

**Internal Review of MSHA's Actions
At the Big Branch Refuse Impoundment
Martin County Coal Corporation
Inez, Martin County, Kentucky**



U.S. Department of Labor
Mine Safety and Health Administration

January 21, 2003

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U.S. Department of Labor
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Background

The Federal Mine Safety and Health Act of 1977 (Mine Act) states that mine operators, with the assistance of the miners, have the primary responsibility to prevent unsafe and unhealthful conditions and practices in the nation's mines. The Mine Safety and Health Administration (MSHA) 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.

In the early morning hours of Wednesday, October 11, 2000, a breakthrough of slurry (fine coal refuse and water) occurred from the 68-acre impounding area of Martin County Coal Corporation's (MCCC's) Big Branch Refuse Impoundment which inundated the underground active mine workings of MCCC's 1-C Mine. The breakthrough occurred a few minutes after a belt examiner, who was performing a preshift inspection, exited the 1-C Mine.

Slurry from the impoundment ultimately breached two underground sealed areas of the active mine and subsequently exited the mine at two drift openings of the 1-C Mine: the South Mains Portal and the No. 2 North Portal. In addition, a relatively small volume of water exited the mine near the Big Branch Punch Out. The outflow from the impoundment was stopped by using dozers to push spoil mixture from above the impoundment into the area where the breakthrough had occurred. An estimated 306 million gallons of slurry flowed from the impoundment into the mine, causing the impoundment pool level to drop an average of 14 feet. The released volume represented 22 percent of the volume of slurry impounded above the 1-C Mine.

The flow of slurry out of the mine resulted in flooding and downstream "black water" contamination of Wolf Creek and Coldwater Fork. No fatalities or personal injuries resulted from the breakthrough or mine inundation; however, extensive environmental damage occurred in these waterways and successive downstream areas.

At the time of the accident, the impoundment was under the jurisdiction of MSHA's Coal Mine Safety and Health (CMS&H) District 6, which is headquartered in Pikeville, Kentucky.

Immediately after the accident, MSHA began an investigation into its causes. The investigation was conducted by a team of investigators independent of Coal Mine Safety and Health District 6. The investigation included interviews of past and present MCCC employees, contractors, and persons living along the affected streams as well as a geotechnical evaluation of the breakthrough area.

MSHA's accident investigators determined that the failure of the Big Branch Refuse Impoundment and subsequent inundation of the 1-C Mine occurred because Martin County Coal Corporation failed to follow its approved Impoundment Sealing Plan, dated August 8, 1994, and subsequent plan modification dated September 7, 1995. The approved plan included provisions to reduce seepage from the impoundment into mine

workings. Failure to fully comply with these provisions resulted in internal erosion (piping) of the material between the impoundment and the mine workings. Over a period of time, the seepage into this area began to carry sand (weathered material) into the mine opening. As this material was carried away, a pipe (void) formed and worked its way toward the impoundment. As more material was carried into the mine, a larger seepage path was created allowing additional and larger particles to be carried away. This process continued until the void developed close enough to the impoundment that the remaining plug of material failed suddenly, allowing the contents of the impoundment to discharge uncontrolled into the mine.

MSHA's official *Report of Investigation, Surface Impoundment Facility, Underground Coal Mine, Noninjury Impoundment Failure/Mine Inundation Accident, October 11, 2000, Big Branch Refuse Impoundment, ID No. 1211KY60035-01, Preparation Plant, ID No. 15-05106, I-C Mine, ID No. 15-03752, Martin County Coal Corporation, Inez, Martin County, Kentucky*, was made available to the public on October 17, 2001.

Purpose, Scope, and Methodology

The purpose of an internal review is to: thoroughly and objectively evaluate the quality of MSHA's enforcement activities at a mine that has experienced a serious accident; identify any weaknesses in MSHA's enforcement activities at the mine; provide appropriate recommendations for addressing any weaknesses found; and disseminate internal review findings, conclusions, and recommendations to Agency employees and other interested persons.

MSHA policy requires that an internal review be conducted after each mining accident that results in three or more fatalities. MSHA's Assistant Secretary may direct that an internal review be conducted under other circumstances.

On October 30, 2001, Dave D. Lauriski, Assistant Secretary for Mine Safety and Health, directed that MSHA's Directorate of Program Evaluation and Information Resources conduct an internal review of the Agency's actions at MCCC's Big Branch Refuse Impoundment in connection with the October 11, 2000, slurry breakthrough. Assistant Secretary Lauriski directed that the internal review include:

- an examination of the procedures MSHA personnel followed to approve the Big Branch Refuse Impoundment;
- an examination of MSHA's inspections of the Big Branch Refuse Impoundment prior to October 11, 2000;
- a review of the MSHA procedures currently used to approve all coal mine impoundments; and
- a review of MSHA's impoundment inspection procedures in general.

Consistent with MSHA's policy for conducting internal reviews, the conduct of the MSHA accident investigation is not within the scope of this internal review.

In conducting the internal review, the review team examined and evaluated applicable policies and procedures, inspection records, the Big Branch Refuse Impoundment Plan, and pertinent data from MSHA's Management Information System (MIS). The review team also interviewed MSHA employees with 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 interviewed is included as [Appendix A](#).

Report Organization

The evaluation section of this report is organized into four sections, each focusing on one of the four internal review objectives established by Assistant Secretary Lauriski. The discussion of each issue included in the report is divided into several sections: "Requirement," "Statement of Facts," "Conclusion," and, where appropriate, "Corrective Action Taken" and "Recommendation." The "Requirement" section describes the relevant provisions of the Mine Act, its standards and implementing regulations, and MSHA policies and procedures. The "Statement of Facts" presents the facts as found by the review team during its review. The review team's analysis of the facts is presented under "Conclusion." The "Corrective Action Taken" section describes any corrective action taken by MSHA to address the issue since the accident. When recommendations to MSHA were considered appropriate, they are also included.

After the Assistant Secretary approved the internal review report, he transmitted the report to the Administrator for Coal Mine Safety and Health, the Administrator for Metal and Nonmetal Mine Safety and Health, and the Director of Technical Support and directed them to respond to the report's recommendations. A copy of the joint response is included as [Appendix D](#).

General Conclusions

The failure of Martin County Coal Corporation, to comply with its approved plan for the Big Branch Refuse Impoundment resulted in a breakthrough of coal slurry into the adjacent 1-C Mine. The slurry exited the mine and traveled for several miles in Coldwater Fork and Wolf Creek before flowing into the Tug Fork of the Big Sandy River and eventually reached the Ohio River. More than 300 million gallons of slurry were released from the impoundment during the accident. The slurry visibly affected over 100 miles of waterways.

Although the internal review team identified some weaknesses in MSHA's actions at the facility, the team did not find any evidence that these weaknesses caused the accident.

Opportunities exist to strengthen MSHA's program for the inspection and approval process for impoundments. The following actions would have the greatest positive impact of improving the processes of impoundment activities:

- Addressing the impoundment plan review process to ensure plans are reviewed and processed in a timely manner.
- Consolidating and clarifying policy and guidance related to the inspection and review of impoundments.
- Addressing the recommendations contained in the report entitled, *Peer Review of U.S. Department of Labor/MSHA - Impoundment Safety Program*, prepared by the Association of State Dam Safety Officials - April 1998.
- Exploring methods to accurately confirm the full extent of underground workings as depicted on mine maps, under or near an impoundment.

A. Approval of the Big Branch Refuse Impoundment

A chronological summary of all plan submittals and approvals for the history of the Big Branch Refuse Impoundment was compiled and evaluated. Interviews were also conducted with District 6 and Technical Support impoundment specialists, engineers, supervisors, and managers. Based upon this information the following positive findings as well as issues were identified.

District 6 impoundment specialists are highly qualified and respected. At the time of this review, the impoundment group was staffed by three specialists/engineers with significant industry and MSHA impoundment experience.

Interviews with the District 6 impoundment specialists and a review of their inspection reports revealed a high degree of professionalism in their work and a dedication to their impoundment specialist duties.

District 6 impoundment specialists took the initiative to review impoundment plan modifications in an effort to help reduce the backlog of plans pending review at Technical Support's Mine Waste and Geotechnical Engineering Division (MWGED).

Issue A-1: District 6 did not comply with its own Standard Operating Procedure in effect prior to March 13, 1996 concerning the review of impoundment plans by Technical Support.

Requirement: The MSHA Program Policy Manual establishes CMS&H policy for the review and approval of mine plans. The policy states that the responsibility for plan

approvals is assigned to the district manager. The policy requires a management system of controls for the proper administration of the plan and program approval process to be developed in writing by each district. Program Policy Letter No. 88-V-1, dated August 19, 1988, first initiated this policy. The policy was incorporated into the Program Policy Manual on April 1, 1990. There is no written MSHA policy requiring impoundment plans to be submitted to Technical Support for review.

Statement of Fact: Impoundment plans are submitted by mine operators to the appropriate Coal Mine Safety and Health district manager for review and approval. Technical Support's Mine Waste and Geotechnical Engineering Division maintains a staff of engineers whose primary purpose is to review impoundment plans. The MWGED subsequently provides written recommendations to the district manager regarding plan reviews.

District 6 developed three separate Standard Operating Procedures (SOPs) for the review and approval of impoundment plans. These include an initial SOP, another dated March 13, 1996, and the most recent SOP dated November 8, 2001.

The initial SOP was in effect until superseded by the SOP dated March 13, 1996. It stated that impoundment plans, submittals of additional information necessary to approve the plan, and plan revisions submitted after the plan had been approved, were all to be transmitted to Denver Technical Support for review and recommendation for approval. No provisions were included for an internal review of impoundment plans or plan revisions by District 6 personnel.

The March 13, 1996, SOP stated, "Minor modifications to plans may be reviewed by the specialist for technical quality and a recommendation for approval/disapproval made to the District Manager." Therefore, the SOP allowed the specialists to review some impoundment plans without forwarding them to Technical Support. Interviews with District 6 personnel indicated that they exercised their own discretion to determine which plans should be forwarded to Technical Support's MWGED.

The November 8, 2001, SOP required all impoundment plans to be forwarded to Technical Support for review. No provisions were included for an in-house review of impoundment plans or plan revisions by District 6 personnel.

Prior to the SOP change in 1996, several plan modifications for the MCCC Big Branch Slurry Impoundment were reviewed in-house by District 6 personnel. The most significant one was the Impoundment Sealing Plan dated August 8, 1994, which was formulated to address the May 22, 1994, breakthrough.

The impoundment sealing plan was submitted to and reviewed by District 6 personnel. The plan was initially disapproved, by letter dated September 9, 1994. Revisions, which included the design of a water seal at the South Mains Portal, were submitted to District 6 and the sealing plan was subsequently approved on October 20, 1994. This sealing plan was not submitted to Technical Support for review. The District 6 Manager stated in an

interview, “Under the way we operated, no plan was approved without a review by Technical Support.” He stated that he was unaware that the 1994 Impoundment Sealing Plan was not forwarded to Technical Support.

In 1995, District 6 personnel reviewed and approved two revisions to the impoundment sealing plan. Revisions to the South Mains Portal seals were approved on January 13, 1995. Following this, approval to use a chain link fence instead of a seal at the South Mains Portal and to use Gunitite to strengthen existing seals in the 1-C Mine instead of a reinforced concrete wall was granted September 29, 1995. All of these plan reviews were completed in-house and did not comply with the District 6 SOP in effect at the time.

Conclusion: District 6 did not comply with its own Standard Operating Procedure in effect prior to March 13, 1996, concerning the review of impoundment plans by Technical Support.

Corrective Action Taken: On January 6, 2003, the District 6 Manager revised the SOP to provide for the review of “minor” modifications to impoundment plans in-house. The SOP defines “minor” modifications as those which do not affect stability, flood routing, breakthrough potential or seepage analysis. The District Manager also directed the impoundment specialists and the supervisor to comply with the SOP.

Recommendation: None

Issue A-2: **The Impoundment Sealing Plan for the Big Branch Slurry Impoundment which was approved on October 20, 1994, lacked timetables or deadlines for completion of approved corrective actions.**

Requirement: None

Statement of Fact: The Impoundment Sealing Plan was formulated to alleviate the conditions present after the 1994 breakthrough. The Impoundment Sealing Plan, as approved by the District 6 Manager, did not contain any time frames or deadlines for completion of work. Because of lack of deadlines, the underground seals in the 1-C mine were not installed until February and March 1996, the seepage barrier was not completed until September 1995, and the monitoring well was not installed at all.

Conclusion: The Impoundment Sealing Plan for the Big Branch Slurry Impoundment which was approved October 20, 1994, lacked timetables or deadlines for completion of approved corrective actions. As a result, there was an excessive delay in the implementation of plan requirements.

Corrective Action Taken: On January 6, 2003, the District 6 Manager revised the SOP to require all approval letters to contain, where appropriate, a timetable or deadline for completion of corrective actions contained in impoundment plans.

Recommendation: None

Issue A-3: **Critical requirements of the Impoundment Sealing Plan, related to the underground seals, were not properly conveyed to the appropriate enforcement group.**

Requirement: Paragraph (a) of 30 C.F.R. 77.216 requires that plans for the design, construction, and maintenance of structures which impound water, sediment, or slurry shall be required if such an existing or proposed impounding structure can:

- (1) Impound water, sediment, or slurry to an elevation of five feet or more above the upstream toe of the structure and can have a storage volume of 20 acre-feet or more; or
- (2) Impound water, sediment, or slurry to an elevation of 20 feet or more above the upstream toe of the structure; or
- (3) As determined by the district manager, present a hazard to coal miners.

Paragraph (d) of 30 C.F.R. 77.216 requires that the design, construction, and maintenance of all water, sediment, or slurry impoundments and impounding structures which meet the requirements of paragraph (a) of this section shall be implemented in accordance with the plan approved by the District Manager.

30 C.F.R. §75.371 Mine ventilation plan; contents, requires, in part, that “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 C.F.R. §75.335(a)(1).”

The MSHA Program Policy Manual establishes CMS&H policy for the review and approval of mine plans. The policy requires a management system of controls for the proper administration of the plan and program approval process to be developed in writing by each district. The system of controls must include coordination of the progress of the plan through the approval procedures by a supervisory technical specialist or engineer to ensure that cross-communication with other plan approval groups occurs when appropriate.

Statement of Fact: The underground seals described in the impoundment sealing plan were different from those specified by 30 C.F.R. §75.335(a)(1) and should therefore have been included in the contents of the ventilation plan. The design of the South Mains Portal Water Seal and the construction of the 1st Left off 2 North Underground Seals were initially approved on October 20, 1994 in the Impoundment Sealing Plan. The underground health and safety specialists assigned to inspect the 1-C Mine were unaware of the requirement for these seals.

Conclusion: Critical requirements of the Impoundment Sealing Plan, related to the underground seals, were not properly conveyed to the appropriate enforcement group.

Corrective Action Taken: On July 2, 2002, the District 6 Manager issued a memorandum instructing specialists to coordinate information between departments. Changes to any impoundment plan that may affect a mine plan, such as a ventilation or roof control plan, must be coordinated between departments and incorporated into the appropriate plan. The SOP for the Impoundment Department had been previously revised on November 8, 2001, to adopt the use of a “District 6 Plan Review Transmittal Sheet for the Impoundment Department” in order to ensure coordination between the departments. The revised SOP of January 6, 2003 contains a statement requiring communications between “other departments and agencies as appropriate.”

Recommendation: None

Issue A-4: **District 6 approved the Impoundment Sealing Plan despite MCCC’s failure to address five of the nine Technical Support recommendations identified in the investigation of the 1994 breakthrough.**

Requirement: The District Manager’s authority to require additional information is outlined in 30 C.F.R. §77.216-2(a)(18) which states that the plan shall contain, “Such other information pertaining to the stability of the impoundment and impounding structure which may be required by the District Manager.”

Statement of Fact: On May 22, 1994, slurry from the Big Branch Refuse Impoundment broke through into the 1-C Mine for the first time. Immediately following the breakthrough, District 6 requested that Technical Support aid in the investigation of this event by evaluating conditions on-site and making recommendations for corrective actions. On May 25, 1994, a Technical Support engineer conducted an on-site investigation and prepared a report, dated June 13, 1994, to the District 6 Manager. The report contained nine recommendations for monitoring the existing conditions and for preparing a plan of action for the future use of the site. Subsequently, a letter from District 6 to MCCC, dated July 6, 1994, requested that these nine recommendations from Technical Support be addressed in the proposed Impoundment Sealing Plan.

Interviews with District 6 personnel and a review of the approved plan indicated that five of the nine Technical Support recommendations were neither directly nor indirectly addressed by MCCC¹. Information obtained during the internal review regarding these recommendations is as follows:

1. *“Install weirs at all locations where flow was noticed to monitor the outflow...”*
Interviews determined that a weir was not built at the South Mains Portal, but that an 18-inch pipe was installed there. The amount of flow was measured in inches of water in the pipe, and flow rates in gallons per minute were only estimated. Also,

¹ The Internal Review Team, by stating that a recommendation “was addressed,” is not assessing the adequacy of MCCC’s responses to the recommendations.

according to Technical Support's report, a 16-inch pipe was installed at the Big Branch hollow breakout. There was no indication that weirs were installed at any locations. This recommendation was not addressed by MCCC.

2. *"Install several monitoring wells in the mines..."* The map included in the Impoundment Sealing Plan proposed that a single (not several) monitoring well(s) be installed. No monitoring wells were installed. Therefore, this recommendation was not addressed by MCCC.
3. *"A tracing dye should be introduced into the pool..."* Tracing dye was never used at the site, and this recommendation was not addressed by MCCC.
4. *"... a plan for preventing future failures of this sort should be formulated."* This recommendation was addressed by MCCC in their design of the seepage barrier in the Impoundment Sealing Plan. The Impoundment Sealing Plan incorporated the construction of a designed seepage barrier in conjunction with depositing of fine slurry to address the issue of preventing future failures.
5. *"Monitor seepage coming from the hillside in Mill Creek..."* This recommendation was not addressed by MCCC.
6. *"Monitor the bubbles located near the make-up pump..."* This recommendation was addressed by MCCC in the Impoundment Sealing Plan by stating that the location of bubbles had been surveyed and bubbles had not been observed since mid-June of 1994. This indicated that the leak in that area had been stopped.
7. *"Details on how the mine entries at the head of the hollow were sealed should be submitted to MSHA..."* The maps submitted by MCCC indicated the location of a "previously sealed mine entry," but no details were provided as to how the entry had been sealed. Therefore, this recommendation was not addressed by MCCC.
8. *"There is a set of ventilation seals that separate the abandoned portions of the I-C Mine from an active section... It is very possible that they would fail and a loss of life could occur. For this reason, I believe these seals should be re-evaluated by the Company's consultant to determine if the bulkheads are adequate to withstand hydrostatic loading that will be present should the pool break into the abandoned area again."* This was addressed in the Impoundment Sealing Plan, and subsequent modifications, by requiring that the seals be replaced by either concrete bulkheads or Gunite re-enforced seals.
9. *"The Company should not blast to get hillside material for covering the failure zone below the Stockton Seam... If the Company needs fill material, it should be either brought to the site from another location or gotten from an elevation above the Stockton Seam."* This was addressed in the Impoundment Sealing Plan by only using the overburden above the Stockton seam for the seepage barrier. This ensured that blasting would only be done above the Stockton seam.

Conclusion: The District 6 Manager approved the Impoundment Sealing Plan despite MCCC's failure to address five of the nine Technical Support recommendations identified during the investigation of the 1994 breakthrough.

Corrective Action Taken: On January 6, 2003, the District 6 Manager revised the SOP for the Impoundment Department with instructions to ensure that mine operators address all recommendations made by Technical Support during site investigations and impoundment plan reviews. This SOP also mandates that all recommendations be addressed prior to approval of the plan.

Recommendation: None

Issue A-5: **District 6 did not identify the fact that Martin County Coal Corporation had injected slurry into the underground mine workings of the 1-C Mine without joint approval of the state regulatory authority and MSHA.**

Requirement: MSHA's role in the approval of slurry injection originated in 30 C.F.R. §817.81(f) of the implementing regulations of the Surface Mining Reclamation and Control Act of 1977, which requires, "Coal mine waste may be disposed of in underground mine workings, but only in accordance with a plan approved by the regulatory authority and MSHA under 30 C.F.R. §784.25 of this chapter."

30 C.F.R. §784.25, Return of Coal Processing Waste to Abandoned Underground Workings requires that, "Each plan shall describe the design, operation and maintenance of any proposed coal processing waste disposal facility, including flow diagrams and any other necessary drawings and maps, for the approval of the regulatory authority and the Mine Safety and Health Administration under 30 CFR §817.81(f)."

Subsequent to the passage of this Act, the Commonwealth of Kentucky assumed the role for enforcement of these provisions through the attainment of primacy. This was achieved by implementing nearly identical regulations, which also required joint approval by MSHA, to be enforced by the Kentucky Department for Surface Mining Reclamation and Enforcement (KDSMRE).

Procedures for coordinating these joint approvals are contained in KDSMRE's Internal Advisory Memorandum No. 04-86 dated November 10, 1986, and MSHA's CMS&H Memo No. HQ-86-943-S dated January 17, 1986, which was superseded by Procedure Instruction Letter (PIL) No. I97-V-10 dated November 1, 1997. This PIL expired on March 31, 1999.

Statement of Fact: The injection of slurry into an underground mine is an activity that is covered by OSM regulation. Since Kentucky is a primacy state, KDSMRE reviews

slurry injection plans. MSHA then reviews the plan for protection of the underground miners and concurs with the tentative approval by KDSMRE.

During the research conducted in this review, it was discovered that slurry had been injected into two areas of the 1-C Mine. These slurry injections are shown on a map of the Big Branch Slurry Impoundment, and are indicated by shaded areas of the 1-C Mine. District 6 never received an application for injection of slurry into this mine. Information provided by KDSMRE and a review of District 6 records confirmed that no approvals by the state regulatory authority or MSHA were ever issued for these injections.

Conclusion: District 6 did not identify the fact that Martin County Coal Corporation had injected slurry into the underground mine workings of the 1-C Mine without joint approval of the state regulatory authority and MSHA.

Corrective Action Taken: On August 2, 2002, the District 6 Manager issued a memorandum to all enforcement personnel requiring that any underground injection of slurry encountered be immediately reported to the District Ventilation Department. The ventilation department maintains a database of all underground slurry injections and is responsible for determining whether the mine operator has obtained the required permits and approvals.

Recommendation: The Administrator for CMS&H should re-issue PIL I97-V-10 to all Program Policy Manual Holders, which would continue to extend the responsibility for approval of the above-referenced plans to all district managers.

Issue A-6: **Technical Support did not consider the Impoundment Sealing Plan, previously approved by District 6, during its review of the Phase III Plan Modification for the Big Branch Slurry Impoundment.**

Requirement: MSHA Program Policy requires that plans be evaluated for provisions that are contrary to existing standards and that mine files be checked during reviews.

Statement of Fact: During 1997 and 1998, the Phase III Plan Modification for the Big Branch Refuse Impoundment was submitted to and reviewed by Technical Support. The engineer reviewing this plan indicated that he noticed a reference to the 1994 Impoundment Sealing Plan, which had been approved by District 6. He contacted the District and asked that a copy of the approved sealing plan be sent to Technical Support for their files, but stated that he did not consider the 1994 Impoundment Sealing Plan during his review of the Phase III modification. The content of this particular plan modification involved changes to the compaction specifications for the embankment, a provision to allow some coarse refuse to be placed in the reservoir area, a provision to allow coarse refuse to be disposed of on the Stockton bench, installation of a French drain outlet pipe through the embankment, and installation of a new decant pipe through the embankment. The modification did not propose to raise the crest or the pool above previously approved levels.

Conclusion: Technical Support did not consider the Impoundment Sealing Plan, previously approved by District 6, during its review of the Phase III Plan Modification for the Big Branch Slurry Impoundment.

Corrective Action Taken: None

Recommendation: The MWGED Chief should establish guidelines to ensure that all previous approvals or modifications of a plan which may impact the current submittal be taken into consideration by the reviewer.

B. Inspection of the Big Branch Refuse Impoundment

The review team conducted a review of inspection reports for the Big Branch Refuse Impoundment (1992-2000) including AAA, technical and spot inspections. The team also conducted interviews with current and former District 6 impoundment specialists and supervisors, other specialty supervisors, and current and former managers. Based on this information, the following positive findings as well as issues were identified.

The impoundment specialists for District 6 conducted numerous technical inspections of the Big Branch Slurry Impoundment following the initial breakthrough in May 1994 through the breakthrough in October 2000. During these 6.4 years, specialists conducted 23 CCE Water, Sediment, or Slurry Impoundment Technical Inspections and 7 CAA Spot Inspections. These averaged approximately 5 inspections per year by impoundment specialists at the site. Three of the CAA inspections were conducted as a result of heavy rainfall in accordance with Coal Mine Safety and Health Memorandum HQ-96-093-S. In addition to the specialist inspections, health and safety specialists consistently inspected the slurry impoundment during AAA Safety and Health Inspections and documented these inspections in their notes and/or on the Mine Activity Data sheet.

The inspection notes recorded by District 6 impoundment specialists/engineers were detailed, legible, and well written. These notes consistently documented crest and slurry elevations, conditions of seeps, embankment grade conditions, and work being done at the site.

The quality of inspections by the impoundments specialists was good with respect to embankment construction. Specialists thoroughly examined the embankment and refuse placement construction work. Citations were issued for improper compaction, lift thickness, and embankment slopes.

Issue B-1: **Potential problems with the Big Branch Slurry Impoundment were not effectively communicated among District 6 personnel.**

Requirement: The MSHA Program Policy Manual establishes CMS&H policy for the approval of mine plans. The Manual requires each district to develop and implement

management system controls necessary for the proper administration of the plan approval process. Among the required controls is the evaluation of each plan's technical adequacy and completeness by the District Manager, through the supervisory technical specialist or engineer, as follows:

1. When necessary, conducting an on-site investigation by technical specialists; and
2. Acquiring and considering field office input from local health and safety specialists during plan reviews, and addressing specific recommendations.

Program Policy Letter No. 88-V-1, dated August 19, 1988, first initiated this policy. The policy was incorporated into the MSHA Program Policy Manual on April 1, 1990.

Statement of Fact: The health and safety specialist's notes for the November 23, 1998, CCE Inspection identified an unusually high flow of water discharging from the South Mains Portal. The health and safety specialist indicated that he would check with the Impoundment Group and discuss three items of concern:

1. The presence of a 400+ gpm flow of water discharging from the South Mains Portal, which the health and safety specialist described as "an uncommonly large quantity of flow."
2. The presence of a silt basin being established in the groin ditch on the downslope of the embankment.
3. The requirement for the mine operator to monitor outflow during weekly inspections at the South Mains Portal.

The health and safety specialist and his supervisor, who was accompanying him on a Field Activity Review, stated in interviews that they had discussed the above referenced items with the impoundment specialists. However, during interviews of the impoundment specialists, they indicated that they had no recollection of any such discussions with the health and safety specialist or supervisor.

A review of the inspection reports indicated that the next inspection was made on this impoundment on April 29, 1999, which was 5 months after the health and safety specialist's observation on his November 23, 1998, inspection.

Conclusion: Potential problems with the Big Branch Slurry Impoundment were not effectively communicated among District 6 personnel.

Corrective Action Taken: On July 2, 2002, the District 6 Manager issued a memorandum to all health and safety specialists, directing them to communicate any significant concerns involving impoundments to the Impoundment Department. Any complaints, reports or concerns received involving impoundments are immediately investigated and coordinated with other appropriate state and federal agencies. Any

significant concerns raised or presented by a specialist, regular health and safety specialist, or by a representative of another entity such as a State agency or OSM, which cannot be immediately resolved will be followed by a site visit by an impoundment specialist.

Recommendation: None

Issue B-2: **The Section 103(k) Orders that were issued as a result of the Big Branch Slurry Impoundment breakthrough into the 1-C Mine which occurred in May 1994 were terminated without sufficient justification.**

Requirement: Section 103(k) of the Federal Mine Safety and Health Act of 1977 provides 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.”

Statement of Fact: A breakthrough into the 1-C Mine from Martin County Coal Corporation’s Big Branch Slurry Impoundment occurred on May 22, 1994. On May 23, 1994 at 7:10 a.m., Order #4012948 was issued under Section 103(k) of the Mine Act on Martin County Coal Corporation’s 1-C Mine, closing the No. 1 and No. 2 North Mains Belts. A second Order #4012949 was issued at 7:15 a.m. on Martin County Coal Corporation’s Big Branch Slurry Impoundment, effectively closing the area of the impoundment and the preparation plant to ensure the safety of any person in or around the mine. At 12:40 p.m., Order #4012949 was modified to allow the backfilling of the area where the impoundment pool broke into the underground mine and ‘Item 15 – Area affected,’ was modified to remove the plant area.

On May 24, 1994, both Orders were terminated; Order #4012949 at 7:00 a.m. and Order #4102948 at 8:00 a.m. At that time, the mine operator was permitted to resume pumping slurry into the impoundment. The justification given for terminating Order #4012949 was that “the area of the slurry impoundment where the slurry broke into the 1-C Mine has been repaired at this time.” The justification given for terminating Order #4012948 was that “the water level has been reduced to an acceptable level behind the sealed area off 1st Left off 2 North Mains.”

Both Orders were terminated prior to the on-site investigation that was requested by the District 6 Manager, and conducted by a Technical Support engineer.

Based on conditions observed on May 25, 1994, water continued to flow and adequate repairs had not been made when the Orders were terminated. According to a Technical Support engineer’s Memorandum of Investigation dated June 13, 1994, the impoundment continued to leak after the Orders were terminated. He conducted his investigation on

May 25, 1994, and documented that water continued to flow from the South Mains Portal and the Big Branch Hollow breakout of the 1-C Mine. He described these flows as follows:

1. South Mains Portal – “...Water was only flowing from the left portal during this visit. Shortly after the failure, however, water was reported flowing from all three portals. [An impoundment specialist from District 6] said that the quantity of flow in this area was only about 10% of what was flowing during his visit on Monday, May 23, 1994.”
2. Big Branch Hollow – “It appears that all of the water and slurry material flowed from a breakout in the hillside at a location approximately 225 feet to the north. When the coal was mined, a barrier of only two to three feet of coal was left between the room and the coal outcrop...[] The hole left by the breakout was approximately 4 feet wide and 3 feet high with a notch at the bottom that was 1.5 feet wide. During the visit, the water flowing through this notch was approximately 6 inches deep. This water was being collected by a 16-inch-diameter pipe and was being discharged into the creek. Approximately 500 gpm was flowing from the pipe. According to [the impoundment specialist], the flow through the breakout area was approximately 1.4 feet deep the previous day at 7:00 a.m.”

The termination of Order #4012948 did not document that it was safe to enter the 1-C Mine, or address the physical condition of the seals and the continued leaking of the impoundment. Although, the Technical Support engineer’s on-site investigation did not extend to underground areas of the 1-C Mine, his analysis of available maps and documentation yielded the following information:

“If the water in the Impoundment broke through and these seals [2 North Main Seals] were inundated, it is very possible that they would fail and a loss of life could occur. For this reason, I believe these seals should be re-evaluated by the company’s consultant to determine if the bulkheads are adequate to withstand hydrostatic loading that will be present should the pool break into the abandoned areas again.”

No remedial plan was acknowledged, approved, or in place to justify the termination of the Orders. The Impoundment Sealing Plan dated August 8, 1994, submitted by Martin County Coal Corporation referenced a May 23, 1994, Impoundment Sealing Plan developed in response to the events associated with the discharge of water from the slurry impoundment into the underground mine workings in the Coalburg seam. The May 23, 1994, plan states, in part, “This plan was prepared by Martin County Coal Corporation personnel in cooperation with Mine Safety and Health Administration (MSHA) and included a remedial plan with short term and long term actions. A copy of the May 23, 1994, ‘Impoundment Sealing Plan’ has been included... for reference.” However, the MSHA personnel interviewed did not have any knowledge of this plan, its formulation,

or its implementation. Also, there was no documentation that provided evidence that a plan was ever approved.

Conclusion: The Section 103(k) Orders that were issued as a result of the Big Branch Slurry Impoundment breakthrough into the 1-C Mine which occurred in May 1994 were terminated without sufficient justification.

Corrective Action Taken: On October 25, 2002, the District 6 Manager issued a memorandum reiterating the established procedures and requirements of the Mine Act for the proper termination of a Section 103(k) Order. The manager also verbally instructed the supervisors and staff to monitor and evaluate the issuance of Section 103(k) Orders and ensure that they are not terminated prematurely.

Recommendation: None

Issue B-3: A District 6 health and safety specialist did not take appropriate enforcement action for an observed violation.

Requirement: Section 104(a) requires an inspector to 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 Impoundment Sealing Plan approved October 20, 1994, required the operator to monitor the flow at the South Mains Portal on a weekly basis and provide a record of such flow.

Statement of Fact: On September 2, 1999, a health and safety specialist, while conducting a CCE inspection of the impoundment, indicated in his inspection notes that there were no flow readings recorded in the weekly examination book for the South Mains Portal. He also indicated that there had been no flows recorded since April. The health and safety specialist did not issue a citation for the mine operator's failure to monitor the outflow from the South Mains Portal.

The internal review team's review of the mine operator's record books revealed that there were flow recordings missing from the weekly examination record book from April 1999 through September 1999 for the South Mains Portal.

Conclusion: A District 6 health and safety specialist did not take appropriate enforcement action for an observed violation.

Corrective Action Taken: The Roof/Impoundment Department Supervisor has conducted counseling with the health and safety specialist to ensure that proper emphasis is given to inspection procedures, documentation, and health and safety specialist/supervisory review of inspection notes. A review of subsequent Field Activity Reviews

for this specialist indicated no deficiencies and that proper enforcement actions were taken for observed violations.

Recommendation: None

Issue B-4: **District 6 enforcement personnel did not utilize, or require the mine operator to utilize, consistent units of measurements and methods to determine the flow of water from the South Mains Portal and other discharge locations.**

Requirement: The Impoundment Sealing Plan that was approved on October 20, 1994, required that water flow from the South Mains Portal would be monitored during the mine operator's regular (weekly) impoundment inspections. It also required that "Any unusual change in flow quantity or quality that would indicate possible impoundment leakage will be reported immediately to MSHA and the appropriate mine management."

Statement of Fact: A review of MSHA inspection reports and records of the mine operator indicated that there were inconsistent methods of measuring water flow at mine discharge points. There were areas where water flow was being estimated instead of being accurately measured, e.g., South Mains Portal.

Measurements identified in the health and safety specialists' notes and records books of the mine operator were inconsistent in the units of measurement, which made it difficult to compare changes in the amount of flow. Some flows were estimated in gallons per minute; others were recorded by observing the depth of flow discharging from a pipe. The basis for this plan requirement is to provide for a historical comparison of flows, to be utilized as a practical tool for hydrologic assessment.

Conclusion: District 6 Enforcement Personnel did not utilize, or require the mine operator to utilize, consistent units of measurements and methods to determine the flow of water from the South Mains Portal and other discharge locations.

Corrective Action Taken: On August 2, 2002, the District 6 Manager issued a memorandum to all impoundment personnel, requiring that all impoundment plans pertaining to sites with breakthrough concerns contain requirements for monitoring mine discharges and the installation of proper instrumentation to measure flow rates. In addition, the memorandum instructs impoundment personnel to ensure that impoundment plans require flow rates to be recorded in a graphical manner.

Recommendation: None

C. MSHA Impoundment Approval Procedures

The internal review team reviewed Standard Operating Procedures (SOPs) from all eleven coal districts. Impoundment specialists from all districts along with engineers and management personnel from Technical Support's MWGED were interviewed. Based upon this information the following positive findings as well as issues were identified.

All districts have developed Standard Operating Procedures (SOPs) for review of impoundment plans, including both new plans and modifications. It was determined that all districts are currently following their SOPs.

Interviews with impoundment specialists from the eleven districts and with personnel from the MWGED determined that a good working relationship exists between the field specialists and the engineers at MWGED. District specialists stated that MWGED engineers and managers are very responsive to situations requiring site visits and in reviewing plans for sites that need a prompt review/approval.

The MWGED is staffed with experienced and highly qualified engineers and managers. Engineers are encouraged to take postgraduate courses and to obtain their Professional Engineering registration, although this is not a prerequisite for the position. As the budget allows, MSHA supports funding for MWGED to reimburse employees for completing postgraduate courses.

Interviews and review of plan review documents indicated that MWGED engineers conduct extensive and thorough reviews of impoundment plans submitted by mine operators. MWGED engineers routinely find errors in engineering designs and analyses provided by consulting engineers employed by mine operators.

Interviews with MWGED engineers and managers revealed a high degree of professionalism and a dedication to MSHA's impoundment program. This group is highly respected in the industry.

Issue C-1: Impoundment plans are not reviewed and processed by Technical Support in a timely manner.

Requirement: MSHA Program Policy does not establish timeframes for plan reviews by Technical Support, but requires that each District develop fundamental management system controls necessary for proper administration of the plan and program approval process. The purpose of these controls is to accomplish, among other things, timely action on each approval request. The Districts have developed these controls in the form of SOPs, to include the integral role of Technical Support in the plan approval process.

Statement of Fact: A period of 1 to 2 years is required to complete the process of reviewing, revising, and approving plans for new impoundments or plans for major

modifications to existing impoundments. Therefore, a mine operator must allow for this time period in the planning process for future construction or modification of a site.

Shortages of manpower, turnover of employees and the experience level of reviewers in the MWGED have all contributed to a backlog of submittals awaiting review. As of June 2002, this backlog totaled 129. The effects of the recent breakthroughs have also impacted the current plan review situation. As a result of those failures, MSHA requested that operators with mining near their impoundments re-evaluate the breakthrough potential and provide information to MSHA on any needed remedial measures. The responsibility for reviewing these special submittals was assigned to Technical Support.

The Mine Waste and Geotechnical Engineering Division currently has 19 employees. In 1995, Technical Support had a staff of 22 people working in this area. In addition, the MWGED lost six experienced review engineers during 1998 and 1999. At the time of this internal review, seven review engineers had approximately 1 year or less experience with the Agency.

Technical Support's MWGED engineers are also utilized in other areas, including structural evaluations and accident investigations. This further limits the amount of time available for impoundment plan reviews.

The current plan review process requires that engineers at Technical Support's MWGED review and independently validate most of the design calculations submitted by mine operators.

The traditional role of Technical Support has been to serve as the consultant to the districts. Currently, Technical Support engineers communicate with districts instead of directly with consultants/operators, which increases the length of the process, since the district office often serves only as an intermediary.

Computer equipment and software applications utilized by Technical Support were also found to be less than state-of-the-art, slowing down the process and putting Technical Support engineers at a disadvantage to those in the private sector.

Technical Support personnel indicated that some of the newer plan reviewers had never visited an impoundment. The unfamiliarity of reviewers with specific sites slows the review process.

Conclusion: Impoundment Plans are not reviewed and processed by Technical Support in a timely manner.

Corrective Action Taken: The following actions have been taken by the Administrator for CMS&H and the Director of Technical Support to help reduce the backlog and workload of the MWGED staff: 1) The Administrator for CMS&H issued memorandum HQ-03-001-A, directing all District Managers to provide for levels of staffing and

expertise which are adequate to conduct impoundment plan reviews in-house; 2) the Administrator for CMS&H has approved the hiring of professional engineers in two districts, and all other districts were evaluated and were found to have adequate engineering support; 3) The Director of Technical Support has purchased new laptop computers for MWGED engineers, acquired a new filing system for better storage and retrieval of impoundment plans and instructed the MWGED Chief to direct engineers, under his supervision, to participate in field activities to familiarize themselves with specific impoundment sites.

Recommendation: The Administrator for CMS&H and the Director of Technical Support should consider streamlining the communication process between MWGED engineers, district impoundment departments, and representatives of mine operators in order to minimize the length of the review process.

The Director of Technical Support should allocate resources to purchase state-of-the-art software applications for use by MWGED engineers.

After an evaluation of the corrective actions that have been taken, the Director of Technical Support should review the levels of staffing to ensure that the MWGED has the appropriate personnel to improve the timeliness of the plan review process.

Issue C-2: Technical Support’s “expedited review process” does not result in timely reviews of impoundment plans.

Requirement: MSHA Program Policy does not establish timeframes for plan reviews by Technical Support, but requires that each district develop fundamental management system controls necessary for proper administration of the plan and program approval process. The purpose of these controls is to accomplish, among other things, timely action on each approval request. The districts have developed these controls in the form of SOPs, to include the integral role of Technical Support in the plan approval process.

Statement of Fact: Due to the continuing existence of a backlog of plan submittals, Technical Support developed an “expedited review process” as a way to address situations that required immediate attention. The criterion for expediting a plan is that, “if the time that it would take for a plan to be reviewed under the normal review process would result in a disruption of operations at the mine, or a closing of the preparation plant, and if District personnel can verify that this is the case, then the plan review will be expedited.” The current situation has led to a backlog of expedited submittals.

The backlog of regular plan submittals has continued to increase. The number of requested expedited reviews more than doubled, from 69 in calendar year 2000 to 148 in calendar year 2001. In the 5 years from 1994 to 1998, an average of 124 plans per year was submitted to Technical Support for review. However, in 1999, 2000, and 2001, the numbers of submitted plans were 159, 159, and 245. As of June 13, 2002, there were 41 expedited submittals pending review.

Technical Support personnel indicated in interviews that expedited reviews are only done on voluntary overtime. Therefore, these reviews are conducted only in relatively short, discontinuous, and unpredictable time increments.

Typically, the expedited review process results in reviews that are completed sooner than if the plan had “waited its turn.” However, once more than a few plans are designated as expedited, the designation begins to lose its significance because even expedited plans then have their own backlog, causing their processing time to increase.

Conclusion: Technical Support’s “expedited review process” does not result in timely reviews of impoundment plans.

Corrective Action Taken: In order to alleviate a portion of the MWGED workload and also allow for more timely completion of plan reviews, the Administrator for CMS&H issued memorandum HQ-03-001-A. This memorandum directed all District Managers to provide a level of staffing that is adequate to provide for expertise in impoundment plan reviews. The directive requires engineering support for impoundment plan reviews in the districts and appropriate training for all impoundment specialists. Additional instructions have also been given to the districts to conduct in-house reviews of impoundment plans when appropriate. Professional engineers were hired for two districts and all other districts were evaluated and presently have adequate engineering support for their impoundment staff.

Recommendation: The Administrator for CMS&H and the Director of Technical Support should jointly develop guidance for determining which plans should be “expedited.”

After an evaluation of the corrective actions that have been taken, the Director of Technical Support should review levels of staffing to ensure that the MWGED has sufficient personnel to provide for timely review of impoundment plans.

Issue C-3: MSHA did not assign a proper level of emphasis and priority to potential impoundment breakthroughs.

Requirement: As a result of three impoundment breakthroughs which occurred in August, October, and November of 1996, MSHA began to issue guidelines for identifying and evaluating impoundments with breakthrough potential.

On December 20, 1996, CMS&H issued Memo HQ-96-158-S (SUB-C77) which requested that the districts perform a historical review of breakthroughs since September 1975 and evaluations of impoundments with currently approved plans to identify those with breakthrough potential. The information was to be submitted to Headquarters and MWGED by January 31, 1997.

PIL 197-V-11, effective December 1, 1997, and reissued under PIL 199-V-3, outlined procedures for determining breakthrough potential ratings and instructions to notify mine operators of the need for revised plans. The PIL specifically stated that if the “mine’s impoundment plan does not adequately address the breakthrough potential, the mine operator responsible for that impoundment shall be notified that the plan must be revised. This plan modification shall be done in accordance with the plan revision procedures described in the MSHA Program Policy Manual, Volume V, Page 3c, 4/1/90 (Release V-2).” PIL 197-V-11 also required that once all sites had been identified on a priority listing, the pertinent information was to be submitted to the Pittsburgh Safety and Health Technology Center. For this submittal, the identified format was to be used on a hard copy form as well as in an electronic spreadsheet. PIL 197-V-11 did not contain any timeline for completing the breakthrough ratings or for notifying mine operators of the need to revise plans.

On September 9, 1999, CMS&H issued Memo No. HQ-99-095-S which instructed districts to mail letters to mine operators allowing operators 90 days to submit the results of an engineering study with additional time to be granted when circumstances warranted. A sample format letter was attached to this memo. This sample letter required the operator to submit an engineering study which was to include an evaluation of the breakthrough potential, the consequences if a breakthrough occurred, and the design for a safety barrier or other measures necessary to prevent a breakthrough from occurring. The sample letter stated that it was being sent to mine operators whose impoundments received a breakthrough potential rating of “high.” This memo did not contain any timeline for districts to send the letters to the operators.

Statement of Fact: The districts completed the historical review as required by CMS&H Memo No. HQ 96-158-S. The information was submitted to Headquarters and Technical Support by January 31, 1997.

No further instructions were given until December 1, 1997, when PIL No. 197-V-11 was issued. No response was made to this PIL until June 15, 1998, when the districts received the required spreadsheet format for use in recording summary results of the breakthrough rating survey required by the PIL. The districts completed the required spreadsheets and forwarded the information to Technical Support in a timely manner. However, the districts did not send letters to mine operators as required by the PIL, pending further instruction from Headquarters on the appropriate letter format.

After receiving CMS&H Memo No. HQ-99-095-S, the districts sent letters to mine operators who had impoundments with high breakthrough potential and began to receive responses in late 1999. The districts performed a cursory review and forwarded the responses to Technical Support. Technical Support processed these breakthrough submittals by adding them to their existing “expedited” review list with no special priority assigned. As of June 13, 2002, 79 submittals covering 35 sites had been received in response to the PIL. Submittals for 6 sites had been approved. Requests for additional information had been sent to the mine operators for 19 sites. Submittals for 10 sites were currently under review.

The initial action on these impoundments began on December 20, 1996, and the process of receiving responses from the mine operators took approximately 3 years.

Conclusion: MSHA did not assign a proper level of emphasis and priority to potential impoundment breakthroughs.

Corrective Action Taken: All submittals have now gone through the first level of review. Those that have not been recommended for approval have been returned to the mine operators for additional information.

Recommendation: The Administrator for CMS&H and the Director of Technical Support should establish directives to ensure that plans submitted for any proposed impoundments, that are to be constructed over or near mine workings, will include breakthrough potential evaluations. These directives should be incorporated into the updated Impoundment Inspection Handbook.

Issue C-4: **Memoranda and instructions issued in the form of Program Information Bulletins, Program Policy Letters and Procedure Instruction Letters are cumbersome and confusing to MSHA personnel and stakeholders.**

Requirement: Volume II, Section 102 of the MSHA Administrative Policy and Procedures Manual states that the objectives of the MSHA Directives System are to:

1. provide MSHA managers with an orderly and effective channel of written communications through which to direct and coordinate Agency activities;
2. provide MSHA employees with instructions and information to effectively and efficiently implement MSHA programs and mission support activities;
3. make available to members of the mining community and other interested parties information and policy about the Federal Mine Safety and Health Act of 1977 and its implementing regulations, as well as other pertinent information;
4. provide each originating office with adequate control over those policies and procedures which it has established and for which it is responsible;
5. provide a method for central management and oversight of the directives process within the Agency;
6. provide easy reference and retrieval of directives; and
7. provide guidelines for producing directives that are easy to read, understand, and implement.

Statement of Fact: The following memoranda, information bulletins, or instruction letters concern impoundments: PIB P00-16; PIL I99-V-3; PIB P97-4; CMS&H Memo No. HQ-96-056-S; CMS&H Memo No. HQ-96-158-S; CMS&H Memo No. HQ-99-095-S; PIB P95-24; and PIB P94-18. These documents were obtained by researching district files and did not correlate with documents supplied by Headquarters or listed on the MSHA website. It is unclear as to whether anyone has a complete listing of documents related to impoundments. Many of these documents have been superseded or incorporated into later documents, others are reissuances with expiration dates, and others have not been reissued. The volume and scope of these directives contribute to confusion as to which instructions remain in place. It was also noted that the distribution of these documents may not have been made to all appropriate parties. For example, PIL I99-V-3 was distributed to employees of CMS&H and Technical Support, but not to stakeholders.

Conclusion: Memoranda and instructions issued in the form of Program Information Bulletins, Program Policy Letters and Procedure Instruction Letters are cumbersome and confusing to MSHA personnel and stakeholders.

Corrective Action Taken: The Administrator for CMS&H, the Director of Technical Support and the Director of PEIR issued memorandum HQ-03-003-A, assigning a committee to evaluate MSHA's impoundment plan review and inspection procedures. The memorandum directed the committee to review all present directives, establish a complexity rating system to facilitate inspections, define inspection/review timetables, set parameters for review procedures and consolidate guidance in a uniform handbook.

Recommendation: The Administrator for CMS&H and Directors of Technical Support and PEIR should monitor progress of the committee to ensure timely completion of the project.

Issue C-5: **MSHA has not addressed eight of the eleven key recommendations contained in the report entitled "Peer Review of U.S. Department of Labor/MSHA - Impoundment Safety Program" prepared by the Association of State Dam Safety Officials - April 1998.**

Requirement: The Federal Guidelines for Dam Safety dated June 1979 mandate that agencies having enforcement jurisdiction over dams must have this periodic review.

Statement of Fact: The purpose of the Peer Review was to evaluate the competence of the impoundment safety program of the Mine Safety and Health Administration relative to the generally accepted standards of practice for dam safety.

The Peer Review provided 11 key recommendations that, when implemented, would strengthen MSHA's Dam Safety Program. The 11 key recommendations of the Peer

Review report are listed below². Eight of these recommendations have not been effectively addressed by the Agency.

1. *“Designation of Dam Safety Officer: The Peer Review Team recommends that the roles, responsibilities, activities and authority of the existing Dam Safety Officer be established, and be officially published and distributed throughout the agency. This will identify a single, technically qualified, administrative head, with the responsibility for assuring that all management and safety aspects of dam engineering are adequately considered as required by the Federal Guidelines for Dam Safety.”* The Agency has identified its Dam Safety Officer, but has not addressed all aspects of this recommendation.
2. *“Inventory of impoundments: A standard process and format should be developed for maintaining an inventory of impoundments, including the fields of data and submission requirements which meet the information requirements of the National Dam Inventory. A computer format would facilitate data updating, review, management and reporting for use at all levels in the organization and for use in the National Inventory of Dams. One central office should be designated as having inventory management and control. A system for periodically updating hazard classification of impoundments should be a part of the inventory updating process.”* A standard process and format for maintaining an inventory of MSHA’s impoundments has not been developed.
3. *“Dam Safety Training: Orientation training for District inspectors should emphasize all aspects of impoundment safety. Division and District personnel involved in impoundment safety should receive continuing training specifically related to impoundment safety. Such training could include in-house training, or dam safety training provided by the Bureau of Reclamation, Corps of Engineers, Interagency Committee of Dam Safety, ASDSO, as well as by universities.”* Training is currently provided mainly through MSHA’s annual Impoundment Seminar. Personnel in the impoundment program also sometimes attend other seminars or conferences dealing with impoundment safety. When the budget has allowed, job-related graduate-level courses have been taken by Technical Support engineers, with the tuition paid by MSHA. This recommendation has been addressed by MSHA.
4. *“Technical criteria, manuals and guidelines: The Peer Review Team recommends that a program be established for the scheduled review, updating and appropriate revision of all manuals, guidelines, and Procedure Instruction Letters to ensure that state-of-the-art technical criteria are available to support the Impoundment Safety Program.”* Technical Support routinely considers and evaluates the technical criteria that are applied in MSHA’s impoundment safety program. When necessary, adjustments are made to ensure that MSHA is consistent with current, prudent practice. This recommendation has not been addressed by MSHA.

² See [Appendix C](#) for a listing all recommendations contained in the report.

5. *“Professional Engineer designation: Key Division and District personnel positions descriptions should require that they be filled by registered professional engineers.”* In Technical Support’s MWGED, all engineers are encouraged to obtain professional registration. The Division Chief and other key personnel are registered professional engineers. Of the Division’s 18 engineers, 11 are registered professional engineers. Six other Division engineers have Engineer-In-Training status and are expected to take the exam for professional registration in the future. This recommendation has been addressed by MSHA.
6. *“Metal and Non-metal Regulation: MSHA should adopt and issue metal/non-metal mining impoundment safety regulations which include requirements for emergency action plans.”* This recommendation has not been addressed by MSHA.
7. *“Decommissioning of impoundments on abandoned sites: MSHA should coordinate with the Office of Surface Mining and State Mine Reclamation offices to ensure adequate decommissioning of abandoned unsafe impoundments, and that they receive a priority for reclamation funding.”* MSHA has regulations that require that impoundments under their jurisdiction be abandoned according to an approved abandonment plan. MSHA co-operates with OSM and State Mine Reclamation offices, and will continue to do so, on sites that do fall under MSHA’s jurisdiction. This recommendation has been addressed, but not rectified.
8. *“Authority to require Emergency Action Plans (EAP): MSHA should obtain regulatory authority to require Emergency Action Plans for all high and intermediate hazard coal impoundments, where not already required by State regulatory authority and should continue to emphasize and encourage development of EAPs until such authority is obtained.”* MSHA’s approach to this issue has been to encourage mine operators to prepare an EAP for any high and intermediate hazard potential impoundment. However, a regulation has not been promulgated, therefore this recommendation has not been addressed.
9. *“Develop program goals and performance indicators: Program performance goals, objectives and indicators should be developed for the MSHA Impoundment Safety Program. To measure performance against these goals, the District Offices should prepare an annual impoundment safety status report covering all aspects at each high and significant dam in their area. Organizational performance measures for dam safety, as required under the Government Performance and Results Act (GPRA), should be based on information provided in Dam Safety status reports.”* MSHA has not specifically addressed this recommendation.
10. *“Organization and staffing of the Dam Safety Office: The grade level and staffing of the Division should be consistent with national level expertise and responsibility within an agency.”* This recommendation has not been addressed by MSHA.
11. *“Application review and approval: The Peer Review Team recommends that the embankment design review process be evaluated and appropriate action taken to*

improve response time. This could include applicant education, project management or team approach to assignments, improved progress reporting and increased staffing.” This recommendation has not been addressed by MSHA.

Conclusion: MSHA has not addressed eight of the eleven key recommendations contained in the report entitled “Peer Review of U.S. Department of Labor/MSHA - Impoundment Safety Program” prepared by the Association of State Dam Safety Officials - April 1998.

Corrective Action Taken: The Assistant Secretary issued a memorandum assigning a committee of top staff whose main focus is to consider the recommendations contained in the Peer Review Report and to evaluate actions that may be taken, within budgetary and personnel constraints, for the program’s improvement.

Recommendation: The Assistant Secretary’s office should monitor the progress of this committee and ensure that the appropriate recommendations are implemented.

Issue C-6: The levels of staffing and technical expertise among MSHA’s district impoundment specialists are inconsistent.

Requirement: None

Statement of Fact: The level of staffing varies significantly from district to district, and is not correlated to the number, size, hazard classification, or breakthrough potential of impoundments in each district. (See [Appendix B.](#)) Impoundment specialists in all districts are also assigned a variety of collateral duties.

From 1995 through 2001, the districts sent 47% of processed plans, both new plans and modifications, to Technical Support for review. Of the eleven districts, seven sent all plans received to Technical Support, while four districts reviewed some portion of plans in-house. All districts have developed Standard Operating Procedures (SOPs). Some districts allow plans to be reviewed in-house while others require that all plans be forwarded to Technical Support for review.

The level of technical expertise of impoundment specialists varies in each district from that of a registered professional engineer to that of a regular health and safety specialist. The level of expertise is not correlated to the number, size, hazard classification, or breakthrough potential of impoundments in each district.

Conclusion: The levels of staffing and technical expertise among MSHA’s district impoundment specialists are inconsistent.

Corrective Action Taken: The Administrator for CMS&H issued memorandum HQ-03-001-A, directing all District Managers to provide a level of staffing that is adequate to provide for expertise in impoundment plan reviews. The directive requires engineering

support for impoundment plan reviews in the districts and appropriate training for all impoundment specialists. Additional instructions have also been given to the districts to conduct in-house reviews of impoundment plans where appropriate. Professional engineers were hired for two districts and all other districts were evaluated and presently have adequate engineering support for their impoundment staff.

Recommendation: None

Issue C-7: **There is no national policy for determining which plan submittals should be sent to Technical Support for review and which should be reviewed in the districts.**

Requirement: Individual districts have developed internal Standard Operating Procedures (SOPs) which contain instructions for use by district personnel as to which plans/revisions, if any, may be reviewed in-house and which are forwarded directly to Technical Support.

Statement of Fact: An evaluation of district SOPs indicated that six districts may approve some plans in-house and five districts are required to send all plans to Technical Support. The criteria for determining which plans receive in-house review are not consistent between districts and are in most cases subjective. These differences may result from variations in the number, level of experience, and expertise of district personnel.

Conclusion: There is no national policy for determining which plan submittals should be sent to Technical Support for review and which should be reviewed in the districts.

Corrective Action Taken: The Administrator for CMS&H issued memorandum HQ-03-001-A, emphasizing the importance for all districts to review and approve plans in house when appropriate. The memorandum specifies that districts should consider reviewing minor modifications to existing plans and design plans for relatively small impoundments.

The Administrator for CMS&H and the Directors of Technical Support and PEIR issued memorandum HQ-03-003-A, assigning a committee to establish a complexity rating system. Once developed and implemented the complexity rating system will be utilized to differentiate between plans containing highly technical material, which should be reviewed by MWGED, and those which could be appropriately reviewed in the districts.

Recommendation: The Administrator for CMS&H and the Directors of Technical Support and PEIR should monitor the progress of the committee to ensure the timely completion of the project.

Issue C-8: The level of information sharing by the districts with Technical Support concerning sites and plan data is inconsistent.

Requirement: None

Statement of Fact: Each district, for its own use, maintains a complete file of impoundment plans within their respective district. However, Technical Support does not have a complete file of all impoundment plans/modifications in the nation.

The districts do not always advise Technical Support of the number of sites and plan reviews done at the district level. For example, Technical Support did not have a copy of the Martin County Coal Corporation Impoundment Sealing Plan until the reviewer requested a copy of the plan during the Phase III modification review several years later.

District impoundment specialists and Technical Support personnel commented that having no common database to share plan information between the two staffs leaves gaps in potentially crucial aspects of the review process.

Conclusion: The level of information sharing by the districts with Technical Support concerning sites and plan data is inconsistent.

Corrective Action Taken: The Administrator for CMS&H and the Director of Technical Support issued memorandum HQ-03-002-A, establishing a communication path for impoundment plan reviews. The directive provides for an accessible database common to both divisions and expands the information log. The directive requires completion of the all work by April 29, 2003.

Recommendation: The Administrator for CMS&H and the Director of Technical Support should review and evaluate the benefits of the established database and report the improvements to the Assistant Secretary.

Issue C-9: There are no guidelines for locating and constructing an impoundment adjacent to or over pre-existing underground mine workings.

Requirement: None

Statement of Fact: The primary document that is utilized by the mining industry to provide technical guidance for the construction of impoundments over or adjacent to existing underground mine workings is Information Circular 8741 of 1977 titled, "Results of Research to Develop Guidelines for Mining Near Surface and Underground Bodies of Water." This actual intent of this document was to provide guidance to the mining industry for safe methods of conducting active mining operations under or adjacent to a body of water. The document was not intended to provide guidance for impounding bodies of water over or adjacent to active or abandoned underground mine workings. It

has been used in that manner by the industry because there is no other document available.

There are differences between constructing impoundments over or adjacent to underground mine workings as opposed to developing mine workings under bodies of water. When areas of underground mines are inaccessible, the ability to provide verifiable control survey information is eliminated. In addition, ground conditions in inaccessible underground mine workings are difficult, if not impossible, to determine.

Conclusion: There are no guidelines for locating and constructing an impoundment adjacent to or over pre-existing underground mine workings.

Corrective Action Taken: None

Recommendation: The Administrator for CMS&H, the Director of Technical Support, and the Administrator for MNMS&H should assign a committee to investigate the development of guidelines for reviewers to use when evaluating breakthrough potential of an impoundment located adjacent to or over mine workings. Where appropriate, this committee's work should be coordinated with NIOSH for additional research.

Issue C-10: MSHA has no established method to verify or confirm the full extent of underground workings as depicted on mine maps.

Requirement: Paragraph (a)(14) of 30 C.F.R. 77.216-2 requires, "The locations of surface and underground coal mine workings including the depth and extent of such workings within the area 500 feet around the perimeter..." be included in the content of each impoundment plan.

In addition, 30 C.F.R. 75.1200 requires that, "The operator of a coal mine shall have in a fireproof repository located in an area on the surface of the mine chosen by the mine operator to minimize the danger of destruction by fire or other hazard, an accurate and up-to-date map of such mine drawn on scale."

Statement of Fact: Numerous events and accidents have occurred resulting in injuries, loss of life, loss of property, and environmental damage due to inaccurately mapped and/or located workings of both active and abandoned mines. Many mines were developed and subsequently abandoned prior to the passage of the Mine Act. Consequently, these mines were not subject to the requirements of 30 C.F.R. 75.1200.

Following the October 11, 2000, slurry breakthrough at the MCCC Big Branch Refuse Impoundment, Congress requested the National Research Council (NRC) to examine ways to reduce the potential for similar accidents in the future. To conduct this study, the NRC appointed the Committee on Coal Waste Impoundments. One of the charges to this committee was to evaluate the accuracy of mine maps and to explore ways to improve

surveying and mapping in order to more accurately delineate how underground mines relate to current or planned slurry impoundments.

In response to the NRC report, representatives from OSM, MSHA, and State Agencies are now engaged in the research and development of information and procedures for verifying the accuracy of surveys and the extent of underground mines in the vicinity of impoundments and other mines.

Accurate surveying and mapping is critical to the planning process in the location and design of impoundments in proximity to underground mines. However, in instances where these mines are inaccessible, the accuracy of these maps can no longer be confirmed through the utilization of surveying methods alone.

Conclusion: MSHA has no established method to verify or confirm the full extent of underground workings as depicted on mine maps.

Corrective Action Taken: The Administrator for CMS&H and the Directors of Technical Support and PEIR issued memorandum HQ-03-003-A, assigning a committee to participate in updating the Impoundment Inspection Handbook. As a specific item for incorporation into the handbook, the committee was directed to study the development of guidelines to be utilized by plan approval personnel to ensure accurate location of mine workings under or near an impoundment.

On October 29, 2002, a Geo-technical Symposium was sponsored by MSHA in Charleston, WV, to share ideas, technology and information related to detecting old mine workings.

Recommendation: MSHA should commit resources to assist in the development and testing of new technology for determining the extent and location of mine workings where the accuracy of mine maps and subsequent content of the impoundment or other plan is critical or in question.

The progress of the appointed committee should be monitored and MSHA should continue to participate in the research and development of information and procedures for more accurate location and determination of the extent of existing underground mines in the vicinity of impoundments and other mines.

D. MSHA Impoundment Inspection Procedures

The internal review team evaluated MSHA human resources, policies and procedures concerning impoundment inspections, and District SOPs. The review team also interviewed field impoundment specialists/supervisors in each district. Based on this information the following positive findings as well as issues were identified.

Of all eleven districts, the impoundment inspection program in District 4 was found to be most effective. District 4 has 81 active impoundments, most of which are slurry ponds. The district has three specialists assigned to field office locations, an engineer at the district office, and an impoundment supervisor. The district is able to maintain quality oversight during most phases of impoundment construction, particularly during critical construction phases.

In addition to its inspection activities, District 4 reviews impoundment plan modifications in-house and does partial reviews and approvals of new plans or modifications in order to expedite the review process. From 1995 through 2001, 54 new plans and 597 modifications were received in the District for review. The District reviewed and approved 513 plans and forwarded 138 plans to Technical Support. Interviews with MWGED managers indicated high levels of respect and confidence in the review capabilities of the district's specialists and supervisor.

Issue D-1: MSHA's frequency, quality, and documentation of impoundment inspections are inconsistent.

Requirement: Section 103(a) of the Mine Act requires that an impoundment attached to an underground mine must be inspected four times a year and an impoundment attached to a surface mine must be inspected twice a year (AAA).

The Coal General Inspection Procedures Handbook requires that all impoundments that are inspected shall be identified in the notes and a general statement of the examination be included. Construction sites at existing mines will be inspected as part of the AAA inspection of the mine. Major construction sites may be inspected more often to address unusual hazards at the discretion of the District Manager. The Impoundment Inspection Handbook states that, "The construction requirements for impoundments are specified in engineering plans submitted by the coal company and subsequently approved by MSHA. Once a plan is approved, there is an ongoing need to periodically check the operation and condition of the disposal facility in order to determine whether it is in conformance with the approved plan and to see whether any potentially dangerous conditions have developed." Also the handbook states that health and safety specialists should use the Periodic Inspection Form to document inspections of all impounding sites.

The handbook defines a CCE Inspection as a "Safety and Health Water, Sediment or Slurry Impoundment by a Specialist." There is no mandatory requirement to conduct CCE Inspections.

Statement of Fact: The frequency of regular impoundment inspections is dependent upon whether the facility is associated with an underground or a surface mine. While professional engineers inspect some impoundments, others are inspected by regular health and safety specialists with a minimum level of knowledge and expertise with specific regard to impoundment design and construction.

The Internal Review Team found that several Districts were not using the Periodic Inspection Form, as recommended by the Impoundment Inspection Handbook. The use of this form serves as a tool to document inspections and as a vehicle to notify the District's impoundment specialists of deficiencies observed at these facilities. AAA inspections made on impoundments generally contain notes that state "Checked Impoundment – OK" or the impoundment identification number is listed on the Mine Activity Data cover sheet to show that an inspection was made. No details of the inspection of the impoundment are noted by the health and safety specialists in many of the AAA inspection reports reviewed.

Conclusion: MSHA's frequency, quality, and documentation of impoundment inspections are inconsistent.

Corrective Action Taken: The Administrator for CMS&H, and the Directors of Technical Support and PEIR issued memorandum HQ-03-003-A, assigning a committee to evaluate the MSHA's impoundment plan review and inspection procedures. The memorandum directed the committee to review all present directives, establish a complexity rating system to facilitate inspections, define inspection/review timetables, set parameters for design, review, and inspection procedures, and consolidate guidance in an updated Impoundment Inspection Handbook.

Professional engineers were hired for two districts and all other districts were evaluated and presently have adequate engineering support for their impoundment staffs.

Recommendation: The Administrator for CMS&H and the Directors of Technical Support and PEIR should monitor the progress of the committee to ensure timely completion of the project.

Issue D-2: **There are no national guidelines for the inspection of impoundments during construction phases, impoundments with high hazard classification, or impounding structures with high breakthrough potential.**

Requirement: The Coal General Inspection Procedures Handbook indicates that "Construction sites at existing mines will be inspected as part of the AAA [regular] inspection of the mine. Major construction sites may be inspected more often to address unusual hazards at the discretion of the District Manager."

There is no requirement for frequency of inspections in the Impoundment Inspection Procedure Handbook.

Statement of Fact: Normally, AAA inspections are conducted by journeyman coal mine health and safety specialists who have little or no expertise concerning phase construction, hazard classification, or breakthrough potential.

Statements obtained during interviews of district impoundment specialists and technical support engineers indicated that observation and inspection of construction phases is currently inadequate in most districts. The consensus was that observation and inspection of construction phases was as critical as or more critical than the actual plan approval process. It was determined that inspections during all construction phases are not normally being conducted. District specialists further commented that interpretation varies from district to district as to whether impoundments are considered “major construction.”

Procedure Instruction Letter No. I97-V-11 indicates that the potential for breakthrough events occurring in the future remains a concern, especially since active impoundments continue to increase in elevation and may overtop worked out coal seams or seams that are presently being mined. However, this PIL did not identify timeframes or inspection frequencies for impoundments evaluated with varying degrees of breakthrough potential.

There are no requirements in the Coal General Inspection Procedures Handbook or the Impoundment Inspection Procedures Handbook for additional inspections of impoundments during construction phases, or those having ‘high’ hazard classifications or breakthrough potential ratings.

Conclusion: There are no national guidelines for the inspection of impoundments during construction phases, impoundments with high hazard classification, or impounding structures with high breakthrough potential.

Corrective Action Taken: The Administrator for CMS&H, and the Directors of Technical Support and PEIR issued memorandum HQ-03-003-A, assigning a committee to evaluate the MSHA’s impoundment plan review and inspection procedures. The memorandum directed the committee to develop national guidelines and inspection frequency timetables for the inspection of impoundments during construction phases, with high, moderate, and low hazard classifications, or with varying degrees of breakthrough potential. The inspection frequency guidelines will be incorporated into an updated Impoundment Inspection Handbook.

Recommendation: The Administrator for CMS&H and the Directors of Technical Support and PEIR should monitor the progress of the committee to ensure timely completion.

Issue D-3: **There is inadequate national guidance and instruction concerning inspection frequency or activities on impoundments where these structures are ancillary to closed or abandoned mines.**

Requirement: Mandatory safety standard 30 C.F.R. 77.216-5 requires in part that prior to abandonment of any water, sediment, or slurry impoundment and impounding structure which meets the requirements of 30 CFR 77.216(a), the person owning, operating, or controlling such an impoundment and impounding structure shall submit to

and obtain approval from the District Manager, a plan for abandonment based on current, prudent engineering practices.

The Coal General Inspection Procedures Handbook states, “Mines sites that have active impoundments are still subject to inspection and therefore cannot be placed in CF (No One Working, Idle/Inactive, Temporarily Idled/Inactive) status.” AAA inspections are required to be conducted on impoundments even after the mine has been closed if the impoundment is not yet abandoned.

Statement of Fact: The districts are required to keep many mines that are closed or abandoned in an inspectable status due to an ancillary impoundment facility not being abandoned in accordance with 30 CFR §77.216-5. A number of impoundments continue to require mandatory inspections long after the mine or facility to which it is attached has been abandoned. There are inconsistencies among districts as to how and if these inspections are being conducted. There are inconsistent methods of abandoning mines with impoundments among districts.

Conclusion: There is inadequate national guidance and instruction concerning inspection frequency or activities at impoundments where these structures are ancillary to closed or abandoned mines.

Corrective Action Taken: The Administrator for CMS&H, and the Directors of Technical Support and PEIR issued memorandum HQ-03-003-A, assigning a committee to evaluate the MSHA’s impoundment plan review and inspection procedures. The memorandum directed the committee to develop national guidelines and inspection frequency timetables for the inspection of impoundments where these are ancillary to closed or abandoned mines. These guidelines will be incorporated into an updated Impoundment Inspection Handbook.

Recommendation: The Administrator for CMS&H and the Directors of Technical Support and PEIR should monitor the progress of the committee to ensure timely completion.

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 related to the Martin County Coal Corporation Big Branch Refuse Impoundment including: an examination of the procedures MSHA personnel followed to approve the Big Branch Refuse Impoundment; an examination of MSHA's inspections of the Big Branch Refuse Impoundment prior to October 11, 2000; a review of the MSHA procedures currently used to approve all coal mine impoundments; and a review of MSHA's impoundment inspection procedures in general.

Respectfully submitted,

ORIGINAL SIGNED BY

Joseph W. Pavlovich
District Manager
CMS&H District 7

ORIGINAL SIGNED BY

Alvah L. Skaggs, P.E.
Mining Engineer, Impoundments
CMS&H District 7

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Charles H. Grace, P.E.
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CMS&H District 7

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George M. Fesak
Director of Program
Evaluation and Information Resources

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Linda F. Zeiler
Deputy Director
Technical Support

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William G. Denning, P.E.
Staff Assistant
CMS&H District 9

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Alvin L. Brown
Conference/Litigation Clerk
CMS&H District 7

ORIGINAL SIGNED BY

Douglas N. White
Associate Regional Solicitor

Approved by:

ORIGINAL SIGNED BY

Dave D. Lauriski
Assistant Secretary of Labor
Mine Safety and Health

Appendix A

Persons Interviewed

CMS&H Headquarters Employees

William Crocco	Accident Investigation Program Manager Former Subdistrict Manager, Paintsville, Kentucky, District 6
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Educational Field Services

Jesse P. Cole	Chief of Eastern Operations Former District Manager, Pikeville, Kentucky, District 6
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Technical Support – Mine Waste & Geotechnical Engineering Division

Kelvin Ke Kang Wu	Chief
Donald T. Kirkwood, Jr.	Supervisor
Stanley J. Michalek	Supervisor
Gharib Ibrahim	Engineer
Lawrence G. Wilson	Engineer, Former Employee of MSHA

Coal Mine Safety and Health – District Personnel

Gregory J. Mehalchick	Engineer, District 1
Gary E. Smith	Engineer, District 2
Theodore P. Betoney, Jr.	Engineer, District 3
William H. Shuff, Jr.	Engineer, District 4
James R. Elkins	CMI (Impoundment), District 4
A.J. Baker	CMI (Impoundment), District 5
Arlie Anthony Webb	Staff Assistant, District 6
Thomas H. Griffith	Health Supervisor, District 6
Danny Harmon	Roof Control/Impoundment Supervisor, District 6
Timothy P. Watkins	Ventilation Supervisor, District 6
Hank R. Bellamy	Engineer, District 6
Garett Robinson	Engineer, District 6
Robert Newberry	Engineer, District 6
Buster Stewart	Special Investigator, District 6
Steven L. Sorke	Roof Control/Impoundment Supervisor, District 7
Mark O. Eslinger	Ventilation/Impoundment Supervisor, District 8
Billy D. Owens	Roof Control/Impoundment Supervisor, District 9
Carl E. Boone, II	District Manager, District 10
	Former District Manager, District 6
Troy K. Davis	Roof Control/Impoundment Supervisor, District 10
Michael K. Woodrome	Assistant District Manager, District 11

Appendix B

Overview of Workload Distribution for Impoundment Branches Nationwide (1995-2001)

District	# of Sites	# of New Plans	# of Modifications	Plans Sent To Technical Support	Percentage Reviewed in Technical Support	Plans Reviewed In District	Percentage Reviewed in District	# of Specialists*	# of High Breakthrough Potential Sites	Ratio of Sites to Specialists	Ratio of High Breakthrough Potential Sites to Specialists	Ratio of Plan Reviews to Specialists
1	19	7	1	8	100%	0	0%	1	1	19.0	1.0	0.0
2	53	4	81	85	100%	0	0%	1	1	53.0	1.0	0.0
3	76	6	22	28	100%	0	0%	2	1	38.0	0.5	0.0
4	91	54	597	138	21%	513	79%	5	20	18.2	4.0	102.6
5	24	3	40	43	100%	0	0%	1	4	24.0	4.0	0.0
6	30	8	279	153	53%	134	47%	3	11	10.0	3.7	44.7
7	68	10	276	146	51%	140	49%	1	13	68.0	13.0	140.0
8	90	20	15	33	94%	2	6%	1	0	90.0	0.0	2.0
9	186	42	13	55	100%	0	0%	1	0	186.0	0.0	0.0
10	22	0	2	2	100%	0	0%	1	1	22.0	1.0	0.0
11	47	7	3	10	100%	0	0%	1	2	47.0	2.0	0.0
National Totals	706	161	1329	701		789		18*	54			
National Averages		1490			47%		53%			39.2	3.0	43.8
*18 FTE's are not committed to only impoundment duties. All specialists in all districts have collateral duties.												

APPENDIX C

Recommendations of the Peer Review

(Listed below are the issues that included recommendations within the report entitled, "Peer Review of U.S. Department of Labor/MSHA - Impoundment Safety Program" prepared by the Association of State Dam Safety Officials - April 1998. These were taken verbatim from this document and the eleven key recommendations are bold and italicized.)

Issue 2: Program Formulation and Execution

- 3.2.1 Issue 2-1: Are procedures and practices adequately effective, efficient, and comprehensive?

Recommendations:

- 2-1.1 Current procedures and practices appear to be working, but should be regularly examined and adjusted as necessary to enhance the uniform relationship between the district and Division.
- 2-1.2 Assignments for project continuation with same engineer should continue. For technical review of new projects, more supervisory judgement is recommended to give assignment based upon area of expertise.
- 2-1.3 Some efficiency and quality assurance may be gained by a team plan review consisting of 2-3 engineers, each of whom would review a specific technical aspect of the plan. The team leader would ensure all technical aspects were covered and would track progress of the review. (See also Recommendation 6-2.1) The Division's organization chart should be revised to more actually reflect division of responsibilities.
- 2-1.4 through 2-1.5 ***MSHA should adopt and issue regulations for impoundments at metal/non-metal mines which include a requirement for EAPs for intermediate and high hazard impoundments, and EAPs for intermediate and high hazard coal impoundments. Until such regulations are issued, MSHA should continue to encourage EAPs by policy and PILs. The need for EAPs should be a part of the safety awareness program for mine operators.***
- 2-1.6 The standard impoundment inspection form should be revised to expand the checklists to cover all likely impoundment deficiencies and to require more detailed observations.

2-1.7 MSHA should coordinate with the Office of Surface Mining and the appropriate State Mine Reclamation offices to ensure adequate decommissioning of unsafe impoundments, and that they receive a priority for reclamation bond funding.

- 3.2.2 Issue 2-2: Is the communication and coordination of objectives, goals and needs effective?

Recommendations:

- 2-2 Some efficiency may be gained by standardizing the commonly used forms among the districts which are used to convey impoundment information between districts and the Division.

- 3.2.3 Issue 2-3: Is record keeping appropriate?

Recommendations:

2-3.2 A standard process and format should be developed for maintaining an inventory of impoundments, including the fields of data and submission requirements which meet the information requirements of the National Dam Inventory. A computer format would facilitate data updating, review, management and reporting for use at all levels in the organization and for the National Inventory of Dams. One central office should be designated as having inventory management and control. A system for periodically updating hazard classification of impoundments should be a part of the inventory updating process.

- 2-3.3 A separate category in the impoundment inventory should be created to indicate which impoundments have EAPs.

- 3.3 Issue 3: Development, maintenance and utilization of technical experts.

- 3.3.1 Issue 3-1: Are adequate programs or practices in place which allow MSHA to maintain expertise in inspection, analysis, design and construction management?

Recommendations:

- 3-1.1 Review engineers should be given the opportunity to make periodic impoundment construction inspections, particularly during the training phase of career development.

- 3-1.2 Continue to maintain up-to-date equipment, references and facilities.

- 3-1.4 Orientation training in impoundment safety for all district personnel inspecting impoundments should be reviewed to ensure an adequate minimum level of training is given.
- 3-1.5 *Division and District personnel involved in impoundment safety should receive continuing training specifically related to impoundment safety. Such training could include in-house training, or dam safety, training provided by the Bureau of Reclamation, Corps of Engineers, Interagency Committee on Dam Safety, ASDSO, as well as by universities.***
- 3-1.6 Impoundment training records for inspectors and impoundment specialists should be reviewed, and additional in-house or other impoundment safety training given, especially when the inspectors will have responsibility for intermediate and high hazard impoundments.
- 3-1.7 Maintain and enhance the good communications and working conditions.
- 3-1.8 Recognize that lack of advancement opportunities will likely cause cyclic turnover. Consider creating more technical expert positions, perhaps as plan review team leaders.
- 3-1.9 A job performance rating system with more classifications would give more flexibility for evaluations. Standards for job performance for each rating should be more clearly defined.

3.4 Issue 4: Technical practices and standards

- 3.4.1 Issue 4-1: Are practices reliable and credible and do they represent appropriate state-of-the-art techniques?

Recommendations:

- 4-1.1 *Key Division personnel positions should have a requirement that they be filled by Registered Professional Engineers.***
- 4-1.2 Technical journals and publications should be maintained. Voice mail capabilities at the Division should be added.
- 4-1.3 *The Peer Review Team recommends that a program be established for the scheduled review, updating and appropriate revision of all manuals, guidelines, and Procedure Instruction Letters to ensure that state-of-the-art technical criteria are available to support the***

Impoundment Safety Program. This should include adequate independent technical review.

- 3.4.2 Issue 4-2: Are external and internal technical review practices adequate?

Recommendations:

- 4-2.1 Policies should be established to improve the consistency of the quality assurance of the impoundment reviews. Efforts should continue to assign a variety of reviews and tasks to technical personnel. However, critical tasks should have oversight by technical experts in that specialty.
- 4-2.2 The coordination process could be strengthened by more frequent meetings with OSM and NRCS. Differences between the dam safety criteria of OSM, MSHA, and NRCS should be clarified, documented, and disseminated agency-wide.

- 3.5 Issue 5-1: Dam safety regulatory decision making authority and procedures

- 3.5.1 Issue 5-1: Do MSHA's policies and procedures define decision making authorities for a regulatory program and ensure an appropriate balance between public safety and federal expenditures?

Recommendations:

5-1.3 Regulations need to be established for metal/non-metal impoundments that cover the safety of the adequate public. (See also Recommendations 2-1.4 and 2-1.5)

- 3.6 Issue 6: Organization

- 3.6.1 Issue 6-1: Do organization structures, policies, practices and relationships facilitate effective dam safety practices and accomplishments?

Recommendations:

6-1.1 The Peer Review Team recommends that the roles, responsibilities, activities and authority of the existing Dam Safety Officer be established, and officially published and distributed throughout the agency. This will identify a single, technically qualified, administrative head, with the responsibility for assuring that all management and safety aspects of dam engineering are adequately considered as required by the "Federal Guidelines for Dam Safety."

6-1.3 MSHA should develop program goals and performance indicators for their Dam Safety Program and a Dam Safety Program Status Report should be prepared annually. Organizational performance measures for dam safety, as required under the Government Performance and Results Act (GPRA), should be based on information provided in the Status Report.

3.6.2 Issue 6-2: Are staffing levels appropriate?

Recommendations:

6-2.1 Efforts should continue to make mine operators and their consultants aware of information required so that application approval is obtained upon first submittal. Mine operators should also be made aware of need for lead time in application submittal. The possibility of increased plan review efficiency by a team approach to plan review should be investigated. (See also Recommendation 2-1.3) *The Peer Review Team recommends that the dam design review process be evaluated and appropriate action taken to improve response time. This could include project management or team approach to assignments, improved process reporting and increased staffing, as well as applicant education.*

6-2.3 *The grade level and staffing of the Division should be consistent with national level expertise and responsibility within an agency.*

APPENDIX D

Joint Response to the Internal Review Report

The following is a text-only copy of the memorandum (with attachment) detailing the joint response to the Internal Review Report from CMS&H, Technical Support, and MNMS&H. The original document was dated January 13, 2003, and signed by Ray McKinney, Mark E. Skiles, and Robert M. Friend.

January 13, 2003

MEMORANDUM FOR: DAVE D. LAURISKI
Assistant Secretary for
Mine Safety and Health

FROM: RAY McKINNEY
Administrator for
Coal Mine Safety and Health

MARK E. SKILES
Director, Technical Support

ROBERT M. FRIEND
Administrator for Metal and Nonmetal
Mine Safety and Health

SUBJECT: Response to Report of Internal Review of MSHA
Actions at the Big Branch Refuse Impoundment, Martin
County Coal Corporation

This responds to your memorandum of January 8, 2003, requesting that Coal Mine Safety and Health (CMS&H), Technical Support, and Metal/Nonmetal Mine Safety and Health (M/NMS&H) respond to the recommendations in the subject Report, and to provide an outline of our corrective actions.

The report identified issues in regard to inspections, plan reviews, and approvals specifically related to the Big Branch Refuse Impoundment of Martin County Coal Corporation, but also further identified issues pertaining to the agency's coal mine impoundment inspection and approval program as a whole. Therefore, while some issues relate specifically to CMS&H and will be summarily corrected or satisfied by that office, an effective response to other national issues will require joint cooperation among CMS&H, Technical Support, Program Evaluation and Information Resources (PEIR), and your office.

The primary deficiencies identified in the impoundment program include inadequate or improperly distributed levels of staffing in some CMS&H districts, the need for an updated Impoundment Inspection Handbook, and a lack of guidance for evaluating proposed impoundment plans with breakthrough potential into mine workings. The

report also concluded that the level of staffing in Technical Support is inadequate to ensure timeliness in the plan review process, and that the level of information sharing between CMS&H and Technical Support is inconsistent. The committee also noted that several issues identified by the 1998 Association of State Dam Safety Officials Peer Review of MSHA's impoundment safety program have not been addressed by the Agency.

The attached summarizes the actions to be taken by our program areas for the issues and recommendations provided in this report, and is ordered first by the mechanism of corrective action, then by general area of concern.

All guidance, memoranda, PILs, and PIBs identified in the attachment will be developed and issued by April 15, 2003.

Corrective actions related to the development of the shared impoundment database will be completed on or before October 1, 2003.

Corrective actions related to the developing an updated Impoundment Inspection Handbook, reviewing and addressing the recommendations contained in Peer Review Report, and evaluating procedures and methods related to potential impoundment breakthroughs will be completed on or before March 21, 2004.

We will keep you informed of our progress on these initiatives.

Attachment

Attachment

Procedure Instruction Letters (PILs) and Program Information Bulletins (PIBs)

Issue A-5: District 6 did not identify the fact that Martin County Coal Corporation had injected slurry into the underground mine workings of the 1-C Mine without joint approval of the state regulatory authority and MSHA.

Issue D-1: MSHA's frequency, quality, and documentation of impoundment inspections are inconsistent.

Issue D-2: There are no national guidelines for the inspection of an impoundment during construction phases, an impoundment with high hazard classification, or impounding structures with high breakthrough potential.

Issue D-3: There is inadequate national guidance and instruction concerning inspection frequency/activities on impoundments where these are ancillary to closed/abandoned mines.

CMS&H and MNMS&H will issue a new PIL to all Program Policy Manual Holders to provide guidance for enforcement personnel concerning regular and other inspection activities at impoundments, where these are ancillary to either underground or surface coal mines and facilities. The PIL will further provide clarification for the required frequency of inspections and reinforce the requirements for accompanying documentation of these inspections and any necessary enforcement actions.

CMS&H will re-issue PIL I97-V-10 to all Program Policy Manual Holders, which continues to extend the responsibility for approval of the above-referenced plans to all CMS&H District Managers. This letter will provide instruction to CMS&H personnel for handling requests from coal mine operators for approval of slurry injection plans.

CMS&H will issue a PIB outlining MSHA's role in the approval of a slurry injection plan for an underground mine. The PIB will alert industry that slurry can not be legally injected into an underground mine without joint approval of MSHA and the state regulatory authority or OSM.

Memoranda - Enforcement-Specific Issues

Issue A-3: Critical requirements of the Impoundment Sealing Plan, related to the underground seals, were not properly conveyed to the appropriate enforcement group.

The District Manager addressed this issue for District 6, but CMS&H will provide a memorandum to all District Managers directing them to ensure that District Technical Division Branch Supervisors be made aware of the possibility for specific plan requirements to overlap into other plan areas. Also, this memorandum will direct them to take steps within their specialty groups to ensure that any impoundment plan submittal which may have areas which overlap into other group's responsibilities is shared and coordinated to ensure the accuracy of the appropriate plan. The District Managers will be instructed to review all impoundment plans presently on file to ensure that any overlapping requirements are identified, and to ensure that mine operators are made aware that these overlapping requirements must be incorporated into the appropriate plan.

Issue A-5: District 6 did not identify the fact that Martin County Coal Corporation had injected slurry into the underground mine workings of the 1-C Mine without joint approval of the state regulatory authority and MSHA.

CMS&H will issue a written directive requiring all districts to maintain a data base listing all preparation facilities that pump slurry into underground mines and the ID numbers of such underground mines. This listing will be cross-referenced quarterly to ensure that an approved plan exists for those mines receiving slurry.

Issue B-2: The Section 103(k) Orders that were issued as a result of the Big Branch Slurry Impoundment breakthrough into the 1-C Mine which occurred in May 1994 were terminated without sufficient justification.

Although this issue was corrected in District 6, CMS&H will provide guidance in the form of a memorandum to all District Managers in regard to the establishment of root causes and the subsequent termination of Section 103(k) orders. This memorandum will reiterate that orders issued under Section 103(k) of the Mine Act must not be terminated until the hazards that caused or contributed to the accident have been eliminated. The District Managers will also be instructed to provide any needed re-training to enforcement personnel and accident investigators in their respective districts in this regard, and to reinforce under what circumstances a Section 103(k) order may be terminated.

Memoranda - Plan Review-Specific Issue

Issue A-6: Technical Support did not consider the Impoundment Sealing Plan, previously approved by District 6, during its review of the Phase III Plan Modification for the Big Branch Slurry Impoundment.

Technical Support's MWGED Chief will issue a memorandum to plan review engineers containing established guidelines to ensure that all previous approvals or plan modifications that may impact a current plan submittal are appropriately considered by the review engineer(s).

Memoranda - Impoundment Program Improvement Issues

Issue C-3: MSHA did not assign a proper level of emphasis and priority to potential impoundment breakthroughs.

Issue C-4: Memorandum and instructions issued in the form of Program Information Bulletins, Program Policy Letters and Procedure Instruction Letters are cumbersome and confusing to MSHA personnel and stakeholders.

Issue C-7: There is no national policy for determining which plans/plan revisions should be sent to Technical Support for review and which should be reviewed in the districts.

Issue C-10: MSHA has no established method to verify or confirm the full extent of underground workings as depicted on mine maps.

Issue D-1: MSHA's frequency, quality, and documentation of impoundment inspections are inconsistent.

Issue D-2: There are no national guidelines for the inspection of impoundments during construction phases, impoundments with high hazard classification, or impounding structures with high breakthrough potential.

Issue D-3: There is inadequate national guidance and instruction concerning inspection frequency/activities on impoundments where these are ancillary to closed/abandoned mines.

Several report recommendations highlight problems that exist with the current Impoundment Inspection Handbook. A memorandum has been issued to establish a joint committee and requesting CMS&H, Technical Support and PEIR to update and expand the Handbook in order to address these specific items:

- A. Review all previously issued directives concerning impoundments and determine which are still applicable.
- B. Review all existing PPLs, PILs, PIBs, and memoranda of instruction concerning impoundments and determine which are still applicable.
- C. Develop a uniform rating system in order to differentiate levels of impoundment plan complexity.

- D. Study the development of guidelines to be utilized by plan approval personnel to ensure accurate locations of mine workings under or near an impoundment (i.e., additional surveying, requiring drilling, etc.)
- E. Develop national guidelines and inspection frequency timetables for the inspection of impoundments during construction phases, with high, moderate, and low hazard classifications, or with varying degrees of breakthrough potential.
- F. Develop national guidelines and inspection frequency timetables for the inspection of impoundments where these are ancillary to closed/abandoned mines.
- G. Establish timeframes in which to complete the plan approval process at both the district and Technical Support offices.
- H. Pending the receipt of findings of the Assistant Secretary's committee evaluating the Peer Review, recommendations concerning directives or guidelines relating to inspections or plan reviews will also be incorporated into the Handbook.

As identified in Item C above, once the complexity rating system is developed and implemented, it will be utilized to differentiate between plans containing highly technical material, which should be reviewed by MWGED, and those which could be appropriately reviewed in the districts.

As identified in Item E above, guidelines will be incorporated into the updated Impoundment Handbook to ensure that plans submitted for proposed impoundments, that are to be constructed over or near mine workings, will include breakthrough potential evaluations.

The Administrator for CMS&H and the Directors of Technical Support and PEIR will monitor the progress of the committee to ensure timely completion of the project.

Memoranda/Training - Impoundment Program Structure Issues

Issue C-1: Impoundment plans are not reviewed and processed by Technical Support in a timely manner.

Issue C-2: Technical Support's "expedited review process" does not result in timely reviews of impoundment plans.

Issue C-6: Levels of staffing and technical expertise among MSHA's district impoundment specialists are inconsistent.

Issue C-7: There is no national policy for determining which plans/plan revisions should be sent to Technical Support for review and which should be reviewed in the districts.

An action plan for this related group of findings requires several steps in order to effectively address the personnel, workload, and consistency issues identified with the impoundment program. As noted in the internal review report, CMS&H has distributed a memorandum to all District Managers instructing them to evaluate staffing needs related to impoundment work, specifically in regard to plan review capabilities and adequate engineering support for their impoundment groups. Nationally, CMS&H had 15 mining engineers and 8 civil engineers on its impoundment staff in 2002.

The memorandum also outlines which plans should currently be considered for review at the District level. It further describes that a plan complexity rating system will be developed (by the Impoundment Inspection Handbook committee) to better define which plan reviews can be conducted in the Districts, and what plans must be reviewed by Technical Support's Mine Waste and Geotechnical Engineering Division (MWGED). Once the complexity rating system is developed and implemented, it will be utilized to differentiate between plans containing highly technical material, which should be reviewed by MWGED, and those which could be appropriately reviewed in the districts. The intent is to first establish consistency within CMS&H for the review and approval of impoundment plans that are also appropriately assigned to the Districts. Taking the above action should alleviate a portion of the MWGED workload, and also allow for more timely completion of plan reviews.

In order to further ensure timely reviews of impoundment plans, the Administrator for CMS&H and the Director of Technical Support will jointly develop guidance for determining which plans should be "expedited."

In addition, separate guidance will be developed by the Administrator for CMS&H and the Director of Technical Support for streamlined communications between MWGED, the mine operator or his representative and district impoundment departments.

Technical Support will develop defined parameters and roles for the various approval, inspection, and construction site visit responsibilities under the program. Initial and subsequent annual training for all impoundment plan review personnel will be provided by the MWGED. Establishment of a more unified program will also improve communications between the Districts and the MWGED on plan review issues. Additionally, Technical Support will allocate resources to procure state-of-the-art software applications for use by MWGED engineers.

The Administrator for CMS&H and the Director of Technical Support will evaluate the effectiveness of the corrective actions taken above on improving the consistency and timeliness of the overall impoundment plan review process. If further improvements are necessary to meet the set goal for plan review timeliness, Technical Support will review levels of staffing and work with your office to ensure the MWGED has sufficient engineers to accomplish this goal.

General Issues

Issue C-5: MSHA has not addressed eight of the eleven key recommendations contained in the report entitled “Peer Review of U.S. Department of Labor/MSHA – Impoundment Safety Program” prepared by the Association of Dam Safety Officials – April 1998

In response to the memorandum from your office, we and other assigned top staff will work on the committee to evaluate the Peer Review document, and we will determine the feasibility and method of implementation for that report’s recommendations to improve the Agency’s impoundment program. We will keep you apprised of our progress.

Issue C-8: The level of information sharing by the districts with Technical Support concerning sites and plan data is inconsistent.

To improve and standardize the level of information exchange, Technical Support’s Impoundment Plan Approval Database will be made available to District impoundment groups on a secure public drive. It will also be expanded to allow for plan review and approval data input at the District level (i.e. date of plan receipt, date of requests for additional information, date of plan approval). A memorandum has been issued by CMS&H, Technical Support and PEIR, with instructions to update this database in order that the approval process can be accurately tracked in detail by all interested parties.

The Administrator for CMS&H and the Director of Technical Support will review and evaluate the benefits of the established database and report the improvements to the Assistant Secretary.

Issue C-9: There are no guidelines for locating and constructing an impoundment adjacent to or over pre-existing underground mine workings.

Proposed impoundment structures must be examined on a case-by-case basis. However, Technical Support, MNMS&H and CMS&H will issue a memorandum assigning a committee to investigate the development of guidelines for reviewers to use

when evaluating breakthrough potential of an impoundment located adjacent to or over mine workings. Where appropriate, this committee's work will be coordinated with NIOSH for additional research.