHRC 1258, 1263 (Aug. 1992)*
[9] *Youghiogheny & Ohio Coal Co., 9 FMSHRC 2007, 2010-11 (Dec. 1987)*

citations were terminated 3 days or more after the abatement due dates. Twenty-six percent of the citations took 4 to 8 days to abate. Three examples follow:

- On May 11, 2005, an S&S, section 104(a) citation (7549086) was issued for a violation of 30 CFR 75.400 because combustible materials in the form of loose coal, oil soaked coal, coal dust, paper, and plastic bottles had been allowed to accumulate on the control valve banks, drill head masts, pump motors, tram motors, and inside motor compartments of the Fletcher Twin Head Roof Bolter S/N 91041. The termination due date was set for May 12, 2005, 26 hours later. The roof bolter was inspected again on May 16, 2005, 4 days past the due date. The operator requested an extension. The citation was extended to the next day May 17, 2005. On May 17, 2005, the inspector issued a section 104(b) order requiring the operator to remove the bolter from service.

- On July 11, 2005, a non-S&S, section 104(a) citation (7552533) was issued for a violation of 30 CFR 75.400 because accumulations of combustible materials in the form of loose coal, oil soaked coal dust, and paper had been allowed to accumulate on the same Fletcher twin head roof bolter. The termination due date was set July 12, 2005, 31 hours later. The roof bolter was inspected again and the citation terminated on July 21, 2005, 9 days later.

- On July 11, 2005, an S&S, section 104(a) citation (7555235) was issued for a violation of 30 CFR 75.1725(a) because the Joy 21 SC shuttle car S/N 14758 was not being maintained in a safe operating condition. The service braking system was inoperative and would not stop the shuttle car. The shuttle car was removed from service. The abatement time was properly set for July 11, 2005, at 11:00 a.m. The shuttle car was again inspected and the citation was terminated July 21, 2005, 10 days later.

During interviews with the internal review team, Harlan field office inspectors stated that their practice was to follow up on S&S citations on the abatement due dates. The inspectors with other regular inspections assigned to them often had several days between mine visits which resulted in citations not being terminated in a timely manner.

Section 104(b) Orders

During the review period, a District 7 inspector issued one section 104(b) order at the Darby Mine for the operator's failure to timely abate a violation 30 CFR 75.400. On May 11, 2005, a citation (7549086) was issued for accumulations of combustible materials on a Fletcher Twin Head Roof Bolter S/N 91041. The termination due date was set for May 12, 2005, 26 hours later. The roof bolter was inspected again on May 16, 2005, four days past the due date. The operator requested an extension. The citation was extended to the next day May 17, 2005. On May 17, 2005, the inspector issued a section 104(b) order

requiring the operator to remove the bolter from service. Following the issuance of the noncompliance order, the roof bolter was cleaned in 3 hours and the order was terminated.

A headquarters Program Accountability Review of District 7, conducted November 29, 2005, through December 2, 2005, identified some of the same issues as the internal review team. The accountability review identified these issues at another District 7 mine. The issues included:

- The level of enforcement was inconsistent with information documented in the body of citations and inspection notes.

- The facts and circumstances surrounding the conditions cited supported stronger actions.

- Termination dates appeared to be set for operator and inspector convenience.

- S&S violations were not always abated in a timely manner.

- Violations were not issued for inadequate examinations where the conditions appeared to support this type violation.

- Some abatement times appeared extensive and did not always appear justified.

Many of the same issues addressed in the District 7 action plan had been previously identified by the District's own Peer Reviews during 2005. Similar issues related to the level of enforcement were also identified during the *Internal Review of MSHA's Actions at the No. 5 Mine, Jim Walter Resources, Inc., Brookwood, Tuscaloosa County, Alabama, January 24, 2003*.

District 7 managers developed an action plan to address the findings of the 2005 headquarters Program Accountability Review. Methods were developed to measure the effectiveness of the corrective actions and a timeline was established to implement these corrective actions. The timeline required training to begin by February 1, 2006, and continue until July 1, 2006. More comprehensive supervisory and management level reviews would begin February 1, 2006. The internal review team found that District 7 had implemented their action plan and that District 7 was progressing with their scheduled timelines at the time of the explosion.

Conclusion [Sections 104(a) and 104(b)]: The level of enforcement was not always appropriate at the Darby Mine. Inspector evaluations of gravity, negligence, and the type of enforcement action were not always consistent with the requirements of the

Mine Act, 30 CFR, controlling Commission case law, MSHA policy, and the conditions documented in citations, orders, and inspection notes.

- Gravity evaluations were not always consistent with MSHA policy and relevant Commission decisions. In particular, permissibility violations and violations for accumulations of float coal dust were not always properly evaluated for gravity. Inspectors did not always consider exposure in the context of continued normal mining operations. Several supervisors and inspectors stated that methane must be present at the time a permissibility violation was observed to designate it as S&S. Likewise, they indicated that an ignition source must be observed to designate a float coal dust violation as S&S.

- Inspectors did not make independent determinations of likelihood of occurrence and anticipated injury or illness.

- Harlan field office inspectors did not always appropriately determine the number of persons potentially affected by the condition cited. Permissibility violations and fire and ignition hazards were rarely evaluated as affecting more than one person, disregarding all other miners working on the section or inby the cited hazard.

- District 7 enforcement personnel did not properly evaluate negligence. The violation history of the Darby Mine was not used to recognize repeat violations. As a result, higher negligence evaluations were not used to address such violations. Inspectors did not effectively use the mine examination record books to determine negligence. Violations for hazards entered in the operator's record of examinations for numerous consecutive days were not evaluated with a higher degree of negligence.

- While District 7 personnel generally set appropriate abatement times when issuing citations, they did not always return on the termination due dates to determine if the condition had been abated in a timely manner or if an extension of abatement time was justified.

- A District 7 inspector issued a section 104(b) order when the operator failed to timely abate a violation of 30 CFR 75.400 for accumulations of combustible materials on a roof bolter. However, the inspector did not issue the order until 5 days after the original termination due date. After the inspector issued the order, the mine operator abated the violation in 3 hours.

District 7 supervisors, managers, and the conference litigation representatives did not recognize that MSHA policy and procedures were not consistently followed and take appropriate corrective action.

A Headquarters Program Accountability Review of District 7, conducted November 29, 2005, through December 2, 2005, identified some of the same issues identified by this internal review. The internal review team found that District 7 had implemented their action plan and was progressing with their scheduled timelines at the time of the explosion at the Darby Mine.

Many of the same issues addressed in the District 7 action plan had been previously identified by District 7 Peer Reviews during 2005. District 7 management did not provide sufficient guidance to prevent recurrence of the issues.

Alternative Case Resolution (ACR)-*Safety and Health Conferences*

Requirement: 30 CFR 100.3(d) defines negligence as: "*committed or omitted conduct which falls below a standard of care established under the Act to protect persons against the risks of harm.*"

30 CFR 100.3(e) defines gravity as: "*an evaluation of the seriousness of the violation as measured 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 occurred or were to occur, and the number of persons potentially affected if the event occurred or were to occur.*"

30 CFR 100.6(a) provides that all parties shall be afforded an opportunity to review, with MSHA, each citation and order issued during an inspection. 30 CFR 100.6(c) states that it 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 MSHA *Program Policy Manual* provides that the mine operator and the miner's representative can request a Safety and Health Conference (conference) with MSHA district personnel to discuss facts surrounding a citation or order. The purpose of the conference is to provide an opportunity to submit additional information regarding a violation. Questions regarding the issuance of a citation or order, including the inspector's evaluation of negligence, gravity, and good faith may be discussed.

Chapter 2 of the MSHA *Alternative Case Resolution Handbook* provides that the Conference/Litigation Representative (CLR) should not announce his or her decision at the conclusion of the conference. Inspectors and their supervisors must be notified prior to issuing any subsequent actions resulting from the conference. The CLR may affirm the inspector's findings, or if facts and circumstances explained during the conference warrant, find that the citation or order should be modified or vacated. The CLR should explain to the conference participants the reason(s) for his or her decision.

Chapter 2 also instructs the CLR to document his decisions on the conference worksheet (*MSHA Form 7000-12*) or other appropriate format, to include reasons for modifying or vacating citations and orders. Copies of the subsequent actions must be transmitted to all interested parties and a copy of the conference worksheet should be forwarded to the appropriate supervisor and inspector.

CMS&H Memo No. HQ-96-134-P (SEC 104) concerning safety and health conference activities states that: "One of the more important functions of the ACRI Program is to ensure that a viable communication link is established between CLRs and field office supervisors and inspectors. The communication link will enable the CLR to provide both the supervisor and the inspector the reason(s) that citations and orders were modified during S&H conferences. The reason(s) should be fully explained by the CLR to the inspector and supervisor and the CLR should point out exactly what kind of information or documentation was lacking in the body of the citation. Merely contacting the supervisor and/or the inspector and telling them that the citation was modified because it did not meet the criteria does not provide the kind of substantive feedback an inspector can use when he or she is citing a similar violation during a subsequent inspection."

The memorandum also states that preparation for conferences is a very essential part of a CLRs responsibility within the ACRI program. There should be sufficient communication between the CLR and the issuing inspector to clear up any confusing statements or include additional information, which could strengthen determinations of gravity and negligence made in the citations or orders. The CLR should ensure that the inspector is involved, to the degree necessary, in the pre-conference preparation.

The *Alternative Case Resolution Handbook*, March 2004, states: "Final Preparation - After initially reviewing all available information, the CLR must contact the issuing inspector if any additional relevant information is required. When necessary, the CLR should review: the applicable safety and health standards; mine inspection handbooks; the MSHA *Program Policy Manual*; and prior decisions of the courts, the Commission, and Administrative Law Judges (ALJs)."

The *Citation and Order Writing Handbook*, September 2005, page 10, Section B: Inspector's Evaluation, Item D states:

> "*Enter the number of persons who were actually injured or became ill as a result of the hazard caused by the violation or the number of persons who could or would be affected <u>if the anticipated event were to occur</u>.*" (Emphasis supplied)

Page 16, Gravity Criteria:

> "*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*." (Emphasis supplied)

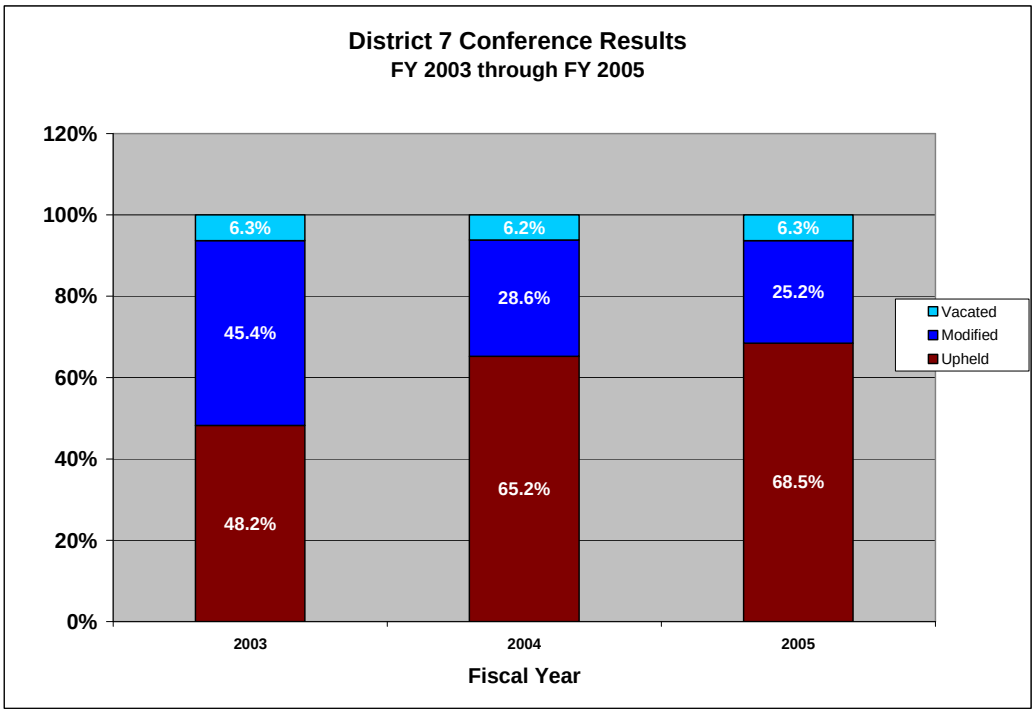
Absent some additional information provided by the operator during the conference, or a determination made by the CLR that an enforcement action taken by an inspector is not in accordance with MSHA policies and procedures, a CLR should not substitute his or her own judgment for that of the inspector.

Volume I of MSHA *Program Policy Manual* states that the third finding required by the "S&S" test, i.e., a reasonable likelihood that the hazard contributed to will result in an injury or illness, is more difficult to establish. Factors such as the fatality and injury or illness frequency associated with the violation in the general industry are relevant but must be tied to an evaluation of the particular circumstances surrounding the violation at the mine in question.

Statement of Facts: Four persons conducted CLR activity in District 7 during the period fiscal year 2003 through fiscal year 2005. During this period, the CLRs held Safety and Health Conferences on 1,661 citations and orders. This represents about 6.2% of the 26,617 citations and orders issued during the period. Only one conference was held for the Darby Mine during the review period. Therefore, the internal review team examined more than 50 percent of all CLR activity in District 7. The following table shows Safety and Health Conference activity for fiscal years[10] 2003 through 2005.

Fiscal Year	Violations Issued	Conferenced		Modified		Upheld		Vacated	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
2003	7,973	427	5.4%	194	45.4%	206	48.2%	27	6.3%
2004	8,652	552	6.4%	158	28.6%	360	65.2%	34	6.2%
2005	9,992	682	6.8%	172	25.2%	467	68.5%	43	6.3%
Total	26,617	1,661	6.2%	524	31.5%	1,033	62.2%	104	6.3%

[10] The federal fiscal year runs from October 1 of one year through September 30 of the following year.



The CLRs worked with a great deal of autonomy in handling the health and safety conferences (conferences), making all modifications with few exceptions. There were instances where citations were modified at the field office level after a conference had been scheduled. Justifications for these modifications were not included on the conference worksheet.

The review of conference activity fell into two distinct categories: evaluation of District 7 adherence to program procedures, and evaluation of the CLR's decision making relative to citations and orders conferenced. Two issues were identified under program procedures: involvement of the issuing inspector and supervisor in pre- and post-conference discussions and documentation of relevant resource material supporting decisions made by the CLR. Five items were identified as issues related to the decisions made by the CLR in conferences: determinations of gravity, S&S, number of persons affected, negligence and modifications based on abatement actions.

Program Procedures

Involvement of inspectors and supervisors in pre- and post-conference discussions

The CLRs did not always discuss their views with or request additional information from the issuing inspector. In instances where the notes indicated the inspector had been contacted, the inspectors' views or additional observations were not included. One CLR stated that the information had to be in the inspector's notes to be considered. It was evident to the internal review team that if the notes did not adequately support the citation, the CLRs did not follow up with the inspectors for additional information.

Inspectors interviewed stated they were rarely consulted on their citations prior to modifications being made.

Documentation of relevant resource material supporting decisions reached
The conference worksheets did not always include supporting statements from inspection handbooks, *Program Policy Manual*, and prior decisions of the Commission and ALJs. Justifications on the worksheets were frequently a summary of the mine operators' statements.

Justification for the modifications by CLRs were also lacking on Form 7000-3a, Mine Citation/Order Continuation form. CLRs merely stated the modifications being made without providing a detailed explanation. In accordance with the PPM, Volume I: "*When vacating a citation or order, Form 7000-3a must be completed, stating the reason for vacating the prior enforcement action*." Also the *Citation and Order Writing Handbook* (C&O Handbook), Chapter 4, Section 8, states: "*A modification from S&S to non-S&S must give the reason for modification*."

Conclusion: The CLRs did not ensure that inspectors and supervisors were involved to the degree necessary, in pre- or post-conferences as outlined in Chapter 2 of the MSHA *Alternative Case Resolution Handbook.*

It should be noted that, while the CLRs communicated their findings regarding the modifications to field enforcement personnel, they provided limited explanation or constructive references to appropriate policy and controlling case law. A lack of second level review of the conference process allowed this practice to go uncorrected.

The failure to follow the established procedures in the *Alternative Case Resolution Handbook* was also identified in the *Internal Review of MSHA's Actions at the No. 5 Mine, Jim Walter Resources, Inc., Brookwood, Tuscaloosa County, Alabama, January 24, 2003*.

CLR Decisions

Darby Mine Conference
The internal review team reviewed the only conference for the Darby Mine, dated December 2, 2003. This conference was requested by the operator during the review period, and included the following three citations.

- On October 15, 2003, two S&S, section 104(a) citations (7532978 and 7532979) were issued for violations of 30 CFR 75.370(a)(1) because the approved ventilation plan was not complied with when deflector curtains were not maintained within 40 feet of the face on the 001 MMU section. The inspector measured a distance of 55 feet from the face of the No. 1 entry and 81 feet from the face in the crosscut between Nos. 1 and 0 entries. Another S&S citation

(7532980) was issued when the inspector observed the continuous mining machine cutting in the crosscut between the No. 3 entry and the No. 2 entry and a line curtain had not been established to within 14 feet of the miner scrubber discharge. The inspector measured the distance at 119 feet from the miner to the existing curtain.

The operator contested the S&S findings of the citations stating that its block curtains were all in place, methane was not present in the face areas, and that plenty of air was on the section. The operator also stated that the curtains were present, but were rolled up while the scoop was cleaning the areas. Concerning the citation for mining without a curtain, the operator stated that a curtain was hung within 14 feet of the continuous miner scrubber discharge until the continuous miner holed through into No. 2 entry and once the cut went through, all the air and dust was pulled through the crosscut and the curtain was no longer needed. The operator contested that the curtain was taken partially down after it holed through so the miner operator could have room to maneuver.

The CLR upheld citation 7532980 stating that there was a lack of curtains in use on this section, and that all 5 dust samples taken from a recent sample were over the allowable limits.

The CLR's decision did not consider the intent of the standard when reducing these citations from S&S to non-S&S. The standard is meant to control methane as well as respirable dust. The CLR reduced citations 7532978 and 7532979 to "unlikely" and "non S&S."

The CLR also failed to consider the negligence of the mine operator. It was apparent from the inspector's notes that the continuous mining machine had mined the previous two faces without the required curtains, and the inspector observed and cited the continuous mining machine in a working face without the required curtain. The foreman was present on the section, and on encountering the inspector, began yelling out a warning to the crew. The inspector's notes mentioned citing the violations as unwarrantable failures; however, all were issued as section 104(a) citations with moderate negligence. The conference worksheet did not document an exchange of information between the CLR and inspector, and Form 7003-3a did not clearly state the justification for the modification.

Gravity Evaluations

Volume I of the MSHA *Program Policy Manual* contains guidelines for evaluating whether a violation is significant and substantial (S&S). In determining whether a violation could "significantly and substantially contribute to the cause and effect of a mine safety or health hazard," the inspector must be able to 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. Additional guidance on S&S determinations is provided in Chapter 8 of the *Coal General Inspection Procedures Handbook*.

The *Citation and Order Writing Handbook* provides that information concerning gravity and negligence must be provided so an accurate determination of the proposed civil penalty can be made.

Gravity determinations revealed modifications were made linking likelihood of occurrence to anticipated injury. Two of the four CLRs interviewed stated that violations evaluated as "unlikely to occur" could not be designated above "lost workdays." Both the CLRs and inspectors associated likelihood of occurrence to the anticipated degree of injury, regardless of the cited hazard.

All three (100%) 30 CFR 75.400 citations conferenced from April 2003 through March 2005, originally evaluated by the inspector as "fatal" were reduced to "lost work days or restricted duty."
One CLR routinely modified citations with the statement "*an injury resulting from the condition cited could result from no lost work days up to and including fatal*." His modifications routinely reflected "lost work days or restricted duty."

The majority of reviewed conferences that resulted in a reduction of gravity to "unlikely" reflected a reduction of anticipated injury to "no lost workdays" or "lost workdays or restricted duty." The injury or illness was reduced regardless of the injury anticipated by violation of the standard. Typical language used in conference worksheets in reducing the inspectors' gravity determination was:

- *"Due to the violation being unlikely at the most, it would be lost workdays or restricted duty,"*
- *"An unlikely occurrence is not reasonably expected to result in fatal injuries,"*
- *"By the inspector marking unlikely indicates that he does not believe that this condition would cause anyone to be injured."*

CLR interview statements indicated the same philosophy:

- *"If it's unlikely to occur, you can't reasonably expect it to result in a fatal injury,"*

- "*An injury resulting from an unlikely occurrence evaluation would most likely be lost workdays or restricted duty*."

Example 1: On November 30, 2003, a citation was issued for a violation of 30 CFR 75.330(b)(1): "*The ventilation devices (brattice cloth) used to provide ventilation to dilute explosive gases on the 009 MMU was not maintained. The brattice cloth being used on this section was not properly hung allowing an accumulation of 2.2% methane (CH_4) as measured with a detector to accumulate in the #2 face. There was not enough air in the face to move an anemometer. There was no energized equipment in the face at this time*."

The inspector issued the citation with an anticipated injury of "fatal." During the conference, the CLR reduced the gravity to lost workdays or restricted duty stating "*the methane was not in an explosive range and a possible ignition source was not identified. A gravity evaluation of unlikely is appropriate for this situation, but the assessment of injury or illness resulting from this condition is not. An appropriate evaluation would more likely be lost workdays or restricted duty*."

Example 2: On January 14, 2004, a citation was issued for violation of 30 CFR 75.360(a)(1): "*the mine operator is not following the approved ventilation plan. Seals have been installed off the first left entries approximately 30 crosscuts inby the first left head drive in all 5 entries and they have not been approved to be installed. The operator has conducted second mining (pillaring) in the first left entries and has no approved plan to establish and maintain a proper bleeder system or to pillar this area. The operator has mined the pillars on first left and has removed the pillars that were to be used to start and maintain a bleeder system. There is no approved ventilation system in place for any of these areas*."

The citation was issued with an anticipated injury of "permanently disabling." During the conference, the CLR reduced the citation to "lost work days or restricted duty" with the following justification on the worksheet: "*There was no methane or other conditions noted which would likely result in permanently disabling injuries*."

In both previous examples, the CLR's findings did not consider the potential hazard anticipated by the standard, namely an explosive accumulation of methane. Methane explosions have a reasonable potential to result in fatal injuries.

Example 3: On December 7, 2004, a citation was issued for violation of 30 CFR 75.1103-4(a): "*The #1 belt was not provided with an automatic fire sensor and warning device system, the system was not hooked up. It was found loose at the surface area of the mine*."

The citation was issued with an anticipated injury of "permanently disabling." During the conference, the CLR reduced the anticipated injury to "lost workdays or restricted duty" based on the following statement: "*After reviewing the citation and condition cited, the inspector and I agreed that a more appropriate evaluation of gravity would be reflected by*

marking lost workdays or restricted duty as the degree of injury." The CLR did not consider the potential effects of a fire in the belt entry. Fires in belt entries have a significant potential to result in fatal injuries.

Example 4: On December 6, 2005, a citation was issued for a violation of 30 CFR 75.206(e): "*Improperly installed conventional support (poor timbering on pillar line, setting timbers on rocks, belt, without wedges, crooked, split wedges, etc) Location: The 002 Section pillar line.*

The citation was issued with an anticipated injury of "fatal." During the conference, the CLR modified the citation to reflect "lost work days or restricted duty" based on the following statement: "*If an injury were to occur as a result of the cited condition it could range from no lost work days up to and including fatal, depending on the amount of rock and exposure at the time of the occurrence. The injury resulting from the conditions noted would reasonably be expected to result in lost workdays or restricted duty*." The CLR did not consider the size of the area left exposed. Roof failures under these conditions have the potential to result in permanently disabling or fatal injuries.

Conclusion: District 7 CLRs did not follow the guidance provided in the *Program Policy Manual*, the *Coal General Inspections Procedures Handbook*, the *Alternative Case Resolution Handbook*, and controlling case law when rendering decisions related to gravity.

An inappropriate correlation between the degree of anticipated injury and likelihood of occurrence was evident throughout the conference process. The CLRs' decisions almost always associated "unlikely to occur" with an insignificant injury. A finding of "reasonably likely to occur" was associated with the least of anticipated injuries for S&S, "lost work days or restricted duty." The CLRs did not utilize industry experience available through the Accident and Injury Database concerning injury and illness determinations. Instead, the CLRs based decisions of anticipated injury or illness on personal experience. Interviews with CLRs also revealed a belief that the determining factor for type of injury was based on likelihood of occurrence.

Out of the 146 citations issued at the Darby Mine, only 5 citations involving violations of safety standards were designated above "lost work days or restricted duty." The gravity of hazardous conditions such as entrapment, gas inundation, belt fire, methane ignition, being struck by mobile equipment, and caught in rotating machine parts, was rarely designated above "lost work days or restricted duty."

The review team found no instance where anticipated injury was elevated above what was originally identified by the inspector, regardless of the hazard cited. Conferences focused only on the issues identified by mine operators during conference. The CLRs did not take the opportunity to address instances where the inspectors' notes indicated a higher gravity than designated on the citation.

Neither the MSHA *Program Policy Manual* nor the *Citation and Order Writing Handbook* provides specific guidance to inspectors and supervisors in evaluating the degree of anticipated injury. A review of training materials from the Academy showed a lack of specific guidance on this subject as well.

Significant and Substantial (S&S)
CLRs frequently reduced S&S determinations associated with 30 CFR 75.400 violations, in direct conflict with controlling Commission case law. Twelve out of fifteen (80%) of these violations were reduced from S&S to non-S&S during conferences.

The following case law establishes the controlling factors for S&S determinations:

- A violation is properly designated S&S if "*there exists a reasonable likelihood that the hazard contributed to will result in an injury or illness of a reasonably serious nature*." Cement Division, National Gypsum Co., 3 FMSHRC 822, 825 (April 1981).

- In Mathies Coal Co., 6 FMSHRC 1, 3-4 (Jan.1984) the Commission explained that, in order for a violation to be S&S, the secretary must prove: *(1)the underlying violation of a mandatory safety standard, (2) a discreet safety hazard - that is, a measure of danger to safety - contributed to by the violation; (3) a reasonable likelihood that the hazard contributed to will result in an injury; and (4) a reasonable likelihood that the injury in question will be of a reasonably serious nature.*

- In Enlow Fork Mining Co., 19 FMSHRC 5, 9 (Jan. 1997) the Commission analyzed S&S under the "confluence of factors" standard, i.e., the particular factors surrounding the violation. Some of the factors include the extent of the accumulations, possible ignition sources, the presence of methane, and the type of equipment in the area. The Commission also held that S&S must be analyzed in the context that "*mining operations had continued without the inspector's intervention.*" 19 FMSHRC at 10. See also Buck Creek Coal Co. v. FMSHRC, 52 F.3d 133,135-36 (7th Cir.1995) (Mine fire deterrent, detection and suppression systems did not mitigate the S&S nature of coal dust accumulation violations because the event of a fire would "*pose a serious safety risk to miners*").

- The Commission has rejected the notion that redundant safeguards diminish S&S finding. See AMAX Coal Co., 19 FMSHRC 846, 849-50 (May 1997). (Miners working in the area, operational communications systems, the presence of fire detection systems, SCSRs, and fire fighting equipment in the cited area "*does not mean that fires do not pose a serious safety risk to miners.*" "*In the event of an explosion, they would make no difference*").

Volume 1 of the MSHA *Program Policy Manual* states: "*Since 1995, the Commission has …rejected an argument that an accumulations violation was not S&S because there was fire fighting equipment and fire detection equipment in the cited area.*"

Despite controlling Commission case law not to base a reduction of S&S on redundant safeguards, numerous reductions were made in conferences relative to S&S and gravity with the following statements on conference worksheets:

- "*If your fire suppression system was working, if fire sensors were working properly, more than likely people would be warned before it ever got to that point*."
- "*No ignition source present and adequate fire fighting equipment was present*."
- "*Since the area was wet, a gravity evaluation of 'unlikely' would be more appropriate for the condition observed*."

Example 1: On October 12, 2004, a citation was issued for violation of 30 CFR 75.400: "*Accumulations of combustible material in the form of loose coal and coal float dust were present on the mine floor along the #7 conveyor belt. The condition extended from the drive inby to the tail roller, a distance of approx. 3,000 feet. The accumulations were black in color and measured up to 8" deep. The belt tail roller was turning in accumulations up to 16" deep."*

The citation was issued as "reasonably likely to occur" with "lost work days or restricted duty." During the conference, the CLR reduced the citation to non-S&S based on the following statement, "*The inspector stated that the area along the number 7 conveyor was wet and that a possible ignition source was not identified*."

Example 2: On February 22, 2005, a citation was issued for violation of 30 CFR 75.400: "*Accumulations of loose coal and coal fines were allowed to accumulate in the number 2 belt mains. When checked the section had moved from this area and [was} not cleaned or rock dusted the roof, ribs or floor. Two energized pumps were observed in the area with no firefighting equipment present along with the short circuiting of the ventilation. In the event of a fire some of the smoke would travel inby onto the active working section where approximately 9 men perform duties*."

During the conference, the CLR reduced the citation to non-S&S based on the following statement, "*the surrounding area was wet; therefore a possible ignition source was not present*."

All eleven (100%) S&S citations, issued for open or damaged splices in power cables exposing the internal wiring, were reduced to non-S&S by the CLR during conferences despite controlling Commission case law that the S&S nature of damaged power cables

must be analyzed in terms of "*continued normal mining operations*" U.S. Steel Mining Co., 6 FMSHRC 1573, 1574 (July 1984).

Example 3: On September 10, 2004, a citation was issued for a violation of 30 CFR 75.604(b): "*The trailing cable to the Joy shuttle car No. ### in use on 002 MMU has one splice torn open exposing the inner energized wires.*"

During the conference, the CLR reduced the citation to non-S&S based on the following, "*the purpose of the outer jacket on a trailing cable is to protect the inner insulated conductors. Unless the insulation is damaged on inner conductors exposing bare wires it is unlikely that an injury would occur.*"

Example 4: On May 4, 2006, a citation was issued for a violation of 30 CFR 75.517: "*The energized 480 volt trailing cable supplying power to the Joy 21SC shuttle car (standard car) s/n #### on the 002 MMU is not insulated adequately and fully protected. There are three areas in the cable that have been taped and the insulation and outer jacket is broken apart exposing the energized electrical conductors. The exposed areas range in length from 1" to around the circumference of the cable. This condition creates an electrical shock to any miners that handle this cable. Two miners operate this car daily.*"

During the conference, the CLR reduced the citation to non-S&S based on the following," *it was determined that the section was dry, no bare wires were exposed, the monitoring circuit was maintained, the circuit breaker was of a proper size, proper short circuit and overload protection was provided and the trailing cable is rarely handled.*"

Conclusion: The conference litigation process was not following the appropriate Commission case law or program policy.

Examples 1 and 2 were reduced by the CLR using redundant safeguards as a basis for modifications. Commission decisions gave clear guidance not to consider redundant safeguards in determining S&S.

Examples 3 and 4 were reduced by the CLR without considering conditions in context of continued mining operations. During the review period, only one instance was noted where an S&S designation was upheld, and only when the inspector documented visible exposed copper wiring.

A second level review was not in place to provide oversight of conference activity to prevent these improper modifications. At the headquarters level, information was only gathered relative to the total number of cases, total number of citations conferenced, and total number of citations modified or vacated.

The failure to follow the established procedures in the Alternative Case Resolution Handbook was also identified as an issue in the *Internal Review of MSHA's Actions at the No. 5 Mine, Jim Walter Resources, Inc., Brookwood, Tuscaloosa County, Alabama, January 24, 2003*.

Number of Persons Affected

During the review period, 31 citations were modified in conference to reflect a lower number of persons affected than had been originally designated by the inspector.

Conference Litigation Representatives used an inappropriate method of analyzing the number of miners affected: miners "exposed" versus miners "affected." Miners working in close proximity that should have been considered "affected" were considered merely "exposed," and not accounted for in the citation. The majority of these violations involved a potential hazard affecting a greater number of miners inby the cited area.

Potential fires in belt entries and methane ignitions comprised the majority of citations where numbers of persons affected were reduced in the conference. The CLR reduced the number of persons affected based on the following factors:

- the location of the dumping point
- a regulator installed in the belt entry
- existing fire hoses and deluge systems
- available fire extinguishers or rock dust
- persons in close proximity that might alert others

Example 1: On October 16, 2003, a citation was issued for violation of 30 CFR 75.400: "*Accumulations of loose coal and float coal dust have been allowed to accumulate on the mine floor, ribs and roof on the right side of 004 MMU. The accumulations along the ribs/mine floor were up to 18" deep, dry in most places and approx. 75% not rock dusted. This covered the area of the #3 entry to #5 entry including crosscuts and extended from the face to 2.5 breaks outby the face. This mine does liberate methane*."

The citation was issued with six persons affected. During the conference, the CLR reduced the citation to reflect two persons affected. A justification was not documented for the reduction in number of persons affected.

Example 2: On February 27, 2004, a citation was issued for a violation of 30 CFR 75.325(b): "*The #1 working section required 9,000 cfm*[11] *in the last open break and was not being maintained. No reading on an approved, calibrated anemometer. No air movement*." The citation was issued as an unwarrantable failure with seven persons affected. It is important to note that two other unwarrantable failure violations were cited in conjunction with this citation. An

[11] Cubic feet per minute

unwarrantable failure was issued for a violation of 30 CFR 75.360(a)(1) for a failure to make a preshift inspection of the working place affecting seven persons, and an unwarrantable failure citation was issued for a violation of 30 CFR 75.333(b)(2) because three intake and return stoppings had not been installed to separate the belt line from the return and intake air course, affecting seven persons. During the conference, the CLR reduced all three unwarrantable failure violations to one person affected, stating "*There was no documentation of hazards observed in the area where miners were observed working which would be highly likely to result in permanently disabling injuries to seven persons.*"

Example 3: On April 5, 2006, an order was issued for a violation of 30 CFR 75.400: "*Accumulations of float coal dust and loose coal have accumulated in the numbers 1, 1-left, 1-kickback, 2 and 2-left headings and crosscuts on the 008 active section. The accumulations are very dry and black in color and measure approximately 1" to 12" in depth along coal ribs, mine floor and roof. The affected areas range in length from approximately 20 feet to 120 feet. Dates, times and initials indicate that members of management have been in these areas and these areas are required to be preshifted. The last preshift examination during which production of coal was produced was conducted by (foreman.) This mine has been issued 6 citations in the last 3 months for the same mandatory standard. Management has engaged in aggravated conduct constituting more than ordinary negligence. This violation is an unwarrantable failure to comply with a mandatory standard*."

This order was issued with 13 persons affected. During the conference, the CLR reduced the number of persons affected to two, stating, "*I discussed this citation with the issuing inspector and explained that you could have 10 persons working on the section, all of them would be exposed, but not all would be affected. A more reasonable evaluation of the number of persons affected would be reflected by marking 2 rather than 10.*"

Three more orders were issued during this inspection; two for 30 CFR 75.1725(a) and one for excessive accumulations in conveyor belt entries. In all three instances, the number of persons affected was reduced from ten to three with the same justification.

Example 4: On October 21, 2004, a citation was issued for violation of 30 CFR 75.400: "*Accumulations of combustible material (coal dust piled up along low-low). Location: Along the left rib and mine floor of no. 3 entry on 001 section, beginning at the back end of the low-low belt and extending approximately 180' inby. Details: Accumulations of mostly dry coal dust, up to approx. 20" deep, were present*."

The citation was issued with 10 persons affected. During the conference, the CLR modified the citation to reflect two persons affected. A justification was not documented for the reduction in number of persons affected.

During internal review interviews, inspectors and CLRs indicated that they had been trained to evaluate citations to reflect that not every person exposed would be affected, regardless of the anticipated hazard.

Conclusion: The CLRs tended to place an unrealistic burden on the inspector relative to supporting the number of persons affected relating to potential catastrophic events such as ignitions and explosions by requiring the inspector to show how every individual would be affected. While inspector notes documented more than one miner in the affected area, this information was not considered by the CLR.

Miners considered exposed (but not affected) by the CLRs were not accounted for in their analysis. CLRs indicated that they had been trained to evaluate citations to reflect that every person exposed would not be affected, regardless of the anticipated hazard. This misunderstanding of miners exposed vs. miners affected has conditioned inspectors to indicate only one person affected.

The number of persons was often reduced when the number of persons was not in dispute, in conflict with the ACR handbook which states "Settlements must not to be based on false reasons such as nonexistent mining circumstances, untrue facts or on manipulation of the facts relating to the violation or the civil penalty criteria i.e. the number of persons affected when that is not in dispute."

Negligence Evaluations

The internal review team identified numerous instances where the CLRs and inspectors did not properly utilize the mine's violation history when evaluating negligence. Only one CLR was aware of the 2-year violation history and how to access it. Negligence was generally not a consideration in conference unless contested by the operator. One CLR stated that if the inspector did not provide the violation history he did not consider it. That CLR did not know how to access the provided database to obtain the mine violation history. Therefore, he relied solely on previous conferences conducted with that particular mine operator for violation history.

On January 5, 2006, a section 104(d)(2) unwarrantable failure order was issued for a violation of 30 CFR 75.400: "*Combustible materials in the form of loose coal, coal dust, and float coal dust is present on the mine roof, ribs, and floor, of all entries and crosscuts on the 012 active MMU. The presence of these materials begins at the section dumping point and extends to the face areas. The loose coal ranges in depth from 2" to 18" along the coal ribs and mine floor. Little to no rock dust is present on the coal ribs, and no visible rock dust is present on the mine roof for 3 crosscuts outby the face areas. Methane ranging from .1% to .35% is present in the working face areas. Additional citations and/or orders are being issued for failure to comply with the approved ventilation plan. The operator engaged in aggravated conduct which*

constitutes more than ordinary negligence. This violation is an unwarrantable failure to comply with a mandatory standard."

During the conference, the order was modified to a section 104(a) citation with "moderate" negligence based on the operator's argument that both scoops were broken down. During the same inspection, a similar unwarrantable failure order was issued on the 011 working section. It was also modified to a section 104(a) citation with the same reasoning. During the internal review analysis of the previous 2-year violation history, the mine operator was found to have been cited 86 times for violations of 30 CFR 75.400.

Three additional unwarrantable failure orders were issued for violations of 30 CFR 75.370(a)(1), one on each working section for a failure to maintain a sufficient amount of air in the last open crosscut and failure to provide deflector curtains. Two section 104(d)(1) citations were reduced to section 104(a) citations based on the operator stating he had the correct amount of air when the preshift was performed and the deflector curtains had partially fallen down.

Proper analysis of mine violation history is critical in addressing repeat violations. Elevated monetary penalties for operators with a history of repeat violations of mandatory standards are an incentive to address the issues through preventative practices.

Conclusion: The failure to adequately consider violation history was problematic with both inspectors and CLRs. The mine violation history was not used to support higher negligence determinations. Additionally, a number of negligence determinations were reduced despite the operators' history of repeated noncompliance with the cited standard. There were no instances where negligence was elevated by a CLR.

Modifications Based On Abatement Activity

Citations were modified during conferences by reducing the seriousness of the violations based on abatement action that was taken after the citation was written. The CLRs relied on post-citation abatement activity in making the decision to reduce S&S findings.

The Commission has determined that: *"[R]eliance on post-citation events to vacate the S&S designation is incorrect as a matter of law. The question of whether a violation is S&S must be resolved on the basis of the conditions as they existed at the time of the violation and as they might have existed under continued normal mining operations."* Manalapan Mining Co.,18 FMSHRC 1375, 1382 (Aug. 1996).

Additional guidance is given in the *Citation and Order Writing Handbook* on page 19, where it states," *A violation must remain S&S if it is properly evaluated at the time it was observed. The mine operator or contractor might withdraw equipment, or personnel, or*

immediately proceed to correct the violation. However, none of these actions would alter the citation's S&S evaluation."

Example 1: On September 22, 2005, a citation was issued because a required check curtain was not provided in the 2nd crosscut outby the face of the 001 section separating the #1 return entry from the #2 belt (neutral) entry and the check curtain was torn down across the #2 entry allowing a short circuit of air.

The CLR modified the citation to non S&S with the following statement: "*The curtain was installed immediately and it would be unlikely a serious injury would occur*."

Example 2: On May 9, 2006, three citations were issued for: failure to maintain an accurate mine map showing an accurate direction of airflow; failure to submit a revised ventilation plan for cutting through the coal bed; and failure to submit a revised ventilation plan for approval by the District Manager.

The CLR modified all three citations to "unlikely," non S&S with zero persons affected with the following statements:

> "*I discussed this citation with the issuing inspector and the District 7 ventilation group and it was determined that the direction of airflow in the mine had no impact on the health and safety of the miners (no obvious hazards were created). It was also determined that it would be unlikely this condition would result in injury or illness to any miners*."
>
> "*I discussed this citation with the issuing inspector and the District ventilation group. It was determined that the operators failure to submit a revised mine ventilation map would have no adverse impact on health and safety of the miners (no obvious hazards were created). It was also determined that it would be unlikely this condition would result in injury or illness to miners*."
>
> "*After discussing this citation with the issuing inspector and the District ventilation group and reviewing information presented during the health and safety conference, it was determined that the operators completion of Phase 5B prior to having an approved revised mine map to show the ventilation changes had no adverse impact on the miners health and safety. "The ventilation changes actually improved conditions for the miners air quantity was increased."*

Example 3: On June 28, 2005, a citation was issued for a violation of 30 CFR 75.388(c): The mine operator was not performing borehole drilling when mining within 200' of old works. The 001-0 section was driven approximately 220' in depth with no alternative plan approved or drilling conducted as required by regulation.

The citation was issued "reasonably likely," "lost workdays or restricted duty," S&S.

During the conference, the operator argued that the old works were not penetrated after drilling 720 feet. The CLR reduced the citation to "unlikely," non-S&S based on the following statement, "*Since the operator proved that the boundaries of the old works (720 feet) were not going to be penetrated it would be unlikely that this condition or practice would result in an injury to any miners.*"

Conclusion: The CLR did not utilize controlling Commission case law when rendering decisions relative to post citation abatement and after the fact knowledge.

Summary Conclusion: CMS&H headquarters did not provide sufficient oversight to ensure that actions of the District 7 conference litigation officers were consistent with ACR guidelines, and Commission and Appellate Court decisions. In addition, the CLRs did not utilize Agency reference material such as the 2-year violation history, the MSHA *Program Policy Manual*, the *Citation and Order Writing Handbook*, and controlling case law.

District 7 management did not provide effective oversight of the ACR program to ensure that the CLR decisions were consistent with Agency policy, guidelines, and appropriate Commission case law. The CLR decisions were not reviewed by management and had an adverse effect on the level of enforcement in District 7.

The CLRs held 230 conferences in fiscal year 2006, involving 566 violations. Although these conferences presented an excellent opportunity to improve inspectors' evaluations of gravity, number of persons affected, and negligence, the failure of the CLRs to follow controlling case law and Agency policy resulted in the opposite. As a result, CLR decisions adversely influenced inspectors in their evaluations.

Even though the inspectors were instructed to "write them as you see them," they believed that practice was useless because their decisions would not be supported in conference. Some inspectors felt humiliated by CLR modifications, stating that operators later used such modifications to question their judgment.

ACR Program

Alternative Case Resolution

MSHA Policies and Procedures: The October 4, 1994, *Alternative Case Resolution Initiative Memorandum of Understanding (MOU)* between the Solicitor and the Assistant Secretary for MSHA states that both will provide guidance and oversight of the ACR program.

Statement of Facts: From its inception in 1994, oversight responsibility for the ACR program was coordinated by CMS&H. This responsibility was originally assigned to the Chief of the Technical Compliance and Investigation Division until 2003, when it was transferred to the National Coordinator for ACR Accountability, CMS&H. In March 2004, the Alternative Case Resolution Handbook was reissued with no substantive changes with the exception of the acronym ACRI was replaced with ACR.

At the national level, oversight for the ACR program consists of maintaining a database for all data related to CLR activities, including but not limited to: the number of safety and health conferences held by each CLR; the number of citations or orders upheld as written, modified, or vacated; and the number of cases contested or settled.

The current structure for oversight of the decisions made by the CLR in approving settlement agreements is provided by the district manager.

Training programs for both new and existing CLRs were coordinated by CMS&H headquarters and conducted in cooperation with the Office of the Solicitor. Initial training for District 7 personnel was provided in February 2003, at the Academy. MSHA personnel and representatives of the Solicitors office conducted this training as a cooperative effort. Course topics ranged from introduction to the legal system to the conduct of the hearing. The training included a discussion on S&S, negligence and prior history. As a follow up to the initial CLR training, refresher training was provided in March 2004. The refresher training included issues related to S&S, unwarrantable failure, and negligence. The refresher training that was scheduled for October 2006 was delayed due to the internal review.

There were no ACR cases generated from the Darby Mine inspections from January 2004 to May 20, 2006. Therefore, a cross section of cases within District 7 was reviewed. A total of 48 cases were reviewed from 2004, and 19 cases were reviewed from 2005.

During the review, a number of issues similar to those observed in the conference process were identified.

S&S

Example 1: ACR case Kent 2004-125. A citation was issued for a violation of 30 CFR 75.400 for accumulations of combustible materials in the form of loose coal and float dust on the mine floor along the #7 conveyor from the head drive to the tail roller, a distance of 3,000'….the tail roller was turning in accumulations up to 16" inches.

The ACR officer modified the citation to non S&S based on the statement, "*Parties agree the area was wet and muddy for 5,000 feet….*"

Example 2: ACR case Kent 2004-62. A citation was issued for a violation of 30 CFR 75.370(a)(1) when the operator failed to maintain 4,500 CFM of air behind the line curtain as required. The inspector cited the condition S&S when he found only 2,162 CFM of air behind the curtain.

The ACR officer modified the citation to non S&S based on the statement, "*Parties agree there was no visible dust or methane at the time of the violation*."

Example 3: ACR case Kent 2004-133. A citation was issued for a violation of 30 CFR 75.370(a)(1) when the operator failed to maintain the line curtain up to the scrubber discharge on the continuous mining machine according to the plan.

The ACR officer modified the citation to non-S&S based on the statement, ."*[s]ince the miner was operated by remote control no one was exposed to the hazards."*

Example 4: ACR case Kent 2004-172. A citation was issued for a violation of 30 CFR 75.604 for an opening in the outer jacket of a continuous miner cable.

The ACR officer modified the citation to non-S&S based on the statement, "*Parties agree there were no bare conductors*."

Example 5: ACR case Kent 2004-98, 99. Two separate citations were issued for violations of 30 CFR 75.1101(a) where the water was turned off to the #2 and the #4 belt drives.

The ACR officer modified both citations to non-S&S based on the statement, "*Parties agree the belt is examined each shift and personnel are frequently in the area*."

Number of persons affected
Example 6: ACR case Kent 2004-150. A citation was issued for a violation of 30 CFR 75.321(a)(1) when methane in the amount of 1.4% was found in the #5 heading of MMU 002.

The ACR officer modified the citation, reducing the number of persons affected from seven persons to one based on the statement, "*Parties agree there was no equipment in the area, and no one was aware of the methane….the company immediately corrected the condition*."

Conclusion: The internal review team found that in most cases, settlements were based primarily on the operator's statements. There was no documentation in the files where the issuing inspector had been contacted prior to a decision being finalized.

District 7 did not provide sufficient oversight of the ACR program to ensure that the actions of the CLR were consistent with ACR guidelines.

CMS&H headquarters did not provide sufficient oversight to ensure that actions of District 7 were consistent with ACR guidelines and controlling case law. This was also identified as an issue in the *Internal Review of MSHA's Actions at the No. 5 Mine, Jim Walter Resources, Inc., Brookwood, Tuscaloosa County, Alabama, January 24, 2003*.

At the headquarters level, ACR information is compiled into a national data base; however; it is not reviewed for content or adherence to policy and program procedures. The National Coordinator for ACR accountability stated that the individual district managers provided oversight of the decisions made by CLRs when handling conference litigation and approving settlement agreements under Alternate Case Resolution.

Inspection Activities Immediately Prior to the Explosion

MSHA inspectors conducted onsite inspection or investigation activities at the Darby Mine on the following 16 days: January 17, 25, 31; February 6, 13, 15; March 6, 20, 27, 28; April 10; and May 3, 9, 15, 16, and 17, 2006. A summary of these inspection activities follows.

January 17, 2006 (Day Shift) Regular Inspection
The regular health and safety inspection began and continued throughout the quarter. The inspector conducted a pre-inspection conference, reviewed the mine map with the superintendent, and reviewed the preshift and on-shift records. He held a safety meeting with 11 employees and traveled in the mantrip with the crew to A Left. The inspector conducted an imminent danger inspection of the section and observed the continuous mining machine complete a cut. He issued citations for violations of 30 CFR 75.604(b) and 30 CFR 75.1722(a) on a Joy shuttle car, 30 CFR 75.220(a)(1) for a violation of the roof control plan, and 30 CFR 75.1722(a) for a missing guard. He also issued a citation for a violation of 30 CFR 75.403 as a result of a rock dust survey conducted in November 2005. Four of the five citations issued were terminated.

January 25, 2006 (Day Shift) Regular Inspection
The inspector reviewed the preshift and on-shift, and belt examination records. He traveled to the A Left Section in the mantrip with the crew and conducted an imminent danger inspection of the section. He held a safety meeting with nine employees and discussed the fire fighting plan and escapeways. The inspector observed a smokers search conducted by the foreman, and checked the first aid supplies and escapeway map. He traveled all four conveyor belts to the surface. The inspector issued one citation for a violation of 30 CFR 75.1103-1 for the automatic fire warning system on the No. 1 conveyor. The citation was terminated the same day.

January 31, 2006 (Day Shift) Regular Inspection
The inspector examined the preshift and on-shift records and the weekly and fan examinations records. He traveled the intake entry to the A Left section with the fire boss. He conducted an imminent danger inspection of the section, and checked the continuous miner, two shuttle cars, scoop car, and feeder. The inspector took air readings and collected bottle samples at the main fan. No citations were issued.

February 6, 2006 (Day Shift) Regular Inspection
The inspector examined the preshift and on-shift records, and traveled to the A Left Section with the mine superintendent. He conducted an imminent danger inspection of the section, and terminated a citation that was issued on January 17, 2006. No citations were issued.

February 13, 2006 (Day Shift) Regular Inspection
The inspector examined the preshift, on-shift, fire drill, and fan records, and traveled to the A Left Section with the mine superintendent. He conducted an imminent danger inspection of the section, and checked the roof bolter and scoop. The inspector took air readings and collected bottle samples in the A Left Section returns. He issued a citation for a violation of 30 CFR 75.523-2(a) on the scoop.

February 15, 2006 (Day Shift) Regular Inspection
The inspector conducted a respirable dust survey on the A Left section. He examined the preshift and on-shift records, placed the pumps on the employees, and traveled to the A Left Section with the mine superintendent. He conducted an imminent danger inspection of the section, checked dust parameters, and monitored the dust pumps. He also terminated a citation he had issued on February 13, 2006.

March 3, 2006
This was the last day that coal was mined in A Left.

March 06, 2006 (Day Shift) Regular Inspection
The inspector and an inspector trainee examined the preshift and SCSR records. They traveled to B Left and conducted an imminent danger inspection of the section. B Left was not in production and the section equipment was being moved from A Left. While the inspector trainee remained on the B Left Section, the inspector traveled to A Left and conducted a rock dust survey. This was the last MSHA presence in A Left until after the explosion. The inspector returned to B Left and held a safety meeting about fire drills and escapeways with eight miners. They traveled to the surface and inspected the following: two front-end loaders; check-in and check-out system; fan housing and warning devices; haulage roads; substation; highwalls; mine office bulletin board; mine plans; communications; sanitary toilet; first aid; emergency supplies; training records; surface belt; and fuel storage. No citations were issued.

March 18, 2006 (Day Shift)
Construction of the A Left seals was started.

March 20, 2006 (Day Shift) Regular Inspection
The inspector and an inspector trainee examined the preshift, on-shift, and weekly examination books. Eleven CSE-100 SCSRs were checked in the mine office, and one was removed from service. They traveled underground to the top end of the mine to check the quality of the air and collect a bottle sample. The handheld detectors indicated 0.55 percent methane and 45 ppm carbon monoxide (CO). From there they traveled to the B Left Section and conducted an imminent danger inspection. They traveled to the surface and inspected a coal haulage truck and discussed the air quality readings found in the top end of the mine with the mine superintendent. The inspector did not travel to the area of the A Left seals. No citations were issued.

March 22, 2006 (Day Shift)
The A Left seals were completed by coating them with sealant.

March 27, 2006 (Partial Midnight Shift/Day Shift) Regular Inspection
The inspector examined the preshift and on-shift examination records. He called underground and had the midnight shift foreman come out and transport him underground. They traveled to the B Left Section and the inspector conducted an imminent danger inspection. He held a safety meeting with the midnight shift crew. The inspector discussed fire drills and observed each miner perform his duties. He observed the section foreman conduct a smokers search and conduct a preshift examination of the section. The inspector traveled from B Left to the top end of the mine with the mine examiner, to collect two bottle samples. No citations were issued.

March 28, 2006 (Afternoon Shift) Regular Inspection
The inspector checked the preshift and on-shift records. He traveled in the mantrip to B Left Section and conducted an imminent danger inspection. He held a safety meeting with seven miners, discussed fire drills and responsibilities with each miner, and observed the section foreman conduct a search for smoking articles. He observed the continuous mining machine during a complete cut. The inspector traveled to the surface and held a close out meeting with the shift foreman. No citations were issued. This concluded the regular inspection for the first quarter of 2006.

April 10, 2006 (Day Shift)
A specialist from the Harlan field office traveled to the mine to collect information for an inventory of Omega block seals. The specialist obtained information on the seals from the superintendent and the mine map in the mine office, but did not travel underground. The information collected by the specialist indicated that there were six seals off the intake air course and three seals at the mouth of the A Left Section. The specialist also measured the length of the beltlines. No citations were issued.

April 17, 2006
The 2nd quarter inspection was opened with a review of the uniform mine file in the Harlan office.

May 3, 2006 (Day Shift) Regular Inspection
The inspector conducted a pre-inspection conference with the mine operator to begin the 2nd regular inspection for 2006. The inspector checked mine maps, bulletin board postings, the check-in and check-out board, and the following record books: preshift and on-shift examination; fire drill; belt examination; weekly examination for methane and hazardous conditions; examination of emergency escapeways and facilities; daily and monthly ventilation examination; weekly electrical; B Left Section examination of electrical equipment; monthly outby electrical equipment; monthly surface high-voltage electrical; and the monthly surface electrical books. The inspector issued a citation for a violation of 30 CFR 75.1502(c)(1) because the mine operator was not maintaining an up to date record of mine emergency drills.

The inspector traveled underground with the mine superintendent and checked the six intake seals. He traveled to the B Left Section and conducted an imminent danger inspection. He issued and terminated a citation for a violation of 30 CFR 75.360(e) because dates, times, and initials from the previous shift were not present in the working faces. The inspector conducted a safety meeting with the 12 miners on the section, on various safety topics which included proper SCSR checks. He also asked the miners if they were familiar with the use of SCSRs and observed the section foreman conduct a smokers search. He then observed a bolting cycle, inspected the power center area, and checked the section escapeway map.

May 9, 2006 (Afternoon Shift) Regular Inspection
The inspector checked the preshift, fire drill, belt, and the daily and monthly ventilation examination books. The inspector traveled to the B Left Section with the outby foreman. He issued three citations along the roadway into the section for violations of 30 CFR 75.202(a), 30 CFR 75.400, and 30 CFR 75.512.

The inspector conducted an imminent danger inspection on B Left Section. He held a safety meeting with the 12 miners on the section, which included proper SCSR checks. The inspector also questioned the miners on their familiarity with the use of SCSRs. The miners stated they all felt comfortable with the units if an emergency required them to be used. He also discussed the escapeway route from the section to the surface; the approved evacuation plan and fire drills with the miners, and observed the section foreman conduct a search for smoking articles.

The inspector then checked the section roof bolting machine and issued three citations for violations of: 30 CFR 75.400; 30 CFR 75.503; and 30 CFR 75.211(d). After leaving the

section, he traveled the section belt and issued two citations for violations of 30 CFR 75.400 and 30 CFR 75.1101-10. The inspector terminated a citation issued on May 9, 2006, and terminated three of the eight citations issued on this day.

May 15, 2006 (Day Shift) Regular Inspection
The inspector checked the B Left Section preshift, outby examination, smokers' search, and ventilation record books, and the mine maps and postings on the mine bulletin board. He traveled to the B Left Section with the fire boss and terminated two citations for the roadway to the section. He conducted an imminent danger inspection of the section and terminated two citations. The inspector examined the section belt and terminated a citation. He then inspected the No. 3 belt and issued three citations for violations of 30 CFR 75.1101-10, 30 CFR 75.202(a), and 30 CFR 75.400.

May 16, 2006 (Afternoon Shift) Regular Inspection
The inspector checked the B Left Section preshift, belt examination, smokers' search, and weekly fan examination records. He traveled to the No. 3 belt drive and terminated two citations. He inspected the No. 2 belt and issued a citation for a violation of 30 CFR 75.1101-10. The inspector then inspected the No. 1 belt to the surface and examined the stacker belt.

May 17, 2006 (Afternoon Shift) Regular Inspection
The inspector checked the B Left Section preshift and belt examination records, and the mine maps, electrical map, and bulletin board postings. He traveled to B Left with the outby foreman and inspected a scoop that was on charge outby the section. The inspector issued three citations on the scoop for violations of 30 CFR 75.523-3(b)(2), 30 CFR 75.503, and 30 CFR 75.400. The inspector conducted an imminent danger inspection of the section and issued a citation for a violation of 30 CFR 75.400 for accumulations of combustible material on the roof bolting machine. He inspected a shuttle car and issued three citations for violations of 30 CFR 75.1722(a), 30 CFR 75.1725(a), and 30 CFR 75.523-3(b)(5). The inspector traveled to the No. 3 and No. 2 belt drives and terminated one citation at each drive.

This was the last MSHA presence in the Darby Mine prior to the explosion.

Inspection Activities after the Explosion

Statement of Facts: On May 3, 2006, a Harlan field office inspector began the onsite inspection at the Darby Mine. The inspection was suspended when the explosion occurred on May 20, 2006. The inspector issued 21 section 104(a) citations during this portion of the regular inspection.

The MSHA investigation of the explosion began on May 23, 2006. The accident investigation team issued 30 citations and orders for 6 contributory and 24 noncontributory violations observed during their investigation of the explosion.

On June 15, 2006, District 7 resumed the regular inspection that had been suspended when the explosion occurred. This inspection was conducted under the direction of the Assistant District Manager - Technical Division (Technical ADM). Inspection team members included a District 6 supervisor, a District 5 ventilation specialist, and four District 7 inspectors and specialists from outside the Harlan field office. An electrical engineer from District 6 also conducted an electrical spot inspection at the Darby Mine. The inspection team issued 47 additional citations during the post-explosion regular inspection and spot electrical inspection.

To get a complete understanding of the condition of the Darby Mine at the time of the explosion, the internal review team evaluated the 47 citations issued during the inspection activities conducted after the explosion. This review identified some of the same issues that the team identified in its review of the inspections conducted before the explosion occurred, particularly related to level of enforcement. See the section of this report entitled "Use of Sections 104(a) and 104(b)." Several of the 47 post-explosion citations had inappropriate gravity, number affected, and negligence determinations. The determinations of number of persons affected by violations did not account for other miners who could reasonably be expected to be affected by the hazards. Negligence determinations did not take into account repeat violations of the same standard or hazards that were identified in the mine examination record books for extended periods of time.

District 7 management reviewed the citations and identified the same issues. As a result, the District modified 21 of the citations as follows:

- The gravity evaluations for 7 non-S&S, section 104(a) citations were modified to reflect S&S determinations.

- 1 section 314(b) notice to provide safeguards was modified to a section 104(a) citation.

- 17 section 104(a) citations originally reflecting 1 person affected were modified to reflect 2 to 9 persons affected.

- 1 section 104(a) citation originally reflecting 5 persons affected was modified to reflect 2 persons affected.

- 1 section 104(a) citation originally issued reflecting 5 persons affected was modified to reflect 9 persons affected.

- 15 section 104(a) citations originally issued with a negligence determination of moderate were elevated to reflect high negligence, with a finding of unwarrantable failure on the part of the mine operator to comply.

Conclusion: The shortcomings identified in this internal review report that related to evaluations of S&S, number of persons affected, and negligence were also evident in the post-accident citations. The post accident inspection team, comprised of inspectors from other field offices in District 7, made similar errors in their evaluations as noted in numerous modifications to their citations.

In light of the notoriety of this event and appearance of conflict of interest, the use of District 7 personnel to conduct the post-explosion inspection was not deemed appropriate.

Background Information on Alternative Seals

This section of the report discusses criteria used for the approval of alternative seals, investigations of explosions involving seals, and enforcement efforts following the January 2, 2006, fatal explosion at the Sago Mine. For specific information concerning the Omega block seals in the Darby Mine, see the sections of this report entitled: "Enforcement of 30 CFR 75.370(a)(1), *Mine Ventilation Plan – Construction of Omega block alternative seals;*" and "Mine Ventilation Plan - *Approval of Omega block alternative seals.*"

Approval of Alternative Seals

Mandatory safety standard 30 CFR 75.335(a)(2) states that "Alternative methods or materials may be used to create a seal if they can withstand a static horizontal pressure of 20 pounds per square inch provided the method of installation and the material used are approved in the ventilation plan." Since November 15, 1992, MSHA's approval of alternative seals pursuant to 30 CFR 75.335(a)(2) has been based on the results of full-scale seal testing conducted at the National Institute for Occupational Safety and Health (NIOSH) Lake Lynn Experimental Mine (Lake Lynn) near Fairchance, PA. MSHA worked with NIOSH to develop the testing program.

While Lake Lynn is a limestone mine, the seal tests were conducted in mine entries configured similar in size to coal mine entries. The tests involved constructing seals and subjecting them to a pressure pulse of at least 20 pounds per square inch (psi) generated from a methane explosion. The test seals were constructed in crosscuts off of the entry in which the methane explosion was initiated. This test protocol was based on a recommendation in "Explosion Proof Bulkheads: Present Practices," RI 7581, U.S.

Bureau of Mines, 1971. RI 7581 recommended that a seal be considered explosion proof if it could withstand a "static" pressure of 20 psi. By constructing the test seal in a crosscut, instead of in the entry where the explosion was initiated, the seal was subjected to a "side on" or "static" pressure. See Appendix F for a more detailed discussion of the 20 psi test criteria for alternative seals.

The basis for MSHA's approval of alternative seals has been that once a seal passed the test criteria at the Lake Lynn (i.e., withstood at least a 20 psi explosion pressure and subsequently passed an air leakage test), then a seal that is proposed to be built in the exact same fashion as the test seal can be approved in a mine ventilation plan.

Testing of Omega Block Alternative Seals

Two types of Omega block seals were tested at Lake Lynn and passed the test criteria. One seal required hitching, that is, constructing part of the seal into a channel or recess cut into the floor and ribs to help anchor the seal to the strata. The other type of Omega seal was thicker and did not require hitching. Omega block is a lightweight fiber-reinforced cementitious block product manufactured by Burrell Mining Products, International, Inc. Individual Omega blocks measure 8 x 16 x 24 inches and weigh approximately 45 lbs.

The hitched Omega block seal was the type of alternative seal that was approved for use in the Darby Mine ventilation plan. The hitched Omega seal configurations tested at Lake Lynn were either 24 or 32 inches thick and had one or two pilasters interlocked in each seal. The test seals were hitched at the floor and ribs by using 6-inch by 6-inch by ½-inch steel angles (the angles simulated the effect of hitching the seals 6 inches into the floor and ribs). The seals were erected in cross-cuts approximately 19 feet wide by 7 feet high. Omega blocks were installed one course on top of another with the vertical joints staggered. All joints were fully wet mortared and the inby and outby faces of the seals were coated with a minimum ¼-inch thickness of surface bonding sealant. Wood planking, nominally 1-inch thick, was placed between the top of the last course of blocks and the mine roof and wedges were driven between the planking and the roof. The planking was set in a layer of mortar. The hitched Omega block seals were tested at Lake Lynn in 1990. The following seal configurations withstood explosion pressures of approximately 20 psi and passed post-explosion air leakage testing:

- Test Seal No. 1 - 32-inches thick with two 48-inch by 48-inch pilasters.
- Test Seal No. 2 - 24-inches thick with one 72-inch by 56-inch pilaster.
- Test Seal No. 3 - 24-inches thick with one 48-inch by 48-inch pilaster.

After passing the 20 psi test, the above seals were subjected to a 30 psi explosion test. During the 30 psi test, Test Seal No. 3 failed.

The results of the hitched Omega block seal testing are reported in *Omega 384 Block as a Seal Construction Material,* Stephan, C. R., MSHA Industrial Safety Division, Open File Report No. 10-318-90, November 14, 1990, and in *Strength Characteristics and Air-Leakage Determination for Alternative Mine Seal Design*, RI 9477, U.S. Bureau of Mines, 1993.

Investigations of Explosions Involving Seals

MSHA Policies and Procedures: The MSHA *Accident/Illness Investigations Procedures Handbook* (PH00-I-5), issued in November 2000, provides direction for the investigation of accidents pursuant to the Mine Act. The accident investigation procedures are intended to result in efficient and orderly collection of information relevant to a mining accident and to provide guidance for investigators in determining accident causes. Upon conclusion of the investigation and review and analysis of all relevant information, MSHA issues a report describing its findings and conclusions. The purpose of the report is to disseminate this information to the mining community and others for purpose of accident prevention.

Statement of Facts: The Darby internal review team reviewed available MSHA accident reports for explosions involving seals in underground coal mines. Explosions that occurred prior to the Darby explosion since 1986 are summarized in Appendix G. The review revealed the following:

- From 1986 until the explosion at the Darby Mine on May 20, 2006, MSHA personnel investigated 12 explosions involving seals.

- Seal failures occurred in 9 of the 12 explosions. The seals performed as designed in two of the explosions. In one other incident, the mine was sealed following the explosion and an investigation of the seals was not performed. With the exception of the Sago explosion, which resulted in the deaths of 12 miners, none of the other seal failures led to injuries to miners.

- Alternative seals were involved in seven of the nine explosions resulting in seal failures. In the other two explosions, solid concrete block seals failed.

- In five of the nine explosions involving known seal failures, the failures were attributed to deficiencies in seal construction, either quality control issues with construction materials, or the use of improper construction techniques. Seal construction deficiencies included: insufficient seal thickness for the width of the entry; seal material with compressive strength less than specified; improperly cured polyurethane seal material; extraneous material embedded within a seal; and lack of mortar on vertical joints of a block seal. In three of the other cases,

information on the quality of seal construction is not available. The ninth case of seal failure occurred at the Sago Mine where the pressure the seals were subjected to was significantly higher than 20 psi.

- In four of those five cases where failure was attributed to faulty seal construction, the MSHA accident investigation teams determined that the seals had been subjected to maximum explosion overpressures of less than 20 psi. In the other case, the accident report indicated that the pressure exceeded 20 psi. This conclusion was based solely on a limited number of samples of material from one of the failed seals having tested at the required minimum compressive strength. However, samples tested from two other failed seals were found to have low compressive strengths, and one of these seals was found to have an empty 5-gallon can embedded inside the seal. These conditions bring the adequacy of the construction practices for this set of seals into question and raise an issue about whether the seals necessarily were subjected to an overpressure of at least 20 psi. In summary, with the exception of the Sago Mine explosion, there was no conclusive evidence in the other investigated cases that the explosive pressures had exceeded 20 psi.

- Including the Sago Mine explosion, MSHA accident investigators have concluded that lightning was the most likely ignition source in six of the explosions in sealed areas. In three cases, MSHA investigators concluded that the source of ignition was either lightning or a frictional ignition from a roof fall. In another case, friction from either a roof fall or from a metal strap being torn from its anchorage was determined to be the ignition source. The ignition source could not be determined in the other two cases.

The distribution over time and the locations of the accidents listed in Appendix G are shown below. Incidents where seals failed are shaded.

Year	No. of Incidents	State	MSHA District
1986	1	KY	6
1987	0		
1988	0		
1989	0		
1990	0		
1991	0		
1992	0		
1993	1	AL	7[12]
1994	1	AL	7
1995	1	WV	4
1996	3	AL, WV	7, 4
1997	1	AL	11
1998	0		
1999	0		
2000	0		
2001	1	WV	4
2002	1	IL	8
2003	0		
2004	0		
2005	1	CO	9
2006	1	WV	3

The *Accident/Illness Investigations Procedures Handbook* does not provide specific guidance on the distribution of formal accident reports within MSHA. According to the Coal Accident Investigation Program Manager, the procedure for the distribution of formal reports is that the district sends a copy of the final report to individuals and industry and labor organizations on a distribution list which includes Accident Investigation Program Manager, each of the other district managers and the Technical Support Center Chiefs. Each manager then distributes copies of the report to the appropriate individuals within their organization. This is the procedure for both fatal and non-fatal formal accident reports. Fatal accident reports, and certain non-fatal reports (e.g. Quecreek), are also posted on MSHA's web page, at www.msha.gov, where they are available for all interested parties. Accident information collected on a database form is not distributed but is available on the accident investigation database.

The internal review team found that the distribution of non-fatal accident reports varies from district to district. Some districts send copies of the reports to the same distribution lists used for fatal accident reports, while others do not.

[12] Alabama mines were no longer under District 7 after District 11 was established on October 1, 1995.

In examining accident reports from incidents involving seals, the internal review team found that information on the seals often lacked the following details: information on seal construction, anchorage to surrounding strata, and quality control during construction.

For accidents involving methane ignitions and explosions, the Accident Investigation Handbook directs that an MSHA Form 7000-50d "Accident Investigation Data – Methane Ignition/Explosion Information" be completed. However, this form does not specifically address seals.

Following the Darby Mine explosion, 105 citations related to seals were issued at mines in District 7 and 296 citations related to seals were issued nationwide.

Conclusion: Even though accident investigations revealed that several seals had failed as a result of faulty construction, MSHA did not recognize the potential for significant problems with seal construction. MSHA should have investigated the extent of poor seal construction practices throughout the coal industry and taken corrective action.

Since 1986, the nine cases of seal failures occurred in six MSHA Districts. Prior to the Sago explosion, these failures were viewed as incidents occurring in gobs or abandoned areas as a result of isolated cases of poor seal construction. Sago was the first seal failure resulting in loss of life.

Prior to the Sago Mine explosion, no problem with the use of the 20-psi alternative seals had been identified. In the investigations of explosions involving seals, going back to 1986, there had been no conclusive evidence that the explosion pressure had exceeded 20 psi.

There was no specific protocol in MSHA for the evaluation, compilation, and distribution of information on seal failures and incidents.

MSHA Actions Regarding Seals Following the Sago Mine Explosion

Requirement: Section 103(a) of the Mine Act states that authorized representatives of the Secretary shall make inspections of each underground mine in its entirety at least four times a year (regular inspections) 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. Section 103(a) of the Mine Act also authorizes MSHA to conduct other mine inspections.

Statement of Facts: Following the Sago explosion, the Chief, Division of Safety, CMS&H, assigned a mining engineer to visit Lake Lynn and gather information about the procedure used to test alternative seals. The mining engineer visited Lake Lynn on January 19, 2006. The engineer's trip report indicates that NIOSH personnel explained the testing protocol for alternative seals, discussed the testing of the 40-inch thick, no-hitch Omega block seals (the type of seals used at Sago), indicated that explosive forces of greater than 20 psi may develop in sealed areas, and stated that the test criteria used at Lake Lynn does not adequately represent many sealed areas in coal mines.

In an interview with the internal review team, the mining engineer expressed his concerns about the 20 psi test protocol based on this trip. Concerns included the test seals being located in crosscuts instead of in direct line with the explosion, explosion forces being vented instead of being confined, and test seals being constructed under more ideal conditions than would typically exist in a coal mine. The information from the trip was discussed the week of January 23, 2006, with senior CMS&H headquarters staff. The Chief, Division of Safety, presented the information during a District Manager meeting in early February 2006 and requested that the districts begin compiling inventories of the seals in each district.

In an interview with members of the internal review team, the CMS&H Administrator indicated that initial reports to headquarters were that the seals at Sago had apparently been constructed in general accordance with the seals tested at Lake Lynn. Testing conducted later, as part of the Sago accident investigation, demonstrated that, although the Omega block seals built at Sago had construction deficiencies, similarly constructed seals withstood explosion pressures of at least 35 psi.

Following the fatal fire at the Aracoma Alma Mine #1 on January 19, 2006, the District 7 Assistant District Manager – Inspection Division implemented a Winter Alert Action Plan to address potential compliance problems similar to those that caused the fatal Aracoma fire. The initiative began on January 23, 2006, and involved sending teams of two inspectors to each underground mine in District 7. The inspectors were instructed to discuss Fire Fighting and Evacuation and Mine Evacuation Plans with miners and to make random inspections of conveyor belts. The random inspections were to include: clean-up, rock dusting, sensor systems, and fire protection. Additionally, checks of appropriate record books, such as: preshift, on-shift, and those addressing escapeways and fire drills were to be made. The inspections were to be completed within one week, unless additional time was required.

On January 30, 2006, the CMS&H Administrator held a conference call with the district managers. Notes taken by the District 7 Technical ADM indicate that the Administrator instructed the managers to send inspectors to all underground mines starting the next day. Inspectors were to conduct the following inspection activities:

- Evaluate how miners build seals, isolation of intake escapeways, and rock dust.

- Inspect all belts (including looking at any potential ignition source(s), Atmospheric Monitoring Systems, charging stations, fire suppression and water supplies, and firefighting capability).

- Evaluate the adequacy of belt clean-up and levels of enforcement (including numbers, gravity and negligence).

The Administrator indicated that there was no deadline and that he wanted "quality not quantity." The district managers were instructed to notify the Accident Investigation Program Manager in headquarters when inspections were completed. District 7 managers forwarded the instructions to field office supervisors and directed them to record the results of their inspections in a spreadsheet on a shared network folder.

The headquarters initiative overlapped the District 7 Winter Alert Initiative in several areas. Accordingly, District 7 combined the two initiatives. On January 31, 2006, one of the two supervisors in the Harlan field office created a form entitled *"Additional Information Needed for the Winter Alert Action Plan"* to compile the information requested by headquarters. The form was used by all inspectors in the Harlan field office. The inspector who conducted the regular inspection of the Darby Mine for the first quarter of 2006 completed the form during this inspection. The inspector stated that he believed the initiative required him to physically inspect six seals located off the intake air course in Darby Mine, but he could not recall when or how he inspected them. The inspector indicated on the form that Darby Mine was using Omega Block no-hitch seals; however, the approved ventilation plan for the mine required Omega Block hitched seals. A copy of the form that was completed by the inspector is in Appendix H.

Most of the Harlan field office inspectors interviewed by the internal review team did not remember if inspecting seals was part of the combined Winter Alert Action Plan / headquarters initiative. Others remembered collecting a seal inventory, rather than inspecting seals. The Assistant District Manager for Inspection Programs told the internal review team that he understood the instructions from headquarters to mean that inspectors were required to observe seals as they were being built.

The Assistant District Manager for Inspection Programs pointed out that prior to the Darby Mine explosion inspectors would only perform visual examinations of seals

because at that time it was not an Agency practice to check seal construction by removing, or having the operator remove, some of the sealant from the face of a seal. The sealant could conceal many construction defects such as missing mortar between joints.

After the Sago explosion, District 7 personnel inspected some new seal construction and some existing seals. The inspections were usually the result of miners' complaints. As a result of these inspections District 7 personnel cited 47 violations related to seals. The number of violations cited was significantly more than any other district, as shown in the following table.

Seal Violations by District			
District	Before Darby Explosion	After Darby Explosion	Total
1		1	1
2	7	16	23
3	6	21	27
4	14	66	80
5	6	14	20
6	7	33	40
7	47	105	152
8	5	13	18
9	5	14	19
10	6	9	15
11	2	4	6
Totals	**105**	**296**	**401**

During mid-January, under the direction of the District 7 Manager, the ventilation department reviewed the District's guidelines for "Omega No Hitch" seals that were part of the ventilation plans for some mines. Non-hitched Omega block seals were the type of seals that had failed in the Sago Mine explosion. The guidelines for the non-hitched Omega seals were sent to the Ventilation Division at the Pittsburgh Technical Support Center for review. Technical Support recommended revisions to the guidelines to clarify certain portions.

Data collected during the combined District 7 Winter Alert Action Plan and headquarters initiative included the number of belt flights, number of miles of belt inspected, and citations issued, but did not include information on seals.

On March 16, 2006, CMS&H headquarters held a conference call with district managers and assistant district managers and instructed them to develop a count of mines with Omega block seals by June 30, 2006. The survey also was to include the approximate number of seals at each mine. A specialist from the Harlan field office was assigned to collect information for the inventory of Omega block seals. The specialist visited the Darby Mine on April 10. In his interview with the internal review team, the specialist

stated that he obtained information on the seals from the superintendent and the mine map in the mine office, but did not travel underground. The information collected by the specialist indicated that there were six seals off the intake air course and three seals at the mouth of the A Left Section. The inspector and workgroup supervisor told the review team that they did not place any special significance on the three new A Left seals because the purpose of the visit was solely to compile a seal inventory.

Following the fatal explosion at Darby Mine, a Program Information Bulletin (PIB) was developed announcing a moratorium on the future construction of alternative seals. The PIB was issued on June 1, 2006. On June 2, 2006, the CMS&H Chief of Safety directed the districts to conduct an inventory of all seals at every underground mine where miners are working or present. The inventory was to include standard concrete block seals as well as alternative seals. The inventory could be conducted during the course of regular inspection activities. The instructions directed districts to place a high priority on checking and inventorying Omega Block seals so that the location, number, and integrity of these seals would be obtained quickly. Other types of alternative seals also were to be visited and inspected prior to inventorying the concrete block seals. Inspectors were directed to review seal requirements in approved ventilation plans for possible discrepancies during the inventory process.

The seal inventory identified nearly 14,000 seals in underground coal mines, 1,642 of which were in District 7. The results of the seal inventory are in Appendix I.

Following the fatal explosion at Darby Mine, District 7 enforcement personnel inspected seals within the District. Unlike prior to the explosion, inspectors had operators remove portions of the sealant to help determine whether the seals were properly constructed. As a result of this inspection activity, District 7 personnel cited 105 violations for defects in 492 seals. Nationwide, 296 seal-related citations were issued after the Darby explosion.

Conclusion: CMS&H did not place a high priority on the inspection of existing seals until after the Darby explosion. In the weeks following the Sago explosion, the focus of CMS&H was more on the adequacy of the 20-psi strength criteria than the adequacy of seal construction practices. The information from the Lake Lynn visit by the Safety Division's mining engineer had raised concerns about the 20 psi test protocol.

Instructions from CMS&H headquarters were not effectively conveyed concerning the actions to be taken following the Sago explosion. As a result, the focus was directed on establishing an inventory of seals rather than visual inspections. This was the situation until the Darby Mine explosion occurred on May 20, 2006.

CMS&H did not follow-up to determine how the requested information on seals was being compiled. The instructions to the districts should have been formally

communicated with a written follow-up to the conference call clearly conveying what was expected.

Enforcement of Specific Safety Standards - Contributory Violations

This section addresses the enforcement of mandatory safety standards associated with training and retraining of miners, the construction of ventilation controls, construction of Omega block alternative seals, escapeway map, 90-day escapeway drills, and welding or cutting underground. MSHA's accident investigation team determined that the mine operator's failure to comply with these mandatory safety standards caused or contributed to the May 20, 2006, explosion at the Darby Mine.

Enforcement of 30 CFR 48.8

Annual refresher training of miners

Requirement: Mandatory safety standard 30 CFR 48.8(a) requires that each miner receive a minimum of 8 hours of annual refresher training. Mandatory safety standard 30 CFR 48.8(b) requires in relevant part that the annual refresher training program include the following courses of instruction:

(4) *Roof or ground control, ventilation, emergency evacuation and firefighting plans.* The course shall include a review of roof or ground control plans in effect at the mine and the procedures for maintaining and controlling ventilation. In addition, for underground coal mines the course shall include a review of the emergency evacuation and firefighting plans in effect at the mine.

(8) *Self-rescue and respiratory devices.* The course shall include instruction and demonstration in the use, care, and maintenance of self-rescue and respiratory devices used at the mine. Training in the use of self-contained self-rescue devices shall include complete donning procedures in which each person assumes a donning position, opens the device, activates the device, inserts the mouthpiece or simulates this task while explaining proper insertion of the mouthpiece, and puts on the nose clip.

MSHA Policies and Procedures: Chapter 3 of the *Coal General Inspection Procedures Handbook* instructs inspectors to evaluate the operator's compliance with approved self-rescuer condition and use requirements by evaluating the adequacy of SCSR training by discussing donning procedures with a representative number of individual miners to ascertain their understanding of how to use their SCSRs. If inspectors are made aware of any self-rescuer training deficiencies, they should report them to the District training liaison or specialist.

Statement of Facts: MSHA accident investigators determined that the annual refresher training the miners received on December 10, 2005, was significantly deficient. Training in the Mine Emergency Evacuation and Firefighting Plan did not include the use of non-verbal communication techniques when using a SCSR device. During evacuation following the explosion, at least two miners removed the mouthpieces from their SCSRs to verbally communicate. Three miners died while attempting to escape from the mine. In addition, the SCSR 3+3 donning procedures training did not include complete donning procedures where the miners assumed a donning position and opened the device.

The accident investigation team determined that this violation contributed to the fatal accident and issued an S&S, section 104(d)(1) order (7168187) for this violation of 30 CFR 48.8.

Item 5 of the Mine Emergency Evacuation and Firefighting Plan for the Darby Mine approved February 6, 2003, states: "All employees will be trained in the use of self-rescue devices annually. This training shall include communication techniques, other than verbal, to be used in contaminated atmosphere where the removal of the SCSR mouthpiece would be hazardous to the wearer." However, the accident investigation team determined that training on non-verbal communication techniques was not given to the miners on December 10, 2005.

A review of inspection documentation revealed that an MSHA inspector was not present at the Darby Mine on December 10, 2005, and therefore did not observe the deficient training. Inspection notes for the second regular inspection of calendar year 2006 indicated that a District 7 inspector discussed SCSRs with the miners on two occasions. On March 20, 2006, the inspector's notes documented that he and an inspector trainee examined eleven CSE-100 SCSRs in the mine office, and one was removed from service. On the day shift on May 3, 2006, the inspector discussed proper SCSR checks with the 12 miners on B Left and asked the miners if they were familiar with the use of their SCSRs. On the evening shift on May 9, 2006, the inspector questioned the 12 miners on B Left on their familiarity with the use of their SCSRs. The miners stated they all felt comfortable with the units if an emergency required them to be used. The inspector also discussed the escapeway route from the section to the surface, the approved evacuation plan, and fire drills with the miners.

Another inspector documented that he discussed and explained how to use the SCSR with miners on the 001 MMU on April 28, 2004, and August 2, 2004. All miners said they were trained in the use of their SCSRs. The notes for the other regular inspections conducted during the review period did not indicate that inspectors evaluated the adequacy of SCSR training by discussing donning procedures with a representative

number of individual miners to ascertain their understanding of how to use their SCSRs.

District 7 inspectors did not cite a violation of 30 CFR 48.8 at the Darby Mine during the review period.

Conclusion: The District 7 inspectors who conducted the first and second quarter inspections in calendar year 2006 interviewed miners concerning their familiarity with the use of their SCSRs. Their interviews did not identify that training on non-verbal communication techniques had been given to the miners on December 10, 2005. Only one other District 7 inspector documented interviewing miners concerning their familiarity with the use of their SCSRs.

Enforcement of 30 CFR 75.333(h)

Construction of permanent ventilation controls

Requirement: Mandatory safety standard 30 CFR 75.333(h) requires in pertinent part that all ventilation controls, including seals, shall be maintained to serve the purpose for which they were built.

Statement of Facts: The MSHA accident investigation team concluded that, on May 20, 2006, the integrity of the No. 3 Seal in A Left was compromised when a metal roof strap intersecting the seal was cut with a torch. As a result of the cutting of the metal strap, this seal was not being maintained for its intended purpose of separating the sealed area in A Left from the active portion of the mine. This resulted in methane from behind the seal coming into contact with the ignition sources that resulted from the cutting of the metal strap. The resulting methane explosion contributed to the death of five miners.

The accident investigation team determined that this violation of 30 CFR 75.333(h) contributed to the fatal explosion and issued an S&S, section 104(d)(1) citation (7061230).

The accident investigation team determined that the metal roof strap was cut on May 20, 2006. The last MSHA presence at the Darby Mine prior to the explosion was May 17, 2006. See the section of this report entitled "Inspection Activities Immediately Prior to the Explosion" for a detailed description of inspection activities during this period of time.

A review of enforcement data revealed that District 7 inspectors did not cite a violation of 30 CFR 75.333(h) at the Darby Mine during the review period. Two violations of this standard were cited after the explosion.

Conclusion: An MSHA inspector was not present at the Darby Mine when this violation of 30 CFR 75.333(h) occurred and could not have prevented mine management from compromising the integrity of the No. 3 Seal in A Left by cutting a metal roof strap intersecting the seal with a torch.

Enforcement of 30 CFR 75.370(a)(1)

Mine Ventilation Plan – Construction of Omega Block Alternative Seals

Requirement: Mandatory safety standard 30 CFR 75.334 requires that worked-out areas of coal mines be ventilated or sealed.

Seal construction requirements are contained in 30 CFR 75.335 which provides for two options:

- Subsection (a)(1) specifies requirements for constructing seals using solid concrete blocks; and

- Subsection (a)(2) states that "Alternative methods or materials may be used to create a seal if they can withstand a static horizontal pressure of 20 pounds per square inch provided the method of installation and the material used are approved in the ventilation plan."

Mandatory safety standard 30 CFR 75.370(a)(1) requires in pertinent part 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. The plan is required to be approved by the district manager.

Mandatory safety standard 30 CFR 75.371 lists the information that must be contained in the ventilation plan. Subsection (ff) requires a description of the methods and materials to be used to seal worked-out areas if those methods or materials will be different from those specified by 30 CFR 75.335(a)(1).

MSHA Policies and Procedures: The *Coal General Inspection Procedures Handbook* instructs inspectors to determine whether all approved plans are being followed, are up-to-date, and are appropriate during every regular inspection at an underground coal mine.

The *Coal General Inspection Procedures Handbook* instructs inspectors and specialists to review the Uniform Mine File (UMF) and sign the inspector's certification sheet prior to an inspection or investigation of a coal mine.

Statement of Facts: MSHA accident investigators determined that "…the three Omega block seals installed to seal the A Left Section from the active workings were not constructed to meet the requirements of 30 CFR 75.335 'Construction of Seals.' The alternative method for seal construction approved in the ventilation plan on September 1, 2005, was not complied with as follows:

a. The Omega blocks were dry stacked with no mortar between the joints.
b. The seals were not hitched into the solid rib and floor for the entire perimeter.
c. The seals had been spray coated with a bonding and sealing agent not approved for this purpose.
d. The pilaster was not properly constructed as it did not extend inby the seal as depicted in the plan and was only one 16-inch block wide.
e. A single layer of 1 inch wood planking was not provided between the Omega block and the mine roof.
f. The No. 3 seal was located 6.2 and 7.2 feet from the outby rib corner whereas the plan requires a minimum distance of 10 feet.
g. The Omega 384 lightweight block were approved to be used for underground mine ventilation seals without any metal roof straps or other extraneous metal passing through the seal. The metal straps interfered with the wood planking on the top of the seal in that the wood planking could not be flush with the mine roof. The presence of metal straps was not addressed in the approved plan."

MSHA's accident investigators determined that this violation of 30 CFR 75.370(a)(1) contributed to the fatal explosion and issued an S&S, section 104(d)(1) order (7061232).

MSHA's accident investigation team also determined that the A Left seals were not built according to the approved construction sequence. The No. 1 and No. 2 seals were constructed on or about Saturday, March 18, 2006. The No. 3 seal was not completed until the day shift the following March 22, 2006. The A Left Section was left unventilated during this period. The mine ventilation plan approved on September 1, 2005, requires that when entrances to worked out areas are sealed, the seals shall be erected in a sequence such that positive ventilation is furnished to the affected area until the erection of the two (2) final seals, with the last seal to be erected being the furthest upwind.

Interviews conducted with the miners by the accident investigation team confirmed the construction sequence, and that No. 1 and No. 2 seals were completed by the end of Saturday afternoon shift. They also testified they were under constant supervision of management.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued an S&S, section 104(d)(1) order (7061234) for this violation of 30 CFR 75.370(a)(1).

MSHA's accident investigation team determined that construction of the A Left seals was started on or about March 18, 2006, and was completed on March 22, 2006. A District 7 inspector began a regular inspection of Darby Mine on January 17, 2006, and completed the inspection on March 30, 2006. A review of the inspection report and interviews with the inspector revealed that the inspector traveled to the A Left Section on January 17, 25, and 31, and February 6 and 16, 2006, while the section was still in production. The inspector also conducted a rock-dust survey in A Left on March 6, 2006, while the section equipment was being moved to B Left. This was the last MSHA presence in A Left before the explosion.

The inspector was at the Darby Mine on March 20, 2006, during the construction of the A Left seals. The inspector traveled past the intake seals through the parallel mains to the worked out areas to the deepest point of the mine. From there, he traveled to the B Left Section, conducted an imminent danger run, and traveled to the surface. During his interviews with the accident investigation team and the internal review team, the inspector stated that he was not informed by mine personnel or otherwise aware that the A Left seals were being built. Therefore, he did not inspect the seals during their construction. Furthermore, he did not see the A Left seals because he had completed his inspection activities in A Left prior to their construction.

On April 10, 2006, a specialist from the Harlan field office visited the Darby Mine to collect information for an inventory of Omega block seals. In his interview with the internal review team, the specialist stated that he obtained information on the seals from the superintendent and the mine map in the mine office, but did not travel underground. The information collected by the specialist indicated that there were six intake seals and three seals in the return at the mouth of the A Left Section. The inspector and workgroup supervisor told the review team that they did not place any special significance on the three new A Left seals because the purpose of the visit was solely to compile a seal inventory.

The second regular inspection of the Darby Mine for calendar year 2006 began on April 17, 2006, with a review of the uniform mine file. The inspection was suspended when the explosion occurred on May 20, 2006. The internal review team's interviews with the inspector and review of his inspection report indicated that the inspector did not inspect the A Left seals. During his interview with the internal review team, the inspector stated that he was aware that the A Left seals and that he planned to inspect the seals when he traveled the return air course as part of his regular inspection. At the time of the explosion, the inspector had not yet inspected the return air course.

See the section of this report entitled "Inspection Activities Immediately Prior to the Explosion" for a more detailed description of MSHA's activities at the Darby Mine from January 1, 2006, up to the date of the explosion.

According to the MSHA accident investigation report, a set of Omega block intake seals had been constructed in the Darby Mine in 2003. This set of six seals was constructed across the mains approximately 1,000 feet inby the No. 5 Portal. A new set of mains was turned off to the left inby this location. A miner stated that he helped build these seals and that the seals were constructed using Omega blocks in the same manner as the A Left seals.

The explosion at Darby Mine occurred during the on-going regular inspection which had started on April 17, 2006. The inspection was resumed following the explosion. During this inspection on May 26, 2006, a District 7 inspector determined that the set of intake seals did not comply with the approved seal plan dated December 10, 2003. The inspector found that "Six seals located approximately 1,000 feet inby the #5 portal…contained the following defects:

- Pilaster dimensions ranged from 16" X 11" to 17" X 16."
- The two (2) inch "U" tube (water trap) located in the No. 2 seal was dry and contained a cut-off valve.
- The 2-inch air quality exam tube located in the No. 6 seal could not be used due to mine sealant spray rendering the cut-off valve inoperative.
- All six (6) seals were coated with "Pyro Chem," a mine sealant that is not approved for mine seals."

The inspector issued an S&S, section 104(d)(1) citation (7552659) for this noncontributory violation of 30 CFR 75.370(a).

After the explosion, the Omega block intake seals were replaced with seven solid concrete block seals. The plan approved by the District 7 Manager for the construction of the replacement seals required that the existing No. 4 Omega block seal be breached prior to completing the solid concrete block seal that would replace it.

On June 7, 2006, team members of MSHA's Mine Emergency Unit breached the No. 4 seal. The team found the following seal deficiencies:

- The thickness of the seal was 16 inches and not 24 inches as approved.
- The blocks were dry stacked with no mortar between the joints.
- The seal was not hitched into the mine floor and ribs.
- The pilaster was undersized and did not extend to the inby side of the seal.
- The outer wall was coated with Pyro Chem TC spray. This product is not approved for use on Omega block seals.
- The inner wall was not coated with any sealant.
- Wedges installed at the top of the seal were in direct contact with the Omega blocks.

On July 10, 2006, another inspector modified the original citation on the intake seals to include the following language: "The condition of the No. 4 intake Omega seal was as follows:

1.) The outer wall of the seal was coated with sealant.
2.) The inner wall of the seal was not coated with any sealant.
3.) The inner wall did not contain any pilaster.
4.) The mine floor and ribs were not hitched as required.
5.) The seal was constructed by laying the Omega blocks end to end with staggered joints creating a 16-inch wide seal and was dry stacked.
6.) The total amount of Omega blocks for this construction was 77 blocks.
7.) Some cap blocks were installed on top of the seal and wedges were in direct contact with blocks along top and sides of seal."

The internal review team determined that the Uniform Mine File contained a copy of the approved ventilation plan for the Darby Mine.[13] In interviews with the internal review team, inspectors stated that they reviewed the mine file at the beginning of each regular inspection and that they understood the provisions of the approved ventilation plan related to the construction of Omega block seals. However, three of the inspectors could not recall whether the approved ventilation plan specified hitched or no-hitch Omega block seals. Another inspector stated that the plan required hitched Omega block seals. That inspector, however, documented on the Winter Alert form that the Darby Mine used no-hitch Omega block seals. See Appendix H for a copy of the Winter Alert form for the Darby Mine.

A review of MSHA inspection reports revealed that District 7 inspectors documented inspecting the intake seals during seven of the eight regular inspections during the review period. There was no documentation that the intake seals were inspected during the regular inspection conducted in the third quarter of calendar year 2005.

Once the intake seals were constructed, the only obvious deficiency would have been the size of the pilaster, as the seal construction deficiencies would not have been apparent due to the sealant applied to the surface. During interviews with the internal review team, the Inspection ADM and inspectors in the Harlan field office stated that inspectors would only perform visual examinations of seals because it was not Agency practice at that time to remove, or have the operator remove, some of the sealant covering the faces of seals. The sealant would conceal construction defects such as missing mortar between joints. However, the width of the pilasters was significantly

[13] *The mine ventilation plan in the Uniform Mine File was not the same ventilation plan that was in effect at the time the intake seals were built. However, the seal construction provisions of both plans were identical.*

less (16 inches) than the width required for a single pilaster (48 inches) in the approved ventilation plan for the alternative Omega block seals.

The acting ventilation supervisor in District 7 indicated that, at the time of the Darby Mine explosion, there was no specific policy or instructions for inspectors to observe seal construction. If, during the course of an inspection, an inspector came across a seal being constructed, the expectation was that the inspector would observe the practices and discuss the construction with the miners, just as would be done for any construction activity at a mine site. There were no specific instructions, other than to conduct visual examinations during regular inspections, to check whether seals had been constructed in accordance with the approved plan.

Interviews with members of the National Mine Health and Safety Academy staff revealed that seals were covered in a ventilation training module during inspector training. The training focused primarily on the requirements in 30 CFR 75.335. Construction requirements for the alternative seals that had passed the 20-psi Lake Lynn testing were not covered in detail. Inspectors were taught to check the approved ventilation plan for the alternative seal construction requirements. For additional information on acceptable seal designs, inspectors were referred to *"Strength Characteristics and Air-Leakage Determinations for Alternative Mine Seal Designs,"* Report of Investigation No. 9477, U.S. Bureau of Mines.

Interviews with the inspectors revealed they could not recall any formal training for the inspection of seals.

Conclusion: MSHA did not inspect the A Left seals during their construction. The inspector assigned to the first regular inspection for calendar year 2006 had completed his inspection of A Left on March 6, 2006. The seals in A Left were constructed 12 days after the inspector had examined this part of the mine. Although this inspector was at the mine an additional three days in March following the construction of the A Left seals, he was not aware these seals had been constructed.

The inspector assigned to the Darby Mine for the second regular inspection for calendar year 2006 was aware that the A Left seals had been built, and he intended to examine the seals as part of his inspection of the return air course. The explosion occurred before he had the opportunity to inspect that part of the mine.

District 7 inspectors stated that they understood the provisions of the approved ventilation plan relevant to the construction of Omega block seals in the Darby Mine. They did not, however, identify and cite observable defects (undersized pilasters) in the intake seals during the course of eight regular inspections conducted during the review period.

The construction deficiencies found in the intake seals, and also present in the A Left seals, highlight the need for MSHA to be aware of when seals are to be constructed and to perform more comprehensive inspections of seals. The internal review found no formal protocol in MSHA for updating enforcement personnel with additional training on seal construction and inspection procedures.

Instructions at the Academy on alternative seal design and construction was not in depth or designed to teach procedures for the inspection of seals.

Enforcement of 30 CFR 75.383(a)

Escapeway map

Requirement: Mandatory safety standard 30 CFR 75.383(a) provides in relevant part that a map shall be posted or readily accessible to all miners in each working section, and in each area where mechanized mining equipment is being installed or removed.

The map shall show the designated escapeways from the working section to the area where the split of air ventilating the working sections intersects a main air course, or 2,000 feet outby the section loading point, whichever distance is greater. A map showing the main escapeways shall be posted at a surface location of the mine where miners congregate, such as at the mine bulletin board, bathhouse, or waiting room.

Any changes in route of travel, locations of doors, or directions of airflow shall be shown on the maps by the end of the shift on which the changes are made, and affected miners shall be informed of changes before entering the underground areas of the mines. Miners underground on a shift when a change is made shall be immediately notified of the change.

MSHA Policies and Procedures: Chapter 3 of the *Coal General Inspection Procedures Handbook* directs inspectors to thoroughly examine all record books required by the Mine Act and Regulations.

Statement of Facts: The accident investigation team determined that escapeway maps showing the designated escapeways were not provided on the surface and for miners who worked on the B Left working section (MMU 001). Two maps were posted in the mine office on the surface and a map was located on the working section. Neither the maps on the surface nor the map on the section clearly identified the escapeways or distinguished the escapeways from other available entries. The map on the working section did not show the active workings of the B Left Section.

The accident investigation team determined that this violation contributed to the fatal explosion and issued an S&S, section 104(d)(1) order (7488601) for this violation of 30 CFR 75.383(a).

The accident investigation team determined that the escapeway map on the B Left Section had been inaccurate since March 6, 2006, when mining was completed in A Left, and the section was moved to B Left. Two MSHA inspectors were on the B Left Section a total of eight times between March 6, 2006, and the time of the explosion. The inspectors did not issue a citation for this violation of 30 CFR 75.383(a).

One inspector inspected the B Left Section on March 20, 27, and 28. The inspector did not document examining the escapeway map on the B Left Section on those days. The inspector who conducted the second regular inspection for calendar year 2006 documented that he checked the surface escapeway map on May 3, 15 and 17. The inspector also checked the escapeway map on the B Left Section on May 3. The inspector did not detect that the maps had not been updated since the section was moved from A Left to B Left.

During their interviews with the review team, two inspectors could not remember if they had checked the escapeway map on the surface. One inspector was not sure he was required to check the map on the surface. All other inspectors interviewed were familiar with the requirements for escapeway maps. Inspection notes for each regular inspection during the review period documented inspection of the section escapeway map. The inspection of the escapeway map maintained on the surface was not documented in the inspection notes during the review period.

The inspectors at the Darby Mine cited two violations of 30 CFR 75.383(a), one on October 5, 2004, and the other on January 14, 2005, because escapeway maps on the section had not been maintained up to date. The Harlan field office cited 19 violations of 30 CFR 75.383(a) during the review period. District 7 inspectors cited the standard 56 times during the same period.

Conclusion: The majority of District 7 inspectors interviewed by the review team understood the requirements of 30 CFR 75.383(a) and demonstrated through past enforcement actions that they would take appropriate action if they observed a violation of this standard. However, an inspector did not recognize and take appropriate enforcement action when the operator failed to maintain accurate escapeway maps after March 6, 2006.

Enforcement of 30 CFR 75.383(b)(1)

Escapeway maps and drills

Requirement: Mandatory safety standard 30 CFR 75.383(b)(1) states in pertinent part that at least once every 90 days, each miner, including miners with working stations located between working sections and main escapeways, shall participate in a practice escapeway drill. During this drill, each miner shall travel the primary or alternate escapeway from the miner's working section or area where mechanized mining equipment is being installed or removed, to the area where the split of air ventilating the working section intersects a main air course, or 2,000 feet outby the section loading point, whichever distance is greater. Other miners shall participate in the escapeway drill by traveling in the primary or alternate escapeway for a distance of 2,000 feet from their working station toward the nearest escape facility or drift opening. An escapeway drill shall not be conducted in the same escapeway as the immediately preceding drill.

MSHA Policies and Procedures: Chapter 3 of the *Coal General Inspection Procedures Handbook* directs inspectors to thoroughly examine all record books required by the Mine Act and Regulations.

Statement of Facts: The accident investigation team determined that during the emergency evacuation drills, escapeways were not alternated so that the alternate escapeway was traveled by miners. The records indicated and testimony revealed that miners only traveled out the intake escapeway during drills.

The accident investigation team determined that this violation contributed to the fatal accident and issued an S&S, section 104(d)(1) order (7488603) for this violation of 30 CFR 75.383(b)(1).

The internal review team reviewed the escapeway drill records and verified that the escapeways were not alternated. According to the Fire Drill Record Book, miners did not travel the alternate escapeway during 26 consecutive escapeway drills conducted from August 20, 2004, through May 3, 2006. MSHA inspectors documented examining the Fire Drill Record Book during all seven inspections of the Darby Mine conducted after August 20, 2004. The inspectors did not detect this violation 30 CFR 75.1502(c)(1) during any of the seven inspections.

On March 6, 2006, a District 7 inspector traveled to the B Left Section on the dayshift and held a safety meeting about fire drills and escapeways with eight miners. On March 27, 2006, the inspector held a safety meeting on the B Left Section and discussed fire drills with the midnight shift crew. On March 28, 2006, the same inspector traveled to the B Left Section on the evening shift. He held a safety meeting with seven miners,

discussed fire drills and responsibilities with each miner, and observed the section foreman conduct a search for smoking articles.

Another District 7 inspector started the onsite portion of the second regular inspection for calendar year 2006 on the day shift on May 3. The inspector reviewed a number of required record books including the Fire Drill Record Book. He issued a section 104(a) citation for a violation of 30 CFR 75.1502(c)(1) because the mine operator was not maintaining an up to date record of signatures and dates to insure that the mine emergency drills were being held on the active section for the first shift miners. The last recorded date for the mine emergency drills for the first shift miners was March 18, 2006. The inspector did not cite a violation of 30 CFR 75.383(b)(1) for the operator's failure to alternate escapeway drills between the primary and alternate escapeways from August 20, 2004, through May 3, 2006.

The inspector returned to the mine on the evening shift on May 9, 2006, and documented inspecting the Fire Drill Record Book. He terminated the citation he had issued on May 3, 2006, for a violation of 30 CFR 75.1502(c)(1). The inspector traveled to the B Left Section and held a safety talk with 12 miners. During the safety talk he discussed the escapeway route from the section to the surface, the approved evacuation plan, and fire drills with the miners. During his interview with the internal review team, the inspector stated he frequently discussed escapeways with the miners. The inspector stated that he could recall only one miner who stated he wasn't sure he could get out of the mine. The miner was an inexperienced miner and had been working in the mine about a month. After this discussion with the miner, the inspector traveled the intake escapeway with the inexperienced miner.

The internal review team determined that District 7 inspectors were familiar with the requirements of 30 CFR 75.383(b)(1). During the review period, inspectors did not cite the operator of the Darby Mine for failure to rotate escapeway drills between the primary and secondary escapeways. Harlan field office inspectors cited two violations of 30 CFR 75.383(b)(1) during the review period. District 7 inspectors cited the standard 12 times during the same period.

Conclusion: Even though District 7 inspectors documented reviewing the Fire Drill Record Book during each regular inspection, they did not detect the mine operator's failure to conduct proper escapeway drills. During the regular inspections conducted from August 2004 through May 2006, inspectors did not recognize that mine management failed to rotate escapeway drills between the primary and alternate escapeways.

Enforcement of 30 CFR 75.1106

Welding or cutting underground

Requirement: Mandatory safety standard 30 CFR 75.1106 provides in relevant part that welding, cutting, or soldering with arc or flame in other than a fireproof enclosure shall be done under the supervision of a qualified person who shall continuously test for methane with means approved by the Secretary for detecting methane. Welding, cutting, or soldering shall not be conducted in air that contains 1.0 volume per centum or more methane.

Statement of Facts: MSHA accident investigators determined that on May 20, 2006, cutting was performed with an acetylene/oxygen torch in an atmosphere containing an explosive mixture of methane and oxygen. Evidence indicates that adequate tests for methane were not continuously performed during the cutting of a metal roof strap located at the No. 3 seal in A Left. A methane explosion occurred as a result of the cutting resulting in five fatalities.

The accident investigation team determined that this violation contributed to the fatal explosion and issued an S&S, section 104(d)(1) order (7061231) for this violation of 30 CFR 75.1106.

The accident investigation team determined the metal roof strap was cut on May 20, 2006. The last MSHA presence at the Darby Mine prior to the explosion was May 17, 2006. See the section of this report entitled "Inspection Activities Immediately Prior to the Explosion" for a detailed description of the inspector's activities during this inspection.

The internal review team's analysis of inspection data revealed that District 7 inspectors cited violations of 30 CFR 75.1106, two times during the review period. None of the violations were cited by Harlan field office inspectors.

During their interviews with the internal review team, District 7 inspection personnel demonstrated that they understood the requirements of 30 CFR 75.1106 and would have taken appropriate enforcement action if they had observed a violation of this standard.

Conclusion: An MSHA inspector was not present when this violation of 30 CFR 75.1106 occurred and could not have prevented mine management from using a cutting torch without conducting proper methane tests.

Enforcement of Specific Safety Standards - Noncontributory 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 accident investigation team as contributing to or causing the May 20, 2006, accident, but are relevant to the activities of MSHA at the Darby Mine prior to the accident.

Enforcement of 30 CFR 48.9(a)

Records of training

Requirement: Mandatory safety standard 30 CFR 48.9(a) states that: Upon a miner's completion of each MSHA approved training program, the operator shall record and certify on MSHA form 5000–23 that the miner has received the specified training. A copy of the training certificate shall be given to the miner at the completion of the training. The training certificates for each miner shall be available at the mine site for inspection by MSHA and for examination by the miners, the miners' representative, and State inspection agencies. When a miner leaves the operator's employ, the miner shall be entitled to a copy of his training certificates.

MSHA Policies and Procedures: MSHA *Program Policy Manual*, Vol. III, February 2003, states that all Part 48 training must be properly recorded by the operator on an MSHA Form 5000-23 (training certificate), or on an MSHA Approved Alternate Form 5000-23 (current month and year).

Statement of Facts: The accident investigation team determined that Paul Ledford completed Annual Refresher Training conducted at the Jericol Training Center on December 10, 2005. However, the operator did not record and certify on MSHA Form 5000-23 that the miner had received this specified training. The training certificate was not available at the mine site for inspection by MSHA and for examination by the miners, miners' representative, and State inspection agencies.

MSHA's accident investigators issued a non-S&S, section 104(a) citation (7168189) for this noncontributory violation of 30 CFR 48.9(a). This was the only violation of this standard cited following the explosion.

The internal review team's analysis of inspection data revealed that District 7 inspectors issued 23 citations for violations of 30 CFR 48.9(a) during the review period. The Harlan field office inspectors issued ten citations for violations of this standard. There were no violations of this standard cited at the Darby Mine.

Examination of inspection notes and interviews with inspectors revealed that inspectors examined the training records during each regular inspection of the Darby Mine during the review period.

Conclusion: Inspection personnel examined the training records during every regular inspection of the Darby Mine, however, they did not identify this particular violation of 30 CFR 48.9(a).

Enforcement of 30 CFR 75.151

Test for methane; qualified person

Requirement: Mandatory safety standard 30 CFR 75.151, states in relevant part that no person shall be a qualified person for testing for methane unless he demonstrates to the satisfaction of an authorized representative of the Secretary that he is qualified to test for methane with a portable methane detector approved by the Bureau of Mines or the Mine Safety and Health Administration under 30 CFR Part 22.

Mandatory safety standard 30 CFR 75.159 requires the operator of each coal mine to maintain a list of all certified and qualified persons designated to perform duties under 30 CFR Part 75.

MSHA Policies and Procedures: Chapter 3 of the *Coal General Inspection Procedures Handbook* instructs inspector to thoroughly examine all record books required by the Mine Act and Regulations.

Statement of Facts: MSHA's accident investigation team determined that required methane tests were conducted by four miners who had not demonstrated to the satisfaction of an authorized representative of the Secretary that they were qualified to test for methane with a portable methane detector approved by the Bureau of Mines or the Mine Safety and Health Administration.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued a section 104(d)(1) order (7168184) for this violation of 30 CFR 75.151.

The accident investigation team determined the methane concentrations ranged from 0.1% to 0.2% methane in the A Left and B Left Sections. The Darby Mine utilized several different types of detectors and four persons were not qualified to test for methane. Three roof bolter operators and one certified electrician were making methane checks without being qualified as required by 30 CFR 75.151. This practice had existed since the mine opened in 2001.

Prior to the fatal explosion, a violation of 30 CFR 75.151 had not been cited at the Darby Mine. The last time this standard was cited in the nation was in 2003.

The internal review team's review of inspection notes revealed that inspectors did not document examining the list of qualified persons required by 30 CFR 75.159 during the review period. During interviews by the internal review team, one inspector stated that he never checked the list of qualified persons. Another inspector stated that he checked the list of qualified persons, but did not determine whether the miners who performed methane checks were qualified.

Conclusion: The mine operator did not ensure that miners making methane tests were qualified. District 7 inspection personnel did not recognize this deficiency and take appropriate enforcement action for violations of 30 CFR 75.151 at the Darby Mine.

Enforcement of 30 CFR 75.310(a)(3), 75.312(a), and 75.312(c)

Main mine fan

Requirement: Mandatory safety standard 30 CFR 75.310(a)(3) provides in pertinent part that each main mine fan shall be equipped with an automatic device that gives a signal at the mine when the fan either slows or stops.

Mandatory safety standard 30 CFR 75.312(a) requires in pertinent part that each main mine fan and its associated components, including devices for measuring or recording mine ventilation pressure, shall be examined for proper operation by a trained person designated by the operator. Examinations of main mine fans shall be made at least once each day that the fan operates, unless a fan monitoring system is used. No examination is required on any day when no one, including certified persons, goes underground, except that an examination shall be completed prior to anyone entering the mine.

Mandatory safety standard 30 CFR 75.312(c) states in relevant part that at least every 31 days, the automatic fan signal device for each main mine fan shall be tested by stopping the fan. Only persons necessary to evaluate the effect of the fan stoppage or restart, or to perform maintenance or repair work that cannot otherwise be made while the fan is operating, shall be permitted underground.

Statement of Facts: MSHA accident investigators determined that the automatic device (Dry-Sys Air Flow Switch, Model No. 955-R), provided on the mine fan to give a signal at the mine when the fan slows or stops, would not function when tested. The device was installed on the mine fan used to ventilate the mine, but was not properly wired through the Multiguard Model 631 Permissible Signaling Device, to sound an alarm over the mine phone system. The accident investigation team issued a non-S&S, section 104(d)(1) order (7168177) for this noncontributory violation of 30 CFR 75.310(a)(3).

The MSHA accident investigation team determined that there was no examination of the mine fan for six Sundays between April 2 and May 14, 2006, prior to anyone entering the mine following the idle period. MSHA accident investigators issued a non-S&S, section 104(a) citation (7168179) for this noncontributory violation of 30 CFR 75.312(a).

MSHA accident investigators also determined that the fan signal device installed on the main fan at this mine site was not tested by stopping the main fan. The record book indicates March 26, 2006, as the last date the signal was tested. The accident investigation team issued a non-S&S, section 104(d)(1) order (7168180) for this noncontributory violation of 30 CFR 75.312(c).

The accident investigation team discovered that the fan alarm would not function because it was improperly wired. On March 26, 2006, the Daily and Monthly Examination of Ventilation Equipment Record Book indicated that the fan signal did not work and that the examiner did not stop the fan to check it. The accident investigation team also discovered, from testimony, that the mine fan was never shut down when the fan signal was tested.

During their interviews with the internal review team, District 7 inspection personnel stated they checked the fan signal and the Daily and Monthly Examination of Ventilation Equipment Record Book as part of their regular inspections. A review of the fan chart and interviews with the inspector indicated the fan was checked on February 13, 2006. The inspector stated he checked the fan alarm on a production shift by slowing the fan down enough to produce an audible alarm. The inspector stated the fan was only slowed enough to get an alarm.

Another inspector activated the fan alarm by holding down the fan alarm activation switch (flapper).

The inspector who was conducting the regular inspection at the time of the explosion stated he had not yet inspected the fan alarm signal when the fatal explosion suspended his inspection. This inspector documented in his notes that he checked the Daily and Monthly Examination of Ventilation Equipment Record Book on May 3, 2006. There was no record that an examination of the main mine fan had been conducted on four of the five Sundays before the inspector examined the book on May 3, 2006. Additionally, the monthly examination of the fan was 7 days overdue on the day the inspector checked the record book.

During the review period District 7 inspectors cited 46 violations of 30 CFR 75.310(a)(3). Fourteen of these violations were cited out of the Harlan field office. One violation was cited at the Darby Mine. District 7 inspectors also cited one violation of 30 CFR

75.312(c), none were issued at the Darby Mine. This violation was cited by the Harlan field office.

Conclusion: The mine operator failed to maintain the fan signal device in an operative condition, record fan examinations, and conduct a proper fan alarm signal test by stopping the main mine fan. A District 7 inspector did not detect the mine operator's failure to record mine fan examinations on four of the five Sundays prior to his inspection of the record book on May 3, 2006. The inspector also did not recognize that the 31-day test of the fan signal device was 7 days overdue.

Enforcement of 30 CFR 75.320(a)

Air quality detectors and measurement devices – methane detectors

Requirement: Mandatory safety standard 30 CFR 75.320(a) requires that tests for methane be made by a qualified person with MSHA approved detectors that are maintained in permissible and proper operating condition and calibrated with a known methane-air mixture at least once every 31 days.

Statement of Facts: The MSHA accident investigation team determined that the methane detectors used at the mine to make required tests were not calibrated every 31 days. Detectors were only calibrated when the instruments were sent for repairs.

MSHA accident investigators also determined that the MX 250 gas detector found on a personnel carrier in the B Left Section was not maintained in proper operating condition. When tested at the MSHA Approval and Certification Center on August 2, 2006, the instrument would not respond to any concentration of methane. The instrument had been used by the third shift foremen to conduct required examinations.

The accident investigation team determined that these violations did not contribute to the fatal explosion and issued two S&S, section 104(d)(1) orders (7168185 and 7168186) for violations of 30 CFR 75.320(a).

The accident investigation team's report reflects that nearly 50 percent of the detectors sent for repair were out of calibration. When tested, some detectors would indicate 0.0 or 0.1 percent methane regardless of the concentration of methane that was applied.

In their interviews with the internal review team, District 7 inspection personnel indicated that they did not always check the calibration of methane detectors. One inspector stated that he never checked the detectors and that he asked mine management and miners if the instruments were calibrated. Mandatory safety standard 30 CFR 75.320(a) does not require that the operator keep a record of methane detector calibration.

Inspection notes for the review period did not document inspection of the methane detectors to verify that the calibration dates were current. The inspectors did not observe the procedures used by mine management when calibrating methane detectors.

During the review period District 7 inspectors cited three violations of 30 CFR 75.320(a), including one from the Harlan field office.

Conclusion: The mine operator failed to calibrate methane detectors every 31 days with a known mixture of methane. As a result, nearly 50 percent of the methane detectors were out of calibration and not capable of measuring methane greater than 0.1 percent. District 7 inspectors did not recognize and take appropriate enforcement actions for these violations of 30 CFR 75.320(a). Effective guidance was not provided through national policy for enforcement of 30 CFR 75.320(a).

Enforcement of 30 CFR 75.324(b)

Intentional changes in the ventilation system

Requirement: Mandatory safety standard 30 CFR 75.324(b) states that intentional changes in the ventilation system shall be made only under the following conditions:

(1) Electric power shall be removed from areas affected by the ventilation change and mechanized equipment in those areas shall be shut off before the ventilation change begins.

(2) Only persons making the change in ventilation shall be in the mine.

(3) Electric power shall not be restored to the areas affected by the ventilation change and mechanized equipment shall not be restarted until a certified person has examined these areas for methane accumulation and for oxygen deficiency and has determined that the areas are safe.

Statement of Facts: MSHA's accident investigators determined that the mine operator conducted an intentional air change in the A Left Section from on or about March 18 through 22, 2006. Miners who were not involved in the air change were assigned to work in other areas of the mine performing various assignments. In addition, the mine electrical power was not de-energized in the B Left Section. There was no record to indicate that the required examinations to determine the effects of the air change had been conducted.

MSHA's accident investigators issued an S&S, section 104(d)(1) order (7061235) for this noncontributory violation of 30 CFR 75.324(b).

Interviews conducted by the accident investigation team revealed that a supervisor assigned three miners to roof bolt and rock dust in B Left while the supervisor and other miners were constructing seals in A Left. The miners assigned to work in B Left were not participating in the air change being conducted at A Left. Later during the construction of the A Left seals, coal was produced on the B Left Section.

A District 7 inspector began a regular inspection of the Darby Mine on January 17, 2006, and completed the inspection on March 30, 2006. A review of the inspection report and interviews with the inspector revealed that he traveled to the A Left Section on January 17, 25, 31 and February 6 and 16, 2006, while the section was still in production. The inspector also conducted a rock-dust survey in A Left on March 6, 2006, while the section equipment was being moved to B Left. This was the last MSHA presence in A Left before the fatal explosion.

The inspector was at the Darby Mine on one day during the construction of the A Left seals. On March 20, 2006, the inspector traveled past the intake seals through the parallel mains to the worked out areas in the deepest point of the mine. He then traveled to the B Left Section, conducted an imminent danger run, and then traveled to the surface.

During his interviews with the accident investigation and internal review teams, the inspector stated that he was not informed by mine personnel or otherwise aware that the intentional change had been made to the ventilation of the A Left Section.

Conclusion: The last MSHA presence in A Left was March 6, 2006, which was prior to the construction of the A Left Seals and corresponding ventilation change. The inspector was not aware of the intentional ventilation change and could not have taken enforcement action.

Enforcement of 30 CFR 75.335(c)(2)

Construction of seals

Requirement: Mandatory safety standards 30 CFR 75.335(c)(2) requires that each water pipe installed in a seal shall have a water trap installed on the outby side of the seal.

Statement of Facts: MSHA accident investigators determined that the three Omega block seals installed to seal the A Left Section from the active workings were not constructed to meet the requirements of 30 CFR 75.335(c)(2). Testimony and physical evidence revealed that the installed water trap was not located on the outby side of the No. 3 seal.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued a section 104(a) citation (7061233) for this violation of 30 CFR 75.335(c)(2).

The team also determined that construction of the A Left seals was started on March 18, 2006, and was finished on March 22, 2006. Although the inspector visited the Darby Mine on two occasions after the completion of the A Left seals, the inspector did not inspect the seals because he had already finished his inspection of this part of the mine. Another inspector started a new regular inspection on April 17, 2006. At the time of the explosion on May 20, 2006, the inspector had not examined the A Left seals.

During the review period, District 7 inspectors cited seven violations of 30 CFR 75.335(c)(2); six of these violations were cited by Harlan field office inspectors.

Conclusion: MSHA did not inspect the A Left seals before the fatal explosion. During the first regular inspection for calendar year 2006, an MSHA inspector completed his inspection of A Left 12 days before the mine operator began construction of the A Left seals. The explosion occurred during the second regular inspection for calendar year 2006 before the MSHA inspector inspected the area in which the A Left seals had been erected. The inspector was aware that the A Left seals had been built and he would have inspected the seals during the normal course of his inspection.

Enforcement of 30 CFR 75.360(a)(1)

Preshift examination

Requirement: Mandatory safety standard 30 CFR 75.360(a)(1) states that a certified person designated by the operator shall 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 the certified examiners may enter or remain in any underground area unless a preshift examination has been completed for the established 8-hour interval. The operator must establish 8-hour intervals of time subject to the required preshift examinations.

The examiner is required to certify by initials, date, and time that the examinations were made. A record shall be made of the results of the examination including a record of hazardous conditions and their location, and results and locations and air and methane measurement. A record shall also be made by a certified person of the action taken to correct hazardous conditions found during the preshift examination. All required methane readings are required to be recorded as the percentage of methane measured by the examiner.

MSHA Policies and Procedures: The *Coal General Inspection Procedures Handbook* establishes general procedures for inspectors to follow when conducting inspections and investigations. Chapter 3 of the handbook instructs inspection personnel to thoroughly examine all record books required by the Mine Act and regulations during each regular inspection. Inspection personnel are to evaluate the operator's examination records to determine that the results of examinations include the specific area or location examined and that the area is adequately described or identified. Also, air measurements taken by inspectors are to be compared to those taken by examiners at the same locations.

Chapter 3 of the *Coal General Inspection Procedures Handbook* also instructs inspectors to evaluate the operators' compliance with requirements for conducting preshift, on-shift, and weekly examinations during every regular inspection by:

- Selectively traveling (at least once) with the person(s) who performs the preshift, on-shift, and weekly examinations to evaluate the thoroughness and completeness of such examinations and to determine if the time expended by the examiner is commensurate with the areas required to be traveled and examined;

- Determining that all areas where persons work or travel are properly examined. Particular emphasis shall be placed on idle workings, worked out areas that are not sealed, and other such areas where persons may be required to work or travel;

- Looking for initials, dates, and times of examinations in all areas where such information is required;

- Determining if the required exams are conducted by certified examiners; and

- Evaluating the operator's examination records to determine that examination results appear to be authentic.

Statement of Facts: MSHA's accident investigation team determined that a preshift examination had not been conducted on May 19, 2006, of the No. 3 coal conveyor belt entry prior to miners being assigned to work and travel said entry. Information obtained during the accident investigation revealed that it was a common practice that only belt drives and transfer points were examined during the preshift examination of the mine even though personnel were assigned to travel and work along the conveyor belt system daily. Without the benefit of a preshift examination being made to assess the presence of imminent dangers and changes to the mining environment, miners working and traveling the conveyor belt could be unnecessarily exposed to various unknown hazards.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued an S&S, section 104(d)(1) order (7098937) for this violation of 30 CFR 75.360(a)(1).

MSHA accident investigators also determined that preshift examinations were not conducted where miners were assigned to work on the following dates: January 13, 2006; February 20, 23, 24, and 27, 2006; March 6, 2006; April 4, and 10, 2006; and May 19, 2006. The accident investigation team determined the section foreman conducted preshift examinations of the intake travelway and spot checked the belt drives rather than examining the belts in their entirety.

District 7 inspectors did not clearly document that they selectively traveled with the persons who performed preshift examinations to evaluate the thoroughness and completeness of the examinations.

Inspectors stated that they reviewed the preshift record books every time they visited the mine. One inspector stated that he placed emphasis on looking at the records and usually reviewed back a week or so. The inspector also stated that he had no idea how the belts were preshifted. Another inspector stated that he looked at everything in the preshift book and he usually reviewed back a day or two. When the inspector was presented with numerous hazardous conditions documented in the preshift examination record book, he responded by stating that evidently he missed them.

During the review period District 7 inspectors cited 48 violations of 30 CFR 75.360(a)(1); of those 48, 6 were issued in the Harlan field office and none at the Darby Mine.

Conclusion: Inspectors did not thoroughly examine the mine operator's preshift record book. The deficiencies in the preshift examinations at the Darby Mine should have been identified and cited by District 7 enforcement personnel prior to the explosion.

Enforcement of 30 CFR 75.362(b)

On-shift examination

Requirement: Mandatory safety standard 30 CFR 75.362(b) states that during each shift that coal is produced, a certified person shall examine for hazardous conditions along each belt conveyor haulageway where a belt conveyor is operated. This examination may be conducted at the same time as the preshift examination of belt conveyors and belt conveyor haulageways, if the examination is conducted within 3 hours before the oncoming shift.

MSHA Policies and Procedures: The *Coal General Inspection Procedures Handbook* establishes general procedures for inspectors to follow when conducting inspections

and investigations. Chapter 3 of the handbook instructs inspection personnel to thoroughly examine all record books required by the Mine Act and regulations during each regular inspection. Inspection personnel are to evaluate the operator's examination records to determine that the results of examinations include the specific area or location examined and that the area is adequately described or identified. Also, air measurements taken by inspectors are to be compared to those taken by examiners at the same locations.

Statement of Facts: Based on information gathered during the investigation of the fatal explosion, it was determined that, beginning on June 16, 2005, and ending on May 19, 2006, examinations for hazardous conditions were routinely not conducted along any of the four conveyor belt haulageways for the afternoon coal production shifts where the belt conveyors operated.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued an S&S, section 104(d)(1) order (7061236) for this violation of 30 CFR 75.362(b).

A review of the record book conducted by the accident investigation team revealed that on-shift examinations were being conducted for both the day and the afternoon shift until June 15, 2005. The afternoon shift examination was no longer conducted after that date, even though coal continued to be produced on both shifts.

Through interviews with inspectors and a review of inspection notes, the internal review team determined that inspectors reviewed on-shift belt examination records during each regular inspection. The inspectors did not identify the operator's failure to conduct and record on-shift examinations for the second shift for an 11-month period.

Every inspector interviewed stated that they reviewed the on-shift record books every time they visited the mine. One inspector stated that he placed emphasis on looking at the records and usually reviewed back a week or so. The same inspector stated that the examinations are required once each production shift. After reviewing the record books during the interview, the inspector acknowledged that the books indicated that the second shift didn't make on-shift examinations of the belts for 11 consecutive months, and he missed it. He also said that he examined all the belts on January 25, 2006, and that he did not look at the belt books after that, and he did not examine back in the book. One inspector stated that he had no idea how the belts were examined on the second shift.

The internal review team determined that the mine operator had documented numerous hazardous conditions in the records of belt examinations. Hazardous conditions identified and cited by MSHA inspectors following the explosion included adverse roof and loose rib conditions, obstructed walkways, accumulations of loose coal

and coal dust, partially empty oil cans, and inadequate rock dust. These hazards were often carried in the record book for weeks without corrective action being noted. The maximum number of days that hazards were carried in the record book for belt examinations during the review period is shown in the following table.

Belt	Number of Days	Beginning On
No. 1	76	06/10/2005
No. 2	45	06/10/2005
No. 3	54	09/01/2005
No. 4	70	05/17/2005
No. 5	66	06/10/2005
No. 6	21	05/27/2005
No. 7	34	05/05/2005
No. 8	57	07/26/2004

The foregoing table reflects maximum time periods. The belt book indicated numerous other instances where hazardous conditions were repeatedly carried. For instance, there were five other periods where hazards were carried in the book for the No. 1 belt for more than 28 days before being corrected. Similar problems were found in the book with the other belts.

During the review period District 7 inspectors cited 56 violations of 30 CFR 75.362(b). Of those 56 violations, 7 were cited in the Harlan field office and 2 at the Darby Mine.

Conclusion: The mine operator failed to conduct and record on-shift examinations of the belts during the 2nd shift for an 11-month period, and hazardous conditions were documented in the records of on-shift examinations for extended periods of time with no corrective action noted. District 7 enforcement personnel did not effectively enforce the requirements of 30 CFR 75.362(b) for on-shift examinations at the Darby Mine and did not identify and cite numerous violations of this standard.

Enforcement of 30 CFR 75.364(a), 75.364(b)(5),75.364(h)

Weekly examinations

Requirement: Mandatory safety standard 30 CFR 75.364 provides in relevant part that a certified person designated by the operator shall examine specified locations at least every 7 days. The standard also specifies locations where air quantities must be measured and where airflow direction and methane and oxygen concentrations must be tested. The examiner must check for hazardous conditions, test for methane and oxygen deficiency, and determine if the air is moving in its proper direction. The

examiner is required to certify by initials, date, and time that the examination was made. A record is required of hazardous conditions found, their locations, and the corrective action taken, and the results and location of air and methane measurements. All methane readings must be recorded as percentages.

Subsection (c)(1), requires that the measurements and tests shall determine the volume of air entering the main intakes and in each intake split;

Subsection (c)(2), requires the volume of air and test for methane in the last open crosscut in any part or set of developing entries or rooms, in the return of each split of air immediately before it enters the main returns, and where the air leaves the main returns.

Subsection (d) requires hazardous conditions found during weekly examinations to be corrected immediately.

Subsection (h) requires that at the completion of any shift during which a portion of a weekly examination is conducted, a record of the results of each weekly examination, including a record of hazardous conditions found during each examinations and their locations, the corrective action, and the results and locations of air and methane measurements shall be made.

The Preamble to the Final Rule for Safety Standards for Underground Coal Mine Ventilation – March 11, 1996; Federal Register 96-5453 [Page 9803] states in relevant part, "*The weekly examination is directed at hazards that develop in the more remote and less frequently visited areas of a mine. These areas include: … [s]ome main intake and return air courses. Over the course of time, hazards such as methane accumulations and obstructions to ventilation can develop in these areas and can result in an explosion or loss of ventilation if not discovered and corrected. Because of the confined nature of the underground mining environment, loss of life can result in other areas of the mine outside the immediate location of the hazard. The weekly examination assures that these hazards are located and corrected.*"

MSHA Policies and Procedures: Chapter 3 of the *Coal General Inspection Procedures Handbook* instructs inspection personnel to thoroughly examine all record books required by the Mine Act and regulations during each regular inspection. Inspection personnel are to evaluate the operator's examination records to determine that the results of examinations include the specific area or location examined and that the area is adequately described or identified. Also, air measurements taken by inspectors are to be compared to those taken by examiners at the same locations.

The handbook further directs inspectors to evaluate the operators' compliance with requirements for conducting preshift, on-shift, and weekly examinations during every regular inspection by:

- Selectively traveling (at least once) with the person(s) who performs the preshift, on-shift, and weekly examinations to evaluate the thoroughness and completeness of such examinations and to determine if the time expended by the examiner is commensurate with the areas required to be traveled and examined;

- Determining that all areas where persons work or travel are properly examined. Particular emphasis shall be placed on idle workings, worked out areas that are not sealed, and other such areas where persons may be required to work or travel;

- Looking for initials, dates, and times of examinations in all areas where such information is required;

- Determining if the required exams are conducted by certified examiners; and

- Evaluating the operator's examination records to determine that examination results appear to be authentic.

Statement of Facts: MSHA's accident investigation team determined that the weekly examination for hazardous conditions was not performed in the worked out A Left Section for two consecutive seven-day periods; one period ending March 7, 2006, and the other, March 14, 2006. Examinations were also not conducted in the mined-out A Left Section while the return seals were being constructed. The only examination inby at the seal construction was conducted to the end of the closest pillar or block.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued an S&S, section 104(d)(1) order (7098938) for this violation of 30 CFR 75.364(a).

MSHA's accident investigators also determined that the examination for hazardous conditions conducted May 15, 2006, in the alternate escapeway (No. 1 Belt and No. 2 Belt) was inadequate. Obvious hazardous conditions were present in the alternate escapeway and were not identified, posted, or corrected. The hazardous conditions included the following:

- The alternate belt escapeway was not being maintained in safe condition to ensure passage of anyone, including disabled persons.

- Along the No. 2 belt entry, extraneous material in the form of wedges, half headers, crib blocks, belt rollers, and old conveyor belting, was located in the designated escapeway, which was on the return side in the No. 2 belt entry.

- The 5-foot door installed in the permanent ventilation control at the portal in the No. 1 Belt entry could only be opened about 40 inches due to an excessive amount of gob. The gob started 48 inches inby the door and extended 8 feet, was 6 to 38 inches deep, and extended from the rib to the belt structure.

- At the same location there was an area of roof measuring 6 to 8 feet in width and about 20 feet in length that was not adequately supported due to sloughing around the resin roof bolts.

- The escapeway was not adequately marked. In the No. 2 belt (approximately 1,070 feet in length) there was only one intersection marked with blue reflectors. In the No. 1 belt (approximately 1,150 feet in length) there were only two red reflectors on the intake side and two white reflectors on return side.)

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued an S&S, section 104(d)(1) order (7168183) for this violation of 30 CFR 75.364(b)(5).

The MSHA accident investigation team determined that the certified record of the results of the weekly examination for hazardous conditions was inaccurate for the examination on May 19, 2006. The mine examiner who actually conducted a portion of the physical examination for the A Left return seals did not sign and date or initial and date the certified record of the examination. Additionally, it was revealed that the examinations conducted from January 3, 2006, through and including May 19, 2006, were inaccurate and incomplete. The certified record of the results of all weekly examinations for hazardous conditions revealed that the results and locations of air and methane measurements were not recorded during any of the weekly examinations from January 3, 2006, through and including May 19, 2006.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued an S&S, section 104(d)(1) order (7098939) for this violation of 30 CFR 75.364(h).

The internal review team reviewed the records of weekly examinations during the period of May 28, 2004, through May 19, 2006. This review identified the following issues:

- The results of air measurements were not properly recorded where air entered worked-out areas and where air from worked-out areas entered a return split, as required by 30 CFR 75.364(a)(2)(i).

- From September 14, 2005, through May 20, 2006, intake and return air measurements were not entered into the Weekly Examination for Hazardous Conditions record book.

- Records of examinations of the A Left seals were not recorded for April 13, 21, and 28, 2006.

- In the year prior to the explosion, the operator exceeded the 7-day requirement eleven times. In one instance, the interval between examinations was 28 days.

Inspectors did not cite a violation of 30 CFR 75.364 at the Darby Mine during the review period.

During interviews conducted by the internal review team, inspectors stated they had accompanied the weekly examiners. While inspectors documented traveling with certified persons in their notes, they did not distinguish these persons to be the weekly examiners.

Inspection personnel demonstrated they understood the requirements of 30 CFR 75.364 regarding weekly examinations and associated records. Most inspectors stated they reviewed the last entry in the record book. Some inspectors stated they reviewed several weeks of prior entries. However, the inspectors did not identify that the examinations were not conducted within the required 7-day intervals on several occasions. When the review team pointed out deficiencies in the record book, such as the absence of air readings for extended periods of time, most inspectors stated that they reviewed the record book and could not explain why these deficiencies were not observed.

Conclusion: The mine operator failed to conduct adequate weekly examinations for hazardous conditions and did not properly record or document the results of the examinations. These deficiencies were extensive and had existed for extended periods of time.

Inspection personnel did not cite a violation of 30 CFR 75.364 at the Darby Mine during the review period. A review of the records of weekly examinations for hazardous

conditions revealed that the books did not identify hazards and their locations and had missing dates and air quality and quantity measurements. The inspectors did not review a sufficient number of prior examination records to identify the operator's failure to conduct examinations on the required 7-day intervals.

Enforcement of 30 CFR 75.370(a)(1)

Ventilation plan

Requirement: Mandatory safety standard 30 CFR 75.370(a)(1), in pertinent part, requires the mine operator to 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.

Statement of Facts: MSHA's accident investigation team determined that the A Left seals were not built according to the approved construction sequence. The No. 1 and No. 2 seals were constructed on or about Saturday, March 18, 2006. The No. 3 seal was not completed until the day shift the following March 22, 2006. The A Left Section was left unventilated during this period. The mine ventilation plan approved on September 1, 2005, requires that when entrances to worked out areas are sealed, the seals shall be erected in a sequence such that positive ventilation is furnished to the affected area until the erection of the two (2) final seals, with the last seal to be erected being the furthest upwind.

Interviews conducted with the miners by the accident investigation team confirmed the construction sequence, and that No. 1 and No. 2 seals were completed by the end of Saturday afternoon shift. They also testified they were under constant supervision of management.

The accident investigation team determined that this violation did not contribute to the fatal explosion and issued an S&S, section 104(d)(1) order (7061234) for this violation of 30 CFR 75.370(a)(1).

MSHA's accident investigation team determined that construction of the A Left seals was started on or about March 18, 2006, and was completed on March 22, 2006. A District 7 inspector began a regular inspection of Darby Mine on January 17, 2006, and completed the inspection on March 30, 2006. A review of the inspection report and interviews with the inspector revealed that the inspector traveled to the A Left Section on January 17, 25, and 31 and February 6 and 16, 2006, while the section was still in production. The inspector also conducted a rock-dust survey in A Left on March 6, 2006, while the section equipment was being moved to B Left. This was the last MSHA presence in A Left before the fatal explosion.

The inspector was at the Darby Mine on March 20, 2006, during the construction of the A Left seals. The inspector traveled past the intake seals through the parallel mains to the worked out areas to the deepest point of the mine. From there, he traveled to the B Left Section, conducted an imminent danger run, and then traveled to the surface. (See the section of the report entitled "Inspection Activities Immediately Prior to the Explosion.")

During his interview with the internal review team, the inspector stated that he was not informed by mine personnel or otherwise aware that the A Left seals were being built. Therefore, he did not inspect the seals during construction.

Conclusion: During the first regular inspection for calendar year 2006, an MSHA inspector completed his inspection of A Left on March 06, 2006, by conducting a rock dust survey in the abandoned section. This was 12 days prior to the mine operator beginning construction of the seals. The inspector returned to the Darby Mine on March 20, 2006, but his inspection activities did not include travel into the area of the A Left seals. As a result of not being present during the construction of the seals, he did not have an opportunity to observe the violation of 75.370 (a)(1).

Enforcement of 30 CFR 75.380(d)

Escapeways

Requirement: Mandatory safety standard 30 CFR 75.380(d) states in pertinent part that each escapeway shall be:

- Maintained in a safe condition to always assure passage of anyone, including disabled persons;

- Clearly marked to show the route and direction of travel to the surface;

- Maintained to at least the height of five feet from the mine floor to the mine roof, excluding the thickness of any roof support, except that the escapeways shall be maintained to at least the height of the coalbed, excluding the thickness of any roof support, where the coalbed is less than five feet. In areas of mines where escapeways pass through doors, the height may be less than five feet, provided that sufficient height is maintained to enable miners, including disabled persons, to escape quickly in an emergency; and

- Maintained at least six feet wide except where necessary supplemental roof support is installed, the escapeway shall not be less than four feet wide; where the alternate escapeway passes through doors or other permanent ventilation controls or where supplemental roof support is required and sufficient width is

maintained to enable miners, including disabled persons, to escape quickly in an emergency. When there is a need to determine whether sufficient width is provided, MSHA may require a stretcher test where four persons carry a miner thorough the area in question on a stretcher.

Statement of Facts: The MSHA accident investigation team determined that the alternate (belt entry) escapeway was not being maintained in a safe condition to insure passage of anyone, including disabled persons. Along the No. 2 belt conveyor entry, material in the form of wedges, half headers, crib blocks, belt rollers, and old conveyor belt, was located in the designated escapeway which was on the return side of the No. 2 belt entry.

The five foot door installed in the permanent ventilation control at the portal in the No. 1 belt conveyor entry could only be opened about 40 inches due to an excessive amount of gob. The gob started 48 inches inby the door and extended 8 feet, and was 6 to 38 inches deep, and extended from the rib to the belt structure. Also, present at the same location was an area of the mine roof measuring six to eight feet in width and about 20 feet in length that was not adequately supported due to sloughing around resin roof bolts.

The escapeway was not adequately marked. In the No. 2 belt entry (approximately 1,070 feet in length) there was only one intersection marked with blue reflectors. In the No. 1 belt entry (approximately 1,150 in length) there were only two red reflectors on the intake side and two white reflectors on the return side.

MSHA accident investigators issued an S&S, section 104(d)(1) order (7168182) for this noncontributory violation of 30 CFR 75.380(d).

During interviews with the internal review team, inspectors stated they could not recall which side of the belt was being used as the escapeway, the location of the 5-foot door, or the roof supports. Also, the inspectors could not recall if the escapeways were adequately marked, and whether roof supports affected the required walkway clearance. The inspectors did not measure any of the clearances and stated they did not have any problem traveling the escapeway. One of the inspectors stated that he could not rely on his notes because the only documentation was "walked No. 4, No. 3, No. 2, and No. 1 belts." He also stated the miners could travel either side of the conveyor belt. However, the post-accident inspection revealed that the clearance along the intake side of the No. 1 belt was approximately 14 inches at one location and 18 inches at a second location.

Conclusion: District 7 inspection personnel examined the alternate escapeway during the course of their regular inspections but did not recognize and cite obvious violations of 30 CFR 75.380(d).

Enforcement of 30 CFR 75.403

Maintenance of Incombustible Content of Rock Dust

Requirement: Mandatory safety standard 30 CFR 75.402 states in relevant part that 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, shall be rock dusted to within 40 feet of all working faces. Mandatory safety standard 30 CFR 75.402-1, states that the term "too wet" means that sufficient natural moisture is retained by the dust that when a ball of finely divided material is squeezed in the hands water is exuded.

Mandatory safety standard 30 CFR 75.403 provides in pertinent part that where rock dust is applied, it shall 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 shall not be less than 65 percent, but the incombustible content in the return air courses shall be no less than 80 percent. Where methane is present in any ventilating current, the percent of incombustible content of such combined dusts shall be increased 1.0 and 0.4 percent for each 0.1 percent of methane where 65 and 80 percent incombustible content is required.

MSHA Policies and Procedures: Chapter 4 of the *Coal General Inspection Procedures Handbook* instructs inspectors to conduct rock dust surveys during each regular inspection for advancing sections. These surveys provide data to form conclusions regarding adequacy or inadequacy of rock dusting in a mine. If more than 10 percent of the dust samples collected in a dust survey of a particular area or section is substandard, as shown by analysis, a citation must be issued. In addition to rock dust surveys, the handbook also directs inspectors to collect spot samples to substantiate the violation when citing a location for inadequate rock dust.

Statement of Facts: During the accident investigation, 217 mine dust samples were taken in the B Left, Mains, and Parallel Mains. These samples were subjected to an incombustible content analysis. The results revealed that 178 (82%) of the samples did not meet the regulatory requirements for incombustible content of the combined coal dust, rock dust, and other dust of at least 65% in the intake air courses and at least 80% in the return air course.

MSHA's accident investigation team issued an S&S, section 104(d)(1) order (7488604) for this noncontributory violation of 30 CFR 75.403.

The internal review team determined that District 7 inspection personnel conducted rock dust surveys in the Darby Mine during each regular inspection and recorded the area surveyed in the inspection report. However, during the review period, rock dust

samples were not collected in worked out rooms, the cut through area of the parallel mains, and one section of the mains. During the first regular inspection of calendar year 2006, an MSHA inspector conducted a rock dust survey in the A Left Section but did not collect samples in the rooms driven off the A Left entries. In the 2 years prior to the explosion, four citations were issued for violations of 30 CFR 75.403 as a result of rock dust surveys. See Appendix E for mine map that illustrates the locations of rock dust surveys conducted during the review period.

Conclusion: District 7 inspection personnel collected rock dust samples during each regular inspection. The Harlan field office had an effective system in place to ensure that appropriate enforcement action was taken when rock dust surveys were out of compliance. However, the Harlan field office did not have an effective system in place for tracking rock dust surveys. Required rock dust samples were not collected in worked out rooms off the A Left entries, the cut through area of the parallel mains, and one section of the mains.

Enforcement of 30 CFR 75.503

Maintenance of permissible electric face equipment

Requirement: Mandatory safety standard 30 CFR 75.503 states that the operator of each coal mine shall maintain in permissible condition all electric face equipment required by 30 CFR 75.500, 75.501, 75.504 to be permissible[14] which is taken into or used inby the last open crosscut of any such mine.

Mandatory safety standard 30 CFR 75.506-1(a) states in pertinent part that electric face equipment will be considered to be in permissible condition only if it is maintained so as to meet the requirements for permissibility set forth in the Bureau of Mines schedule under which such electric face equipment was initially approved, or, if the equipment has been modified, it is maintained so as to meet the requirements of the schedule under which such modification was approved.

Title 30 CFR Part 18 sets forth requirements for obtaining MSHA approval of electrically operated machines and accessories intended for use in coal mines. Equipment must be

[14] *Permissible equipment* means "all electrically operated equipment taken into or used inby the last open crosscut of an entry or a room of any coal mine the electrical parts of which… [a]re designed, constructed, and installed…. [t]o assure that such equipment will not cause a mine explosion or mine fire, and the other features of which are designed and constructed... [t]o prevent, to the greatest extent possible, other accidents in the use of such equipment." 30 CFR 75.2

maintained in accordance with the approval specifications in 30 CFR Part 18 to remain in permissible condition.

Statement of Facts: The S&S Model 601 battery powered scoop (Approval No. 2G-3144, S/N 601-1059) located on the working section, was not maintained in permissible condition. The following deficiencies were observed:

1) No means was provided to lock the battery couplers to the receptacles. Neither a padlock nor a spring-loaded device was present.
2) A 1.5-inch diameter hole was present in the battery coupler shell on the left side of the machine. The individual insulated battery leads were visible through the hole.
3) A portion of the packing nut was broken where the motor conductors enter the main circuit breaker enclosure. The conduit could not be properly secured to the packing nut.
4) The packing nut on the left front side of the main circuit breaker enclosure was not secured against loosening. The seal wire was broken.
5) The main circuit breaker enclosure was not securely mounted to the machine. The front mounting bolt was missing, allowing the enclosure to move approximately two inches from the mounting hole.
6) Nine of the bolts securing the aluminum main controller cover were not provided with flat washers to prevent the lock washers from damaging the aluminum cover.
7) A section of the conduit is damaged (2-3 inch hole) where it passes through the center section of the machine.
8) Two of the bolts securing the aluminum cover for the switch enclosure located in the operator's compartment were not provided with flat washers.
9) The packing nut was loose on the back of the left front headlight. It could be turned by hand.
10) The conduit was not secured to the hose tube on the back of the right front headlight. A gap was present between the hose tube and the end of the conduit, exposing the insulated light conductors.

The Long-Airdox Model 488 battery powered scoop (Approval No. 2G-2831-5, S/N 488-2055) was not maintained in permissible condition. The following deficiencies were observed:

1) No means was provided to lock the battery couplers to the receptacles. Neither a padlock nor a spring-loaded device was present.
2) No means to secure the battery lids in a closed position.
3) The conduit protecting the conductors leading to the battery coupler on the right side of the machine (facing inby) was improperly repaired. Black tape, instead of an approved sleeve, was used.

4) The conduit protecting the conductors leading to the battery coupler on the left side of the machine was improperly repaired. Black tape, instead of an approved sleeve, was used.
5) The conduit protecting the conductors leading to the left rear light was improperly spliced/repaired. Black tape, instead of an approved sleeve, was used.
6) Lock washers, without flat washers, were installed on the aluminum cover for the main controller enclosure.
7) A portion of the conduit was missing on the cable entering the left side of the enclosure for the right front headlight. The conduit for the cable entering the right side of the same enclosure was improperly spliced/repaired. Black tape, instead of an approved sleeve, was used.

The accident investigation team determined that these violations did not contribute to the fatal explosion and issued two S&S, section 104(a) citations (7408985 and 7408989) for these violations of 30 CFR 75.503.

The internal review team determined that inspectors did not document inspecting the S&S Model 601 battery powered scoop, Approval No. 2G-3144, S/N 601-1059 (S&S Scoop), during the fourth quarter of 2004, the third quarter of 2005, and the fourth quarter of 2005. This S&S Scoop was inspected during the ongoing inspection on May 17, 2006. On this date, the inspector cited the following three violations on the S&S Scoop:

- The automatic emergency parking brake was not being maintained.
- The scoop was not being maintained in permissible condition; a gap in excess of 0.004 inch was found to be present between the scoop's main circuit breaker box and its cover lid when checked with a 0.005-inch feeler gauge.
- There were accumulations of oil, oil soaked coal, and coal dust on the frame, axle housings, and operator's deck of the scoop.

Two of the citations had termination due dates set for the afternoon of May 17, 2006, and the remaining citation, issued for accumulations, was due the next morning on May 18, 2006. The inspector terminated the citation for the defective automatic emergency parking brake on May 17, 2006. The other two citations were outstanding when the explosion occurred.

The internal review team determined that the Long-Airdox Model 488 battery powered scoop, Approval No. 2G-2831-5, S/N 488-2055 (Long-Airdox Scoop) was inspected and documented in the inspection notes in all eight inspections reviewed. The Long-Airdox Scoop was not inspected during the ongoing inspection prior to the fatal explosion. The last time this scoop was inspected was February 13, 2006.

Conclusion: The mine operator failed to maintain the scoops in permissible condition. The MSHA inspector conducting the ongoing inspection at the Darby Mine cited a permissibility violation on the S&S Scoop on May 17, 2006, but did not identify and cite other permissibility violations that existed at the time of his inspection. MSHA inspectors did not inspect the Long-Airdox Scoop during the ongoing inspection and did not observe these conditions.

Enforcement of 30 CFR 75.507-1(a)

Permissibility requirements for electrical equipment used in return air

Requirement: Mandatory safety standard 30 CFR 75.507-1(a) requires that all electric equipment, other than power-connection points, used in return air outby the last open crosscut in any coal mine shall be permissible.

Title 30 CFR Part 18 sets forth requirements for obtaining MSHA approval of electrically operated machines and accessories intended for use in coal mines. Equipment must be maintained in accordance with the approval specifications in 30 CFR Part 18 to remain in permissible condition.

MSHA Policies and Procedures: The *Coal General Inspection Procedures Handbook* instructs inspector to inspect all face equipment (diesel and electric), electric installations, and all mobile equipment as encountered, and document the equipment examined by company number, serial number, or some other means.

Statement of Facts: Based on information gathered by the MSHA accident investigation team, it is evident that on May 19, 2006, the outby foreman and a mine examiner used a non-permissible, battery powered personnel carrier (designated as Company No. 4) to travel in the main return air course of the mine. The non-permissible personnel carrier was used by the two men as they conducted the required weekly examination of the return air course and return seals.

It is evident that on May 20, 2006, the afternoon shift foreman and another employee used a non-permissible, battery powered personnel carrier (designated as Company No. 3) to travel in the main return air course of the mine. The personnel carrier was driven in the return air course from the B Left working section to the No. 3 return seal, a distance of approximately 1,000 feet.

The accident investigation team issued two S&S, section 104(d)(1) orders (7408998 and 7408999) for these noncontributory violations of 30 CFR 75.507-1(a).

Interviews of mine personnel conducted by the accident investigation team revealed this was a common practice at the mine. Interviews further indicated that examiners

had taken non-permissible battery powered personnel carriers into the return entries during their weekly examinations.

During their interviews with the internal review team, inspectors stated that they never questioned mine personnel about the use of non-permissible equipment in the return entries. However, one inspector stated that he was unsure if he should examine outby equipment for permissibility. He further stated that he had examined the return entries from a battery-powered personnel carrier without checking the personnel carrier for permissibility. The internal team determined that at the time of the explosion there were no permissible personnel carriers at the Darby Mine.

Conclusion: District 7 enforcement personnel did not make an effort to determine if the personnel carriers were permissible.

Enforcement of 30 CFR 75.507-1(a)

Permissibility requirements for electrical equipment used in return air

Requirement: Mandatory safety standard 30 CFR 75.507-1(a) requires that all electric equipment, other than power-connection points, used in return air outby the last open crosscut in any coal mine shall be permissible.

Title 30 CFR Part 19 requires, in pertinent part, that battery powered cap lamps be constructed such that both polarities of the battery are not accessible externally.

Statement of Facts: Based on information gathered by MSHA's accident investigation team during the course of a fatal accident investigation, it is evident that a Koehler cap lamp battery was not maintained in permissible condition. The receptacle housing on the power take-off (PTO) had been altered in a way that could permit external access to the negative contact. Physical evidence recovered from the scene of the accident indicates the battery was being used at the No. 3 return seal on May 20, 2006, when a methane gas explosion occurred, resulting in the death of a foreman and four other miners.

MSHA's accident investigation team issued a section 104(a) citation (7409000) for this noncontributory violation of 30 CFR 75.507-1(a).

The accident investigation team could not determine who modified the cap lamp PTO, or who had knowledge that it was modified. The team indicated that the modification was "fairly obvious and should have been seen and corrected by the operator."

The *Coal General Inspection Procedures Handbook* does not explicitly instruct inspectors to inspect cap lamps during their inspections. Interviews conducted by the internal

review team indicated that inspectors did not examine cap lamps for modifications or damage.

Conclusion: District 7 enforcement personnel did not always examine cap lamps during regular inspections. The internal review team could not determine if an MSHA inspector observed the modified cap lamp.

Enforcement of 30 CFR 75.1502(d)

Mine emergency evacuation and firefighting program of instruction

Requirement: Mandatory safety standard 30 CFR 75.1502(d) was promulgated as an emergency temporary standard pursuant to Section 101(b) of the Mine Act on March 9, 2006. The effective date of this standard was April 10, 2006.

Mandatory safety standard 30 CFR 75.1502 states that each operator of an underground coal mine shall adopt and follow a mine emergency evacuation and firefighting program that instructs all miners in the proper evacuation procedures they must follow if a mine emergency occurs, location and use of firefighting equipment, and location of escapeways, exits, and routes of travel to the surface. Such program of instruction shall be approved by the District Manager of the Coal Mine Safety and Health district in which the mine is located. Before implementing any approved revision to the program of instruction, the operator shall instruct persons affected by the revision in any new provisions.

MSHA Policies and Procedures: *CMS&H Memorandum No. HQ-03-021-A,* issued on March 5, 2003, revised MSHA's policy on the observation/discussion of fire drills. This directive instructs inspectors, during the course of the regular inspection, to schedule his or her activities to observe simulated fire drills when possible and conduct discussions with the miners to ensure they are familiar with specific procedures in the event of an emergency. These observations and contacts should be documented in the inspection notes.

Program Information Bulletin P06-07, issued on April 17, 2006, requires mine operators to revise mine emergency evacuation and firefighting program of instruction to comply with 30 CFR 75.1502(d).

Chapter 3 of the *Coal General Inspection Procedures Handbook* directs inspectors to thoroughly examine all record books required by the Mine Act and regulations.

Statement of Facts: The MSHA accident investigation team determined that the mine operator did not submit a revised mine emergency evacuation and firefighting program

of instruction to the District 7 Manager by April 10, 2006. The revised program of instruction was submitted on July 10, 2006, and approved on July 12, 2006.

MSHA's accident investigators issued a non-S&S, section 104(a) citation (7488606) for this noncontributory violation of 30 CFR 75.1502(d).

The review by the accident investigation team also revealed that the mine operator had a valid purchase order for lifelines dated March 8, 2006, and for additional SCSRs, dated April 24, 2006, as required by the new Emergency Temporary Standard.

The internal review team determined that the Darby Mine was one of seven mines inspected by the Harlan field office that had not submitted the revised program of instruction by the April 10, 2006, deadline. Out of 35 active mines inspected out of the Harlan field office, 28 (80%) had submitted the revised program of instruction by the April 10, 2006, due date. Out of 79 active mines in District 7, 50 (63%) had submitted the revised program of instruction by the due date.

The internal review team determined that at the time of the fatal explosion, 23 percent of the underground mines in District 7 had lifelines installed and 63 percent had valid purchase orders. The remaining 14 percent had received the lifelines but had not begun to install them. All but one mine in District 7 had valid purchase orders for SCSRs, and a citation was issued at that mine.

District 7 inspectors were assigned to visit mines and training sessions to observe miners donning SCSRs during training.

Conclusion: The internal review team determined that District 7 enforcement personnel were familiar with the requirements of the new Emergency Temporary Standard and made a reasonable effort to implement the new standard in a timely manner. The Darby Mine was one of seven mines out of the Harlan field office that had not submitted a revised program of instruction by the April 10, 2006, deadline. District 7 personnel should have issued a citation for a violation of 30 CFR 75.1502(d).

Enforcement of 30 CFR 75.1714(b), 75.1714-3(a), 75.1714-3(d), 75.1714-3(e) and 75.1714-4(a)

Self rescue devices

Requirement: Mandatory safety standard 30 CFR 75.1714(b) requires that before any miner employed by the operator or visitor authorized by the mine operator goes underground the operator shall instruct and train such person in the use and location of the self-rescue device or devices made available at the mine. Instruction and training of

miners and visitors shall be in accordance with the provisions set forth in 30 CFR Part 48.

Mandatory safety standard 30 CFR 75.1714-3 establishes requirements for inspection, testing, maintenance, repair, and recordkeeping of self-rescue devices.

Subsection (a) states that each operator shall provide for proper inspection, testing, maintenance, and repair of self-rescue devices by a person trained to perform such functions.

Subsection (d) states that all SCSRs approved by MSHA and NIOSH under 42 CFR Part 84 shall be tested in accordance with instructions approved by MSHA and NIOSH. Any device which does not meet the specified test requirements shall be removed from service.

Subsection (e) states that at the completion of each test required by paragraphs (c) and (d) of this section the person making the tests shall certify by signature and date that the tests were done. This person shall make a record of all corrective action taken. Certifications and records shall be kept at the mine and made available on request to an authorized representative of the Secretary.

Mandatory safety standard 30 CFR 75.1714-4 was promulgated as an emergency temporary standard on March 9, 2006. The effective date of this standard was April 10, 2006. Subsection (a) states that in addition to the requirements of sections 75.1714, 75.1714-1, 75.1714-2, and 75.1714-3, the mine operator shall provide for each person who is underground at least one additional SCSR device, which provides protection for a period of 1 hour or longer, to cover all persons in the mine.

MSHA Policies and Procedures: Chapter 3 of the *Coal General Inspection Procedures Handbook* directs inspectors to evaluate the operator's compliance with approved self-rescuer condition-of-use requirements by:

- Inspecting a representative number of each type of device in use at the mine, but not less than ten percent. A higher percentage should be inspected when devices are worn or carried or machine or equipment mounted. These inspections should be conducted in accordance with the manufacturer's approved daily inspection procedures; and

- Reviewing the mine operator's records of self-rescuer tests. If possible, the inspector should also determine if the operator followed the manufacturer's approved test procedures.

Chapter 3 of the handbook also directs inspectors to evaluate the adequacy of SCSR training by discussing donning procedures with a representative number of individual miners to ascertain their understanding of how to use the SCSR. If inspectors are made aware of any self-rescuer training deficiencies, they should report them to the district training liaison/specialist. Chapter 3 further directs inspectors to thoroughly examine all record books required by the Mine Act and regulations.

Chapter 8 of the handbook, in pertinent part, instructs inspectors to document the number of miners with whom SCSR donning procedures were discussed to evaluate the adequacy of SCSR training. Inspection notes should also include the following for each self-rescue device inspected:

- Name of the manufacturer, model and serial number, and date of manufacture;
- Method of deployment, i.e., worn or carried, machine mounted, stored or cached underground, stored or warehoused on the surface;
- Location of the device at the time of inspection; and
- Date the mine operator last tested the device.

Program Information Bulletin (PIB) P99-05 informs the mining industry of corrective action required to provide reasonable assurance that CSE SR-100 SCSR devices that may exhibit a higher-than-normal level of carbon dioxide (CO_2), when being used, are identified and removed from service as quickly as possible.

PIB P99-05 directs MSHA inspectors to review the information provided by the manufacturer on the distribution of the materials to affect mine operators. Based on this information, MSHA inspection personnel will begin: 1) monitoring the mine operators' progress on conducting the required examinations; and 2) conducting a visual examination and Acoustic Solids Movement Detector (ASMD) instrument test on a representative number of CSE SR-100 SCSR devices in use at a mine.

In accordance with PIB P99-05, mine operators will be subject to appropriate enforcement action if it is determined that:

- The mine operator did not conduct the required examinations on each device in use at the mine within the established time period;
- A record was not made of those devices that failed the visual examination or the ASMD instrument test;

- Devices that failed the visual examination were not removed from service immediately;

- Appropriate action has not been taken to remove a device from service, as soon as possible, that failed the ASMD instrument test; or

- The mine operator has not taken appropriate measures to conduct the required daily visual examination on the devices that are being worn or carried by the miners.

PIB P99-05 also states that MSHA will not take enforcement action if an inspector finds a device in service that does not pass the ASMD instrument test, provided (1) it can be determined that the mine operator conducted the ASMD instrument test within the established time period, and (2) the operator takes appropriate action to have the affected device(s) replaced as soon as possible.

Statement of Facts: The MSHA accident investigation team determined that two miners who began employment with the mine on February 6, 2006, and February 27, 2006, were not properly trained in the use of self rescue devices before working underground. The operator did not use a SCSR training model during instruction given to the two miners. The unit used was a damaged SCSR missing the top and bottom lids, security bands, and goggles. The training plan approved November 15, 2001, required use of a training model and hands on 3+3 donning during instruction in the use of self rescue devices. The MSHA investigation team issued an S&S, section 104(a) citation (7061237) for this noncontributory violation of 30 CFR 75.1714(b).

The accident investigators found that the mine operator did not provide for proper inspection testing, and maintenance of the CSE SR-100 SCSR units in use at the mine. The following conditions/practices were determined:

- The units were not tested at the required 90-day intervals. The last recorded Acoustic Solids Movement Detector tests were performed 115 days prior to May 20, 2006. The test prior to that was performed on July 18, 2005, an interval of 190 days.

- The mine operator did not conduct tests according to manufacturer's recommendations for using the ASMD unit to determine the integrity of the individual SCSR units. The motion used to test the SCSRs was horizontal instead of a vertical (up and down) motion.

- SCSRs were not always inspected each time they were worn.

- The record book was not always signed certifying the tests were conducted.

The accident investigation team issued an S&S, section 104(d)(1) order (7168181) for this noncontributory violation of 30 CFR 75.1714-3(a).

The MSHA accident investigation team found that an examination of the record of the results of the testing of the self contained self rescue devices (SCSR) shows that the required 90-day examination or test of the CSE SR-100 was not conducted as required. An examination of the SCSRs at the Darby No. 1 Mine was due to be conducted by April 25, 2006. Records have been provided to show that the last examination conducted was on January 25, 2006. MSHA accident investigators issued an S&S, section 104(d)(1) order (7098940) for this noncontributory violation of 30 CFR 75.1714-3(d).

MSHA accident investigators determined that the operator failed to maintain the self contained self rescuers (SCSR) at the Darby Mine No. 1 during a period from July 18, 2005, through May 20, 2006. The record of the results of the 90-day examination of the SCSRs at the mine revealed that on July 18, 2005, a CSE SR-100, Serial No. 85920, was identified in the record as "bad." The SCSR was assigned to a miner and was not removed from service or replaced as required. The accident investigation team issued an S&S, section 104(d)(1) order (7098941) for this noncontributory violation of 30 CFR 75.1714-3(d).

MSHA accident investigators determined that the record of the results of the 90-day examination of the self contained self rescuers (SCSR) was not properly maintained. The person making the tests of the CSE SR-100 SCSR did not certify by signature and date that the tests were done. The person making the test also failed to note what actions were taken when SCSRs were found not to pass the test with the acoustics solid movement detector. Based on statements made during the investigation of the fatal mine explosion at the Darby Mine No. 1, on May 20, 2006; the examinations of the SCSRs at the mine were conducted by Mitchell Tom Lunsford who was also a certified mine examiner. The accident investigation team issued a non-S&S, section 104(a) citation (7098942) for this noncontributory violation of 30 CFR 75.1714-3(e).

The MSHA accident investigation team found that the operator failed to comply with the Emergency Temporary Standard (ETS) that became effective March 9, 2006. An order for additional self contained self rescue devices (SCSR) was not made by the operator until April 24, 2006. The accident investigators issued a non-S&S, section 104(a) citation (7098943) for this noncontributory violation of 30 CFR 75.1714-4(a).

The accident investigation team determined that when the tests were made on seven of the SCSRs that were being used on January 25, 2006, six of them had to be removed from service. Four of the units were removed from service because the heat indicators had turned from white to red.

The internal review team determined that inspectors were generally familiar with the requirements of 30 CFR 75.1714. During interviews, District 7 inspection personnel were able to outline the procedures that were to be followed during the regular inspection. Some inspectors, however, were not certain what percentage of SCSRs were required to be inspected.

A review of inspection notes revealed that inspectors documented inspections of SCSRs during all regular inspections during the review period. While the internal review team could not establish how many SCSRs were in service at the Darby Mine, it appears that inspectors checked more than the required 10 percent.

Documentation of SCSR inspections was inconsistent. Inspectors always documented the model number and serial numbers of the SCSRs they examined. During five inspections the dates of manufacture were recorded. Two inspectors documented the method of deployment, or the location of the device at the time of inspection. Five inspectors documented the date the mine operator last tested the device. In both cases, the last test date was within the required 90-day period. A defective SCSR was identified during one inspection.

Three inspectors documented evaluating the adequacy of SCSR training by discussing donning procedures with a representative number of individual miners at the Darby Mine.

During the review period, District 7 inspectors did not cite the Darby Mine for failure to: properly train miners in the use and daily inspection of SCSRs; check and test the SCSRs on the required 90-day interval; remove defective SCSRs from service; and comply with the ETS by ordering additional SCSRs. The Harlan field office cited 77 violations of 30 CFR 75.1714 during the review period. District 7 cited the standard 201 times during the same period.

The review by the accident investigation team also revealed that the mine operator had a valid purchase order dated March 8, 2006, for lifelines, and for additional SCSRs, dated April 24, 2006, as required by the new Emergency Temporary Standard.

The MSHA inspector's first day at the Darby Mine during the second regular inspection for calendar year 2006 was on May 3, 2006, after the mine operator had ordered additional SCSRs. All but one mine in District 7 had valid purchase orders for SCSRs, and a citation was issued at that mine.

Program Information Bulletin P99-05 was not available on MSHA's website.

Conclusion: The internal review team determined that District 7 enforcement personnel were familiar with the requirements concerning the inspection of SCSRs. The inspectors documented the inspection of the SCSRs; however, they failed to recognize deficiencies concerning 30 CFR 75.1714 and take appropriate enforcement action.

Enforcement of 30 CFR 75.1715

Identification check system

Requirement: Mandatory safety standard 30 CFR 75.1715 states that each operator of a coal mine shall establish a check-in and check-out system which will provide positive identification of every person underground, and will provide an accurate record of the persons in a mine kept on the surface in a place chosen to minimize the danger of destruction by fire or other hazard. Such record must bear a number identical to an identification check that is securely fastened to the lamp belt worn by the person underground. The identification check shall be made of a rust resistant metal of not less than 16 gauge.

Statement of Facts: MSHA accident investigators determined that identification tags were not provided on the lamp belts worn underground by the five accident victims. The accident investigation team issued a non-S&S, section 104(d)(1) order (7168178) for this noncontributory violation of 30 CFR 75.1715.

The review team's examination of inspectors' notes revealed that District 7 inspection personnel examined the check-in/check-out board in the lamp room on the surface. In their interviews with the internal review team, the inspectors stated that they inspected the check-in/check-out system located in the lamp room, but did not examine the lamp belts worn by the miners for identification tags.

Conclusion: District 7 inspection personnel understood the requirements of 30 CFR 75.1715. They inspected the check-in/check-out system located in the lamp room, but did not examine the lamp belts worn by the miners for identification tags. As a result the inspectors did not identify the missing identification tags and take appropriate enforcement action.

Mine Rescue and Recovery Operations

Overview: During the review of the rescue and recovery at the Darby Mine, the internal review team found that the District 7 initial response to the explosion was commendable, and District 7 personnel are recognized for their efforts to aid the survivor. All notifications were made as described in the District 7 Mine Emergency Response Procedures Handbook (MERP).

The District 7 members of the Mine Emergency Unit (MEU) responded promptly after being notified. However, their participation and duties were limited until their equipment arrived with the MEU emergency vehicle. This vehicle is maintained at the Academy, approximately 5 hours away from the Darby Mine.

Requirement: Section 103(k) of the Mine Act states that in the event of any accident occurring in a coal or other mine, an authorized representative of the Secretary, when present, may issue such orders as he deems appropriate to insure the safety of any person in the coal or other mine, and the operator of such mine shall obtain the approval of such representative, in consultation with appropriate State representatives, when feasible, of any plan to recover any person in such mine or to recover the coal or other mine or return affected areas of such mine to normal.

MSHA Policies and Procedures: Chapter 6 of the *Coal General Inspection Procedures Handbook* sets forth general procedures to follow when responding to mine emergencies.

MSHA Form 7000-10A, *Guidelines for Inspector's Use in the Event of a Mine Disaster*, sets forth guidelines and procedures to be utilized in the event of a mine emergency. This form is part of the inspector's notebook.

The District 7 MERP handbook sets forth the procedures to be followed by District 7 managers, supervisors, and employees in responding to a full-scale mine emergency. The plan serves as an aid in organization, planning, and training and describes the duties and responsibilities of MSHA personnel involved in an emergency situation.

Administrative Policy and Procedures Manual, Volume III, General Management, establishes MSHA policy for developing, maintaining, and following mine emergency response procedures.

The *Headquarters Mine Emergency Response Procedures Handbook (AH99-III-8)*, outlines procedures to be followed by MSHA headquarters organizations and selected field organizations in responding to a full-scale mine emergency.

Statement of Facts: This section of the report deals with MSHA's response to the explosion at the Darby Mine on May 20, 2006, and covers the following topics: Initial MSHA response to the explosion; availability and adequacy of gas detection equipment; organization of mine rescue and recovery operations underground; availability of Mine Emergency Unit (MEU) team members and equipment; communications and cooperation between MSHA, State, and independent teams; and headquarters emergency response procedures.

Initial MSHA Response to the Explosion

The District 7 MERP sets forth the procedures to be followed by District 7 managers, supervisors, and employees in responding to a full-scale mine emergency. The plan serves as an aid in organization, planning, and training and describes the duties and responsibilities of MSHA personnel involved in an emergency situation.

On May 20, 2006, at 1:00 am, an explosion occurred at the Darby Mine. The mine superintendent notified a Harlan field office supervisor at approximately 1:05 a.m. The supervisor immediately notified other MSHA personnel and officials and dispatched personnel to the mine site. The first MSHA inspector arrived at the mine at 1:54 a.m. and issued a verbal section 103(k) order to ensure the safety of all persons until an investigation could be completed. District 7 managers, supervisors, and inspectors arrived at the mine site at various times during the night. MSHA officials, the Kentucky Office of Mine Safety and Licensing (KOSML), and the mine operator established a command center at the mine office for directing rescue operations. District 7 notified Coal Mine Safety and Health headquarters of the explosion at 2:15 a.m. MSHA's MEU and Technical Support personnel were notified at approximately 3:15 a.m. and dispatched to the mine site.

Availability and Adequacy of Gas Detection Equipment

30 CFR Part 49 sets forth requirements for availability of mine rescue teams, equipment, and capability for purposes of emergency rescue and recovery. This standard further requires that each mine rescue station be provided with two gas detectors appropriate for each type of gas which may be encountered at mines served.

Chapter 6 of the *Coal General Inspection Procedures Handbook* establishes procedures for responding to mine emergencies. Pertinent provisions of the handbook instruct the first MSHA personnel arriving at a mine after notification of a mine emergency to initiate the following actions:

- Advise company officials to have qualified persons make carbon monoxide and methane tests at each exhausting surface fan and keep a log of the results obtained.

- Upon arrival underground, check returns for methane, carbon monoxide, and other gasses if this can be done safely and advise company officials to assign persons to continuously sample the returns and report the results.

- Report all gas readings and mine conditions to the MSHA person in charge of the log, and keep a record of time, location, and gas readings in a notebook. Make sure that the gas detecting devices are accurate.

At 2:01 am, MSHA personnel using handheld MSA Solaris (Solaris) multiple gas detectors began taking air quality readings at the mine fan to establish mine conditions.

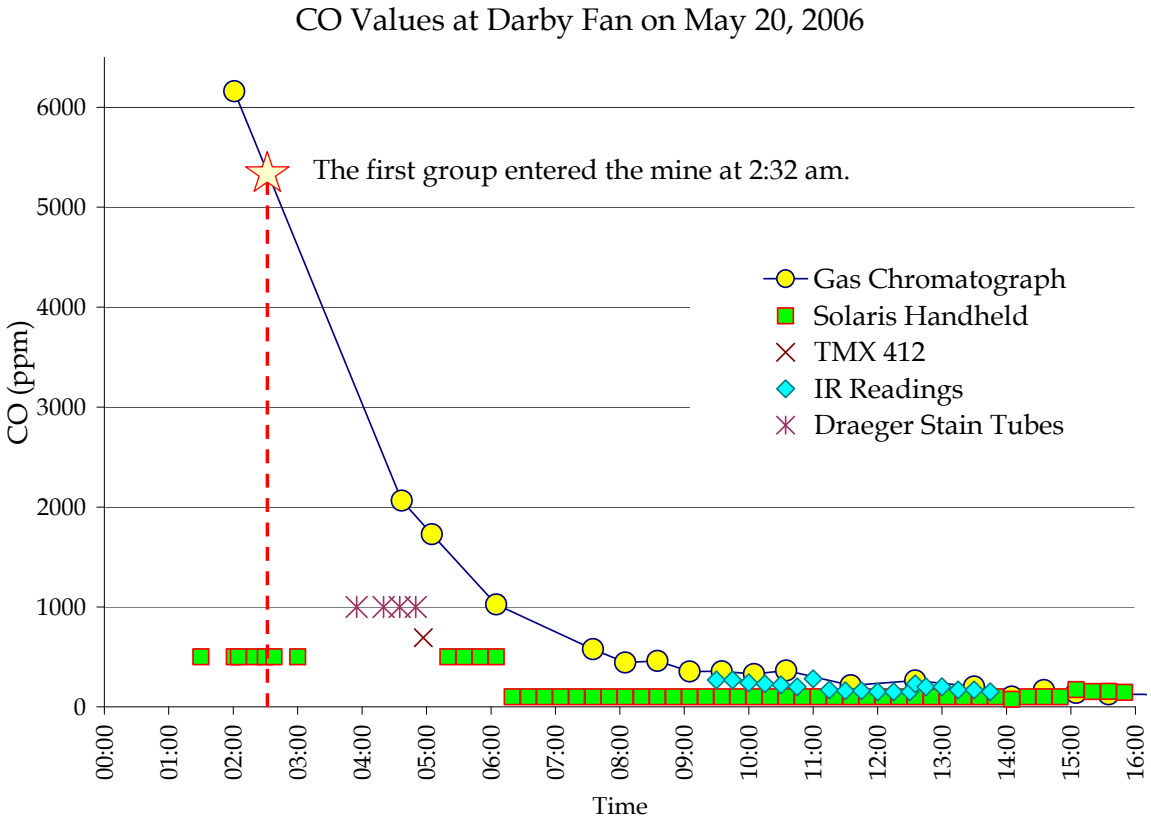
The initial and subsequent readings taken with the Solaris at the fan indicated carbon monoxide (CO) levels above 500 parts per million (ppm) until 6:20 am when the CO readings decreased to 100 ppm.

At 3:55 am, a CO level greater than 1,000 ppm was measured using a Draeger handheld pump with stain tubes. Subsequent stain tube readings for CO at 4:20 am, 4:35 am, and 4:50 am indicated the CO levels remained unchanged. The handheld detectors available to MSHA personnel, KOSML, and company mine rescue teams (MSA Solaris and TMX 412 multiple gas detectors) were not capable of measuring CO concentrations in excess of 500 ppm and 1,000 ppm respectively. The Draeger stain tubes were similarly limited to 1,000 ppm CO.

At 9:30 am, electro chemical (EC) and infrared (IR) instruments from District 5 were set up and used to monitor the mine atmosphere at the fan. EC readings indicated CO levels ranging from 150 ppm to 280 ppm until 1:45 pm. At 1:45 pm, approximately 14 hours after the explosion, the CO readings were determined to be low enough to rely on handheld detectors.

Bottle samples collected at the fan on May 20, 2006, were analyzed with a gas chromatograph on May 24 and 25, 2006. The sample results were; 6,162 ppm CO at 2:01 am, 2,064 ppm CO at 4:37 am, 1,727 ppm CO at 5:05 am, and 1,025 ppm CO at 6:05 am. The bottle samples confirmed CO levels measured at the main exhaust fan exceeded 5,000 ppm when personnel entered the mine barefaced at 2:32 am.

During the event, the Solaris and TMX 412 handheld detectors experienced over-range levels of CO, making them unreliable for the underground rescue and recovery operations, particularly during barefaced exploration. Additionally, MSHA personnel did not have the capability of establishing air quality trends due to the limitations of the available gas detection equipment. Identifying trends in CO levels is essential in determining the existence and or extent of a fire in the mine.



The following table shows the symptoms associated with a given concentration of CO over time.

PPM CO	Time	Symptoms
50	8 hours	Maximum exposure allowed by MSHA in the workplace over an 8-hour period.
200	2-3 hours	Mild headache, fatigue, nausea and dizziness.
400	1-2 hours	Serious headache-other symptoms intensify. Life threatening after 3 hours.
800	45 minutes	Dizziness, nausea and convulsions. Unconscious within 2 hours. Death within 2-3 hours.
1,600	20 minutes	Headache, dizziness and nausea. Death within 1 hour.
3,200	5-10 minutes	Headache, dizziness and nausea. Death within 1 hour.
6,400	1-2 minutes	Headache, dizziness and nausea. Death within 25-30 minutes.
12,800	1-3 minutes	Death

Organization of Mine Rescue and Recovery Operations Underground

Chapter 6 of the *Coal General Inspection Procedures Handbook* instructs inspectors upon arrival underground to check returns for methane, carbon monoxide, and other gasses if this can be done safely and advise company officials to assign persons to continuously sample the returns and report the results.

Instructor's Manual for Mine Rescue Training – Coal (IG 7), and *Principles of Mine Rescue (*IG 16) set forth established basic principles of mine rescue and recovery. While these materials are not formal policies, they do provide MSHA enforcement personnel with important guidelines to follow during a mine rescue and recovery operation. These materials have been designed in accordance with the Federal requirements for mine rescue team training under 30 CFR Part 49 to satisfy the requirement for 20 hours initial training on the use, care, and maintenance of a mine rescue team's breathing apparatus as well as to satisfy the requirement for at least 40 hours of advanced or refresher training annually. The materials are also used for 12 hours of mandatory training for all entry-level coal mine inspectors. The following are excerpts from these documents that address specific issues found by the internal review team.

IG7 states the following:

- During a mine emergency, it is very important to determine the condition of the ventilation system as quickly as possible. This includes knowing the condition of the ventilation controls and knowing the directions and velocity of the underground airflow.

- Barefaced exploration should stop at any point where disruptions in ventilation are found, or when gas tests indicate the presence of any carbon monoxide or other noxious gases, elevated methane readings, or oxygen deficiency.

- Barefaced exploration should be conducted only when the ventilation system is operating properly and frequent gas tests indicate that there is sufficient oxygen and no build up of carbon monoxide.

- A backup crew with apparatus should be stationed outside the area, ready to go immediately to rescue the others if necessary.

- A fresh air base is established at the point where conditions no longer permit barefaced exploration. Teams equipped with apparatus continue exploration from the fresh air base.

- The fresh air base site should be situated where it can be linked to the command center by means of a communication system. There should also be a communication system to link the team and the fresh air base.

- When the fresh air base is set up underground, an airlock must be built to isolate the fresh air base from the unexplored area beyond it.

- The officials at the command center need to receive accurate information from the team regarding the ventilation controls. They need to be kept well informed about conditions underground so that they can make the appropriate decision as to what changes to make in the ventilation.

- Mine rescue teams should never alter ventilation without direct orders from the command center. The command center considers several factors before it considers a change in ventilation, most importantly; it has to consider how the alterations will affect ventilation into an unexplored area.

IG 16 states the following:

- As recovery work progresses, the mine telephone system must be extended to the fresh air base to stay abreast of rescue efforts. Communication line will be used by rescue team to fresh air base.

- If an area needs to be airlocked, ventilation should not be altered until explored.

- Whenever possible, recovery of bodies should be done in fresh air.

Appendix B of the District 7 MERP stipulates that travel in any area of the mine shall not be permitted without prior approval of the Authorized Representative (AR) in charge at the mine site, except for travel in positive intake airways that are not affected by the fire or explosion.

At 2:32 am, three MSHA personnel, one Darby Mine employee, and one KOSML inspector entered the mine barefaced (no breathing apparatus designed for mine rescue was worn or carried). The lone survivor of the explosion was located at 3:10 am at crosscut 13.

The five men traveled the positive intake entry to crosscut 15 where they observed an equipment door (ventilation control) blown out between the belt and intake entries. Prior to traveling to crosscut 15, the five men did not examine entries adjacent to or behind them to determine physical conditions; specifically in the belt and return entries. The mine atmosphere and conditions were only examined in the immediate intake

entry while advancing. Although they did not check the returns or adjacent entries until they stopped at crosscut 15, they established a fresh air base (FAB) at crosscut 15.

From crosscut 15, the five men separated and continued to advance barefaced. Communications were not established between themselves, the fresh air base or the command center. During this time, back up personnel equipped with self-contained breathing apparatus were not available outside.

Three of the men traveled through the damaged equipment door to the No. 3 belt drive and encountered three permanent stoppings damaged between the belt and return entries. Personnel advanced barefaced three crosscuts inby the belt drive where they encountered CO ranging from 80 to over 500 ppm (the limit of the Solaris detector). They retreated to 15 crosscut and traveled inby five crosscuts in the intake entry. After encountering 80 ppm CO, they retreated to 15 crosscut. These individuals remained underground until 5:16 a.m.

The first mine rescue team entered the mine at 4:00 am and traveled to the FAB. They subsequently explored the mine individually without a back up mine rescue team stationed at the fresh air base. As a result, communications were not maintained between the command center and the mine rescue team. The second mine rescue team entered the mine at 4:32 am and traveled to the fresh air base. They advanced toward B Left Section in the intake entry, leaving two members at the fresh air base. This resulted in two teams working inby the fresh air base without proper back-up teams.

At 8:50 am, after all of the victims were accounted for, exploration continued in the area of the A Left seals and B Left Section. A mine rescue team member was encountered exploring B Left alone, without an apparatus, in an area where ventilation had not been restored. CO levels of 360 ppm were detected where this team member was exploring.

Temporary curtains were installed to replace the damaged ventilation controls in the intake to advance the fresh air base. The installation of the temporary curtains in the intake entry was not reported to the command center and resulted in air being directed into unexplored areas. Temporary curtains were also installed between the belt and return entries. This corrected the short circuit caused by the damaged stoppings and ventilated the area to facilitate barefaced recovery of the victims.

Availability of MSHA Mine Emergency Unit (MEU) Members and Equipment
District 7 currently employs five members of the MEU team. The nearest MEU equipment cache is located in Beckley, West Virginia, several hours from the District.

In accordance with the District and National Mine Emergency Response plans, members of the MEU were dispatched to the mine site. Individual members from District 7 arrived at various times during the rescue and recovery period. The Mine

Emergency Operations (MEO) specialist, stationed at the Academy, was notified at 3:15 am, 2 hours and 15 minutes after the explosion. This specialist notified three additional members of the MEU unit and they assembled at the Academy, where they loaded the appropriate equipment in the trucks, trailers, and mobile command center. They were en route by 5:00 am and arrived at the Darby Mine at 9:00 am.

The first two District 7 MEU members arrived at the mine at 3:45 a.m. They requested to borrow two breathing apparatuses from a State mine rescue team and were denied. Equipment was later provided by a company team. The MEU member's assigned apparatuses did not arrive at the mine site until 9:00 am with the MEO unit mobile command center.

Communications and Cooperation between MSHA, State and Independent Teams
The District 7 MERP documents that the function of MSHA personnel is to advise and monitor, not direct rescue operations. The District 7 MERP states that the responsibility of the Operations Director is to direct the activities of the persons assigned to rescue activities and the responsibility of the Rescue Activities Supervisor is to direct the in-mine rescue and recovery activities.

The District 7 MERP also sets forth responsibilities and duties of MSHA personnel assigned to the fresh air base. These duties are to ensure that the procedures used are consistent with generally accepted mine rescue practices, and the safety of the teams is not jeopardized by the instructions given to them. In addition, MSHA personnel assigned to the fresh air base are required to scrutinize the activities of the team to ensure that proper mine rescue procedures are followed, evaluate the progress of the teams, recommend courses of action to the Rescue Activities Supervisor, and withdraw personnel from the mine, when in his judgment, the underground situation has deteriorated so that lives of the rescue workers are endangered.

A section 103(k) order was issued by MSHA to assure the safety of all persons in the mine until an investigation is made to determine the mine is safe. The section 103(k) order specified that only persons selected from company officials, state officials, miner's representative and other persons deemed necessary by MSHA to have information relative to the investigation may enter the mine.

Prior to the arrival of mine rescue teams and the establishment of a command center, personnel from KOSML notified MSHA that they were going to send people underground. At 2:32 am, a KOSML inspector entered the mine with one company and three MSHA personnel.

At around 2:32 am, a command center was established with KOSML, and the mine operator. At 3:50 am, senior officials from MSHA arrived and assumed this responsibility in the command center. KOSML was the first mine rescue team to enter

the mine at 4:00 am. They explored the mine individually, without an attendant at the fresh air base, and without establishing communications to the surface.

Interviews conducted by the internal review team determined that MSHA personnel believed that KOSML had a right of entry into the mine and therefore MSHA had no authority to limit or deny their activities. All documentation and information received from the command center, and interviews, revealed minimal communications between the advancing mine rescue teams and the command center.

Headquarters Emergency Response Procedures

MSHA Handbook number AH99-111-8, states than an Emergency Information Center (EIC) shall be established in the command center in MSHA headquarters to gather information from the ongoing rescue and recovery operation to disseminate current and factual information to the public. A person will be selected to direct operations in the EIC, with the primary duty to resolve any issues that may arise within the EIC. It remains the duty of the of MSHA officials onsite to direct rescue and recovery activities.

Chapter 2 of the handbook states that a log shall be established and maintained of communications from the mine site or District office regarding rescue and recovery operations.

Interviews revealed that the log of the Darby Mine event was not preserved by the Director of the EIC as required in the Headquarters MERP. There are currently no procedures in place for a review and analysis of MSHA's rescue and recovery efforts.

Conclusion: The District 7 personnel responded to the explosion in a timely manner and notified all appropriate personnel in accordance with the District 7 MERP. Immediately upon arrival at the mine, District 7 personnel began sampling for contaminants at the main exhaust fan. However, the available gas detection equipment was inadequate for evaluating elevated CO levels, making it difficult to establish air quality trends, and evaluate mine conditions. The readings from the Solaris and TMX 412 detectors were inaccurate after exposure to over range CO levels. The available hand held detectors were over range for CO readings for 5 hours (TMX 412) and 6 hours (Solaris) after the explosion occurred.

The hand held detectors utilized by KOSML and company mine rescue teams also were not capable of measuring CO concentrations in excess of 1,000 ppm.

District 7 management did not ensure that the criteria set forth in the District MERP and the *Coal General Inspection Procedures Handbook* was followed.

The initial group that entered the mine barefaced did not follow established mine rescue and recovery procedures. They explored inby cross cut 15 with high CO levels

individually and without maintaining constant communications with the command center. A back up team was not available. If anyone had experienced problems, their chance of survival would have been diminished. These people were not withdrawn when trained mine rescue teams arrived underground.

The mine rescue teams did not follow established mine rescue and recovery procedures. Mine rescue team members explored the mine individually and without back-up teams. The teams randomly encountered members of the other mine rescue teams exploring alone and without knowing the location of their own team members.

Constant communications were not maintained between the teams, the fresh air base, and the command center. Critical information was not relayed to the surface which compromised the command center's ability to direct a safe rescue and recovery operation.

When advancing the fresh air base, ventilation changes were made to unexplored areas where the affects were unknown. The command center was not consulted prior to making the ventilation changes and the following had not been determined: the location of the explosion; hazardous gas accumulations; the extent of damage to ventilation controls; and the presence of a fire. It was later determined that energized battery powered equipment was located throughout the mine.

Until 9:00 am when the Mobile Command Center arrived, District 7 MEU members did not have the necessary equipment on site to fully perform their duties as mine rescue personnel. This was after all of the victims had been located.

There are currently no procedures in place for a review and analysis of MSHA's performance during a rescue and recovery operation. An analysis of MSHA's actions during mine emergencies is critical for improving procedures and methodology in the event of future occurrences.

Plan Approvals

Mine Ventilation Plan - *Review and Approval*

Requirement: Mandatory safety standard 30 CFR 75.370(a) requires 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 systems at the mine. The ventilation plan is required to consist of two parts; the plan content prescribed in 30 CFR 75.371 and the ventilation map with information prescribed in 30 CFR 75.372. Only that portion of the map that contains information required by 30 CFR 75.371 is subject to approval by the district manager.

Mandatory safety standard 30 CFR 75.370(g) requires the mine ventilation plan to be reviewed by an authorized representative of the Secretary at least every 6 months to assure that the plan is suitable to the current conditions in the mine.

Mandatory safety standard 30 CFR 75.372(b) requires the mine ventilation map to show the locations of all ventilations controls, including permanent stoppings, and the direction and quantity of air entering and leaving each split. This standard also requires that the location of proposed seals for each worked out area be shown on the ventilation map.

MSHA Policies and Procedures: The MSHA *Program Policy Manual* outlines basic principles to be applied in administering each district's mine plan approval responsibilities.

The *CMS&H Mine Ventilation Plan Approval Procedures Handbook* issued on May 27, 1992, established guidelines and instructions for evaluating and processing mine ventilation plans. The handbook states that the purpose of the mine ventilation plan is to define minimum ventilation requirements and dust controls for normal conditions.

The *Coal General Inspection Procedures Handbook* states that during every regular inspection at an underground coal mine, the inspector shall determine that all approved plans are being followed, are up-to-date, and are appropriate.

Statement of Facts: District 7 had a formal standard operating procedure (SOP) for review and approval of ventilation plans. Ventilation plans, mine maps, and revisions are received in the District Office Technical Division. The ventilation plan or revision is mailed as soon as possible to the appropriate miners' representative allowing for comments. The ventilation specialist or engineer will review the plan, map, or revision and forward it to the District ventilation supervisor with a recommendation. The field office supervisor or inspector will review and comment to the ventilation supervisor or Assistant District Manager, Technical Division. The Technical ADM will make his recommendation for approval or disapproval. The plan, map, or revision is forwarded to the District 7 Manager who sends written correspondence to the operator regarding the results of the review. District 7 allotted 45 calendar days for the plan approval process.

District 7 utilizes the Mine Plan Approval (MPA) database to track all ventilation plan reviews for oversight. Plan actions are also manually tracked and are reported to the ADM on a regular monthly basis and in a detailed quarterly report to the ADM.

The District 7 ventilation supervisor retired on January 3, 2006. The district had two full time ventilation specialists and one trainee who was not an authorized representative

(AR). After the retirement of the supervisor, one specialist was assigned to act in the supervisory position. In February the other specialist was assigned to conduct regular inspections, and retired the following month. From February until May the ventilation department consisted of one trainee and one AR who was acting supervisor. The trainee attended CMI training 5 weeks during the period from January to May leaving only the acting supervisor.

The ventilation department was months behind in reviewing plans during the period January through May 2006. The ventilation department was understaffed and specialists did not conduct any of the 6-month plan reviews. First priority was given to address any plan revision resulting from a citation or order.

The preamble to the 1992 ventilation standards states that MSHA "does not consider air courses that are common only at each end to be the same air course if the separation between the common openings is more than 600 feet." In 1996, MSHA revised the ventilation standards determining that 600 feet was too restrictive and allowed parallel entries to be considered common if common at both ends. On July 25, 2002, the Review Commission reversed MSHA's interpretation of the rule and required parallel entries separated at 600-foot intervals to be considered common (back to the original 1992 interpretation). CMS&H Headquarters did not communicate the Commission Decision to enforcement personnel.

In November of 2005, CMS&H headquarters conducted an accountability review in District 7. One of the issues was that District 7 considered air courses as common when they were connected at both ends. Training was scheduled to address the deficiencies found during the accountability review.

A meeting was held in February of 2006 at a local college with all District 7 employees attending. At this meeting the findings of the accountability review and the corrective actions as prescribed by the District 7's Action Plan were discussed.

The ventilation specialist understood the requirements of 30 CFR 75.333(d)(3) requiring the installation of equipment doors to be in pairs to form an airlock. During interviews, the specialist stated that if the legend on the ventilation map did not indicate equipment doors, it was understood that all doors were personnel doors. The ventilation specialist stated that they would have no reason to know that equipment doors were in the mine. The specialist further stated this oversight would have been corrected during 6-month ventilation reviews by the ventilation department when conducting mine visits.

During interviews it was stated the ventilation department does not check pressure recording gauges at mine fans for accuracy. The only time this test would be conducted is if an inspector had questioned the accuracy of the recording gauge and requested the ventilation department to check the fan pressure. Since the District 7 ventilation

department did not conduct onsite ventilation plan reviews, fan pressures had not been checked.

The mine ventilation map for the Darby Mine did not show the locations of all permanent ventilation controls as required by 30 CFR 75.372. Overcasts were shown on the map to ventilate the parallel mains but had not been installed as projected. Ten sets of equipment doors were not installed in pairs.

A review of the inspection reports revealed that inspectors had documented a review of the mine ventilation plan during seven of the eight regular inspections. During each review, they documented on Form 2000-204 that the plan was adequate.

Conclusion: A number of issues were identified in the ventilation plan for the Darby Mine, including common air courses, air-lock doors, and an inaccurate ventilation map. These issues should have been identified during regular inspections. However, a properly staffed ventilation department would have been more effective in assisting inspectors in recognizing these issues.

The District 7 Ventilation Department was understaffed during the review period. The Ventilation Group worked diligently to perform their duties as set forth by MSHA policy, procedures, and regulations.

Mine Ventilation Plan - *Approval of Omega Block Alternative Seals*

Requirement: Section 303(z)(2) of the Federal Mine Safety and Health Act of 1977 states that "all areas from which pillars have been wholly or partially extracted, and abandoned areas, as determined by the Secretary or his authorized representative, shall be ventilated by bleeder entries or by bleeder systems or equivalent means, or be sealed, as determined by the Secretary or his authorized representative." The section further states that "When sealing is required, such seals shall be made in an approved manner so as to isolate with explosion-proof bulkheads such areas from the active workings of the mine."

Mandatory safety standard 30 CFR 75.334 requires that worked-out areas of coal mines be ventilated or sealed. Paragraph (e) requires that each mining system be designed so that each worked out area can be sealed. The approved ventilation plan shall specify the location and sequence of construction of proposed seals. This requirement is also contained in the requirements for mine ventilation plans outlined in 30 CFR 75.371(bb).

Construction requirements for seals are contained in 30 CFR 75.335 which provides for two options:

- 30 CFR 75.335(a)(1) specifies requirements for constructing seals using solid concrete blocks; or

- 30 CFR 75.335(a)(2) specifies in pertinent part that "Alternative methods or materials may be used to create a seal if they can withstand a static horizontal pressure of 20 pounds per square inch provided the method of installation and the material used are approved in the ventilation plan."

Mandatory safety standard 30 CFR 75.370(a)(1) requires 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. The plan is required to be approved by the district manager. Paragraph (a)(2) requires that the proposed ventilation plan and any revision to the plan shall be submitted in writing to the district manager.

Mandatory safety standard 30 CFR 75.371 indicates the information to be contained in the mine ventilation plan. Paragraph (ff) requires a description of the methods and materials to be used to seal worked-out areas if those methods or materials will be different from those specified by 30 CFR 75.335(a)(1).

Statement of Facts: The Mine Ventilation Plan in effect at the time of the explosion was submitted by the mine operator on July 26, 2005, and approved by the District 7 Manager on September 1, 2005. The approved plan established the following specific requirements for the use of Omega block as an alternate method of seal construction:

- Seals will be hitched 6 inches into the bottom and 6 inches into the ribs.
- An approved bonding and sealant agent (i.e. "BLOCKBOND" or Rite-wall) shall be used between all joints (horizontal, vertical, and in-between blocks) on all surface areas including the inby and outby walls.
- Seal thickness and pilaster size will be in accordance with one of three configurations indicated in sketches included in the plan. (See Appendix J for seal requirements in the plan.)
- For 24-inch thick seals, a single center pilaster is either 48 inches by 48 inches or 72 inches by 56 inches. For 32-inch thick seals, two pilasters, located at the 1/3 points across the entry, are each 48 inches by 48 inches.
- Seals will be constructed of Omega 384 blocks and block courses will be alternated as shown in the sketches attached to the plan.
- All wood will be flush with the walls of the seal and coated with sealant passing ASTM E162-87.
- A single layer of 1-inch thick wood planking (typical) shall be placed between the top of the seal and the mine roof.
- Omega 384 block seals shall be wedged at the mine roof as indicated in the sketch included in the plan.

- Wedges shall not be placed directly against Omega block.
- Seals shall be installed at least 10 feet inby rib corners, in solid competent material.
- A gas sampling tube with a shutoff valve will be provided in the highest seal per set of seals.
- A U-type drain will be provided for water drainage in the lowest seal per set of seals.
- When the entrances to worked-out areas are sealed, the seals shall be erected in a sequence such that positive ventilation is furnished to the affected area until the erection of the two (2) final seals, with the last seal to be erected being the farthest upwind.
- The seal in the middle entry of the set of three entries will be constructed first.
- Evaluations of the inby areas will continue during seal construction.

The internal review team compared the seal construction specifications used for the Lake Lynn tests of hitched Omega block seals with the provisions of the approved ventilation plan for Darby Mine. The seal construction requirements which were submitted in the mine operator's plan, and approved by MSHA, were consistent with the practices used in the construction of the test seals at Lake Lynn.

The internal review team notes that the approved alternative seal plan for Darby Mine did not place a specific limit on the size of entry in which the Omega seals could be constructed. Technical Support had issued guidance in June 1999 recommending that the hitched Omega seals be considered acceptable when constructed in entries up to 8 feet high and 20 feet wide. For larger dimensions, the guidance was that the seals be evaluated on a case-by-case basis for the strength enhancements that should be required. The accident report indicates that the entry at Seal No. 1 was 8 feet, 6 inches high and the entry at Seal No. 2 was 8 feet, 2 inches high. Since the approved plan had not placed a limit on seal size, this was not a violation of the plan. However, it was not consistent with the guidance that had been provided by Technical Support.

Neither the submitted plan, nor the approved plan, addressed the issue of what was required to be done with roof straps or other such items located at the seal construction location. It should be noted that the presence of roof straps or other items such as roof mesh was not an issue in the testing performed at Lake Lynn. The Principal Mining Engineer in the Ventilation Division informed the internal review team that he had distributed reports[15] [16] to the districts, in 1997 and 2001, which included lists of factors

[15] "An Update on the Use of Explosion-Resistant Seals," Society of Mining Engineers (SME), February 26, 2001, Denver, Colorado.
[16] "Construction of Explosion Resistant Seals," SME, February 24-27, 1997, Denver Colorado.

to consider when making decisions concerning seals. One item stated: "In no case should conductors of any nature be permitted to pass from one side of the seal to the other. All telephone lines, track, electrical cable and all other materials that may allow transmission of sufficient energy to cause ignition of methane must be cut and removed from the vicinity of seals." The issue of dealing with items such as roof straps was not specifically addressed in the guidance that had been issued by MSHA Technical Support relative to Omega seal construction. Presumably it was understood that good construction practice would dictate that the mine operator safely remove any object at a seal location, or the adjustment of the seal location, if such an object would interfere with proper seal construction.

The approved ventilation plan did not require the mine operator to notify the District 7 office when seals were going to be built. MSHA did not have a policy at that time requiring this notification.

The internal review team found that information on whether a proposed alternative seal should be approved in a ventilation plan was based on information provided by Technical Support's Ventilation Division. If a question arose, district personnel would contact the Division's Principal Mining Engineer for advice on whether the alternative seal should be approved. In 1999, this individual prepared and distributed summaries of information to the coal districts on the various alternative seal designs that had passed the 20 psi testing at Lake Lynn Experimental Mine. The Principal Mining Engineer also distributed seal information to MSHA personnel at training presentations on alternative seals, as indicated in the following table.

Training on Alternative Seals Provided by the Ventilation Division's Principal Mining Engineer	
Date	MSHA Group Receiving Training:
August 1994	Ventilation Supervisors
February 1997	District 11
February 1997	District 9
March 1997	District Managers
May 1997	District 5
June 1997	District 3
July 1997	Ventilation Supervisors
September 1997	District 2
September 1997	District 10
January 1999	District 11
May 2000	Ventilation Supervisors
July 2000	Ventilation Specialists
December 2003	Ventilation Supervisors

In February 2005, the Principal Mining Engineer in the Ventilation Division expressed in an e-mail message his intention to prepare a report compiling and detailing the construction requirements for alternative seals. This message was sent to the Safety Division of CMS&H and to district ventilation supervisors. In referring to the alternative seal testing that had taken place over the previous 15 years, the e-mail states:

> *"Unfortunately, over a period of years some of the required characteristics may have been forgotten or accidentally overlooked during the construction phase."*
>
> *"It is the intention of Technical Support's Ventilation Division to provide an in-depth, updated technical report detailing each of the explosion-resistant seal constructions that have been determined to be suitable."*

Previous proposals to prepare such a document were reportedly not carried out due to the workload in the Division. Following the Sago explosion, the Principal Mining Engineer was assigned to the Sago accident investigation team. At the time of the Darby explosion, the report on seal construction requirements had not been prepared.

On December 15, 2005, a district ventilation supervisor sent an e-mail to the Safety Division of CMS&H, ventilation supervisors in other districts, and personnel in Technical Support's Ventilation Division. This e-mail indicated a problem with making sure the specifications in submitted seal plans were "exactly as they were tested," meaning the specifications were exactly the same as the seals tested at Lake Lynn. The e-mail referred to "extraneous information" in Technical Support's seal handouts and expressed the need for revised handouts: "Only the information that needs to be in the ventilation plan needs to be included in the handout." Information in response to these concerns had not been prepared at the time of the Darby Mine explosion.

Conclusion: The construction requirements submitted by the mine operator and approved by District 7 were consistent with how the hitched Omega block seals were constructed in Lake Lynn testing. However, the plan did not address a size limitation on the seals and did not address what should be done in the event that roof straps existed at the seal location.

Hitched Omega block seals, the type of alternative seals approved in the Darby Mine ventilation plan, passed Lake Lynn testing by withstanding explosion pressures in excess of 20 psi.

The internal review team found no formal protocol in MSHA for the distribution of information on alternative seal construction requirements prior to the Darby Mine explosion. Technical Support passed on information to the districts on the construction methods used for constructing alternative seals tested at Lake Lynn. However, this

information was not compiled or distributed as a formal document and updated with alternative seal information and new construction specifications.

Technical Support should have given a higher priority to completing a formal report on alternative seal construction requirements which was planned in February 2005. Expertise on alternative seals was limited to one individual, the Principal Mining Engineer in the Ventilation Division.

Management Issues

Accountability Program

MSHA Policies and Procedures: Volume III, Chapter 900, of the MSHA *Administrative Policy and Procedures Manual* sets forth requirements for the MSHA Accountability Program. The purpose of the program is to promote the consistent application of policies and procedures throughout the Agency. MSHA managers are required to implement and maintain an accountability program consisting of internal reviews, identification and resolution of issues, and documentation of findings.

The *Accountability Program Handbook* (AH04-III-10) dated March 2004, provides Administrators and District Managers with policy and guidelines for the implementation of an accountability program in their offices. The purpose of the program is to evaluate the quality of enforcement activities by conducting reviews of district activities, and to provide reasonable assurance that policies and procedures are being consistently followed throughout Coal Mine Safety and Health.

Statement of Facts: District 7 conducted Peer reviews of all field offices in the District on July 26, 2005, and July 27, 2005. The accountability teams prepared and sent memorandums to the District 7 Accountability Coordinator on July 28, 2005. The memorandums listed the deficiencies identified during the reviews and the corrective actions taken.

Corrective actions consisted of discussions with inspectors and training given during staff meetings. The District Coordinator sent the appropriate Semiannual Summary Report to the National Coordinator of the Accountability Program in January 2006.

A Headquarters Program Accountability Review of District 7, conducted November 29 through December 2, 2005, identified issues similar to those identified during previous District 7 Peer reviews. The positive finding section of the headquarters report recognized the District for addressing corrective actions from previous reviews through supervisory staff meetings. The supervisors shared the corrective actions with all inspectors in their respective field offices. The headquarters report also indicated that

follow up actions taken by District 7 were timely. Subsequent reviews demonstrated that the corrective actions were effective in reducing recurrences and that progress had been made.

On January 3, 2006, District 7 received a memorandum from the National Coordinator. The memorandum, as required by the *Accountability Procedures Handbook*, informed the District 7 Manager that he had 15 days from receipt of the final accountability report to develop a plan of corrective actions to address the findings of the review.

To address the 2005 Headquarters Program Accountability Review, District 7 management developed an action plan that was sent to the National Coordinator on January 14, 2006. The Action Plan indicated that training would be used to address and correct general issues and addressed methods that were developed to measure the effectiveness of the corrective actions and training.

District 7 established procedures to measure and determine the effectiveness of corrective actions taken by the District. This consisted of four steps: a field activity review checklist for supervisors (random reports checked to determine the effectiveness of the training); District Peer reviews randomly sampled for oversight; second level reviews by the Inspection ADM; and an established timeline for implementation of corrective actions. The timeline required training to begin by February 1, 2006, and to be completed by July 1, 2006.

Checklists were to be provided to supervisors on February 1, 2006, and would be utilized on all mandatory activity reports submitted after February 8, 2006. The plan identified more comprehensive management reviews to begin on February 1, 2006. This action plan identified the root causes and established corrective actions and procedures to measure their effectiveness.

During interviews with the internal review team the field office supervisor stated that he had not implemented the use of the checklist as of May 20, 2006.

The internal review team found that District 7 had implemented their action plan. District 7 was progressing with their scheduled timelines at the time of the explosion at the Darby Mine on May 20, 2006. The internal review team found improvements to the inspection process during the last two inspections of the review period. However, many of the issues identified in the 2005 District Peer Reviews and the Headquarters Accountability Review had not been corrected.

Supervisory and Second-level Reviews

MSHA Policies and Procedures: The *Coal Mine Safety and Health Supervisor's Handbook* (AH97-III-6) states that to ensure that inspections and investigations are conducted according to Agency policies and procedures, and that inspectors are properly enforcing the provisions of the Mine Act, first line supervisors must review the work performed by their inspectors and specialists. This is accomplished by reviewing their activities, accompanying them on these activities, and rotating mine assignments.

Supervisors are responsible for reviewing work products generated by the inspectors under their supervision. The supervisor is required to conduct a Field Activity Review of at least one completed major inspection activity for each inspector and specialist at least 2 days during each 6 months. Any extraordinary efforts, accomplishments, or deficiencies identified by the review are to be discussed with the inspector. Records of these reviews shall be maintained for at least 2 years. In addition, supervisors must review a representative number of other inspection reports, citations and orders, and associated notes.

The supervisor's review of work products should include an evaluation of all violations issued to determine if the level of enforcement was appropriate for the compliance behavior of the operator. Consideration of number and type of violations issued, if multiple violations of same standard were issued, and if the same type of conditions were cited at different locations during the event.

The handbook also states that second-level managers (i.e., assistant district managers) shall oversee supervisory level reviews and accompanied activities conducted by their first-line supervisors. Each second-level manager shall review at least one Field Activity Review (FAR) conducted by each supervisor and one accompanied activity by each supervisor every 6 months.

Statement of Facts: The Inspection ADM conducted second-level reviews above the requirements in the *Coal Mine Safety and Health Supervisor's Handbook*. The manager conducted two second level reviews every 6 months.

His review included the inspection report, mine map, violation data, and enforcement actions by standard. The ADM used a checklist he had developed from the Coal Inspection Tracking Program. Violations were reviewed for timely abatement and significant and substantial evaluation. Inspection on-site time was compared to time charged to the inspection. The ADM's practice was to include the field office supervisor during the review process.

The ADM used the second level reviews, Peer review reports, and feedback from supervisors for oversight. A summary report was prepared for the District Manager

highlighting issues discovered during the second level review. After the summary review, the District 7 Manager forwarded the report to the ADM to send out to all supervisors to be used as a training document during staff meetings.

Two reviews were missed during the review period. In part, these omissions were due to the ADM being detailed out of the District during 2004 and the 1st quarter of 2006.

The field office supervisor conducted and documented monthly accompanied activities with his inspectors. Field activity reviews were conducted and documented in accordance with the *Coal Mine Safety and Health Supervisor's Handbook*.

Incomplete inspection reports had been identified as an issue during the headquarters Program Accountability Review in December 2005. As a result, the ADM developed a checklist to aid supervisors in the review of inspection reports. The checklist was sent to the field offices in February 2006. The field office supervisor did not implement the checklist until after the explosion occurred.

Conclusion: The second level reviews did not provide the necessary oversight to correct many of the issues identified by both District 7 and headquarters reviews. While supervisors and managers conducted first and second level reviews, a number of deficiencies were not addressed.

The field office supervisor conducted accompanied and field activity reviews. The internal review team identified that first level reviews did not provide effective oversight to prevent recurrences of issues previously identified.

The field office supervisor did not comply with the timeline for implementing the inspection tracking checklist during February 2006. At the time of the explosion, the supervisor had not implemented the check list.

District management did not ensure accountability relative to supervisory review and oversight.

Root Cause Analysis

The internal review team determined that MSHA's actions at the Darby Mine No. 1 did not cause or contribute to the fatal explosion on May 20, 2006. Nevertheless, the team identified several deficiencies in MSHA's enforcement performance that must be corrected. The internal review team conducted a root cause analysis of each deficiency in order to provide recommendations for eliminating the cause of each deficiency.

This analysis presents recommendations to correct the specific deficiencies identified in this report. The findings of this internal review should be communicated to the appropriate MSHA personnel nationwide.

Section 103(a) Inspections

1. **Deficiency: Inspection documentation did not describe all areas traveled and equipment inspected. Inspection notes did not always identify mobile equipment, outby water pumps and electrical installations as encountered. Inspection of emergency roof supplies was not documented during the eight regular inspections reviewed. An inspector did not document an inspection of the intake seals during the 3rd quarter regular inspection for calendar year 2005.**

   Rock dust surveys were not systematically conducted and tracked to ensure adequacy of rock dusting in the mine.

   Escapeway maps located on the surface and underground were not always inspected for accuracy. Escapeways were not properly inspected to ensure they were maintained in a safe condition.

   Inspectors did not effectively evaluate the adequacy of the mine operator's SCSR training or whether miners understood how to properly use their SCSRs.

   Inspectors did not thoroughly examine record books, including: examination of emergency escapeways, facilities, smokers articles, fire doors; examination of electrical equipment; section electrical equipment; belt inspection report; daily and monthly examination of ventilation equipment; and fire drill record book. The 6-week and 90-day fire drill record books were not examined to ensure all miners were traveling both escapeways, and that the drills were alternated between the escapeways.

   1.1. Cause: Inspectors lacked the proper attitude and incentive for following established inspection procedures in conducting thorough, complete, and effective inspections.

   Inspectors did not utilize available resource guides for conducting and documenting complete and thorough inspection activities. Resource guides not used included the MSHA *Program Policy Manual* and *Coal General Inspection Procedures Handbook.*

   1.1.1. **Recommendation:** The field office supervisor should use the Performance Management System to hold inspectors accountable for following established inspection procedures and for conducting thorough, complete, and effective inspections.

1.1.2. **Recommendation:** Supervisors should visit each mine annually during a regular inspection to determine if inspection activity is consistent with mine conditions.

1.2. **Cause:** The field office supervisor's reviews of inspection reports, field activity reviews, and accompanied activities did not identify obvious deficiencies in the performance of his subordinates.

The field office supervisor did not use available management system tools including the Performance Management System to ensure that thorough and efficient inspections were being conducted.

The field office supervisor did not effectively utilize the Performance Management System in addressing an identified poor performer.

1.2.1. **Recommendation:** The field office supervisor should receive training in DOL policy in addressing and resolving poor performance.

1.2.2. **Recommendation:** District management should use the Performance Management System together with Peer reviews to hold the field office supervisor accountable for the performance of his subordinates.

1.3. **Cause:** The assistant district manager did not ensure the Performance Management System was appropriately utilized by the field office supervisor in dealing with unacceptable performance.

1.3.1. **Recommendation:** The district manager should hold the assistant district manager accountable for ensuring the field office supervisor is effectively using the Performance Management System to address and resolve poor performance.

1.4. **Cause:** The Peer review process is ineffective in eliminating repeat deficiencies.

1.4.1. **Recommendation:** The Administrator should redesign the Peer review process to incorporate root cause analysis in identifying and eliminating the source of deficiencies.

1.5. **Cause:** Rock dust surveys were not mapped and were identified using only survey stations. This allowed a number of areas to go un-surveyed.

1.5.1. **Recommendation:** The district manager should require inspectors to incorporate tracking maps in conjunction with survey stations to ensure all areas of the mine have been surveyed.

1.6. **Cause:** Although the *Coal General Inspection Procedures Handbook* requires an inspection of examination records, there are no specific instructions for the time period that should be covered.

1.6.1. **Recommendation:** The *Coal General Inspection Procedures Handbook* should be updated requiring the inspector to thoroughly examine and document the individual records reviewed. Each review should extend back to the previous examination by an inspector or specialist.

1.7. **Cause:** There are several overlapping directives relating to emergency evacuations, donning and use of SCSRs, and fire and escapeway drills.

1.7.1. **Recommendation:** The administrator should consolidate all MSHA directives dealing with emergency evacuations, donning and use of SCSRs, and fire and escapeway drills into one set of instructions in the *Coal General Inspection Procedures Handbook*.

2. Deficiency: Inspectors were not verifying that the operator's handheld detectors were calibrated as required by 30 CFR 75.320(a).

2.1. **Cause:** The operator is not required to maintain a record of calibration and there are no specific instructions in the *Coal General Inspection Procedures Handbook* for checking or documenting this procedure.

2.1.1. **Recommendation:** The *Coal General Inspection Procedures Handbook* should be updated to include instructions for inspectors to document the calibration checks in their notes.

Use of Sections 104(a) and 104(b)

3. Deficiency: Inspectors did not identify and cite several obvious violations that existed during one or more inspections prior to the accident. Doors used for equipment to travel between air courses were not installed in pairs to form an airlock. The intake seals were not constructed in accordance with the approved ventilation plan. A permanent battery charging station was installed in the primary escapeway. There was no on-shift examination for the afternoon shift on the conveyor belts for the 11-month period. Deficiencies existed in several record books. The 6-week and 90-day practice escapeway drills were not systematically rotated. Adequate fire protection was not maintained for the belt conveyors. A clear travel way at least 24 inches wide was not maintained in the secondary escapeway. Line brattices were not installed to provide adequate ventilation in rooms advanced more than 20 feet from the inby rib. Some inspectors did not recognize the use of non-permissible personnel carriers in the return air course as a violation.

3.1. **Cause:** Some inspectors lacked the proper attitude, work ethic, and personal initiative to seek out and identify violations of mandatory standards.

3.1.1. **Recommendation:** The field office supervisor should visit each mine annually during a regular inspection to determine if enforcement activity is consistent with mine conditions.

3.1.2. **Recommendation:** The field office supervisor should conduct accompanied inspections to identify and correct deficiencies noted.

3.1.3. **Recommendation:** The field office supervisor should closely review inspection reports, notes, and violations to determine if inspectors are citing observed violations.

3.1.4. **Recommendation:** The field office supervisor should review and analyze data systems for inspection trends to identify substandard or ineffective enforcement at all mines in their workgroup.

3.1.5. **Recommendation:** The field office supervisor should use the Performance Management System to hold inspectors accountable for properly identifying and citing violations.

3.2. **Cause:** The field office supervisor did not provide adequate oversight of the inspectors in his workgroup. He did not adequately review inspection reports to ensure that inspectors were effectively identifying and citing violations.

3.3. **Cause:** The field office supervisor did not follow the requirements outlined in the Supervisors handbook regarding FARs and accompanied activities to evaluate the quality of enforcement.

3.3.1. **Recommendation:** District management should utilize the Performance Management System to hold the field office supervisor accountable for using FARs and accompanied activities to monitor the performance of his subordinates.

3.3.2. **Recommendation:** District management should utilize Peer reviews and second level reviews to evaluate the effectiveness of the field office supervisor's oversight and leadership.

3.3.3. **Recommendation:** District management should review and analyze data systems for inspection trends to identify substandard or ineffective enforcement at all field offices within the district.

3.4. **Cause:** The assistant district manager did not provide adequate oversight of the field office supervisor. The field office supervisor was not held

accountable for following the requirements of the Supervisors Handbook regarding FARs and accompanied activities.

3.4.1. **Recommendation:** The district manager should hold the assistant district manager accountable for identifying substandard or ineffective enforcement in the Harlan field office.

3.5. **Cause:** Accountability audits from the national office were not comprehensive and did not include detailed analysis of deficiencies that were identified. Corrective actions appeared superficial and provided no long term solutions for repeat deficiencies.

3.5.1. **Recommendation:** Root cause analysis should be incorporated in the audit system to identify and eliminate the source of the deficiencies.

4. Deficiency: Inspectors typically issued citations and orders with improper designations of S&S, number of persons affected, or negligence. Frequently, the inspection notes and cited conditions clearly reflected violations warranting a higher degree of gravity, number of persons affected, or negligence. Inspectors did not use the mine's history of repeat violations to aid in this determination. Some inspectors set excessive termination times in light of the degree of hazard cited.

4.1. **Cause:** The available guidance in the MSHA *Program Policy Manual* and *Citation and Order Writing Handbook* does not give clear guidance for determining gravity, negligence and number of persons affected. For instance, in both the MSHA *Program Policy Manual* and *Citation and Order Writing Handbook*, the instructions for evaluating gravity state "check the appropriate block based on the facts available."

To determine negligence, similar instructions from the MSHA *Program Policy Manual* and *Citation and Order Writing Handbook* state, "check the appropriate block based on the facts available." The reader is than directed to chapter 9 in the *Citation and Order Writing Handbook* for definitions of negligence. There are no clear instructions for inspectors to reference a time frame for violation history.

The *Citation and Order Writing Handbook* clearly states "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 a violation." However, instructions at the Academy are confusing when they differentiate between the number of persons "exposed" and the number of persons "affected."

There are few examples of coal citations and orders in the *Citation and Order Writing Handbook* that have an anticipated injury above "lost work days or

restricted duty." Also, misleading examples are included that reflect a potential shock hazard and methane explosions with an anticipated injury of "lost workdays or restricted duty."

4.1.1. **Recommendation:** The field office supervisor should utilize the available resource material, to include the citation and order writing handbook, program policy manual and controlling case law when reviewing citations and orders.

4.1.2. **Recommendation:** The Administrator should work through the Academy to develop training and resource material to aid inspectors in properly determining gravity, negligence, and number of persons affected.

4.1.3. **Recommendation:** The Administrators for coal and MNM should direct the MSHA *Program Policy Manual* and *Citation and Order Writing Handbook* to be updated to more clearly define and aid inspectors in properly determining gravity, negligence, and number of persons affected. The citation examples in the *Citation and Order Writing Handbook* for coal standards need to include examples that correctly reflect anticipated injuries in light of the expected hazard.

4.2. **Cause:** The inspectors were adversely influenced by conference decisions that improperly lowered their evaluation of gravity, negligence and number of persons affected.

4.2.1. **Recommendation**: The district manager should use the Performance Management System to hold the CLRs accountable for properly considering the conditions documented in citations, orders, and inspection notes and following the procedures outlined in the ACR Handbook.

4.3. **Cause:** Some inspectors did not follow clear direction in the *Citation and Order Writing Handbook* which provides guidance for establishing a reasonable time for termination of citations.

4.3.1. **Recommendation:** The field office supervisor should hold the inspectors accountable for establishing reasonable times for abatement based on exposure to the cited hazard.

4.4. **Cause:** The field office supervisor did not correct these deficiencies during his review of the citations and orders.

4.4.1. **Recommendation:** The assistant district manager should hold the field office supervisor accountable for identifying improper evaluations of

gravity, negligence, and number of persons affected, and establishing abatement times.

4.5. **Cause:** The Peer review process continues to identify repeat deficiencies without recommending effective solutions.

4.5.1. **Recommendation:** The Administrator should redesign the Peer review process to incorporate root cause analysis to identify and eliminate the source of repeat deficiencies.

4.6. **Cause:** MSHA's performance management plan for managers and supervisors does not include provisions to evaluate the quality of enforcement actions.

4.6.1. **Recommendation:** The performance management plan for managers and supervisors should be revised to include elements that will evaluate the quality of enforcement actions.

CLR / ACR Program

5. Deficiency: The CLR rendered decisions that were not always consistent with the requirements of the Mine Act, 30 CFR, MSHA policy, controlling case law, and to the conditions documented in citations, orders and inspection notes. The CLR reduced a number of citations based on post citation abatement and after the fact knowledge. The CLR did not use the appropriate controlling case law and guidance from the MSHA *Program Policy Manual* when accepting redundant safeguards and failing to consider the violation in context of continued mining operations when modifying S&S determinations to non-S&S. Modifications were made reducing negligence without adequate justification or documentation on the conference worksheets. The CLR was not cognizant of or properly utilize the mine operators' violation history. The number of persons affected was sometimes reduced even though it was not contested by the operator.

The CLRs improperly linked the likelihood of occurrence to the anticipated injury by failing to evaluate the gravity of an injury in light of the anticipated hazard. CLR decisions for the severest of possible outcomes reflected "lost workdays or restricted duty". Evaluations of "permanently disabling" or "fatal" were rare.

The CLRs incorrectly reduced the number of persons affected on numerous citations by considering only those persons who were physically present.

The CLRs did not always contact the inspector or supervisor for additional input prior to the conference and before rendering final decisions. The CLRs did not effectively utilize the inspectors' notes or comments in the decision making

process as outlined in the ACR Handbook. Numerous conference decisions appeared to be based solely on the statements provided by the mine operator. Modifications were made without adequate justification or documentation on the conference worksheets.

5.1. **Cause:** The CLRs lacked the proper attitude and incentive to follow clearly established procedures outlined in the ACR Handbook, program policy manual, citation and order writing handbook as well as controlling case law.

5.1.1. **Recommendation:** The district manager should use the Performance Management System to hold the CLRs accountable for properly considering the conditions documented in citations, orders, and inspection notes and following the procedures outlined in the ACR Handbook.

5.1.2. **Recommendation:** The ACR Handbook should be revised to make second level review of the CLR process mandatory.

5.1.3. **Recommendation:** The ACR Handbook should be revised to direct the CLR to confer with district management prior to final decisions.

5.2. **Cause:** The CLRs did not properly apply Agency policy and available resource guides when evaluating gravity, S&S, negligence, and number of persons affected. These resource guides include the Mine Act, 30 CFR, MSHA policy handbooks, and controlling case law.

5.2.1. **Recommendation:** The district manager should use the Performance Management System to hold CLRs accountable for following the Mine Act, 30 CFR, MSHA policy, and controlling case law in making conference decisions.

5.2.2. **Recommendation:** A worksheet should be developed for tracking CLR decisions through a second level review process prior to finalizing the decision. Proposed decisions, which result in a change to a citation or order, should detail the issuing inspector's position and be routed through district management for approval.

5.3. **Cause:** The district manager did not effectively oversee the ACR Program and ensure that issues identified in previous internal reviews and ACR audits were corrected. Many of the issues identified in this internal review were identified in past headquarter audits and remain uncorrected. Memorandum addressing past issues were never incorporated in the ACR handbook.

5.3.1. **Recommendation:** The administrator should use the Performance Management System to hold the district manager accountable for

providing effective oversight of the ACR program, for identifying the root cause of deficiencies disclosed in audits, and for implementing effective corrective actions.

5.3.2. **Recommendation:** All corrective actions addressed in memorandums that require a program change should be incorporated into the ACR Handbook.

5.4. **Cause:** Headquarters oversight of the ACR program was not effective. Currently, headquarter audits focus only on process and procedure. The audit does not evaluate CLR actions against the inspector's notes and other supporting documentation to ensure that the CLRs have not substituted their own judgment for that of the inspector; it does not evaluate the rationale set forth by the CLR against supporting case law, statutory or regulatory authority, or Agency policy. The audit team does not always include a member that has enforcement experience.

5.4.1. **Recommendation:** The Administrator should use headquarters audits and the Performance Management System to hold the district manager accountable for ensuring the CLRs comply with the Mine Act, 30 CFR, MSHA policy, and controlling case law.

5.4.2. **Recommendation:** Headquarter audits of the ACR program should evaluate CLR decisions and examine the CLRs rationale for subsequent actions. Additionally, each audit should include substantive discussions with the issuing inspectors. Audits of the ACR program should include discussions with the issuing inspectors and their supervisors. Each audit of the ACR program should include a member that has enforcement experience.

5.4.3. **Recommendation:** The assistant secretary should use the performance management system to hold the administrator accountable for identifying and correcting deficiencies in the ACR program.

5.5. **Cause:** The CLRs did not properly utilize the mine operators' violation history in evaluating negligence. The CLR relied on previous conference experience with the operator in evaluating negligence.

5.5.1. **Recommendation:** The district manager should use the Performance Management System to hold the CLRs accountable for following the Mine Act, 30 CFR, MSHA policy, and controlling case law in making conference decisions.

5.5.2. **Recommendation:** The ACR Handbook should be updated to require the use of a mine violation history of at least two years for evaluating negligence.

5.5.3. **Recommendation:** Headquarters review of the ACR program should be more in depth and include review of negligence determinations in light of repeat violations.

Alternative Seals at Darby Mine

6. Deficiency: The alternative seal construction provisions in the Darby Mine approved ventilation plan did not address conditions that could adversely affect the quality of seal construction, such as the presence of roof straps and the size of the entries at the seal locations.

6.1. **Cause:** Alternative seal construction requirements reflected the main provisions of how the Omega block test seal had been constructed at Lake Lynn rather than being comprehensive and tailored to the specific conditions at the mine.

6.1.1. **Recommendation:** The Administrator should require that alternative seal construction plans be**:** tailored to the specific mine conditions where the seals are to be constructed; certified by a professional engineer; and reviewed by MSHA. (This is currently in place through interim requirements for alternative 50-psi seals.)

7. Deficiency: Inspectors did not detect the fact that the seals were not constructed as approved in the ventilation plan. Seal construction deficiencies included lack of hitching, improper mortaring, and undersized pilasters.

7.1. **Cause:** The construction defects in the alternative seals found after the explosion were not evident from visual observation after the seals were constructed. District personnel were not aware that the alternative seals were being constructed and did not observe their construction. There were no requirements or instructions for MSHA personnel to inspect seals during their construction.

7.1.1. **Recommendation:** Mine operators should be required to notify MSHA of seal construction in advance so that MSHA has the opportunity to inspect seals during seal construction. This is a requirement of the May 22, 2007, emergency temporary standard for sealing abandoned areas.

7.1.2. **Recommendation:** MSHA should require mine operators to certify that seals are constructed in accordance with the approved seal plan. This is a

requirement of the May 22, 2007, emergency temporary standard for sealing abandoned areas.

7.1.3. **Recommendation:** Where problems are identified with the construction of a block seal, the mine operator should be required to remove a portion of the sealant to allow the joints to be examined for proper mortaring and block pattern.

7.1.4. **Recommendation:** Inspection personnel should be instructed to observe the construction of new seals, to the extent feasible, during the course of regular inspections.

7.1.5. **Recommendation:** The inspector should be required to have a copy of the seal construction requirements with him during the inspection of the seals.

7.2. **Cause:** Inspectors did not receive adequate training on inspection procedures for alternative seals during and after construction. The training focused on regulatory requirements and did not address construction specifications for alternative seals.

7.2.1. **Recommendation:** The Administrator should require seal-related training for coal mine inspection personnel, ventilation supervisors and specialists to raise awareness of critical seal construction requirements and provide inspection guidance.

7.3. **Cause:** Information on the 20-psi alternative seal construction requirements based on testing at Lake Lynn was not systematically distributed to inspectors to assist them in inspecting existing seals. Technical Support provided information to the districts in individual documents. This information was not compiled in a single, formal document that was kept up-to-date.

7.3.1. **Recommendation:** For existing 20-psi seals, the "Guide for Existing Alternative Seals (Built Prior to July 19, 2006)" prepared by MSHA in collaboration with NIOSH, should be distributed to the districts and made available to the inspectors.

8. Deficiency: Some inspectors did not identify and cite the undersized pilasters in the Darby Mine intake seals during the course of eight regular inspections.

8.1. **Cause:** The inspectors lacked the proper attitude, work ethic, and personal initiative to identify this deficiency in the construction of the alternative seals.

8.1.1. Recommendation: The field office supervisor should incorporate an inspection of seals when applicable during accompanied inspection activities.

8.1.2. Recommendation: District ventilation specialists or the ventilation supervisor should make as many of the six-month ventilation plan reviews as feasible and incorporate inspections of seals during that review.

9. Deficiency: MSHA did not recognize the extent or magnitude of problems arising from faulty seal construction until the Darby Mine explosion. Since 1986, there had been 5 incidents where seal failures were attributed to faulty construction. There were 4 other seal failures for which the quality of construction was not determined. Additionally, in February 2005, the Principal Mining Engineer in the Ventilation Division had identified that over time some of the alternative seal requirements had been forgotten or accidentally overlooked. This information was provided to the Safety Division and the district ventilation supervisors.

CMS&H did not place a high priority on the inspection of existing seals following Sago and prior to the Darby explosion.

9.1. Cause: MSHA did not act on the available information on alternative seal incidents. The parties involved, i.e., CMS&H, Technical Support, and EPD, had the differing primary concerns of enforcement, technology and training and collectively did not identify this as a problem.

In the weeks following the explosion at Sago Mine, CMS&H was focused more on the adequacy of the 20-psi strength criteria than the quality of seal construction.

9.1.1. Recommendation: Responsibility should be assigned within MSHA for evaluating information on seal incidents, ensuring that seal information is adequately disseminated, and bringing trends and potential problems to the attention of the Coal Administrator. Incidents where quality control or other issues are identified in seal construction should be included.

9.1.2. Recommendation: Reports on all seal incidents and accidents should be distributed to the Coal districts and industry to keep interested parties informed of problems or trends related to seals.

Mine Rescue and Recovery

10. Deficiency: A section 103(k) order was verbally issued at 1:54 am that did not address the safety of the persons engaged in the rescue and recovery operation.

The order as issued only restricted the actions of persons involved in the investigation of the accident.

10.1. **Cause:** District 7 personnel did not follow established procedures as outlined in section 103k of the Mine Act and Coal General Inspection Procedures Handbook.

10.1.1. **Recommendation:** A section 103(k) order should be issued to ensure the safety of all persons involved in rescue and recovery. This order should be issued to the operator, in writing, as promptly as possible.

10.1.2. **Recommendation:** All rescue and recovery plans should be reviewed and approved by the senior authorized representative at the mine site prior to implementation.

11. Deficiency: District 7 personnel engaged in rescue and recovery operations did not have the appropriate equipment to determine elevated Carbon Monoxide (CO) concentrations in the Darby Mine for the first 5 hours following the explosion, making it impossible to establish air quality trends and evaluate the underground atmosphere.

11.1. **Cause:** Hand-held gas detectors available to MSHA employees were not adequate for measuring elevated CO levels. The TMX 412 detector was capable of measuring CO concentrations up to 1,000 parts per million (ppm) and the Solaris detector was capable of measuring CO concentrations up to 500 ppm. The CO concentration of the air exhausting the Darby Mine did not drop below 1,000 ppm until 6:00 am and below 500 ppm until 7:00 am. Draeger stain tubes were also used, but they also had a 1,000 ppm limit and were expired.

MSHA's portable electrochemical and infrared gas analysis equipment did not arrive on-site until 6:45 am. They were not set up and calibrated until 8:30 am. The gas chromatograph was being transported by the Technical Support group from Bruceton but was turned back because the victims had been located.

11.1.1. **Recommendation:** Corrected. MSHA has provided District 7 with gas detecting equipment capable of measuring elevated CO concentrations present at mine fires or explosions.

12. Deficiency: MSHA personnel did not coordinate rescue and recovery operations prior to and following the establishment of the command center. The first individuals who entered the mine explored individually and barefaced without establishing the quality of the mine atmosphere. They explored beyond the positive intake air entry without apparatus and back-up personnel present. After

trained and equipped mine rescue teams arrived, these barefaced persons were not immediately withdrawn, and continued to explore. OMSL teams explored without coordinating their actions with MSHA. Mine rescue team members advanced individually without back-up personnel.

12.1. **Cause:** The District 7 person in charge at the mine site did not follow the mine rescue and recovery procedures, as outlined in the District 7 MERP, and the *Coal General Inspection Procedures Handbook*.

MSHA personnel did not assume oversight obligations required in the Mine Act that states "in the event of any accident occurring in a coal or other mine, an authorized representative of the Secretary, when present, may issue such orders as he deems appropriate to insure the safety of any person in the coal or other mine, and the operator of such mine shall obtain the approval of such representative, in consultation with appropriate State representatives, when feasible, of any plan to recover any person in such mine or to recover the coal or other mine or return affected areas of such mine to normal." The provisions of the District 7 MERP were not fully implemented in establishing a command center that included the mine operator, state agencies and miner representation if present.

12.1.1. **Recommendation:** The District 7 MERP should be modified to provide clear and concise direction in authority and delegation of duties of MSHA personnel onsite at rescue and recovery operations.

12.2. **Cause:** The verbal section 103(k) order made no provisions to limit the activities or number of individuals underground during the mine rescue and recovery, and did not require a systematic evaluation of the conditions and safety practices conducted.

12.2.1. **Recommendation:** District 7 personnel should be reinstructed to follow the procedures for mine rescue and recovery operations set forth in the District MERP and the *Coal General Inspection Procedures Handbook* in protecting the lives of all persons engaged in rescue and recovery operations.

12.2.2. **Recommendation:** The administrator should clarify duties, responsibilities, and authority of MSHA personnel onsite during mine rescue and recovery operations. Although MSHA should not be placed in a position to direct activities, MSHA's statutory authority to oversee a safe and rapid rescue and recovery operation should not be compromised.

13. Deficiency: Critical information was not relayed to the surface that compromised the command center's ability to direct a safe rescue and recovery operation. Mine

rescue team members advanced without establishing communications between team members, the fresh air base, or the command center.

When advancing the fresh air base, ventilation changes were made into unexplored areas where the effects were unknown, and without consulting the command center prior to making the ventilation changes. The location of the explosion, hazardous gas accumulations, the extent of damage to ventilation controls, and the presence of a fire, had not been determined.

13.1. **Cause:** Mine rescue teams did not follow established mine rescue protocol. The command center did not ensure an established line of communication with the fresh air base and mine rescue teams during the mine rescue and recovery.

13.1.1. **Recommendation:** MSHA personnel onsite should ensure that each team entering the mine be informed of the mine status, locations of advancing teams, fresh air base, and back-up teams, and communication requirements. They should also ensure that exploration beyond the fresh air base be conducted systematically, with the proper apparatus, with constant communications, and proper back-up personnel.

13.1.2. **Recommendation:** The MSHA official in charge of the command center should ensure the safety of all persons involved in rescue and recovery through the use of appropriate enforcement actions.

13.1.3. **Recommendation:** The Administrator should ensure that established guidelines in the coal general inspection procedures handbook and in the mine emergency response plan are followed. The effective use of appropriate enforcement actions to insure the safety of all persons engaged in the rescue and recovery operation should be outlined for MSHA personnel.

14. Deficiency: The response time in deploying the MEU unit resulted in a delay to outfit and equip onsite MSHA MEU members.

14.1. **Cause:** The MEU unit was not notified for 2 hours following the explosion.

14.1.1. **Recommendation:** The MEU unit should be notified immediately following any explosion, entrapment or reportable mine fire. The members should get their equipment ready and remain on standby until they are released or deployed.

14.2. **Cause:** The Mobile Command Center is not situated close enough to District 7 to provide effective and timely support.

14.2.1. Recommendation: Technical Support and CMS&H should perform a feasibility study to determine the need for additional MEU units located throughout the country in order to reduce response times to emergencies.

15. Deficiency: MSHA did not conduct an analysis of rescue and recovery operations following the Darby Mine explosion.

15.1. Cause: There are currently no procedures in place to review and analyze MSHA's rescue and recovery efforts.

15.1.1. Recommendation: CMS&H should form an ad hoc review committee for the purpose of evaluating MSHA's response to each mine emergency that involves rescue and recovery. This team should be composed of no less than the MEO coordinator, the Chief of the Division of Safety, and a District Manager or Assistant District Manager from another district. All required logs should be maintained to aid in this analysis.

Accountability Program

16. Deficiency: The supervisory and second-level reviews for inspection activities were not adequate. The reviews conducted by field office supervisors and managers did not identify several recurring procedural and enforcement deficiencies in inspections at the Darby Mine.

16.1. Cause: The field office supervisor did not perform thorough field activity reviews. He did not follow established policy and procedures as outlined in the CMS&H Supervisor's Handbook for conducting and documenting supervisory reviews for employees under his supervision.

16.1.1. Recommendation: Field Activity Reviews should contain detailed notes indicating significant accomplishments and deficiencies identified by the review should also be documented.

16.1.2. Recommendation: The assistant district manager should use the Performance Management System to hold field office supervisors accountable for conducting thorough field activity reviews and accompanied activities in accordance with the procedures of the CMS&H Supervisor's Handbook.

16.2. Cause: Second level reviews did not identify the deficiencies of the field office supervisor in the Field Activity Reviews.

16.2.1. Recommendation: The district manager should use the Performance Management System to hold the ADM accountable for using second-level reviews to provide effective oversight of supervisory reviews.

16.3. Cause: In 2004, the assistant district manager did not conduct second level reviews of District 7 field offices for the first half of the year. The manager was on detail to District 4.

16.3.1. Recommendation: The District 7 Manager should ensure that second-level reviews are conducted even in the absence of the assistant district manger.

16.4. Cause: District management failed to follow up to ensure the supervisors were addressing the deficiencies found during the Peer Reviews.

16.4.1. Recommendation: The Administrator should use the Performance Management System to hold the district management accountable for implementing effective action plans to eliminate deficiencies identified in Peer Reviews.

16.4.2. Recommendation: The Administrator should examine methods to improve the effectiveness of headquarters' reviews of district Peer Review reports. An effective method for identifying and eliminating repetitive issues should be implemented.

16.4.3. Recommendation: The Administrator should hold district management accountable under the performance management system for second level reviews as well as the Peer reviews.

17. Deficiencies identified during the Headquarters review of 2005, which included incomplete inspection reports, were not corrected as of May 20, 2006 in the Harlan field office. Prior to the January 24, 2006, action plan, District 7 Peer reviews did not adequately address the root causes of identified issues and did not set forth effective measures to eliminate recurrences.

17.1. Cause: The Harlan field office supervisor failed to utilize the checklist provided by the assistant district manager in January 2006**.**

17.1.1. Recommendation: The assistant district manager should use the performance management system to hold the field office supervisor responsible for implementing corrective actions resulting from Peer and Accountability reviews.

17.2. Cause: District 7 managers did not provide proper oversight to ensure implementation of the 2006 action plan to prevent the recurrence of the issues at the Harlan field office.

17.2.1. Recommendation: The Administrator should use the Performance Management System to hold district 7 management accountable for effectively implementing the district action plan.

17.2.2. Recommendation: Headquarters should conduct program accountability reviews annually in District 7 for two consecutive years. CMS&H headquarters should track the problems identified in District 7 through available resources.

17.3. Cause: The root causes of deficiencies were not identified as a basis for corrective actions. District 7 management did not make a reasonable effort to develop effective long-term action plans to prevent recurrence of issues.

17.3.1. Recommendation: Managers should ensure that deficiencies identified in Peer Reviews are analyzed for root causes.

17.3.2. Recommendation: Managers should track the progress of corrective actions and ensure that they are fully implemented.

17.3.3. Recommendation: The Administrator should hold the District 7 manager accountable for identifying root causes of deficiencies and implementing effective action plans to eliminate those deficiencies.

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 Kentucky Darby LLC, Kentucky Darby Mine No. 1.

Respectfully submitted,

SIGNATURE ON FILE

Michael A. Davis
District Manager
MNMS&H Southeastern District

SIGNATURE ON FILE

George M. Fesak
Director of Program Evaluation and Information Resources

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Donald J. Foster
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Senior Trial Attorney
Office of the Solicitor

Approved by:

SIGNATURE ON FILE

Richard E. Stickler
Assistant Secretary of Labor for
Mine Safety and Health

Appendix A - Persons Interviewed or Providing Information

District 7 Personnel

Robert W. Rhea	Supervisory CMS&H Inspector
Kenny Dixon	CMS&H Inspector
Arthur D. Jackson	CMS&H Inspector
Stanley D. Sturgill	CMS&H Inspector
Roger Wilhoit	CMS&H Inspector
Darlas W. Day	CMS&H Inspector
Carla Marcum	Ventilation Specialist
Steven L. Sorke	Supervisor Roof Control
Kevin L. Doan	Roof Control
William Sharp	Special Investigator
Gary W. Harris	Senior Special Investigator
Tommy Frizzell	Conference Officer
Elmer G. Keen	Conference Officer
Ronnie Brock	Staff Assistant
John M. Pyles	Assistant District Manager
Charles Grace	Assistant District Manager
Norman Page	District Manager

Appendix A - Persons Interviewed or Providing Information *(continued)*

Headquarters Personnel

Robert Friend .....Deputy Assistant Secretary Operations

Ray McKinney .....Administrator for CMS&H

John F. Langton .....Deputy Administrator, CMS&H

Melinda Pon.....Special Assistant to the Administrator, CMS&H

Terry Bentley .....Chief, Safety Division, CMS&H

William Crocco.....Accident Investigation Program Manager, CMS&H

Eric Sherer .....Mine Safety and Health Specialist

National Mine Health and Safety Academy

Richard E. McDorman.....Training Instructor

Tom Bonifacio.....Training Instructor

Mack R. Wright .....Training Instructor

Jerry L. Bailey.....Training Instructor

Technical Support

Mark Skiles.....Director

John E. Urosek .....Chief, Ventilation Division

Clete R. Stephan .....Principal Mining Engineer

Appendix A - Persons Interviewed or Providing Information *(continued)*

MSHA Mine Rescue Team

Brown,Virgil .....MEU Coordinator
Mattews,Otis.....Team Member
Clay,Bob .....Team Member
Cox,Lester.....Team Member
Barton,Charles .....Team Member
Langley, Jim .....Team Member
Sturgill, Tony .....Team Member
Barton, Charles .....Team Member

Appendix B – Coal Mine Safety and Health Administrator's Response

June 27, 2007

CMS&H Memo No. HQ-07-071-A (SEC-103)

MEMORANDUM FOR RICHARD E. STICKLER
Assistant Secretary for
Mine Safety and Health

Signature on File
THROUGH: ROBERT M. FRIEND
Deputy Assistant Secretary for
Mine Safety and Health

Signature on File
FROM: KEVIN G. STRICKLIN
Administrator for
Coal Mine Safety and Health

SUBJECT: Coal Mine Safety and Health Response to Internal Reviews of MSHA's Actions at the Wolf Run Mining Company, Sago Mine; Aracoma Coal Company, Inc., Aracoma Alma Mine No. 1; and Kentucky Darby LLC, Darby Mine No. 1

You requested that Coal Mine Safety and Health (CMS&H) respond to the recommendations in the internal review reports concerning MSHA's actions at the Wolf Run Mining Company, Sago Mine; Aracoma Coal Company, Inc., Aracoma Alma Mine No. 1; and Kentucky Darby LLC, Darby Mine No. 1. You also requested that CMS&H provide a consolidated corrective action plan to address all the issues and recommendations raised in the three reviews. The following is our response and a discussion of the actions planned by CMS&H. The reports of internal review will also be shared with Metal and Nonmetal Mine Safety and Health.

I have attached a spreadsheet that specifically describes, for each recommendation, CMS&H's corrective action plan and due date. The spreadsheet compares the reports and shows the similarities and differences of the deficiencies, causes, and recommendations. The corresponding paragraph numbers from each report have also been included. CMS&H will track its implementation progress and work closely with other MSHA program areas to fully address each recommendation with an effective policy and/or program that achieves both short- and long-term results.

Several recommendations have already been implemented. The MINER Act and the Emergency Temporary Standards for Emergency Mine Evacuation, Criteria and Procedures for Proposed Assessment of Civil Penalties, and Sealing of Abandoned Areas have codified several recommendations. Therefore, implementation and enforcement of these new regulations and standards will serve as the corrective actions for these recommendations. Several other recommendations were addressed when CMS&H revised the Coal General Inspection Procedures Handbook.

I have scheduled a meeting at the National Mine Health and Safety Academy on July 11 and 12 with all CMS&H managers, supervisors, and Conference Litigation Representatives. At this meeting, I will discuss each report's findings, as well as CMS&H's corrective actions and measurement strategies. I look forward to your attendance and participation at this meeting.

Attachment

Corrective Action Plan: Sago, Aracoma, and Darby Internal Reviews

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
Incomplete & inadequate inspections & documentation (A: also 103(i) insp inadequate)	Not following procedures, (A,D: also lacked proper attitude)	1.1.1	1.1.1 2.1.1	1.1.1	Supv should use performance management system to hold inspectors accountable	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
		1.1.2			Inspectors should use an Inspection Checklist to ensure complete inspections	Included in latest revision of Coal Inspection Handbook - Rollout on 7/1/2007	7/15/2007
		1.1.3	1.1.2 2.1.2		Supervisors scrutinize inspection reports and take corrective action immediately	Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during mine visits Update and clarify the Supv handbook and conduct training	1/1/2008
		1.1.4			Supv should use an inspection checklist to evaluate whether inspections are complete	Included in latest revision of Coal Inspection Handbook - Rollout on 7/1/2007	7/15/2007
		1.1.5	1.1.4	1.1.2	Supervisors should annually visit each producing mine to assess inspection quality	Memo to DMs requiring a supervisory visit to each mine Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during every UG mine visit annually Update and clarify the Supv Handbook and conduct training	1/1/2008
			1.1.3		Use accompanied activities and field reviews to evaluate whether inspections are complete	Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during every UG mine visit annually Update and clarify the Supv Handbook and conduct training	1/1/2008
			1.1.5 2.1.3		Take appropriate action with respect to individuals when issues of misconduct are identified	Update and clarify the Supv Handbook and conduct training	1/1/2008
	Field office memo on working hours misinterpreted resulting in no preshift travel.	1.2.1			Rescind memo and reinstruct on preshift travel during regular inspections	Rescind memos that conflict with Natl policy	9/1/2007
	Inadequate oversight of inspection activity, no annual UMF review as per procedure.	1.3.1	1.3.1 3.2.6	1.2.1	ADMs should use Performance Management System to hold supervisors accountable for subordinates (S: also UMF reviews)	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
		1.3.2	1.3.2 3.2.4		ADMs should hold supervisors accountable for accompanied activity and annual mine visits	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook	1/1/2008
		1.3.3	1.3.6		District management should use Peer Reviews and Second Level Review to assess supervisor's performance	Supervisors will be held accountable for repetitive issues that are not addressed ADM will conduct second level reviews and travel with supervisors to determine if repetitive issues exists Update and clarify the Supv Handbook and conduct training	1/1/2008
		1.3.4	1.3.7 3.2.7	1.2.3 1.3.1	DM should use Performance Management System to hold ADMs accountable for their oversight of subordinates	ADM will be held accountable for repetitive issues that are not addressed Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook	1/1/2008
		1.3.5	1.3.8 3.2.8		Administrator should use Performance Management System to hold DMs accountable for district deficiencies	DM will be held accountable for repetitive issues that are not addressed Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
			1.3.3		Managers should visit a mine with poor compliance at least monthly	Memo from the Administrator to the DM's requiring monthly visits	9/1/2007
			1.3.4		Managers should get periodic report of mines visited by each supervisor	Issue memos to DMs requiring monthly reports summarizing all supv and management mine visits	9/1/2007
			1.3.5	1.2.2	ADM should hold Supv accountable for returning poor work to inspectors to be corrected Gross or repeated failures should be documented and appropriate disciplinary action taken	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook	1/1/2008
	No effective tools to ensure thorough complete inspections.	1.4.1	1.2.1		Create checklist or tracking system for each regular inspection with supervisor review, management review quarterly	Included in latest revision of Coal Insp Handbook - rollout on 7/1/2007	7/15/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
		1.4.2			Create database to track inspection of SCSRs, integrate with new SCSR inventory system	Enhance SCSR inventory database to identify active units prior to an inspection and record inspection results	7/1/2008
	No effective system to assure "too wet" areas were revisited for subsequent rock dust sample collections.	1.5.1			MSHA should develop a tracking system to ensure that areas that were "too wet" to take rock dust samples are revisited and sampled	Created MSHA Form 2000-210 Rock Dust Survey Wet Locations Tracking to ensure tracking and revisiting of "too wet" rock dust sampling areas	Completed 1/1/2006
		1.5.2			Revise Coal Gen Insp Procedures Handbook to require inspection reports to include a completed 2000-210 form	Included in latest revision of Coal Insp Handbook - Rollout on 7/1/2007	7/15/2007
	Rock dust surveys were not: conducted in several areas or mapped			1.5.1	Require inspectors to incorporate tracking maps in conjunction with survey stations to ensure all areas of the mine have been surveyed	Use tracking maps from the previous inspection to the ongoing inspection to determine what areas need to have rock dust samples collected	10/1/2007
	Directives overlap on emergency evacuation, drills, SCSRs, and AMS handbook is outdated.	1.6.1		1.7.1	Consolidate and update evacuation, SCSR donning and use, fire and escapeway drills, and AMS systems into one instruction	Update and consolidate directives, issue final document, train on updates	1/1/2008
	Enforcement guidance for 30 CFR 75.320(a) and 75.1501 is lacking.	1.7.1			Provide guidance for 30 CFR 75320(a) and 751501 enforcement	Issue instruction by memos to DMs	10/1/2008
	Regular inspectors have insufficient electrical expertise.	1.8.1			The District 3 Manager should provide training to regular inspectors to help them identify electrical violations	Additional electrical retraining was provided to all District 3 inspectors	Completed 8/1/2006
		1.8.2			Inspectors should request assistance from electrical specialists as needed	Issue instruction by memos to DMs	9/1/2007
		1.8.3			Need for additional electrical inspectors should be evaluated in District 3	Additonal electrical inspectors have been hired in District 3	10/1/2007
	Supv and Insp did not maintain and use an effective 103(i) spot inspection tracking system to ensure required time frames were met.		2.2.1		Ensure timeliness of 103(i) inspections are followed, including the use of highlighted calendars with inspector names	FO supervisors should set up the calendar for the respective mines on a 103(i) spot	9/1/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
			2.2.2		Provide reports to track timely completion of 103(i) inspections and hold supervisors accountable for deficiencies	FO supervisors should set up the calendar for the respective mines on a 103(i) spot	9/1/2007
	Supv failed to identify and hold Insp accountable for info in notes stating spot and other inspection activities were combined.		2.3.1		Procedures should require all inspection time be dedicated to spot inspections on days when conducted	Issue instruction by memos to DMs	9/1/2007
			2.3.2		Supv and managers should be provided with periodic reports indicating if inspectors conduct spot and other inspection activities on the same day	Issue instructions by memos to DMs; Develop additional standardized reports to be used within the districts	1/1/2008
	Supv did not identify conflicts standard reports, such as spot inspections with no time shown at the mine and inspections with no notes.		2.4.1		After Supv, staff assistants should compare completed standard reports to double check accuracy of inspection activity	Issue instruction by memos to DMs Supv and office staff will assure accuracy with oversite by ADM	10/1/2007
	Supv failed to take action to correct blatant 103(i) errors: many spot inspections only at main mine fans and surface areas.		2.5.1		Quickly review 103(i) reports for adequacy, inform insp of deficiencies and require an additional spot inspection to correct such deficiencies	Better review of inspection notes and closer evaluation of inspector's time and attendance reports Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during mine visits	10/1/2007
			2.5.2		Supv should review time and activity to ensure inspected areas are commensurate with the intent of Section 103(i)	Better review of inspection notes and closer evaluation of inspector's time and attendance reports Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during mine visits	1/1/2008
			2.5.3		Managers should review reports indicating inspector resources relevant to 103(i) spot inspections	District management will monitor resource availability to complete inspections	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
			2.5.4		ADM should use the Performance Management System to hold Supv accountable for ensuring that subordinates follow policies 103(i) inspections	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
	Administrator and District 4 management did not adequately oversee surface time spent for 103(i) spot inspections.		2.6.1		Use reports detailing 103(i) inspection time and activity and hold managers accountable for their subordinates' compliance	Develop computerized report that compares T&As with IPAL to allow effective oversight of 103(i) inspections	1/1/2008
	No vent. specialist in field office. Reassignment of specialists, workload of D4 Vent Dept, and the remote location of the field office		6.1.1		Ensure that specialist staffing is adequate to provide technical expertise where specialized knowledge of complex mining systems are required for ensuring quality inspections	Districts have been staffed with specialsits as part of the supplemental hiring	10/1/2007
			6.1.2		When specialists are needed for mandated inspections, every effort should be made by to focus their assignments on inspections areas of their expertise	Issue a memo to the DMs indicating that specialist work should be assigend at the beginning of the quarter (when needed for mandated inspections) that will coincide with their area of expertise when possible	9/1/2007
	Supv did not identify errors when they reviewed violations of 30 CFR 75.370.		6.2.1		Supv should ensure that violations are appropriately cited and consult with district specialists when technical guidance is needed	Issue instruction by memos to DMs	9/1/2007
	ADM did not implement established MSHA procedures relevant to 30 CFR 75.370(g).		7.1.1		Revise, implement, and follow SOP for 6-month mine vent plan reviews to comply with the MSHA Mine Vent Plan Approval Procedures hdbk	Issue memo from Administrator to the DMs reiterating 6 month review	9/1/2007
	Although the Coal General Insp Hdbk requires inspection of exam records, no time period is mentioned.			1.6.1	Revise handbook to require the inspector to thoroughly examine and document the inspected records extending back to the previous inspection	Included in latest revision of Coal Insp Handbook - Rollout on 7/1/2007	7/15/2007
	The operator is not required to maintain a record of calibration, no instructions in the Coal Insp Hdbk for checking or documenting this procedure.			2.1.1	The Coal Insp Handbook should be updated to include instructions for Insp to document the calibration checks in their notes	Coal Insp Handbook will require an insp note that the insp observed or determined that gas calibrations are being performed on schedule Issue instruction by memos to DMs	10/1/2007
Improper evals on citations, no notes for vacated citation, delayed safeguards, some terminations not timely (A,D:Insp failed to cite several violations)(D:some abatement times excessive)	Mine Act, 30 CFR, MSHA policies and procedures, and controlling case law not consistently followed (A,D:also lacked proper attitude)	2.1.1	3.1.1	3.1.5	Supervisors should use performance management system to hold inspectors accountable	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
		2.1.2	3.1.3 3.2.2	3.1.3	Supervisors should closely review enforcement actions	Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during mine visits Update and clarify the Supv Handbook and conduct training	1/1/2008
		2.1.3	3.1.4	3.1.1	Supervisors should annually visit each producing mine to assess level of enforcement	Memo to the DM's requiring a supervisory visit at each mine in their district at least one time per year	10/1/2007
		2.1.4	3.1.5	3.1.4	Supervisors should routinely review standard reports to ensure effective enforcement and follow-up	Update and clarify the Supv Handbook and conduct training	1/1/2008
	Improper conference actions influenced inspectors to make lower evaluations of gravity, negligence, and # of persons affected	2.2.1			DM should closely monitor ACRI program and use Perfomrance Management System to ensure that conference officers follow established law, policies, and controlling case law	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
	District safeguard issuance policies conflicted with national policy	2.3.1			DM should revise safeguard policies to comply with national policy	Issue memos to DM requiring any policies contrary to national policy be revoked and personnel be reinstructed	9/1/2007
	District management did not effectively monitor enforcement actions and associated notes	2.4.1	3.2.1	4.4.1	ADMs should hold supervisors accountable for reviewing enforcement actions	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
		2.4.2			ADMs should hold supervisors accountable for notes regarding vacated citations	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
		2.4.3	3.2.3	3.3.2	District management should use Peer Reviews and Second Level Review to assess supervisor's reviews of enforcement actions	Update and clarify the Supv Handbook and conduct training Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during mine visits	1/1/2008
			3.1.2		DM should take appropriate action with respect to individuals when issues of misconduct are identified	Update and clarify the Supv Handbook and conduct training	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
			3.2.5		ADM should visit a mine site at least monthly to ensure enforcement activity is consistent with conditions at the mine	ADM-Enforcement to travel with each inspector in his or her workgroup at least 1 time every 2 months ADM-Technical to travel with different specialist and make at least 2 visits per month Update and clarify the Supv Handbook and conduct training	1/1/2008
			3.2.9	3.3.3	Managers should routinely review standardized reports showing trends in mine enforcement activity and accidents	Develop key indicators report; Update and clarify the Supv Handbook and conduct training	1/1/2008
	Performance Management System for managers and supervisors does not include provisions to evaluate the quality of enforcement actions.	2.4.4 2.4.5		4.6.1	Performance Management System for managers and supervisors should include provisions to evaluate the quality of enforcement actions	Update Performance Management System to include provisions to evaluate the quality of enforcement actions	1/1/2008
	Management did not communicate to inspectors that they would have full support when issuing citations and orders		3.3.1		District managers should ensure that assistant district managers and supervisors support and assist inspectors in taking appropriate enforcement actions	Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during mine visits Update and clarify the Supv Handbook and conduct training	1/1/2008
	The Carbon Monoxide Hdbk is outdated, and has not kept up with current systems		4.1.1		The CO Handbook should be updated to reflect current atmospheric monitoring systems and recent changes to applicable laws	Review and update the CO Insp Handbook as necessary to address new technology and standards	1/1/2008
	Insp did not follow the Carbon Monoxide Hdbk		4.2.1		Insp should be required to document their assessment of the AMS operators' familiarity with his or her responsibilities	Required in new Inspection Procedures Handbook, Rollout 7/1/2007	7/15/2007
	Some Insp did not follow Citation and Order Hdbk guidance on setting abatement times			4.3.1	The Supv should hold the insp accountable for establishing reasonable times for termination of citations	Issue instruction by memos to DMs	9/1/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
	Insp did not have sufficient knowledge of atmospheric monitoring systems and applicable laws.		4.3.1		Insp should be provided with training on systematic evaluation of atmospheric monitoring systems	Provide short term instruction via net meeting and augment with revisions to Natl MHS Academy's training program as necessary	1/1/2008
	Insp assumed that standard fire suppression systems for drives were sufficient for entire transfer installations, including take-up assemblies.		5.1.1		Training should be provided for all CMS&H personnel regarding the requirements for fire suppression on belt drives	Provide short term instruction via net meeting and augment with revisions to Natl MHS Academy's training program as necessary	1/1/2008
			5.1.2		Evaluate fire suppression installations at coal mines belt drives, nationally, to determine whether similar systems are in compliance with this standard	Provide short term instruction via net meeting and augment with revisions to Natl MHS Academy's training program as necessary	1/1/2008
			5.1.3		Peer reviews and supervisory reviews should include an inspection of belt conveyor entries	Issue instruction by memos to DMs	9/1/2007
Inspectors and district management improperly performed possible knowing willful (PKW) reviews	Inspectors were given inappropriate guidance on when to conclude a PKW existed	3.1.1			The DM should ensure enforcement personnel follow established guidance	Reenforce existing requirements and instructions through memos to DMs	9/1/2007
	Reviews by District management improperly supported the inspector's determinations	3.2.1			Administrator should ensure D3 SI program follows SI Handbook	Issue instruction by memos to DMs	9/1/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
		3.2.2			The Administrator should use the Performance Management System to ensure DM follows SI Handbook	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
	Supv SI discouraged PKW cases because of perceived resource limitations	3.3.1			The DM should use the Performance Management System to hold Supv SI accountable for properly evaluating cases	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
	The SI Handbook doesn't provide adequate guidance, discrepancy in time frame between SI handbook and the PPM	3.4.1			Revise the SI handbook to provide better guidance	Revise SI handoobk to provide additional guidance on how to determine that a PKW exists	1/1/2008
		3.4.2			Resolve time-frame discrepancies between SI handbook and PPM	Revise SI handoobk and revise PPM as necessary	1/1/2008
	CMSH didn't use data to address low # of 110 cases	3.5.1			Use available data to provide proper of oversight of SI program	Issue memos to DMs requiring them to use data to determine effectiveness of SI program	9/1/2007
MSHA has issued 2 pattern of violation (POV) notifications and no POV orders	The criteria for determining a POV was ineffective	4.1.1			Revise criteria to determine a POV	Revised POV criteria developed and implemented	Completed 6/14/2007
A CLR made improper conference decisions, some ACRI program deficiencies found by Jim Walters Resources Inc (JWR) internal review not corrected.	A CLR acted with autonomy and did not follow policies or properly value enforcement personnel statements (D:Didn't use violation history for neg evals)	5.1.1		4.2.1 5.1.1 5.2.1	The DM should use the Performance Management System to hold CLR accountable for making proper decisions	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union Issue instruction by memo to DMs	1/1/2008
		5.1.2		5.1.2 5.2.2	Develop new worksheet to circulate proposed CLR decisions and inspector positions through management chain	Study alternatives and develop program revisions to circulate proposed CLR decisions and inspector positions through management chain	1/1/2008
		5.1.3		5.3.1	Administrator should use Performance Management System to hold DMs accountable for holding CLRs accountable	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
	Coal HQ oversight of ACRI program is ineffective, focuses on procedures not decisions, audit team doesn't always have member with enforcement experience	5.2.1		5.4.3 5.5.3	Coal HQ audits should focus on CLR decisions (D: include recommendations for negligence evals)	Review ACRI handbook and complete revisions as necessary to assure appropriate focus on decisions including neg evaluations	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
		5.2.2			Coal HQ audits should include discussions with inspectors	Review ACRI handbook and complete revisions as necessary to assure adequate communication with inspectors	1/1/2008
		5.2.3			Coal HQ audit teams should include a team member with enforcement experience	Ensure each HQ audit team has a member with enforcement experience	1/1/2008
		5.2.4		5.4.1	The Administrator should use HQ audits and the Performance Management System to ensure DM holds CLR accountable	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
				5.4.2	The Deputy Assistant Secretary should use the Performance Management System to hold the administrator accountable for identifying and correcting deficiencies in the ACRI program	Revise performance standards to more directly apply to individual responsibilities	1/1/2008
	ACRI Handbook guidance is inadequate, focuses on administrative not substantive issues	5.3.1		5.3.2	Revise ACRI Handbook to give CLRs guidance on making decisions	Revise ACRI handbook and training to provide additional guidance	1/1/2008
		5.3.2		5.1.3 5.3.2	Revise ACRI Handbook to include a conference worksheet	Study alternatives and develop program revisions to circulate proposed CLR decisions and inspector positions through management chain	1/1/2008
				5.5.2	Revise ACRI Handbook to require use of at least 2 years for negligence evals	Revise ACRI handbook and training to provide additional guidance	1/1/2008
Enforcement personnel marked lower gravity, neg, and persons affected even though notes indicated higher levels and numbers	Inspectors were "conference conditioned"	6.1.1			Reinstruct inspectors to properly evaluate enforcement actions	Request ACRI personnel to attend district training sessions where inspection personnel will be reinstructed on enforcement actions	9/1/2007
				4.2.1	The DM should use the Performance Management System to hold CLR accountable	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
	Guidance in PPM and Cit.&Order Hdbk does not give clear guidance for determining gravity, neg, # of persons affected.			4.1.1	Supv should use material including the citation and order writing handbook, PPM and controlling case law when reviewing citations and orders	Update and clarify the Supv Handbook and conduct training	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
				4.1.2	Work through Academy to develop training and resource material to aid insp to properly determining gravity, negligence, and # of persons affected	Compare current training with Cit & Order Handbook for consistency Update and enhance where necessary Request EPD to conduct refresher training in coal districts	1/1/2008
				4.1.3	Revise PPM and Citation and Order Handbook to provide more guidance on evaluating gravity, neg, and # persons affected	Review PPM and Cit and Order Handbook for any necessary revisions Provide short term instruction via net meeting and augment with revisions to Natl MHS Academy's training program as necessary	1/1/2008
Poor pre and post conference communication	A CLR did not always follow MSHA handbooks	7.1.1		4.2.1 5.2.1 5.5.1	The DM should use the Performance Management System to hold CLR accountable	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
		7.1.2			Each CLR should develop a monthly report, given to all inspectors, briefly describing each decision	Review ACRI handbook and complete revisions as necessary to provide for the monthly summary reports Issue instruction by memos to DMs	1/1/2008
Many unsubstantial conference requests tied up district resources	DM did not use discretion in granting conferences	8.1.1			DM should use more discretiion in granting conferences	DM sent memo on March 1, 2007 requiring operators to explain rationale behind request	Completed 3/1/2007
20 psi horizontal pressure standard for seals is inadequate 75.335(a)(2)	MSHA relied on 1971 US Bureau of Mines report & never identified a need for seals to withstand higher pressures	9.1.1			MSHA should re-evaluate and require a prudent level of protection	Emergency Temporary Standard requiring higher pressure seals published May 22, 2007	Completed 5/22/2007
		9.1.2			Promulgate standards requiring a registered engineer to prepare seal designs	ETS published May 22, 2007	Completed 5/22/2007
		9.1.3			Work with NIOSH, industry, and manufacturers to test new seal designs at higher pressures	Technical Support will continue to work with manufacturers and NIOSH to develop, test, and disseminate information on new seal technology	Ongoing
	The 1992 rule committee relied on a BoM report for 20 psi standard; different engineering expertise should have been applied.	9.2.1			Ensure future rule making committees have necessary expertise	Top staff will ensure that rule making committees have appropriate expertise	9/1/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
Differences between Sago seals, approved plan, and Lake Lynn tests (D: The alternative seal construction provisions in the approved vent plan did not address roof straps entry size that could adversely affect the quality of seal construction.)	Construction specs for alternative seals not comprehensive or mine specific	10.1.1		6.1.1	Require alternative seal construction plans to be: prepared by a reg PE; specific to mine; and reviewed by MSHA	ETS published May 22, 2007	Completed 5/22/2007
Seal defects not always seen by MSHA, faulty construction practices used on seals, approved plan not followed	Construction defects can't be seen after seal is completely constructed	11.1.1			Promulgate standards requiring a registered engineer to prepare seal designs	ETS published May 22, 2007	Completed 5/22/2007
		11.1.2		7.1.2	Require operators to certify that seals are constructed in accordance with the approved seal plan	ETS published May 22, 2007	Completed 5/22/2007
		11.1.3		7.1.5	Require inspectors to have a copy of seal construction specs while inspecting seals	Issue memos to DMs requiring them to ensure inspectors understand approved seal requirements and have copy with them when inspecting seals	9/1/2007
		11.1.4		7.1.3	Require operators to remove portion of sealant so joints can be inspected when questions arise	Proper instruction provided to inspectors	Completed 7/1/2006
	Inspectors & specialists were not given training on specific critical seal construction provisions	11.2.1		7.2.1	Train inspectors/specialists on specific critical seal construction provisions	Critical seal design construction will be posted on the wwwmshagov website	1/1/2008
	MSHA is not always aware of new seal construction	11.3.1		7.1.1	Require operators to notify MSHA in advance	ETS published May 22, 2007	Completed 5/22/2007
		11.3.2		7.1.4	Instruct enforcement personnel to inspect new seal construction	Issue memos to DMs requiring inspectors to inspect new seal construction	9/1/2007
				8.1.2	Instruct vent spc or supv to make as many of the six-month ventilation plan reviews as feasible and incorporate inspections of seals during that review	Issue memos to DMs requiring inspectors to inspect new seal construction	9/1/2007
	Alternative seal construction requirements were not compiled and provided to inspectors	11.4.1		7.3.1	Provide existing 20 psi seal guide to inspectors	Technical Support provided seal construction catalog to districts	9/1/2007
MSHA didn't heed seal lightning explosion failures to act on lightning as an ignition source	Lightning as ignition source was considered to be isolated occurrence. Horizontal lightning ignition source never recognized.	12.1.1			Require insulated conductors with the potential to become an ignition source to be removed from areas to be sealed	ETS published May 22, 2007	Completed 5/22/2007
MSHA did not learn from faulty seal construction causing past failures	No system to evaluate seal accidents	13.1.1			Systematically evaluate seal explosion information	ETS published May 22, 2007	Completed 5/22/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
	No one responsible for analyzing seal accidents	13.2.1		9.1.1	Assign responsibility for systematically evaluating seal explosion information	ETS published May 22, 2007	Completed 5/22/2007
	Info on seal failures not widely known in MSHA and industry	13.3.1		9.1.2	Distribute seal accident reports to districts	HQ and districts will each apprise the other of seal accidents HQ will ensure distribution of seal reports	9/1/2007
After bottom mining, no rock dust was applied	Not following procedures	14.1.1			Direct enforcement personnel to require rock dusting in uncaved abandoned areas	Issue instruction by memos to DMs	10/1/2007
		14.1.2			Ensure mine operators are familiar with availability and use of rock dusting equip	Distribute information on new or existing rock dusting equip	10/1/2007
MSHA did not promulgate standards to implement refuge chambers.	MSHA didn't believe that emergency shelters were technically feasible	15.1.1			MINER Act requires NIOSH to conduct research concerning refuge chambers	Testing of refuge chambers with NIOSH is ongoing	1/1/2008
Plan reviews and inspections were inadequate for Part 48 training.	Specialists and inspectors did not perform adequately plan reviews.	16.1.1			Conduct thorough reviews of all plans DM ensure training plans are corrected	Memo to the DMs stressing the importance of adequate training plans	9/1/2007
		16.1.2			Supv should use Performance Management System to hold inspectors and specialists accountable	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
	Supv did not conduct adequate reviews or provide effective oversight	16.2.1			ADMs should use Performance Management System to hold supervisors accountable for proper oversight	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook	1/1/2008
	EFS staff did not adequately review training plan	16.3.1			ADM should provide technical oversight of EFS	ADM will work with EFS supervisory personnel when issues arise	9/1/2007
		16.3.2			EFS supv should hold EFS personnel accountable	Use performance standards to more effectively assess performance and hold accountable	1/1/2008
First MSHA employee arrived 4 hours after explosion	ICG didn't notify MSHA 84 minutes after explosion	17.1.1			MSHA should revise 30 CFR 5010 to define immediate reporting of accidents	30 CFR 5010 revised	Completed 12/8/2006
	Explosion occurred on Federal Holiday - MSHA traveled from homes to office to mine	17.2.1			Explore methods to decrease response time	Immediate notification within 15 minutes from mine operator to MSHA call center is now required with increased penalties for not complying	9/1/2007
Command Center took 10 hours to determine if fire existed UG	Gas detectors to measure high CO were not available in district	18.1.1		11.1.1	Provide districts with advanced gas detecting equipment that is capable of measuring elevated levels of methane and carbon monoxide	Gas detectors to measure high CO have been provided in each district	Completed 6/1/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
	MSHA's gas analysis van and one primary gas chromatograph were in use at a mine fire in Colorado.	18.2.1			MSHA should procure additional portable gas chromatographs and make them available at strategic locations	Review options for additional portable gas chromatographs and make them available at strategic locations Use newly available high limit gas detectors whenever possible	10/1/2007
Miscommunication between mine rescue teams and the command center	Exploration of 2nd Left Parallel exceeded capabilities of communication equipment. Five communication relays ensued.	19.1.1			The Director of Technical Support should explore the availability of advanced communication equipment	Research and test current technology options for use by mine rescue teams	6/1/2008
Families received misinformation about status of miners	Info transmitted from UG was not secure due to open pager phones and easily accessible Command Center	20.1.1			Establish guidelines for command center control and security and secure communications with mine rescue teams	Issue instruction by memos to DMs Update mine rescue training manual or issue separate instructions	10/1/2007
Briefing and debriefing of MEU did not take place on regular basis	Command center did not follow mine rescue protocol	21.1.1			Ensure that Mine Emergency Unit rescue team members are briefed and debriefed during rescue and recovery operations	Issue instruction by memos to DMs	9/1/2007
Misinformation about seismic location system may have affected Sago miner's decision to barricade	The approved Firefighting program of Instruction indicates that seismic location equipment would be used to locate trapped miners.	22.1.1			Ensure that the Firefighting Programs of Instruction contain the proper instructions and limitations of location systems	Review existing FFE plans to assure correct instructions and add locating system limitations, such as seismic systems	1/1/2008
	After the advent of SCSRs, MSHA did not modify the instructions on hard hat stickers.	22.2.1			Create new mine evacuation instructions	The Agency has created and distributed a new sticker that gives correct instructions on barricading	Completed 8/1/2006
Supv & second-level reviews & documentation of accompanied/field activities not done, incomplete or not adequate, Hdbk not followed	No supv diligent effort to perform thorough field activity reviews, & did not follow established policy for supervisory reviews (D: also accompanied activities)	23.1.1	9.1.3	3.1.2	Provide oversight to ensure the requirements of the CMS&H Supervisor's Handbook are followed	Update and clarify the Supv Handbook and conduct training Perform additional accompanied activities to enhance interaction between managers, supvs, and insp during mine visits	1/1/2008
		23.1.2	9.1.1	3.1.2 3.3.1 8.1.1 16.1.1	Use Performance Management System to hold Supv accountable for conducting thorough field activity reviews in accordance with CMS&H Supervisor's Handbook (D:also accompanied activities, inspect seals during accompanied activities when applicable)	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
		23.1.3		16.1.2	District generated worksheets should be revised to include all information required including detailed notes	Revise district generated worksheet	1/1/2008
			9.1.2		Take appropriate action with respect to individuals when issues of misconduct are identified	Update and clarify the Supv Handbook and conduct training	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
	ADM for did not provide adequate oversight. (A: also DM did not hold ADM accountable)	23.2.1	9.3.2	3.4.1 16.2.1 16.3.1	Use Performance Management System to hold ADM accountable for properly reviewing and documenting second-level reviews and for taking corrective actions	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
		23.2.2	9.2.1 9.3.1 9.4.1	16.4.3	Administrator should use Performance Management System to hold the DM accountable for ensuring that his subordinates comply with Handbooks	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook	1/1/2008
Inadequate Peer reviews, corrective action plans deficient, not submitted, or uncorrected. Significant issues identified as insignificant	Not following procedures	24.1.1			Use Performance Management System to hold staff accountable for following the Accountability Program Handbook and for conducting thorough and effective Peer Reviews	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
		24.1.2			Do not characterize issues as “significant” or “insignificant"	Make necessary revisions to Accountability Hdbk to eliminate the practice of identifying issues as "insignificant"	1/1/2008
	District Peer Reviews did not identify root causes of deficiencies, current process not effective	24.2.1	8.1.1 8.1.2		Ensure that deficiencies identified in Peer Reviews are analyzed for root causes Corrective actions must address root causes	Issue instruction by memos to DMs	10/1/2007
		24.2.2	8.1.3	16.4.1 16.4.3 17.2.1 17.3.3 17.3.2	Use Performance Management System to hold the DM accountable for identifying root causes of deficiencies and implementing effective action plans (D:also track progress of corrective actions) (DM&ADM)	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook	1/1/2008
				1.4.1 4.5.1 17.3.1	Redesign the Peer review process to incorporate root cause analyses	Make necessary revisions to Accountability Handbook to incorporate root cause analyses of peer reviews	1/1/2008
	No HQ reviews for several years.	24.3.1	8.3.1	17.2.2	Conduct reviews during next 2 years Evaluate progress in addressing internal review issues & identifying and correcting root causes Recommend changes to the action plan when appropriate	Review results of district peer reviews to ensure that internal review issues are addressed and defficiencies not recurring	12/31/2009
		24.3.2	8.2.1	3.5.1 16.4.2	Examine methods to improve HQ reviews of district Peer Review reports Implement method for identifying and eliminating repetitive issues and root causes	Reviews wil be conducted by CMSH Use Performance Management System to address recurring root causes	1/1/2008

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
	HQ oversight of Peer Reviews did not recognize or resolve deficiencies.		8.2.1		Examine methods to improve the effectiveness of HQ reviews of district Peer Review reports including eliminating repetitive issues	Reviews wil be conducted by CMSH Use Performance Management System to address recurring root causes	1/1/2008
	The Harlan field office supervisor failed to utilize the checklist provided by the assistant district manager in January 2006.			17.1.1	Use Performance Management System to hold the Supv responsible for implementing corrective actions resulting from Peer and Accountability reviews	Revise performance standards to more directly apply to individual responsibilities Conduct training on effective use of Performance Management System Develop a Performance Management System computer tracking system Update Supv Handbook Inform Union	1/1/2008
MSHA data was not adequately used by Supv and managers to monitor, identify, and correct lapses in required activities	Standardized reports are not available or effectively distributed for all potential indicators of performance deficiencies.		10.1.1		Develop and distribute standardized reports for all critical data to be used by managers and supervisors relevant to inspections and investigations	Develop additional standardized reports to be used throughout HQ and districts	1/1/2008
	National SOPs are not available to ensure effective use of data and reports.		10.2.1		SOPs should be developed for effective use of each report and to identify responsibilities for managers and supervisors	Update and clarify the Supv Handbook and conduct training	1/1/2008
			10.2.2		The administrator should mandate the use of national SOPs and require documentation of report reviews	Issue instruction by memos to DMs	1/1/2008
103(k) order did not address safety of persons engaged in rescue & recovery operation, no mods to the order involving the rescue and recovery.	District 7 personnel did not follow established procedures as outlined in section 103k of the Mine Act and Coal General Inspection Procedures Handbook.			10.1.1	A section 103(k) order should be issued to ensure the safety of all persons involved in rescue and recovery This order should be issued to the operator in writing as soon as possible	Issue instruction by memos to DMs	9/1/2007
				10.1.2	All rescue and recovery plans should be reviewed and approved by the senior authorized representative at the mine site prior to implementation	Issue instruction by memos to DMs Update mine rescue training manual or issue separate instructions	9/1/2007
MSHA did not coordinate rescue & recovery ops before & during command center, people & mine rescue teams entered mine & violated many critical well established safety measures.	Person in charge at mine did not follow mine rescue & recovery procedures, in D7 MERP, Coal Insp Hdbk. MSHA did not assume oversight obligations required in the Mine Act			12.1.1	The District 7 MERP should be modified to provide clear and concise direction in authority and delegation of duties of MSHA personnel onsite at rescue and recovery operations	Issue instruction by memos to DMs Update District MERPs, mine rescue training manual or issue separate instructions	9/1/2007
				12.2.2	D7 personnel should be reinstructed to follow the procedures for mine rescue and recovery operations in District MERP and the Coal Insp Handbook	District 7 personnel will have a training session to review the District MERP	9/1/2007

Deficiency	Cause	RS	RA	RD	Recommendation	Corrective Action	Due Date
Critical info, not relayed, compromised the ability to direct a safe rescue and recovery operation, when advancing the fresh air base, ventilation changes were made into unexplored areas.	Mine rescue teams did not follow established mine rescue protocol. The command center did not ensure communication with the fresh air base and mine rescue teams during the mine rescue and recovery.			13.1.1	The MSHA official in charge of the command center should ensure the safety of all persons involved in rescue and recovery through the use of the section 103(k) order	Issue instruction by memos to DMs Update mine rescue training manual or issue separate instructions	9/1/2007
				13.1.2	Inform each team entering mine of the mine status, locations of teams, fresh air base, back-up teams, and communication requirements, proper apparatus, constant communications, and proper back-up personnel	Issue instruction by memos to DMs Update mine rescue training manual or issue separate instructions	9/1/2007
				13.1.3	Ensure that established guidelines in coal insp handbook and in the mine emergency response plan are followed	Issue instruction by memos to DMs Update mine rescue training manual or issue separate instructions	9/1/2007
The response time in deploying the MEU unit resulted in a delay to outfit and equip onsite MSHA MEU members.	The MEU unit was not notified for 2 hours following the explosion.			14.1.1	Notify MEU immediately following any explosion, entrapment or reportable mine fire, members should get their equipment ready and remain ready for deployment	Included in revised HQ MERP	9/1/2007
	The Mobile Command Center is not situated close enough to District 7 to provide effective and timely support.			14.2.1	Perform a feasibility study, determine need for MEU units located throughout country to reduce response times to emergencies	Review options for improved MEU deployment of personnel and equipment	1/1/2008
MSHA did not conduct an analysis of rescue and recovery operations following the Darby Mine explosion.	There are currently no procedures in place to review and analyze MSHA's rescue and recovery efforts.			15.1.1	Form an ad hoc review committee for the purpose of evaluating MSHA's response to each mine emergency that involves rescue and recovery	Natl MERC and appropriate personnel will perform a review following each mine rescue and recovery op	1/1/2008

KEY	
Alternative Case Resolution Initiative	ACRI
Assistant District Manager	ADM
Atmospheric Monitoring System	AMS
Cause Aracoma	CA
Cause Darby	CD
Conference Litigation Representative	CLR
Cause Sago	CS
Deficiency Aracoma	DA
Deficiency Darby	DD
District Manager	DM
Deficiency Sago	DS
Mine Emergency Evacuation and Fire Fighting Program of Instruction	FFE
Inspector's Portable Application for Laptops	IPAL
Mine Emergency Response Coordinator	MERC
Mine Emergency Response Plan	MERP
Mine Emergency Unit	MEU
Pattern of Violations	POV
Recommendation Aracoma	RA
Recommendation Darby	RD
Recommendation Sago	RS
Time and Activity	T&A
Underground	UG
Uniform Mine File	UMF

Appendix C – MSHA Inspections and Investigations at the Darby Mine

Beginning Date	Ending Date	Inspection Activity Code	Inspection Activity
1/5/2004	3/31/2004	AAA	Regular Inspection
1/6/2004	1/7/2004	BAB	Respirable Dust Tech. Insp.- U.G. Mines
1/7/2004	1/7/2004	BBB	Noise Technical Investigation
4/1/2004	6/3/2004	AAA	Regular Inspection
4/5/2004	7/1/2004	AFB	Non Fatal Injury Accident Investigation
6/28/2004	3/31/2005	CBC	Electrical Spot Investigation
7/1/2004	9/22/2004	AAA	Regular Inspection
10/1/2004	3/31/2004	DGA	Computer Generated Dust Violation
10/1/2004	3/31/2004	DGB	Computer Generated Noise Violation
10/1/2004	3/31/2005	DGC	Other Office Generated Violation
10/5/2004	12/30/2004	AAA	Regular Inspection
1/4/2005	3/28/2005	AAA	Regular Inspection
3/3/2005	3/7/2005	CEF	Other Technical Investigation
3/31/2005	3/31/2005	CED	Respirable Dust Investigation
4/6/2005	6/30/2005	E01	Regular Safety and Health Inspection
7/6/2005	9/30/2005	E01	Regular Safety and Health Inspection
9/16/2005	9/29/2005	E04	Verbal Hazard Complaint Inspections
10/7/2005	12/1/2005	E01	Regular Safety and Health Inspection
12/20/2005	12/21/2005	E20	Roof Control Technical Investigation

Appendix D – MSHA Enforcement Actions at the Darby Mine

Date	C/O #	Type	S&S	30 CFR	Subpart Description
4/1/2004	7518125	104(a)	N	75.517	Power wires and cable insulation
4/1/2004	7518126	104(a)	N	75.904	Identification of circuit breaker
4/6/2004	7518129	104(a)	N	75.1101-10	Water sprinkler fire warning devices
4/6/2004	7518128	104(a)	N	75.360(b)(9)	Preshift electrical installations
4/6/2004	7518127	104(a)	N	75.370(a)(1)	Ventilation plan
4/12/2004	7518137	104(a)	N	75.1100	Fire protection requirements
4/12/2004	7518136	104(a)	Y	75.203(e)(2)	Excessive width of entry
4/12/2004	7518135	104(a)	N	75.370(a)(1)	Ventilation plan
4/20/2004	7518141	104(a)	N	75.370(a)(1)	Ventilation plan
4/22/2004	7518144	104(a)	N	75.503	Permissible electrical face equipment
4/22/2004	7518142	104(a)	N	75.503	Permissible electrical face equipment
4/22/2004	7518143	104(a)	Y	75.523-3(b)(1)	Emergency deenergization device
4/28/2004	7518146	104(a)	N	75.1100-2(b)	Fire hose outlets 300 Feet
5/20/2004	7518154	104(a)	N	75.340(a)	Noncombustible structures or areas
5/20/2004	7518155	104(a)	N	75.342(a)(4)	Calibration of methane monitors
6/10/2004	9865404	104(a)	Y	70.100(a)	Respirable dust standards
6/18/2004	9865393	104(a)	N	70.208(a)	Bimonthly sampling
7/15/2004	7518169	104(a)	N	75.333(e)(1)(ii)	Constructed of non combustible material
7/15/2004	7518168	104(a)	N	75.400	Accumulations of combustible materials
7/19/2004	7518170	104(a)	Y	75.340(a)(1)(i)	Ventilation of non combustible structures
7/19/2004	7518171	104(a)	N	75.400	Accumulations of combustible materials
7/21/2004	7518172	104(a)	N	75.1100-2(b)	Fire hose outlets 300 Feet
7/21/2004	7518173	104(a)	N	75.400	Accumulations of combustible materials
7/26/2004	7518174	104(a)	Y	75.202(a)	Protection from roof, face, rib
7/26/2004	7518175	104(a)	Y	75.370(a)(1)	Ventilation plan
7/27/2004	7518177	104(a)	N	75.514	Electrical connections
7/27/2004	7518176	104(a)	N	75.516	Power wire support
8/1/2004	7518181	104(a)	Y	75.310(a)(3)	Mine fan signal
8/2/2004	7518182	104(a)	N	75.503	Permissible electrical face equipment
8/11/2004	7518189	104(a)	Y	75.1103-1(b)	Automatic fire sensors
8/11/2004	7518188	104(a)	N	75.400	Accumulations of combustible materials
8/11/2004	7518187	104(a)	N	75.512-2	Frequency of electrical examinations
8/16/2004	9865416	104(a)	N	70.208(a)	Bimonthly sampling

Appendix D – MSHA Enforcement Actions at the Darby Mine (continued)

Date	C/O #	Type	S&S	30 CFR	Subpart Description
8/19/2004	7518194	104(a)	N	75.1107-5	Electrical components of fire suppression devices; permissibility requirements.
8/19/2004	7518192	104(a)	N	75.400	Accumulations of combustible materials
8/19/2004	7518193	104(a)	N	75.503	Permissible electrical face equipment
11/30/2004	7539527	104(a)	N	75.370(a)(1)	Ventilation plan
11/30/2004	7539528	104(a)	N	75.400	Accumulations of combustible materials
12/10/2004	7539537	104(a)	N	75.1103-4(a)	Automatic fire sensor and warning device
12/10/2004	7539536	104(a)	N	75.333(b)(2)	Belt air separated from return
12/10/2004	7539533	104(a)	N	75.400	Accumulations of combustible materials
12/10/2004	7539534	104(a)	Y	75.400	Accumulations of combustible materials
12/10/2004	7539535	104(a)	Y	75.601-1	Short circuit protection
12/16/2004	7539545	104(a)	N	75.400	Accumulations of combustible materials
12/20/2004	7539548	104(a)	N	75.1107-4(c)	Manual fire actuators
12/20/2004	7539547	104(a)	N	75.383(a)	Escapeway map
12/20/2004	7539546	104(a)	Y	75.605	Clamping of trailing cables
1/14/2005	7539554	104(a)	N	75.383(a)	Escapeway map
1/14/2005	7539553	104(a)	N	75.402	Rock dust 40 feet face and last open
1/14/2005	7539555	104(a)	N	75.403	Non combustible content
1/20/2005	7539556	104(a)	Y	75.370(a)(1)	Ventilation plan
2/18/2005	7539580	104(a)	N	75.1100-3	Condition and examination of firefighting equipment
3/1/2005	7539586	104(a)	N	75.400	Accumulations of combustible materials
3/1/2005	7539587	104(a)	Y	75.400	Accumulations of combustible materials
3/15/2005	7539594	104(a)	N	75.403	Non combustible content
3/23/2005	7550485	104(a)	N	75.400	Accumulations of combustible materials
3/23/2005	7550486	104(a)	N	75.503	Permissible electrical face equipment
3/23/2005	7550488	104(a)	N	75.523-3(b)(3)	Emergency park brake full stop
3/23/2005	7550487	104(a)	N	75.523-3(b)(3)	Emergency park brake full stop
3/23/2005	7550489	104(a)	N	75.523-3(c)(2)	Emergency park brake without energizing
4/11/2005	7549045	104(a)	N	75.1100-3	Condition and examination of firefighting equipment
4/11/2005	7549043	104(a)	N	75.1502(c)(1)	Mine emergency evacuation drills - 90 days
4/11/2005	7549044	104(a)	Y	75.370(a)(1)	Ventilation plan
4/27/2005	7549076	104(a)	N	75.1106-5(a)	Maintenance of compressed gas cylinders
4/27/2005	7549077	104(a)	Y	75.202(a)	Protection from roof, face, rib
4/27/2005	7549075	104(a)	N	75.903	Visual disconnect disconnecting device

Appendix D – MSHA Enforcement Actions at the Darby Mine (continued)

Date	C/O #	Type	S&S	30 CFR	Subpart Description
5/3/2005	7549078	104(a)	N	75.1101-10	Water sprinkler fire warning devices
5/9/2005	7549079	104(a)	N	75.400	Accumulations of combustible materials
5/11/2005	7549083	104(a)	Y	75.1100-3	Condition and examination of firefighting equipment
5/11/2005	7549081	104(a)	N	75.1103	Automatic fire warning devices
5/11/2005	7549082	104(a)	N	75.211(d)	Bar for taking down loose material
5/11/2005	7535583	104(a)	N	75.342(a)(4)(ii)	Calibration record for methane monitors
5/11/2005	7549086	104(a)	Y	75.400	Accumulations of combustible materials
5/11/2005	7549085	104(a)	Y	75.400	Accumulations of combustible materials
5/11/2005	7549084	104(a)	N	75.503	Permissible electrical face equipment
5/11/2005	7535588	104(a)	N	75.503	Permissible electrical face equipment
5/11/2005	7535584	104(a)	N	75.512	Electrical equipment exam and testing
5/11/2005	7549087	104(a)	N	75.515	Cable fitting suitability
5/11/2005	7535587	104(a)	Y	75.604(b)	Cable splices insulated and sealed
5/19/2005	7549092	104(a)	N	75.523-3(b)(5)	Emergency park brake manual control
5/19/2005	7549090	104(a)	N	75.523-3(b)(5)	Emergency park brake manual control
5/19/2005	7549091	104(a)	Y	75.604(b)	Cable splices insulated and sealed
5/19/2005	7549093	104(a)	Y	75.604(b)	Cable splices insulated and sealed
6/20/2005	7535621	104(a)	N	75.310(b)(1)	Mine fan separate circuit
6/29/2005	4897471	104(a)	N	75.372(a)(1)	Up to date mine map every 12 months
7/11/2005	7552535	104(a)	Y	75.1725(a)	Machinery and equipment - safe condition
7/11/2005	7552533	104(a)	N	75.400	Accumulations of combustible materials
7/11/2005	7552528	104(a)	N	75.503	Permissible electrical face equipment
7/11/2005	7552534	104(a)	N	75.503	Permissible electrical face equipment
7/11/2005	7552531	104(a)	N	75.515	Cable fitting suitability
7/11/2005	7552530	104(a)	Y	75.601	Short circuit protection trailing cables
7/11/2005	7552529	104(a)	Y	75.604(b)	Cable splices insulated and sealed
7/11/2005	7552532	104(a)	Y	75.604(b)	Cable splices insulated and sealed
8/18/2005	7552538	104(a)	N	75.403	Non combustible content
8/22/2005	7540599	104(a)	Y	75.1722(a)	Exposed moving machine parts
8/22/2005	7540600	104(a)	Y	75.1722(a)	Exposed moving machine parts
8/29/2005	9865635	104(a)	Y	70.100(a)	Respirable dust standards
8/29/2005	7552015	104(a)	N	75.370(a)(1)	Ventilation plan
9/16/2005	7553114	104(a)	N	75.1702	Smoking prohibition

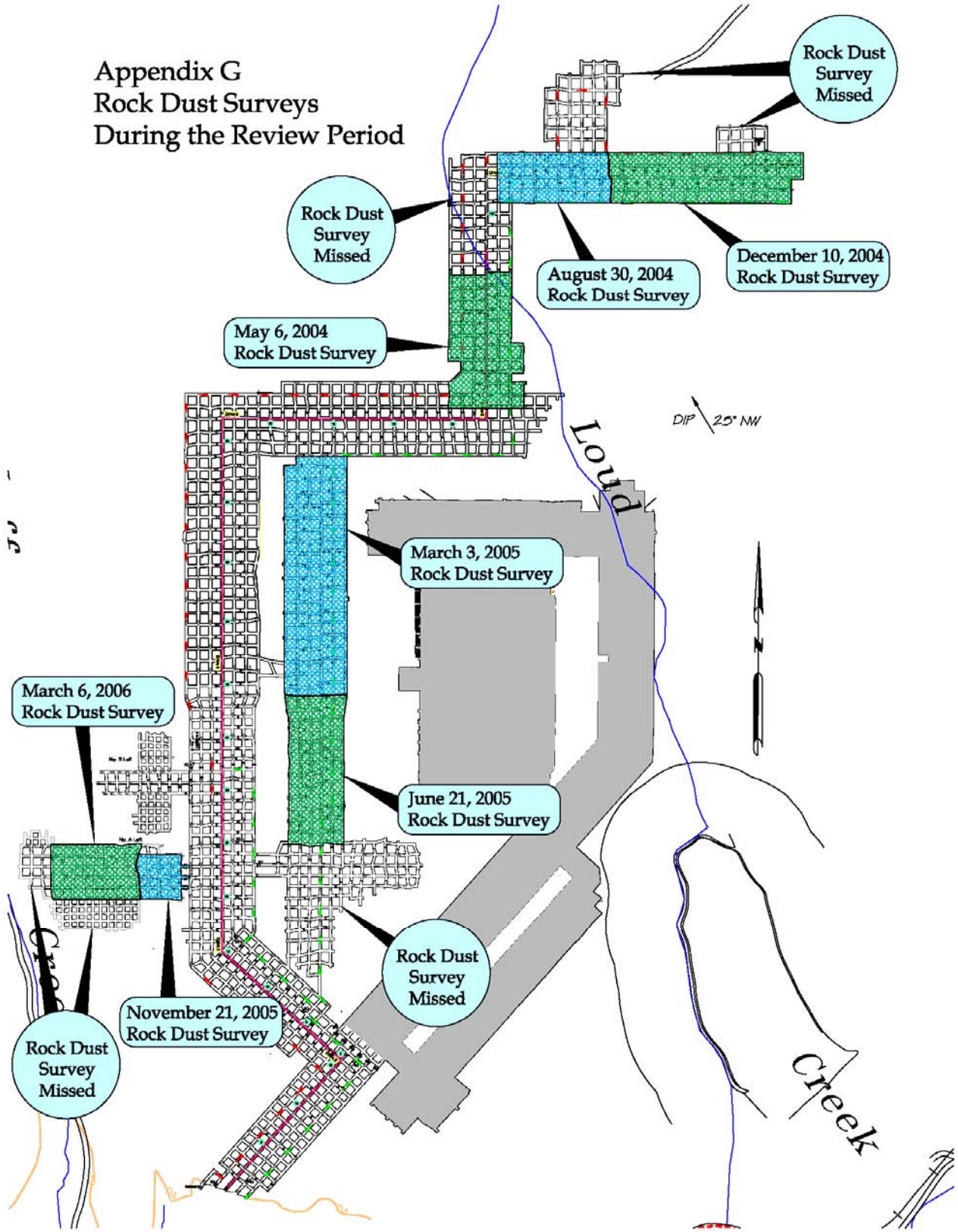
Appendix D – MSHA Enforcement Actions at the Darby Mine (continued)

Date	C/O #	Type	S&S	30 CFR	Subpart Description
10/17/2005	7553127	104(a)	Y	75.1722(b)	Guarding of moving machine parts
10/17/2005	7553125	104(a)	N	75.400	Accumulations of combustible materials
10/17/2005	7553124	104(a)	N	75.400	Accumulations of combustible materials
10/17/2005	7553126	104(a)	N	75.523-3(b)(3)	Emergency park brake full stop
10/31/2005	7553139	104(a)	Y	75.1722(a)	Exposed moving machine parts
10/31/2005	7553142	104(a)	Y	75.1722(a)	Exposed moving machine parts
10/31/2005	7553138	104(a)	Y	75.220(a)(1)	Roof control plan
10/31/2005	7553143	104(a)	N	75.362(b)	Examination of belt conveyor
10/31/2005	7553140	104(a)	N	75.381(c)(1)	Escapeways (cited wrong standard)
10/31/2005	7553141	104(a)	N	75.400	Accumulations of combustible materials
12/20/2005	7552571	104(a)	Y	75.220(a)(1)	Roof control plan
12/20/2005	7552570	104(a)	N	75.220(a)(1)	Roof control plan
1/17/2006	7553161	104(a)	Y	75.1722(a)	Exposed moving machine parts
1/17/2006	7553162	104(a)	Y	75.1722(a)	Exposed moving machine parts
1/17/2006	7553163	104(a)	Y	75.220(a)(1)	Roof control plan
1/17/2006	7553159	104(a)	N	75.403	Non combustible content
1/17/2006	7553160	104(a)	Y	75.604(b)	Cable splices insulated and sealed
1/25/2006	7553174	104(a)	N	75.1103-1	Cable splices sealed and insulated
2/13/2006	7553197	104(a)	Y	75.523-2(a)	Deenergization of tramming motors
5/3/2006	7552619	104(a)	N	75.1502(c)(1)	Mine emergency evacuation drills - 90 days
5/3/2006	7552620	104(a)	N	75.360(e)	Certification of preshift examination
5/9/2006	7552634	104(a)	Y	75.1101-10	Water sprinkler fire warning devices
5/9/2006	7552627	104(a)	Y	75.202(a)	Protection from roof, face, rib
5/9/2006	7552632	104(a)	N	75.211(d)	Bar for taking down loose material
5/9/2006	7552630	104(a)	N	75.400	Accumulations of combustible materials
5/9/2006	7552628	104(a)	N	75.400	Accumulations of combustible materials
5/9/2006	7552633	104(a)	Y	75.400	Accumulations of combustible materials
5/9/2006	7552631	104(a)	N	75.503	Permissible electrical face equipment
5/9/2006	7552629	104(a)	Y	75.512	Electrical equipment exam and testing
5/15/2006	7552637	104(a)	Y	75.1101-10	Water sprinkler fire warning devices
5/15/2006	7552638	104(a)	Y	75.202(a)	Protection from roof, face, rib
5/15/2006	7552639	104(a)	N	75.400	Accumulations of combustible materials
5/16/2006	7552641	104(a)	N	75.1101-10	Water sprinkler fire warning devices

Appendix D – MSHA Enforcement Actions at the Darby Mine (continued)

Date	C/O #	Type	S&S	30 CFR	Subpart Description
5/17/2006	7552646	104(a)	Y	75.1722(a)	Exposed moving machine parts
5/17/2006	7552647	104(a)	Y	75.1725(a)	Machinery and equipment - safe condition
5/17/2006	7552645	104(a)	Y	75.400	Accumulations of combustible materials
5/17/2006	7552644	104(a)	N	75.400	Accumulations of combustible materials
5/17/2006	7552643	104(a)	N	75.503	Permissible electrical face equipment
5/17/2006	7552642	104(a)	N	75.523-3(b)(2)	Emergency park brake without energizing
5/17/2006	7552648	104(a)	N	75.523-3(b)(5)	Emergency park brake manual control

Appendix E – Rock Dust Survey Map



Appendix F – Background on Criteria for Approval of Alternative Seals

Section 303(z)(2) of the Federal Mine Safety and Health Act of 1977 requires that "all areas from which pillars have been wholly or partially extracted, and abandoned areas…shall be ventilated by bleeder entries or by bleeder systems or equivalent means, or be sealed…" The section further states that "When sealing is required, such seals shall be made in an approved manner so as to isolate with explosion-proof bulkheads such areas from the active workings of the mine."

Mandatory safety standard 30 CFR § 75.334 requires that worked-out areas of coal mines either be ventilated or sealed. Seal construction requirements are contained in 30 CFR section 75.335 which provide for two options:

1. Section 75.335(a)(1) specifies requirements for constructing seals using solid concrete blocks; and
2. Section 75.335(a)(2) specifies in part that "Alternative methods or materials may be used to create a seal if they can withstand a static horizontal pressure of 20 pounds per square inch provided the method of installation and the material used are approved in the ventilation plan."

Mandatory safety standard 30 CFR 75.335, Construction of Seals, was promulgated in 1992. Prior to the 1992 rule, the previous seal-related standard (75.320-2) had required that "pending the development of specifications for explosion-proof seals or bulkheads, seals or bulkheads may be constructed of solid, substantial and incombustible materials sufficient to prevent an explosion that may occur on one side of the seal from propagating to the other side."

The preamble to the 1992 rule states the following:

> "Seals must be designed to withstand elevated pressures. The final rule adopts 20 pounds per square inch gauge (psig) as the threshold for determining whether a seal is explosion proof. This threshold is based on the U.S. Bureau of Mines Report of Investigations No. 7581. According to that report, a seal or bulkhead may be considered explosion proof when its construction is adequate to withstand a static load of 20 psig if there is sufficient incombustible material on both sides of the seal to abate the explosion hazard. According to the Bureau's report, with adequate incombustible material and minimum coal dust accumulations, it is doubtful that pressures exceeding 20 psig could occur very far from the origin of the explosion."

Since the 1992 rule revision, MSHA's approval of alternative seals has been based on the results of full-scale seal testing conducted at the National Institute for Occupational

Safety and Health's (NIOSH) Lake Lynn Experimental Mine near Fairchance, PA. MSHA worked with a NIOSH group that was formerly part of the U.S. Bureau of Mines to develop the testing program.

While the Lake Lynn Experimental Mine is a limestone mine, the seal tests were conducted in mine openings configured similar in size to coal mine openings. The tests involved constructing seals and subjecting them to a pressure pulse of 20 psi generated from a methane explosion. The test seals were constructed in cross-cuts off of the entry in which the methane explosion was initiated (see Seal "A" in Figure 1). As a result, the seals were subjected to a "side on" or "static" pressure. This test set up was used based on RI 7581's recommendation that a seal be considered explosion proof if it could withstand a "static" pressure of 20 psi (versus a head-on or "reflected" pressure). The seal would be subjected to a head-on or "reflected" pressure if it was constructed across the entry in which the explosion was initiated (see Seal "B" in Figure 1).

After being subjected to the "side on" pressure from an explosion, the seals were then examined, and if they had survived structurally, were tested for air leakage. The acceptable leakage rates were established by MSHA. For pressure differentials up to 1-inch of water gauge, air-leakage through the seal could not exceed 100 cubic feet per minute; for pressure differentials greater than 3 inches of water gauge, air leakage could not exceed 250 cubic feet per minute.

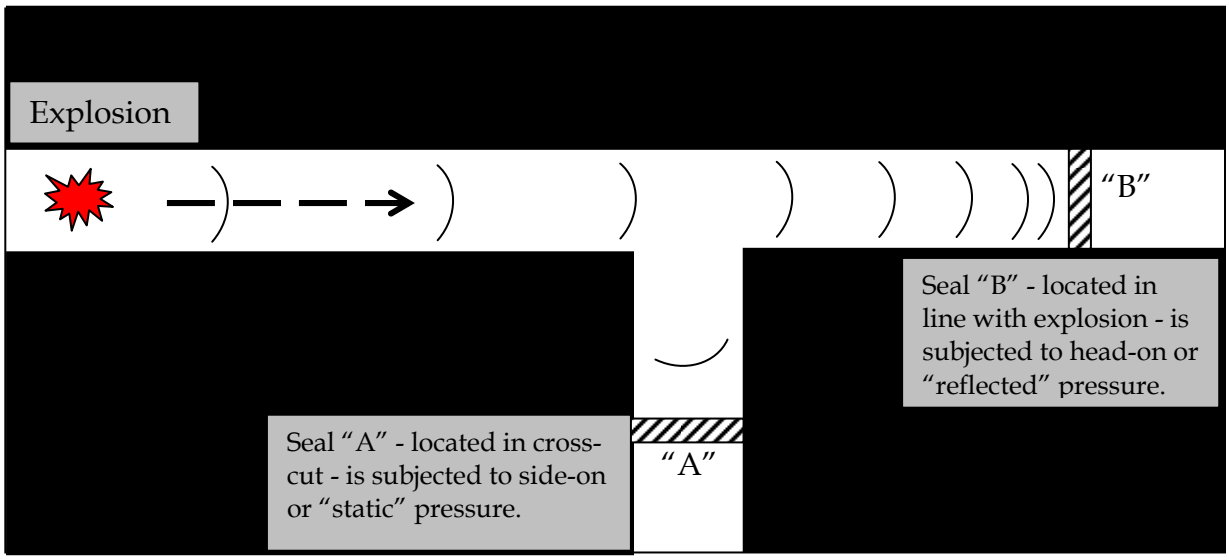


Figure 1 – Simplified illustration of "side-on" or "static" pressure versus "head-on" or reflected pressure.

Types of alternative seals that have been tested at the Lake Lynn Experimental Mine include light-weight cementitious blocks, poured-in-place cementitious seals, wooden seals and seals with a polyurethane/gravel core. Details concerning the alternative seal testing program are provided in "Evaluation of Solid-Block and Cementitious Foam

Seals," U.S. Bureau of Mines Report of Investigation (RI) 9382, Greninger, N.B. Weiss, E.S., Luzik, S.J., and Stephan S.R., United States Department of the Interior, 1991.

The basis for MSHA's approval of alternative seals has been that once a seal passed the test criteria at Lake Lynn Experimental Mine (i.e., withstood at least a 20 psi explosion pressure and subsequently passed a leakage test), then a seal that is proposed to be built in the same fashion as the test seal can be approved in a mine ventilation plan.

Seal Strength Criteria Used in Other Countries

For perspective on the alternative seal strength criterion contained in 30 CFR 75.335(a)(2), it is helpful to consider seal strength requirements used in some other countries where coal is mined.

European Practice: In the United Kingdom, according to "Design Criteria for Explosion Proof Stoppings," issued January 19, 1998, explosion proof stoppings (seals) should be able to withstand pressures up to 76 psi (5.24 bar). This figure is based on the publication "Sealing Off Fires Underground" by the Institution of Mining Engineers, 1985.

The plug-type seals used in the UK are constructed by filling the space between two concrete block walls with a gypsum mix called "hardstop." The block walls are 4 inches thick, wet mortared, and hitched into the ribs and floor. The thickness of the seal is dependent on the width and height of the mine opening and is determined from an empirically derived relationship developed in the 1950s by the National Coal Board. By this relationship, the required thickness of the seal in meters is equal to the average of the width and height of the entry, in meters, plus 0.6 meters. For an entry approximately 20 feet (6.7 m) wide and 8 feet (2.7 m) high, this relationship results in a seal thickness of almost 16 feet (5.3 m).

Use of the National Coal Board formula for seal thickness was evaluated experimentally and found to be conservative in a series of tests reported in a paper entitled, "The Performance of Explosion Proof Stoppings" by Leeming and Brookes in 1999. This report indicates that a 1.5 meter thick seal withstood a dust explosion generating a pressure of approximately 80 psig and a 1.0 meter thick seal withstood a pressure of approximately 68 psig. These tests were conducted in an explosion chamber using coal dust ignited by black powder and the seals were subjected to a head-on pressure. In Germany and Poland, seals are required to be capable of withstanding a pressure of 5 bar, which is equivalent to 72.5 psi.

Australian Practice: Seals tested or designed to withstand a 20 psig explosion are permitted to be installed, however, if the atmosphere behind the seal is in the explosive range, then this atmosphere is required to be inerted and miners withdrawn from the

mine until this occurs. Otherwise, seals tested or designed to withstand a 50 psig explosion pressure are required. The results of seal testing conducted for Australia by NIOSH at Lake Lynn Laboratory have been used to approve seals, as well as engineering analyses of a seal's capability to withstand overpressure.

South African Guideline: The "Guideline for the Compilation of a Mandatory Code of Practice for the Prevention of Coal Dust Explosions in Underground Coal Mines," defines an "explosion proof seal" as a seal which is designed to withstand a static pressure of typically 58 psi. Such seals require "an approved design endorsed by a Professional Civil Engineer." The guideline further indicates that "use of explosion proof seals is dictated by the hazard potential of the area in question and the situation." A situation where explosion proof seals "may be needed, is when the atmosphere of a sealed off area stabilizes within the explosive range or will take so long to pass through the explosive range that it will cause an unacceptable hazard."

The guideline also recognizes that "containment walls" can be installed where the atmosphere in the sealed area stabilizes in the non-explosive range, provided regular monitoring occurs to verify the safe condition. Containment walls "must be designed to withstand a static pressure of approximately 140 kPa (20 psi) on the assumption that the area being sealed has been adequately stone dusted and cleared of all possible conductors of lightning and other electrical charges."

Summary: As indicated above, the pressure criterion used in the United Kingdom, Germany and Poland is in the range of 72.5 to 76 psi. The criteria used in Australia and South Africa are similar in that seals are constructed to withstand pressures of either 20 psi or 50 to 58 psi, depending on the explosion potential of the atmosphere behind the seal. Obviously the criterion used in the European countries, and the requirements in Australian and South African mines for abandoned areas with explosive atmospheres, are significantly more stringent than the criterion that has formed the basis for alternative seal approvals in the U.S.

Discussion of 20-psi Alternative Seal Strength Criterion in 30 CFR 75.335(a)(2)

As indicated in the preamble to the current rule, a pressure of 20 pounds per square inch gauge (psig) was established as the threshold for determining whether a seal is explosion proof based on U.S. Bureau of Mines Report of Investigations (RI) No. 7581. RI 7581 states that "…a bulkhead may be considered 'explosion proof' when its construction is adequate to withstand a static load of 20 psig, provided that the area to be sealed contains sufficient incombustible to abate the explosion hazard in that area and that adequate incombustible is maintained in the adjoining open passageways."

This conclusion, that a seal be considered "explosion proof" if it can "withstand a static load of 20 psig," appears to be inconsistent with other information provided in RI 7581.

That is, the report indicates that explosion pressures had been measured to 127 psi, that the U.S. had previously required 50 psi for the strength of seals between mines on Federal property, and that other countries considered that seals needed to be constructed to withstand 50 to 72 psi. Consider, however, that at the time that RI 7581 was published, the main concern was for explosions occurring near the face area of a mine, where the primary sources of ignition are located and where methane is liberated during mining. It is unlikely that explosions originating in gobs were a major concern at that time. Indeed, RI 7581 states that "…present studies are directed toward preventing flames from propagating into sealed areas…" Additionally, prior to 1971, seals were mainly used in areas remote from the face area.

As a result of the wording used in RI 7581 – especially use of the term "static load" in relation to an explosion loading - the meaning of - or basis for - the recommendation can be interpreted in different ways.

- The 20 psi conclusion may have been based on the expectation that the main source of an explosion was from the face area of a mine and seals would be located a sufficient distance from the face that the pressure would have dissipated to no more than 20 psi.

- The 20 psi conclusion may have been based on the expectation that more than 200 feet from an explosion, the pressure seldom exceeds 20 psi unless coal dust accumulations are excessive.

- The 20 psi criterion may have been designated as a "static load" because it was expected that seals, being remotely located from the face area, would not be located in the direct line of an explosion and thus would be subject only to a "side on" pressure (that is, interpreting the term "static loading" in the ventilation engineering sense of the term).

- The 20 psi may have been designated as a "static load" because of the author's perception that a seal designed to withstand a "static" load of 20 psi – with the term "static load" interpreted in the structural engineering sense of a time-independent load - would actually be able to withstand a higher explosion pressure. The report states that "a bulkhead designed to withstand a given static load will have a considerable margin of safety should it be subjected to a greater dynamic load." It also indicates that in trials in the Experimental Mine, "a bulkhead designed to withstand a static load of 14 psig withstood 27 explosions developing from 5 to 50 psig."

Although the exact intent of RI 7581 is debatable, it is clear that the test criteria adopted for the approval of alternative seals in the U.S., as tested at Lake Lynn, does not take into account the potential for a seal to be subjected to a head-on or "reflected"

overpressure. As indicated in "*Design of Blast Resistant Buildings in Petrochemical Facilities*," prepared by the Task Committee on Blast Resistant Design, American Society of Civil Engineers, "when the free blast wave from an explosion strikes a surface, it is reflected. The effect of this blast wave reflection is that the surface will experience a pressure much more than the incident side-on value." By interpreting the "static" load as a side-on pressure, the seal test criteria does not take into account the higher head-on or "reflected" pressure. The alternative seal test criteria also results in a significantly lower strength criteria than is generally required in other countries (unless the sealed area is inert).

Seal Use Pre-1971 versus Today

The seal strength requirement incorporated into the 1992 rule revisions, being based on RI 7581, was based on research on seals performed prior to 1971.

- At the time that the 1971 recommendations were made, the main concern was for explosions occurring in the active area of the mine.

- The statement is made in RI 7581 that "Seldom…do pressures 200 feet and more from the origin of an explosion exceed 20 psig unless coal dust accumulations are excessive…" However, no basis is provided in RI 7581 for this conclusion. It may have been based on an explosion occurring in the open active portion of the mine, where pressures would have more of an opportunity to dissipate, versus explosions occurring in a sealed gob area, where pressures would be confined and would not dissipate as readily.

- The use of seals in U.S. coal mines has changed significantly from the practices used prior to 1971. Sealing is much more frequent now. Many seals are used to seal longwall panels, and longwall mining has increased substantially since 1971. Overall, the use of seals has now become much more common in U.S. coal mines, where many more seals are built than are used in European mines. It is estimated that there are over 13,000 seals in coal mines in the U.S. and that most have been built since the 1992 rule.

Summary and Conclusions: The seal strength criteria stated in 30 CFR 77.335(a)(2), that alternative methods or materials may be approved for seals if the seal "can withstand a horizontal pressure of 20 pounds per square inch," is inadequate.

- RI 7581 is based on seal practices used prior to 1971. Significant changes have occurred in the use of seals in U.S. coal mine since that time.

- The 20-psi criteria was based on a recommendation in RI 7581 which is subject to different interpretations as a result of the different circumstances in which seals

were used prior to 1971 versus now. The use of the term "static" pressure has a different meaning depending on whether it is considered in the context of ventilation or structural engineering.

- In the full-scale testing of seals, the 20-psi recommendation in RI 7581 was interpreted as a "side-on" explosion pressure. Seals can be subjected to "reflected" pressures which can be significantly larger than the side-on pressures.

- Use of a 20 psi "side on" explosion pressure is a significantly lower seal-strength criterion than is used in other countries, which typically require seal strengths in the range of 50 to 76 psi (unless the atmosphere in the sealed area is inert).

- From the 1992 rule revision until the explosion at Sago Mine, the inadequacy of the 20-psi criteria did not become evident. Multiple parties, including seal manufacturers, NIOSH, and MSHA, participated in the alternative seal testing at Lake Lynn in which the 20-psi testing criteria was applied. In the investigations of 11 explosions involving seals, going back to 1986, there had been no conclusive evidence that the explosion pressure had exceeded 20 psi. The general perception was that the seal failures that had occurred over this period were due to faulty seal construction.

Appendix G – Explosions Involving Seals

Case	Date	Mine Name (ID Number)	Type of Seal and Result	Quality of Seal Construction	Estimated Explosion Pressure	Source of Ignition
1	10-7-1986	Roadfork No. 1 Mine (15-10753)	Concrete block seals failed.	No information available.	No information available	Friction from roof fall or metal strap tearing from anchorage
2	8-22-1993	Mary Lee No. 1 Mine (01-00515)	Pumpable cementitious seals failed.	Accident report indicates: "Apparently constructed in accordance with the approved ventilation plan."	No information available	Lightning strike
3	4-5-1994	Oak Grove Mine (01-00851)	Concrete block seals failed.	Questionable due to 25–foot width of entry.	Approximately 5 psi (based on evidence in area of seals)	Lightning strike
4	6-(9-16)-1995	Gary No. 50 Mine (46-01816)	Pumpable cementitious seals withstood explosion.	No information available.	Approximately 5 to 7 psi (based on evidence when sealed area re-entered)	Either lightning strike or frictional ignition from roof fall.
5	1-29-1996	Oak Grove Mine (01-000851)	Pumpable cementitious seals failed.	Compressive strength of samples of seal material found to be significantly less than requirements.	Less than 5 psi (based on evidence in area of seals)	Lightning strike
6	5-15-1996	Mine No. 1 (46-07273)	Polyurethane/ gravel core seals failed	Failed seal showed evidence that polyurethane had not cured properly	Less than 20 psi, possibly as low as 2-3 psi, based on presence of intact stopping nearby.	Lightning strike or frictional ignition from roof fall
7	6-22-1996	Mine No. 1 (46-07273)	Polyurethane/ gravel core – result of explosion unknown.	Unknown whether any seals failed; mine sealed following explosion.	No estimate made; mine was sealed with no investigation of explosion area	Lightning strike or frictional ignition from roof fall
8	7-9-1997	Oak Grove (01-00851)	Pumpable cementitious seals failed.	Low compressive strength; extraneous materials within seals	Possibly >20 psi, but evidence not conclusive due to uncertain quality of seal construction	Lightning strike

Appendix G– Explosions Involving Seals (continued)

Case	Date	Mine Name (ID Number)	Type of Seal and Result	Quality of Seal Construction	Estimated Explosion Pressure	Source of Ignition
9	5-18-2001	Gary No. 50 (46-01816)	Polyurethane/ gravel core withstood explosion	No information available	No information available	Lightning strike
10	2-1-2002	Big Ridge Mine Portal No. 2 (11-02997)	Pumpable cementitious seal failed	No information available	No information available	Unknown
11	11-27-2005	McClane Canyon Mine (05-03013) (Note: Explosion occurred in active area.)	Lightweight cementitious block seals failed.	Problems with seal thickness, mortaring of vertical joints, etc. (Preliminary information only)	Less than 5 psi (preliminary information)	Information not available at this time.
12	01-02-2006	Sago Mine No. 1 (46-08791)	Lightweight cementitious block seals failed.	Some variations from seal tested at Lake Lynn.	Significantly greater than 20 psi	Lightning strike

Appendix H – Copy of Winter Alert Form for the Darby Mine

Additional Information needed for the Winter Alert Action Plan

Company Name KY Darby LLC **Mine Name** Darby Mine No 1

Mine ID 15-18185 **Date of Inspection** _____

1. **Finish any belt that was not inspected last week. Give me notes when you finish them.** all belts finish
2. **Look at the intake escapeway is it isolated (any holes in brattice line)?** NO
3. **How is the rockdusting?** OK
4. **How are the seals built (omega no hitch, solid block or pump)?**
5. **Do they have CO monitoring system or heat point type? Does it work or** yes **citation issued.**
6. **Check charging stations, how many stations are underground?** 1
7. **What type o fire suppression on the belt drives (deluge or sprinkler)?**
8. **What size of water line in the mine (2 inch 4 inch exc.)?** 4
9. **How long is each belt?**
   #1 1,100 #2 1,975 #3 500 #4 1,000
10. **How many citations were issued?**

22,575

1 NON SAS

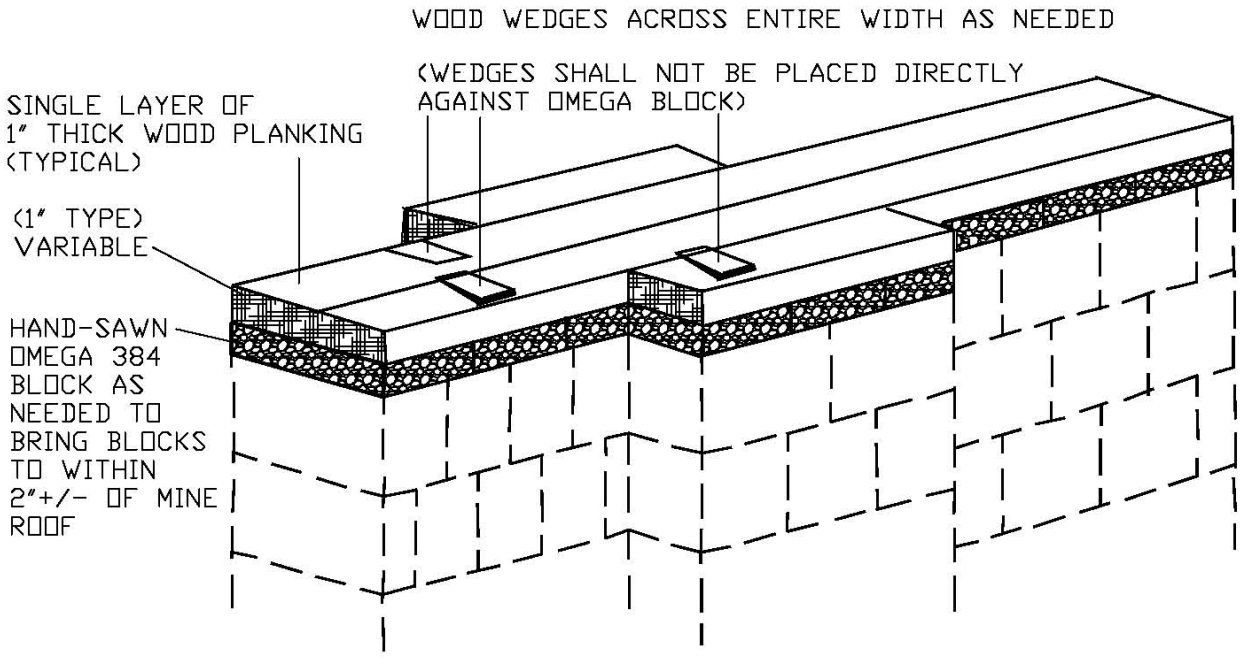
Appendix I – Inventory of Seals by District

District	# of Sets of Seals	Seals by Type						Total Seals
		Standard (Mitchell) Seals	Omega Seals	Micon Seals	Pumpable Seals	Wooden Seals	Other	
1	12	0	0	0	0	95	0	**95**
2	135	163	9	64	256	0	137	**629**
3	254	614	59	152	433	0	303	**1,561**
4	236	116	948	101	362	0	240	**1,767**
5	164	279	354	92	113	0	242	**1,080**
6	308	228	1003	184	171	0	289	**1,875**
7	294	223	737	204	347	0	131	**1,642**
8	283	402	49	110	651	0	412	**1,624**
9	288	143	45	278	719	95	126	**1,406**
10	175	382	0	15	50	0	630	**1,077**
11	121	148	10	41	907	0	86	**1,192**
Total	**2,270**	**2,698**	**3,214**	**1,241**	**4,009**	**190**	**2,596**	**13,948**

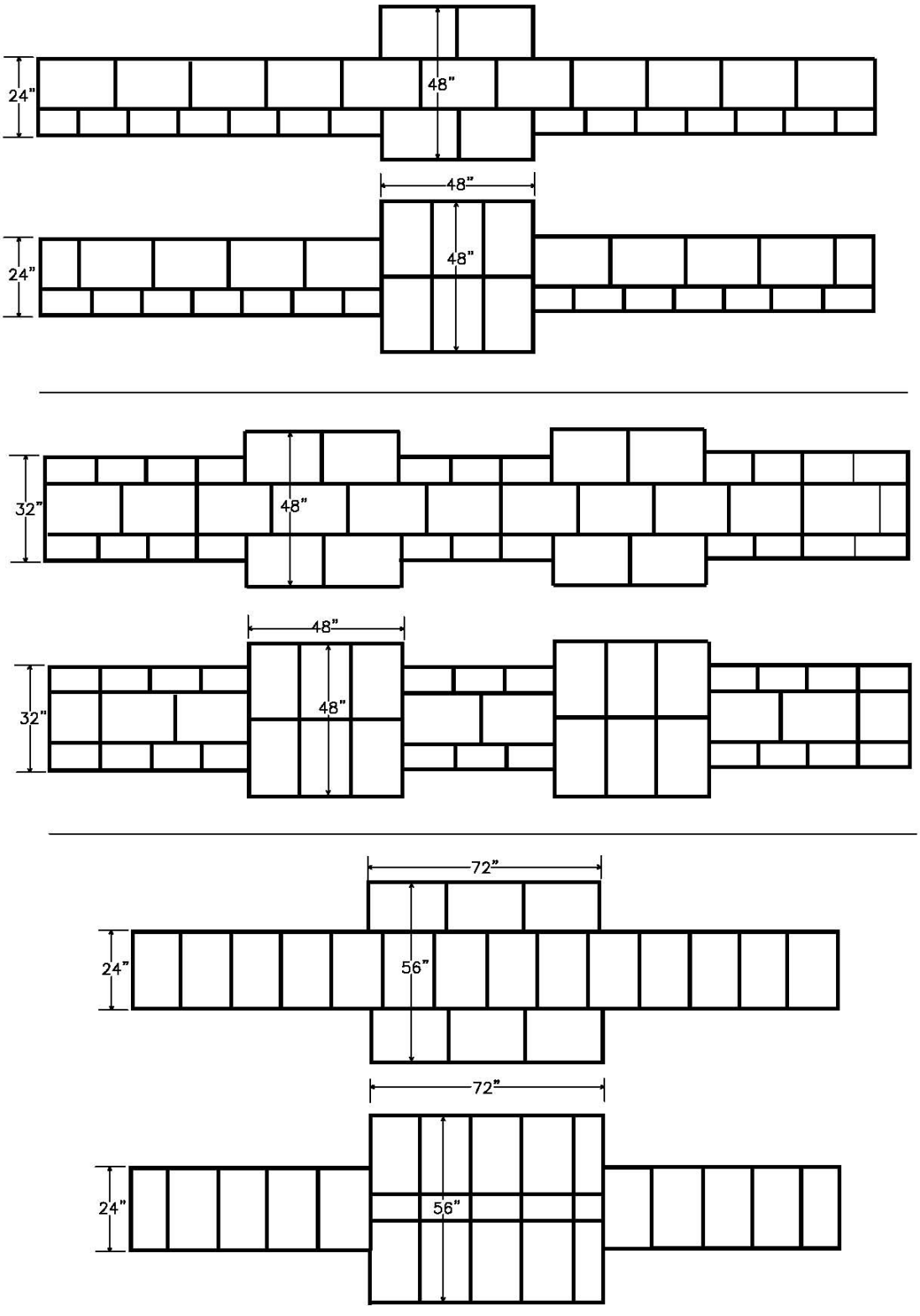
Appendix J – Seal Requirements in Darby Mine Ventilation Plan

OMEGA BLOCK SEALS

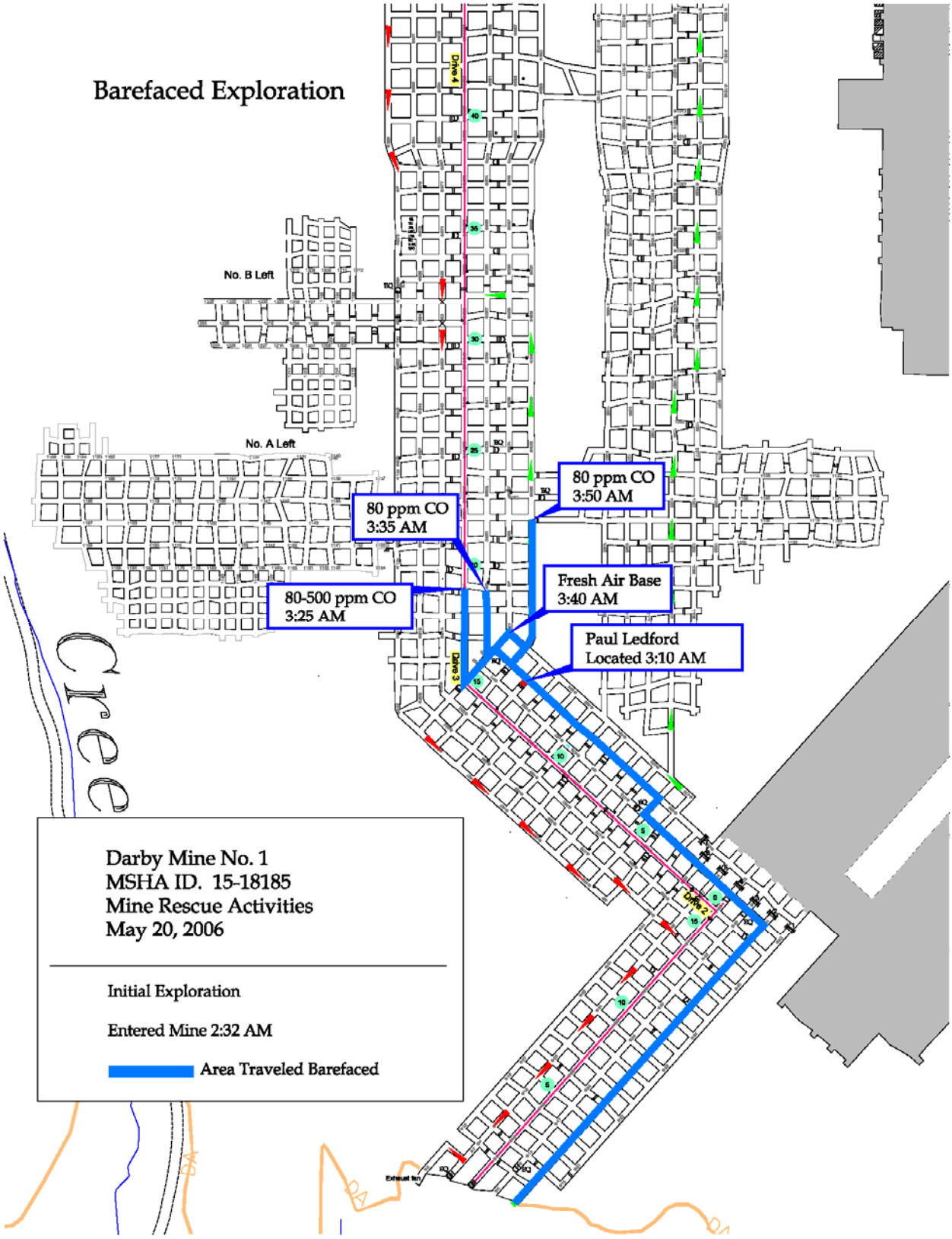
1. Seals will be hitched 6 inches into bottom and 6 inches into the ribs.
2. An approved bonding and sealant agent (i.e. "BLOCBOND" or Rite-wall) shall be used between all joints (horizontal, vertical, and in-between blocks) on all surface areas including the inby and outby walls.
3. Seals and pilaster thickness will be as indicated in sketches.
4. A gas sampling tube with a shutoff valve will be provided in the highest seal per set of seals.
5. A U-type drain will be provided for water drainage in the lowest seal per set of seals.
6. Seals will be constructed of Omega 384 blocks as per one of the attached three drawings.
7. Omega 384 block seals shall be wedged to the mine roof as indicated in the sketch below.
8. All wood will be flush with the walls of seal and coated with sealant passing ASTM E162-87.

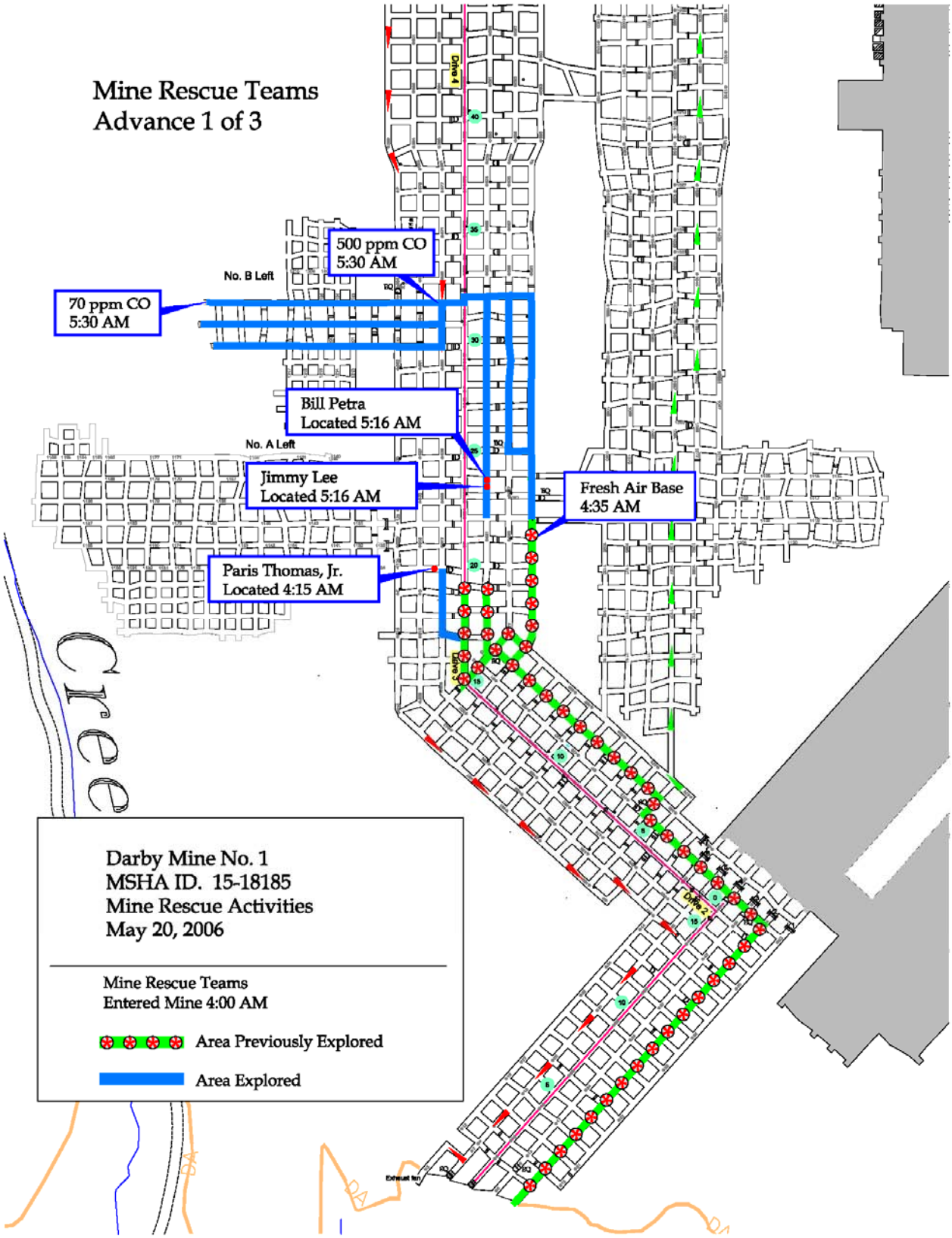


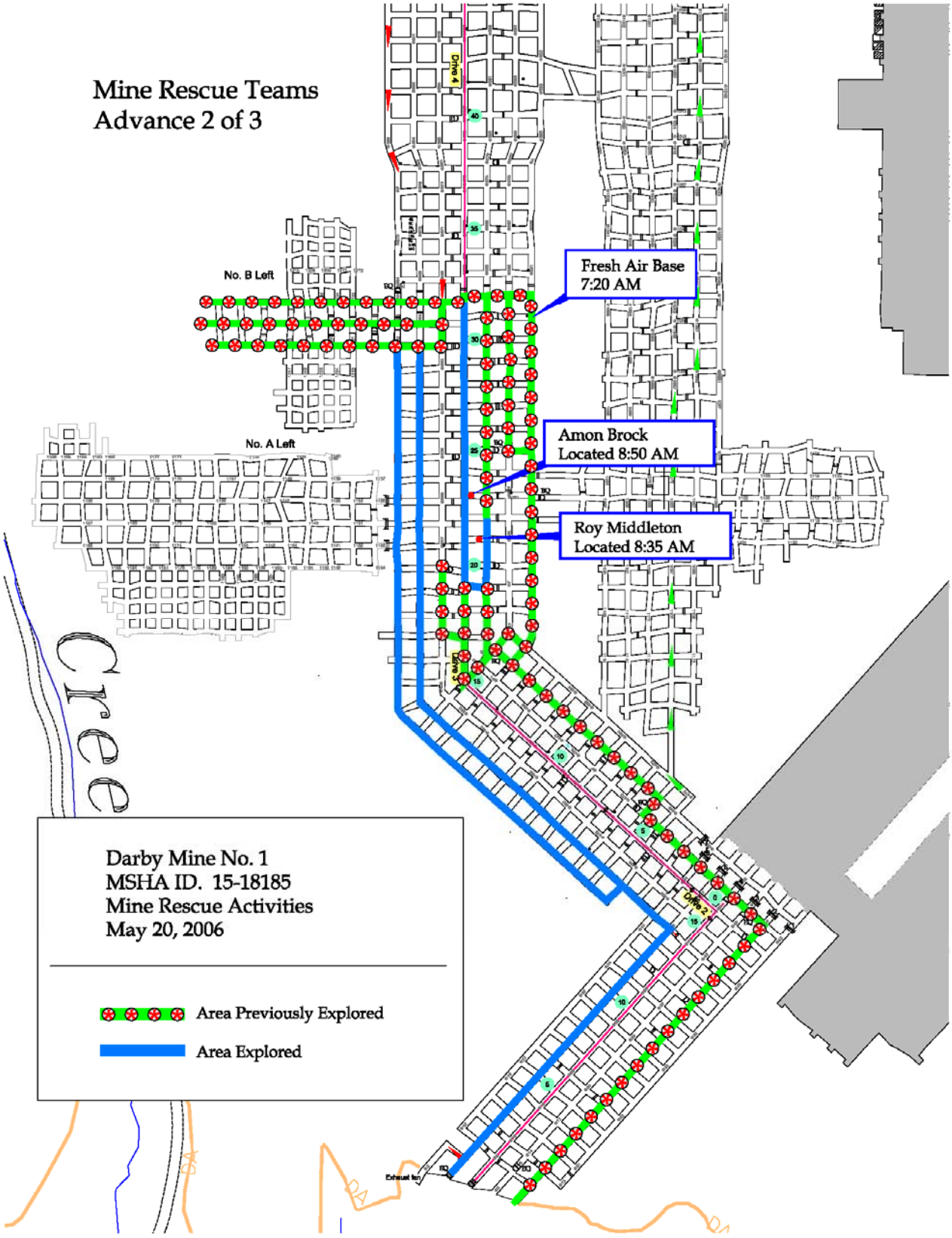
OMEGA 384 BLOCK SEAL
ALTERNATING COURSES

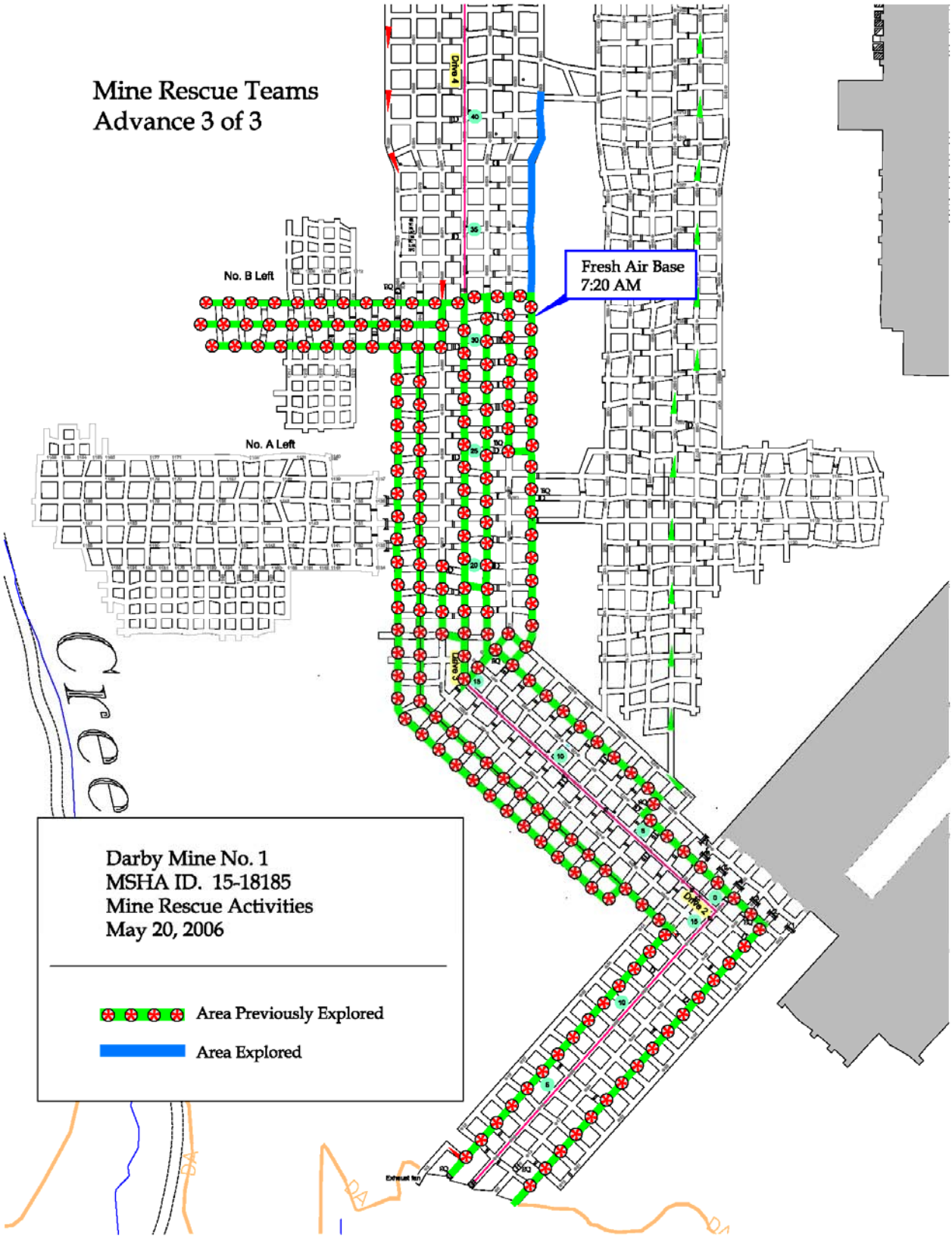


Appendix K – Mine Rescue and Recovery at the Darby Mine




Mine Rescue Teams
Advance 1 of 3
500 ppm CO
5:30 AM
No. B Left
70 ppm CO
5:30 AM
Bill Petra
Located 5:16 AM
No. A Left
Jimmy Lee
Located 5:16 AM
Fresh Air Base
4:35 AM
Paris Thomas, Jr.
Located 4:15 AM
Cree
Darby Mine No. 1
MSHA ID. 15-18185
Mine Rescue Activities
May 20, 2006
Mine Rescue Teams
Entered Mine 4:00 AM
Area Previously Explored
Area Explored


Mine Rescue Teams
Advance 2 of 3
No. B Left
No. A Left
Fresh Air Base
7:20 AM
Amon Brock
Located 8:50 AM
Roy Middleton
Located 8:35 AM
Darby Mine No. 1
MSHA ID. 15-18185
Mine Rescue Activities
May 20, 2006
Area Previously Explored
Area Explored


Mine Rescue Teams
Advance 3 of 3
Fresh Air Base
7:20 AM
No. B Left
No. A Left
Darby Mine No. 1
MSHA ID. 15-18185
Mine Rescue Activities
May 20, 2006
Area Previously Explored
Area Explored