No. 24A463

In the Supreme Court of the United States

EAST KENTUCKY POWER COOPERATIVE, INC.,

Applicant,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY and MICHAEL REGAN, in his official capacity as Administrator of the United States Environmental Protection Agency,

Respondents.

Directed to the Honorable John G. Roberts, Jr., Chief Justice of the United States and Circuit Justice for the U.S. Court of Appeals for the District of Columbia Circuit

RESPONDENT-INTERVENORS' OPPOSITION TO APPLICATION FOR STAY OF FINAL AGENCY ACTION PENDING APPELLATE REVIEW

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RULE 29.6 DISCLOSURE STATEMENT

Respondent-Intervenors Altamaha Riverkeeper, Chattahoochee Riverkeeper, Clean Power Lake County, Coosa River Basin Initiative, Hoosier Environmental Council, Just Transition Northwest Indiana, Sierra Club, and Waterkeeper Alliance are nonprofit environmental organizations. None of the organizations has any parent corporation or any publicly held company that owns 10% or more of its stock.

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INTRODUCTION

East Kentucky Power Cooperative asks this Court to deploy an extraordinary remedy: staying an agency rule produced through the ordinary rulemaking process after a lower court—here, a D.C. Circuit panel of Judges Henderson, Pillard, and Walker—determined that a stay while it reviews the challenge is not warranted. But the Cooperative has not behaved as if it faces any of the extraordinary circumstances that could justify this Court's wading into this dispute on an early and expedited basis. It waited nearly three months to challenge the rule at issue and another seventeen days after that to seek a stay. It did not ask the court below to expedite briefing; it even sought to lengthen its own deadlines. Before telling this Court that it must act quickly, a party should—at a minimum—act quickly itself.

As the Cooperative's leisurely pace signals, there is no actual urgency here. The earliest compliance deadline the Cooperative faces is far down the line—well into 2028. And that deadline requires it to comply only with modest groundwater monitoring requirements. The Environmental Protection Agency puts the total costs of that monitoring at $229,000 per coal ash unit—a tiny proportion of the billions of dollars the Cooperative will earn over the four years it has to accomplish its monitoring. Until this stay litigation, in comments before the agency, the Cooperative suggested a similar figure to EPA's. The Cooperative now puts the number higher, but it appears to arrive there only by incorporating remediation and compliance costs that it will not incur until long after this litigation is resolved, and which therefore cannot harm it, irreparably or otherwise, in the meantime. Tellingly, though many parties have challenged the rule, no other party has sought a stay.

Nor is there any likelihood that the Cooperative's claims will eventually succeed. It challenges parts of EPA's Legacy Rule. That rule aims to combat the dangers posed by the disposal of coal combustion byproducts, as the Resource Conservation and Recovery Act requires, by establishing protective guidelines for certain unlined coal ash deposits. The Cooperative's challenges relate to the rule's treatment of sites like its Dale Station: sites where operators have removed coal ash from the impoundments where it was first dumped.

The Cooperative's main challenges share a mistaken premise: that removing coal ash from within an impoundment removes all the solid waste at a site. That premise is false, because waste placed in legacy impoundments does not stay in those impoundments. As the administrative record explains, legacy impoundments like Dale Station have been spilling and leaking solid waste into the surrounding environment for decades. So though the Cooperative pitches its challenges in several different ways—as violating RCRA, the Administrative Procedure Act, the retroactivity doctrine, and even the Commerce Clause—almost all of them boil down to ordinary record-review questions on which it happens to be wrong. That leaves a constitutional argument that the Cooperative acknowledges is foreclosed by precedent and stray statutory claims. This Court is not likely to review the D.C. Circuit's resolution of any of those arguments.

As the Cooperative acknowledges, the Legacy Rule is the product of an extended rulemaking proceeding. During that time, families who depend on groundwater wells, as well as fishermen and others who rely on clean surface waters, have been waiting for protections from contaminants leaked by the improper storage of coal ash at legacy disposal sites. This rule finally supplies these protections, setting in motion planning, monitoring, closure, and remediation at a couple hundred previously unregulated sites around the country. Staying it now will pause that process and push the relief communities need even further into the future. This Court should not force them to endure continued exposure on the Cooperative's account.

The Cooperative has not met its burden to show that stay relief is warranted.

STATEMENT

A. The Resource Conservation And Recovery Act

Congress enacted the Resource Conservation and Recovery Act in 1976 to regulate the handling and disposal of solid waste. Pub. L. No. 94-580, § 1002(a)(4), 90 Stat. 2765, 2796 (1976) (codified at 42 U.S.C. § 6901(a)(4)). Industrial progress, Congress observed, had resulted in a "rising tide of scrap, discarded, and waste materials." 42 U.S.C. § 6901(a)(2). The disposal of those materials "without careful planning and management" presents a "danger to human health and the environment." *Id.* § 6901(b)(2). Congress was especially concerned with the "open dumping" of waste, which it found was "particularly harmful to health" because open dumping "contaminates drinking water from underground and surface supplies, and pollutes the air and the land." *Id.* § 6901(b)(4).

RCRA's Subtitle D establishes a framework for federal, state, and local governments to cooperate to control the management of solid wastes such as coal ash. Among other things, it imposes a protectiveness "mandate." *Util. Solid Waste Activities Grp. v. Env't Prot. Agency*, 901 F.3d 414, 431 (D.C. Cir. 2018) ("*USWAG*"). EPA must adopt criteria that ensure, at a minimum, that the "disposal" of "solid waste" will have "no reasonable probability of adverse effects on health or the environment." 42 U.S.C. § 6944(a). Under the statute, sites that follow those criteria when disposing of solid waste are classified as "sanitary landfills." *Id.* Sites that don't are deemed "open dumps" and prohibited. *Id.* §§ 6944(b), 6945(a).

In 2016, Congress enacted the Water Infrastructure Improvements for the Nation Act ("WIIN Act"), which amended RCRA to enhance the regulation of coal ash. Pub. L. No. 114-322, § 2301, 130 Stat. 1628, 1736 (2016) (codified at 42 U.S.C. § 6945(d)). It first authorizes states to seek EPA approval to administer coal ash permit programs that are "at least as protective as" the federal rules. *Id.* § 2301(d)(1)(A)–(B) (codified at 42 U.S.C. § 6945(d)(1)(A)–(B)). It then directs EPA, subject to federal appropriations, to implement its own permitting program to administer federal coal ash rules in states not operating their own, federally approved programs. *Id.* § 2301(d)(2)(B) (codified at 42 U.S.C. § 6945(d)(2)(B)). The Act does not disturb EPA's standard-setting role under RCRA. Instead, it expressly declines to displace any existing EPA authority and equips the agency with new enforcement powers. *Id.* § 2301(d)(7) (codified at 42 U.S.C. § 6945(d)(7)); *id.* § 2301(d)(4) (codified at 42 U.S.C. § 6945(d)(4)).

B. EPA Regulation Of Coal Ash Under RCRA

When power plants burn coal to generate electricity, much of the coal is converted into gases routed to smokestacks, but a significant portion remains as larger particles called coal combustion residuals, or coal ash. *See* Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 80 Fed. Reg. 21,302, 21,303 (Apr. 17, 2015) (codified at 40 C.F.R. pts. 257, 261); *see also USWAG*, 901 F.3d at 421. The production of coal ash is one of the country's "largest industrial waste streams"—and one that is highly toxic. 80 Fed. Reg. at 21,303. Coal ash contains significant concentrations of chemicals like arsenic, boron, lead, selenium, and mercury, each of which poses serious dangers to human health and the environment. *Id.* at 21,311; *USWAG*, 901 F.3d at 421. Among other things, exposure increases rates of skin, liver, bladder, and lung cancer as well as risks of neurological, psychiatric, and cardiovascular harm. 80 Fed. Reg. at 21,451.

For decades, coal-power producers and utilities did little to protect surrounding communities from these risks. They disposed of coal ash in unlined surface impoundments and landfills that permitted contaminants to leach into the surrounding environment and groundwater and to migrate to nearby surface and drinking waters. *Id.* at 21,324–25. As a result, for years thereafter, the surrounding waters threatened the health of those who consumed them—from families who relied on well water to fishermen and recreationists who depended on clean waterways. *See* Env't Prot. Agency, Human and Ecological Risk Assessment of Coal Combustion Residuals 6-11, Docket ID No. EPA-HQ-OLEM-2019-0173-0008 (Dec. 2014) ("2014 Risk Assessment").

Recognizing that the disposal of coal ash triggered its RCRA obligations, EPA in 2015 established its first set of national minimum criteria for the safe disposal of coal ash. 80 Fed. Reg. at 21,302. Operators' management practices, EPA explained, posed sufficient risks to human health and the environment to justify uniform national guidelines. *Id.* The agency identified particular danger from waste escaping unlined landfills and surface impoundments and contaminating groundwater that is then used as drinking water. *Id.* at 21,303, 21,309, 21,325, 21,396. That could happen when facilities leaked coal ash into the surrounding environment, *see, e.g.*, *id.* at 21,313, or as water drained through coal ash solids and the resulting leachate carried their contaminants into soil, groundwater, and bedrock, *see id.* at 21,343, 21,388; *see also* Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals from Electric Utilities; Legacy CCR Surface Impoundments, 89 Fed. Reg. 38,950, 38,983–84 (May 8, 2024) (codified at 40 C.F.R. pts. 9, 257). To meet RCRA's mandate, the agency established minimum criteria to ensure that coal ash was managed responsibly, including location restrictions, design and operating criteria, groundwater monitoring requirements, closure and post-closure requirements, and corrective actions to address coal ash contamination. 80 Fed. Reg. at 21,302.

But EPA did not extend those obligations to every impoundment or landfill in the country. In particular, when it came to *inactive* impoundments—those that housed coal ash and liquids but that, as of October 19, 2015, were no longer receiving new waste—EPA drew a distinction. If such an impoundment was located at a plant that was actively engaged in the generation of power, EPA's rule applied. *Id.* at 21,303. But if a power plant was itself inactive, its impoundments, now referred to as legacy impoundments, were exempted from the rule. *Id.* at 21,344.

On petitions for review of various aspects of the rule, the D.C. Circuit held that this carveout was invalid. Under RCRA's protectiveness mandate, the court explained, EPA had the "statutory duty" to ensure that the disposal of coal ash had "no reasonable probability of adverse effects" to environmental and human well-being. *USWAG*, 901 F.3d at 433 (quotation marks omitted). The administrative record showed that legacy impoundments presented a "unique confluence" of these sorts of risks. *Id.* at 432–33. As EPA had exhaustively documented, older, unlined impoundments posed a high risk of substantial harm. *Id.* That problem was compounded at inactive disposal sites, where no one was onsite to monitor and remediate emergent problems. *Id.* Indeed, it was these very concerns that led EPA to extend the rule's requirements to *active* power plants' inactive disposal sites. *Id.* at 433. EPA therefore acted arbitrarily when it refused to extend the same logic to legacy impoundments simply because an operator no longer generated energy at those sites. *Id.* The risks posed by old, inactive impoundments had nothing to do with whether those impoundments were located at active power plants. If anything, legacy impoundments presented more risk because, with no operative power plant on site, they were less stringently supervised. *Id.* The court thus vacated the provision and remanded it to EPA for further proceedings. *Id.* at 449.

C. EPA's Legacy Rule

On remand, EPA revisited the rule as instructed, ultimately issuing a rule that, as relevant here, removed the legacy-site carveout. *See* 89 Fed. Reg. at 38,950. Under this Legacy Rule, the operators of legacy impoundments that EPA's initial rule otherwise would have covered—those that, like Dale Station, contained coal ash and liquids on or after October 19, 2015—face essentially the same requirements the agency initially imposed only on the operators of inactive impoundments at *active* utilities. *Id.* at 38,984.

RCRA required that outcome for two reasons. *First*, as *USWAG* had explained, legacy impoundments triggered RCRA's protectiveness mandate, under which EPA was required to ensure that the disposal of "solid waste" will have "no reasonable probability of adverse effects on health or the environment." 42 U.S.C. § 6944(a). That mandate required the agency "to address the substantial environmental risks" posed by legacy impoundments, 89 Fed. Reg. at 38,984, and required that it impose the same protections it had adopted for other, similarly situated facilities, *see id.* at 38,954, 38,983, 39,002. And *second*, information the agency had gathered since 2015 only reinforced the need, illustrating that "the totality of the risks" posed by legacy impoundments was "potentially greater" than what the agency initially estimated. *Id.* at 38,983. Among other things, those facilities were typically unlined, older, and not professionally engineered, giving them "more time to leak" and allowing those releases to "migrate[] further" into the surrounding environment. *Id.* at 38,975, 38,981. And newer data indicated that these problems were more pronounced than the agency previously understood. *See* Env't Prot. Agency, Risk Assessment of Coal Combustion Residuals: Legacy Impoundments and CCR Management Units 7-1 to 7-2, Docket ID No. EPA-HQ-OLEM-2020-0107-0887 (Oct. 2023) ("2023 Risk Assessment"); Env't

Prot. Agency, Risk Assessment of Coal Combustion Residuals: Legacy Impoundments and CCR Management Units 7-3, Docket ID No. EPA-HQ-OLEM-2020-0107-1075 (Apr. 2024) ("2024 Risk Assessment").

All legacy impoundments, EPA explained, posed a high probability of harm, even the small subset whose owners had, since 2015, made efforts to remove the coal ash the impoundments had contained. 89 Fed. Reg. at 38,998. For starters, "[p]rogression toward closure" did not "remediate any releases that occurred during the operation of the unit." *Id.* at 38,975; *see also id.* at 38,981–83. Under the typical lifecycle of an unlined legacy impoundment, by the time operators stopped placing new coal ash at the site or took steps to remove the existing ash, those releases had been occurring for decades, whether through breaches that spilled coal ash into the surrounding environment or through the slow leakage of leachate into soil, groundwater, and bedrock. *Id.* at 38,983–84. By EPA's estimations, this process resulted in the highest concentrations of harmful chemicals in groundwater some seventy years after waste placement. *Id.* at 38,981–92, 38,984; 2014 Risk Assessment 5-36 tbl. 5-25. Simply removing coal ash from an impoundment did not address either those leaks or the contamination they continued to spread. *See* 89 Fed. Reg. at 38,998 (noting that operators removed ash "to the soil level," subject to "visual inspection"). Put differently, the "current configuration of the unit" is "immaterial to the releases that occurred during operation." *Id.* at 38,958. And until and unless *those* releases were addressed, the risks the site posed to human health remained—as did EPA's mandate to set criteria to regulate the unit. *Id.* at 38,983–84; *see also* 2014 Risk Assessment 6-11; 2023 Risk Assessment 7-2 to 7-3; 2024 Risk Assessment 7-1 to 7-2.

Notwithstanding these concerns, EPA designed its rule to address the burdens that the rule would impose on owners or operators who have already taken steps to remove coal ash from their facilities. To close a site under RCRA, EPA explained, owners and operators needed to do more than just remove visible coal ash in the impoundment. They also had to remove coal ash that had mixed with soils and decontaminate areas affected by releases from the unit. 89 Fed. Reg. at 39,009–10; *see also* 40 C.F.R. § 257.102(c) (setting the criteria that count for closure under RCRA). But so long as an operator could show that the steps it had taken nevertheless satisfied groundwater protection standards, the agency explained, there was "no health or environmental benefit in requiring compliance" with the rule's remediation requirements. 89 Fed. Reg. at 39,010.

Accordingly, the Legacy Rule provides three avenues for an operator to demonstrate that a site already satisfies the rule's objectives and RCRA's protectiveness mandate, and that no further remediation is required. First, if a site owner "can certify that its prior closure meets the performance standards in § 257.102(c) [it] only needs to post the documentation that it meets the standard." 89 Fed. Reg. at 39,028. It can do so by "complet[ing] a closure certification" by

November 8, 2024 that, among other things, demonstrates that groundwater protection standards have been met. *Id.* at 39,107 (codified at 40 C.F.R. § 257.100(g)).

Under the second option, an owner can, by May 8, 2028, "elect to conduct groundwater monitoring . . . to demonstrate" that "there are no exceedances of the groundwater protection standards." *Id.* at 39,107 (codified at 40 C.F.R. § 257.100(h)). To maximize owners' flexibility, EPA provided a lengthy window of time to install monitoring wells and collect data—up to four years. *See id.* at 39,107–08 (codified at 40 C.F.R. § 257.100(h)(1)). Once an owner makes this showing, "no further requirements . . . apply." *Id.*

Third, owners can seek to defer compliance activities until EPA completes its forthcoming federal permitting program, under which EPA will identify any actions necessary to ensure that a given site is not an open dump. *Id.* at 39,025. This permitting program will allow EPA to make site-specific determinations about remaining risks and compliance activities needed for legacy ponds. To obtain this deferral, an owner must demonstrate that the legacy pond was closed "under substantially equivalent regulatory authority." *Id.* at 39,109 (codified at 40 C.F.R. § 257.101(g)). Any owner that makes this demonstration can defer further compliance activities until permitting, at which time they can seek a "closure equivalency determination" from EPA. *Id.* at 39,109.

D. Procedural Background

EPA issued a proposed rule in May 2023, proposing to extend its requirements for inactive surface impoundments to legacy impoundments. *Id.* It issued its final Legacy Rule on May 8, 2024.

The Cooperative waited eighty-six days to petition for review of EPA's rule, ultimately filing on August 2, 2024. EKPC App. 228. It petitioned EPA for a stay pending litigation on August 7, 2024, EKPC App. 190, and amended that petition on August 16, 2024, EKPC App. 209. On August 19, 2024, the Cooperative sought a stay in the D.C. Circuit. *See* EKPC App. 407. A panel of the D.C. Circuit—Judges Henderson and Pillard, who reviewed the 2015 rule in *USWAG*, joined by Judge Walker—denied the Cooperative's motion on November 1, 2024, EKPC App. 174, noting that the company had not satisfied the stringent requirements for a stay pending judicial review under *Nken v. Holder*, 556 U.S. 418, 434 (2009).

ARGUMENT

The Cooperative has not met its burden to show that the extraordinary remedy of a stay of the Legacy Rule pending judicial review is warranted. *See id.* (noting that the applicant "bears the burden of showing that the circumstances justify an exercise of that discretion"). To do so, it must show that (1) it will likely succeed on the merits, (2) it will suffer irreparable harm without a stay, and (3) the equities and the public interest support a stay. *See Ohio v. Env't Prot. Agency*, 603 U.S. 279, 291 (2024). An applicant seeking that relief in this Court must also show a reasonable probability that the Court would grant certiorari. *See Hollingsworth v. Perry*, 558 U.S. 183, 190 (2010) (per curiam); *Labrador v. Poe*, 144 S. Ct. 921, 931 (2024) (Kavanaugh, J., concurring) ("Emphasizing certworthiness as a threshold consideration helps to prevent parties from using the emergency docket to force the Court to give a merits preview in cases that it would be unlikely to take." (quotation marks omitted)). The Cooperative has not made any of these showings. Its merits arguments collapse into factbound record-review issues and longshot statutory and constitutional claims that fail to satisfy this Court's traditional criteria for certiorari and that are belied by the agency's extensive rulemaking record. But even if this Court were inclined to delve into that record, the equities strongly disfavor doing so on its emergency docket.

I. The Cooperative's Application Does Not Warrant The Extraordinary Remedy Of A Stay Through This Court's Emergency Docket.

A party asking this Court to "intru[de] into the ordinary processes of administration and judicial review," *Nken*, 556 U.S. at 427 (quotation marks omitted), must "show an exceptional need for immediate relief," *Louisiana v. Am. Rivers*, 142 S. Ct. 1347, 1348 (2022) (Kagan, J., dissenting). That is true not just because established principles of equity demand it. It is true also because, as members of this Court have explained, these kinds of applications ask this Court to rule "on a tight timeline—without the benefit of many reasoned lower-court opinions, full merits briefing, and oral argument." *Labrador*, 144 S. Ct. at 929–

30 (Kavanaugh, J., concurring); *see also id.* at 934–35 (Jackson, J., dissenting) (similar); *Does v. Mills*, 142 S. Ct. 17, 18 (2021) (Barrett, J., concurring) (similar).

Here, the Cooperative's actions contradict its claims that this Court must step into this case *now*. The Cooperative took nearly three months to petition for review after this rule was published on May 8, 2024. *See East Ky. Power Coop., Inc. v. Env't Prot. Agency*, No. 24-1267 (D.C. Cir. filed Aug. 2, 2024). It has neither acknowledged nor explained this delay. The Cooperative certainly knew the rule was coming. It commented on the rule several times during the rulemaking process. *See* EKPC App. 176; East Ky. Power Coop., Comments, Docket ID No. EPA-HQ-OLEM-2020-0107-0978 (Nov. 14, 2023). And it was certainly possible to move quickly, given that another challenger did so. *See City Util. of Springfield v. Env't Prot. Agency*, No. 24-1200 (D.C. Cir. filed June 13, 2024). Even after filing, the Cooperative then took another seventeen days to move for a stay. No other challenger has made a similar request. And it has not sought to expedite proceedings below. That the Cooperative has not acted as if this rule is an emergency strongly counsels against this Court's treating it as such.

The Cooperative's slow pace undercuts its claims of irreparable harm. It states (at 36) that irreparable harm will exist as of March 2025, when it says it needs to start compliance work to meet the rule's May 2028 compliance deadline. Its actions contradict that claim, given that it has not taken any steps to expedite obtaining either a stay or a merits decision by that date.

Beyond that, the Cooperative's lack of haste has complicated this Court's review. The Cooperative's application is filled largely with record-based arguments about the nature of the solid waste at legacy impoundments like Dale Station and the sufficiency of the rulemaking record evidence showing that those impoundments pose significant risk to human health and the environment. The 2015 rule and this rule fill nearly 400 Federal Register pages. *See* 80 Fed. Reg. at 21,302–501; 89 Fed. Reg. at 38,950–39,122. The dockets include nearly 1,000 supporting and related documents, 12,000 comments, and extensive scientific findings, including two detailed risk assessments. The D.C. Circuit is well-positioned to examine these materials in the first instance and routinely addresses record-heavy cases like this one. And it can hit the ground running here. It has already reviewed an earlier version of the rule and large portions of the record, and the rule at issue here flowed in large part from that earlier proceeding.

As this Court has recognized, its review benefits from that kind of lower-court review, and the Cooperative's timeline here deprived it of that review. If the Cooperative had acted with the haste that it urges here, it could have secured a lower-court ruling before coming to this Court. *Compare West Va. v. Env't Prot. Agency*, No. 24A95 (applications denied Oct. 16, 2024) (denying an application to stay a rule issued a day after this one where proceedings below moved quickly enough to allow a merits decision by the time the Cooperative's irreparable harm would allegedly begin). By declining to do so, it guaranteed that this Court's review will carry the risks that come with early review through truncated procedures. *See Ohio*, 603 U.S. at 323 (Barrett, J., dissenting). This Court should not let parties sit on claims so that they can later argue that only this Court can prevent their alleged irreparable harm. This Court's emergency docket is reserved for actual emergencies, not invented ones.

Even taken on its own terms, the Cooperative's claim of irreparable harm does not support a stay for three reasons. *First*, the mere possibility of *some* harm does not warrant the extraordinary remedy of a stay of an agency action pending judicial review. This Court has discussed "weighty" harms; it has never suggested that minimal harms suffice. *Ohio*, 603 U.S. at 291 (quotation marks omitted) (referring to claims of "hundreds of millions[,] if not billions of dollars"). The harms the Cooperative relies on here, which relate only to its single Dale Station site, are nowhere near the magnitude that this Court has previously described as weighty.

Second, the Cooperative's irreparable harm claim turns on an inflated and unjustified estimate of compliance costs. By EPA's estimate, installing and operating a monitoring system costs $229,000 per coal ash unit. *See* Env't Prot. Agency, Regulatory Impact Analysis 4-20, Docket ID No. EPA-HQ-OLEM-2020-0107-1067 (Apr. 2024). The Cooperative suggested a similar estimate when it first commented on the rule. *See* EKPC App. 180. It now offers (at 37) a different figure when discussing its compliance costs: $16.5 million. The Cooperative does not explain where its newly enlarged estimate comes from. But on inspection, it appears to be not an estimate of groundwater monitoring costs alone, but rather an estimate of the *total* compliance costs that the Cooperative would incur if, in addition to groundwater monitoring, the Cooperative had to "re-open" and "re-close" its Dale Station facility. *See* EKPC App. 424 (describing $16.5 million as the cost of "compliance with the Rule"); EKPC App. 421, 423–24 (explaining that compliance with the rule could range from groundwater monitoring to, if contaminants are detected, "preparing closure and post-closure plans," "performing corrective action," and, ultimately, "re-closing the impoundments"); Appl. 13–14, 36 (repeatedly referencing "closure" expenses). True, it is possible that the Cooperative could eventually face these sorts of compliance costs *if* its monitoring reveals that contamination at its Dale Station facility exceeds EPA's standards. But those costs are irrelevant to irreparable harm because the Cooperative will not incur them until *after* reporting the results of its groundwater monitoring in spring 2028, long after this litigation is resolved.[1] As to the only expenses relevant to the inquiry before this Court—the costs of groundwater monitoring—the Cooperative has not submitted any evidence that they exceed EPA's or its own earlier estimates. And that figure is small for an entity that will earn billions of

[1] And, of course, if the Cooperative eventually incurs those expenses, that only serves to further undercut its claim that no remediation would ever be needed at its site, *see infra* pp. 23–30.

dollars in revenue over the four years it has to comply with the Legacy Rule. *See* East Ky. Power Coop., 2023 Annual Report 49, https://bit.ly/ekpcrpt.

And *third*, EPA has already considered and acted upon the Cooperative's arguments about the timing of compliance costs. EPA paid close attention to and accommodated concerns about the timing of those expenses. Its final rule significantly extended the deadlines for sites like the Cooperative's Dale Station after being convinced by commenters—including the Cooperative, *see* EKPC App. 188–89—that more time was needed. *See* 89 Fed. Reg. at 39,004. Under the agency's proposed rule, sites like Dale Station had six months to demonstrate their compliance with applicable EPA criteria; they now have four years. *Compare* Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Legacy CCR Surface Impoundments, 88 Fed. Reg. 31,982, 32,039 (May 18, 2023), *with* 89 Fed. Reg. at 39,010, 39,107; *compare also* 88 Fed. Reg. at 31,997, *with* 89 Fed. Reg. at 39,005 (for all legacy impoundments, extensions from six to thirty months to install a groundwater monitoring system, from twelve to thirty-six months to prepare closure and post-closure plans, and from twelve to forty-two months to initiate closure).

Even if the Cooperative would incur some portion of these minimal compliance costs starting in March 2025, it would still not warrant stay relief because of the public's interest in the benefits the rule provides. The rule promises far-reaching benefits for those who live in proximity to legacy impoundments around the country—including the residents of rural, well-dependent areas like those the Cooperative serves. There are at least 194 legacy ponds, and at least 195 other previously unregulated coal ash sites newly subject to the Legacy Rule, in thirty-four states around the country. Env't Prot. Agency, Regulatory Impact Analysis at 2-8–2-9, 2-11. Large populations live in close proximity to these sites: 332,540 people live within one mile and 3,926,722 people live within three miles. *Id.* at 6-23. Right now, these sites are leaking chemicals that measurably increase the risks of cancer and other harms for those who live or recreate near them. *USWAG*, 901 F.3d at 421; 89 Fed. Reg. at 38,980. And those sites that still contain large volumes of coal ash are at constant risk of catastrophic failures that can send colossal amounts of coal ash into surrounding communities and ecosystems. *See, e.g.*, 89 Fed. Reg. at 38,954 (39,000 tons into North Carolina's Dan River in 2014); *id.* (6.1 million gallons of toxic slurry into Alabama waterways).

With the rule in place, utilities will finally start to address those harms by closing or retrofitting leaking impoundments, implementing monitoring systems to detect problems, and preventing more dangerous contaminants from leaking into groundwater and impacting nearby communities. *See id.* at 38,951. These changes will reduce cancer from the consumption of arsenic in drinking water, avoid IQ losses from mercury and lead ingestion, lower cardiovascular mortality, improve water quality for consumption and recreation, and more—benefits EPA estimates to run from $2.64 billion to $4.03 billion. Regulatory Impact Analysis at ES-27, Ex. ES-11. The value of ensuring that utilities across the country finally begin to address the impacts of decades worth of dumping coal ash into unlined surface impoundments outweighs the limited costs to the Cooperative of monitoring the groundwater at Dale Station.

Finally, the fact that this application concerns *one* site of *one* regulated party further undermines the case for relief here. The Cooperative asks this Court to stay the rule, but its challenges are limited to questioning the rule's application to its Dale Station site. At most, the relief that the Cooperative can seek is limited to the Cooperative and to the portions of the rule that govern the specific factual circumstances of that site (though the Cooperative does not even identify those portions for this Court). Moreover, the parochial nature of this application further separates its contents from the kinds of "rare[]" questions that may warrant stay relief. *Heckler v. Lopez*, 462 U.S. 1328, 1330 (1983) (Rehnquist, J., in chambers) (citation omitted). It presents no unexpected, fast-moving issue, *see Chrysafis v. Marks*, 141 S. Ct. 2482 (2021) (COVID-19 regulations), or "significant new law[]," *Labrador*, 144 S. Ct. at 928 (Kavanaugh, J., concurring). The Cooperative presents only a routine challenge to portions of a long-awaited update to an existing rule, one well-suited to resolution through routine judicial review.

II. The Cooperative Has Not Shown That It Will Likely Succeed On The Merits.

The Cooperative presses a long list of arguments against the rule, but nearly all rest on the same mistaken premise. It claims that the rule goes beyond RCRA, regulates retroactively, reflects arbitrary and capricious decisionmaking, and violates the Commerce Clause. Most of these arguments presume that once operators have removed the coal ash from within their impoundments, their facilities no longer contain solid waste. But as the administrative record exhaustively demonstrates, removing coal ash from an impoundment doesn't address the waste that exists everywhere else on site. As for the rest of the Cooperative's arguments, they fail as a matter of statutory text and precedent.

None of these arguments are likely to garner the votes needed to grant certiorari. The Cooperative entirely ignores that requirement. That may be because it cannot show it is met here. This Court does not ordinarily grant review of record-based claims whose significance is limited to the rule at hand, or to claims based on novel theories that no court has embraced. *See Mills*, 142 S. Ct. at 18 (Barrett, J., concurring) (referring to claims where this Court would be "the first to address the questions presented" under the emergency docket's expedited timeline).

A. Removing coal ash from a legacy impoundment doesn't remove all solid waste from the disposal site.

Over and over again, the Cooperative complains that the Legacy Rule purports to regulate impoundment sites that contain no solid waste. *See, e.g.*, Appl. 15–19, 20–22, 26, 31–32. But that simply is not true. The "totality of the information" in EPA's "rulemaking record" shows that legacy impoundments leak leachate and coal ash into the surrounding environment. 89 Fed. Reg. at 38,997–98. And Congress decided long ago to define the liquids that leak and carry pollutants out of disposal areas as solid waste. *See* 42 U.S.C. § 6903(27) ("solid waste" includes "liquid . . . material"); *id.* § 6903(3) ("disposal" includes "spilling" or "leaking" "into or on any land or water" so that "such solid waste" "may enter the environment"). So even if an operator succeeds in removing coal ash from an impoundment, there is still leaked and spilled solid waste "disposed of" at the site. 89 Fed. Reg. at 38,985; *see also* 42 U.S.C. § 6903(14).

1. Even if an operator has removed coal ash from an impoundment, harmful solid wastes covered by the rule remain on site. 89 Fed. Reg. at 38,985. The record before EPA reflected that, over the long life of a legacy impoundment, coal ash—and the dangerous heavy metals it contains—does not stay in those impoundments. Unlined facilities not designed by professional engineers can experience failures, landslides, and floods. *See id.* at 38,954, 38,981, 39,002. And even if they don't, when operators leave coal ash in unlined legacy impoundments for decades, operators create leachate—formed when liquids, such as sluice water and rainwater, carry the contaminants from coal ash as they percolate through the ash. *Id.* at 38,998. At first, leachate may remain intermixed with coal ash inside the impoundment, but over time it seeps into soil, groundwater, and bedrock. *Id.* Leachate can also itself form further solids, whether by interacting with "unsaturated or partially saturated soils," by "react[ing] with aquifer solids beneath the unit to form intermediate chemical compounds, some of which may be bound to the aquifer matrix in solid phases," by causing the formation of mineral species, or by becoming "temporarily immobilized at or beneath the water table as solid mineral phases." *Id.*; *see also id.* at 38,984.

Removing coal ash from within an impoundment does not address any of these wastes. Clearing coal ash from an impoundment does nothing to remove coal ash that has spilled over a bank or into a fissure, not to mention leachate that has spent the preceding decades leaking into the aquifer matrix underneath the impoundment, the surrounding soils, or the local groundwater. All the more so because the practices operators told EPA they employed—a "visual inspection" of the soils "just beneath" the maximum depth of the ash impoundment supported by no groundwater monitoring—are insufficient to detect all of the waste remaining at a site. *Id.* at 38,998.

Both coal ash and the leachate that carries its pollutants beneath and out of unlined impoundments are solid wastes within the meaning of RCRA—coal ash for obvious reasons, and leachate because RCRA says so. RCRA defines "solid waste" to include not just "garbage, refuse," or "sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility," but also "other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities." 42 U.S.C. § 6903(27). Leachate is a "discarded" byproduct of coal combustion and the storage of its residuals in general—and of coal ash removal efforts in particular, since leachate "left behind as soil and groundwater contamination" following those removal efforts "would clearly constitute material that has been 'abandoned' or 'discarded.' " 89 Fed. Reg. at 38,997.

And when coal ash or leachate leaks out of a surface impoundment, it is "disposed of" within the meaning of RCRA. *Id.* at 38,985 (citation omitted). Congress specifically defined "disposal" to cover the "spilling" or "leaking" of waste "into or on any land or water so that such solid waste" may later "enter the environment or be emitted into the air or discharged into any waters, including ground waters." 42 U.S.C. § 6903(3). "[D]isposal" thus isn't just the intentional dumping or depositing of materials. It's also accidental leaks and spills. And solid waste that leaks into the environment—even if that means being "emitted into the air" or "discharged into [] waters"—doesn't stop being solid waste. *See id.* (disposal includes "leaking . . . so that *such solid waste* . . . may enter the environment" (emphasis added)).

2. If it sounds like RCRA was tailor-made to cover these sorts of wastes, that's because it was. When RCRA was enacted, Congress saw evidence that the "contamination of groundwater by leachate from land disposal of waste" was "[p]erhaps the most pernicious effect" of the open dumping of solid waste—particularly because that contamination was "very long lasting" and often discovered "after the damage is done." 80 Fed. Reg. at 21,345 (quoting H.R. Rep. No. 94-1491, at 89 (1976)). As a result, not only did Congress define "solid waste" and "disposal" to sweep leachate within their ambit, but it repeatedly, and explicitly, instructed EPA to design RCRA regulations to account for leachate and to closely monitor its implications for groundwater. When RCRA instructs EPA to develop guidelines, one of the factors EPA must consider is the "protection of the quality of ground waters and surface waters from leachates." 42 U.S.C. § 6907(a)(2). Subtitle D—the very subtitle addressing coal ash—requires EPA's "Guidelines for State plans" to consider "the varying regional, geologic, hydrologic, climatic, and other circumstances under which different solid waste practices are required in order to insure the reasonable protection of the quality of the ground and surface waters from leachate contamination." *Id.* § 6942(c)(1). And RCRA explicitly required EPA to conduct a study, and report back to Congress, on the extent to which the criteria it issues under Subtitle D are "adequate to protect human health and the environment from ground water contamination." *Id.* § 6949a(a).

That study, Congress emphasized, "shall include a detailed assessment of the degree to which" EPA's criteria succeeded in protecting groundwater. *Id.*

Unsurprisingly, EPA has long adopted the same interpretation, treating leachate as a solid waste that RCRA requires it to regulate. Promptly after RCRA was enacted, the agency explained that leachate from previously disposed hazardous wastes was itself a hazardous waste—and therefore a solid waste as well. *See, e.g.*, 40 C.F.R. § 261.3(c)(2)(i); *see also* Hazardous Waste Management System: Identification and Listing of Hazardous Waste, 45 Fed. Reg. 33,084, 33,096 (May 19, 1980) ("wastes removed from" hazardous waste management facilities, "including spills, discharges, or leaks" must themselves "be managed as hazardous wastes"); Mem. From Office of Solid Waste and Emergency Response on Groundwater Quality at Closure 2, RPPC No. 9476.1985(02), RCRA Online No. 12444 (Aug. 27, 1985) ("We must be clear that ground-water quality is an integral aspect of RCRA closure. Owners and operators must not be allowed to 'walk away' from units with inadequate monitoring systems and ground-water contamination at closure.").

EPA followed these statutory commands, and drew on its own longstanding thinking, when it issued the rule at issue here. Its 2015 rule established a framework for managing coal ash impoundments and landfills that explicitly accounts for both the coal ash first placed at those sites, and the subsequent leakages that occur there. *See, e.g.*, 40 C.F.R. § 257.70(a)(1), (d) (describing operators' obligations to incorporate "leachate collection and removal system[s]"). The roots of the agency's approach go back even further. In 2010, when EPA first proposed a coal ash rule, it included similar remediation and monitoring requirements. *See* Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities, 75 Fed. Reg. 35,128, 35,207 (June 21, 2010). And as early as 2003, the agency drew on similar thinking to inform the managers of coal ash facilities that closing a legacy facility required more than just the removal of the coal ash itself. Env't Prot. Agency, Guide for Industrial Waste Management: Protecting Land, Ground Water, Surface Water, Air 11-1 to 11-20, EPA530-R-03-001 (Feb. 2003). To close a facility "by waste removal," EPA explained, operators must remove the coal ash and decontaminate the site, including removing "waste residues, contaminated ground water," and "soils," with removal incomplete until "areas affected by releases [] do not exceed numeric cleanup values." *Id.* at 11-21; *see also id.* at 11-22. When EPA ultimately set standards for how to properly close an impoundment, it incorporated these same ideas. *See, e.g.*, 40 C.F.R. § 257.102(c).

3. Though the Cooperative claims that Dale Station is a "perfect" example of a facility where all the solid waste has been removed, *see* Appl. 15, the Station actually illustrates why EPA imposed requirements on *all* legacy impoundments. Dale Station is located in a bend of the Kentucky River, a waterway that supplies drinking water to much of the state. *See* ENGO App. 9, 55 (fig. 1), 57 (fig. 3). It is just 20 miles outside of the state's second-largest city and close to critical infrastructure. *See* ENGO App. 9–10, 55 (fig. 1), 57 (fig. 3). Schools, hospitals, churches, and municipal water intake facilities all lie within a few miles, and Dale Station sits just upriver from boating and picnic facilities at Fort Boonesborough State Park. *See id.* But for decades, beginning in the 1950s, the Cooperative dumped its coal ash, typically combined with sluicing water, at several on-site impoundments. Like most legacy impoundments, they were unlined. *See, e.g.*, ENGO App. 10, 71, 87. And that ash did not stay where it was first placed.

There have been serious coal ash leaks, erosion, and even catastrophic failures at Dale Station. One early embankment failure leaked 300 tons of coal ash and large amounts of water directly into the Kentucky River. ENGO App. 14. That was only the beginning. Over time, the land around Dale Station's ponds eroded heavily. ENGO App. 12. Large fractures and voids emerged in the limestone bedrock underneath the impoundments, and coal ash could be seen in "several locations of such fractures and voids." ENGO App. 17. One leak, by a consultant's estimate, emitted waste directly into the bedrock for "at least five years." ENGO App. 16. All of these leaks were in addition to the leachate seeping into the shallow groundwater and fractured bedrock around the site, which the region's unstable and porous karst geology only exacerbated. *See* ENGO App. 10, 32.

The Cooperative thus is correct that Dale Station is a "perfect example" of the Legacy Rule's scope. Appl. 15. The site illustrates why EPA was right to conclude that legacy impoundments and the areas around them contain solid waste even after impounded coal ash is removed. Recent examples keep proving EPA right. Within the last year alone, regulators have uncovered still further evidence that residual waste remains even at legacy impoundment sites whose operators have removed the coal ash formerly stored within the impoundment. For instance, after a plant in Glynn County, Georgia removed the ash it had stored for about seventy years in an on-site ash pond, groundwater monitoring detected unusually high arsenic concentrations attesting to the continued presence of harmful waste. *See* Resolute, *2024 Annual Groundwater Monitoring and Corrective Action Report: Plant McManus Former Ash Pond 1 (AP-1)* 6, 23 (July 31, 2024), bit.ly/mcmanuspond1. And at Cherokee Station in Denver, Colorado, groundwater monitoring five years after ash removal revealed elevated lithium concentrations attributable to waste leaked from the plant's three historic coal ash impoundments. *See* Pub. Serv. Co. of Colo., *2023 Annual Groundwater Monitoring and Corrective Action Report: Cherokee Station* 1, 15 (Jan. 29, 2024), sforce.co/40PEmok.

B. The presence of solid waste at Dale Station precludes most of the Cooperative's merits arguments.

The presence of solid wastes at legacy impoundments like Dale Station means the Cooperative cannot prevail on its regulatory authority, retroactivity, or APA arguments.

1. Start with EPA's regulatory authority. Because legacy impoundments contain solid waste, the Cooperative's lead argument—that EPA lacks the authority to regulate sites that no longer contain solid waste—simply is not presented. *See* Appl. 15–18. Its secondary argument—that there is no evidence that legacy impoundments that no longer contain coal ash pose a "reasonable probability of adverse effects on health or the environment," *see* Appl. at 16–17, is just as easily disposed of. Removal of coal ash from an impoundment does not remediate past releases and leaks from the impoundment into the soil and groundwater beneath and around it. 89 Fed. Reg. at 38,975, 38,996. All the more so when a facility's purported closure occurs solely through "visual inspection" or removal of waste "down to the level of the underlying existing soil." *See* EKPC App. 417; 89 Fed. Reg. at 38,998. As EPA explained in detail, it is the "lifecycle" of an impoundment, and not whether it still contains deposits of coal ash, that predicts its "long-term risks." 89 Fed. Reg. at 38,975; *see also id.* at 38,958 (The "current configuration of the unit" is "immaterial to the releases that occurred during operation."). That is why EPA's Risk Assessment—which the agency subsequently cautioned understated likely risk—traces peak groundwater concentrations for most contaminants to seventy-four to ninety-seven years after their original placement, and peak concentrations for other contaminants still later. 2014 Risk Assessment 5-36 (tbl. 5-25).

2. The Cooperative's retroactivity challenge (at 19–22) fails for many of the same reasons. Because the record illustrates that solid waste persists at facilities like Dale Station, the Legacy Rule does not, as the Cooperative claims, penalize the facility for its past conduct. *Landgraf v. USI Film Prods.*, 511 U.S. 244, 280 (1994). The rule applies to the Cooperative based on the "*current* presence" of solid waste, Appl. 20–21, including the leachate and coal ash that remain at its Dale Station facility. And the rule does not impose past obligations on the Cooperative; it imposes the modest prospective requirement that, within the next three and a half years, the utility monitor the groundwater at its facility.

The Cooperative's remaining retroactivity arguments (at 21–22) are equally flawed. Many of these arguments appear to hinge on a semantic debate about whether the Cooperative "completed" the closures of its Dale Station impoundments so as to prohibit EPA from "attach[ing] 'new legal consequences' " to those closures. *See* Appl. 21–22 (quoting *Landgraf*, 511 U.S. at 270). That debate is beside the point, because the Legacy Rule does not "attach[]" any "legal consequences" to the Cooperative's closures, complete or not. The Legacy Rule attaches legal consequences to the presence of solid waste at Dale Station.

3. The extensive record evidence explaining why solid waste remains at Dale Station resolves the Cooperative's substantial evidence APA claim (at 31–32) as well. As explained, *supra* pp. 23–30, the record contains detailed evidence reflecting that legacy impoundments "pose a reasonable probability of adverse effects on health or the environment" even if they no longer contain coal ash because they have been leaching dangerous contaminants into adjacent soil, groundwater, and bedrock for decades. The evidence before the agency indicated that those contaminants persist even after the coal ash itself has been removed.

4. The Cooperative's reliance interests APA claim (at 29–31) fails for related reasons. EPA did not "ignore" the concerns of operators like the Cooperative. Rather, it explained in detail that those concerns were outweighed by the reasonable probability of harm their facilities still posed. What is more, EPA took pains to take account of these facilities' concerns. It offered operators multiple avenues, over a long time horizon, for demonstrating that their facilities complied with EPA standards so that further remedial actions are unnecessary. *See* 89 Fed. Reg. at 38,985, 38,996.

Nor did the Legacy Rule somehow "make[] worthless substantial past investment" the Cooperative "incurred in reliance" on its 2015 counterpart. *See* Appl. 29 (quoting *Bowen v. Georgetown Univ. Hosp.*, 488 U.S. 204, 220 (1988) (Scalia, J., concurring)). For starters, by its own admission, the Cooperative did not act in "reliance" on the 2015 rule. It acted on its own initiative. *See* EKPC

App. 416. Had the utility intended to rely on EPA's views, it would have done more than simply remove coal ash "down to the level of the underlying existing soil" and subject that removal to "visual inspection." EKPC App. 417. As long ago as 2003, and again in 2010, EPA emphasized that proper "closure" of a coal ash unit required not just the removal of the unit's coal ash, but also many of the same requirements that ultimately made their way into the 2015 and 2024 rules—including remediation to remove solid waste leaked or spilled from impoundments and groundwater monitoring to confirm success in doing so. *See supra* pp. 6–11; 75 Fed. Reg. at 35,208.

And in any event, the Legacy Rule does not make any of the Cooperative's conduct "worthless." All EPA requires the Cooperative to do is install a groundwater monitoring system—a task that, by its own admission, does not either "undo" or "duplicate" any of its prior activities. It is precisely because the Cooperative did not previously install a groundwater monitoring system that it must do so now.

C. The Cooperative's remaining arguments flout statutory text and longstanding precedent.

Beyond its claim that no solid waste remains at its facilities, the Cooperative resorts to longshot challenges to EPA's RCRA authority. Following the WIIN Act, the Cooperative says (at 23–24), EPA is barred from adopting criteria to enforce RCRA's protectiveness mandate. And the utility insists (at 24–29) that, under the Commerce Clause, neither EPA nor Congress can regulate solid waste in the first place. Neither argument is likely to prevail.

1. First off, the Cooperative's WIIN Act concerns (at 23–24) flout the plain text of that statute. The Cooperative insists that the Legacy Rule is "inconsistent" with the WIIN Act because, it says, the WIIN Act sought to displace EPA's role in setting solid waste disposal criteria and to replace that function with federal and state permitting programs. But the statute does no such thing.

As the Cooperative says, the WIIN Act authorizes states to propose permitting programs for coal ash units and directs the EPA Administrator, where states do not submit their own conforming permitting program, to implement such a program directly. 42 U.S.C. § 6945(d). These programs are not intended to "replace" the coal ash rules. Rather, the purpose of the permitting programs is to "achieve compliance with applicable criteria established by the Administrator" under 40 C.F.R. Part 257 "or successor regulations promulgated pursuant to [42 U.S.C. §§] 6907(a)(3) and 6944(a)." *Id.* § 6945(d)(2)(B). That is, Congress intended the permitting programs to serve as a means of *enforcing* the substantive standards adopted by EPA under its general RCRA rulemaking authority. EPA's coal ash rules thus are not "interim," they are the standards to which owners and operators will be held under both state and EPA-run permit programs. *See id.* § 6945(d)(1)(B), (d)(2)(B).

The Cooperative's assertion that the 2024 Rule is not a "successor" regulation to the 2015 rule is not just incorrect, it is irrelevant. It is incorrect because the 2015 rule expressly reserved EPA's authority to regulate inactive facilities, relying on both the plain text of RCRA and its legislative history. 80 Fed. Reg. at 21,344–45 (citing, inter alia, the definition of "disposal" at 42 U.S.C. § 6903(3) and H.R. Rep. No. 94-1491, at 37 (1976)). Congress, in enacting the WIIN Act, is presumed to have endorsed this authority. *See Lorillard v. Pons*, 434 U.S. 575, 581 (1978). Indeed, the Legacy Rule reflects EPA's efforts to fulfill the agency's obligation, pursuant to RCRA's protectiveness mandate and the evidence reflecting the dangers of legacy impoundments, as to what should have been the rule's original scope. *See* 89 Fed. Reg. at 38,983–84. The argument is also irrelevant because the "successor" language simply describes the universe of standards that must be incorporated into a permitting program. Nothing in the WIIN Act purports to limit subsequent regulation under 42 U.S.C. § 6944(a), whether "successor" to then-operative regulations or not. *See* 42 U.S.C. § 6945(d).

The Cooperative's APA claim (at 32–34) that EPA failed to reconcile the Legacy Rule with the WIIN Act fails for similar reasons. As EPA explained, the WIIN Act does not supplant coal ash regulations, it offers EPA tools for ensuring compliance with them. 89 Fed. Reg. 39,025–26, 39,047.

2. Switching gears, the Cooperative argues that the Legacy Rule violates the Commerce Clause. *See* U.S. Const. art. I, § 8. As the Cooperative recognizes (at 25), this Court's "existing Commerce Clause jurisprudence" forecloses its argument. Statutes pass Commerce Clause constitutional muster if they regulate an activity that has a "substantial effect on interstate commerce." *Gonzales v. Raich*, 545 U.S. 1, 17 (2005). The legislative history of RCRA includes Committee findings of such substantial impacts. *See, e.g.*, H.R. Rep. No. 94-1491, at 3, 9–10 (1976). With good reason: Solid waste disposal is an expensive, extensive, nationwide industry. So is solid waste *recovery*—RCRA's related goal of facilitating beneficial reuse and recycling. *See* 42 U.S.C. § 6901(c)–(d). And improper disposal practices directly impact instrumentalities of commerce like the Kentucky River. 80 Fed. Reg. at 21,327.

Thus, the courts of appeals have repeatedly rejected analogous Commerce Clause challenges to hazardous waste disposal regulation under CERCLA. *See, e.g.*, *United States v. Olin Corp.*, 107 F.3d 1506, 1509–10 (11th Cir. 1997) ("CERCLA reflects Congress's recognition that both on-site and off-site disposal of hazardous waste threaten interstate commerce."); *Frier v. Westinghouse Elec. Corp.*, 303 F.3d 176, 200–02 (2d Cir. 2002) ("In considering legislation to promote safer containment of hazardous wastes and to decrease pollution of the ambient air and navigable waters by such materials, Congress plainly sought to deal with matters that substantially affected interstate commerce."); *see also Voggenthaler v. Maryland Square LLC*, 724 F.3d 1050, 1059–60 (9th Cir. 2013) (explaining that "the application of CERCLA to contaminated soil and groundwater" is proper as a regulation of both "articles in commerce" and "activities affecting commerce"). The rule thus falls squarely within federal Commerce Clause authority.

And as for the Cooperative's efforts to press new interpretations of the Commerce Clause, like so many of its arguments, they depend on its mistaken view that the rule somehow regulates inaction. As explained, the record contradicts its assertion (at 26) that Dale Station contains "no solid waste disposal." *See supra* pp. 23–30. The Cooperative is unlikely to prevail on this front.

CONCLUSION

The application should be denied.

Respectfully submitted,

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November 26, 2024

APPENDIX

Exhibit A:

AMEC Earth & Environmental, *Report of Dam Safety Assessment of Coal Combustion Surface Impoundments* (Apr. 2011)

Report of
Dam Safety Assessment of Coal Combustion Surface Impoundments

East Kentucky Power Cooperative
William C. Dale Power Station, Winchester, KY

AMEC Project No. 3-2106-0177.0001

Prepared By:

AMEC Earth & Environmental, Inc.
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STATE OF KENTUCKY
JAMES H. BLACK
21781
LICENSED PROFESSIONAL ENGINEER
4-18-11

April 2011

I certify that the management units referenced herein:

East Kentucky Power Cooperative, William C. Dale Power Plant: Ash Pond 2, Ash Pond 3, and Ash Pond 4 were assessed on August 4, 2010.

Signature James B. Black 4-18-11
James Black, PE
Project Engineer

List of AMEC Participants who have participated in the assessment of the management units and in preparation of the report:

- James Black, PE
  Project Engineer
- Chris Eger
  CADD Technician
- Dan Conn
  GIS Specialist
- Mary Sawitzki, PE
  Civil/Environmental Engineer
- Mary Swiderski, EIT
  Staff Engineer

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1.0 INTRODUCTION AND PROJECT DESCRIPTION

1.1 Introduction

AMEC was contracted by the United States Environmental Protection Agency (EPA), via contract BPA EP09W001702 to perform site assessments of selected coal combustion byproducts surface impoundments. AMEC was directed by EPA, through the provided scope of work and verbal communications, to utilize the following resources and guidelines to conduct a site assessment and produce a written assessment report for the coal combustion waste facilities and impoundments.

- Coal Combustion Waste (CCW) Impoundment Inspection forms (hazard rating, found in Report Appendix A)
- Coal Combustion Dam Inspection Checklist (found in Report Appendix A)
- Impoundment Design Guidelines of the Mining Safety and Health Administration (MSHA) Coal Mine Impoundment Inspection and Plan Review Handbook (hydrologic, hydraulic, and stability conditions)
- National Dam Safety Review Board Condition Assessment Definitions (condition rating)

As part of this contract with EPA, AMEC was assigned to perform a site assessment of East Kentucky Power Cooperative's (EKPC) William C. Dale Power Plant (Dale Power Station), which is located in Ford, Kentucky, approximately 20 miles southeast of Lexington, Kentucky and ten miles southwest of Winchester, Kentucky, as shown on the upper portion of Figure 1, the Site Location and Vicinity Map. The bottom of Figure 1 shows an enlargement of the site.

A site visit to Plant Dale was made by AMEC on August 4, 2010. The purpose of the visit was to perform visual observations, to inventory coal combustion waste (CCW) surface impoundments, assess the containment dikes, and to collect relevant historical impoundment documentation.

AMEC engineers, James Black, PE and Mary Swiderski, EIT were accompanied during the site visit by the following individuals:

Table 1. Site Visit Attendees

Company or Organization	Name and Title
EKPC	Larry D. Morris, Plant Manager
EKPC	Jerry Purvis, Environmental Affairs Manager
EKPC	Brad Condley, Senior Chemist
EKPC	Mark S. Brewer, PE, PLS, Engineering Services Supervisor G & T Operations

1.2 Project Background

CCW results from the power production processes at coal fired power plants like EKPC's Dale Power Station. Impoundments (dams) are designed and constructed to provide storage and disposal for the CCW that are produced. At present, EKPC refers to the three CCW impoundments at the Dale Power Station as “Ash Pond 2”, “Ash Pond 3”, and “Ash Pond 4”.

Kentucky Revised Statute (KRS) 151.100 defines the word dam to mean any artificial barrier, including appurtenant works, which does or can impound or divert water and which either: (a) is or will be twenty-five (25) feet or more in height from the natural bed of the stream or watercourse at the downstream toe of the barrier; or (b) has or will have an impounding capacity at maximum water storage elevation of 50 acre-feet or more. The Kentucky Department for Natural Resources and Environmental Protection’s (KDEP) Division of Water (KDOW) regulates dam design, construction and repair. KDOW also evaluates a dam’s structure and various other criteria related to the effects of dam failure to determine and assign a dam hazard classification to each structure. KDOW’s Engineering Memorandum No. 5 (EM No. 5) provides minimum hydrologic and hydraulics related design criteria, as well as hazard classification definitions for dam structures. Dam hazard classifications, outlined in KDOW’s EM No. 5, include Low Hazard (A), Moderate Hazard (B), and High Hazard (C).

- A Low Hazard (A) classification is assigned to structures “located such that failure would cause loss of the structure itself but little or no additional damage to other property.”

- A Moderate Hazard (B) classification is assigned to structures that “are located such that failure may cause significant damage to property and project operation, but loss of human life is not envisioned.”

- A High Hazard (C) classification is assigned to “structures located such that failure may cause loss of life or serious damage to houses, industrial or commercial buildings, important public utilities, main highways or major railroads.”

According to KDOW, state inspections for dams with high (Class C) and moderate classifications (Class B) occur every two years, while dams with a low hazard classification (Class A) are inspected every five years. A Certification of Inspection is issued to the dam owner if, upon inspection, it is determined that the as-built structure meets all the necessary requirements as outlined in KDOW’s Engineering Memorandum No. 5. Following successful construction completion and inspection, the owner is given permission to impound water and the dam is placed on the KDOW inventory of dams.

Ash Pond 4 at Dale Power Station does meet KDOW criteria for dam definition, carries a Class A, or Low Hazard rating, and has been assigned ID 660 on the KDOW dam inventory. Although Ash Pond 2 at the Dale Power Station meets the criteria set forth by KDOW for identification as a dam (impounds greater than 50 acre-feet), KDOW has not assigned a hazard classification to the structure, does not list the pond on the dam inventory list, and does not inspect the dam structure. Ash Pond 3 does not meet the definition criteria for a dam.

The National Inventory of Dams (NID), administered by the U.S. Army Corps of Engineers (USACE), provides a list of many dams within the United States, as well as hazard potentials related to the listed dams. The information is provided to the USACE for inclusion in the NID database primarily by the states. Ash Pond 4 at Dale Power Station is listed on the NID and is assigned ID KY00660. Ash Pond 2 and Ash Pond 3 are not listed on the NID.

As part of the observations and evaluations performed at Dale Power Station, AMEC completed EPA’s Coal Combustion Dam Inspection Checklist and Coal Combustion Waste (CCW) Impoundment Inspection Forms. Copies of these forms are provided in Appendix A. The

Impoundment Inspection Forms include a section that assigns a “Hazard Potential” that is used to indicate what would occur following failure of an impoundment. “Hazard Potential” choices include “Less than Low,” “Low,” “Significant,” and “High.” Based on the site visit evaluation of the impoundments, AMEC engineers assigned a “Significant Hazard Potential” classification to each of the three ash ponds located at Dale Power Plant. As defined on the Inspection Form, dams assigned a “Significant Hazard Potential” classification are those dams where failure or miss-operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. AMEC assigned the “Significant Hazard Potential” classification to these impoundments based on their proximity to the Kentucky River.

EPA received Draft Report[1] response comments from EKPC (January 12, 2011). In their comments, EKPC noted that “AMEC assigned the ‘Significant Hazard Potential’ to the impoundments at Dale Station based on the proximity to the Kentucky River.” EKPC questions the assignment of the hazard potential based only on proximity to the river and states “the condition or operation of the impoundments was not considered in assigning the classification.” AMEC notes that hazard classifications, as defined in KDOW’s EM No. 5, do not include references to environmental damage, only “damage to property.” The hazard potential classifications provided by EPA for use in the assessment reports do include a reference to “environmental damage” and, in AMEC’s opinion; failure of the ash ponds at the Dale Station would cause environmental damage to the Kentucky River due entirely to those pond’s proximity to the river. Furthermore, pond condition and/or operation are not used as a basis for assignment of the hazard potential, only what would occur following an impoundment failure.

1.2.1 State Issued Permits

The Kentucky Natural Resources and Environmental Protection Cabinet Department for Environmental Protection Division of Water has issued Kentucky Pollutant Discharge Elimination System (KPDES) Permit No. KY 0002194 to East Kentucky Power Cooperative, Incorporated. This KPDES Permit authorizes EKPC to discharge from Dale Power Plant outfalls 002, 003, 004, and 008 into the Kentucky River. The permit became effective on December 1, 2001 and expired on November 30, 2006. EKPC’s KPDES permit renewal request was received by KDOW and given an effective date of July 20, 2006 (DS CBI 000087). According to EKPC, KDOW’s technical review of the renewal request is still underway.

EKPC provided AMEC with a copy of the Certificate of Inspection for Ash Pond 4, which was dated October 29, 1998 (DS CBI 000088). Although KDOW regulations state that Class A dams shall be inspected every five years, no records were provided to show whether prior or subsequent inspections of the dam were performed. EKPC stated that KDOW has not conducted an inspection at the facility since that time.

1.3 Site Description and Location

EKPC’s Dale Power Station is located in Ford, Kentucky (Clark County), approximately ten miles southwest of Winchester, Kentucky. The area surrounding the plant boundary is primarily rural. The Kentucky River is located directly adjacent to the south and west of the plant facilities. The shortest distance between the top of embankment and the Kentucky River is approximately 330 feet, 120 feet, and 85 feet for Ash Ponds 2, 3, and 4, respectively. The

[1] Draft Report submitted to EPA by AMEC in September 2010

Photo Site Plan, included as Figure 2, shows the location of Ash Ponds 2, 3, and 4 and their proximity to the Kentucky River.

An aerial photograph of the region indicating the location of Dale Power Station's ash ponds in relation to schools, hospitals, municipal water intakes and other critical infrastructure located within approximately 5 miles down gradient of the structures is included as Figure 3, the Critical Infrastructure Map. A table that provides names and coordinate data for the infrastructure is included on the map.

1.4 Process Ponds

1.4.1 Ash Handling and Flow Summary

Dale Power Station utilizes coal in the production of electricity. In this process, two types of CCW ash are generated: bottom ash and fly ash. Typically, power plants like Dale discharge CCW by wet sluicing it into large impoundments designed to hold the CCW solids as well as the liquid added for sluicing.

Based on conversations with EKPC personnel, Dale Power Station, as originally constructed, contained three ash ponds. These ponds were identified as Ash Pond 1, Ash Pond 2, and Ash Pond 3. The impoundment currently identified as Ash Pond 2 was originally divided into two, approximately 4-acre, ponds; namely Ash Pond 1 and Ash Pond 2. A divider dike, located horizontally across the impoundment, served to separate the pond into northern and southern areas. Ash Pond 3, approximated to be nearly 4 acres based on topographic maps (DS CBI 000485 and 000486) provided to AMEC, was located adjacent to and west of the original Ash Pond 2. CCW was sluiced into either Ash Pond 1 or Ash Pond 3, with clarified supernatant entering into Ash Pond 2 prior to discharge into the Kentucky River.

According to the Ash Flow Narrative (DS CBI 000447) provided by EKPC, Dale Power Station disposes of bottom ash (the heavier of the two types) and fly ash by introducing service water, from the re-circulating cooling water system, into ash hoppers. A "hydrovac" system is then used to pull the water and ash from the hoppers, mixing it and sluicing it into a concrete pit. From there, the ash and water mixture is pumped into a holding tank, where it then flows by gravity to the "in service" ash pond. Until recently, both Ash Ponds 2 and 4 were available to receive sluiced CCW. Only Ash Pond 2 receives wet sluiced ash currently because Ash Pond 4 is out of service. Ash sluicing water decants in Ash Pond 2 and is discharged into the Kentucky River via KPDES permitted outfalls.

1.4.2 Ash Pond 2

A topographic plan view of Ash Pond 2 is included as Figure 4. This figure is based on a Lidar survey that was conducted in late 2009 to provide EKPC with more accurate embankment elevations and other useful information regarding the facilities.

<u>EKPC Response to EPA Request for Information (RRFI)</u>

The following information was provided by EKPC in their response to EPA's Request for Information under Section 104(e) of CERCLA, March 24, 2009 (DS 000001-000036). Ash Pond 2 was placed into service on December 1, 1954. At that time, the impoundment was divided by an internal dike into two ponds which were referred to as Ash Pond 1 and Ash Pond 2. The internal dike was removed and improvements were made to watershed ditches in 1999. Ash

Pond 2 has a total storage capacity of 180,000 cubic yards (CY), a crest height of 20 feet, and a corresponding surface area of eight acres. Additionally, as of March 15, 2008, the total CCW stored within the pond was 40,000 CY. In the pond, the ratio of bottom ash to fly ash is approximately 20 percent to 80 percent, respectively. It was noted that "Boiler slag and other constituents make up less than one percent of the volume of coal combustion products (CCB) stored in the ponds." The term "other constituents" was not defined by EKPC. Whether the pond was designed by, or, constructed under the supervision of a professional engineer is unknown. However, the pond is "evaluated on a periodic basis by the Vice-President of Production, a Registered Professional Engineer with a BS & MS in Mining Engineering and 20 years + of extensive work in civil and geotechnical engineering." The name of the evaluator was not provided.

<u>Stantec Consulting Services 2009 Ash Storage Pond #2 Inspection Report</u>

A report completed by Stantec Consulting Services (Stantec) in February 2010, entitled *2009 Ash Storage Pond #2 Inspection Report, Dale Power Station, Ford, Kentucky* (DS CBI 000026-000068) provided information regarding history of Ash Pond 2 as well as pond conditions as of the observation date of July 1, 2009.

Stantec notes in their inspection report that documentation, dated August 13, 1992, provided to them by EKPC "indicated that a 90 feet long area of the western limits had erosion repairs constructed which included placing rip rap (crushed limestone channel lining)." Additionally, "the documentation also indicated that 650 feet of the western limits had trees removed to facilitate erosion repairs."

As noted previously, very little historical documentation, including design criteria, exists for Ash Pond 2. AMEC was not provided with documentation that clearly set any design or as-built conditions for Ash Pond 2; however, Stantec's report states that "early drawings for the ash storage impoundment indicate that the top of dike elevation for the ash pond would be 595.0 feet, and the bottom of the pond would be at approximate elevation 579.0[2] feet." Stantec refers to Ash Pond 2 as "an approximate 10-acre pond." This pond area appears to be more accurate, than the eight acre surface area figure provided by EKPC in their RRFI, when measured without the previously existing divider dike. Additionally, based on survey data collected during the site visit, Stantec notes that "the dikes encompassing the pond are approximately 23 feet high", which contradicts the 20 foot embankment height noted in the RRFI and to AMEC during the August 4, 2010 site visit[3]. Additionally, the crest was noted to vary "in elevation along its approximate center between 593.5[4] feet and 602.7 feet with an average of 595.5 feet." Stantec's report also indicates that crest elevations are higher in the southern portion and lower in the northern portions. One explanation, Stantec notes, could be caused by the initially constructed two connected pond condition. A historic topographic plan (DS CBI 000486) that

[2] Comments to the Draft Report provided by EKPC in January 2011 indicate that the elevation 579.0 feet referenced on page 1 of the Stantec report was a typographical error and that Section 5.2 of that report correctly reported the pond bottom elevation as 572.0 feet.

[3] Additional comments to the Draft Report provided by EKPC provide some clarification regarding the dike height issue. The original dike height may have been 23 feet (elevation 595.0 ft. - 572.0 ft.), but current conditions show the minimum dike height to be between 20 and 21 feet (elevation 592.8 ft. – 572.0 ft.)

[4] August 2010 S&ME report entitled *Engineering Study for Dale Power Station Ash Pond No. 2 Evaluation of Risks of 100-Yr Rain Event & Freeboard Requirement* notes a minimum crest elevation of 592.8 ft, based on field survey information.

was provided to AMEC substantiates Stantec's assertion. This topographic plan indicates operating water surface elevations for Ash Pond 1 (southern half) and Ash Pond 2 (northern half) of 589.8 feet and 586.2 feet, respectively.

Assessments and observations listed in the report that are applicable to this Draft Assessment Report are described below.

1. Stantec states that, according to information provided by EKPC, the western interior slopes were designed to be 2.5:1 (H:V). However, results of slope surveys by Stantec showed the north and east interior slopes ranged from 1.2:1 (H:V) to 2.6:1 (H:V).

2. Erosion rills and gullies were noted "throughout the interior slopes", with some areas considered "excessive".

3. Although northern exterior slopes ranged from 2.6:1 (H:V) to 2.1:1 (H:V) based on Stantec's survey results, these slopes were noted to be "well protected with Class III channel lining and appeared to be uniform with no signs of erosion or instability."

4. Assessment of exterior slopes along the southwestern portions of the pond was not possible due to "dense vegetation greater than 4 feet tall." Other exterior slopes were not assessed due to the existence of roadways, a coal stockpile and Ash Pond 3.

5. An area of ponded water was observed along the southern half of the western exterior slope. Poor drainage conditions and a water discharge or process piping system (possibly abandoned) seemed to be the source of the ponding.

6. A second area of ponded water existed along the northern edge of Ash Pond 3 and between Ash Pond 2 and Ash Pond 3. A plugged drain line located at the northwest corner of Ash Pond 2 was unplugged, allowing some water to flow back into Ash Pond 2. However, due to what appeared to be poor grading, some water remained ponded.

7. Possible instability or settlement on the western crest was observed in an area that, after review of aerial images and old drawings, appeared to be near the limits of the original divider dike that existed in Ash Pond 2. "This area contained two cracks or voids within the crest of the dike and signs of interior slope erosion." Recent construction appeared to have taken place along approximately 40 feet at the location and included "regrading and the placement of fill material on the crest and interior slope. Fill material appeared to consist of soil, rock, ash, coal particles, and crushed limestone," as well as a few pieces of wood and metal pipe.

Figure 5 provides a plan view of Ash Pond 2 that illustrates the location of the critical observations described above as well as the location of two embankment cross sections that were surveyed during Stantec's site visit. The two cross sections, labeled A-A' and B-B', are illustrated on Figure 6. These figures were originally provided by Stantec in their 2009 Inspection Report (DS CBI 000026-000068).

Although Stantec provided an overall rating of fair/satisfactory for the condition of Ash Pond 2, many critical items noted during the assessment resulted in recommendations "that were considered of high importance." Numerous engineering, programmatic and maintenance recommendations were provided and are described below.

1. Completion of an engineering study to determine sources of cracking and voids, as well as the source of water that was observed in two areas outside the ash pond.

2. Formalization of an Operation and Maintenance Plan for the facility.

3. Institution of a monitoring plan for the ash ponds and installation of monitoring and surface displacement monuments. Regular inspection of the ash ponds and related facilities, as well as regular data collection and reporting from the instrumentation.

4. Regrading plan to promote proper drainage (eliminate ponding) for areas outside Ash Pond 2 and Ash Pond 3.

5. Use of a 1992 survey completed by EKPC as a base map, to include a plant survey control, for all future facility modifications.

6. Improve monitoring of the interior slopes where erosion is occurring. Repair these areas promptly to prevent continuation of the erosion. Additionally, monitor crest for potholes and rutting and provide prompt repair by re-grading to promote flow toward the ash pond.

7. Improve mowing frequency of toe and external slope areas to three to four times per year to enhance monitoring and observation capabilities.

8. Continued monitoring of observed wet areas outside Ash Pond 2 in the vicinity of Ash Pond 3 to determine if conditions change.

9. The 30-inch discharge pipe located at the base of the pond's overflow structure should be evaluated for suitability and age.

10. Ash/sediment accumulation inside the overflow structure should be monitored to maintain unobstructed flow from the structure.

<u>Ash Pond 2 Current Conditions</u>

Subsequent to Stantec's July 2009 observations and recommendations, EKPC issued a document entitled *Request for Proposal, Engineering Services, Ash Dams and Landfill* (RFP) (DS CBI 000001-000025), dated November 23, 2009. This RFP set forth a scope of work for each of the three ash ponds, specifically requesting that Dale Ash Pond No. 2 be inspected and evaluated to provide the following;

> *Item B1 - Engineering study to evaluate the source of cracking, erosion and voids observed along the western limits of the pond,* and,
>
> *Item B2 - Engineering study for source of water; to evaluate the source observed along the toe of the southeastern portion of the west dike and between Ash Pond #2 and #3 to determine if seepage is occurring.*

The RFP also included Item B3, as discussed below in Section 1.4.3, that describes grading and drainage work for Ash Pond 3 and the area it shares with Ash Pond 2. However, the RFP did not include reference to any other of the recommendations provided by Stantec as a result of their site inspection. However, comments to the Draft Report, provided by EKPC in January 2011, note "the remaining items [recommendations] deal with inspections and monitoring that are incorporated in the standard operation of the Dale Station Coal Yard. EKPC has addressed all of the recommendations in the report."

In January 2010, EKPC contracted with Qore Property Sciences (now S&ME Inc.) to provide engineering services for Ash Pond 2 scope items B1 and B2 of the RFP (DS CBI 000498-000523). The original proposal (DS CBI 000528-000532) submitted by Qore Property Sciences made reference to a geotechnical exploration that was not listed in the RFP, but that was considered necessary to collect data for use in proposal items B1 and B2. These engineering studies concerning Ash Pond 2 are underway at this time.

1.4.3 Ash Pond 3

<u>EKPC Response to EPA Request for Information (RRFI)</u>

EKPC did not provide information regarding Ash Pond 3 to the EPA in response to the EPA's Request for Information. However, at the time of AMEC's site visit, former ash in the pond had been excavated (by comparison to 2009 inspection photos) and the pond was being used as a dewatering/ash stacking facility. A topographic plan view indicating the general location of Ash Pond 3 is included as Figure 7. This figure is based on a Lidar survey that was conducted in late 2009 to provide EKPC with more accurate embankment elevations and other useful information regarding the facilities. The history of this pond and its current condition are described below.

<u>Ash Pond 3 History</u>

According to conversations with EKPC and Dale Power Station personnel, Ash Pond 3 was designed and constructed as part of the original CCW disposal facilities at the station. Originally, ash was sluiced into Ash Ponds 1 and 3 with decant water from the sluiced ash routed into Ash Pond 2 prior to discharge into the Kentucky River. According to EKPC and Dale Power Station personnel, Ash Pond 3 experienced an embankment failure on December 11, 1975. EKPC notified KDOW of the failure and leak of an estimated 300 tons of CCW and 2 acre feet of decant water into the river, as well as the fact that Ash Pond 3 had been taken out of service (DS CBI 000085 - 000086). As a result, the station operated for a time with only Ash Pond 1 and 2 in service. According to conversations with EKPC personnel, in October 1975, just weeks prior to the failure in Ash Pond 3, they had received a permit to construct Ash Pond 4. We understand no other documentation is available concerning the history of Ash Pond 3. However, EKPC and Dale Power Station personnel have stated that, as of 1994, the pond was full and topped by a soil cover.

<u>Ash Pond 3 Current Conditions</u>

EKPC plans to use the area of Ash Pond 3 to stack ash dredged from Ash Pond 2, and to cover the stack with soil and regrade slopes once Ash Pond 4 is placed back into service. A 2009 RFP issued by EKPC (DS CBI 000001-000025), sets forth the scope of work required to prepare Ash Pond 3 for dry stacking operations. Specifically, the RFP requested that Dale Ash Pond 3 be inspected and evaluated to provide the following;

Item B3 - Design and Plans for re-grade of #3 Ponds for positive drainage; develop a re-grade plan and evaluate the stability in the area of the Dry Ash Pond #3 to create positive drainage into Ash Pond #2.

In January 2010, EKPC contracted with Qore Property Sciences (now S&ME Inc.) to provide engineering services for scope item B3 of the RFP (DS CBI 000498-000523).

Drawings, entitled *Construction Plans for Dale Ash Pond Number 3 Re-grading, Ford, Clark County, Kentucky*, (DS CBI 000448 - 000465) dated June 2010 and completed by S&ME Inc., outline the proposed re-grade of Ash Pond 3, as well as drainage improvements for the area. According to the drawings, the top of stack elevation is proposed to be 620 feet. The embankment is shown to initially contain 77,688 CY of ash fill, with an ultimate ash fill volume of 84,545 CY.

A trapezoidal ditch lined with Class II channel material, with bottom and top widths of two (2) feet and six (6) feet, respectively, and side slopes of 2:1 (H:V) is propsed to be constructed along the northern, eastern, and southern toe of the ash fill slope. Beginning at the southeast corner of Ash Pond 3 and proceeding approximately 360 feet along the Ash Pond 3 eastern toe of slope, the trapezoidal ditch is proposed to be directly adjacent to the downstream toe of the western embankment of Ash Pond 2. This channel is proposed to collect runoff from the majority of the ash stack and is shown to be graded to drain to Ash Pond 2 through an existing 15-inch corrugated metal pipe (CMP) located at the northwestern corner of Ash Pond 2.

1.4.4 Ash Pond 4

A topographic plan view of Ash Pond 4 is included as Figure 8. This figure is based on a Lidar survey conducted in late 2009 to provide EKPC with more accurate embankment elevations and other useful information regarding the facilities. Figure 9 illustrates typical Ash Pond 4 embankment cross sections taken from the pond's 1977 construction drawings (sheet 7, DSI CBI 000489 of set DS CBI 000477-000483).

<u>EKPC Response to EPA Request for Information (RRFI)</u>

According to documentation provided by EKPC in response to the EPA Request for Information under Section 104(e) of CERCLA, March 24, 2009 (DS 000001-000036), Ash Pond 4 was constructed in 1977. Final design drawings for Ash Pond 4, *East Kentucky Power Cooperative, Ash Storage Basis, Dale Station* (DS CBI 000477-000483), were completed by Stanley Consultants and dated November 18, 1977. The following information was provided by EPKC's response to EPA (DS 000001-00036); this pond has a total storage capacity of 230,000 CY, a corresponding surface area of 10.3 acres, and a maximum embankment height of 26 feet. Additionally, according to EKPC, the pond contained 180,000 CY of CCW as of August 22, 2008. Ash Pond 4 contains an ash mixture that is "approximately 20 percent bottom ash to 80 percent fly ash. Boiler slag and other constituents make up less than one percent of the volume of coal combustion products (CCB) stored in the ponds." The term "other constituents" was not defined by EKPC. Currently, Ash Pond 4 is not in service. Ash Pond 4 was designed and constructed, and is monitored by a professional engineer. Evaluations are periodically performed on this pond by EKPC's Vice-President of Production, as described above for Ash Pond 2.

2004 Evaluation of Corrective Measures Fly Ash Pond No. 4 Leakage

Fuller, Mossbarger, Scott and May Engineers Inc. (FMSM) authored a December 2004 report entitled *Evaluation of Corrective Measures for Fly Ash Pond No. 4 Leakage* (DS CBI 000329-000378). The report was written in response to a request by EKPC that the site be evaluated so that corrective measures could be designed that would stop the leakage that had been occurring, in FMSM's understanding, for "at least five years through the east side" of Ash Pond 4 "presumably through the limestone bedrock formation underlying the dike." Based on the results of the geotechnical exploration and topographic survey, FMSM provided recommendations for three individual, possible corrective actions that included installation of a cutoff trench, a partial clay liner, or a partial flexible membrane liner. The "Conclusions and Recommendations" section of the report states;

> *The pressure testing performed and rock cores obtained from the different borings suggest that soft shale seams, fractures and voids within the limestone bedrock underlying the east side of the dike provide seepage paths for water and fly ash to leak out of the pond. Although a seep has been noted surfacing along a small drain located east of the pond, it is possible there are other locations where leaks surface.*
>
> *Because of the karst features present within the underlying bedrock, the measures to reduce or control the leakage need to be applied to the entire pond. Otherwise, the potential for leakage to occur will not be eliminated.*

FMSM was directed by EKPC to focus "on the east side of the pond where the leakage is known to occur" as a first course of action. Following FMSM's investigation, they recommended that "the east side of the pond be lined either using clay soil or a flexible membrane liner", citing "cost and the relative ease for potential future expansion," for the choice.

EKPC noted in their comments to the September 2010 Draft Report comments that they do "not believe that FMSM's intent was to say that the No. 4 pond had been leaking continuously for the past five years, but that five years ago leakage had occurred at that location that was corrected upon discovery." EKPC also noted that intent for the 2004 FMSM investigation was to "look at a permanent fix to ensure the leakage did not recur in the future." FMSM's 2004 report noted that the first attempt to stop or reduce the leaks are detailed in a November 2000 report by T. Luckey Sons Inc., as described later in this section.

2009 Ash Storage Pond No. 4 Inspection Report

A February 2010 report, completed by Stantec Consulting Services, entitled *2009 Ash Storage Pond No. 4 Inspection Report, Dale Power Station, Ford, Kentucky* (DS CBI 000069-000120) identifies and describes the following occurrences which detail a lengthy history of leakage from the impoundment, as well as control or repair attempts.

> *In August 1978, a report by Stokely-Cheeks & Associates was issued to EKPC regarding Ash Pond No. 4 leakage along the north side of the pond. The report recommended that a grout curtain be constructed along the north side of the pond to stop or reduce the potential for ash leakage. Following issuance of Stokely-Cheeks & Associates report, EKPC reportedly hired Stanley Consultants for the design and construction of a bentonite curtain. Reportedly, this measure resolved the ash leakage along the north side of the impoundment.*

Additional repair measures were reportedly completed by EKPC in 1998 along the northern limits of the pond. It is understood that a trench was dug down into weathered bedrock, and the resulting excavation was backfilled with concrete.

In 2000, a report by T. Luckey Sons Inc., dated November 15, 2000 and titled Chemical Grouting Fly Ash Pond No. 4, describes attempts made to stop or reduce the leakage by injecting chemical grout into 4-inch holes drilled to a maximum depth of 30 feet and forming a grout cutoff wall along the east side of the dike. The holes were reportedly drilled along a line on 15-foot centers, and followed by a second series of holes drilled in between the first series of holes to insure that the chemical grout was continuous form hole to hole. The report also confirms that there were multiple locations that exhibited large fractures and voids in the rock formation, and that fly ash was noted in several locations of such fractures and voids. During this time period Fuller, Mossbarger, Scott and May Engineers, Inc. was also hired to perform rock coring to follow up in helping to identify other voids/karst features within the vicinity of the grout repair area.

In 2004 EKPC contracted Stantec (formerly Fuller, Mossbarger, Scott & May Engineers, Inc.) to investigate water and fly ash that had been leaking…..through the east side of the Dale Station - Fly Ash Pond No. 4, presumably through the limestone bedrock formation underlying the dike. Reportedly, the leakage surfaces [were located] *along a natural drain* [which was] *located approximately 300 feet east of the dike. Subsurface information obtained from borings advanced by Stantec along the eastern dike indicates that the top of the bedrock varies in elevation significantly and the underlying limestone bedrock includes voids (karst features). A report,* (Evaluation of Corrective Measures Fly Ash Pond No. 4 Leakage, DS CBI 000329-000378) *was completed by Stantec* (FMSM) *in December 2004 in which three corrective measure alternatives and their estimated costs were evaluated for repair/treatment of the east side of the pond where leakage is known to occur. EKPC proceeded to construct a 5-foot soil wedge extending from the bentonite curtain along the northeast to the middle of the crest along the southeastern limits of the dike. EKPC reported this measure effectively stopped any noticeable leaking through the dike.*

It is Stantec's understanding that on August 22, 2008, a whirlpool was observed by EKPC personnel approximately 60 feet from the crest of the dike along the eastern side. EKPC then observed leakage surfacing along a natural drain located approximately 300 feet east of the dike. Upon observing the whirlpool and seepage EKPC stopped ash disposal into the pond, began dewatering the pond and notified the proper authorities of the observations. Due to leakage EKPC has stopped sluicing ash to the pond and is currently excavating existing ash material. Reportedly, EKPC plans to have all ash excavations completed by fall 2010, perform maintenance activities and have the pond back to an active ash storage facility by summer 2011.

Assessments and observations listed in the report that are applicable to this Draft Assessment Report are described below.

1. Survey of the existing crest elevation found it to be an average of 604.5 feet, one half foot below the design elevation of 605 feet.

2. Field measurement of interior slopes indicated they ranged from 2.3:1 (H:V) to 2.9:1 (H:V). Interior slopes were designed to be 2.5:1 (H:V).

3. Exterior slopes were designed to be 3:1 (H:V), however, survey data indicated that the exterior slopes ranged from 2.6:1 (H:V) to 2.9:1 (H:V). However, these slopes were said to be uniform with no signs of erosion of instability present. Several "large mature trees were observed near the exterior toe of the ash pond, particularly along the Kentucky River banks and northern limits of the pond."

4. In many areas, the buffer zone located along the western limits of the pond was found to be less than the originally constructed design width of 30 feet. The smallest section was located at the point of a 2004 landslide (discussed below). The buffer width at this section was measured to be 9 feet wide between the toe of the embankment and the top of the scarp.

5. Ponded water was noted in at least six areas along the 30-foot buffer zone located at the exterior western embankment toe. The source of the water was noted to be unclear since Ash Pond 4 had been drained entirely in 2008, the previous year.

6. Survey of the crest found that width averaged 18 feet, which is greater than the crest design width of 15 feet.

7. Comparison between topographic survey data that was obtained by Stantec during the inspection and elevation data that was obtained in 2004, indicated that an eastern dike crest segment, which extends from roughly the entrance from KY 1924 to the portion directly above the spillway, showed settlement ranging from 0.6 feet to 1 foot near the center portion of the crest.

8. Sediment and ash was noted to have accumulated in the lower portion of the pond's discharge structure. It was noted that debris, left uncleared, could create blockages that would negatively affect the structure's discharge capacity.

Figure 10 provides a plan view of Ash Pond 4 that illustrates the location of the critical observations described above, as well as the location of two embankment cross sections that were surveyed during Stantec's site visit. The two cross sections, labeled C-C' and D-D', are illustrated on Figure 11. These figures were originally provided by Stantec in their 2009 Inspection Report (DS CBI 000069-000120).

Stantec stated that the overall condition of Ash Pond 4 "appears to be poor to fair" based on the results of their inspection. Additionally, Stantec noted the many of the recommendations that they provided in this report "are considered of high importance, while others pertain to general maintenance that should be performed to limit future concerns." Stantec specifically cited as critical, the "karst or subgrade crevice feature" related to the whirlpool, as well as the active landslide located at the base of the western exterior embankment toe. While not critical, the areas of ponded water were noted to be important. Engineering and programmatic recommendations are described below.

1. Not returning Ash Pond 4 to service until the source of the leak is repaired.

2. Creation of a facility "Operations and Maintenance Plan" that would contain an emergency action plan for the ash pond.

3. Periodically updating the pond's topographic survey to "reflect current site conditions," as well as "to note and update any modifications performed within the facility."
4. Institution of a monitoring plan that includes "piezometers, slope inclinometers and surface monuments" that should be "concentrated along the southern and western dike segments."

5. Alleviate areas of ponded water by filling and re-grading such locations to drain to the river.

6. Re-establishment of the 30-foot (design) buffer zone.

Maintenance recommendations are listed below.

1. Requesting additional engineering evaluations regarding the karst and seepage issues prior to placing the pond back into operation.

2. Repair of the interior pond slopes that showed erosion, rills, and gullies, to include re-grade operations to attain original design configuration.

3. Removal of large trees located at the toe of slope along the river to at least 15 feet from the toe.

4. Toe area mowing to be performed as needed, at least three to four times per year.

5. Continued monitoring of the wet areas of ponded water.

6. Evaluation of the 12-inch corrugated metal pipe (CMP) located at the bottom of the discharge structure. Typical design life for CMP was noted to be 30 years, depending on amount of use.

7. Installation of a walkway to the overflow structure to allow for better access, observation, and maintenance. Also, removal of accumulated ash and sediment currently inside structure.

8. Repair and re-grading of the ash pond crest to the design elevation of 605.0 feet.

<u>Stantec Consulting Services 2009 River Bank Stability Near Ash Storage Pond #4 Inspection Report</u>

Additionally, a February 2010 report, completed by Stantec Consulting Services, entitled *2009 River Bank Stability Near Ash Storage Pond #4 Inspection Report, Dale Power Station, Ford, Kentucky* (DS CBI 000121-000150) identifies that Stantec conducted a geotechnical exploration in August 2004 in response to a landslide that had occurred below the toe of the southwestern portion of the downstream embankment of Ash Pond 4. The report that resulted from the August 2004 exploration, not provided to AMEC, apparently summarized a topographic survey that was completed in August 2004 to determine the "approximate limits of the landslide." The report addressed "recommendations for immediate countermeasures including vegetation removal, re-grading the landslide area, re-vegetating the area and installing two slope inclinometers to monitor movement." Long term recommendations were stated as well, and included "possible corrective measures such as a piling wall, tie-back wall or toe berm."

The 2009 riverbank stability inspection report also provides an assessment summary for the area to the west and south of Ash Pond 4, between the pond's embankment and the Kentucky River. Assessment of the area noted the following items.

1. Dense vegetation along the riverbank that included mature trees, grasses, and brushy undergrowth that hampered inspection;

2. Variability in riverbank slopes, gentle slopes to the south and steep to near vertical in the northern portion;

3. Presence of alluvial, easily eroded soils and dessication cracks throughout the observed area;

4. Movement, based on survey data, noted in top of scarp from the landslide (dimensioned at 45 feet by 175 feet) of "approximately 2.5 feet toward the toe of Ash Pond 4 from 2004 to 2009";

5. Erosion of the 30-foot wide buffer zone that existed between Ash Pond 4 and the river. A minimum buffer width of 9-feet was noted to exist in some areas;

6. Bank undermining and erosion along the river's edge, most notably in an area approximately 200 feet north of the limits of the landslide; Stantec noted that it considers this area as having "excessive erosion" and calls it "marginally stable"; and,

7. Leaning trees along the river bank that indicate "river migration, erosion of alluvial soils and/or undermining, and slope movement."

Figure 12, provided by Stantec in the riverbank stability inspection report, illustrates changes in the landslide from 2004 to 2009.

Stantec stated that the "overall condition of the riverbank and how it affects the integrity of Ash Pond No. 4 is poor due to the observed landslide." Additionally, Stantec noted the many of the recommendations that were provided in their report "are considered of high importance, while others pertain to general maintenance that should be performed to limit future concerns." Stantec specifically cited as critical, the "landslide and excessive bank erosion observed north of the landslide area." Concerning the landslide, Stantec noted;

> *Although the actual cause of the landslide is unknown, similar riverbank failures are usually attributed to unusual changes in the river level, localized steepness of the riverbank, unusually wet bank conditions due to surface runoff during heavy rain or snow precipitation, or a combination of these factors. Also, drastic changes in the water level of the river can cause a rapid groundwater drawdown within the alluvial deposits, which in turn can cause a bank failure. In this case, the alluvial deposits and the normal water level of the river make it practically impossible to find out the full extent of the failure, which hinders any efforts to determine the cause of the slide. Even though certain types of instrumentation could be installed within land borings to determine the slip plane location, the river would prevent locating the toe of*

the slide if it is assumed the slide actually toes out within the river channel. A hydrographic survey could be performed in the river adjacent to the slide area. The technology may help define the limits of the slide within the river.

Engineering and programmatic recommendations are described below.

1. Conduct further engineering study to develop and construct a repair to the landslide. Following repair, maintain the area to control any expansion.

2. Repair erosion and undermining of the riverbank slopes by backfilling or re-grading or installing a piling wall, tie-back wall or a toe berm.

3. As recommended in Ash Pond 4 Inspection Report, alleviate areas of ponded water by filling and re-grading such locations to drain to the river.

4. As recommended in Ash Pond 4 Inspection Report, re-establish the 30-foot (design) buffer zone located between the western exterior embankment toe and the river.

Maintenance recommendations are listed below.

1. Repair existing areas of minor erosion along river banks, monitor and repair erosion rills and gullies as they are formed.

2. As recommended in Ash Pond 4 Inspection Report, remove large trees located at the toe of slope along the river to at least 15 feet from the toe.

3. As recommended in Ash Pond 4 Inspection Report, the toe area of the buffer zone and riverbank area should be mowed as needed, at least three to four times per year.

<u>Ash Pond 4, Adjacent Buffer Area and Riverbank Current Conditions</u>

Subsequent to Stantec's July 2009 observations and recommendations regarding Ash Pond 4 and the river bank stability near Ash Pond 4, EKPC issued a document entitled *Request for Proposal, Engineering Services, Ash Dams and Landfill* (RFP) (DS CBI 000001-000025), dated November 23, 2009. This RFP set forth a scope of work for each of the three ash ponds, specifically requesting that Dale Ash Pond 4 and its buffer area be inspected and evaluated to provide the following;

Item C1 - Design and plans for a repair of ash pond #4; engineering study, design and development of detailed construction plans to repair the #4 Pond with an 80 mil poly membrane liner and under drain system for a wet sluicing pond;

Item C2 - Alternate: Design and plans for a conversion of ash pond #4 to a landfill; engineering study, design and development of detailed construction plans for the repair of the #4 pond with a geosynthetic liner and under drain system for dry ash placement;

Item C3 - Phase I. Engineering study to evaluate the 30 ft. buffer zone design to the edge of the river in the area of the slide; and, *Item C4 - Phase II buffer inadequate. Study, design and plans for a river bank repair adjacent to #4 pond; engineering study, design and development of detailed construction plans for the repair of the river bank slide adjacent to pond #4.*

In January 2010, EKPC contracted with Qore Property Sciences (now S&ME Inc.) to provide engineering services for scope items C1 through C4 of the RFP (DS CBI 000498-000523). Qore Property Sciences added geotechnical investigations to scope items C1 (C1-1), C2 (C2-1), and C4 (C4-1), that they maintain would be necessary to collect data for use in finalizing plan designs. As of August 10, 2010, scope items C-1, C-3, and C4-1 had been authorized.

Documents entitled *Technical Specifications for Seepage Correction of Ash Pond No. 4 at Dale Power Station* (DS CBI 000329-000424) and *Dale Ash Pond No. 4 Seepage Correction Drawings* (DS CBI 000466-476) were completed in response to the November 2009 *RFP* noted above. These documents, both prepared by S&ME Inc., are dated May and June 2010, respectively, and outline a proposed repair for Ash Pond 4. The repair method detailed in the S&ME Inc. document includes seepage correction through placement of a flexible, 60 mil geomembrane liner, in conjunction with clay anchors and layers of No. 9 crushed stone and Class III channel lining, each with thickness equal to 1.5 feet. Seepage correction will be performed over an area located from the top of dike along the eastern edge, down the embankment face and approximately 100 feet into the body of the impoundment, over a distance of nearly 600 feet. The embankment face will be graded to a slope of 3:1 (H:V) prior to placement of the seepage correction materials. Additionally, the S&ME Inc. specifications and drawings include instructions pertaining to a reverse filter that is to be constructed in an existing sinkhole (apparently located during a post whirlpool investigation of the pond). It was stated that the reverse filter will allow subsurface drainage to continue without allowing fines to migrate into the sinkhole. The sinkhole location shown on S&ME's *Seepage Correction Drawings* is very near the observed whirlpool location shown on the Site Aerial Map from Stantec's 2009 Ash Storage Pond No. 4 Inspection Report. Stantec's Site Aerial Map is included as Figure 10 of this Draft Assessment Report.

EKPC plans to complete the leakage repair construction over the eastern portion of the pond interior before finalizing decisions regarding future pond operations. FMSM noted in their *2004 Evaluation of Corrective Measures Report* that it would be possible to initially place the clay or flexible membrane liner over a portion of the pond then extend the soil or liner boundary in the future, if necessary. EKPC stated that their prevailing thought at this time is that Ash Pond 4 will be utilized for dry storage purposes in the future. As a result of the construction and repairs in Ash Pond 4, Ash Pond 2 currently receives all liquid-borne CCW, both bottom and fly ash, produced by Dale Power Station.

1.5 Previously Identified Safety Issues

In their response to Question 5 of EPA's Request for Information, EKPC stated that "on August 20, 2008 a small leak was detected in Ash Pond #4." The response continues with a summary of actions taken as described previously.

In their response to Question 7 of EPA's Request for Information, EKPC stated that "there have been no assessments, evaluations, or inspections conducted by the State or Federal regulatory officials on Dale Power Station's dams within the past year. See response to Question No. 5 above."

There was no documentation provided regarding any response from KDOW on the reported release from Ash Pond 3 in 1975 and from Ash Pond 4 in 2008. Additionally, no documentation was provided that detailed whether the releases/fixes from the 1978, 1998, 2000, and 2004 events discussed in the 2009 Stantec inspection at Ash Pond 4 were reported to, or responded to, by KDOW.

1.6 Site Geology

Fuller Mossbarger Scott & May (FMSM) Engineers completed *Evaluation of Corrective Measures Fly Ash Pond No. 4 Leakage* for the Dale Power Station, dated December 2004. The site geology was described within the report as follows;

> *Available geologic mapping (Geologic Map of the Ford Quadrangle, Kentucky, USGS, 1968) shows the site to be underlain by bedrock belonging to the Camp Nelson formation of the Middle Ordovician period. The Camp Nelson Limestone is described as limestone interbeded with dolomite. The limestone is light-brownish-gray in color, cryptograined and argillaceous in the upper part. The dolomite is described as brownish-yellow, very finely crystalline grained, occurs as irregular fingers and weathers differentially with the surrounding limestone. This weathering process results in honeycomb surfaces within the limestone mass.*

The report further describes faults associated with the Kentucky River Fault Zone. The report states that;

> *Structure contours drawn on the base of the Brannon Member of the Lexington Limestone Formation indicate a general rock strata dip to the east at approximately 75 feet per mile. Numerous faults associated with the Kentucky River fault Zone are located within the immediate vicinity of the site. The closest mapped fault is located 700 feet north of the site with numerous faults located in the west-northwest direction. However, these faults are not known to have been active in recent geologic time. As a result of the fault system two large basins, measuring approximately 1,300 feet and 1,400 feet along their major axis, are located near the project site. The smaller basin is located roughly 2,300 feet northwest of the project site and the larger basin is mapped 3,000 feet west of the pond.*

The "Conclusions and Recommendations" section of the report states that;

> *The pressure testing performed and rock cores obtained from the different borings suggest that soft shale seams, fractures and voids within the limestone bedrock underlying the east side of the dike provide seepage paths for water and fly ash to leak out of the pond. Although a seep has been noted surfacing along a small drain located east of the pond, it is possible there are other locations where leaks surface.*

1.7 Inventory of Provided Materials

EKPC provided AMEC with documentation pertaining to the design and operation of Dale Power Station. These documents were used in the preparation of this report and are listed in Appendix C, Inventory of Provided Materials.

2.0 FIELD ASSESSMENT

2.1 Visual Observations

AMEC performed visual assessments of Plant Dale's three ash pond units on August 4, 2010. Assessment of the ash ponds was completed in general accordance with *FEMA's Federal Guidelines for Dam Safety, Hazard Potential Classification System for Dams, April 2004*. The EPA Coal Combustion Dam Inspection Checklist and Coal Combustion Waste (CCW) Impoundment Inspection Forms were completed for each ash pond during the site visit. The completed forms were provided to the EPA via email four business days following the site visit. Copies of the completed checklists are included in Appendix A. In addition to completing the checklist and assessment forms, photographs were taken of each impoundment during the site visit. Photo site location maps and descriptive photos are included in Appendix B.

2.2 Ash Pond 2 -Visual Observations

Ash Pond 2 is currently active and receives/contains fly ash, bottom ash, boiler slag, coal pile runoff and other constituents. The northern section of the west dike is a common dike with Ash Pond 3. A surface boom skimmer is located across the middle area of the pond.

2.3.1 Ash Pond 2 - Embankments and Crest

The ash pond has a side-hill configuration, and a freeboard of approximately 4 feet between the top of ash and top of dike was observed during the site visit (photo 2-4). The crest of the dam was primarily surfaced with crushed stone (photos 2-5, 2-6, and 2-12). The surface of the downstream embankment was covered with rock on the northern dike, rip-rap and crushed stone on the eastern dike (photos 2-3 and 2-6), and grass along the western dike (photo 2-12). A small depression was observed near the toe of the rip-rap cover on the west side of the north dike. The western dike appeared to be maintained and mowed at the time of the site visit. The upstream slopes were typically covered with rock and crushed rock (photos 2-4, 2-6 and 2-11). It appeared that uneven and/or steep slopes and isolated areas of slight to moderate erosion may be present on the south end of the pond, especially on the south dike where the height of the slopes are greater (photos 2-6, 2-8, 2-9 and 2-11). Actual embankment slopes may have been obscured (or disturbed) due to the presence and recent removal of ash.

2.3.2 Ash Pond 2 - Outlet Control Structure

The primary outlet for Ash Pond 2 is a concrete structure connected to a 24-inch diameter concrete discharge pipe (photo 2-1). The concrete structure supports a floating perimeter skimmer and adjustable stop log unit which facilities water level adjustment as needed, based on facility operations. The outlet control structure is located at the north end of the pond. Flow from this primary outlet structure is conveyed through the 24-inch diameter concrete pipe to a discharge point which is located at the downstream toe of the north embankment (photos 2-2 and 2-3). The discharge outfall is a natural channel which discharges to the Kentucky River.

2.3 Ash Pond 3 - Visual Observations

Ash Pond 3 is located adjacent and to the west of Ash Pond 2. The pond is currently considered inactive, as it receives no liquid-borne material, but active in the sense of being utilized for ash stacking purposes for ash dredged from Ash Pond 2 (photo 3-1). The eastern dike of Ash Pond 3 is adjacent to Ash Pond 2.

2.3.1 Ash Pond 3 - Embankments and Crest

The north and south dikes of Ash Pond 3 were generally covered with grass. The west dike was covered with trees (photo 3-2). The eastern dike is adjacent to Ash Pond 2 and the crest is covered with crushed rock.

2.3.2 Ash Pond 3 - Outlet Control Structure

Ash Pond 3 had no visible outlet. It appeared that ponded water that collects in the pond is conveyed by a portable pump to Ash Pond 2 (photo 3-1). Review of provided documentation showed that a 15-inch pipe exists in the upper northeast portion of the Ash Pond 2 embankment. This pipe is planned to serve to convey discharge from the runoff collection channel, proposed for most of the perimeter of the dry ash stack in Ash Pond 3, into Ash Pond 2.

2.4 Ash Pond 4 - Visual Observations

Ash Pond 4 is located to the south of the plant and is active. However, the pond was not receiving liquid-borne CCW materials at the time of the site visit. Due to a leak in 2008, the pond was taken out of service in order to dewater, remove the ash, and perform maintenance activities. At the time of the site visit, the ash was being excavated and transported off site to a permitted ash landfill (photos 4-1, 4-8 and 4-11).

2.4.1 Ash Pond 4 - Embankments and Crest

Ash Pond 4 generally has a diked configuration. The center portion of the north embankment ties into a hillside/natural ground (photo 4-8 and 4-11). A freeboard of approximately 26 feet was visible during the site visit. The upstream embankment is covered with rock (photos 4-1, 4-7, 4-8, 4-10, 4-13 and 4-14). The crest of the dam was surfaced with crushed stone (photo 4-7, 4-8, 4-10 and 4-14). The surface of the downstream embankment was covered with rock (photos 4-6 and 4-12). Areas with apparent over-steepened slopes from the 3:1 (H:V) design were noted on the downstream slopes (photos 4-6 and 4-12). A buffer area was observed below the toe of the downstream embankment on the east dike (photo 4-6). Vegetation and trees were observed up to and slightly above the downstream toe of the west and south dikes (photo 4-12). The crest of the dike appeared wider than the design width of 15 feet (photo 4-7 and 4-14). Roadways, assumed constructed for current repair work, were observed on the upstream slopes of the east, north and west dikes (photos 4-7, 4-8, 4-10, 4-11 and 4-14). An excavated sump and a severely eroded area on the upstream slope of the south dike were observed at the location of pump utilized to remove water from the pond during construction (photo 4-13). HDPE pipes used to convey CCW from Ash Pond 4 to Ash Pond 2 were observed on the interior side of the crest of the south and west dikes (photo 4-14).

2.4.2 Ash Pond 4 - Outlet Control Structure

The inlet of the primary outlet structure for Ash Pond 4 consists of a concrete structure connected to a 12-inch diameter corrugated metal discharge pipe. The concrete structure supports a floating perimeter skimmer and adjustable stop log unit, which facilitates water level adjustment as needed, based on facility operations (photos 4-1 and 4-2). The inlet is located at the southeast end of the pond. The outlet is located beyond the toe of the downstream embankment and discharges to a concrete drainage ditch that ultimately discharges to the Kentucky River (photos 4-3, 4-4, and 4-5).

2.5 Monitoring Instrumentation

Impoundment monitoring equipment/instrumentation was not historically, and is not currently, used at the Plant Dale facility.

3.0 DATA EVALUATION

3.1 Design Assumptions

This section provides a summary of accepted minimum design criteria for dams and impoundments with respect to hydrologic, hydraulic and stability design of those structures. The relevant, methodology, design criteria, data, and analyses information that was provided for the particular project impoundments concerning hydrologic and hydraulic issues, as well as for structural adequacy and stability issues, is then presented and compared to the accepted minimum industry criteria.

3.2 Hydrologic and Hydraulic Design

KDOW Minimum Criteria

The Kentucky Department for Natural Resources and Environmental Protection, Division of Water, Engineering Memorandum No. 5 (EM No. 5), Section C, provides minimum hydrologic design criteria for all dams, as defined by KRS 151.100, and all other impounding obstructions which might create a hazard to life or property, that are constructed within the state of Kentucky. EM No. 5 provides equations to determine the minimum hydrologic criteria to be used in the development of emergency and spillway hydrographs for the structures. Definitions provided in EM No. 5 for emergency and hydrograph spillways are as follows:

> "The emergency-spillway hydrograph is that hydrograph used to establish the minimum design dimensions of the emergency spillway."

> "The freeboard hydrograph is the hydrograph used to establish the minimum elevation of the top of the dam."

Precipitation values to be used in determination of the emergency and freeboard hydrographs for low, moderate, and high hazard class dams are provided by EM No. 5 and are as follows. .

Emergency Spillway Hydrograph

Class (A) Low Hazard Structure	$P_A = P_{100}$	(1)
Class (B) Moderate Hazard Structure	$P_B = P_{100} + [0.12 \times (PMP - P_{100})]$	(2)
Class (C) High Hazard Structure	$P_c = P_{100} + [0.26 \times (PMP - P_{100})]$	(3)

Freeboard Hydrograph

Class (A) Low Hazard Structure	$P_A = P_{100} + [0.12 \times (PMP - P_{100})]$	(4)
Class (B) Moderate Hazard Structure	$P_B = P_{100} + [0.40 \times (PMP - P_{100})]$	(5)
Class (C) High Hazard Structure	$P_c = PMP$	(6)

where, P refers to 6-hour precipitation, P_{100} refers to 6-hour, 100-year precipitation, and PMP refers to 6-hour Probable Maximum Precipitation.

According to EM No. 5, the freeboard hydrograph rainfall depth established by the equation “does not eliminate the need for sound engineering judgment but only establishes the lowest limit of design considered acceptable.” Several sources are provided in EM No. 5 regarding where to obtain rainfall values to use in the equations. Engineering Memorandum No. 2 (EM No. 2), issued by KDOW and last revised on June 1, 1979, is entitled “Rainfall Frequency Values for Kentucky”, and is noted as an acceptable data source for rainfall data for locations in Kentucky.

With respect to the principal spillway, EM No. 5 states that “It is desirable that the retarding pool be emptied in ten (10) days or less. It may be assumed that this requirement has been met if eighty (80) percent of the maximum volume of retarding storage has been evacuated in the ten (10) day period.” KDOW defines retarding pool at “the reservoir space allotted to the temporary impoundment of floodwater. Its upper limit is the elevation of the crest of the emergency spillway.” According to discussions with KDOW Dam Safety personnel, In the absence of an emergency spillway, the upper limit would be considered to be the crest of the dam.

Emergency spillway hydrographs are to be routed “through the reservoirs beginning at the water surface elevation of the principal spillway or the water surface elevation after 10 days drawdown, whichever is greater.” Class (A) and (B) structures shall have freeboard “routed through the structure beginning at the same water surface elevation as for the emergency spillway hydrograph.” The crest of the principal spillway shall be the starting point for routing hydrographs for Class (C) structures.

Additional discussions with the Dam Safety Division of KDOW indicate that in that absence of an emergency spillway, the crest of the dam is considered the uppermost elevation. A temporary water surface may exist within an impoundment as a result of the design storm occurrence; however, the discharge structure must be shown to be capable of returning the water surface elevation to normal levels within 10 days following the storm. Routing hydrographs are necessary to show the discharge capabilities of the principal spillway within the structure. Stability analyses that reflect adequate stability for the “pond full” condition are also important.

Mine Safety and Health Administration Minimum Criteria

Chapter 8 - Impoundment Design Guidelines of the Mining Safety and Health Administration (MSHA) Coal Mine Impoundment Inspection and Plan Review Handbook (Number PH07-01) published by the U.S. Department of Labor, Mine Safety and Health Administration, Coal Mine Safety and Health, October 2007 provides another source for minimum hydrologic design criteria.

When detailing impoundment design storm criteria, MSHA states that dams need “to be able to safely accommodate the inflow from a storm event that is appropriate for the size of the impoundment and the hazard potential in the event of failure of the dam.” Additionally, MSHA notes that sufficient freeboard, adequate factors of safety for embankment stability, and the prevention of significant erosion to discharge facilities, are all design elements that are required for dam structures under their review. Additional impoundment and design storm criteria are as shown in Table 2, MSHA Minimum Long Term Hydrologic Design Criteria.

Table 2. MSHA* Minimum Long Term Hydrologic Design Criteria

Hazard Potential	Impoundment Size	
	< 1000 acre-feet **< 40 feet deep**	**≥ 1000 acre-feet** **≥ 40 feet deep**
Low - Impoundments located where failure of the dam would result in no probable loss of human life and low economic and/or environmental losses.	100 - year rainfall**	½ PMF
Significant/Moderate - Impoundments located where failure of the dam would result in no probably loss of human life but can cause economic loss, environmental damage, or disruption of lifeline facilities.	½ PMF	PMF
High - Facilities located where failure of the dam will probably cause loss of human life.	PMF	PMF

*Mining Safety and Health Administration (MSHA) Coal Mine Impoundment Inspection and Plan Review Handbook (Number PH07-01) published by the U.S. Department of Labor, Mine Safety and Health Administration, Coal Mine Safety and Health, October 2007
**Per MSHA, the 24-hour duration shall be used with the 100-year frequency rainfall.

Probable maximum flood (PMF) is, per MSHA, "the maximum runoff condition resulting from the most severe combination of hydrologic and meteorological conditions that are considered reasonably possible for the drainage area." Additionally, MSHA notes the designer should consider several components of the PMF that are site specific. These components are said to include: "antecedent storm; principal storm; subsequent storm; time and spatial distribution of the rainfall and snowmelt; and runoff conditions." Basic agreement, it was noted, exists between dam safety authorities regarding "combinations of conditions and events that comprise the PMF;" however, there are "differences in the individual components that are used." MSHA provided the following as a "reasonable set of conditions for the PMF:

- Antecedent Storm: 100-year frequency, 24 hour duration, with antecedent moisture condition II (AMC II), occurring 5 days prior to the principal storm.

- Principal Storm: Probable maximum precipitation (PMP), with AMC III. The principal storm rainfall must be distributed spatially and temporally to produce the most sever conditions with respect to impoundment freeboard and spillway discharge.

- Subsequent Storm: A subsequent storm is considered to be handled by meeting the "storm inflow drawdown criteria," as described subsequently in the document.

With regard to storm influent drawdown criteria, MSHA Impoundment Design Guidelines noted that:

> *Impoundments must be capable of handling the design storms that occur in close succession. To accomplish this, the discharge facilities must be able to discharge, within 10 days, at least 90 percent of the volume of water stored during the design storm above the allowable*

> *normal operating water level. The 10-day drawdown criterion begins at the time the water surface reaches the maximum elevation attainable for the design storm. Alternatively, plans can provide for sufficient reservoir capacity to store the runoff from two design storms, while specifying means to evacuate the storage from both storms in a reasonable period of time - generally taken to be at a discharge rate that removes at least 90% of the second storm inflow volume within 30 days………When storms are stored, the potential for an elevated saturation level to affect the stability of the embankment needs to be taken into account.*

In Mineral Resources Department of Labor Mine Safety and Health Administration Title *30 CFR § 77.216-2 Water, sediment, or slurry impoundments and impounding structures; minimum plan requirements; changes or modifications, certification*, information relevant to the duration of the probable maximum precipitation is given. Sub-section *(10)* of *77.216-2* states that a "statement of the runoff attributable to the probable maximum precipitation of 6-hour duration and the calculations used in determining such runoff" shall be provided at minimum in submitted plans for water, sediment or slurry impoundments and impounding structures.

The definition of design freeboard, according to the MSHA Guidelines, is "the vertical distance between the lowest point on the crest of the embankment and the maximum water surface elevation resulting from the design storm." Additionally, the Handbook states that "Sufficient documentation should be provided in impoundment plans to verify the adequacy of the freeboard." Recommended items to consider when determining freeboard include "potential wave run-up on the upstream slope, ability of the embankment to resist erosion, and potential for embankment foundation settlement." Lastly, the Handbook states, "Without documentation, and absent unusual conditions, a minimum freeboard of 3 feet is generally accepted for impoundments with a fetch of less than 1 mile."

3.2.1 Ash Pond 2

An August 2010 report by S&ME Inc., titled *Engineering Study for Dale Power Station Ash Pond No. 2 Evaluation of Risks of 100-Yr Rain Event & Freeboard Requirement*, provides a hydrologic analysis that is specific to Ash Pond 2.

As part of the assessment of Ash Pond 2 for this study, S&ME conducted a hydrographic survey of the pond using a reflectorless prism method for areas with CCW present. In northern areas of the pond, with little to no CCW present (water only), a weighted tape measure, total station, and prism pole method was used to determine depth to ash. Carlson Survey software was used to process the data and produce a topographic map of the pond bottom. The bottom map was then merged with a Lidar surface topographic file that was created late in 2009. As a result, drawings illustrating the existing conditions for four typical crest to crest pond cross sections, as well as a dam crest (inside, center, and outside elevation) profile were produced and included in the S&ME report. These drawings are included in Appendix D of this draft assessment report. It is apparent from the existing crest elevation drawings that over 70 percent (Station 0+00 to Station 21+00 of Station 28+00 total) of the dam crest's existing elevation is less than the Kentucky River's 100-year flood stage elevation at that location.

Table 3 below identifies various existing and proposed elevation conditions related to the hydrologic analysis of Ash Pond 2 that were summarized in the S&ME report.

Table 3. Ash Pond 2 Elevation Conditions

Elevation Condition	Elevation*
Kentucky River 100-year (Base) Flood Elevation (ft)	595.0
Existing Dam Crest Minimum Elevation (ft)	592.8
Pond Bottom Elevation	572.0
Current Operating Water Surface Elevation (ft)	587.6
Current Operating Freeboard (ft)	592.8 - 587.6 = 5.2
Historic/Proposed Dam Crest Elevation	595.5

*Elevations based on a late 2009 Lidar survey merged with 2010 hydrographic survey.

S&ME noted that, based on the KDOW defined low hazard Class (A) status of Ash Pond 2[5], it must be capable of storing the 100-year rainfall event as defined in EM No. 5. As defined previously in this section, KDOW additionally specified that the 6-hour duration rainfall be utilized to determine the freeboard hydrograph of a low hazard Class (A) dam. Rainfall data from KDOW EM No. 2 lists a precipitation value for the 100-year, 6-hour event of 4.3 inches. That precipitation value was used in the KDOW EM No. 5 freeboard hydrograph equation for low hazard Class (A) dams, identified previously as equation (4), to calculate a minimum freeboard of 7.2 inches.

Ash Pond 2 receives runoff from the adjacent coal pile. S&ME noted that the additional runoff volume from the coal pile should be included in the hydrologic impacts to the ash pond. S&ME calculated that the 1.2 acre coal pile area tributary to Ash Pond 2 would contribute an additional 694 CY (or 140,160 gallons) of runoff based on the 100-year, 6-hour precipitation value of 4.3 inches.

According to the S&ME report, the total volume of the ash pond and the volume remaining for water storage were calculated using the computer modeling algorithm of triangulation around the contours of the pond. S&ME's report notes that "these volumes were derived from the estimated bottom elevation to the proposed water surface and to the minimum dike elevation, based on field generated survey information." Table 4, identified as Table 1 in the S&ME report, provides results of estimated area and volume calculations as well as design storm event rainfall depths and minimum and preferred freeboard values.

Table 4. Ash Pond 2 Estimated Area/Volume Calculation Results*

Dale Ash Pond No. 2 Criteria	To Pond Elevation 591.5 ft. (16 inches freeboard)	To Minimum Dike Elevation 592.8 ft.
Area (acres)	9.5	9.5
Total Volume (CY)	232,942	251,793
Total Volume (gallons)	47,047,296	50,854,632
Volume Used (CY)	139,443	139,443

[5] In comments provided by EKPC to the Draft Report, attached comments by S&ME note that Ash Pond 2 was erroneously referred to as having a low hazard Class (A) status in S&ME's August 2010 report. Ash Pond 2 is not rated as a 'dam' by KDOW and therefore does not carry any hazard status and is not listed in the KDOW database. S&ME will correct the error and resubmit the report to EKPC.

Dale Ash Pond No. 2 Criteria	**To Pond Elevation 591.5 ft. (16 inches freeboard)**	**To Minimum Dike Elevation 592.8 ft.**
Volume Used (gallons)	28,163,303	28,163,303
Percent Used (VU/TV)	59.9	55.4
Volume Remaining (CY)	93,499	112,394
Volume Remaining (gallons)	18,883,993	22,700,216
Percent Remaining (VR/TV)	40.1	44.6
100-Year, 6-Hour Rainfall (in.)	4.3	n/a
100-Year, 6-Hour Rainfall (CY)	5,492** +694 (pipe inflow)	n/a
100-Year, 6-Hour Rainfall (gallons)	1,249,386***	n/a
Freeboard-minimum (in.)		4.3 + 7.2 = 11.5
Freeboard-preferred (in.)		4.3 + 12 = 16.3

*Table from S&ME report, *Engineering Study for Dale Power Station Ash Pond No. 2 Evaluation of Risks of 100-Yr Rain Event & Freeboard Requirement*

**Equivalent to 9.5 acres at Elev. 591.8 (NOTE: appears to be an error, should be Elev. 591.5)

*** Includes 140,160 gallons of runoff from coal pile

Following the presentation of the volume and freeboard calculations, the report prepared by S&ME recommended that:

- Although the minimum freeboard was calculated to be 11.5 inches a preferred operating freeboard of 16 inches should be used to protect the embankment and crest from the 100-year, 6-hour design storm event. The additional, preferred freeboard was said to account for the "lack of an emergency spillway, potential wave/bank action, riser failure and other contingencies." This freeboard could be achieved by operating the pond with a water surface elevation of 591.5 feet with no correction to the crest height (maintain current low crest elevation of 592.8 feet), or by operating the pond with a water surface elevation of 594.2 feet with a corrected crest elevation of 595.5 feet;

- Periodic inspections by EKPC personnel to ensure the chosen operating water surface elevation, as well as dam crest elevations, are maintained;

- Regrade some of the low lying areas along the crest to maintain the required freeboard;

- The dam crest should be raised to elevation 595.5 to protect it and the impoundment from the base flood;

- Correct any slope deficiencies, including erodible areas, and;

- Increased crest elevation coupled with exterior slope adjustment would provide additional storage.

In the EPA Coal Combustion Dam Inspection Checklist and Coal Combustion Waste (CCW) Impoundment Inspection Forms that AMEC completed as part of the site visit performed in conjunction with preparation of the Draft Assessment Reports, AMEC assigned a "Significant Hazard" potential rating to Ash Ponds 2, 3, and 4, based on their proximity to the Kentucky River. As a result, it will be necessary to apply minimum hydrologic criteria to the Dale Power

Station based on a significant hazard potential. Review of documentation provided by EKPC indicates that the dry ash stack planned for Ash Pond 3 will be constructed and graded to drain to Ash Pond 2. The runoff from that area, approximately 3.5 acres, should also be included in determination of an acceptable freeboard/operating water surface elevation for Ash Pond 2, even if acceptance of drainage from the Ash Pond 3 surface is only a temporary condition for Ash Pond 2.

The ash pond crest should be rebuilt to withstand the Kentucky River base flood elevation of 595.0 feet. Additionally, although the plan is to store the runoff from the design storm, no mention was made regarding the discharge structure located in Ash Pond 2. AMEC did not receive any design drawings or documentation regarding this structure. Although several reports referenced in this Draft Assessment refer to the discharge pipe as having a 30-inch diameter, it was measured to be 24-inches in diameter during AMEC's site visit. EKPC should make an effort to investigate this discharge structure to evaluate its physical condition, as well as to locate and document its size and upstream and downstream invert elevations. With that information, a hydraulic routing analysis should be performed to determine how quickly the structure could draw down high pond water surface elevations resulting from the required design storm based on the pond's hazard category.

S&ME, in Draft Report comments provided by EKPC, reiterates the validity of the KDOW minimum hydraulic design criteria and the desire of KDOW to use these criteria as presented in EM No. 5. It was further noted that KDOW does "not recognize MSHA criteria." AMEC was asked by the EPA to assess the structures, describe design information, and provide comment on the design and current conditions using the documentation that was provided by the EPA. Hydrologic and hydraulic design methods including minimum freeboard criteria for both KDOW EM No. 5 and MSHA Impoundment Design Guidelines (Chapter 8) were presented and used, as well as engineering judgment, to provide comments and recommendations concerning the impoundments in question.

Additionally, Draft Report comments provided by EKPC's consultant, S&ME, noted that,

> *a routing hydrograph was not done for Ash Pond No. 2 or Ash Pond No. 4 since a "worst-case" condition for storage of the design storm was determined. Also, a key objective of the study was to calculate the approximate storage capacity remaining in each pond for additional fly ash material.*

S&ME noted that they could provide addendums to each report that would illustrate the "routing hydrographs for each pond and noting that the volume of precipitation can be safely discharged using the existing outlet structure."

Lastly, S&ME noted in comments to the Draft Report, with respect to the ditch that carries runoff from Ash Pond 3 to Ash Pond 2 and the effect to the freeboard/operating surface in Ash Pond No. 2, that "the ditch runoff was not included in the calculations since the inflow would be controlled by the inlet pipe." S&ME could provide the routing through the proposed ditch structure and any effects that may result on the freeboard of Ash Pond No. 2.
EKPC's comments to the Draft Report did not include any additional hydrologic or hydraulic calculations that were recommended by AMEC in the Draft Report.

3.2.2 Ash Pond 3

No hydrologic or hydraulic design criteria or calculations were provided for Ash Pond 3.

3.2.3 Ash Pond 4

An August 2010 report by S&ME Inc., entitled *Engineering Study for Dale Power Station Ash Pond No. 4 Evaluation of Risks of 100-Yr Rain Event & Freeboard Requirement*, provides a hydrologic analysis that is specific to Ash Pond 4.

S&ME used the same assessment methodology, computer modeling and volume calculations to evaluate Ash Pond 4 that were described previously for Ash Pond 2. As a result, drawings illustrating the existing conditions for three typical crest to crest pond cross sections, as well as a dam crest (inside, center, and outside elevation) profile were produced. These drawings are included in Appendix E of this draft assessment report. It is apparent from the existing crest elevation drawings that approximately 90 percent of the dam crest's existing elevation is less than the crest's design elevation of 605.0 feet.

The same design storm rainfall event was used, namely the 100-year, 6-hour event, to determine the freeboard water surface elevation. A freeboard of 16 inches was again recommended as sufficient for Ash Pond 4.

Additionally, although the plan is to store the runoff from the design storm, no mention was made regarding the discharge structure located in Ash Pond 4. EKPC should perform a hydraulic routing analysis for the discharge structure to determine how quickly the structure could draw down high pond water surface elevations resulting from the required design storm that is based on the pond's hazard category.

3.3 Structural Adequacy & Stability

The Commonwealth of Kentucky Department of Natural Resources Environmental Protection, Bureau of Environmental Protection, Division of Water, provided the June 1, 1980 document entitled, *Guidelines for the Geotechnical Investigation and Analysis of Existing Earth Dams*. The guidelines were written pursuant to the provisions set forth in KRS 151.125(2). Earthen dams, when analyzed to determine safety factors using the methods, guidelines, and procedures of the agencies listed in the guidelines may be considered, by the State of Kentucky, to have acceptable stability if the analyses yield at least the minimum safety factors shown in Table 5.

Two well regarded sources for embankment design and evaluation criteria include The United States Army Corps of Engineers (USACE) and the United States Mine Safety and Health Administration (MHSA). Minimum recommended factors of safety for different loading conditions can be found in those agency publications, as shown in Table 5 below.

Table 5. Minimum Stability Factors of Safety

Loading Condition	KDOW[1]	MSHA[2]	USACE[3]
Rapid Drawdown	1.2	1.3	1.1[4] - 1.3[5]
Long-Term Steady Seepage	1.5	1.5	1.5
Earthquake Loading	1.0	1.2	---[6]

[1] Guidelines for the Geotechnical Investigation and Analysis of Existing Earth Dams, 1980, Kentucky Division of Water
[2] Coal Mine Impoundment Inspection and Plan Review Handbook, 2007, US Mine Safety and Health Administration
[3] Slope Stability Publication, EM1110-2-1902, 2003, US Army Corps of Engineers, Table 3-1: New Earth and Rock-Fill Dams
[4] Applies to drawdown from maximum surcharge pool
[5] Applies to drawdown from maximum storage pool
[6] Referred to USACE Engineer Circular "Dynamic Analysis of Embankment Dams" document that is still in preparation

To analyze the structural adequacy and stability of the ash ponds at Dale Power Station, AMEC reviewed stability analysis material provided by EKPC with respect to the load cases shown in Table 5. Factors of safety documented in the provided material were compared with those factors outlined in the table to help determine whether the impoundments meet the requirements for acceptable stability.

3.3.1 Ash Pond 2

2010 Stability Analysis

The *Summary of Stability Evaluation ASH POND #2*, dated August 24, 2010 (DS-CBI 000609-000619) was completed by S&ME Inc. to provide stability analysis information. S&ME stated that "the Environmental Protection Agency requested that the west and north slopes be evaluated for slope stability and included the area adjacent to the existing pond outlet on the north end and the area adjacent to the sprinkler area on the west side of Pond #2." Typically, cross sections of minimum width or maximum height are evaluated when analyzing stability; however, information was not provided to indicate whether these cross sections represented minimums or maximums for the impoundment. A boring was advanced on the crest at each location. S&ME noted wet ground surface conditions and overhead power lines made it difficult to access the toe areas of each berm. A plan view figure of Ash Pond 2 indicating the locations of the stability sections, as well as, stability cross section soil and analysis details are included in Appendix F.
Tri-axial and direct shear strength tests were performed on soils collected from berm and foundation depths. The slope stability model was developed using "laboratory test data, laboratory test data from other projects at the Dale Generating Plant and test boring profiles." Table 6 below, provides soil information for the north boring, including description, strata elevations, and strength parameters.

Table 6. Ash Pond 2 Soil Parameters - North Boring Location

Soil	Description	Elevation Range (ft)	Thickness (ft)	Φ (degrees)	C (psf)	γ (pcf)
Crest Surface	Gravel	593.2 - 591.7	1.5	--	--	--
I - Ash	Coal Ash, sampled as STIFF soil, black damp	591.7 - 586.2	5.5	32	0.0	85.0
II - Clay	Lean clay (CL) sandy, SOFT, brown, moist	586.2 - 582.2	4.0	33	20.0	98.8
I - Ash	Coal Ash, sampled as SOFT to FIRM soil, black, moist	582.2 - 568.2	14.0	32	0.0	85.0
III - Silty	Lean Clay (CL)	568.2 - 555.2	13.0	23	690.0	99.8

Soil	Description	Elevation Range (ft)	Thickness (ft)	Φ (degrees)	C (psf)	γ (pcf)
Clay	silty, sandy, STIFF to FIRM, brown, moist					
IV - Sand	Sand, silty, clayey, FIRM, gray, wet	555.2 - 537.2	18.0	37	0.0	99.0
IV - Sand	Sand, course grained with few gravel pieces, VERY LOOSE, brown and tan, wet	537.2 - 530.2	7.0	37	0.0	99.0

Soil types, layer order, and strength parameters determined for the western boring sample were modeled nearly identical to those determined for the northern boring. The primary difference between the two locations is in the thickness of each layer. When compared to the northern boring, the western boring contained more than twice the thickness of clay (II), but approximately half the thickness of the second ash (I) layer and silty clay (III) layer. A nearly 27 foot band of sand was encountered in the northern boring starting at a depth of 38 feet (elevation 555.2 feet); while depth to the 35 foot band of sand in the western boring was measured to be 30 feet (elevation 564 feet). Auger refusal in the north and west borings was encountered at a depth of 64.6 feet (elevation 528.6 feet) and 64.5 feet (elevation 529.6 feet , respectively. Groundwater levels were recorded at depths of 26.0 feet (elevation 567.2 feet) and 28.0 (elevation 566.1 feet), respectively.

According to S&ME, the slope of the normal river pool water table (groundwater levels measured in the borings) and the 100-year Kentucky River flood elevation of 595 feet were evaluated for both static and seismic conditions. Results of the stability analyses are shown in Table 7.

Table 7. Ash Pond 2 Slope Stability Analyses - Calculated Factors of Safety

	North End of Ash Pond 2		Western Side of Ash Pond 2	
	Normal Pool	100-Year Flood Event	Normal Pool	100-Year Flood Event
Static	1.29	1.31	1.61	1.51
Seismic	1.14	0.91 (N/A)	1.41	1.08 (N/A)

The lowest calculated factor of safety occurred for the seismic condition coupled with the 100-year Kentucky River flood event. S&ME noted that the likelihood of those two conditions occurring at the same time was low; therefore, the opinion noted was that “this condition should not control the design of the embankment.” A rapid drawdown analysis was not performed because, according to S&ME, the embankment had historically experienced many high water levels and “has not experienced any distress” associated with those events.

Discussion was not provided on the program and its method used for the analyses. In addition, no data was provided showing the analyses input and calculations. Based on these factors alone, there is insufficient information in this report to assess the stability of Ash Pond 2. In addition, a statement of historical observed stability due to rapid drawdown conditions is not a substitute for the analyses. AMEC also has concerns with the high strength parameters, lack of adjustment for inconsistencies or exhibited lower strength layers, and design crest elevations used in the analyses.

3.3.2 Ash Pond 3

No structural adequacy or stability information was provided for this pond. Design drawings (DS CBI 000448-000465) were provided that show proposed regrading of the area and ash stacking information.

3.3.3 Ash Pond 4

1975 Stability Analysis

No recent stability analysis was performed for the Ash Pond 4 embankments. However, Bowser-Morner Testing Laboratories, Inc. completed a Soil Investigation for Proposed Dale Station Fly Ash Dikes and Pond, Ford, Kentucky (DS CBI 000151-000327), dated February 25, 1975. The report provided "the nature of the subsurface materials", made "recommendations as to the construction of an ash pond and dikes to contain the ash," and included factors of safety that resulted from various stability analyses.

Table 8 summarizes the results of seven confined compression tests that were performed on "relatively undisturbed samples" collected by "hydraulically pressing" samplers through the soil strata. The tests were used to determine undrained shear strength at various confining pressures.

Table 8. Ash Pond 4 - Summary of Confined Compression Tests

Boring No.	Sample Depth (ft)	Dry Unit Weight (pcf)	Moisture Content (%)	Wet Unit Weight (pcf)	Confining Pressure (psi)	Confined Compressive Strength (psi)
SB-6	1.7-2.2	92.0	23.5	113.6	10.0	18.6
SB-7	9.5-10.0	100.2	23.7	124.0	30.0	19.7
SB-7	15.5-16.0	99.0	25.8	124.6	19.5	12.4
SB-8	19.8-20.3	99.5	25.8	125.2	8.0	17.9
SB-9	6.7-7.2	97.4	27.6	124.2	10.0	17.2
SB-13	10.0-10.5	107.8	20.2	129.6	19.5	20.1
SB-14	7.0-7.5	110.0	19.9	131.9	20.0	37.9

Three consolidated-undrained triaxial tests with pore pressure measurements were performed. Table 9 summarizes the results of the triaxial tests.

Table 9. Ash Pond 4 - Design Soil Parameters

Test No.	Type of Material	Effective Cohesion C' (psi)	Effective Friction Φ' (degrees)
1	Brown Silt and Clay, some Sand (undisturbed samples)	0.0	33.7
2	Brown Silt and Clay, some Sand (laboratory compacted samples)	1.5	30.3
3	Brown Silt and Clay, some Sand (laboratory compacted samples)	0.0	38.7

Other reported laboratory testing included consolidation tests on compressible soils, Unified Soil Classification tests, and Modified Proctor moisture density relation tests.

The Bowser-Morner report provided a description of the soil profile for the site. It was noted that alluvial deposits exist beneath the foot thick layer of topsoil and consist of "layered clay, silt, and sand." At higher elevations, these strata were noted to extend to the bottoms of the borings. Lower elevations showed these strata extending to depths of "20 to 30 feet, at which depth a layer of loose to dense, brown, fine to coarse sand was encountered." This lower strata was found to extend to "either the bottom of the borings or to rock." The upper stratum of alternating layers was noted to be "quite wet, very soft, and highly compressible, while the lower sand was "medium dense and moderately compressible." Additionally, it was noted that "groundwater was encountered at quite shallow depths throughout the entire site."

Discussion of embankment design recommendations noted that several different modes were evaluated to determine worst case scenarios. Additionally, the report noted that "The embankment bearing on the original soil has been analyzed for the situation of the entire embankment and original soil sliding into the river and the slopes of the embankment itself have also been analyzed." Proctor curves results for material from the site indicated the optimum moisture content to be between 10 to 12 percent. However, the natural moisture content of the material planned for use as embankment fill ranged from 20 to 30 percent. Bowser-Morner performed triaxial tests at moistures greater than those found optimum, to determine whether the borrow material would provide the stability required for the embankment. Based on the results of these tests, Bowser-Morner recommended that "dike material be placed at a moisture content no greater than 7.5 percent above optimum, or in the neighborhood of 19 percent field moisture content" to ensure adequate strength in the recommended slopes and flexibility that will allow settlement without cracking in the dike. The report noted that the dike foundation would be compressible and would require "flexibility be built into the dike; therefore, the moisture content should not be allowed to drop below about 2 percent over optimum moisture content as determined by the Modified Proctor test, as the structure would be brittle if this were allowed to occur." Recommendations were also provided for a 30 feet buffer between the downstream toe of the dam and the Kentucky River. Recommendations were also provided to address an existing drainage swale located in the southeast portion of the site.

The recommended embankment slopes for the Ash Pond 4 dike were given as 3:1 (H:V) and 2.5:1 (H:V) for the downstream (river side) and upstream portions, respectively. A crest width of 12 feet was also recommended. Figure 9 illustrates embankment cross sections for Ash Pond 4. Stability analyses were performed using soil parameters found from triaxial tests 2 and 3, as shown previously in Table 9. Table 10 below, illustrates the factors of safety resulting from the stability analyses performed for multiple conditions.

Table 10. Ash Pond 4 Slope Stability Analysis - Calculated Factors of Safety

Condition	Slope	Soil Parameter Test ID	Circle	Factor of Safety, Static	Factor of Safety, Seismic
Long Term	3:1 (outside)	3	Shallow	2.517	2.323
	3:1 (outside)	2	Shallow	4.315	4.000
	3:1 (outside)	3	Deep	2.517	2.323
	3:1 (outside)	2	Deep	3.277	3.034
	2.5:1 (inside)	3	Deep	2.148	2.004
	2.5:1 (inside)	2	Deep	2.706	2.533
	2.5:1 (inside)	3	Shallow	2.141	1.998
	2.5:1 (inside)	2	Shallow	3.784	8.547
Rapid Drawdown	3:1 (outside)	3	Shallow	1.233	1.129
	3:1 (outside)	2	Shallow	3.339	3.093
	3:1 (outside)	3	Deep	1.235	1.131
	3:1 (outside)	2	Deep	2.302	2.128
Long Term	Original Ground (River Bank)	--	Shallow	1.254	1.184
	Original Ground (River Bank)	--	Deep	1.487	1.395
	Through Top of Dike and Original Ground	3	--	1.805	1.682
	Through Top of Dike and Original Ground	2	--	1.822	1.698
	Through Top of Dike and Original Ground	3	--	2.535	2.295
	Through Top of Dike and Original Ground	2	--	2.524	2.285
Rapid Drawdown	Through Top of Dike and Original Ground	3	--	1.471	1.369
	Through Top of Dike and Original Ground	2	--	1.529	1.423
	Through Top of Dike and Original Ground	3	--	2.096	1.897
	Through Top of Dike and Original Ground	2	--	2.081	1.883

According to the Bowser-Morner report, the earthquake coefficient utilized for the stability analyses was 0.025 for a Zone 1 (little to no probability of seismic activity) area such as the location of Dale Power Station. That force was viewed as 0.025 times the weight of each slice in the stability analyses and applied as a horizontal force in the centroid of the slice itself.

Bowser-Morner stated that the computed factors of safety for all conditions are "within the limits recommended by the National Dam Safety Act and that they believe the design is safe.

Discussion was not provided on the calculations/program and method used in the analyses. In addition, no data was provided showing the analyses input and calculations. Based on these factors alone, there is insufficient information in this report to assess the stability of Ash Pond 4. In addition, when the computed factors of safety are compared to those minimum factors provided by USACE and MSHA as shown in Table 5, the long term analyses through the original ground (river bank) shallow circle and deep circle are below and about equal to the minimum factor of safety of 1.5, respectively. AMEC does not agree with the storm event, loading conditions and high strength values used in the analyses.

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EKPCs comments to the draft report assume the last sentence above relates to more stringent design criteria (MSHA). To clarify the last sentence, in AMEC 's opinion, the water level should be determined by a hydraulics analysis, loading conditions should model worst case which would be pond full conditions and question whether the use in analyses of effective friction angles of 34 and 39 degrees are high for a silt and clay with some sand. In addition, these analyses were performed for design of the embankment and do not necessarily represent the constructed embankments.

<u>2010 Stability Analysis (Berm Area Between Embankment Toe and Slide Location)</u>

A June 2010 report by S&ME Inc., entitled Summary of Stability Evaluation Slide at Ash Pond #4, provides a summary evaluation of the berm area between the toe of Ash Pond 4 and the location where the 2004 landslide occurred. Stability profile sections were developed using information from the 1975 Bowser-Morner Report, soil data collected by S&ME from their recent work at the facility, and previously supplied survey information. S&ME provided soil data for the area shown in Table 11 below.

Table 11. Ash Pond 4 2010 Berm Area Stability Analysis - Soil Parameters

Soil Description	Total Unit Weight (pcf)	Saturated Unit Weight (pcf)	Cohesion (psf)	Friction Angle
Silt	110.0	130.0	0.0	34.0
Berm	110.0	130.0	100.0	34.0

Failure surfaces were modeled, using the Modified Bishop Method, to approach the toe of the embankment with the typical Kentucky River elevation (noted to be 568 feet) and an extreme high water (595 feet) elevation. Cross sections illustrating these failure surfaces are included in Appendix G. Resulting factors of safety at the toe of the embankment for normal and high water levels were 1.4 and 1.3, respectively. Rapid drawdown was also modeled and resulted in a factor of safety of 1.6 for failure surfaces involving the embankment. S&ME stated that based on these results, they believe "that it is unlikely that a slide would occur initially that would impact the embankment."

The impacts of high water and rapid drawdown on the berm that exists between the scarp and the ash pond embankment were then considered. According to S&ME, the high water and rapid drawdown analyses indicate that under either of those conditions "the existing slide may propagate uphill a few feet." Factors of safety for the surfaces ranged from 0.85 to 1.1; additionally, predicted failure surfaces were described to "range from two to four feet behind the existing scarp." S&ME commented that, in their opinion, the results of the rapid drawdown analysis (FS=0.85) seem to indicate that the in-situ soil shear strength parameters may be "somewhat conservative." It was noted that the rapid drawdown condition has existed at this location over the previous six years; but, that "no failure has occurred." The lack of failure, S&ME noted, would seem to indicate a factor of safety of greater than 1.0. Due to the lack of subsurface information, S&ME advised that the more stringent assessment of shear strength be used.

S&ME recommended that EKP "consider improving the existing slope to increase stability of the berm and reduce the potential for progressive sliding uphill that would eventually involve the embankment." A stability analysis that was completed for a repair concept using fill material to flatten the scarp profile resulted in an increased factor of safety greater than 1.4 (FS=1.9 and 1.6). Basic fill placement information that was provided included "widening the bench at the base of Ash Pond #4 berm to a width of 10 feet and continuing at a slope of 2.8:1 (H:V) downhill form the outer edge of the bench. S&ME noted that additional loads will be placed on the riverbank soils as the result of soils placed to widen the bench or flatten the slope and that they lack additional soils data and survey information that would be required to accurately perform a stability analysis of the riverbank. Therefore, S&ME cautioned EKPC that fill should not be placed in excess of that outlined in their previously described repair concept.

Discussion was not provided on the calculations/program and method used in the analyses. In addition, no data was provided showing the analyses input and calculations. Based on these factors alone, there is insufficient information in this report to assess the stability of Ash Pond 4.

3.4 Foundation Conditions

3.4.1 Ash Pond 2

Based on the recent borings performed for the 2010 Stability Analysis Report by S&ME (DS-CBI 000609-000619), the foundation soils at ASH Pond 2 consist of 13 to 20 feet of silty clay and silt overlying 20 to 25 feet of silty sands and sands. (The report also shows an 8 to 10 feet thick ash layer within the embankment fill material)

3.4.2 Ash Pond 3

Information was not provided concerning the foundation conditions of Ash Pond 3.

3.4.3 Ash Pond 4

The report *Soil Investigations for Proposed Dale Station Fly Ash Dikes and Pond*, Ford, KY, prepared by Bowser-Morner Testing Laboratories, Inc. in February 1975 for EKPC contains descriptive information regarding the foundation beneath the dike proposed for Ash Pond 4. (DS-CBI 000164 and 000165) The report stated that topsoil was present in the majority of the proposed dike location and averaged one foot in thickness, but was as thick as two feet in some areas. An area of deposited materials was also noted to exist in the region where the dike was proposed to cross an existing intermittent creek. The topsoil and organic material was noted to be unsuitable as foundation material for the dike and direction was given to excavate and remove it from the entire area of the dike and borrow area prior to the start of construction. Following removal of the unsuitable material, the report indicated that “the surface of soil beneath the dike should be compacted to dry unit weight equal to at least 90% of the maximum dry unit weight as achieved by the Modified Proctor test to prepare the site for the placement of fill material.” The report indicated that Bowser-Morner engineers did not encounter any other major foundation problems.

The Bowser-Morner report provided a description of the soil profile for the site. It was noted that alluvial deposits exist beneath the foot thick layer of topsoil and consist of “layered clay, silt, and sand.” At higher elevations, these strata were noted to extend to the bottoms of the borings. Lower elevations showed these strata extending to depths of “20 to 30 feet, at which depth a layer of loose to dense, brown, fine to coarse sand was encountered.” This lower strata was found to extend to “either the bottom of the borings or to rock.” The upper stratum of alternating layers was noted to be “quite wet, very soft, and highly compressible, while the lower sand in this strata was medium dense and moderately compressible.” Additionally, it was noted that “groundwater was encountered at quite shallow depths throughout the entire site.”

The report discusses aspects of the foundation soils that were noted to affect the stability of the embankment and recommendations regarding placement of the dike with respect to the river.

> *The soil, in general is quite soft, however, if the dike is kept at least 30 feet back from the steep edge of the river bank portion of the site, the original material will carry the load of the new dike without sliding into the river. It is recommended that, because of the soft foundation soil, the toe of the dike be placed at least 30 feet from the edge of the river bank (which is about 30 feet from the 580 contour). This should be done in all areas.*

The report then discusses the importance of “particular care” being taken to prepare the soil in the vicinity of where the embankment will traverse the existing ditch. Slopes where the embankment crosses the ditch were noted to be possibly as high as 37 feet. Direction was given to clean the ditch slopes of “all vegetation and all loose or soft material so that the dike is placed on relatively hard, original material in the ditch area.” The report states that “If these precautions are followed, the original soil will be stable enough to hold the dike without exceptional movement and without shearing.”

3.5 Operations and Maintenance

AMEC was not provided with any operation, inspection, or maintenance reports, that resulted from the actions of personnel from Dale Power Station, other than a document referred to as Dale Station Ash Ponds Daily Log (DS CBI 000442-000446). The document shows a beginning date of January 1, 2010 and includes columns for date, inspector name, and time of inspection. Only twenty slightly descriptive entries were included in a fourth column for the seven month log record. Overall, the document does not provide a clear picture of inspection areas and procedures, nor does it provide information regarding inspection information that is specific to the condition of various parts of the ash pond dams, such as embankments, cover, and discharge structures.

Reports detailing Ash Pond 2 and Ash Pond 4 inspections, performed by Stantec Consulting Services in 2009, were provided to AMEC. Information contained in these reports, including observations, assessments, and recommendations, are detailed in Sections 1.4.2 and 1.4.4 of this report.

3.5.1 Instrumentation

Instrumentation has not been historically used at the Dale Power Station and is not used at the current time. However, the recent inspection reports completed by Stantec, as described in Sections 1.4.2 and 1.4.4 of this report, recommend that instrumentation be installed.

3.5.2 State or Federal Inspections

State regulations indicate that KDOW will inspect Class A (low hazard) dams every 5 years, and Class B (moderate hazard) and Class C (high hazard) every 2 years. The regulations state that a Certificate of Inspection shall be issued to the dam owner upon completion of a successful inspection.

Although Ash Pond 2 appears to meet the dam definition criteria stipulated by the State of Kentucky, based on impoundment volume, the pond has not been classified as a dam and is not regulated or inspected by the state.

Ash Pond 4 has been categorized by the state as a Class (A) dam. Dale Power Station has a Certificate of Inspection for Ash Pond 4 dated October 29, 1998; however, EKPC personnel stated that KDOW has not conducted an inspection since that time.

4.0 COMMENTS AND RECOMMENDATIONS

Condition assessment definitions, as accepted by the National Dam Safety Review Board, are as follows:

SATISFACTORY

No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria or tolerable risk guidelines.

FAIR

No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.

POOR

A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. POOR may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Further investigations and studies are necessary.

UNSATISFACTORY

A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.

NOT RATED

The dam has not been inspected, is not under state jurisdiction, or has been inspected but, for whatever reason, has not been rated.

4.1 Acknowledgement of Management Unit Conditions

I certify that the management unit referenced herein (Ash Ponds A, 1, and 2) was personally assessed by me and was found to be in the following condition:

Ash Pond 2: Fair

Dale Ash Pond 2 was rated poor in the September 2010 Draft Report because, in AMEC's opinion, further critical studies or investigations (detailed below) were needed to identify any potential dam safety deficiencies.

Based on comments to the Draft Report provided by EKPC, in AMEC's opinion, the pond is now rated fair because no existing dam safety deficiencies are recognized for normal loading conditions, but rare or extreme hydrologic events may result in a dam safety deficiency. Risk may be in the range to take further action.

Ash Pond 3: Fair

Ash Pond 3 was rated poor in the Draft Report because, in AMEC's opinion, further critical studies or investigations were needed to identify potential dam safety deficiencies.

Based on comments to the Draft Report provided by EKPC, in AMEC's opinion, the pond is now rated fair because no existing dam safety deficiencies are recognized for normal loading conditions, but rare or extreme hydrologic events may result in a dam safety deficiency. Risk may be in the range to take further action. EKPC notes Ash Pond 3 was permanently removed from service as a wet pond after a breach was repaired, has not received sluiced ash for over 30 years, and is used only for dry storage.

Ash Pond 4: Fair

Ash Pond 4 was rated poor in the Draft Report because, in AMEC's opinion; (1) a dam safety deficiency existed in relation to the release in 2008 and ongoing repairs (not to mention the history of releases at the facility), and (2) further critical studies or investigations were needed to identify potential dam safety deficiencies.

Based on comments to the Draft Report provided by EKPC, in AMEC's opinion, the pond is now rated fair because no existing dam safety deficiencies are recognized for normal loading conditions, but rare or extreme hydrologic events may result in a dam safety deficiency. Risk may be in the range to take further action.

Additional Information regarding recommendations for hydrologic/hydraulic and geotechnical/stability analyses, as well as monitoring equipment/instrumentation and can be found in Sections 4.2 through 4.5.

4.2 Ash Pond 2

4.2.1 Hydrologic and Hydraulic Recommendations

September 2010 Draft Report

An August 2010 report by S&ME Inc., titled *Engineering Study for Dale Power Station Ash Pond No. 2 Evaluation of Risks of 100-Yr Rain Event & Freeboard Requirement*, provides a hydrologic analysis that is specific to Ash Pond 2. This analysis uses the 100-year, 6-hour event as the maximum storm. The report also notes about 70% of the crest is below the 100-year flood elevation of the Kentucky River (595.0 feet), and areas on the upstream and downstream slopes are steeper than designed. The maintenance items listed in the report should be performed, especially items concerning raising the crest and repairing the slopes.

Ash Pond 2 is currently used for disposal and processing of CCW. Historically, the dam was, for all practical purposes a ring dike and the watershed was the area of the impoundment. With the ash stacking activity in Ash Pond 3, some additional runoff will be tributary to Ash Pond 2. Ash is primarily deposited in the south and east portions of the pond; the northern portion of the pond is primarily occupied by water. The impoundment does not have an emergency spillway. AMEC recommends that an appropriately conservative design storm rainfall and freeboard depth in accordance with MSHA guidelines be applied to the impoundment's watershed to assure that the dam and decant system can safely store, control, and discharge the design flow. Based on the size and rating for Ash Pond 2, the MSHA design storm would be the ½ PMF.

The watershed should include runoff originating in the proposed adjacent ash stack and coal pile. Hydraulic calculations should also be completed to determine the rate at which the discharge structure and associated piping could pass the design storm, if necessary, or draw down elevated water surfaces following such an event. The study should consider all critical stages over the life of the pond including pond full conditions.

Final Report

In comments to the September 2010 Draft Report, EKPC noted that "AMEC implies the 2010 S&ME hydraulic study at Dale is not adequate and recommends another study on the No. 2 pond in accordance with MSHA guidelines." EKPC provided the following comment regarding the recommendation by AMEC to consider MSHA guidelines.

> *The study performed was in accordance with current applicable engineering design standards and prudent engineering practice. AMEC did not provide any evidence or supporting data to justify the application of the MSHA design criteria, especially since EKPC is required by Kentucky regulations to use the dam design criteria specified by the KDOW. EKPC also questions retroactive increases in design criteria, even if there is justification to support an increase. The new criteria will result in significant costs to upgrade these facilities.*
>
> *MSHA is not the regulatory agency with jurisdiction over the two EKPC surface impoundments in Kentucky. The Kentucky Division of Water is the requlatory agency under which these impoundments were built and operated for numerous years. The impoundments were designed and built pursuant to the design criteria required by KDOW.*

AMEC does not dispute that the impoundments were designed in accordance with KDOW criteria. However, to complete the CCW impoundment assessments, AMEC utilized the materials and guidelines provided and recommended by the EPA (outlined in Section 1.1 of this report) and engineering judgment in addition to various criteria provided by the state in which the impoundment is located.

EKPC's consultant, S&ME, recommended a freeboard of 16 inches, which included the 4.3 inch KDOW minimum design storm (100-year 6-hour) rainfall amount for ash pond's location. Freeboard is not generally defined to include the design storm depth; rather it is the depth available between the top of the design storm water surface elevation and the impoundment crest. Applying the typical definition of freeboard to the operating conditions proposed for Ash Pond 2 in the reports provided to AMEC results in a freeboard of only 12 inches, Additionally, due to the environmental impacts to the Kentucky River that would result from a failure of the impoundment, it is AMEC's opinion that sound engineering judgment would dictate that the minimum design storm hydrologic criteria used for these impoundments should be increased to a more critical minimum storm event, such as, at a minimum, the 100-year 24-hour storm. Increasing the minimum design storm event, as well as the freeboard to more than 12 inches above the design storm event, would provide a higher, more conservative level of protection against overtopping of the crest of the impoundment.

The Fair rating maintains that no deficiencies exist for normal loading conditions (KDOW minimum design storm/freeboard requirements). In AMEC's opinion, assignment of a satisfactory rating to Ash Pond 2 is not possible due to the pond's limited level of hydrologic protection.

4.2.2 Geotechnical and Stability Recommendations

September 2010 Draft Report

In the opinion of the assessing professional engineer, the criteria for minimum safety factors should be in accordance with USACE EM 1110-2-1902 with a minimum seismic safety factor of 1.2 as recommended by 2007 *MSHA Coal Mine Impoundment Inspection and Plan Review Handbook*, page 88. Likewise, if the dam does not meet the above seismic factor of safety, then the stability of the embankment should be analyzed and the amount of embankment deformation or settlement that may occur should be evaluated to assure that sufficient section of the crest will remain intact to prevent a release from the impoundment.

The provided stability analyses by S&ME Inc., dated August 24, 2010 (DS-CBI 000609-000619) analyzed two cross-sections, one on the north dike and one on the south portion of the west dike. There is insufficient information in this report to assess the stability of Ash Pond 2. Discussion was not provided on the program and its method used for the analyses[6]. In addition, no data was provided showing the analyses input and calculations. Statements of historical observed stability due to rapid drawdawn conditions is not a substitute for the analyses, especially when the flood elevation of the river is within one-half foot of the design crest elevation. AMEC also has concerns with the strength parameters used in the analyses and lack of adjustment for inconsistencies or exhibited lower strength layers. Typical ash friction values are 28 degrees for compacted, 24 degrees for loosely compacted, and 11 degrees for uncompacted material. Consideration should be given for lowering strength values to account for exhibited lower strengths or inconsistencies within the fill or foundation materials. Lowering the friction value, by one or two degrees, or more for weaker soils would be conservative and more appropriate. More layering of the embankment materials may be needed to model lower strength materials, such as the lower ash in the embankment. The presence and material properties of the ash in the embankment, especially the lower layer, creates concerns for susceptibility to erosion and piping that should be addressed in the Hydrologic and stability analyses.

In the opinion of the assessing professional engineer, the analyses should be revised in accordance with these recommendations. The analysis should consider all critical stages over the life of the pond including pond full conditions. These conditions would need to be determined in conjunction with the hydrologic and hydraulic recommendations above. The hydrologic and hydraulic analysis will provide maximum water levels in the pond and a phreatic surface through the embankment.

Final Report

Comments included in the January 12, 2011 response to the draft report by EKPC take exception to the use of MSHA guidelines to evaluate CCW impoundments. AMEC followed the guidelines presented in our scope of work for assessment of CCW impoundments which was provided by EPA

AMEC acknowledges the design stability studies performed for Ash Pond 2 indicate the impoundment meets KDOW minimum requirements for all cases on the west section and the seismic case on the north section, but falls short of these requirements on the north section for

[6] *S&ME Comments dated January 12, 2011 provide program and method as PC Stabl using Modified Bishop Method*

the static case/normal pool. The additional static case/100-year pool also does not meet the minimum requirements.

AMEC recommends EKPC evaluate the need to revise the stability analyses (and hydraulic analyses as stated above) considering worst case conditions (i.e. highest pond water level and pond full of ash).

4.2.3 Monitoring and Instrumentation Recommendations

September 2010 Draft Report

Instrumentation has not been historically used at Ash Pond 2 and is not used at the current time. AMEC recommends EKPC evaluate the need to install piezometer instrumentation to provide a means of internally monitoring conditions within the dam. Monitoring should also include documenting associated pond and river levels.

Final Report

AMEC continues to recommend the monitoring and instrumentation approach described in the Draft report.

4.2.4 Inspection Recommendations

September 2010 Draft Report

EKPC plant personnel currently perform a daily inspection that is documented by date, inspector name, and time of inspection. Although daily inspection by EKPC is commendable, a more detailed and documented record would be more appropriate. AMEC recommends that the current inspection program by the plant be expanded to include at least monthly documented inspections which identify potential problems, areas inspected, instrumentation monitoring (when installed) and pond and river levels.

AMEC has reviewed the 2009 inspection reports and determined EKPC has adequate annual inspections by a Profession Engineer. We recommend this type of annual inspection program and report by a Professional Engineer be continued at least yearly, in addition to the recommended monthly inspections by facility personnel.

Final Report

AMEC continues to recommend the inspection regimen described in the Draft report.

4.3 Ash Pond 3

4.3.1 Hydrologic and Hydraulic Recommendations

September 2010 Draft Report

A hydrologic or hydraulic study was not provided for Ash Pond 3. Ash Pond 3 is currently being used to stack ash dredged from Ash Pond 2. Based on a known release that occurred in 1975, its location adjacent to the Kentucky River, and current and proposed activity for the pond, AMEC recommends a hydrologic and hydraulic analysis following MSHA guidelines be performed for Ash Pond 3.

Final Report

No additional documentation was provided for Ash Pond 3 following submittal of the Draft Report.

4.3.2 Geotechnical and Stability Recommendations

September 2010 Draft Report

A stability analyses was not provided for Ash Pond 3. Based on the reasons stated in Section 4.3.1, AMEC recommends stability analyses following USACE and MSHA guidelines, as stated in the first paragraph of 4.2.2, be performed for Ash Pond 3.

Final Report

No stability analyses documentation was provided for Ash Pond 3 following submittal of the Draft Report.

4.3.3 Monitoring and Instrumentation Recommendations

Draft Report

Instrumentation has not been historically used at Ash Pond 3 and is not used at the current time. AMEC recommends at least piezometer instrumentation be installed to provide a means of internally monitoring conditions within the dam. Monitoring should also include documenting associated pond and river levels.

Final Report

Comments included in the January 12, 2011 response to the draft report by EKPC state "Ash Pond 3 is used for dry storage of compacted ash. It is unclear what useful information such instrumentation would provide". In AMEC's opinion, the area contains ash and water and is therefore a coal combustion waste impoundment. AMEC revises the second sentence above to: AMEC recommends EKPC evaluate the need to install piezometer instrumentation to provide a means of internally monitoring conditions within the embankment(s) of the dam.

4.3.4 Inspection Recommendations

EKPC plant personnel currently perform a daily inspection that is documented by date, inspector name, and time of inspection. It is not known whether Ash Pond 3 is included in these inspections. AMEC recommends that the current inspection program by the plant be expanded to include Ash Pond 3 in the daily inspections and perform at least monthly documented inspections which identify potential problems, areas inspected, instrumentation monitoring (when installed) and pond and river levels. In addition, EKPC should include Ash Pond 3 in annual inspections by a Profession Engineer.

4.4 Ash Pond 4

4.4.1 Hydrologic and Hydraulic Recommendations

September 2010 Draft Report

An August 2010 report by S&ME Inc., entitled *Engineering Study for Dale Power Station Ash Pond No. 4 Evaluation of Risks of 100-Yr Rain Event & Freeboard Requirement*, provides a hydrologic analysis that is specific to Ash Pond 4. This analysis uses the 100-year, 6-hour event as the maximum storm. The report indicates a minimum dike elevation of 603.0 feet, or 2 feet below the design elevation of 605.0 feet with about 90% of the crest an average of 1 foot below design. The report recommends "correcting any interior slope deficiencies, including erodible areas, etc…" S&ME recommends a minimum freeboard height of 16 inches. Construction is currently being performed for a seepage repair. The seepage repair was not considered in the hydrologic evaluation.

AMEC recommends that an appropriately conservative design storm rainfall and freeboard depth in accordance with MSHA guidelines be applied to the impoundment's watershed to assure that the dam and decant system can safely store, control, and discharge the design flow. Based on the size and rating for Ash Pond 4, the MSHA design storm would be the ½ PMF. Hydraulic calculations should also be completed to determine the rate at which the discharge structure and associated piping could pass the design storm, if necessary, or draw down elevated water surfaces following such an event. The study should include modifications to the interior of the pond by current or planned construction. The analysis should consider all critical stages over the life of the pond including pond full conditions.

Final Report

EKPC provided Draft Report comments for Ash Pond 4 that are identical to those provided for Ash Pond 2. The same design storm event (100-year 6-hour) and freeboard (12 inches) were applied to the impoundment. Additionally, due to the environmental impacts to the Kentucky River that would result from a failure of the impoundment, it is AMEC's opinion that sound engineering judgment would dictate that the minimum design storm hydrologic criteria used for these impoundments should be increased to a more critical minimum storm event, such as, at a minimum, the 100-year 24-hour storm. Increasing the minimum design storm event, as well as the freeboard to more than 12 inches above the design storm event, would provide a higher, more conservative level of protection against overtopping of the crest of the impoundment.
The Fair rating maintains that no deficiencies exist for normal loading conditions (KDOW minimum design storm/freeboard requirements). In AMEC's opinion, assignment of a satisfactory rating to Ash Pond 4 is not possible due to the pond's limited level of hydrologic protection.

4.4.2 Geotechnical and Stability Recommendations

September 2010 Draft Report

In the opinion of the assessing professional engineer, the criteria for minimum safety factors should be in accordance with USACE EM 1110-2-1902 with a minimum seismic safety factor of 1.2 as recommended by 2007 *MSHA Coal Mine Impoundment Inspection and Plan Review Handbook*, page 88. Likewise, if the dam does not meet the above seismic factor of safety, then the stability of the embankment should be analyzed and the amount of embankment deformation or settlement that may occur should be evaluated to assure that sufficient section of the crest will remain intact to prevent a release from the impoundment.

A recent stability analysis was not performed for the Ash Pond 4 embankments. However, EKPC provided the design stability analyses performed by Bowser-Morner Testing Laboratories, Inc. (DS CBI 000151-000327), dated February 25, 1975. The report discusses wet conditions of the proposed fill materials and construction practices to place embankment fill wet of the optimum moisture content and the presence of a natural ditch within the interior of the proposed pond. The results of the analyses dictated the design of the slopes and provisions for a 30 feet buffer between the toe of the slope and the Kentucky River. In addition, the computed factors of safety for the long term analyses through the river bank for shallow circle and deep circle are below and about equal to the minimum factor of safety of 1.5, respectively. Although the other computed factors of safety were above USACE and MSHA seismic minimums, AMEC has issues with the interior hydrology and loading conditions and strength values used in the analyses.

A recent stability analysis study completed in 2010 by S&ME dated June 2010 (DS-CBI 000553-000561) was performed to evaluate the berm area between the toe of Ash Pond 4 and the location where a 2004 landslide had occurred. The study suggests the strength factors used in the report may be too conservative based on the rapid drawdown results and no failure within the past six years. However, the 2009 River Bank Stability performed by Stantec (DS-CBI 000121-000150) notes the slide has moved up the slope about 2.5 feet toward the toe of Ash Pond 4.

The thirty year old design stability study for Ash Pond 4 was performed under different guidelines than recommended herein, and does not accurately represent the as-built structure. In the opinion of the assessing professional engineer, a current stability analyses for Ash Pond 4 should be performed in accordance with the recommended guidelines stated herein, and the following recommendations. The analysis should consider all critical stages over the life of the pond including pond full conditions. These conditions would need to be determined in conjunction with the hydrologic and hydraulic recommendations above. The hydrologic and hydraulic analysis will provide a phreatic surface through the embankment. AMEC concurs with the recommendation in the S&ME 2010 report that the existing slope be improved to increase the stability of the berm and reduce the potential for progressive sliding uphill that would eventually involve the embankment.

Final Report

Comments included in the January 12, 2011 response to the Draft report by EKPC take exception to the use of MSHA guidelines to evaluate CCW impoundments. AMEC followed the guidelines presented in our EPA provided scope of work for assessment of CCW impoundments.

AMEC acknowledges the 1975 Bowser-Morner design stability analyses performed for Ash Pond 4 was approved by KDOW for construction of the impoundment. The study meets current KDOW standards, except for the long term case for the river bank section.

AMEC recommends EKPC evaluate the need to perform a current stability analyses (and hydraulic analyses as stated above) considering present as-built embankment soil conditions, current (and/or repaired) embankment configurations. The analyses should include worst case conditions (i.e. highest pond water level and pond full of ash).

The Fair rating maintains that no deficiencies exist for normal loading conditions (KDOW minimum design requirements). In AMEC's opinion, assignment of a satisfactory rating to Ash Pond 4 is not possible due to the pond's limited level of stability protection represented by recent analyses, history of releases, and current interior and planned exterior (river bank) repairs.

4.4.3 Monitoring and Instrumentation Recommendations

<u>September 2010 Draft Report</u>

Instrumentation has not been historically used at Ash Pond 4 and is not used at the current time. AMEC agrees with the monitoring recommendations provide in the 2009 inspection report by Stantec. A monitoring plan with at least piezometer instrumentation should be initiated. The plan could also include slope inclinometers and surface monuments as deemed appropriate. The implementation of the plan should be concentrated along the southern and west dike segments of the pond and other problem areas, such as the slide below the toe of the slope. The instrumentation will provide a means of establishing baseline criteria and monitoring of conditions within the dam. Monitoring should also include documenting associated pond and river levels.

<u>Final Report</u>

AMEC continues to recommend the monitoring and instrumentation approach described in the Draft report.

4.4.4 Inspection Recommendations

<u>September 2010 Draft Report</u>

EKPC plant personnel currently perform a daily inspection that is documented by date, inspector name, and time of inspection. Although daily inspection by EKPC is commendable, a more detailed and documented record would be more appropriate. AMEC recommends that the current inspection program by the plant be expanded to include at least monthly documented inspections which identify potential problems, areas inspected, instrumentation monitoring (when installed) and pond and river levels. In response to the existing landslide, EKPC should begin the weekly inspections of the affected area and the remainder of the riverbank immediately, and include or add inspections for significant rainfall events.

AMEC has reviewed the 2009 inspection reports and determined EKPC has adequate annual inspections by a Profession Engineer. We recommend this type of annual inspection program and report by a Professional Engineer be continued at least yearly, in addition to the recommended monthly inspections by facility personnel.

<u>Final Report</u>

AMEC continues to recommend the inspection regimen described in the Draft report.

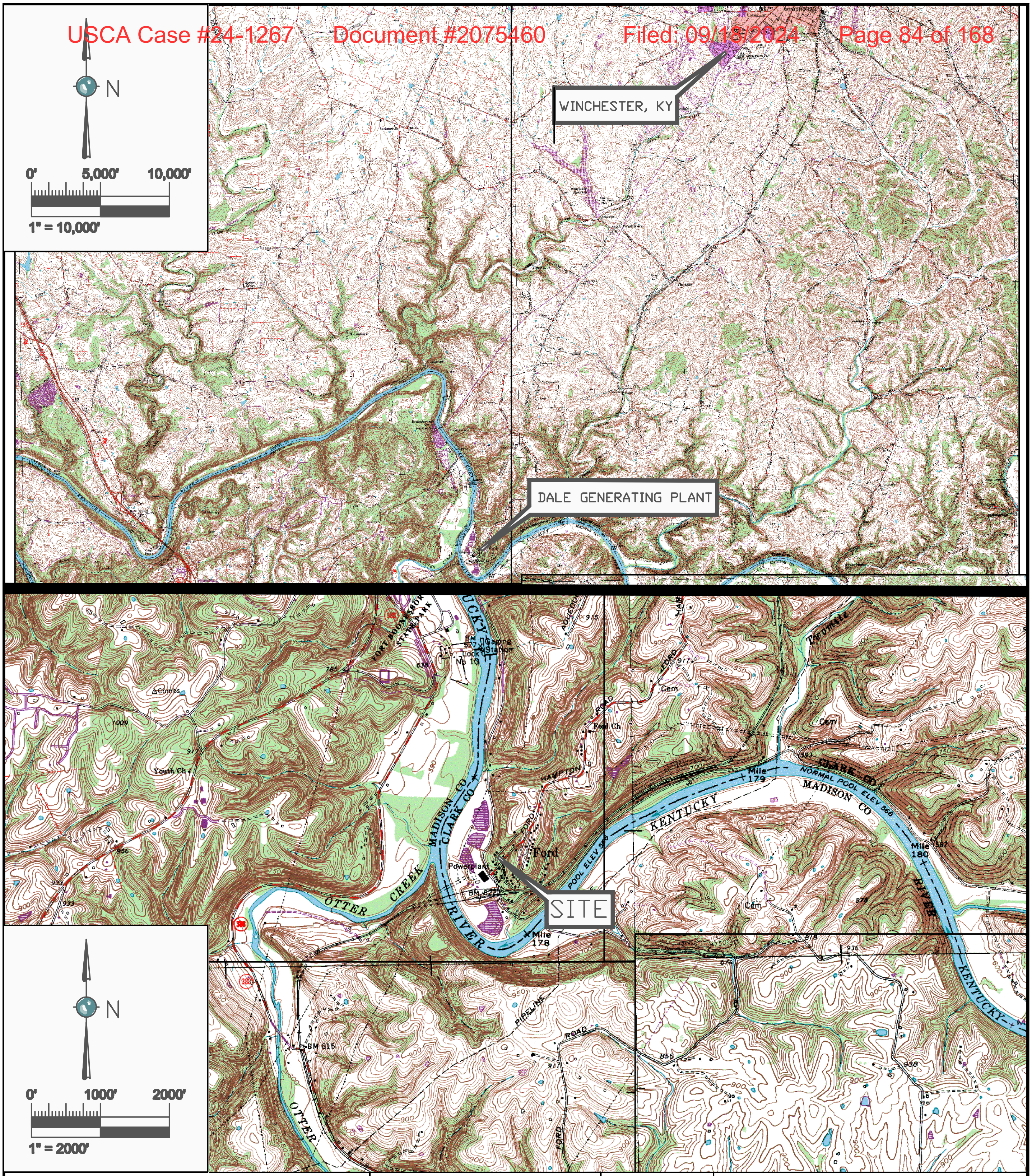
5.0 CLOSING

This report is prepared for the exclusive use of the Environmental Protection Agency for the site and criteria stipulated herein. This report does not address regulatory issues associated with storm water runoff, the identification and modification of regulated wetlands, or ground water recharge areas. Further, this report does not include review or analysis of environmental or regional geo-hydrologic aspects of the site, except as noted herein. Questions or interpretation regarding any portion of the report should be addressed directly by the geotechnical engineer.

Any use, reliance on, or decisions to be made based on this report by a third party are the responsibility of such third parties. AMEC accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The conclusions and recommendations given in this report are based on visual observations, our partial knowledge of the history of Dale Power Station impoundments, and information provided to us by others. This report has been prepared in accordance with normally accepted geotechnical engineering practices. No other warranty is expressed or implied.

FIGURES



AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

DWN BY: CAE | DATUM: | DATE: 9/3/10

TITLE: EAST KENTUCKY POWER COOPERATIVE
WILLIAM C. DALE POWER PLANT, FORD, KY
SITE LOCATION & VICINITY MAP

CHK'D BY: MSC | REV. NO.: | PROJECT NO: 3-2106-0177-0001

PROJECTION: | SCALE: AS SHOWN | FIGURE No. 1

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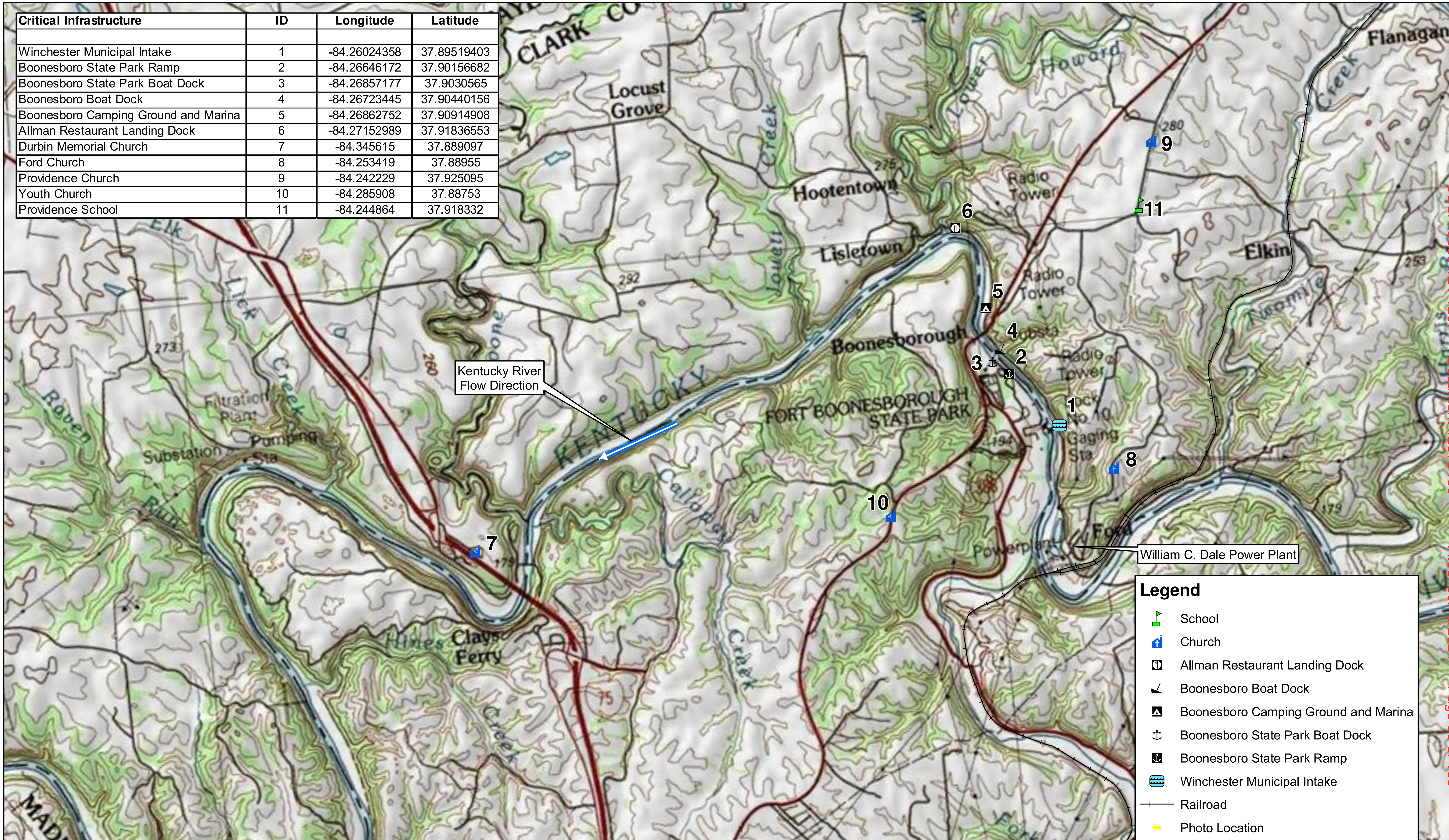
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DWN BY: DJC CKD BY: MS	ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	REV. No.: A Date: 8-19-10
AMEC Earth & Environmental 690 Commonwealth Business Center 11003 Bluegrass Parkway Louisville, KY 40299	Datum: NAD 83 Projection: Albers Scale: As Shown	EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY SITE PLAN	Project No: 3-2106-0177-0001 Figure No: 2

Critical Infrastructure	ID	Longitude	Latitude
Winchester Municipal Intake	1	-84.26024358	37.89519403
Boonesboro State Park Ramp	2	-84.26646172	37.90156682
Boonesboro State Park Boat Dock	3	-84.26857177	37.9030565
Boonesboro Boat Dock	4	-84.26723445	37.90440156
Boonesboro Camping Ground and Marina	5	-84.26862752	37.90914908
Allman Restaurant Landing Dock	6	-84.27152989	37.91836553
Durbin Memorial Church	7	-84.345615	37.889097
Ford Church	8	-84.253419	37.88955
Providence Church	9	-84.242229	37.925095
Youth Church	10	-84.285908	37.88753
Providence School	11	-84.244864	37.918332



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11003 Bluegrass Parkway
Louisville, KY 40299

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

DRAWN BY: DJC
CHK'D BY: MS
DATUM: NAD83
PROJECTION: Albers
SCALE: AS SHOWN
DATE: 5/21/2010

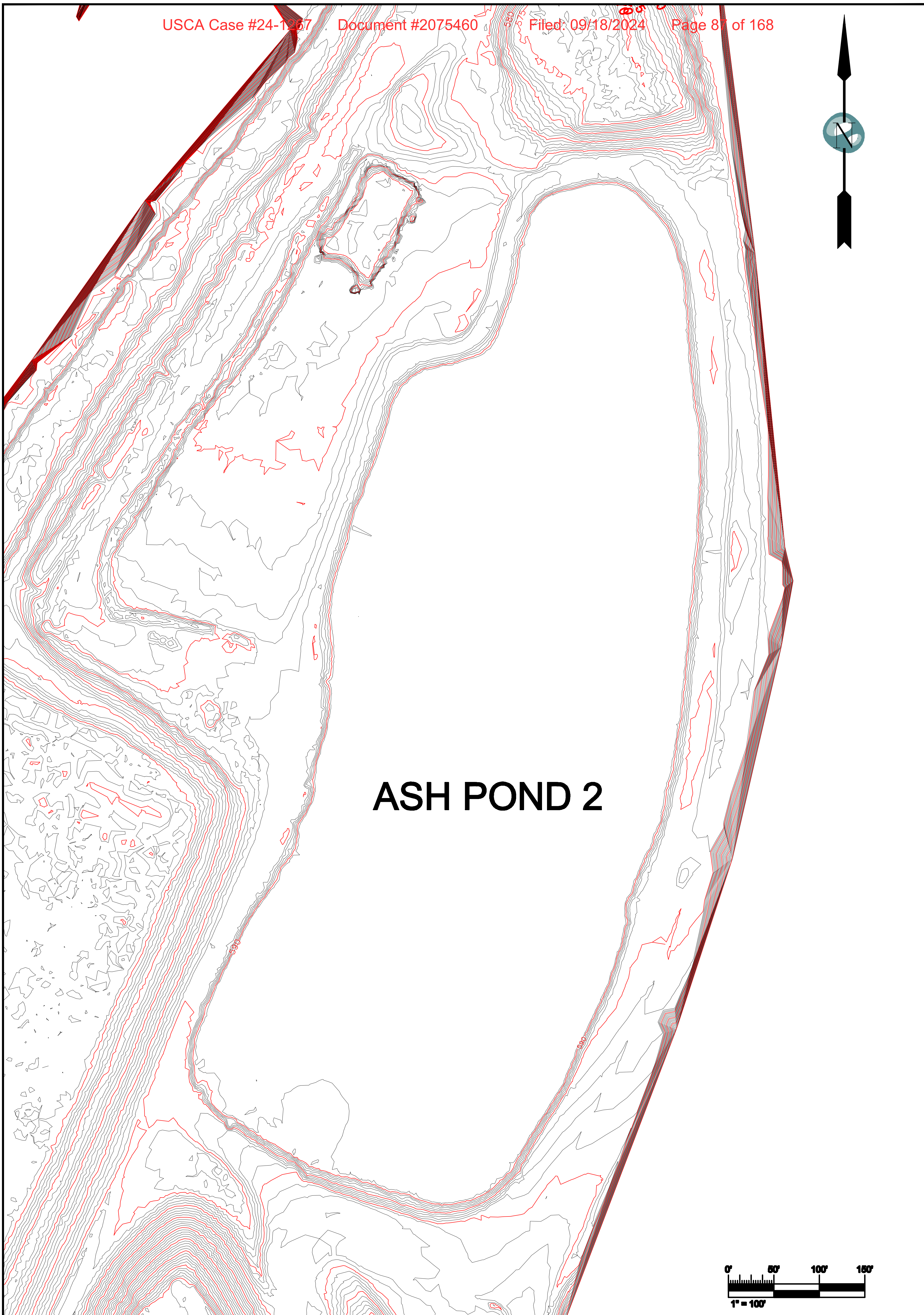
ASSESSMENT OF DAM SAFETY OF
COAL COMBUSTION SURFACE IMPOUNDMENTS

EAST KENTUCKY POWER COOPERATIVE
WILLIAM C. DALE POWER PLANT, FORD, KY
CRITICAL INFRASTRUCTURE

N
0 1 Miles
0 1 Kilometers

Notes: Critical infrastructure data provided by ESRI

FIGURE
3



CLIENT LOGO

CLIENT
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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Louisville, Ky 40299
(502) 267-0700

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DWN BY:	CAE
CHK'D BY:	MS
DATUM:	
PROJECTION:	
SCALE:	AS SHOWN

PROJECT
ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE
EAST KENTUCKY POWER COOPERATIVE
WILLIAM C. DALE POWER PLANT, FORD, KY
2004 TOPOGRAPHIC MAP ASH POND 2

REV. NO.:	
DATE:	9/2/10
PROJECT NO:	PROJECT NO.
FIGURE No.	4

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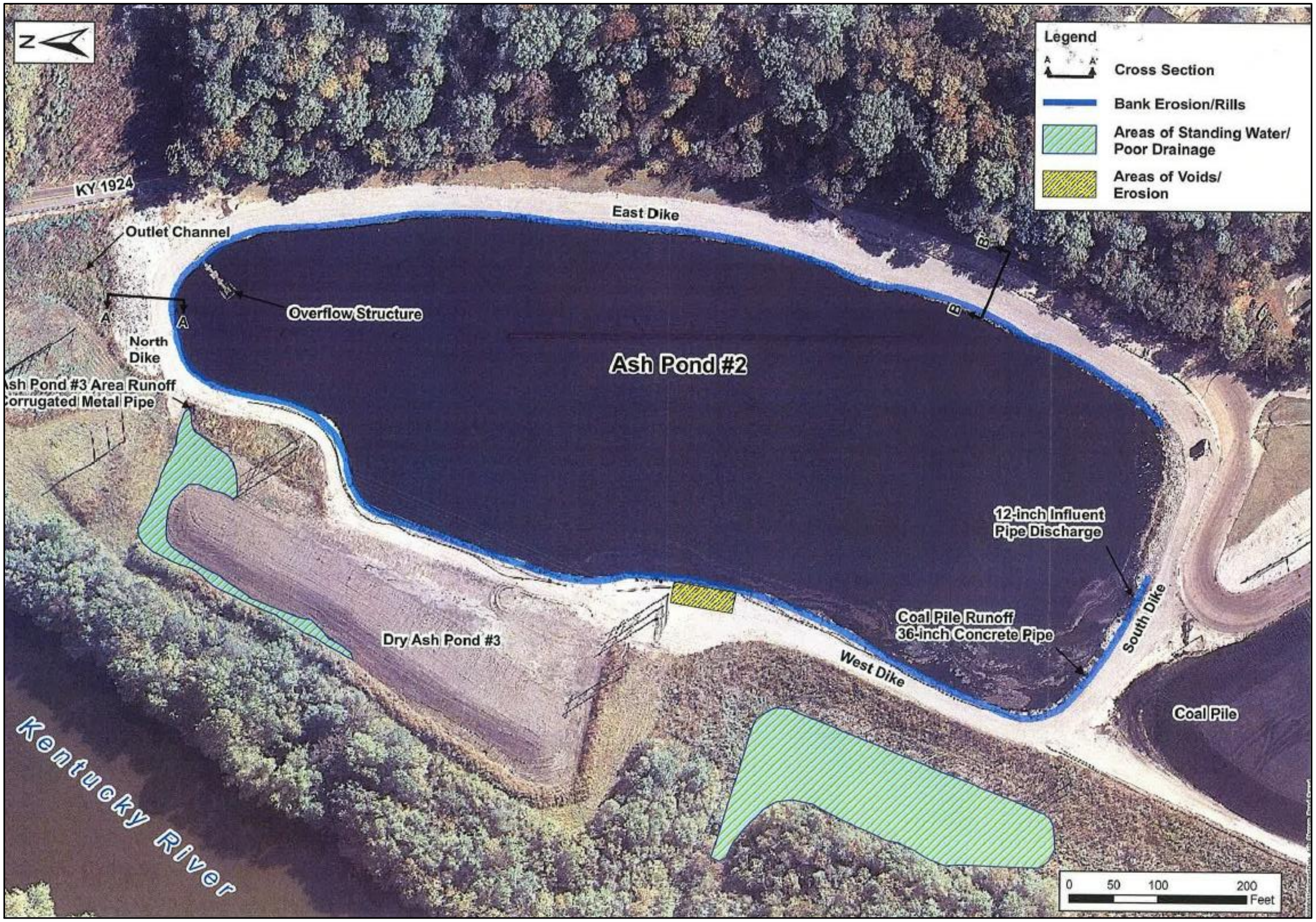
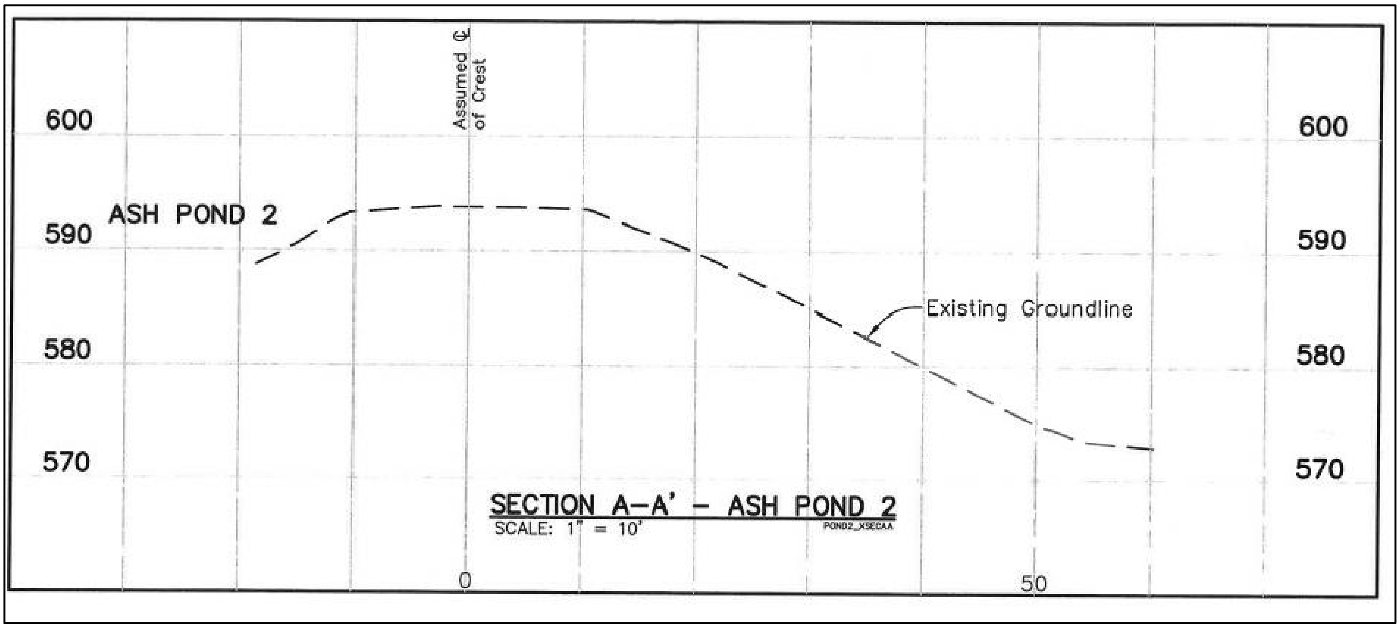
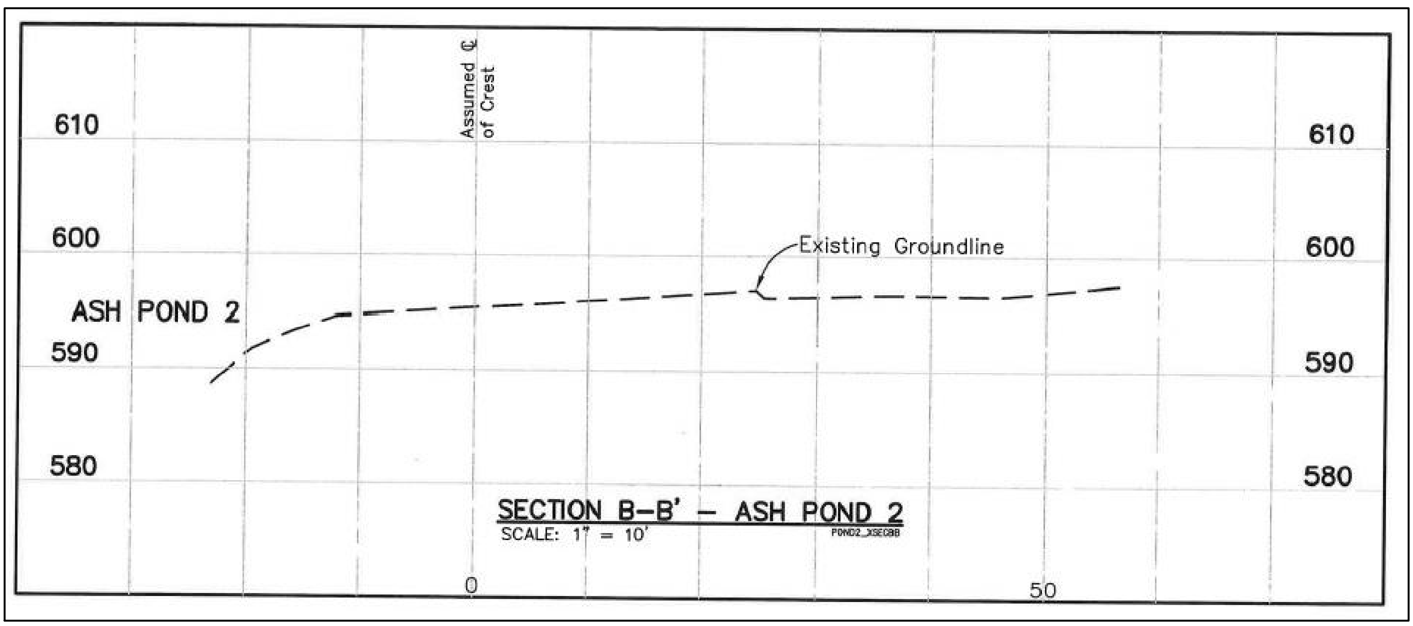


CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DWN BY: CAE / CHK'D BY: MS	PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	REV. NO.: A / DATE: 8/31/10
AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	DATUM: / PROJECTION: / SCALE: AS SHOWN	TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY 2009 ASSESSMENT ISSUES MAP ASH POND 2	PROJECT NO: 3-2106-0177-0001 / FIGURE No. 5

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\dalefig5.dwg – Layout2 – Aug. 31, 2010 11:36am – chris.eger



SECTION A–A' – ASH POND 2
SCALE: 1" = 10'



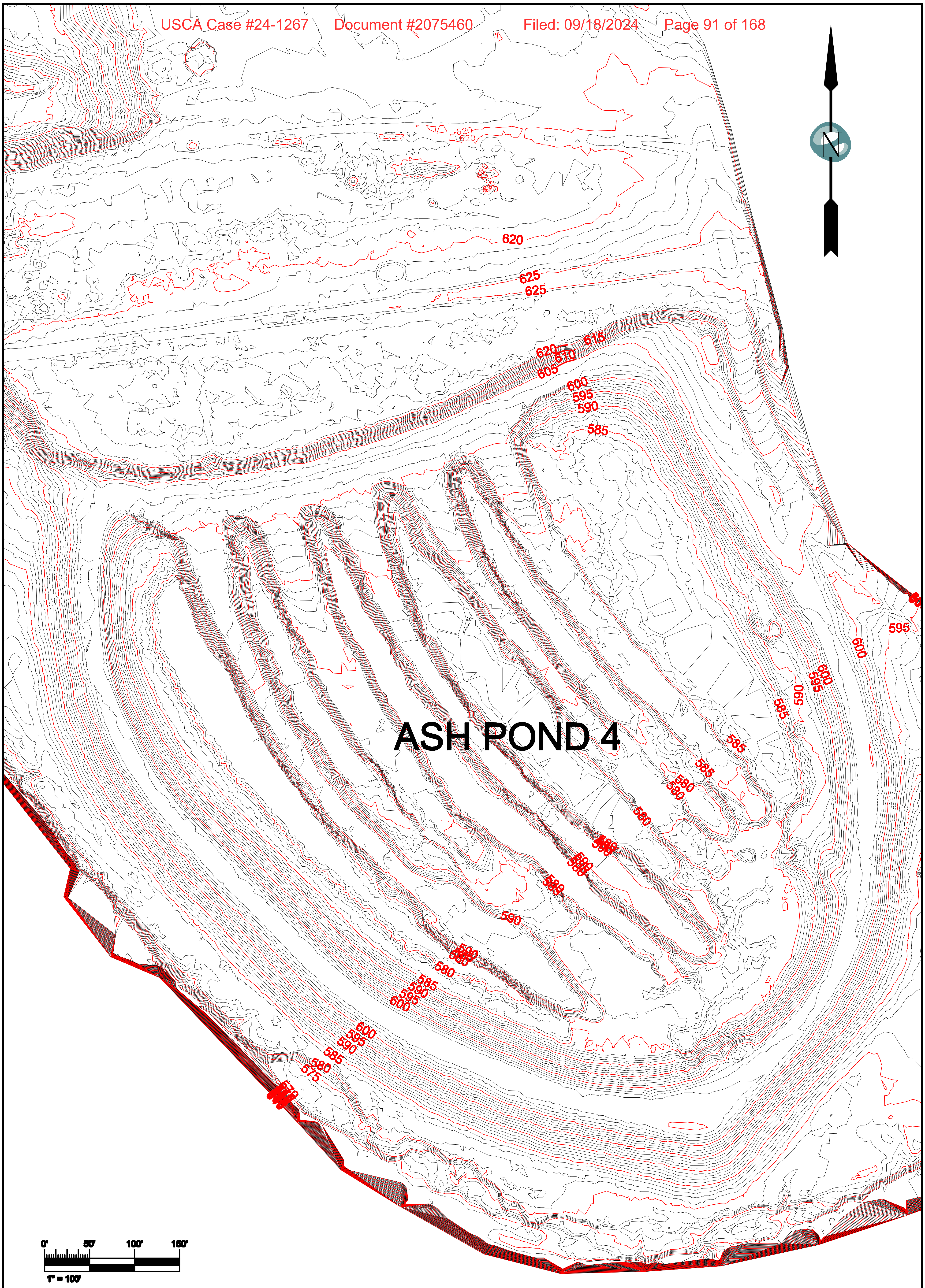
SECTION B–B' – ASH POND 2
SCALE: 1" = 10'

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 8/31/10
TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY CROSS-SECTIONS A-A` & B-B` ASH POND 2		CHK'D BY: MS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
		PROJECTION:	SCALE:	FIGURE NO. 6

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\dalefig6.dwg – Layout1 – Aug. 31, 2010 12:33pm – chris.eger

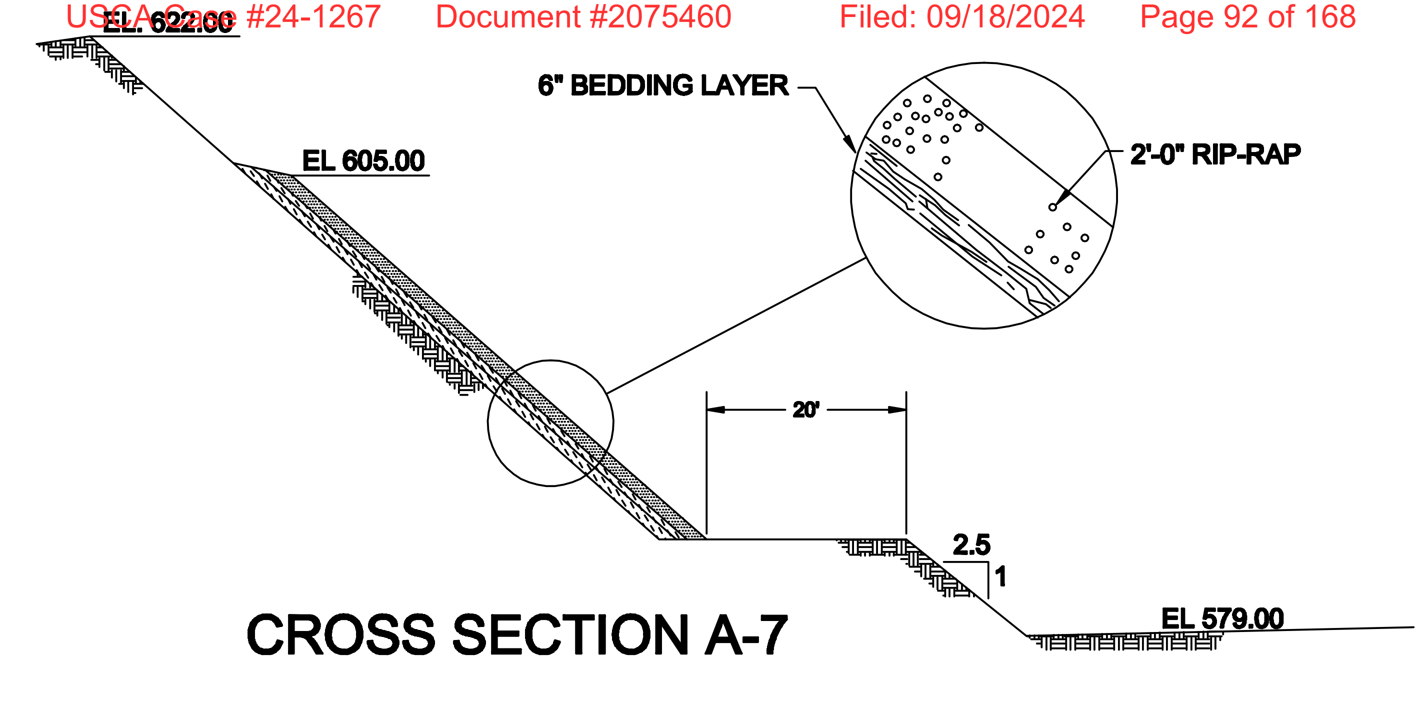
CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DWN BY: CAE	PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	REV. NO.:	
		CHK'D BY: MS		DATE: 9/2/10	
AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	DATUM:	TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY 2004 TOPOGRAPHIC MAP ASH POND 3	PROJECT NO: PROJECT NO.	
		PROJECTION:		FIGURE No. 7	
		SCALE: AS SHOWN			

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\Dale SurfaceTopo 1.dwg – AP3 – Sep. 03, 2010 8:29am – chris.eger

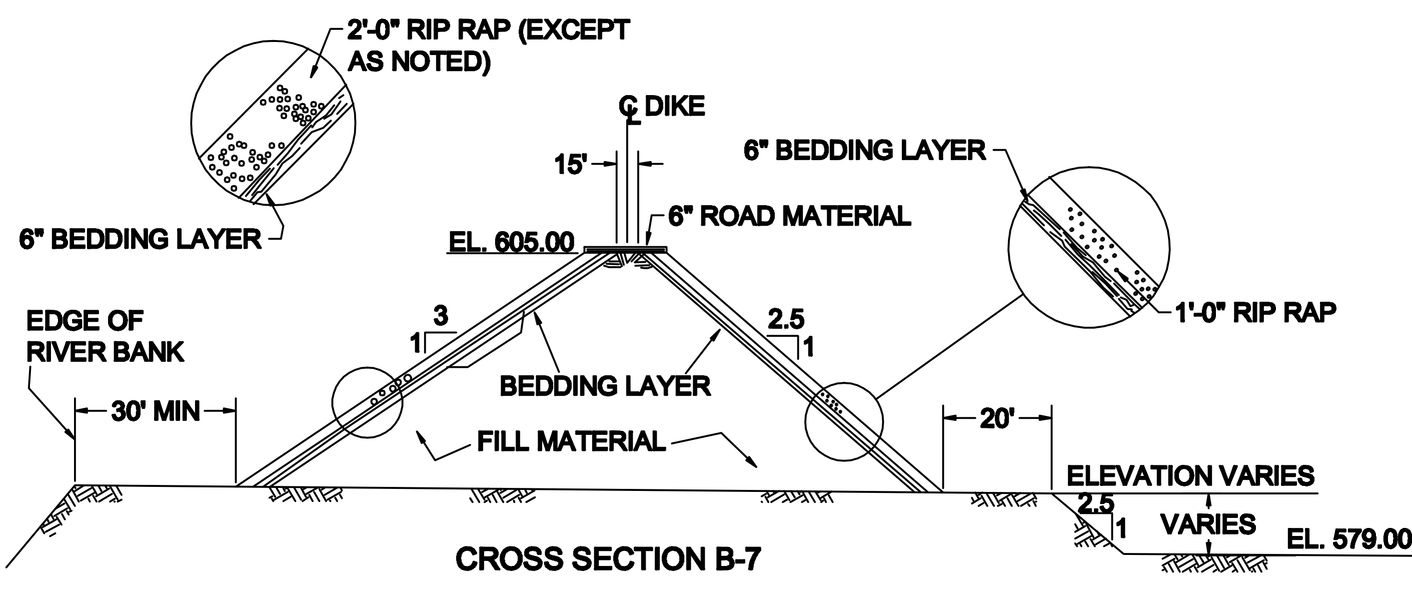


CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DWN BY: CAE	PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	REV. NO.:
		CHK'D BY: MS		DATE: 9/2/10
AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	DATUM:	TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY 2004 TOPOGRAPHIC MAP ASH POND 4	PROJECT NO: PROJECT NO.
		PROJECTION:		FIGURE No. 8
		SCALE: AS SHOWN		

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\Dale SurfaceTopo 1.dwg — AP4 — Sep. 03, 2010 8:28am — chris.eger



CROSS SECTION A-7



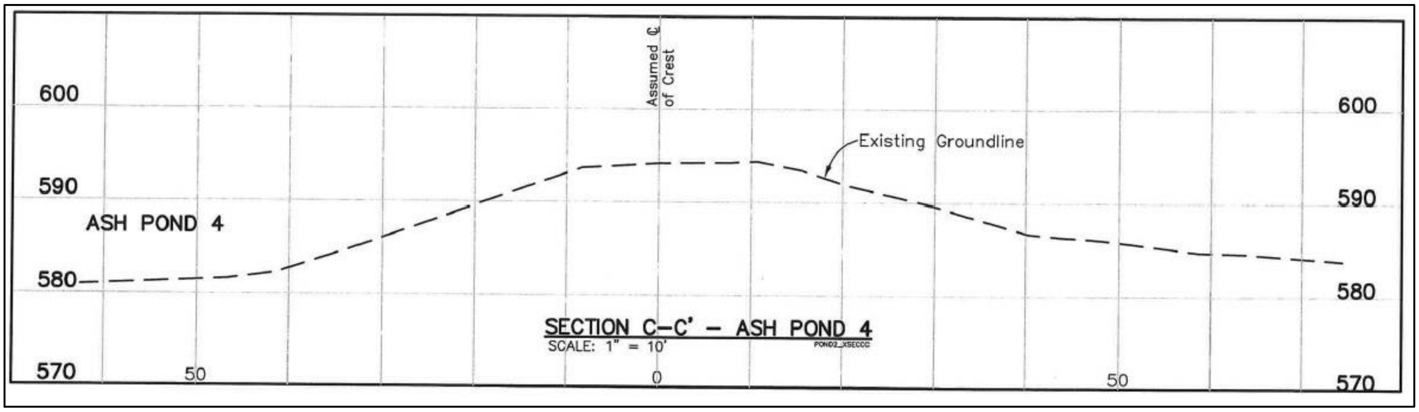
CROSS SECTION B-7

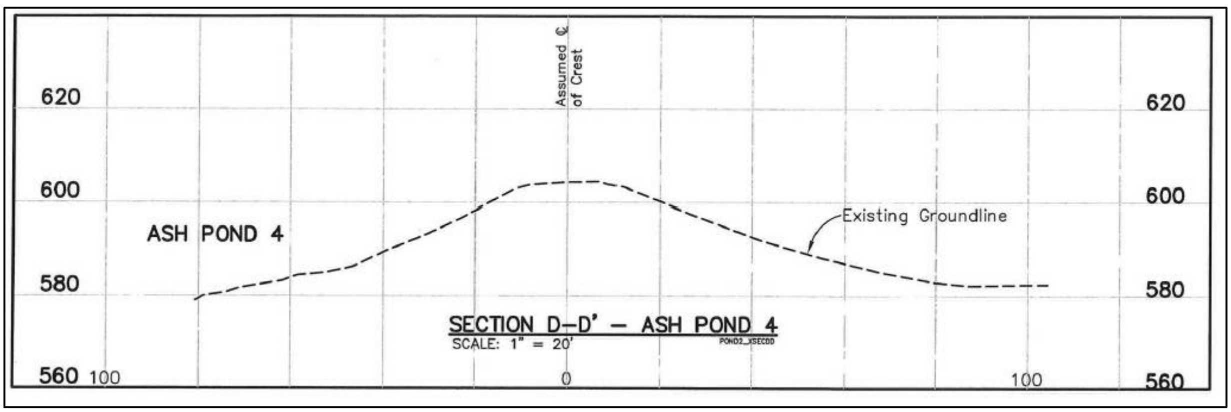
AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 8/31/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY TYPICAL CROSS-SECTIONS ASH POND 4		CHK'D BY: MS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
		PROJECTION:	SCALE:	FIGURE NO: 9

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\dalefig9.dwg — Layout1 — Aug. 31, 2010 12:33pm — chris.eger

CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	DWN BY: CAE	PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	REV. NO.: A
		CHK'D BY: MS		DATE: 8/31/10
AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	DATUM:	TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY 2009 ASSESSMENT ISSUES MAP ASH POND 4	PROJECT NO: 3-2106-0177-0001
		PROJECTION:		FIGURE No. 10
		SCALE: AS SHOWN		

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\dalefig10.dwg - Layout1 - Aug. 31, 2010 12:38pm - chris.eger



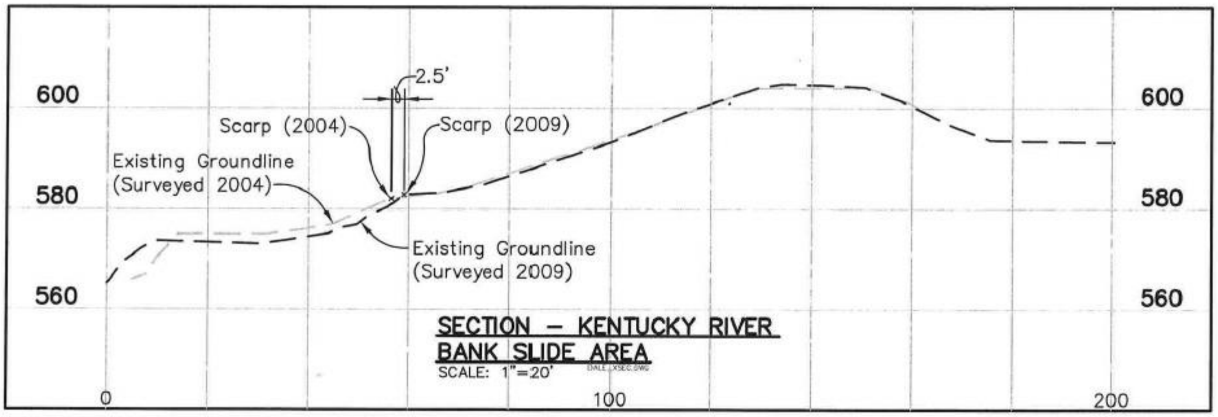


NOTES:

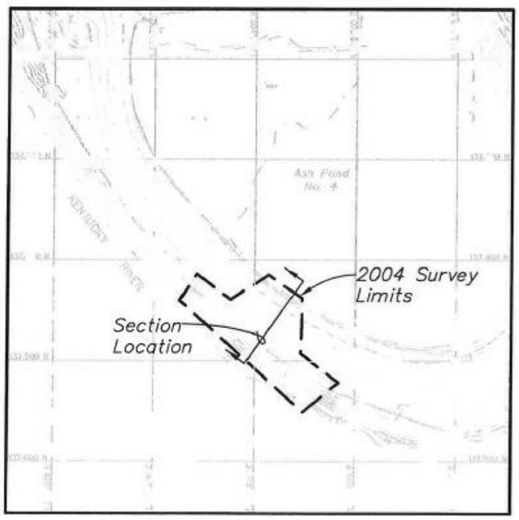
1. This site map was provided by East Kentucky Power Cooperative (EKPC). It is for illustration only and should not be used for construction or any other purpose.
2. The topographic survey was obtained from a site survey conducted by Stantec Consulting Services, Inc. (Stantec) in September 2004.

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/31/10
TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY CROSS-SECTIONS C-C` & D-D` ASH POND 4	CHK'D BY: MS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	FIGURE NO: 11

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\dalefig11.dwg — Layout1 — Aug. 31, 2010 12:40pm — chris.eger



SECTION — KENTUCKY RIVER BANK SLIDE AREA
SCALE: 1"=20'



SITE LOCATION MAP
SCALE: 1"=200'

NOTES:

1. This site map was provided by East Kentucky Power Cooperative (EKPC). It is for illustration only and should not be used for construction or any other purpose.
2. The topographic survey was obtained from a site survey conducted by Stantec Consulting Services, Inc. (Stantec) in September 2004. An additional topographic survey of the slide area was conducted by Stantec on July 20, 2009.

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS

TITLE: EAST KENTUCKY POWER COOPERATIVE
WILLIAM C. DALE POWER PLANT, FORD, KY
2004 SLIDE AREA CROSS-SECTION ASH POND 4 BUFFER AREA

DWN BY: CAE	DATUM:	DATE: 8/31/10
CHK'D BY: MS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
PROJECTION:	SCALE:	FIGURE NO: 12

S:\Geosciences\Proposals\EPA Coal Impoundment Inspection\EPA CCW June Round 6\EKP Dale\CAD and GIS Files\dalefig12.dwg — Layout1 — Aug. 31, 2010 12:42pm — chris.eger

APPENDICES

APPENDIX A
Waste Impoundment Inspection Forms

Site Name: William C. Dale Power Plant	Date: August 4, 2010
Unit Name: Ash Pond 2	Operator's Name: East Kentucky Power Cooperative
Unit I.D.: Ash Pond 2	Hazard Potential Classification: High Significant Low
Inspector's Name: James Black, Mary Swiderski	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	587'9"		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Varies		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	593.5		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		X	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
3	Outlet controlled by stop logs, bottom elevation of structure is 571', top is 592'. Source: Drawing, Pond 2 New Discharge Structure, EKP, 01 August 2003).
5	Source: Stantec Report dated16 February 2010.
12	Skimmer present.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # KY 0002194 INSPECTOR Black/Swiderski
Date August 4, 2010

Impoundment Name William C. Dale Power Plant - Ash Pond 2
Impoundment Company East Kentucky Power Cooperative
EPA Region 4
State Agency (Field Office) Address
200 Fair Oaks Lane
Frankfort, KY 40601

Name of Impoundment Ash Pond 2
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Bottom and fly ash settling pond, also receives water from coal pile runoff.

Nearest Downstream Town : Name Valley View, KY
Distance from the impoundment Approximately 17 miles
Impoundment
Location: Longitude -84 Degrees 15 Minutes 44 Seconds
Latitude 37 Degrees 53 Minutes 2 Seconds
State KY County Clark

Does a state agency regulate this impoundment? YES X NO ____

If So Which State Agency? KY Division of Water

<u>HAZARD POTENTIAL</u> (In the event the impoundment should fail, the following would occur):

______**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

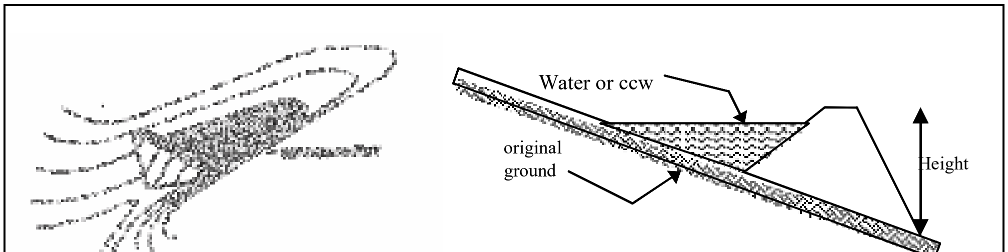
__**X**__**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

______**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

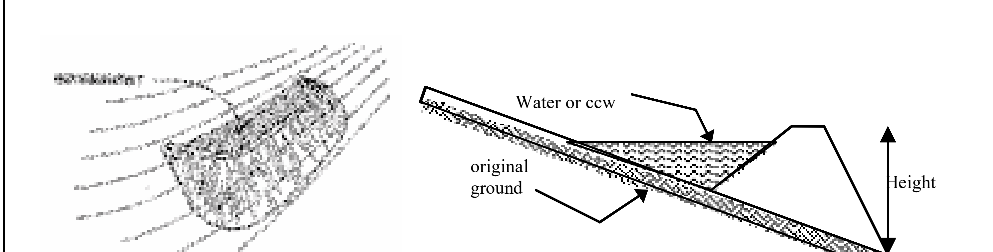
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure may reach Kentucky River

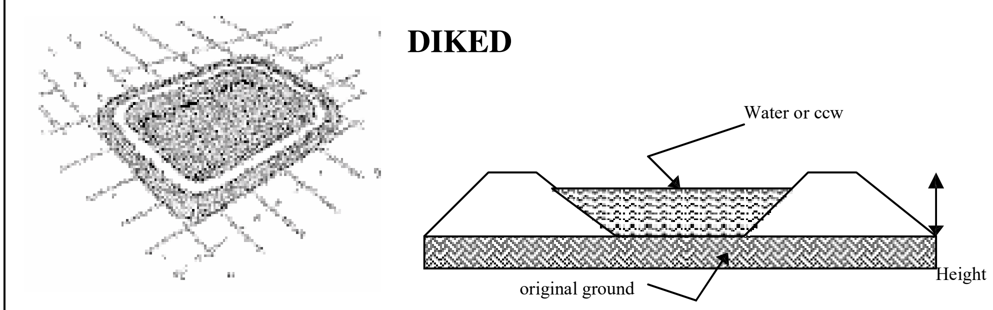
CONFIGURATION:



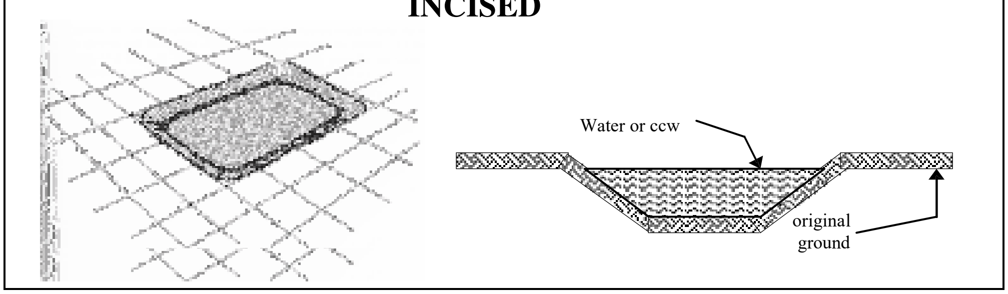
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

______Cross-Valley
___X__Side-Hill
______Diked
______Incised (form completion optional)
______Combination Incised/Diked

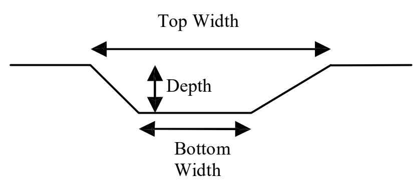
Embankment Height ___20______feet Embankment Material_Soil___________
Pool Area _____8______________ acres Liner _N/A___________________________
Current Freeboard ___4________ feet Liner Permeability _N/A______________

TYPE OF OUTLET (Mark all that apply)

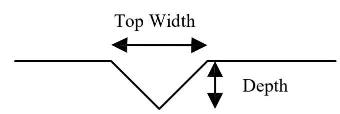
_N/A_ Open Channel Spillway
______Trapezoidal
______Triangular
______Rectangular
______Irregular

______depth
______bottom (or average) width
______top width

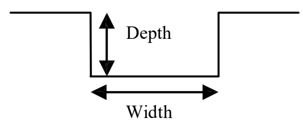
TRAPEZOIDAL



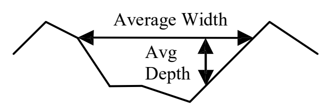
TRIANGULAR



RECTANGULAR

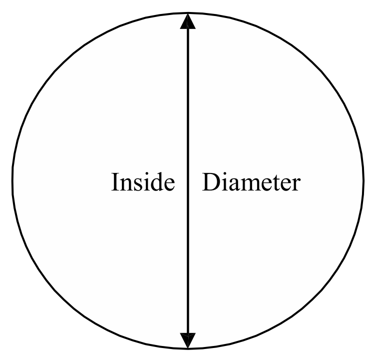


IRREGULAR



_X_ Outlet

_24"_ inside diameter



Material
______corrugated metal
______welded steel
_X_ concrete
______plastic (hdpe, pvc, etc.)
______other (specify) ______________________

Is water flowing through the outlet? YES _X_ NO _______

______No Outlet

______Other Type of Outlet (specify) __________________________________

The Impoundment was Designed By _Unknown_

Has there ever been a failure at this site? YES ___________NO ____X______

If So When? ______________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES ________NO ___X___

If So When? ______________________________

IF So Please Describe: ____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________ NO __X____

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ____________________

Site Name: William C. Dale Power Plant	Date: August 4, 2010
Unit Name: Ash Pond 3	Operator's Name: East Kentucky Power cooperative
Unit I.D.: Ash Pond 3	Hazard Potential Classification: High $\boxed{\text{Significant}}$ Low
Inspector's Name: James Black, Mary Swiderski	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	593.7		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?		X
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?		X	From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)	X		At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
2	Dry Pond – Currently used for ash stacking
3	No outlet structure
5	Source: Ash Pond 3 Regrading Plan, lowest elev. Field Road
9	Tree diameter – Approximately 4 inches

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # KY 0002194 INSPECTOR Black/Swiderski

Date August 4, 2010

Impoundment Name William C. Dale Power Plant - Ash Pond 3

Impoundment Company East Kentucky Power Cooperative

EPA Region 4

State Agency (Field Office) Address

200 Fair Oaks Lane
Frankfort, KY 40601

Name of Impoundment Ash Pond 3

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ______

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?		X

IMPOUNDMENT FUNCTION: Inactive, Currently used as a temporary dry stack storage.

Nearest Downstream Town : Name Valley View, KY

Distance from the impoundment Approximately 17 miles

Impoundment Location:

Longitude -84 Degrees 15 Minutes 48 Seconds
Latitude 37 Degrees 53 Minutes 6 Seconds
State KY County Clark

Does a state agency regulate this impoundment? YES X* NO ______

If So Which State Agency? *KY Division of Water Regulation KAR 45.060 for ash stacking.

<u>HAZARD POTENTIAL</u> (In the event the impoundment should fail, the following would occur):

______**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

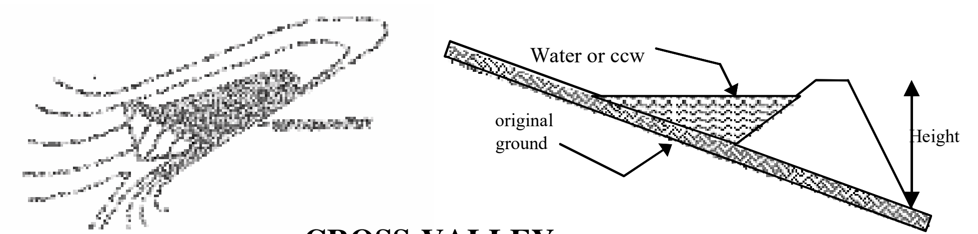
___X__**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

______**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

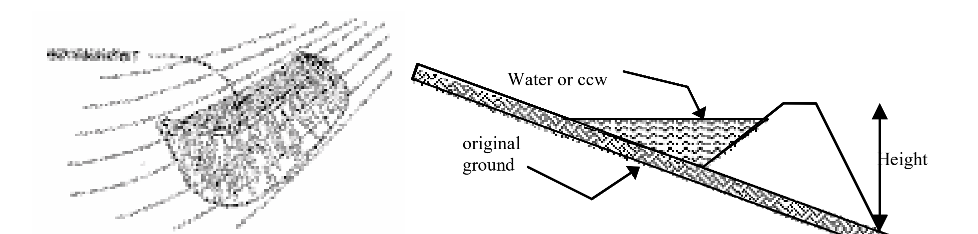
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure may reach Kentucky River.

<u>CONFIGURATION</u>:

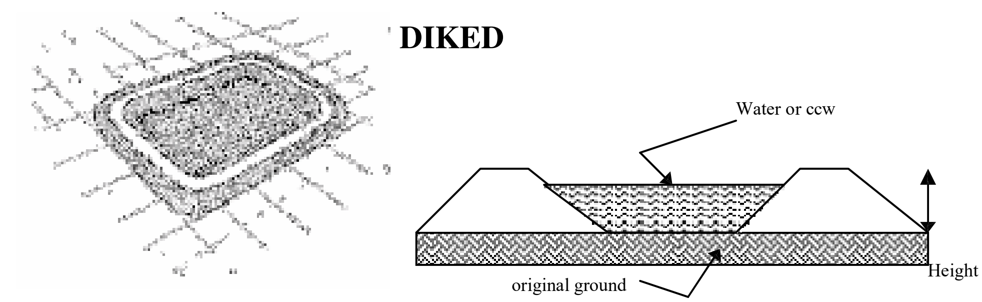


CROSS-VALLEY

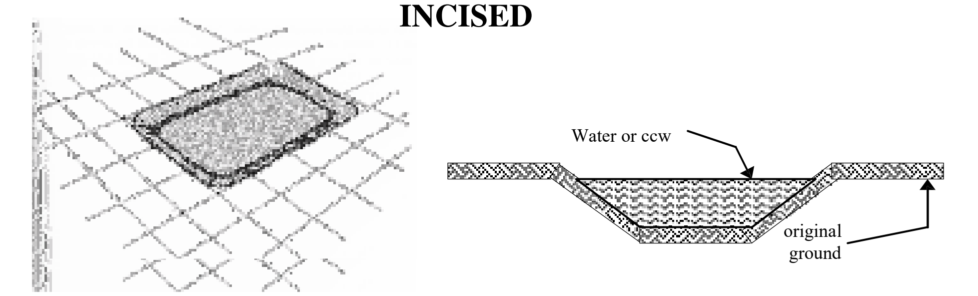


SIDE-HILL

DIKED



INCISED



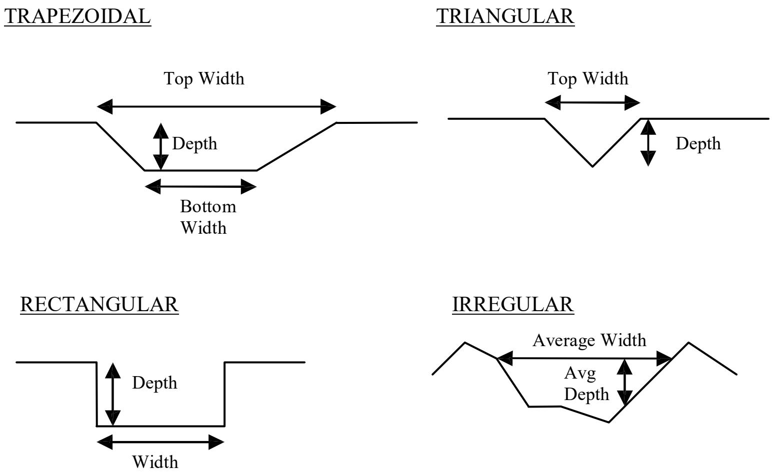
______Cross-Valley
______Side-Hill <u>**Unknown No Original Design Drawings**</u>
______Diked
______Incised (form completion optional)
______Combination Incised/Diked

Embankment Height __Unknown_feet Embankment Material_Unknown_______
Pool Area ______Unknown______ acres Liner _Unknown_______________________
Current Freeboard __Unknown_ feet Liner Permeability _N/A______________

TYPE OF OUTLET (Mark all that apply)

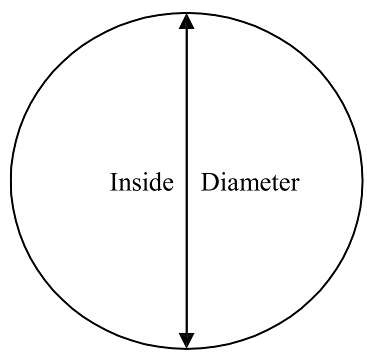
_N/A_ Open Channel Spillway
______Trapezoidal
______Triangular
______Rectangular
______Irregular

______depth
______bottom (or average) width
_____top width



__N/A__ **Outlet**

______inside diameter



Material
______corrugated metal
______welded steel
______concrete
______plastic (hdpe, pvc, etc.)
______other (specify) ______________________

Is water flowing through the outlet? YES _______ NO _______

_X_ No Outlet

______**Other Type of Outlet** (specify) ________________________________

The Impoundment was Designed By Unknown ______________________________

Has there ever been a failure at this site? YES ___X______NO ___________

If So When? ____________________________

If So Please Describe : ____

EKP to provide further information.

Has there ever been significant seepages at this site? YES ________NO ________

If So When? ______________________________

IF So Please Describe: ______________________________

EKP to provide further information.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES ________NO ________

If so, which method (e.g., piezometers, gw pumping,...)? ____________________

If so Please Describe : ______________________________________

EKP to provide further information.

Site Name: William C. Dale Power Plant	Date: August 4, 2010
Unit Name: Ash Pond 4	Operator's Name: East Kentucky Power cooperative
Unit I.D.: Ash Pond 4	Hazard Potential Classification: High **Significant** Low
Inspector's Name: James Black, Mary Swiderski	

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	varies		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?			Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?		X
7. Is the embankment currently under construction?		X	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	X		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	X	
17. Cracks or scarps on slopes?		X	24. Were Photos taken during the dam inspection?	X	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue #	Comments
2, 20	Dry Pond – Currently all ash material is being excavated.
3	Stop Log Inlet Structure, top is 602', inlet of outlet is 588'
23	Standing water along southern downstream toe, appears to be a result of poor drainage.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # KY 0002194 INSPECTOR Black/Swiderski

Date August 4, 2010

Impoundment Name William C. Dale Power Plant - Ash Pond 4
Impoundment Company East Kentucky Power Cooperative
EPA Region 4
State Agency (Field Office) Address
200 Fair Oaks Lane
Frankfort, KY 40601

Name of Impoundment Ash Pond 4
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update ____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?		X

IMPOUNDMENT FUNCTION: Currently used as Ash Pond

Nearest Downstream Town : Name Valley View, KY
Distance from the impoundment Approximately 17 miles
Impoundment
Location: Longitude -84 Degrees 15 Minutes 42 Seconds
Latitude 37 Degrees 52 Minutes 40 Seconds
State KY County Clark

Does a state agency regulate this impoundment? YES X NO ____

If So Which State Agency? KY Division of Water

<u>**HAZARD POTENTIAL**</u> (In the event the impoundment should fail, the following would occur):

______**LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

______**LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

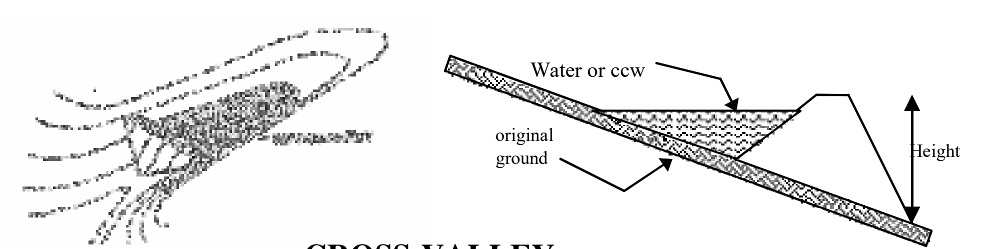
___X___**SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

______**HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

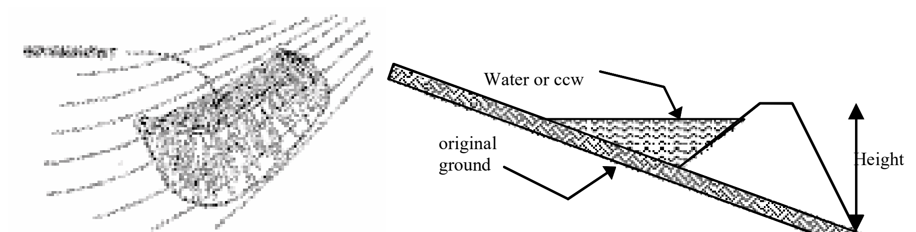
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Failure may reach Kentucky River.

CONFIGURATION:

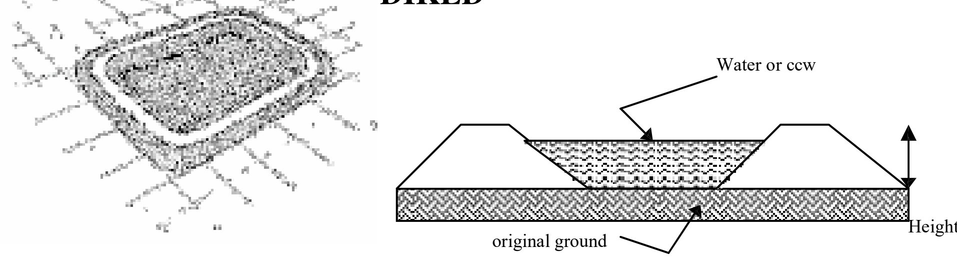


CROSS-VALLEY

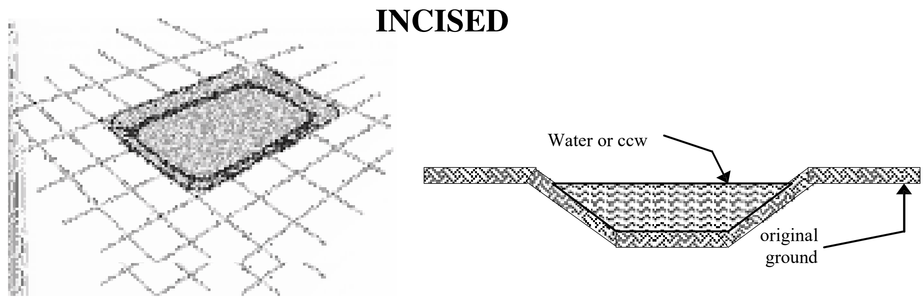


SIDE-HILL

DIKED



INCISED



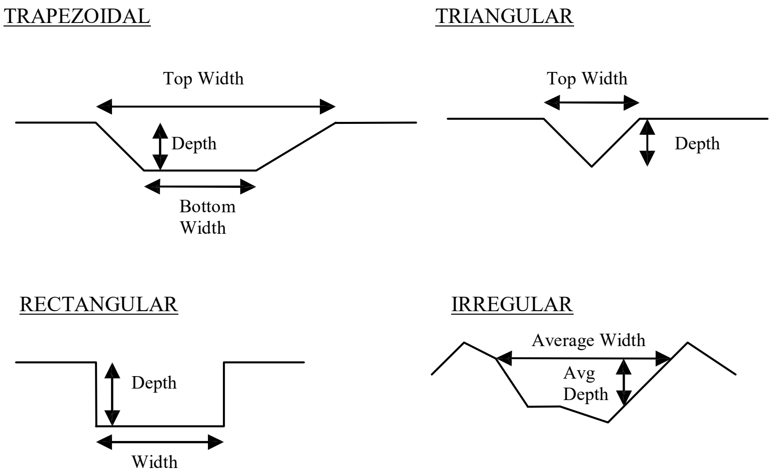
______Cross-Valley
______Side-Hill
__X__Diked
______Incised (form completion optional)
______Combination Incised/Diked

Embankment Height __26________feet Embankment Material_Earthern Fill_____
Pool Area ______10.7__________ acres Liner _N/A______________________________
Current Freeboard ___Dry 26'___ feet Liner Permeability _N/A_______________

TYPE OF OUTLET (Mark all that apply)

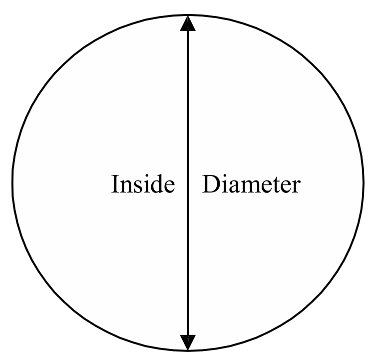
_N/A_ Open Channel Spillway
______Trapezoidal
______Triangular
______Rectangular
______Irregular

______depth
______bottom (or average) width
______top width



__X__ Outlet

__12”__ inside diameter



Material
__X__ corrugated metal
______welded steel
______concrete
______plastic (hdpe, pvc, etc.)
______other (specify) ______________________

Is water flowing through the outlet? YES _______ NO __X____

______No Outlet

______Other Type of Outlet (specify) ________________________________

The Impoundment was Designed By Stanley Consultants, January 30, 1976, Donald Jones KY #7872

Has there ever been a failure at this site? YES ___________NO _____X______

If So When? ______________________________

If So Please Describe : ____

Has there ever been significant seepages at this site? YES __X__ NO ____

If So When? August 2008

IF So Please Describe: ____

In August 1978, a consultant issued a report regarding leakage around the north side of Ash Pond No. 4. Following the report, EKPC installed a bentonite curtain to resolve the leak around the northern side of the impoundment. No further information was provided regarding the 1978 leak. Additional repair measures were reportedly completed by EKPC in 1998 along the northern limits of the pond. It is understood that a trench was dug down into weathered bedrock, and the resulting excavation was backfilled with concrete.

In 2000, attempts were made to stop or reduce leakage from the east side of the dike by injecting chemical grout into 4-inch holes drilled to a maximum depth of 30 feet to form a grout cutoff wall. In 2004, an additional consultant was contacted to investigate water and fly ash that had been leaking for at least five years through the east side of Ash Pond 4, presumably through the limestone bedrock formation underlying the dike. Reportedly, the leakage surfaces along a natural drain located approximately 300 feet east of the dike. EKPC constructed a 5-foot soil wedge extending from the bentonite curtain along the northeast to the middle of the crest along the southeastern limits of the dike. EKPC reported that this measure effectively stopped any noticeable leaking through the dike.

According to provided documents, on August 22, 2008 a whirlpool was observed by East Kentucky Power Company (EKPC) personnel approximately 60 feet from the crest of the dike along the eastern side. EKPC then observed leakage surfacing along a natural drain approximately 300 feet east of the dike. Upon observing the whirlpool and seepage EKPC stopped ash disposal into the pond, began dewatering the pond and notified the Kentucky Division of Water of the observations. Due to the leakage EKPC has stopped sluicing ash to the pond and is currently excavating existing ash material.

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES X NO ________

If so, which method (e.g., piezometers, gw pumping,...)? ______________________

If so Please Describe :

Please see Page 6 for details.

APPENDIX B
Site Photo Log Map and Site Photos

	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY		DWN BY: DJC	ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	REV. No.: A
			CKD BY: MS		Date: 8-19-10
AMEC Earth & Environmental 690 Commonwealth Business Center 11003 Bluegrass Parkway Louisville, KY 40299	amec		Datum: NAD 83	EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH PONDS 2 & 3 PHOTO LOCATION MAP	Project No: 3-2106-0177-0001
			Projection: Albers		Figure No: B-1
			Scale: As Shown		

App. 94

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

AMEC Earth & Environmental
690 Commonwealth Business Center
11003 Bluegrass Parkway
Louisville, KY 40299

DWN BY:	DJC
CKD BY:	MS
Datum:	NAD 83
Projection:	Albers
Scale:	App. 95 As Shown

ASSESSMENT OF DAM SAFETY OF
COAL COMBUSTION SURFACE IMPOUNDMENTS

EAST KENTUCKY POWER COOPERATIVE
WILLIAM C. DALE POWER PLANT, FORD, KY
ASH POND 4
PHOTO LOCATION MAP

REV. No.:	A
Date:	8-19-10
Project No:	3-2106-0177-0001
Figure No:	B-2

ASH POND 2 SITE PHOTOS

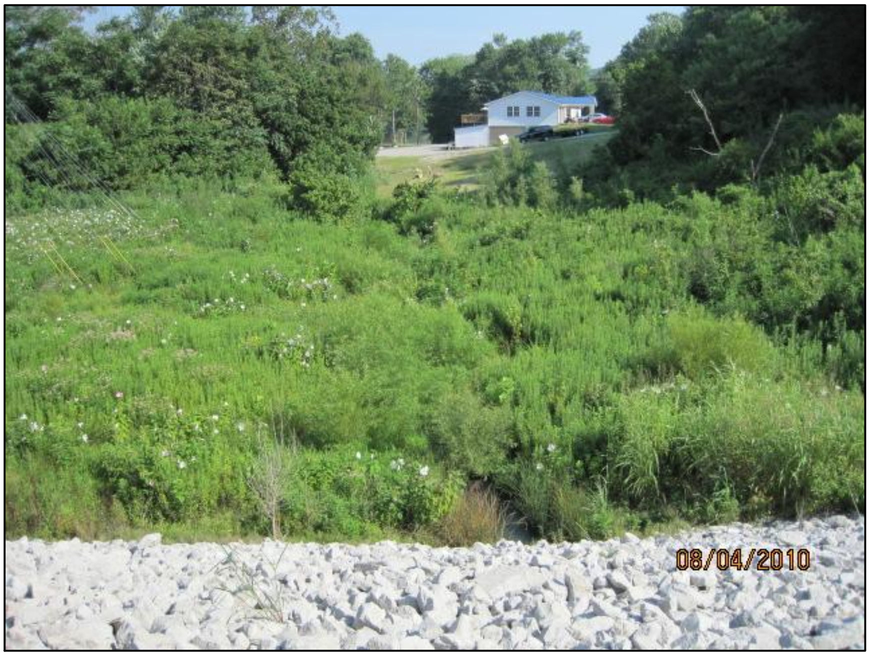
2-1

NORTH DIKE OF POND LOOKING SOUTHWEST AT PRIMARY OUTLET STRUCUTRE

2-2

POND NPDES OUTFALL AT TOE OF NORTH DIKE

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 2 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-3



2-3

FROM NORTHERN DIKE LOOKING NORTH AT OUTFALL CHANNEL TO KENTUCKY RIVER

2-4

LOOKING SOUTH FROM NORTHERN BANK AT POND INTERIOR, AND CREST AND UPSTREAM SLOPE OF EASTERN DIKE

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

amec

CLIENT LOGO

CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 2 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-4

2-5

FROM EASTERN DIKE LOOKING SOUTH AT CREST AND DOWNSTREAM SLOPE, FORD ROAD LOCATED TO THE EAST

2-6

FROM NORTHEAST DIKE LOOKING SOUTH AT UPSTREAM SLOPE, CREST AND FORD ROAD

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 2 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-5

2-7

LOOKING WEST FROM EAST DIKE AT BOOMS ACTING AS SKIMMER

2-8

FROM EASTERN BANK LOOKING SOUTHWEST AT SOUTHERN CREST AND UPSTREAM SLOPE, COAL PILE IN BACKGROUND

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 2 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-6

2-9

ASH INLET PIPES FROM POWER PLANT ON SOUTH DIKE

2-10

CLOSE-UP OF ASH INLET PIPES FROM POWER PLANT

AMEC Earth & Environmental
690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 2 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-7

2-11

COAL PILE RUNOFF INLET ON SOUTH DIKE

2-12

SOUTH END OF WEST DIKE LOOKING NORTH AT CREST AND DOWNSTREAM SLOPE

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Louisville, Ky 40299
(502) 267-0700

CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY		
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 2 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-8

2-13

FROM MIDDLE OF WEST DIKE LOOKING NORTH

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 2 SITE PHOTOS		CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
		PROJECTION:	SCALE:	PAGE NO.. B-9

ASH POND 3 SITE PHOTOS

3-1

FROM SOUTH END OF COMMON DIKE LOOKING NORTHWEST

3-2

BEHIND WEST DIKE LOOKING NORTHWEST. VEGETATION AND TREES ON WEST DIKE (ON RIGHT SIDE OF PHOTO)

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690 Commonwealth Center
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Louisville, Ky 40299
(502) 267-0700

amec

CLIENT LOGO	CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY		
PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 3 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-10

ASH POND 4 SITE PHOTOS

4-1

FROM SOUTHEAST DIKE LOOKING NORTHWEST AT INACTIVE OUTLET STRUCTURE AND POND INTERIOR

4-2

INACTIVE OUTLET STRUCTURE

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690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

amec

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 4 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-11

4-3

POND DISCHARGE/OUTFALL 004 AND TOE OF SOUTHEAST DIKE

4-4

POND DISCHARGE/OUTFALL 004 WEIR

<table>
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690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700</td><td>amec</td><td>CLIENT LOGO</td><td colspan="2">CLIENT
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY</td></tr>
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ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS</td><td>DWN BY:
CAE</td><td>DATUM:</td><td>DATE:
8/5/10</td></tr>
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WILLIAM C. DALE POWER PLANT, FORD, KY
ASH POND 4 SITE PHOTOS</td><td>CHK'D BY:
MGS</td><td>REV. NO.:</td><td>PROJECT NO:
3-2106-0177-0001</td></tr>
<tr><td>PROJECTION:</td><td>SCALE:</td><td>PAGE NO..
B-12</td></tr>
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4-5

CONCRETE DISCHARGE CHANNEL AWAY FROM SOUTHEAST SLOPE

4-6

TYPICAL SOUTHEAST DOWNSTREAM EMBANKMENT

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 4 SITE PHOTOS		CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
		PROJECTION:	SCALE:	PAGE NO.. B-13

4-7
LOOKING SOUTH FROM EASTERN DIKE

4-8
LOOKING NORTHWEST FROM EASTERN DIKE

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 4 SITE PHOTOS		CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
		PROJECTION:	SCALE:	PAGE NO.. B-14

4-9

INLET STRUCTURE FROM PLANT ON NORTH DIKE

4-10

LOOKING SOUTH FROM NORTH DIKE

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690 Commonwealth Center
11003 Bluegrass Parkway
Louisville, Ky 40299
(502) 267-0700

amec

CLIENT LOGO

CLIENT: UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

PROJECT: ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE: EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 4 SITE PHOTOS	CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
	PROJECTION:	SCALE:	PAGE NO.. B-15

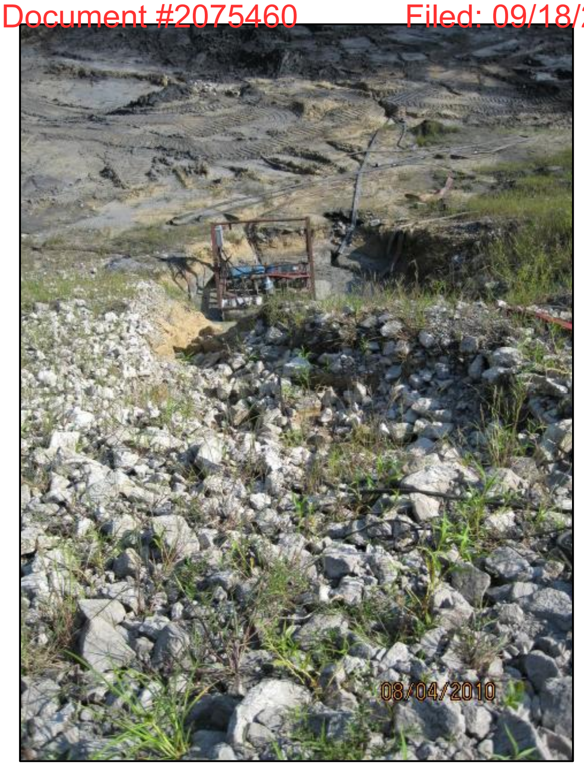
4-11

LOOKING NORTH FROM WESTERN BANK

4-12

TYPICAL SOUTHERN DOWNSTREAM EMBANKMENT

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS	DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 4 SITE PHOTOS	CHK'D BY: MGS PROJECTION:	REV. NO.: SCALE:	PROJECT NO: 3-2106-0177-0001 PAGE NO.. B-16



4-13

PUMP UTILIZED DURING LOWERING OF PHREATIC SURFACE, EXCAVATED SUMP AND EROSION GULLEYS ON UPSTREAM SLOPE

4-14

LOOKING WEST FROM SOUTH DIKE AT CREST, UPSTREAM SLOPES AND HDPE PIPES USED TO TRANSPORT CCW TO POND #2

AMEC Earth & Environmental 690 Commonwealth Center 11003 Bluegrass Parkway Louisville, Ky 40299 (502) 267-0700	amec	CLIENT LOGO	CLIENT UNITED STATES ENVIRONMENTAL PROTECTION AGENCY	
PROJECT ASSESSMENT OF DAM SAFETY OF COAL COMBUSTION SURFACE IMPOUNDMENTS		DWN BY: CAE	DATUM:	DATE: 8/5/10
TITLE EAST KENTUCKY POWER COOPERATIVE WILLIAM C. DALE POWER PLANT, FORD, KY ASH POND 4 SITE PHOTOS		CHK'D BY: MGS	REV. NO.:	PROJECT NO: 3-2106-0177-0001
		PROJECTION:	SCALE:	PAGE NO.. B-17

APPENDIX C
Inventory of Provided Materials

	East Kentucky Power Cooperative, Inc. List of Documents Provided at the Inspection of the Dale Power Station on August 4, 2010	
No.	**Description**	**Bates No.**
1.	EPA Request for Information under Section104(e) of CERCLA (March 24, 2009)	DS 000001-000036 (1)
2.	KPDES Permit No. KY002194, issued March 26, 2001	DS 000037-000076 (6)
3.	USGS Real-Time Water Data for Kentucky River at Lock 10 near Winchester, KY	DS 000077–000080 (21)
4.	US Army Engineer District, Louisville, Navigation Locks Data Sheet B, Kentucky River Lock No. 10, Chart No. 25; Kentucky River Chart No. 26; and L&N Railroad Bridges 3	DS 000081-000084 (22)
5.	Request for Proposal, Engineering Services, Ash Dams & Landfills (November 23, 2009)	DS-CBI 000001-000025 (5)
6.	2009 Ash Storage Pond #2 Inspection Report, Dale Power Station, Ford, KY (February 16, 2010), prepared by Stantec Consulting Services	DS-CBI 000026-00068 (2)
7.	2009 Ash Storage Pond No. 4 Inspection Report, Dale Power Station, Ford, KY (February 16, 2010), prepared by Stantec Consulting Services	DS-CBI 000069-000120 (3)
8.	2009 River Bank Stability Near Ash Storage Pond #4 Inspection Report, Dale Power Station, Ford, KY (February	DS-CBI 000121-000150 (4)
9.	Soil Investigation for Proposed Dale Station Fly Ash Dikes and Pond, Ford, Kentucky (February 25, 1975), prepared by Bowser-Morner	DS-CBI 000151-000327 (8)
10.	Dale Station Water & Waste Water Mass Balance (May 24, 1995)	DS-CBI 000328 (10)
11.	Evaluation of Corrective Measures, Fly Ash Pond No. 4 Leakage, Dale Power Station (December 2004), Ford, KY,	DS-CBI 000329-000378 (11)
12.	Technical Specifications for Seepage Correction of Ash Pond No. 4 at Dale Power Station (May 2010), prepared by S&ME	DS-CBI 000379-000424 (12)

13.	Emergency Action Plan, William C. Dale Power Station	DS-CBI 000425-000441 (not on list)
14.	Dale Station Ash Ponds Daily Log (January 1, 2010 to August 1, 2010)	DS-CBI 000442-000446 (23)
15.	Ash Flow Narrative	DS-CBI 000447 (24)
16.	Dale Ash Pond No. 3 Re-Grading Drawings (June 8, 2010), prepared by S&ME	DS-CBI 000448-000465 (9)
17.	Dale Ash Pond No. 4 Seepage Correction Drawings (June 8, 2010), prepared by S&ME	DS-CBI 000466-000476 (13)
18.	East Kentucky Power Cooperative, Ash Storage Basis, Dale Station (Final November 18, 1977)	DS-CBI 000477-000483 (14)
19.	No. 3 Pond Cross Sections, W.C. Dale Power Station (June 2, 1989)	DS-CBI 000484 (15)
20.	Topographic Map of Ponds 1 and 2, Prepared by Park Aerial Surveys (Photo taken December 6, 1992)	DS-CBI 000485-000486 (16)
21.	Site Plan, Dale Generating Station, East Kentucky Rural Electric Power Coop, Ford, KY (1952), prepared by Burns &	DS-CBI 000487 (17)
22.	East Kentucky Power Cooperative, Dale Power Station Pond 2 New Discharge Structure (August 1, 2003), prepared by East Kentucky Power	DS-CBI 000488 (18)
23.	East Kentucky Power Cooperative, Dale Station Plan – Ash Storage Basin, Dale Station (January 30, 1976), prepared by Stanley Consultants	DS-CBI 000489 (19)
24.	Lidar survey (printed July 30, 2010)	DS-CBI 000490 (20)
25.	Compact Disc containing various reports related to the design and operation of the Dale Station	The documents on the CD are not Bates numbered.
	Documents requested during conference call with EKPC on August 24, 2010	
26.	Letter to Division of Water Quality (December 18, 1975)	DS 000085-000086
27.	Letter acknowledging receipt of KPDES application for Dale Station (July 20, 2006)	DS 000087

28.	Certificate of Inspection for Dam and Appurtenant Works (Inspection Date 10/29/98)	DS 000088-000090
29.	Change Orders	DS-CBI 000491-000497
30.	Engineering Services Contract for Ash Dam and Landfill (January 6, 2010)	DS-CBI 000498-000552
31.	Summary of Stability Evaluation Slide at Ash Pond #4 (June 11, 2010)	DS-CBI 000553-000561
32.	QORE Proposal for Engineering Services (December 16, 2009)	DS-CBI 000562-000587
	Additional Documents Provided August 30, 2010	
33.	Engineering Study for Dale Power Station Ash Pond No. 2	DS-CBI 000588-000608
34.	Summary of Stability Evaluation Ash Pond #2	DS-CBI 000609-000619
35.	Engineering Study for Dale Power Station Ash Pond No. 4	DS-CBI 000620-000640
	Comments to Draft Report	
36.	1. East Kentucky Power Cooperative Comments on Draft *Report of Geotechnical Investigation Dam Safety Assessment of Coal Combustion Surface Impoundments East Kentucky Power Cooperative William C. Dale Power Station, Winchester, KY*, dated January 12, 2011.	

APPENDIX D
Ash Pond 2 Typical Sections and Dam Profile (2010 S&Me Report - Evaluation of Risks of 100-Yr Rain Event & Freeboard Requirement for Ash Pond No. 2)

SCALE: 1"=100'

PROJECT NO. 1831-10-5580

DATE: AUGUST, 2010

S&ME

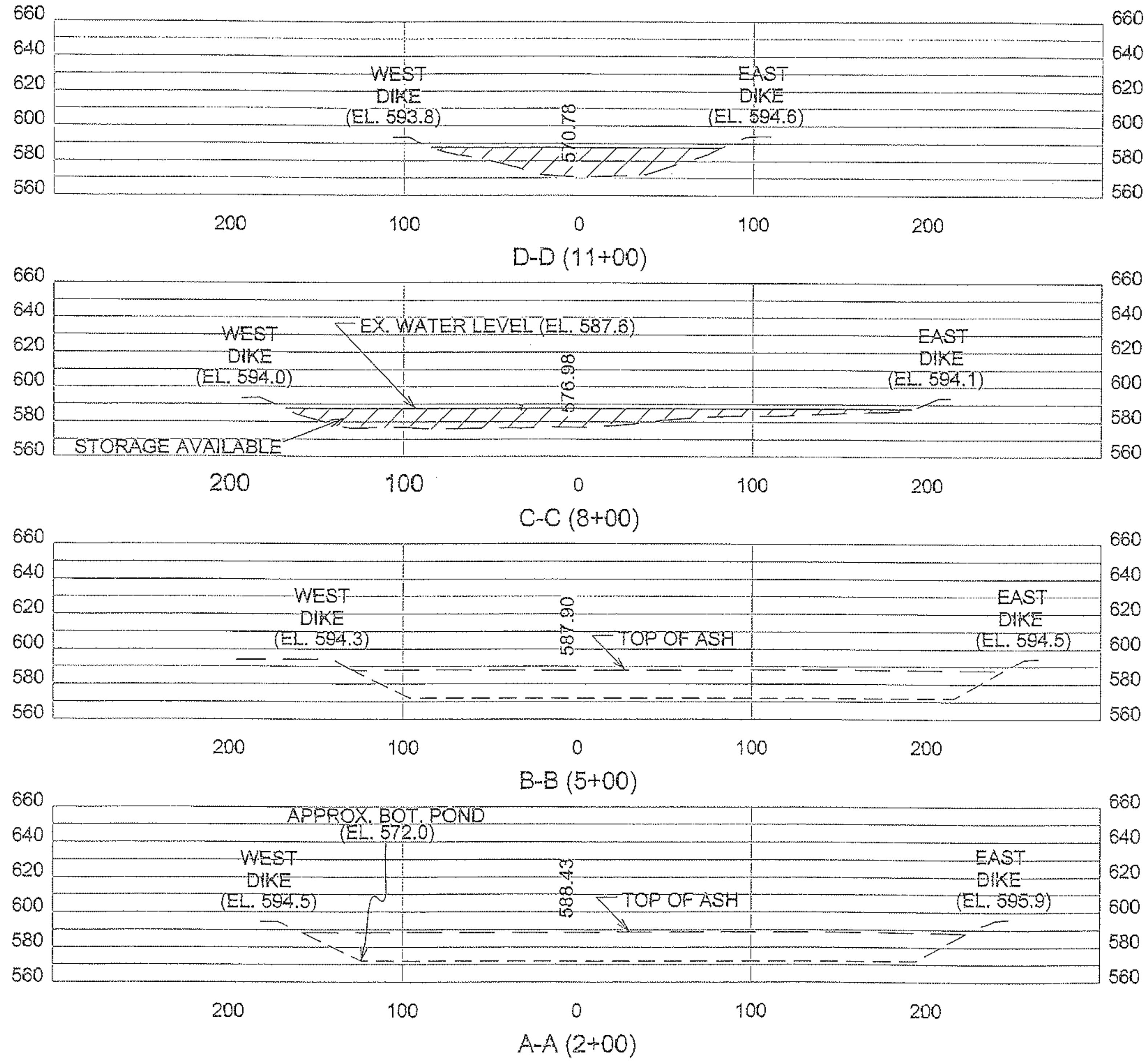
422 CODELL DRIVE
LEXINGTON, KY 40509
(859)293-5518

WWW.SMEINC.COM

TOP OF DIKE BASELINE PLAN VIEW

ASH STORAGE POND NO. 2
DALE POWER STATION
FORD, KENTUCKY

SHEET



DATE OF SURVEY: AUGUST 18, 2010

TYPICAL CROSS-SECTIONS

SCALE: 1"=80'
DATE: AUGUST 2010
PROJECT NO. 1831-10-5580

APPENDIX C

TYPICAL CROSS-SECTIONS

ASH STORAGE POND 2
DALE POWER STATION
FORD, KENTUCKY

S&ME
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LEXINGTON, KY 40509
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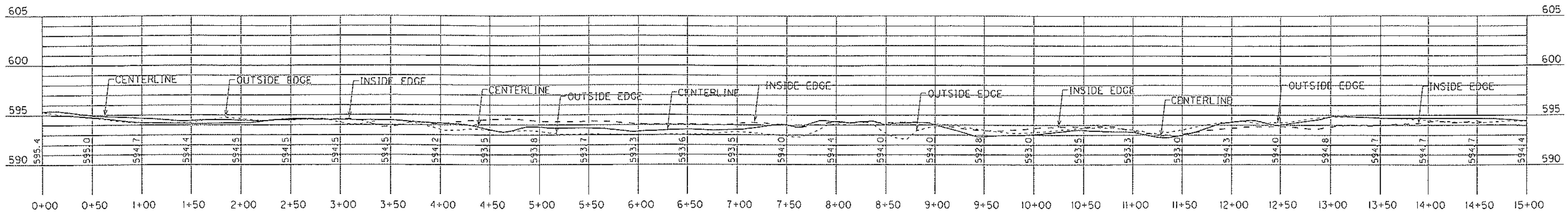
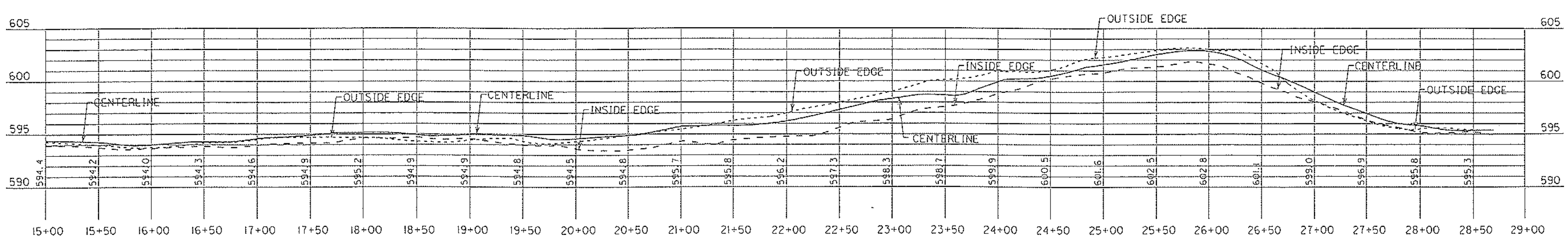
SHEET
2 of 2


KENTUCKY RIVER
N
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00
9+00
10+00
11+00
12+00
13+00
14+00
15+00
16+00
17+00
18+00
19+00
20+00
21+00
22+00
23+00
24+00
25+00
26+00
27+00
28+00
0
100
200
300
BASELINE – DALE ASH DAM NO. 2





GRAPHIC SCALE IN FEET

0 100 200

LEGEND

CENTERLINE
OUTSIDE EDGE
INSIDE EDGE

S&ME
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422 CODELL DRIVE, LEXINGTON, KY 40509
PHONE: 859.293.5518

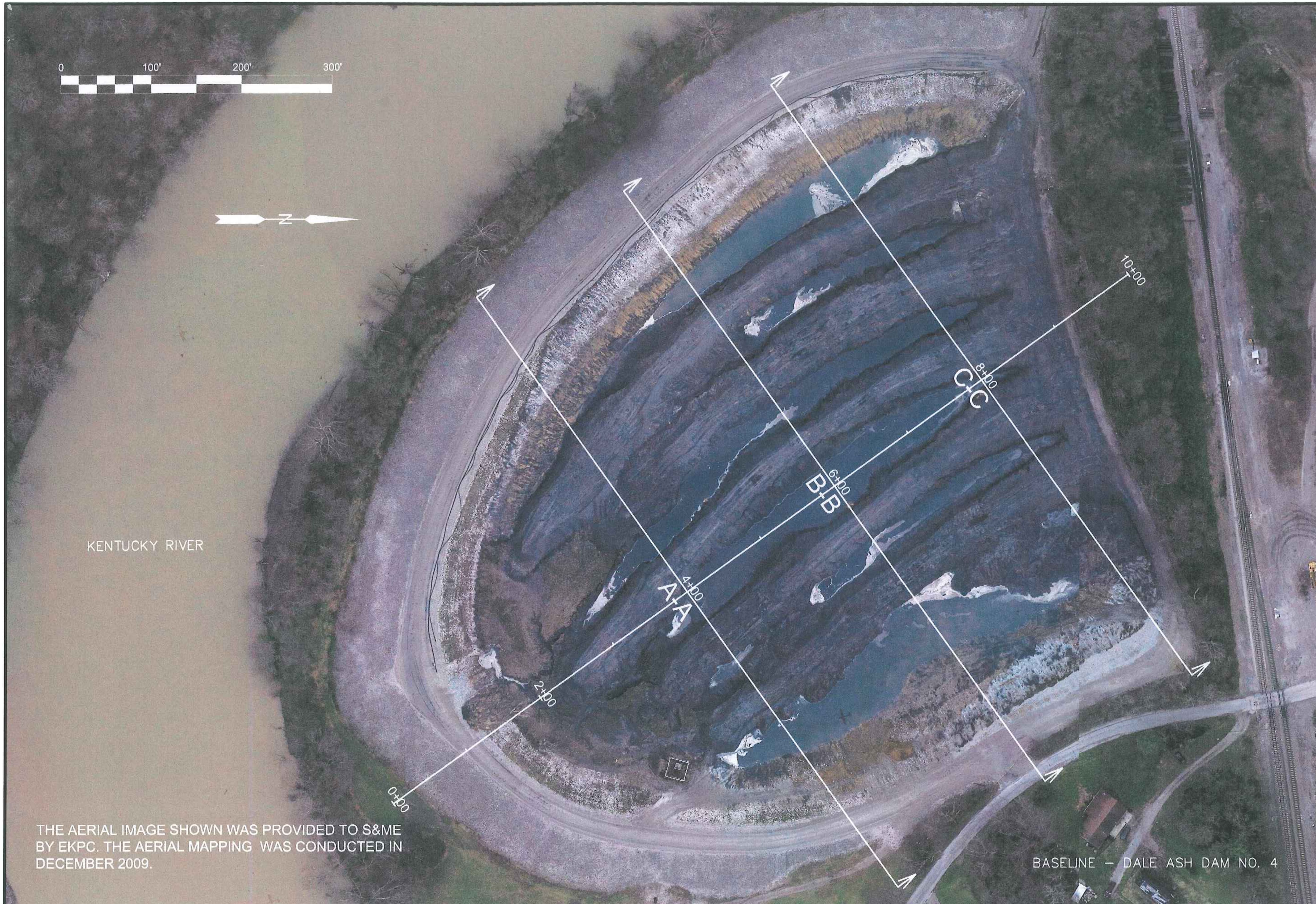
SCALE: 1" = 50'	DATE: 8/12/2010
PROJECT NUMBER: 1831105580	DRAWN BY: RLW
DRAWING NUMBER: P-1	CHECKED BY: AWL

EKP DALE
CLARK COUNTY, KENTUCKY

TOP OF POND 2 DIKE PROFILE

FIGURE NO. 1

APPENDIX E
Ash Pond 4 Typical Sections and Dam Profile (2010 S&Me Report - Evaluation of Risks Of 100-Yr Rain Event & Freeboard Requirement for Ash Pond No. 4)



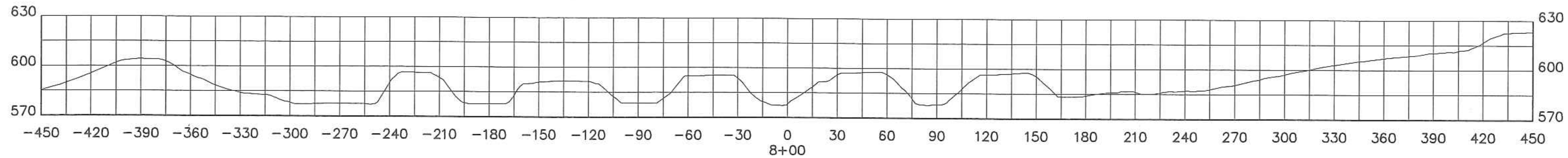
SCALE: 1"=100'
PROJECT NO. 1831-10-5580
DATE: AUGUST 2010

S&ME
422 CODELL DRIVE
LEXINGTON, KY 40509
(859)293-5518
WWW.SMEINC.COM

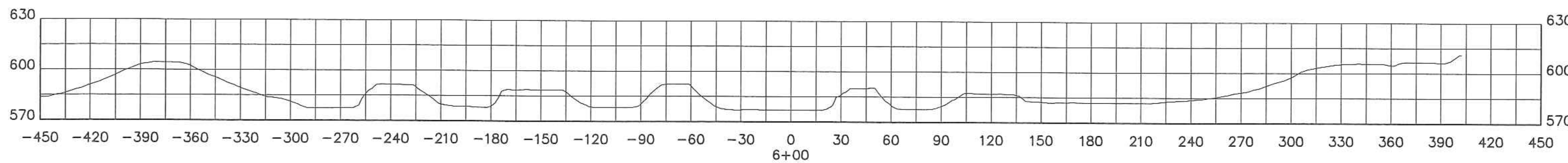
TYPICAL SECTION BASELINE PLAN VIEW

ASH STORAGE POND NO. 4
DALE POWER STATION
FORD, KENTUCKY

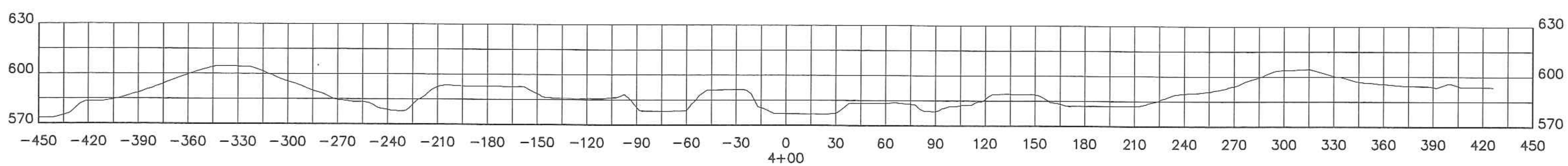
SHEET
1 of 2



C–C



B–B



A–A

SCALE: 1"=80'

PROJECT NO. 1831-10-5580

DATE: AUGUST, 2010

S&ME

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LEXINGTON, KY 40509
(859)293-5518
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TYPICAL SECTIONS

ASH STORAGE POND NO. 4
DALE POWER STATION
FORD, KENTUCKY

SHEET
2 of 2

TOP OF DIKE BASELINE PLAN VIEW

ASH STORAGE POND NO. 4
DALE POWER STATION
FORD, KENTUCKY

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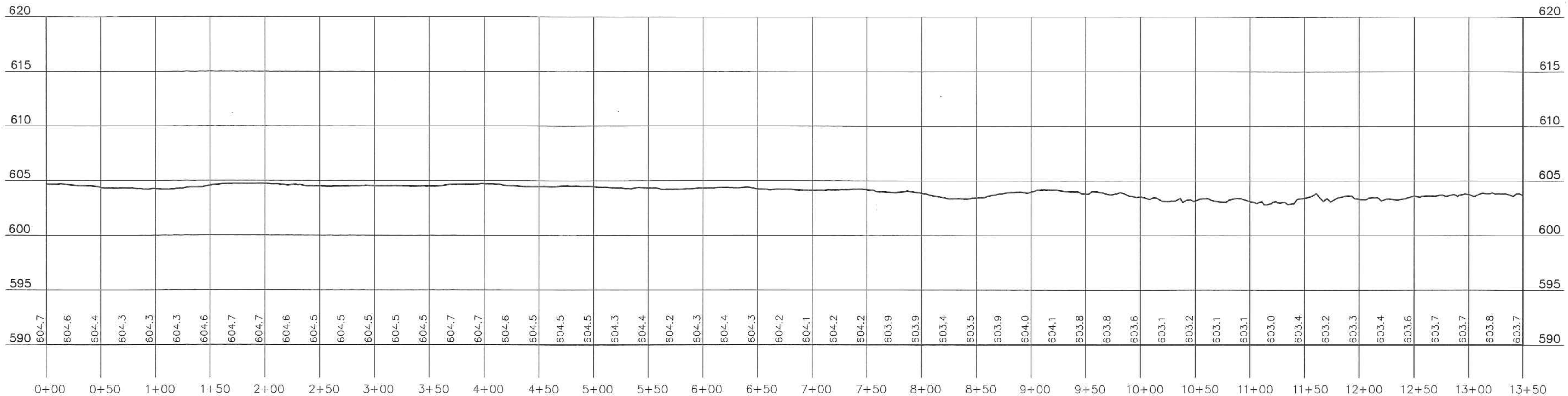
LEXINGTON, KY 40509
(859)293-5518
WWW.SMEINC.COM

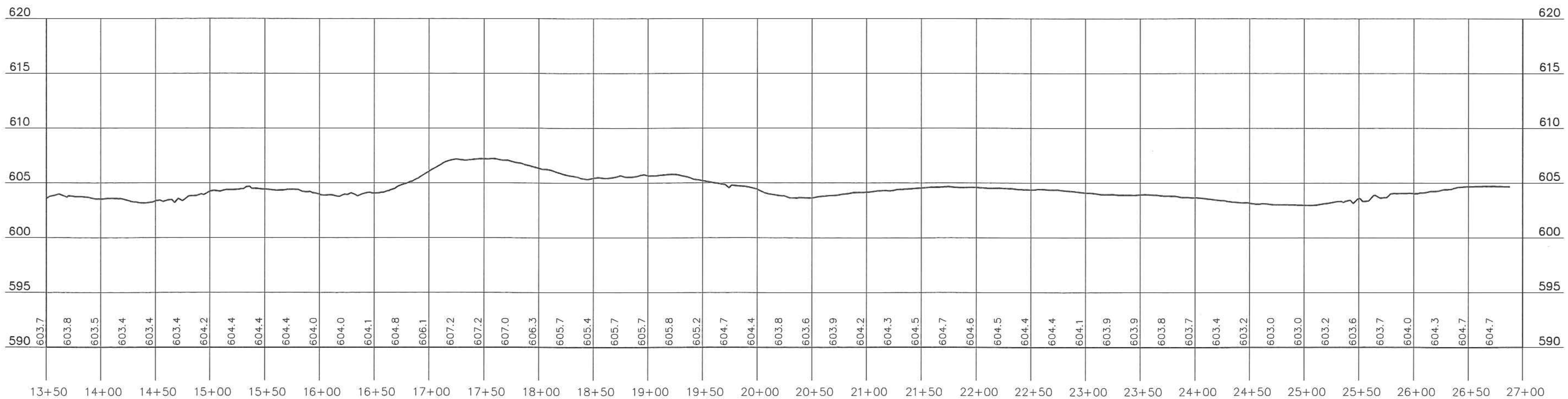
SCALE: 1"=100'

PROJECT NO. 1831-10-5580

DATE: AUGUST 2010

SHEET
1 of 2





SCALE: 1"=100'

PROJECT NO. 1831-10-5580

DATE: AUGUST, 2010

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(859)293-5518

S&ME

WWW.SMEINC.COM

TOP OF DIKE BASELINE PROFILE

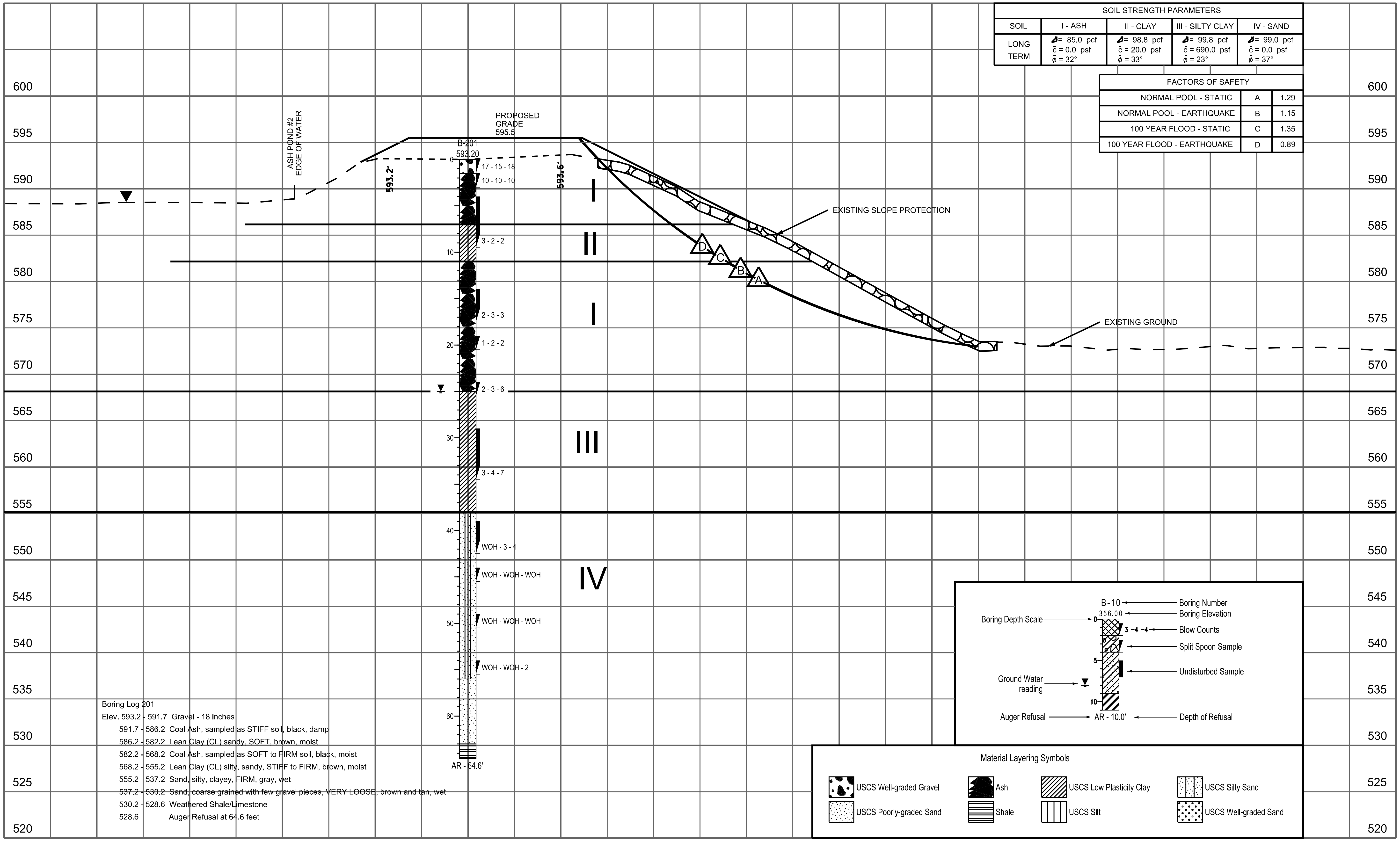
ASH STORAGE POND NO. 4
DALE POWER STATION
FORD, KENTUCKY

SHEET
2 of 2

APPENDIX F
2010 Stability Evaluation Ash Pond #2 Plan View and Stability Sections


COUNTY OF
CLARK
PROJECT NO.
1831-10-5580
SHEET NO.
P1
DRY ASH POND #3
WEST DIKE
NORTH DIKE
ASH POND #2
B-202
B-201
1+50
1+00
0+00
COAL PILE
SOUTH DIKE
EAST DIKE
0
50
100
200
GRAPHIC SCALE IN FEET
SCALE: 1"=50'
EKP DALE
ASH POND #2
BORING LOCATIONS
FILE NAME:
USER: RLW
DATE PLOTTED: 8/16/2010
E-SHEET NAME:
MicroStation v8.11.7.443

COUNTY OF	PROJECT NO.	SHEET NO.
CLARK	1831-10-5580	X1



SOIL STRENGTH PARAMETERS				
SOIL	I - ASH	II - CLAY	III - SILTY CLAY	IV - SAND
LONG TERM	γ = 85.0 pcf $\bar{c}$ = 0.0 psf $\bar{\phi}$ = 32°	γ = 98.8 pcf $\bar{c}$ = 20.0 psf $\bar{\phi}$ = 33°	γ = 99.8 pcf $\bar{c}$ = 690.0 psf $\bar{\phi}$ = 23°	γ = 99.0 pcf $\bar{c}$ = 0.0 psf $\bar{\phi}$ = 37°

FACTORS OF SAFETY		
NORMAL POOL - STATIC	A	1.29
NORMAL POOL - EARTHQUAKE	B	1.15
100 YEAR FLOOD - STATIC	C	1.35
100 YEAR FLOOD - EARTHQUAKE	D	0.89

Boring Log 201
Elev. 593.2 - 591.7 Gravel - 18 inches
591.7 - 586.2 Coal Ash, sampled as STIFF soil, black, damp
586.2 - 582.2 Lean Clay (CL) sandy, SOFT, brown, moist
582.2 - 568.2 Coal Ash, sampled as SOFT to FIRM soil, black, moist
568.2 - 555.2 Lean Clay (CL) silty, sandy, STIFF to FIRM, brown, moist
555.2 - 537.2 Sand, silty, clayey, FIRM, gray, wet
537.2 - 530.2 Sand, coarse grained with few gravel pieces, VERY LOOSE, brown and tan, wet
530.2 - 528.6 Weathered Shale/Limestone
528.6 Auger Refusal at 64.6 feet

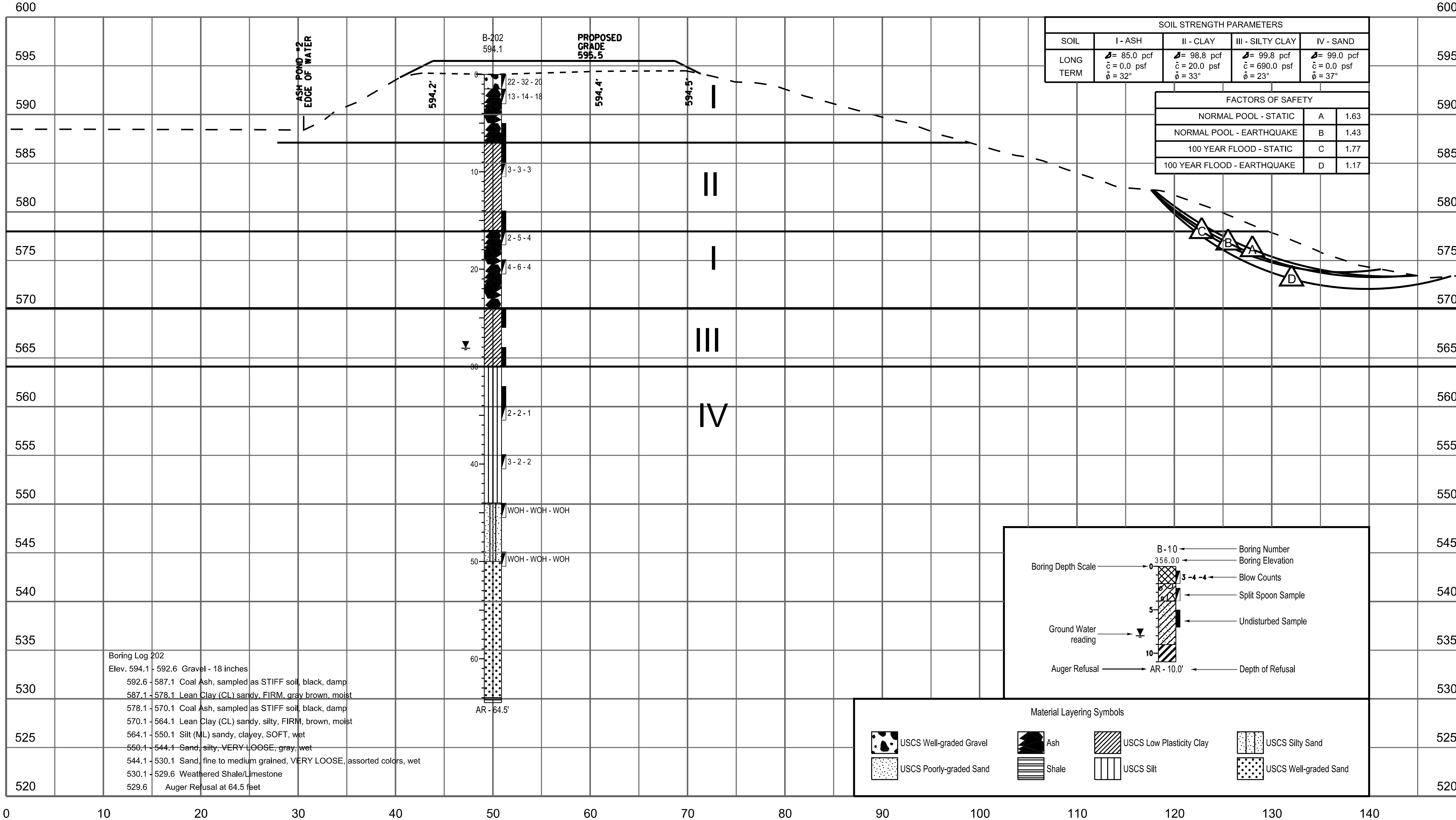
SCALE: 1"=10' HORIZ. 1"=10' VERT.

STABILITY SECTION AT BORING 201
NORTH END - DALE ASH POND #2

EKP DALE ASH POND #2
STABILITY SECTION
NORTH END BORING 201

FILE NAME:
USER: RLW DATE PLOTTED: 8/23/2010
E-SHEET NAME:
MicroStation v8.11.7.443

COUNTY OF	PROJECT NO.	SHEET NO.
CLARK	1831-10-5580	X2



SOIL STRENGTH PARAMETERS				
SOIL	I - ASH	II - CLAY	III - SILTY CLAY	IV - SAND
LONG TERM	γ = 85.0 pcf, $\bar{c}$ = 0.0 psf, $\bar{\phi}$ = 32°	γ = 98.8 pcf, $\bar{c}$ = 20.0 psf, $\bar{\phi}$ = 33°	γ = 99.8 pcf, $\bar{c}$ = 690.0 psf, $\bar{\phi}$ = 23°	γ = 99.0 pcf, $\bar{c}$ = 0.0 psf, $\bar{\phi}$ = 37°

FACTORS OF SAFETY		
NORMAL POOL - STATIC	A	1.63
NORMAL POOL - EARTHQUAKE	B	1.43
100 YEAR FLOOD - STATIC	C	1.77
100 YEAR FLOOD - EARTHQUAKE	D	1.17

Boring Log 202
Elev. 594.1 - 592.6 Gravel - 18 inches
592.6 - 587.1 Coal Ash, sampled as STIFF soil, black, damp
587.1 - 578.1 Lean Clay (CL) sandy, FIRM, gray brown, moist
578.1 - 570.1 Coal Ash, sampled as STIFF soil, black, damp
570.1 - 564.1 Lean Clay (CL) sandy, silty, FIRM, brown, moist
564.1 - 550.1 Silt (ML) sandy, clayey, SOFT, wet
550.1 - 544.1 Sand, silty, VERY LOOSE, gray, wet
544.1 - 530.1 Sand, fine to medium grained, VERY LOOSE, assorted colors, wet
530.1 - 529.6 Weathered Shale/Limestone
529.6 Auger Refusal at 64.5 feet

B-10 ← Boring Number
356.00 ← Boring Elevation
Boring Depth Scale → 0
3 - 4 - 4 ← Blow Counts
← Split Spoon Sample
← Undisturbed Sample
Ground Water reading
Auger Refusal → AR - 10.0' ← Depth of Refusal

Material Layering Symbols

USCS Well-graded Gravel · Ash · USCS Low Plasticity Clay · USCS Silty Sand · USCS Poorly-graded Sand · Shale · USCS Silt · USCS Well-graded Sand

STABILITY SECTION AT BORING 202
WEST SIDE - DALE ASH POND #2

SCALE: 1"=10' HORIZ.
1"=10' VERT.

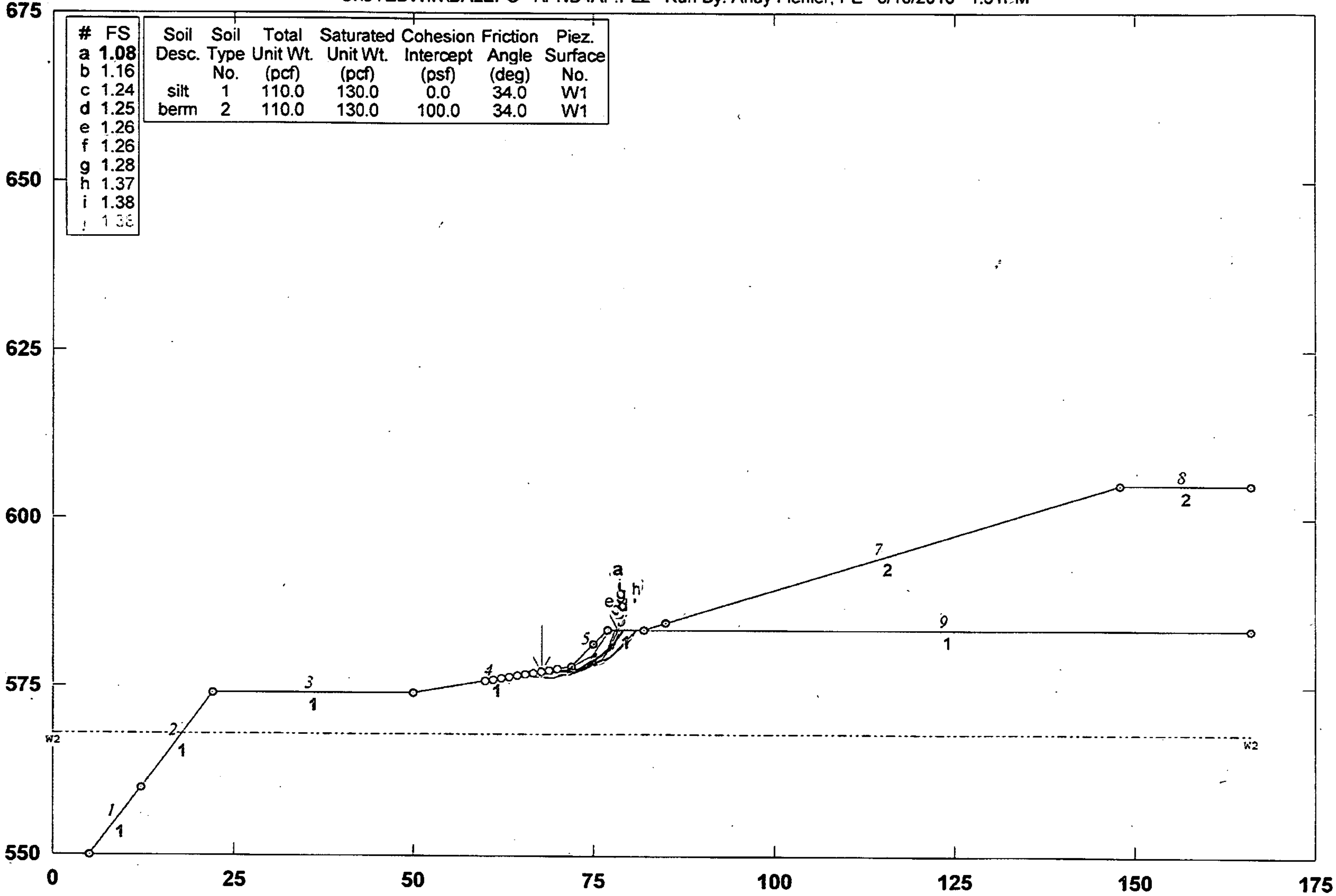
EKP DALE ASH POND #2
STABILITY SECTION
WEST SIDE BORING 202

FILE NAME:
USER: RLW
DATE PLOTTED: 8/23/2010
E-SHEET NAME:
MicroStation v8.11.7.443

APPENDIX G
2010 Stability Evaluation Slide at Ash Pond #4 Stability Sections

Dale Pond #4 - River Bank Stability - Steep Scarp

C:\STEDWIN\DALEPO~1\PND4AF.PL2 Run By: Andy Fiehler, PE 6/10/2010 1:51PM



#	FS
a	1.08
b	1.16
c	1.24
d	1.25
e	1.26
f	1.26
g	1.28
h	1.37
i	1.38
j	1.38

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
silt	1	110.0	130.0	0.0	34.0	W1
berm	2	110.0	130.0	100.0	34.0	W1

STABL6H FSmin=1.08

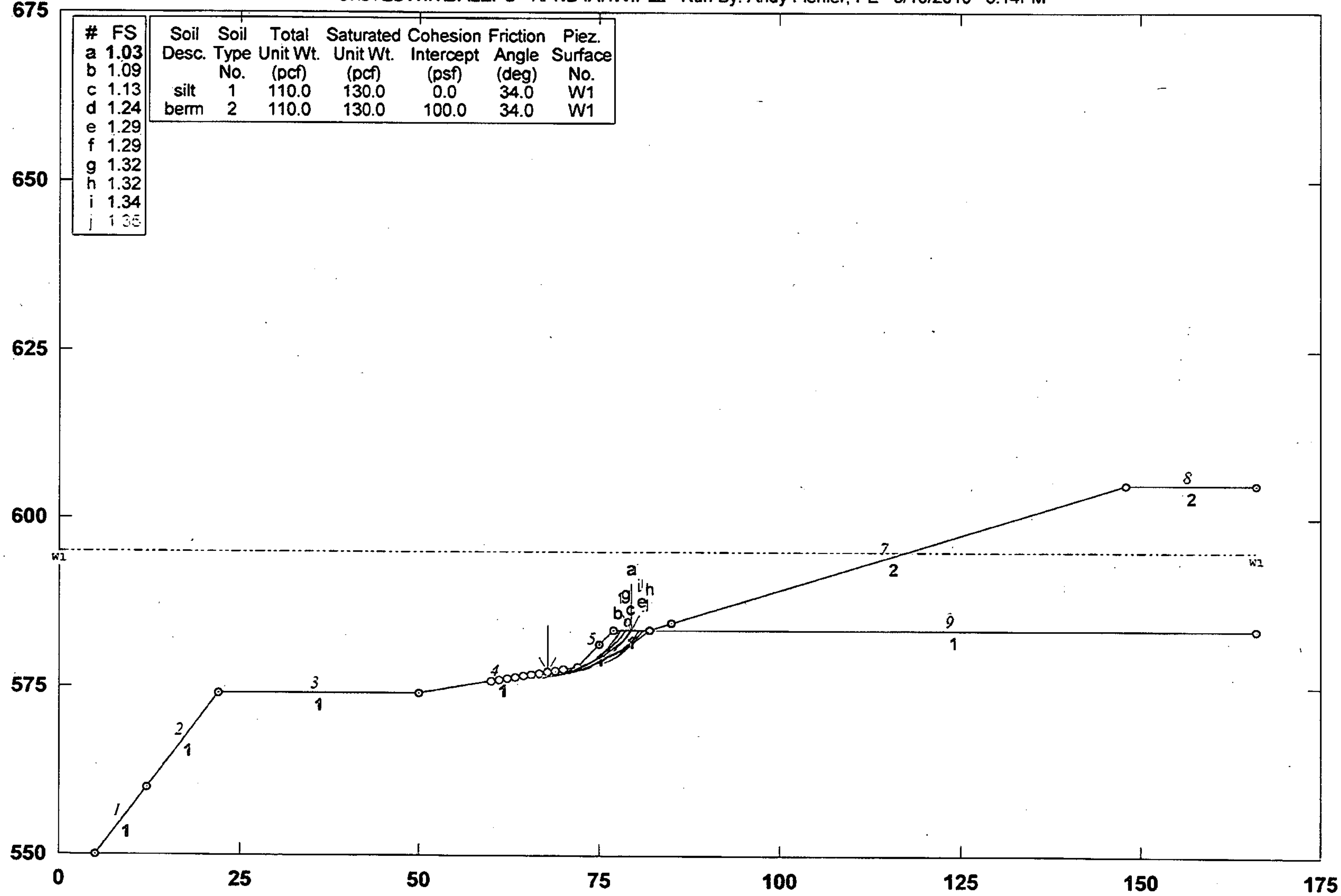
Safety Factors Are Calculated By The Modified Bishop Method

STED

DS - CBI
000555

Dale Pond #4 - River Bank Stability - Steep Scarp - High Water

C:\STEDWIN\DALEPO~1\PND4AHW.PL2 Run By: Andy Fiehler, PE 6/10/2010 3:14PM



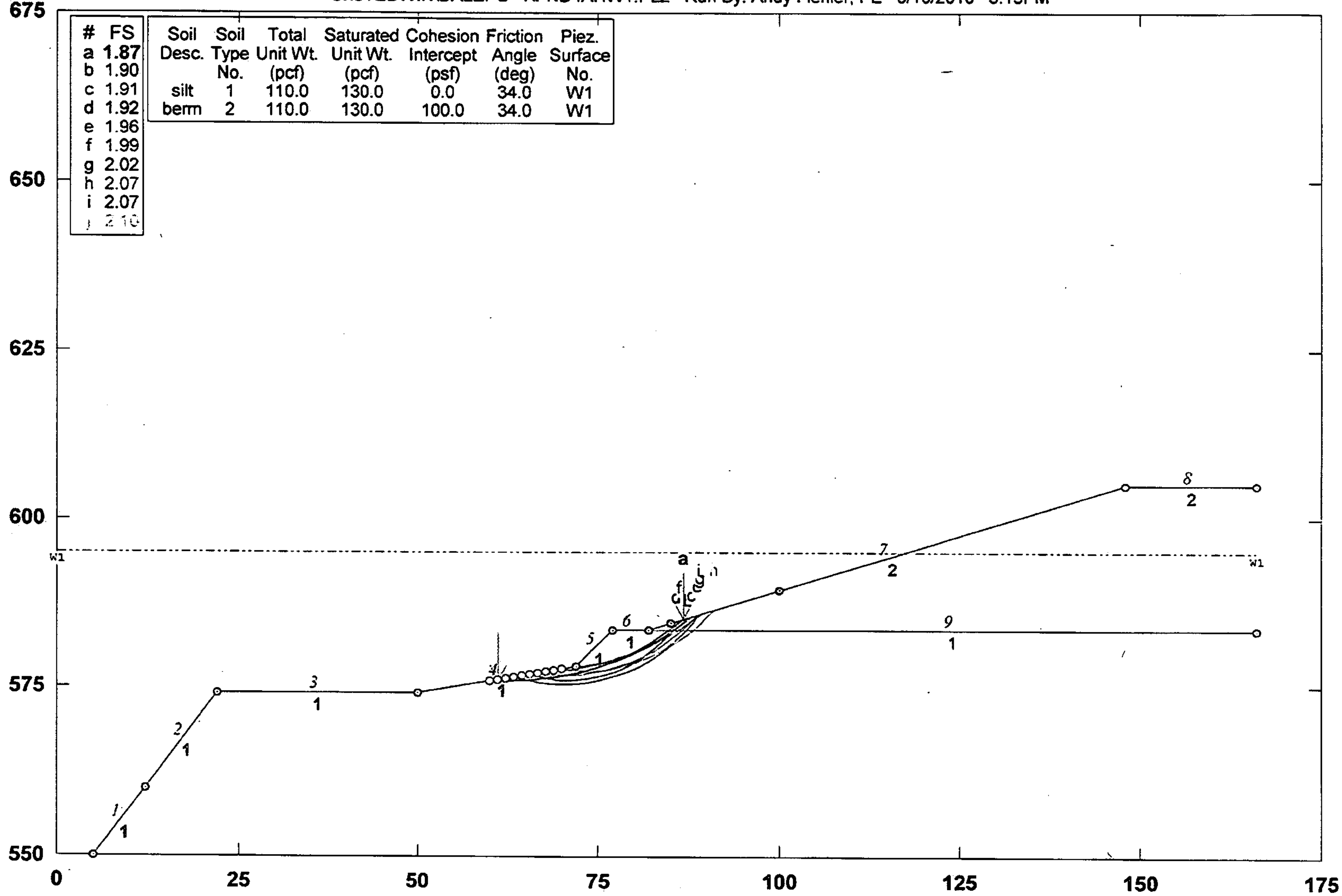
STABL6H FSmin=1.03

Safety Factors Are Calculated By The Modified Bishop Method

STED

Dale Pond #4 - River Bank Stability - Steep Scarp - High Water

C:\STEDWIN\DALEPO~1\PND4AHW1.PL2 Run By: Andy Fiehler, PE 6/10/2010 3:13PM



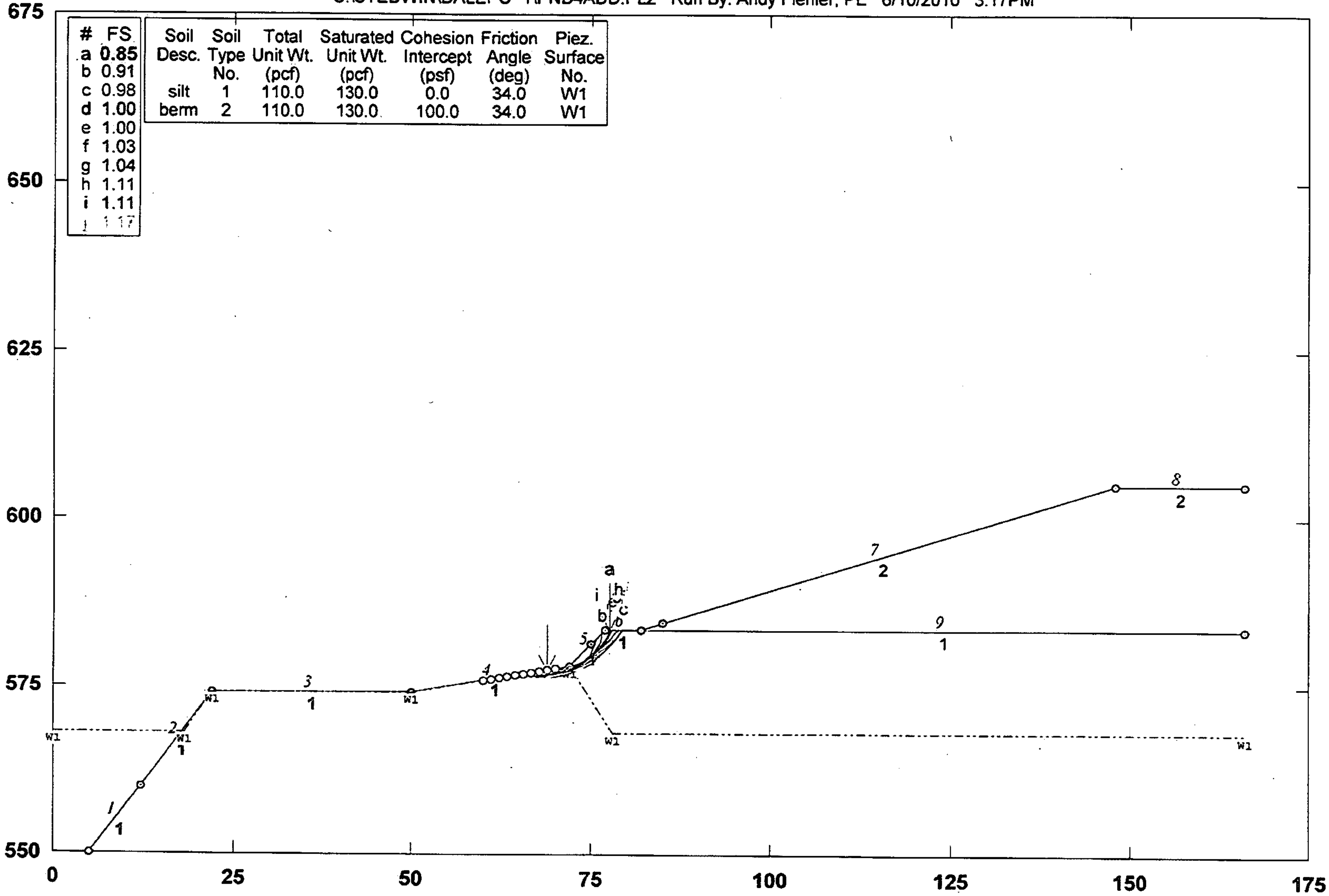
STABL6H FSmin=1.87

Safety Factors Are Calculated By The Modified Bishop Method

STED

Dale Pond #4 - River Bank Stability - Steep Scarp - Draw Down

C:\STEDWIN\DALEPO~1\PND4ADD.PL2 Run By: Andy Fiehler, PE 6/10/2010 3:17PM



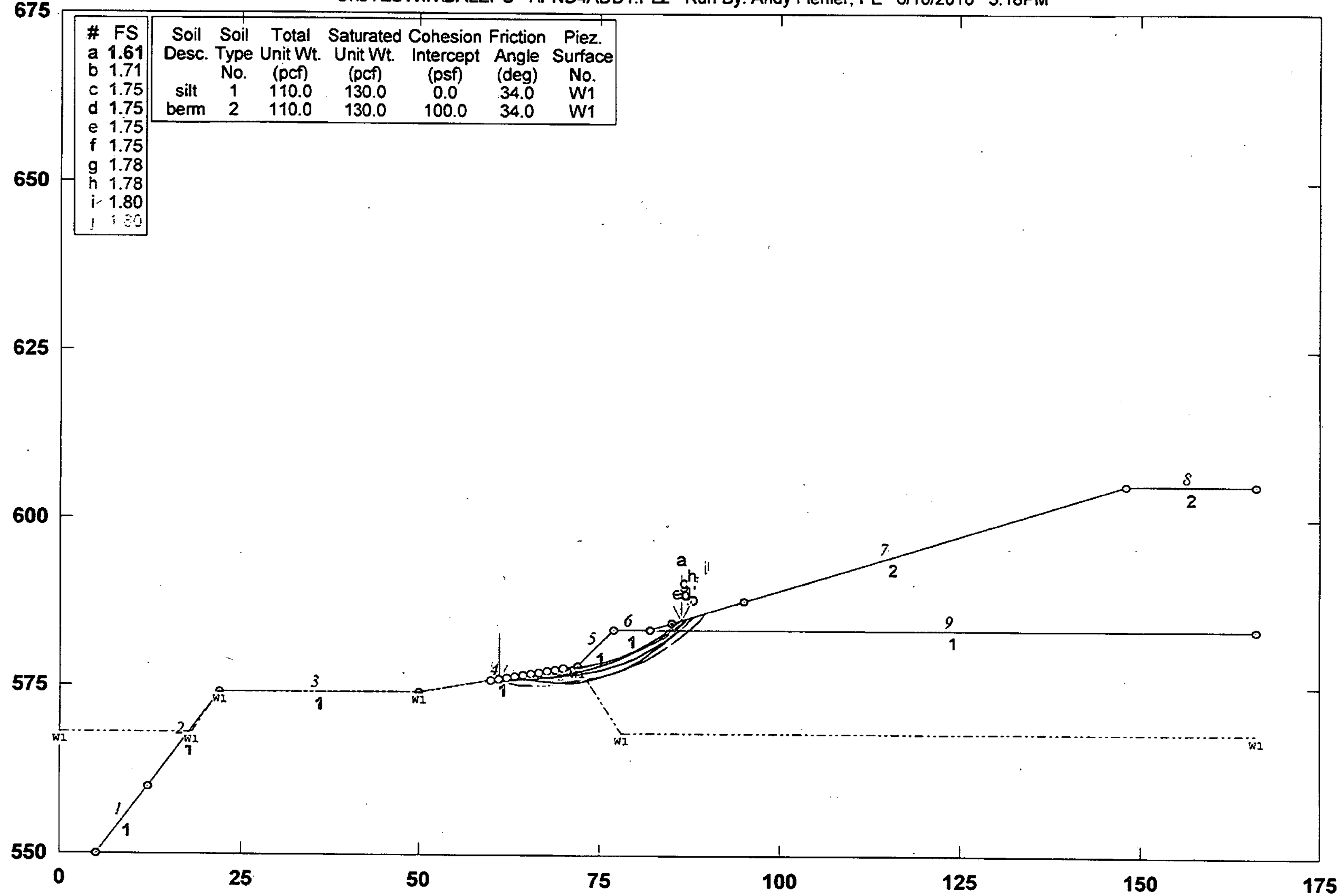
STABL6H FSmin=0.85

Safety Factors Are Calculated By The Modified Bishop Method

STED

Dale Pond #4 - River Bank Stability - Steep Scarp - Draw Down

C:\STEDWIN\DALEPO~1\PND4ADD1.PL2 Run By: Andy Fiehler, PE 6/10/2010 3:18PM



STABL6H FSmin=1.61

Safety Factors Are Calculated By The Modified Bishop Method

STED

Dale Pond #4 - River Bank Stability Existing Conditions

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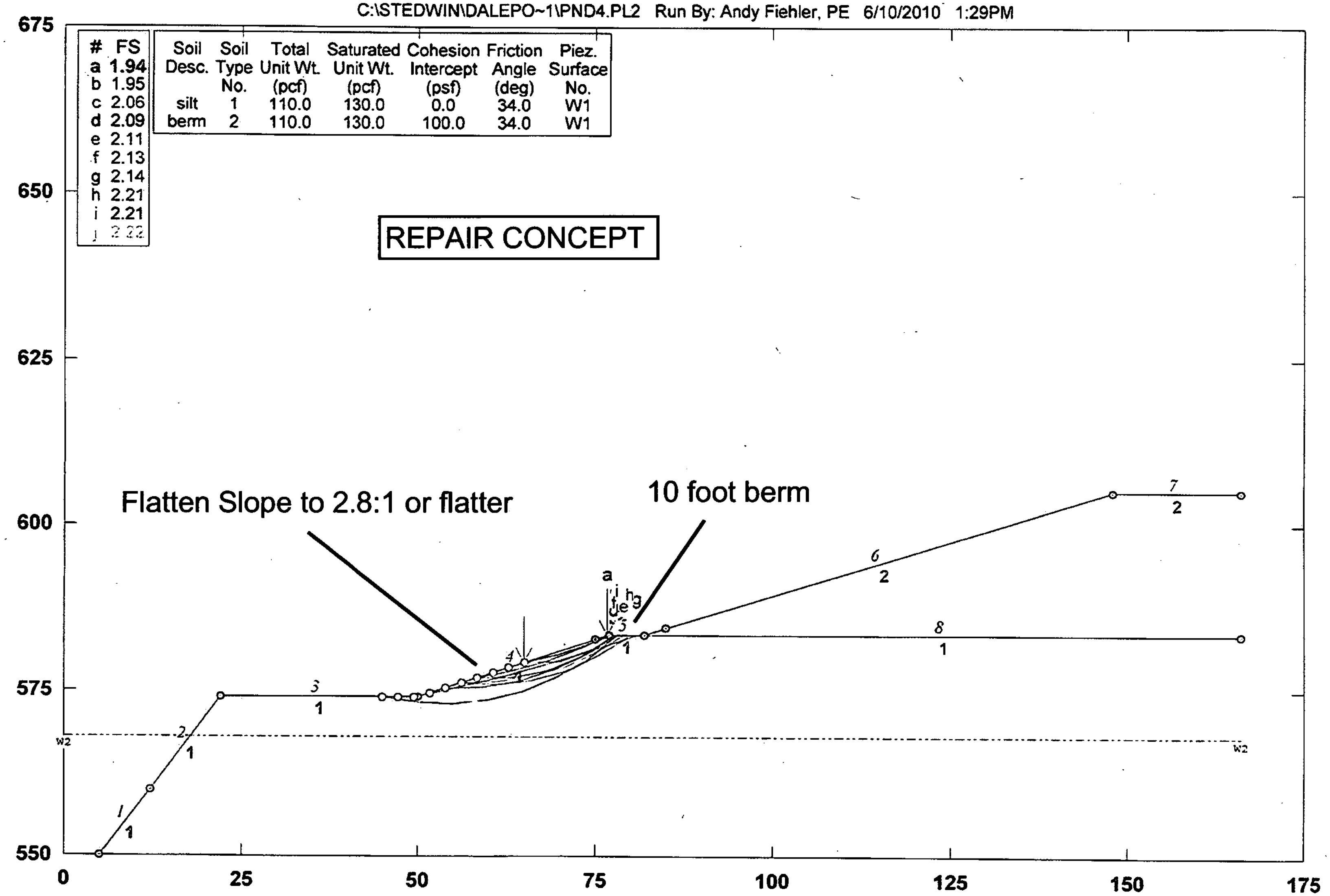


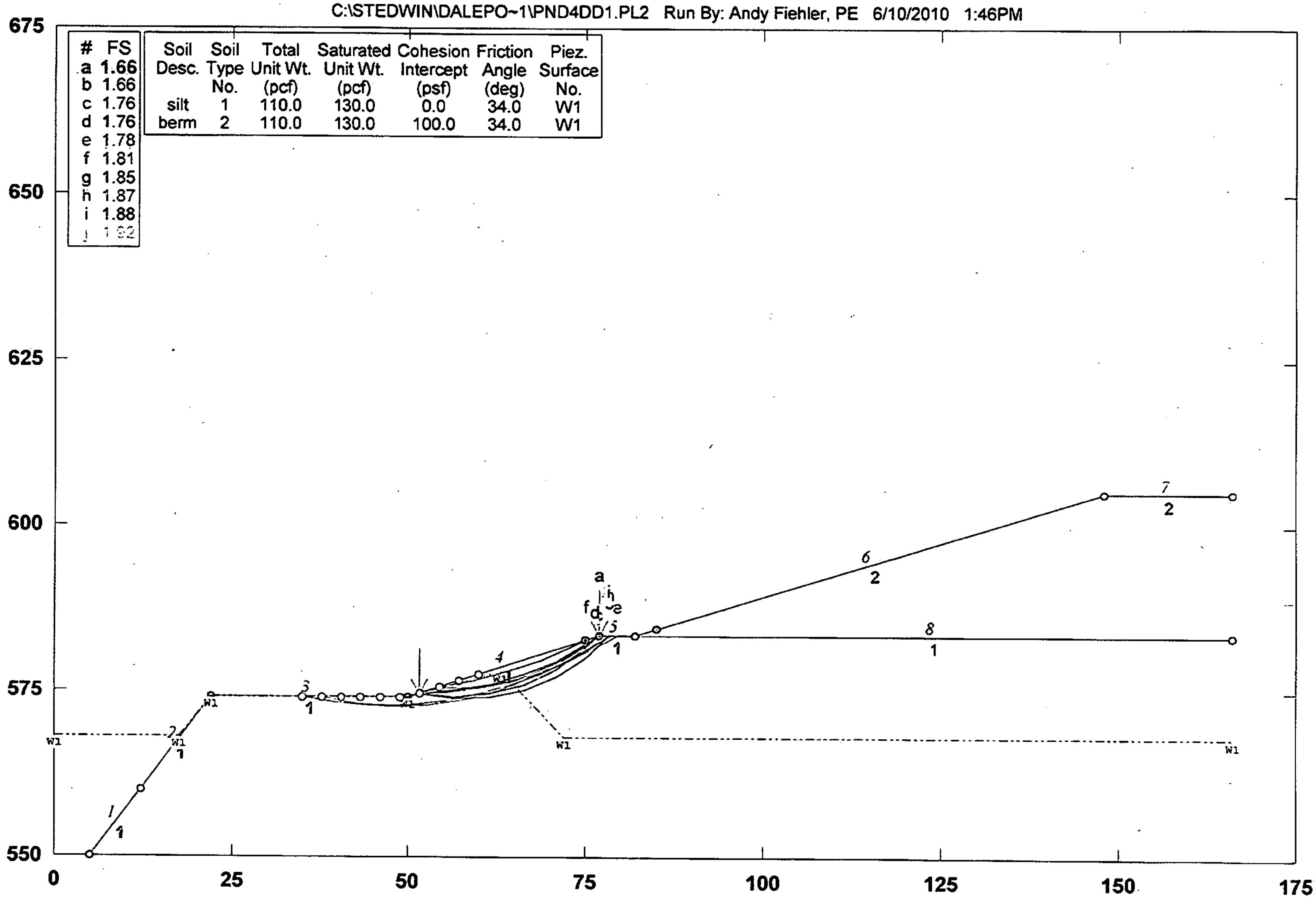
STABL6H FSmin=1.94

Safety Factors Are Calculated By The Modified Bishop Method

STED

Dale Pond #4 - River Bank Stability Rapid Drawdown

C:\STEDWIN\DALEPO~1\PND4DD1.PL2 Run By: Andy Fiehler, PE 6/10/2010 1:46PM



#	FS
a	1.66
b	1.66
c	1.76
d	1.76
e	1.78
f	1.81
g	1.85
h	1.87
i	1.88
j	1.92

Soil Desc.	Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Piez. Surface No.
silt	1	110.0	130.0	0.0	34.0	W1
berm	2	110.0	130.0	100.0	34.0	W1

STABL6H FSmin=1.66
Safety Factors Are Calculated By The Modified Bishop Method

STED