FEDERAL MINE SAFETY AND HEALTH REVIEW COMMISSION

OFFICE OF ADMINISTRATIVE LAW JUDGES
601 New Jersey Avenue, N.W., Suite 9500
Washington, D.C. 20001

November 13, 2007

MARTIN COUNTY COAL CORPORATION, Contestant	:	CONTEST PROCEEDINGS
	:	Docket No. KENT 2002-42-R Citation No. 7144401: 10/17/01
v.	:	Docket No. KENT 2002-43-R Citation No. 7144402: 10/17/01
SECRETARY OF LABOR, MINE SAFETY AND HEALTH ADMINISTRATION (MSHA), Respondent	:	Preparation Plant
SECRETARY OF LABOR, MINE SAFETY AND HEALTH ADMINISTRATION (MSHA), Petitioner	:	CIVIL PENALTY PROCEEDING
	:	Docket No. KENT 2002-262 A.C. No. 15-05106-03571
v.	:	Preparation Plant
MARTIN COUNTY COAL CORPORATION, Respondent	:	

DECISION

Appearances: James B. Crawford, Esq., Melissa Bowman, Esq., Office of the Solicitor, U.S. Department of Labor, Arlington, Virginia, on behalf of the Secretary of Labor;
Marco M. Rajkovich, Jr., Esq., Melanie J. Kilpatrick, Esq., Rajkovich, Williams, Kilpatrick & True, PLLC, Lexington, Kentucky, on behalf of Martin County Coal Corporation.

Before: Judge Zielinski

These cases are before me on Notices of Contest and a Petition for Assessment of Civil Penalties filed by the Secretary of Labor ("Secretary"), pursuant to section 105 of the Federal Mine Safety and Health Act of 1977, 30 U.S.C. § 815. The violations at issue here arose out of the Secretary's investigation of the October 11, 2000, slurry spill and breakthrough at Martin

County Coal's ("MCC") Big Branch Slurry Impoundment, near Inez, Kentucky. These violations and several others, including violations alleged against Geo/Environmental Associates, were the subject of a January 14, 2004, Decision by an Administrative Law Judge. *Martin County Coal Corp.*, 26 FMSHRC 35 (Jan. 2004) (ALJ). By Decision dated May 30, 2006, the Review Commission vacated portions of that Decision and remanded the cases. *Martin County Coal Corp.*, 28 FMSHRC 247 (May 30, 2006). With the exception of the two violations at issue here, all other issues involved in the earlier proceedings have been resolved by the ALJ Decision, the Commission Decision, or through settlement. Remaining at issue are Citation No.7144401 and Order No. 7144402, alleging significant and substantial ("S&S") and unwarrantable failure violations of 30 C.F.R. § 77.216(d) for MCC's failure to follow its approved Impoundment Sealing Plan.

Supplemental hearings were held in Pikeville and Louisville, Kentucky on January 16-18 and February 23, 2007.[1] The parties filed briefs after receipt of the transcripts. For the reasons set forth below, I find that the Secretary has not proven the alleged violations, and vacate the citation and order.

<u>Findings of Fact - Conclusions of Law</u>

Background

For a full discussion of the history of the impoundment and related developments, see the Review Commission Decision. Briefly, in May 1994, slurry and water from the impoundment broke through into MCC's adjacent and largely inactive 1-C (Coalburg Seam) mine. Over 100 million gallons of material, mostly water, was discharged and flowed out of the mine at three locations, including the South Mains Portal. MCC hired a geotechnical engineering consulting firm, Ogden Environmental & Energy Services, and submitted plans designed to reduce the potential for future breakthroughs and to enable MCC to use the impoundment for the forseeable future. The Secretary's Mine Safety and Health Administration ("MSHA") approved MCC's Impoundment Sealing Plan ("Plan") on October 20, 1994, after additional information was provided clarifying certain aspects of the Plan.[2]

The Plan called for construction of a "seepage barrier," around the perimeter of the impoundment above the outcrop of the Coalburg Seam, in areas where the 1-C mine workings

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[1] Transcripts of the various hearings are referred to as follows: "Tra." – hearings of June 2003; "Trb." – hearings of August 2003; "Trc." – hearing of January 16, 2007; "Trd." – hearing of January 17, 2007; "Tre." – hearing of January 18, 2007; and "Trf." – hearing of February 23, 2007.

[2] A "Short Term Plan," to allow re-commencement of operations, was submitted in May of 1994. In August 1994, a plan intended to govern future operation of the impoundment was submitted. The plans are referred to collectively as the "Impoundment Sealing Plan."

posed the potential for another breakthrough. The barrier was intended to reduce seepage into the 1-C mine and to provide bulk that would fill and plug any breakthrough that might occur. It was constructed using spoil material generated from surface mining of the Stockton Seam, MCC's 1-S mine, which lay about 100 feet above the Coalburg Seam. That material consisted largely of highly permeable shot sandstone. The Plan contemplated that fine refuse would be deposited on the barrier to decrease its permeability. As actually constructed, the barrier was approximately 40 feet thick, measured horizontally, and extended 1.4 miles along the perimeter of the impoundment. Construction of the seepage barrier was completed in late 1995 or early 1996. The Plan also called for monitoring of outflow at the South Mains Portal of the 1-C mine, and the reporting to MSHA of any unusual changes in flow quality or quantity that would indicate possible impoundment leakage. In February 1996, MCC retained Geo/Environmental Associates ("Geo") to perform weekly impoundment monitoring.

On October 11, 2000, another breakthrough into the 1-C mine occurred. More than 300 million gallons of slurry-laden water rushed out through the mine and into adjacent streams. An extensive investigation was conducted by MSHA. The violations at issue here allege that MCC failed to comply with the Plan in two respects.

<u>Order No. 7144402</u>

Order No. 7144402 was issued on October 17, 2001, in conjunction with the release of MSHA's Report of Investigation of the October 11, 2000, impoundment failure. The Order was issued pursuant to section 104(d)(1) of the Act, and alleges a S&S and unwarrantable failure violation of 30 C.F.R. § 77.216(d), which requires that operators of mines with slurry impoundments implement the design, construction and maintenance of such facilities in accordance with plans approved by the MSHA District Manager. As described in the "Condition or Practice" section of the Order, the violation is based upon MCC's failure to "periodically direct the fine refuse slurry discharge along the 'seepage barrier,'" as required in the Plan. Ex. Jt-4B.

The Order was vacated in the original ALJ decision, upon a finding that the Secretary had failed to establish a prima facie case. The Commission reversed. Two of the three Commissioners that heard the case concluded that, "[b]ased on its plain language, the plan provision requires the operator to place or cause to move fine refuse over the length of the seepage barrier by regularly changing the course of the slurry discharge."[3] 28 FMSHRC at 256. The Commission found that "MCC does not sufficiently comply with the impoundment plan by merely pumping fine slurry into the impoundment without ensuring that the fines have accomplished the stated purpose, which is to adequately cover the seepage barrier 'to reduce, to

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[3] Commission Chairman Duffy also voted to reverse, but found that the Plan's language was ambiguous, and that under Commission precedent, the Secretary was obligated to establish the meaning intended by the parties by presenting credible evidence as to the history and purpose of the provision, or evidence of consistent enforcement. 28 FMSHRC at 273-75.

the extent practical, seepage from the impoundment that could contribute to the occurrence of another breakthrough.'" 28 FMSHRC at 257. It remanded the case for a determination of "whether MCC provided effective coverage of the seepage barrier under the terms of the Impoundment [Sealing] Plan." 28 FMSHRC at 257.

The Plan

As the Commission emphasized, the Plan must be read as a whole. 28 FMSHRC at 256-57. There are several provisions of the Plan that bear on the question of whether MCC provided effective coverage of the seepage barrier. Some were included in MCC's original August 1994 submission, and others were included in its October 5, 1994, letter forwarding revisions in response to concerns that had been raised by MSHA. Pertinent provisions include:

> Following completion of the "seepage barrier" fine refuse shall be directed along the barrier by periodically redirecting the discharge of fine refuse slurry. As fine refuse settles and consolidates along the surface of the "seepage barrier," seepage should be further reduced due to the low permeability of consolidated fine refuse. Also, to further reduce the seepage from the impoundment, the pool level in the impoundment should be maintained as low as possible, thereby, reducing the quantity of clear water in the impoundment and the hydraulic head. As the fine refuse deposit progresses up the slope of the "seepage barrier," the quantity of seepage in the area of the mine workings in the Coalburg seam should progressively reduce. After the impoundment level has increased to a level above the Stockton mine bench, we believe the potential for a "breakthrough" in the future is reduced considerably.

Ex. G-2 at 7, MCC-A1 at 012297.

> The purpose of the "seepage barrier" is twofold. The primary purpose for the barrier will be to reduce, to the extent practical, seepage from the impoundment that could contribute to the occurrence of another "breakthrough." Secondarily, the barrier will provide bulk that will collapse into the subsided area in the event another "breakthrough" occurs and should form a "plug," limiting the amount of fine coal refuse and water entering the mine.

Ex. G-2 at 4, MCC-A1 at 012294.

> The function of the spoil material placed in the seepage barrier is to provide bulk and sealing in the event of a collapse or breakthrough. The primary seepage control is provided by fine refuse deposited in the impoundment against the fill as operations progress. This control reduces the potential for piping of material from the fill into openings and seams. A distinction should be made between flow through a seam and flow through an opening. Water traveling through the barrier

> into seams that intersect with the mine rooms is an expected event. Water traveling through the barrier and openings in the natural ground is only a problem if the flow carries fill material or fines with it into the mine. Over time, this piping action could result in instability of the fill slope. It is intended that any instability resulting from a collapse or breakthrough be "choked off" given the expected gradation of the fill material.

Ex. G-2A.

The Parties' Contentions

The Secretary argues that, because the seepage barrier consisted of highly permeable material, in order to "reduce seepage from the impoundment," a layer of fine refuse, which provided "the primary seepage control," had to be maintained at all times between any water in the impoundment and the barrier.[4] The only way that could have been accomplished was by discharging slurry onto the barrier at various points ("redirecting") to establish a layer of fine refuse *above* the pool level, so that as the pool rose water could not come into direct contact with the barrier. The Secretary maintains that MCC did not provide effective coverage of the seepage barrier because it did not discharge slurry onto the seepage barrier, which allowed water at the top of the pool to come into contact with the barrier, i.e., where there was no primary seepage control device in place. As a result, seepage was not reduced, and the October 2000 piping related failure occurred.

MCC argues that over 99% of the seepage barrier was coated with settled and consolidated fine refuse, thereby reducing seepage "to the extent practical," and that once the pool level "increased to a level above the Stockton mine bench," the seepage barrier would have been encapsulated with fine refuse, and "the potential for a 'breakthrough' in the future [would have been] reduced considerably."[5] It further contends that discharging slurry directly onto the seepage barrier would not have been practical for a number of reasons: 1) it would have contravened established impoundment management practices and Phase III of its impoundment plan, which required that the slurry discharge line be located at the embankment; 2) there was not enough fine refuse to both coat the seepage barrier above the pool level and the embankment; and 3) placement of fine refuse on the seepage barrier above the impoundment level would not have formed an effective barrier to seepage because the fine refuse would have shrunk and cracked as it dried out, and it would have been eroded by rain, wind and wave action.

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4 Quoted material is from the Plan.

5 Quoted material is from the Plan.

Discussion

There is virtually no dispute that MCC redirected the flow of slurry into the impoundment, and that the result was a fairly uniform deposit of settled fines throughout the impoundment, including along the seepage barrier. The slurry discharge pipe was positioned at different locations on the embankment. Trc. 41 (Fredland),[6] Trd. 47 (Betoney),[7] Trd. 363-63 (Bellamy);[8] ex. G-3. The pipe also had a pivot point about eight feet from the end, and was occasionally rotated to change the direction of the slurry discharge. Trd. 435-36 (Muncie)[9]. As MSHA inspector Robert H. Bellamy testified, "[t]here are ways of directing slurry without moving the pipe, and a lot of it will be done naturally." Trb. 640. As fines settle and create a restriction to flow, the flow will change and slurry will be transported elsewhere. "So you can manipulate the slurry placement from the embankment to a certain extent." Trb. 640. Fine refuse could be directed along the seepage barrier "by the natural deposition of the slurry . . . basically what they were doing. And the thing they were doing was they were moving the pipe from side to side of the embankment." Trd. 362-63.

MCC and Geo personnel testified that it was apparent during their inspections of the impoundment, both during its operation and after the breakthrough, that fine refuse was deposited along the seepage barrier. Trb. 477, Trd. 404-06 (Johnson),[10] Trd. 208-09, 225-30 (Ballard),[11] Tra. 1170-73, Trd. 256, 271 (Muncie). Pictures taken shortly after the breakthrough depict a uniform coating of fine refuse along the seepage barrier. Trb. 47 (Ballard); ex. MCC-O.

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[6] John Fredland is a civil engineer employed at MSHA's Pittsburgh Safety and Health Technology Center. From 1980 to 2000, he was in charge of MSHA's Mine Waste and Geotechnical Engineering Division, which was responsible for reviewing impoundment plans.

[7] Theodore P. Betoney, Jr. is a mining engineer employed at MSHA's District 3 impoundment group since 1989.

[8] Robert H. Bellamy is a mining engineer employed by MSHA as an impoundment instructor and inspector since 1987.

[9] Larry Muncie was MCC's preparation plant superintendent. He has over thirty years of experience in dealing with and managing impoundments and has been certified as an impoundment inspector by MSHA.

[10] Robert Johnson is MCC's chief engineer. He has been involved in mining engineering in various capacities, generally supervisory, since 1982.

[11] Scott Ballard is Geo's senior project manager on MCC impoundment work. He was the chief author of the Plan. He is a registered civil engineer specializing in water resource engineering, a certified impoundment instructor, and has been involved in the design of impoundments since 1985.

By October 2000, consolidated fine refuse in the impoundment pool extended 85-90 feet above the Coalburg seam. Trc. 129 (Fredland). MCC's expert, Christopher Lewis, testified that as slurry was distributed throughout the impoundment, the layer of settled fine refuse rose progressively, created a plug in the bottom of the impoundment and covered over 99% of the seepage barrier, and progressively reduced seepage into the 1-C mine.[12] Tre. 20-21, 42 (Lewis).

MSHA's witnesses agreed that fine refuse had been deposited along the length of the seepage barrier, but not up to the top of the pool level, and that water at the top of the pool had been in direct contact with the seepage barrier. Tra. 555 (Betoney); Tra. 963 (Owens).[13] The Secretary's expert, Richard G. Almes, agreed that the traditional method of pumping fines into the impoundment would result in a layer of fines all over the impoundment, but that there would be water against the seepage barrier.[14] Trb. 312-13. Approximately one month after the breakthrough, Owens attempted to ascertain how much water had been in contact with the barrier by measuring the vertical distance between what appeared to be a "high water mark" and the top of the fine refuse cake. Using a ruler and a level, he determined that there had been 22 inches of relatively clear water above the settled refuse. Trc. 258-59. He roughly calculated, using a three-to-one slope, that about six feet of the barrier had been in contact with water, which amounted to .42 of an acre. Trc. 260-61.

MCC disputes Owen's finding. Muncie testified that he was at the impoundment the day before the breakthrough and there was "no chance" that there was two feet of water above the fines cake. Trd. 268-69. MCC's engineering department conducted regular surveys of the impoundment pool level. A comparison of the October 9, 2000, survey of the pool level with a December 2002 survey of the level of the top of the fines cake showed that the level of the settled fine refuse was one inch below the surface of the pool two days before the breakthrough.[15]

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[12] Christopher J. Lewis is Principal Engineer at D'Appolonia Engineering Division of Ground Technology, Inc. He has extensive experience in the design of coal slurry impoundments that are in proximity to underground mine workings and, at the time of his most recent testimony, was involved in updating and re-writing MSHA's design manual for coal refuse disposal facilities. Ex. MCC-AAA.

[13] Harold L. Owens testified as a supervisory civil engineer with twenty-five years of experience as head of MSHA's District 4 impoundment group.

[14] Richard G. Almes testified, originally, as Chairman and Principal Engineer of Almes & Associates, Inc., Consulting Engineers. He has extensive experience in the design of coal slurry impoundments, and is a technical reviewer for the re-writing of MSHA's design manual for coal refuse disposal facilities. Ex. G-13.

[15] MSHA checked MCC's regularly conducted surveys during the investigation and determined that they were accurate. Tra. 778. As Owens stated, MSHA had "no reason to doubt the accuracy of MCC's survey data." Trc. 380.

Trb. 476, 481-83, 497 (Johnson); ex. MCC-BB, MCC-O. Bellamy, who normally inspected the impoundment for MSHA, testified that the fines cake was close to the top of the water during his inspections, and that there was slurry in different consistencies above the fines cake and against the seepage barrier. Trd. 371-73. He also testified that it would have been a problem if .42 of an acre of the seepage barrier had been in contact with water, but that he never found such conditions. Trd. 377-78. He was also "pretty well satisfied" with the water levels MCC maintained in the impoundment, "as far as them pumping out what they could."[16] Trd. 341.

It is doubtful that there was nearly two feet of clarified water in contact with the seepage barrier, certainly not for any appreciable length of time. The difficulty of ascertaining a high water mark, independent of wave action, one month after the breakthrough brings into question Owens' measurements.[17] Nevertheless, there would have been some amount of water in contact with the seepage barrier. Experts testified, and common sense dictates, that the upper surface of the slurry mixture, as it rose along the seepage barrier at the back of the impoundment, would be almost entirely water. The slurry being pumped into the impoundment consisted of approximately 20% solids. The coarser particles settled out first, helping to form a delta against the embankment. Tra. 964. Coarser particles would continue to progressively settle as the natural flow of the slurry traveled the 2,500 or so feet to the rear of the impoundment. The slurry reaching the back bank would have contained a relatively small percentage of solids, the finest particles, which according to the experts, would stay in suspension for a long time. Tra. 110, Trc. 38 (Fredland), Tra. 561 (Betoney), Trc. 113 (Lewis), Trb. 500, 509 (Johnson). Johnson agreed that there would be some water against the seepage barrier, that would have some fines in it. Trd. 418. Muncie indicated that there was a high water mark above the fines level. Trd. 272.

The Secretary's witnesses testified that in order to provide effective coverage of the seepage barrier, a layer of fine refuse had to be maintained between the seepage barrier and any water in the impoundment. Trc. 33-35, 42, 139; Tra. 46, 53 (Fredland); Tre. 199-201; Tra. 894 (Owens). The seepage barrier was composed of shot-rock, relatively course material, that is highly permeable. As Betoney explained, it was not a barrier to seepage, but more of a seepage drain. Trd. 38, Tra. 486. Water contacting the seepage barrier, saturated it, and transmitted the hydrostatic pressure created by the impoundment to the natural soil cover over the 1-C mine.[18]

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[16] As noted above, the Plan required that the pool level be maintained as low as possible. This was accomplished by pumping water from the surface of the impoundment back to the preparation plant.

[17] Owens also relied on the fact that the decant pump's intake was almost two feet below the water mark on its floatation pontoons. Trc. 360. However, the pump creates a depression in the settled fines, such that the depth of water at the pump's location would typically be greater than in surrounding areas. Trb. 501-02, 511-12 (Johnson).

[18] MSHA used a computer program, "seep-w," to perform a seepage analysis. It showed that, with two feet of water in direct contact with the top of the barrier, the hydrostatic pressure at

MSHA concluded that with water in contact with the barrier, seepage into the 1-C mine was not significantly restricted, nor was the potential for piping.

Several witnesses testified that the only way to maintain a layer of fine refuse between impoundment water and the seepage barrier would have been to discharge slurry onto the seepage barrier at various points, such that a layer of fine refuse was created *above* the impoundment pool level – so that as the pool level rose water would not have any direct contact with the seepage barrier. Trc. 43, 142-44, Tra. 201-02, 210 (Fredland); Trd. 40 (Betoney); Trd. 103, 150-53, Trb. 308, 322, 452-53 (Almes).

As the Secretary's witnesses described the process, slurry would have to be discharged onto the seepage barrier at various points along its entire length. The discharge point would be kept in one location until a delta of settled fines developed.[19] The slurry would flow "from the top down" into the pool, where it would settle out and form a base, from which a delta would build back up the slope to the discharge point. Tra. 201-02, Trc. 139-46, 334-36 (Owens). The fines delta would be built up to about ten feet (vertical distance) above the pool level, or approximately 35 feet along the slope of the barrier from the pool.[20] The discharge point would then be moved to an adjacent location, and another delta would be deposited, abutting the first

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the level of the 1-C mine would have been four times higher than if a three foot thick layer of settled and consolidated fine refuse had been between the water and the barrier. Trc. 166-76 (Owens). There is no evidence of how the difference in computer-modeled pressures would have varied if only a few inches of water were in contact with the barrier, which most likely was the case. There is also no explanation of whether or how this analysis reflected the fact that the seepage barrier did not extend down to the level of the Coalburg seam outcrop. When the seepage barrier was constructed in the area of the breakthrough, there was slurry and settled fines approximately 40 feet above the floor of the Coalburg seam. The seepage barrier material settled into that fine refuse to some extent. But there would have been a thick coating of fine refuse against the natural soil surface for as much as twenty or more feet, measured vertically, above the Coalburg seam. Ex. G-1, at 16, fig. 29, fig. 31.

[19] MSHA's Coal Impoundment Inspection Procedures Handbook warns that slurry must be discharged into the pool, not on the embankment, because erosion could substantially weaken the structure. Tra. 173-74 (Fredland); ex. MCC-U. Muncie also explained that slurry must be discharged into the pool, not on the embankment, because of concerns about erosion. Trd. 304. It is doubtful that erosion would have "weakened" the seepage barrier. But the effects of erosion were apparently not addressed in the Secretary's analysis.

[20] In calculating the surface area of the seepage barrier that would have been in contact with water, Owens figured that 22 inches of water would have covered a horizontal distance of about six feet, a ratio of slightly over 3-to-1. Trc. 260. To coat the barrier, the intersection point of the adjoining deltas would have had to have been ten vertical feet above the pool level, and the discharge point would had to have been some distance above that.

one. The discharge point would then be progressively moved around the 1.4-mile seepage barrier, until the entire length of the barrier had a coating of settled and consolidated fine refuse extending above the pool level. Trc. 255, 319-20, 330-31, Tra. 964, 1096 (Owens); Tra. 488, Trd. 40 (Betoney); Trd. 103, 150-53, Trb. 308, 452-53 (Almes); Trc. 43, 142-44, Tra. 201-02, 210 (Fredland). This process would be repeated as the pool level rose, until the entire barrier had been coated.

Estimates of the time required to apply one 10-foot high coating of refuse varied. Betoney believed it would take "somewhere over a year, a year or two years max." Tra. 488. Owens estimated one year. Trc. 255, Tra. 1096. The estimates were very rough. As Owens explained, the only way to determine the spacing and number of discharge points would have been to "do a couple of them . . . to see how it spread and how far apart they'd have to be to get coverage." Trc. 330-31. His estimate was based on a rough calculation of how long it would take to accumulate a sufficient volume of fines to coat the entire length of the barrier to a vertical height of ten feet above the pool level, assuming the slurry was 30% solids.[21] Trc. 319. There are a number of unknowns about the calculation. Owens did not specify a thickness for the fines layer. He first described a six-foot average thickness. Trc. 319. However, he then indicated that the fines layer would have to have a minimum thickness of one-to-two feet, which he conceded was a "little arbitrary [because a]s far as I know there was never any definitive analysis made to set the required dimension of the thickness of the fines."[22] Trc. 322. Also unknown is what assumption, if any, was made as to the percentage of available solids that would be deposited, as opposed to those remaining suspended and flowing out into the impoundment pool. Lewis opined that it would be impossible to establish and maintain a coating of fine refuse above the pool level, in part because there was a high percentage of very fine particles in MCC's slurry, and they would stay in suspension for lengthy periods of time. Tre. 43-44.

MCC's arguments as to the impracticality of the Secretary's position have considerable persuasive value. There is no dispute that, in general, the most critical element of maintaining an impoundment is to assure that the man-made portion, the dam or embankment, retains its structural integrity. To that end, generally accepted engineering principles required that slurry refuse be discharged at the embankment, so as to build and maintain a coating or delta of refuse. Trc. 254 (Owens). A Department of Interior Engineering and Design Manual for Coal Refuse Disposal Facilities describes discharging slurry at the upper end of an impoundment as being "incorrect." Ex. MCC-T. MSHA's Coal Impoundment Inspection Procedures Handbook also discourages depositing slurry at locations other than the embankment. Ex. MCC-U. MCC's plan

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[21] The 30% solids assumption is open to question. Betoney first testified that slurry discharges were typically 10-15% solids (Tra. 559), and later estimated that they were 15-20% solids (Trd. 28-29). Muncie also offered two estimates. Tra. 1140 (25-35% solids), Trd. 310 (10-20% solids).

[22] Almes testified that a minimum of three feet of consolidated and settled fines would have been necessary, based upon a previous design of a slurry trench cut-off. Trd. 136-37.

for Phase III of the impoundment, which was approved by MSHA in 1998, specifies that slurry discharge should be at the embankment. Ex. MCC A-2; Trd. 343 (Bellamy), Tra. 155-56 (Fredland).

MSHA's witnesses testified that there was enough fine refuse being pumped into the impoundment to both coat the seepage barrier above the pool level and protect the embankment. Trc. 255 (Owens), Trc. 71 (Fredland). However, that testimony is not convincing. As previously noted, there are many uncertainties surrounding MSHA's estimate that it would take about one year to coat the barrier to a vertical height of ten feet. Assuming that that estimate is accurate, it is doubtful that slurry could also have been directed at the embankment. The pool level rose about ten feet each year. Trb. 445 (Almes). Consequently, by the time a 10-foot high band of fine refuse had been established over the length of the barrier, the pool level would have risen to the top of the ten-foot fine refuse deposit at the first slurry discharge positions.[23] The process would then have to have been immediately repeated. If not, water would come into contact with the seepage barrier as it rose above the band of fine refuse coating. Trd. 197-99 (Ballard).

MCC's witnesses also challenged the feasibility MSHA's proposed establishment of a fines layer above the pool level. Ballard testified that even though the slurry discharge pipe was kept on the embankment, there were times when the pool level was higher than the fines delta, which was normal for most impoundments. Trd. 196-97. Owens confirmed that MCC's impoundment inspection reports, at times, indicated that the pool level was above the delta. Trc. 285-86. Ballard strongly questioned how a fine refuse deposit could be maintained above the pool level around the 1.4 mile seepage barrier, when it couldn't be maintained at the embankment, which was a fraction of the length of the barrier. Trd. 197. Moving the slurry discharge around the impoundment would also have created other problems, principally interfering with the ability to recycle water by pumping it back to the plant. Muncie testified that moving the discharge point around the seepage barrier would create agitation and prevent pumping of clean water back to the plant. Trd. 272. Owens opined that by moving the pump around the middle of the pool, pumping of clean water could be done. Trc. 267-68. Bellamy testified that with slurry being discharged around the seepage barrier water could not be pumped from the back of the impoundment, but if the pump was moved to the middle of the impoundment, water could be pumped, although it would have been harder to do. Trd. 345-48.

In addition, it is highly questionable that a coating of fine refuse above the pool level would have had the desired result of decreasing the permeability of the barrier. MCC presented evidence that if fine refuse, saturated with water, had been placed above the pool level, it would

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[23] Owens did not claim that his estimate was based upon depositing slurry on the embankment as well as on the seepage barrier during the one-year period. It is unlikely that it was, because a high priority was placed on coating the seepage barrier which, in the Secretary's opinion, was not functional unless and until it was coated with fine refuse. Fredland testified that there would be a "period of risk" until the entire seepage barrier could be coated. Trc. 122-24.

have dried out and cracked, rendering it ineffective as a barrier to seepage. A picture of the fine refuse deposit in the impoundment, taken in September 2002 shows persistent cracking. Ex. MCC-Z; Trd. 431 (Johnson), Tra. 950-51 (Owens), Tre. 27 (Lewis). As Lewis explained, "as [the fines cake] dries, it tends to lose moisture and shrink, reduce in volume." Tre. 27. Geo's expert, Donald J. Hagerty, professor of civil engineering at the University of Louisville, was more descriptive.[24] "If you deposit this material [fines saturated with water] above the water level on the sides of the impoundment, it's going to dry up . . . . Inevitably it cracks. So as soon as . . . the water drains down into the coarser materials around the impoundment, the water leaves the slurry, the fines that are left behind don't occupy nearly as much volume, there's shrinkage and cracking." Trf. 37. "That 70 years of experience we've had with dams and impoundments and piping problems, that pretty much says that if you try to stop a seepage problem by making a barrier, the barrier has to be virtually perfect for it to really work." Trf. 65. "If you have a moisture content of 80 percent, when it dries out it shrinks and cracks, the same thing that happens to the bottom of a farm pond. When it dries up, the mud cracks because of shrinkage. Same mechanism." Trf. 71. "I think as long as we had these fines deposited in a cake or layer that had cracks in it, the cracks make any notion of a barrier simply nonsense." Trf. 70.

I find this evidence persuasive. The photograph confirms that the fines cake shrank and cracked as it dried out. While the picture was taken two years after the breakthrough, it seems likely that significant drying would have occurred within days or weeks of creation of the fines layer, certainly well within one year. I also accept Hagerty's opinion that a barrier has to be virtually perfect in order to restrict seepage, and that a dry, cracked fines layer would not be a virtually perfect barrier. While the dried-out fines cake may have been restored somewhat as it became re-saturated, as Lewis noted, there is no direct evidence rebutting Hagerty's opinion that it would not have performed effectively as a barrier to seepage.[25]

I find that MCC effectively covered the seepage barrier with fine refuse under the terms of the Plan. I accept the testimony of the Secretary's witnesses to the effect that, in the absence of a coating of fine refuse above the pool level, there would not have been a major reduction in overall seepage. However, that condition would have ended when the pool level rose above the Stockton bench, at which time the seepage barrier would have been completely coated and, as the Plan stated, there would have been a "considerable reduction" in seepage and the potential for a breakthrough. As the pool level rose, and the layer of fine refuse covered a greater area and became thicker, reducing seepage through the bottom of the impoundment. The uniform deposit of fine refuse in the impoundment created a "plug" that effectively restricted seepage in all areas

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[24] Donald J. Hagerty has a Phd. in geotechnical engineering and has taught engineering for more than thirty-four years. He was accepted as an expert in piping. Trb. 940; ex. Geo-15.

[25] Owens mentioned that MCC's was the second impoundment that required the seepage barrier to be coated with slurry. Trc. 333. The other facility was not identified and there is no further mention of it, no explanation of how the coating was applied, or any other information that might have been responsive to questions raised by MCC.

of the pool, including 99% of the seepage barrier. In testifying on Citation No. 7144401, Owens and Fredland agreed that the thickening layer of settled fines did reduce seepage. *See* n. 35, *infra*. It was only the few inches (measured vertically) of the seepage barrier nearest the top of the pool that were not coated with refuse. While this small area permitted seepage, it would have been highly impractical to have further reduced it in the "only way" it could have been done, i.e., to have established a layer of fine refuse above the pool level, as the Secretary's witnesses described.

The Secretary argues that impracticality of complying with a mandatory standard or plan provision is not a defense to non-compliance. Sec'y Br. at 16-17. While this may be an accurate statement of law, MCC does not advance impracticality as a justification for non-compliance. Here, the phrase "to the extent practical" is actually part of MCC's Plan. Consequently, consideration of practicalities must be included in determining whether MCC provided effective coverage of the seepage barrier.

The Secretary also argues that expectations about reaching the Stockton bench should not have diminished MCC's efforts to comply with the primary purpose of the Plan in the intervening years, i.e., to reduce seepage into the 1-C mine. Sec'y Br. at 8. She also argues that, since a significant reduction in breakthrough potential was not anticipated until then, MCC should have been especially careful to assure maintenance of fines coverage on the barrier.[26]

The Secretary's argument seems to bifurcate the various provisions of the Plan, and does not address how the subject sentence[27] affects the reading of the Plan. What must be determined is the significance of this language in deciding whether MCC effectively covered the seepage barrier under the terms of the Plan as a whole. As Ballard explained, MCC's approach to distribution of fine refuse over the seepage barrier appears to be consistent with virtually all of the provisions of the Plan, including the subject sentence. On the other hand, the Secretary's position appears inconsistent with the sentence. If effective coverage meant, as she contends, depositing a layer of fine refuse above the pool level such that water in the impoundment was never in contact with the seepage barrier, then the barrier would always have been completely

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[26] The Secretary closed the argument by stating: "Therefore, once the impoundment pool rises to the Stockton seam, it would be above the areas most vulnerable to breakthrough potential for, by then, fine refuse would cover the complete barrier if effectively distributed." Sec'y. Br. at 8. The closing sentence is difficult to understand, and appears to be largely consistent with Ballard's point. The only areas susceptible to breakthrough were the entries closest to the outcrop of the 1-C mine. As explained in MSHA's Report of Investigation, that outcrop was at an elevation of 960 feet. The pool had risen above that level well before the 1994 breakthrough, when it was at an elevation of 992 feet, and it remained above the Coalburg seam level after the breakthrough. Ex. G-1.

[27] "After the impoundment level has increased to a level above the Stockton mine bench, we believe the potential for a 'breakthrough' in the future is reduced considerably." Ex. G-2 at 7.

encapsulated as to any water in the impoundment, and no additional protection would have been realized when the pool level rose above the Stockton bench.

It also strikes me that MCC's position is more consistent with other provisions of the Plan, i.e., "The primary seepage control is provided by *fine refuse deposited in the impoundment against the fill as operations progress*. . . . As fine refuse *settles* and consolidates along the surface of the seepage barrier . . . . As the fine refuse deposit *progresses up the slope* of the seepage barrier . . . ." While the Secretary's position can also be viewed as consistent with these provisions, I find such constructions considerably more strained than when compared to what MCC was doing to comply with the Plan.

I found Ballard's testimony, as principle author of the Plan, particularly informative. He explained MCC's compliance with the Plan as follows:

> [A]n impoundment fills up with slurry as it comes up, okay. So what I'm discussing here is, okay, you've got the barrier. And the fact that the bulk material was put there reduces seepage to some degree. It's called a seepage barrier. Then the fine refuse will progressively come up as you pump fines in there. That's what the word progressively means as the operations continue. As those progressively come up, you're gradually reducing the seepage because fine refuse is a smaller part[icle] and will have a lower permeability. And what I meant here by the last statement after impoundment level increases to a level above the Stockton [seam], once that fine refuse [in the] impoundment got above the Stockton level, then the entire barrier is encapsulated by the fine refuse. And at that point, that's what the statement means, that once it's reached that point, we believe the potential [for a] breakthrough [in the] future is reduced considerably, but that's after it's totally encapsulated.

Trd. 194-96.

I find that, reading the Plan as a whole, MCC effectively covered the seepage barrier with fine refuse.[28]

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[28] While I am constrained by the Commission's remand as to Order No. 7144402, the determination of whether MCC provided effective coverage of the seepage barrier under the terms of the Plan involves interpreting various related, and not entirely consistent, provisions of what appears to me and to some witnesses to be an ambiguous Plan. Were I deciding these issues in the first instance, I would have found the Plan to be ambiguous, and followed the established Commission precedent cited by the Chairman. The difference of opinion over the proper approach to resolving plan ambiguities seems to have been resolved. *See Jim Walter Resources Inc.*, 29 FMSHRC 579, n. 8 at 589 (Aug. 1996). I would have concluded that the Secretary failed to establish her intended meaning by presenting credible evidence as to the history and purpose of the provisions, or evidence of consistent enforcement. It is apparent that

Citation No. 7144401

Citation No. 7144401 also was issued on October 17, 2001, pursuant to section 104(d)(1) of the Act, and alleges an S&S and unwarrantable failure violation of 30 C.F.R. § 77.216(d). As described in the "Condition or Practice" section of the Citation, the violation is based upon MCC's failure to "immediately report to the MSHA District Manager any unusual change in flow quantity or quality from the South Mains Portal that would indicate possible impoundment leakage," as required by the Plan. Ex. Jt-4A. The Order was upheld in the original ALJ decision, but the Commission vacated that portion of the decision because the conclusion that the Plan had been violated was not adequately supported. 28 FMSHRC at 259-63.

The South Mains entry was the primary exit point for water and slurry released during the 1994 breakthrough. For that reason, monitoring of the flow from the South Mains entry was included in the May 1994, or Short Term Plan, which provided:

> Flow from the South Mains entry will be monitored daily, until remedial work at the seepage point is completed. Monitoring will be done during regular impoundment inspections after 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. All necessary remedial measures will be implemented.

MCC Ex. A1, App. 1. MCC challenged whether the monitoring requirement continued in effect. However, its argument was rejected in the original ALJ decision, and the Commission agreed, holding that the "requirement to monitor the South Mains and to report any unusual changes in flow quality or quantity that would indicate possible impoundment leakage to MSHA was part of the permanent Impoundment Sealing Plan." 28 FMSHRC at 261.

The flow from the South Mains Portal of the mine was a few inches deep and ran through a rocky shallow ditch into a sediment control pond located near the portal. Trd. 305 (Muncie). That pond, which was designated Pond 200, and several others at the mine site, were covered by a permit issued by the Kentucky Pollutant Discharge Elimination System ("KPDES"). A corrugated steel pipe, 18 inches in diameter, set at a slightly descending angle, drained the pond once its surface rose above a certain level. Ex. MCC-W. MCC retained Geo to conduct weekly

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no one who was involved in writing the Plan, implementing it, or monitoring its implementation, including experienced engineers and plant operators at MCC and Ogden/Geo, and numerous MSHA inspectors, interpreted the Plan as the Secretary now urges. Her interpretation represents a radical departure from well-established impoundment management practices which, even in hindsight, are only hinted at in the Plan.

"regular impoundment inspections."[29] The South Mains outflow was monitored, indirectly, by observation and measurement of the outflow from Pond 200.[30] The measurement taken was the depth of flow at the intake end of the drainage pipe, measured in inches from the bottom of the pipe opening. The clarity of the outflow, the depth measurement, and several other readings and observations made during the inspections, were recorded on "Refuse Impoundment Site Visit" forms.[31] Ex. G-6, MCC-G. Once completed, the form was delivered to the preparation plant, where the plant superintendent or a foreman in charge would sign it. Copies were given to MCC's engineering office, and to the Geo project manager. Pond 200 was also subject to KPDES monitoring and reporting requirements. MCC retained Blackburn Contracting to perform that function. Blackburn inspected the pond twice a month, measured or estimated the quantity of outflow at the discharge end of the pipe and collected samples for further analysis, including the amount of suspended solids. Blackburn's inspection results were reported on a monthly basis, and were forwarded to KPDES quarterly. Trd. 383 (Johnson); ex. MCC-L.

The Parties' Positions

The Secretary contends that the impoundment site visit reports show that there was a sustained doubling of the outflow from Pond 200 in September 1999, which occurred during a period of drought, that there was no other explanation for the increase other than possible impoundment leakage, and that it was an unusual change in flow quantity that indicated possible impoundment leakage that was required to be reported under the Plan. MCC contends that the

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[29] As recognized in the Plan, MCC was obligated to conduct regular impoundment inspections. Under the Secretary's regulations, operators must examine impoundments at least every seven days for "appearances of structural weakness and other hazardous conditions," and must "immediately" notify MSHA's District Manager whenever a "potentially hazardous condition develops." 30 C.F.R. § 77.216-3(a) and (b).

[30] Seepage from the impoundment was one of three components of the Pond 200 outflow. The others were surface drainage from ten acres surrounding the pond, and ground water that had infiltrated the 1-C mine, which joined with the impoundment seepage and flowed out of the South Mains entry. A substantial portion of the 1-C mine was not under the impoundment and there was a lot of natural drainage into the mine, all of which flowed out the South Mains entry. Tra. 605-07 (Betoney); Trc. 99 (Fredland). It was impossible to determine what portion of the South Mains entry outflow, or what portion of the Pond 200 outflow, was seepage from the impoundment. Tra. 1001, Trb. 1004-05 (Owens); Trc. 180 (Fredland).

[31] Impoundment monitoring included measurements of the pool surface elevation and the elevation of deposited fines; estimates of flow volume at various drains, seeps and other openings; readings of piezometers located in the dam; and visual observations of the slopes, pool, and other aspects of the impoundment to check for sloughing, bulging, erosion, and surface disturbances, such as swirls, that might indicate leakage or some other problem. Trb. 93 (Ballard); ex. MCC-G.

Secretary's arguments are based upon misleading averages of flow data, that the Pond 200 outflow quantity was well within the range of flows that would have been expected for the impoundment as the pool level rose, and that the fluctuation in flow was not indicative of possible impoundment leakage because it was not substantially dissimilar to prior fluctuations and there were no other indications of possible leakage.

The Secretary's "Averages" Argument

The Secretary's argument on this alleged violation is based primarily on a chart included in the Report of Investigation, Figure 38 ("Fig. 38"). Ex. G-1, fig. 38. The chart covers the period from mid-1994 through October 2000, and shows the Pond 200 outflow depths, the impoundment pool level, and monthly averages of rainfall in the general area.[32] Also displayed are two average flow depths, represented by horizontal lines. One represents the average flow for the period from August 1994 to September 1999, which was 5.5 inches. The other represents the average flow for the period from September 1999 to October 2000, which was 8.6 inches. Virtually all of the Secretary's arguments on outflow quantity changes are based on comparisons of the average flows displayed on Fig. 38, and the claim that the average flow increased by 56%, which represents at least a doubling of flow volume. Sec'y Br. at 30, 33; Reply Br. at 17, 18, 20. As stated in the Report of Investigation, "[d]uring this period [September 1999 to October 11, 2000] . . . the average flow rate from the South Main Portal more than doubled." Ex. G-1 at 32.

MCC argues that such comparisons are misleading, because natural seepage from the impoundment increased significantly as the pool level rose. Consequently, any comparison of late 1999-2000 flows with the average of flows for the five years preceding September 1999 would be expected to show a significant increase, even if there was no problem at all with impoundment leakage.

The issue was explained by Barry K. Thacker, Geo's president and principal engineer, who had over thirty years of experience in the design of coal slurry impoundments and is a nationally recognized expert in the field. Trb. 685-91. Thacker described a principle known as "Darcy's law," which is referenced in MSHA impoundment design materials, and dictates that seepage from an impoundment will increase naturally as the impoundment pool level rises. The theoretical relationship is discussed in a report he prepared on the breakthrough. Ex. Geo-13 at 6-9. He also prepared a chart, using the Pond 200 flow depicted on Fig. 38, and extended the

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[32] Fig. 38 shows monthly averages of rainfall recorded at the National Oceanic & Atmospheric Association's National Weather Service station, located at Jackson, Kentucky, for the period from mid-1994 through the October 2000 breakthrough. Owens plotted monthly averages to show a general rainfall pattern in the area, because he was unable to correlate the outflow with available rainfall data. Tra. 1044-47, Trb. 1008 (Owens).

time line back to 1991, when the pool level was just below the Coalburg Seam.[33] Ex. Geo-14. At that point, the seepage from the impoundment into the 1-C mine had to be zero, which he called a critical data point, because it was the only time that the amount of impoundment seepage into the 1-C mine was known for certain. Trb. 699-700. He then observed that the low points of the South Mains flow diagram coincided with a straight line that rose from zero flow in 1991 to 6-inches of flow in October 2000, which, he opined, was the relationship that Darcy's law predicted. Trb. 701-02. He also testified that the 6-inch increase in depth of flow, as the impoundment pool elevation rose nearly 100 feet over nine years, was the type of increase that he had seen at other similar facilities with comparable increases in impoundment pool elevations. Trb. 696-97, 702. He attributed the component of flow represented by the straight line to expected increases in impoundment seepage, and opined that the fluctuations above that line do not indicate unusual changes in flow.

Thacker's analysis convincingly undercuts the Secretary's comparisons of average outflow depths.[34] The Secretary's witnesses generally agreed with the proposition that seepage into the 1-C mine would have increased as the impoundment level rose. Tra. 608 (Betoney); Trc. 184, 235-38, Tra. 123, 228-29 (Fredland); Trc. 296-97, Tra. 971, 1006 (Owens).[35] The proposition also appears to be reasonable. As the pool level rose, the surface area of the impoundment increased, more ground surface was exposed to water and saturated fine refuse, and increasing hydrostatic pressure forced more water through the various layers of shot rock, soil, sandstone and coal, all of which had some degree of permeability. Water flow would also have increased through any faults or defects in those layers, e.g., hillseams or joints in sandstone or cleats in coal deposits. Trc. 100 (Fredland).

It seems obvious, then, that comparisons of outflows in the late 1999 – 2000 time frame with an average of the previous five years' measurements would yield skewed results, i.e.,

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[33] Thacker's charts were originally displayed with an overhead projector during his testimony. Geo submitted paper copies as an exhibit. Ex. Geo-14.

[34] Thacker's analysis does have at least one miner flaw, i.e., the assessment of zero flow in 1991. The outflow through the drainage pipe in Pond 200 had two other components beside impoundment seepage. While it is likely that surface runoff into the pond would have produced negligible flow, groundwater infiltration into the 1-C mine, which drained out the South Mains entry into Pond 200, would not have been at a zero level at any relevant time.

[35] Owens and Fredland questioned whether the effect would be limited, i.e., seepage would be reduced, due to the increasing thickness of the layer of settled fine refuse. Tra. 1006 (Owens), Trc. 237-38 (Fredland). It should be noted, however, that in the discussion of Order No. 7144402, "I accept[ed] the testimony of the Secretary's witnesses [including Owens and Fredland], to the effect that in the absence of a coating of fine refuse above the pool level there would not have been a major reduction in seepage." *supra*, at 12.

erroneously excessive increases.[36] Tre. 51 (Lewis). I have little difficulty in rejecting arguments that are based on comparisons to the 1994-99 average flow.

The Importance of Outflow Quality

The Plan called for monitoring of the South Mains entry outflow and the reporting of any unusual changes in quality or quantity that would indicate possible impoundment leakage. MCC viewed outflow water quality as a more important indicator of leakage because it was a bright line test, i.e., any discoloration or "black water" would be an unmistakable sign of impoundment leakage. It viewed changes in quantity as less reliable indicators of leakage because there was considerable uncertainty as to the influence of the impoundment on the quantity of flow. Tre. 133, 137 (Lewis); Trd. 180-83, 212, Trb. 69, 77, 193 (Ballard); Trf. 51-52, 62, 80 (Hagerty). The Secretary's expert agreed that discoloration would mean that fines were being picked up somewhere and that quantity changes called for a more subjective evaluation. Trb. 330, 394 (Almes).

Outflow quantity took precedence for MSHA's investigators. While the Secretary's "piping" theory of failure is predicated upon particles being eroded by water leaking into the 1-C mine, MSHA's witnesses testified that, because water from the impoundment would have had to flow some 4,000 feet through the mine before reaching the South Mains portal, and elevation changes in the mine workings created pools, solids eroded by the piping/leaking process would have settled out before reaching Pond 200. Tra. 603 (Betoney); Trc. 78-79, 109, 114, Tra. 130 (Fredland); Trc. 301-04, Tra. 1101 (Owens).

However, as MCC's expert pointed out, the mere fact that elevation variations were reflected on mine maps did not mean that there was significant pooling of drainage within the mine because it is likely that those depressions would have been filled with material during the 1994 breakthrough. Tre. 177 (Lewis). Betoney agreed that there was a "lot of material in the mine" from the 94 breakthrough. Tra. 602-03. As Ballard stated, "I don't know the storage capacity of the mine and I don't think anyone can quantify it." Trd. 212. Lewis believed that if piping had been occurring, suspended solids, or slurry, would definitely have been visible in the South Mains flow. Tre. 133, Trb. 818-19. Ballard believed that suspended solids from any significant piping would not have settled out, and would have been present in the Pond 200 outflow. Trd. 212. Hagerty also believed that if leakage had been occurring "something should have been seen at South Mains." Trf. 54. Johnston believed that if piping had been occurring, that significant quantities of suspended solids would have been detected in the highly accurate testing done on the KPDES samples. Trb. 471. Bellamy, MSHA's impoundment inspector, also believed that if there had been leakage from the impoundment, he would have seen fines or

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[36] The Secretary acknowledged in her Brief that a gradual increase in flow was expected as the level of the impoundment rose. Sec'y Br. at 30. However, it is not apparent that she took such increases into account in assessing the flow diagram, and continues to urge comparisons to the 1994-99 average flow.

suspended solids in the Pond 200 outflow. Trb. 609.

I find that, while some settlement would have occurred as water from the impoundment flowed through the 1-C mine, it is highly unlikely that all, or virtually all, of the suspended solids resulting from impoundment leakage or piping would have settled out before the flow reached and exited Pond 200. Consequently, the quality of the Pond 200 outflow was an important factor in assessing whether any change in outflow quantity indicated possible impoundment leakage.

Rainfall – Drought

Pond 200 outflow was definitely influenced by rainfall. Tra. 796, 811 (Owens); Tra. 123 (Fredland); Tra. 603-05 (Betoney). Rainfall at the site added water to the impoundment pool, potentially increasing seepage, and could produce surface run-off into Pond 200 from its 10-acre drainage area. Rainfall at the site and, possibly, in a wider area, percolated into the ground and increased ground water infiltration into the 1-C mine. Owens attempted to correlate Pond 200 outflow with rainfall. His efforts were frustrated because there was no rain gauge at the impoundment site, and the flow depth measurements had been taken only every seven days. He plotted rainfall data from five sites in the general area. Ex. G-6B. However, despite preparation of numerous spreadsheets, he was unable to correlate Pond 200 outflow with rainfall. Trc. 373-76.

Referencing Owens' testimony, the Secretary argues that the period from "July to September" was the driest such period on record. Trc. 278; Sec'y Br. at 33; Reply. Br. at 18. However, Owens was relying upon an American Meteorological Society paper discussing state-wide conditions. Trc. 278, Tra. 812; ex. G-6C. While he maintained that the situation in Martin County was described in the paper as severe drought, he acknowledged that weather patterns can be very localized and that there was substantial rainfall in August 1999, including the highest single day total in six years that caused flash flooding. Trc. 339, Tra. 1047-48.

The Appropriate Test

There were no parameters established in the Plan to determine whether a particular change in flow quantity would be "unusual" or "would indicate possible impoundment leakage." Consequently, the determination was left to a subjective assessment of available data. Tre. 198-202 (Fredland). While the Commission agreed with the previous ALJ that information on South Mains entry outflow had to be viewed "with a heightened degree of scrutiny given the prior impoundment failure and the fact that 'as the pool level rose the risk of failure rose,'" it was critical of the fact that neither the test for determining whether the Plan was violated, nor the test's application were "clearly explained." 28 FMSHRC at 261 (*quoting* ALJ decision).

Neither party has articulated a definitive "test" for determining whether the plan was violated. The Secretary cites to a dictionary definition of the word "unusual,"[37] and argues that the "doubling" of flow at the only monitoring point designated in the Plan was, "standing on its own, an unusual change in flow signaling a possible impoundment leak."[38] Sec'y Reply Br. at 20. MCC argues that the Secretary's view is overly restrictive because it focuses solely on changes in quantity, whereas the Plan requires reporting of unusual changes in quantity that *indicate possible impoundment leakage.* MCC contends that any changes in flow quantity had to be considered in light of the totality of conditions at the impoundment, including the outflow history, weather conditions, and other impoundment monitoring information, especially outflow quality.

In construing broadly worded mandatory safety standards, the Commission has employed a "reasonably prudent person" test, i.e., whether a reasonably prudent person, familiar with the mining industry and the protective purpose of the standard, would have recognized the specific prohibition or requirement of the standard. *See BHP Minerals International, Inc.*, 18 FMSHRC 1342, 1345 (Aug. 1996); *Ideal Cement Co.*, 12 FMSHRC 2409, 2416 (Nov. 1990). While the Plan is applicable only at MCC's impoundment, the specific provision at issue was intended to apply to a potentially wide variety of conditions. Even though it is a Plan provision, as opposed to a mandatory standard, it appears appropriate to apply a formulation of the reasonably prudent person test. The Commission "agree[d] in large part with the basic approach" taken by the previous ALJ, which included a reference to a "reasonably prudent mining engineer." 28 FMSHRC at 261.

Several witnesses expressed opinions on factors that should have been considered in evaluating whether changes in flow quantity indicated possible impoundment leakage. The Secretary's expert, Almes, believed that flow quantity should have been assessed in light of the entire flow history over the years, that rainfall had a lot of relevance, and that other impoundment conditions should have been considered, including flows at seepage outlets, observations of the pool for swirls, and a visual examination of slope stability. Trb. 336-37, 359-60. Ballard agreed, stating that flow should have been evaluated in light of flow over the years, and that he certainly wouldn't have relied only on South Mains flow data. Trb. 153, Trd. 190. Lewis, too, emphasized that the person making the assessment should be familiar with impoundments in

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[37] Unusual is commonly defined as "being out of the ordinary" or "deviating from normal." Webster's Third New International Dictionary at 2514 (1993). Sec'y Br. at 30.

[38] The Secretary initially argued that, since the outflow from the South Mains entry was the only monitoring point specified in the Plan, "it is irrelevant whether [MCC] chose to conduct additional monitoring." Sec'y Br. at 28-29. While she later acknowledged that "it was important for MCC to look at other indications of possible leakage," she continued to focus solely on the South Mains outflow, arguing that "the plan called only for monitoring and immediate reporting of unusual changes in the flow from the South Mains and this pipe was the place to measure that." Sec'y Reply Br. at 21.

general, MCC's impoundment in particular, and all of the pertinent conditions. Tre. 44-47, 168. Fredland testified that a person evaluating the flow information would have to be familiar with the site. Tra. 248-49.

I find that the appropriate test is whether a reasonably prudent mine operator, or mining engineer, familiar with impoundments in general and all of the conditions at MCC's impoundment, both current and historical, should have recognized that a particular change in outflow quantity was outside the range of flows that would have been reasonably forseeable, such that it indicated possible impoundment leakage. This evaluation had to be made with an awareness heightened by knowledge of the 1994 breakthrough, and the fact that the pool level was approximately 100 feet higher than it was at that time.

Was There an Unusual Change in the Quantity of South Mains Outflow?

Pond 200 outflow measurements were recorded in Geo's impoundment inspection reports. Reports for the period from January 1999 through October 5, 2000, were entered into evidence. Ex. G-6, MCC-G. Evidence of flow measurements prior to 1999 are reflected only on Fig. 38, prepared by MSHA, and charts prepared by Thacker.[39] Ex. Geo-14. Thacker prepared two charts that I found helpful in analyzing Pond 200 outflow. One, in which he used the Fig. 38 data, and extended the time line back to 1991, has already been discussed. Because he was critical of MSHA's use of monthly rainfall averages in Fig. 38, he also prepared a chart that displayed weekly Pond 200 outflow measurements, as compared to total rainfall recorded during the seven-day period preceding the measurement.[40] The flow measurements are depicted as small black squares, and the rainfall totals are depicted as small triangles. Trb. 704-05; ex. Geo-14. He used rainfall data recorded at a weather station located at Paintsville, Kentucky, which was about 15 miles from the impoundment. Ex. Geo 11.

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[39] The Secretary maintained that MCC should have plotted the flow depth measurements as part of its monitoring responsibilities. Trc. 288-89 (Owens), Trc. 240 (Fredland), Tra. 505, 626, 690 (Betoney), Trd. 128-29 (Almes). MCC's witnesses disagreed that plotting was necessary. Trb. 96, 153, 158 (Ballard), Trf. 82 (Hagerty), Tre. 53-54 (Lewis). While charts can be helpful is assessing the history of flow measurements, the Secretary actually relies on only a few weeks of data in her argument. MCC made no attempt to disclaim responsibility for knowledge of flow history and, in fact, relies on it as evidence that the 1999 flows were not unusual. Bellamy stated that he might have had a concern if he had seen a display like Fig. 38, which included the misleading average flows. Trd. 354-55. However, he admitted that he had seen all of the flow data displayed in the chart, and had found nothing unusual. Trd. 368-69.

[40] Thacker believed that monthly averages of rainfall had no relationship to when the flow measurements were taken, and that the Jackson site used by MSHA was too far from the impoundment. Trb. 704.

The impoundment inspection reports for September 1999 show a rise in depth of flow from 6.0 inches on September 9 to 8.5 inches on September 30. Ex. G-6. The flow stayed at the 8.5 to 9.0 inch level through February of 2000, dropped to the 7.0 to 7.5 inch range in April – June 2000, and then returned to the 8.0 to 9.0 inch range from July through September of 2000. Ex. G-6, MCC-G. Historically, while flows had been in the 5.5 to 6.5 inch range for most of 1999, the charts show that there had been consistently higher readings, particularly in 1998. Fig. 38 and Thacker's chart show a generally rising pattern of flow measurements over the 1994-1999 time frame that appear to have averaged about 6.0 to 6.5 inches in the mid-1998 to mid-1999 time frame, with a number of readings of 7.0 inches in mid-1998.

More significantly, the charts show substantial fluctuations in outflow quantity. They include occasional sharp spikes, of extremely short duration, which are apparently attributable to rainfall. Trd. 131 (Almes), Trb. 701 (Thacker), Tre. 52 (Lewis). However, they also show periods of increased flow spanning several months, some of which exhibit abrupt onsets, and magnitudes approaching, if not exceeding, 100% increases. Thacker's chart, displaying the Fig. 38 outflow data, with the line slanting upward representing the increase in seepage due to the rise in the impoundment pool level, represents, in my opinion, the context within which the September 1999 data should be evaluated. Ex. Geo-14. Thacker opined that the slanted line depicted the influence of impoundment seepage that was dictated by Darcy's law, and that it is the fluctuations above that line that would have to represent unusual flow increases. Trb. 702. Virtually all witnesses agreed with the proposition that impoundment seepage would increase as the pool level rose. None, except Thacker, attempted to quantify the increase. Accepting the chart's depiction as generally accurate, it is apparent that there were a number of increases in flow measurements that were substantial and lasted for months. In mid-1995, there was an abrupt increase of nearly double the depth of flow, which lasted approximately three to four months. Another abrupt and substantial increase occurred in late 1995, again lasting about four months. There was a more gradual, but substantial, rise beginning in mid-1996 and lasting to mid-1977, and a similar rise extending from the beginning of 1998 until mid-1999.

As Lewis observed in support of his opinion that South Mains outflows were within expected ranges, the charts showed a "two-fold increase in flow" in 1995, "jumps in 1997" and "then it jumped again in 1998. That's more than a two-fold increase." He concluded that "if you really evaluate that step [the September 1999 increase], it's a pretty small step in the grand scheme of the 68-acre impoundment, the 80-plus acres of surface area that drains down into the mine, the seven to ten acres of property drained into Pond 200, [and] the perpetual seeps that drain into Pond 200. . . . [I]t's not a significant step." Tre. 132-34.

The increase in September 1999, from 6.0 inches to 8.5 inches, when viewed in isolation, as the Secretary urges, could be deemed out of the ordinary or significantly different than what had occurred in the immediate past, and could be classified as unusual. However, when viewed in light of the historical fluctuations in flow measurements, it appears much more like another cycle of a repeating pattern of increases in flow depth that lasted for a few months and then returned to lower levels. In fact, the flow depth measurements did drop to the 7.0 inch range from April to June 2000, although that was well after the Secretary argues that the increase should have been reported. The Secretary's expert, Almes, was of the opinion that it would have been appropriate to wait for some time to confirm the readings and see if the flow decreased. He believed that the increase in flow should have been reported by January 2000. Trd. 158, Trb. 403. Owens believed that it should have been reported after one month. Trc. 311.

MCC maintains that the fact that the flow depth stayed essentially the same from the end of September through December 1999 indicates that no piping or leaking was occurring. If piping had been occurring, there should have been a steady and unabated increase in flow. Tre. 63-64, Trb. 832, 887 (Lewis). While there could have been short term decreases due to plugging of the piping opening, piping generally occurs in a zone and quickly works around obstructions. Decreases or level flows would be relatively brief, certainly not several months. Trf. 48, 58-60, 126, Trb. 970-74 (Hagerty).

The Secretary was highly critical of what she viewed as MCC's failure to evaluate the available flow data, and it was the alleged failure to evaluate the data in a systematic way that was the predicate for the unwarrantable failure designation. Trc. 310-11, Tra. 889 (Owens). It is somewhat remarkable, then, that MSHA did not analyze the earlier increases in flow,[41] and the Secretary offered no explanation of the historical flow patterns, which included several abrupt and substantial increases that subsequently abated. The Secretary focused on a few weeks of data, and did not attempt to show that it was significantly different than previous flow patterns, or to explain why the increase to a depth of 8.5 inches should have been regarded with alarm when there had been numerous readings of 7.0 inches approximately one year earlier when the impoundment level was ten feet lower.

Because of their extensive experience and recognized expertise, I place considerable weight on Thacker's and Lewis' testimony that the amount of flow from the South Mains entry was within expected limits for that size facility and the pool elevation, i.e., there was no unusual change in flow quantity that indicated possible impoundment leakage. Trb. 696-97, 702, 706, 742-43 (Thacker), Tre. 53-54, 70-71 (Lewis). Hagerty also testified that, considering rainfall and the pool level, the increase in Pond 200 outflow was normal, and what would have been expected. Trf. 81.

There is little disagreement that all of the other measures of impoundment performance indicated that there was no impoundment leakage. The pool level had risen steadily. There were no swirls observed that would have indicated a leak. The measurements at the piezometers, seeps and drains, were all within normal limits, and there was no evidence of slope instability. The most significant factor, however, was the virtual absence of suspended solids in the outflow. As noted above, I find convincing the testimony of Lewis, Ballard, Johnson, Hagerty and Bellamy, to the effect that if there had been piping or leakage, there would have been suspended solids in the Pond 200 outflow. MSHA's Owens testified that the September 1999 flow increase

[41] Trc. 187-88, Tra. 249 (Fredland).

was, most likely, evidence that something significant had happened with piping, i.e., the erosion of solids by impoundment leakage. Trc. 296, 366. If so, there definitely should have been suspended solids evident in the outflow. Not only were there no visible signs of suspended solids, the KPDES reports establish that there were virtually no suspended solids in the Pond 200 outflow, from September 1999 through the October 2000 breakthrough.[42] Trb 471, 474-75 (Johnson); ex. MCC-L.

I find that the Secretary has failed to carry her burden of proof on this issue. For the reasons stated above, I reject comparisons to the 1994-99 average flow figure. The change in quantity of flow that occurred in September of 1999, when viewed in light of the historical pattern of flow measurements and the other conditions at the impoundment site, would not have been viewed by a reasonably prudent mine manager or engineer as an unusual increase in quantity of flow that would indicate possible impoundment leakage, even when viewed with heightened awareness because of the 1994 breakthrough and the increase in impoundment pool elevation.

This conclusion is confirmed by the empirical evidence. As Lewis and MCC's president, Hatfield, pointed out, numerous individuals, virtually all of whom had extensive experience with impoundments and were well aware of the 1994 breakthrough and the potential for another breakthrough, made frequent observations of South Mains and the Pond 200 outflows, and virtually every aspect of the impoundment. The same personnel had been monitoring the impoundment for years, and had experienced the increases and decreases reflected in Fig. 38 and Thacker's charts.[43] None of them perceived the increase in Pond 200 outflow that occurred in September 1999 as unusual, or indicative of possible impoundment leakage. Tre. 156-57 (Lewis); Tra. 1257, 1294 (Hatfield).

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[42] By all accounts, the outflow from the South Mains entry and the discharge from Pond 200 were at all times clear water, i.e., there was no evidence of turbidity, cloudiness, or suspended solids. Trb. 604 (Betoney); Trd. 278 (Muncie); Tra. 130 (Fredland); ex. MCC-G.

[43] Muncie, the preparation plant superintendent, had over thirty years of experience with impoundments, had been certified as an impoundment inspector by MSHA, and had personally visited the impoundment site two or three times per week. Trd. 242-43, 277-78, Tra. 1175-76. Howard, Geo's inspector, was certified as an impoundment inspector by MSHA, and has conducted some 7,000 impoundment inspections from 1989 to date. Trb. 214-16, 224, 233. Bellamy, MSHA's inspector, has a college degree in mining engineering, over 16 years of experience with impoundments, and had been certified by MSHA as an impoundment instructor. Trd. 338-40, Trb. 535-37.

ORDER

MCC's contests of Order No. 7144402 and Citation No. 7144401 are **SUSTAINED**. Order No. 7144402 and Citation No. 7144401 are hereby **VACATED,** and the petition as to those alleged violations is hereby **DISMISSED**.[44]

Michael E. Zielinski
Administrative Law Judge

Distribution (Certified Mail):

James B. Crawford, Esq., Melissa Bowman, Esq., Office of the Solicitor, U.S. Department of Labor, 1100 Wilson Blvd., 22nd Floor, Arlington, VA 22209

Marco M. Rajkovich, Jr., Esq., Melanie Kilpatrick, Esq., Rajkovich, Williams, Kilpatrick & True, PLLC, 2333 Alumni Park Plaza, Suite 310, Lexington, KY 40517

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[44] Although I have not accepted the Secretary's case on these alleged violations, I have the utmost respect for the MSHA personnel to whom fell the difficult task of investigating the breakthrough and determining its causes. There may have been a piping induced failure, as they concluded. However, on the two alleged violations that remain at issue, and after careful consideration of the extensive record, I concluded that the Secretary did not carry her burden of proof.