Utility Solid Waste Activities Group
c/o Edison Electric Institute
701 Pennsylvania Avenue, NW
Washington, DC 20004-2696
202-508-5645
www.uswag.org

USWAG

February 11, 2008

Hon. Susan Parker Bodine
Assistant Administrator
Office of Solid Waste and Emergency Response
U.S. Environmental Protection Agency (Mail Code 5101T)
1200 Pennsylvania Ave., NW
Washington, D.C. 20460

Re: Notice of Data Availability on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments, Docket ID No. EPA-HQ-RCRA-2006-0796

Dear Ms. Bodine:

I am pleased to submit these Comments on behalf of the Utility Solid Waste Activities Group ("USWAG") to the U.S. Environmental Protection Agency ('EPA") on the above Notice of Data Availability on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments ("NODA"), 72 Fed. Reg. 49714 (Aug. 29, 2007).

USWAG was formed in 1978, and is an association of approximately 80 energy industry operating companies and associations, including the Edison Electric Institute ("EEI"), the National Rural Electric Cooperative Association ("NRECA"), and the American Public Power Association ("APPA"). EEI is the principal national association of investor-owned electric power and light companies. NRECA is the national association of rural electric cooperatives. APPA is the national association of publicly-owned electric utilities. Together, USWAG members represent more than 85% of the total electric generating capacity of the U.S. and service more than 95% of the nation's consumers of electricity.

In May 2000 EPA determined that fossil fuel combustion wastes "do not warrant regulation under Subtitle C of RCRA." 65 Fed. Reg. 32214 (May 22, 2000). At the same time, EPA identified areas of concern regarding disposal of coal combustion wastes ("CCWs") that led the Agency to announce its intention to develop national standards under RCRA Subtitle D to address these concerns.

Id. at 32215, 32217. These conclusions were based on a record assembled prior to 1995.

The NODA seeks public comment on volumes of new data that have become available to EPA since the 2000 regulatory determination. In effect, the NODA advances the public record on CCW disposal from 1994 to the present and requests public comment on how the new data should affect the Agency's regulatory policy regarding CCW disposal.

The totality of information added to the Agency's record on CCW disposal presents a very different picture than the one painted in the 2000 regulatory determination. As we set forth in detail in these Comments, the picture today is one in which

- there are state-of-the-art management controls at nearly all newly constructed or expanded facilities;
- the trend toward groundwater protection and monitoring at existing facilities (noted by EPA in 2000) has continued and accelerated;
- there is a strong preference for dry handling technology when constructing new disposal capacity; and
- state regulatory gaps identified in 2000 are rapidly disappearing.

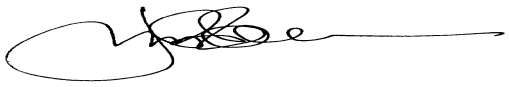
As you know, USWAG has been working with your staff to address some of the concerns raised in 2000 through development of a Utility Industry Action Plan for the Management of Coal Combustion Products ("Action Plan"). We are pleased to inform EPA that more than 75% of USWAG members' coal-fired capacity have either agreed to implement the Action Plan or have informed USWAG that they are operating in accordance with the Plan.

Today's utility industry management of CCW disposal is quite different from the practices that concerned EPA in 2000. To the extent that isolated problems arise, the states are fully equipped to address those issues, and we have provided examples in the Comments where states have in fact "stepped up to the plate" to address issues that have arisen in their communities.

In sum, EPA can safely step back without investing the resources necessary to develop a new federal regulatory program and allow the states to remain the primary regulatory authority on CCW disposal. It is now time for EPA to conclude that it is no longer necessary to proceed with the development of national RCRA regulations for CCW disposal.

We would welcome the opportunity to respond to any questions you or your staff may have. Please contact either me (jim.roewer@uswag.org; 202-508-5645) or our counsel, Bill Weissman of Venable LLP (202-344-4503; wweissman@venable.com).

Sincerely yours,



James R. Roewer
Executive Director

Attachments

cc: Matt Hale
Maria Vickers
Lillian Bagus
Thea McManus
Rich Kinch
Alex Livnat
RCRA Docket

Comments of
The Utility Solid Waste Activities Group,
The Edison Electric Institute,
The American Public Power Association, and
The National Rural Electric Cooperative Association on
Notice of Data Availability on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments;
72 Fed. Reg. 49714 (Aug. 29, 2007)

submitted to
The United States
Environmental Protection Agency

Docket No. EPA-HQ-RCRA-2006-0796

February 11, 2008

Of Counsel:
Venable LLP
575 Seventh Street, N.W.
Washington, D.C. 20004

Table of Contents

Comments of
The Utility Solid Waste Activities Group,
The Edison Electric Institute,
The American Public Power Association, and
The National Rural Electric Cooperative Association on
Notice of Data Availability on the Disposal of Coal Combustion Wastes
in Landfills and Surface Impoundments;
72 Fed. Reg. 49714 (Aug. 29, 2007)

INTRODUCTION

The Utility Solid Waste Activities Group ("USWAG")[1] submits these comments on the Notice of Data Availability on the Disposal of Coal Combustion Wastes in Landfills and Surface Impoundments ("NODA"), published on August 29, 2007, by the United States Environmental Protection Agency ("EPA" or "Agency"). 72 Fed. Reg. 49714.

More than seven years ago, EPA officially determined that fossil fuel combustion wastes ("FFCW") "do not warrant regulation [as hazardous waste] under Subtitle C of RCRA." 65 Fed. Reg. 32214 (May 22, 2000). This regulatory determination completed the multi-stage agency proceedings required by the 1980 Bevill Amendment to the Resource Conservation and Recovery Act ("RCRA"). *See* RCRA §§ 3001(b)(3)(A)(i), (b)(3)(C), 8002(n), 42 U.S.C. §§ 6921(b)(3)(A)(i), (b)(3)(C), 6982(n).

At the same time that EPA determined that hazardous waste regulation of FFCW was "unwarranted" (*see* RCRA § 3001(b)(3)(C), 42 U.S.C. § 6921(b)(3)(C) ("the Administrator shall . . . either determine to promulgate regulations under this subtitle

[1] USWAG was formed in 1978, and is an association of approximately 80 energy industry operating companies and associations, including the Edison Electric Institute ("EEI"), the National Rural Electric Cooperative Association ("NRECA"), and the American Public Power Association ("APPA"). EEI is the principal national association of investor-owned electric power and light companies. NRECA is the national association of rural electric cooperatives. APPA is the national association of publicly-owned electric utilities. Together, USWAG members represent more than 85% of the total electric generating capacity of the U.S. and service more than 95% of the nation's consumers of electricity.

[RCRA Subtitle C] or determine that such regulations are unwarranted."), EPA announced its intention to develop national standards under RCRA Subtitle D (the solid waste subtitle) to address the disposal of coal combustion wastes ("CCWs") in landfills and surface impoundments and the placement of coal combustion products ("CCPs") in mines.[2] 65 Fed. Reg. at 32215, 32217. Although there is no statutory requirement that EPA promulgate regulations applicable to CCW disposal once EPA has made a Bevill regulatory determination that hazardous waste regulation is not warranted,[3] the Agency's staff has been working diligently since 2000 to develop a regulatory program tailored to the wide-ranging circumstances of CCW management throughout the country. During this period, CCW disposal has remained primarily a state regulatory responsibility.[4]

Nevertheless, the Agency's efforts to develop a federal CCW regulatory program have been delayed by repeated requests from various activist groups. In 2003, at the request of various environmental advocacy organizations, EPA conducted a two-day public meeting in Washington, D.C., to hear the concerns of these groups regarding the management of CCWs. The activist groups, however, complained that a Washington, D.C. hearing was insufficient and they demanded a series of hearings around the

---

[2] Despite our preference for identifying these materials as "coal combustion products" or "CCPs", USWAG adopts the terminology in these comments used by EPA in the NODA to distinguish between the materials disposed of in landfills and surface impoundments as wastes ("CCWs") and the same materials when beneficially used ("CCPs"). The term "coal combustion products" is also the preferred term used by ASTM International in its 2002 consensus standard known as Standard Terminology for Coal Combustion Products, ASTM E2201-02a.

[3] RCRA § 3001(b)(3)(C), 42 U.S.C. § 6921(b)(3)(C).

[4] In 2000, EPA observed that "the regulatory infrastructure is generally in place at the state level to ensure adequate management of these wastes." Indeed, the Bevill Amendment requires "EPA to consider actions of state and other federal agencies with a view to avoiding duplication of effort." 65 Fed. Reg. at 32217 (*citing* RCRA § 8002(n), 42 U.S.C § 6982(n)).

country. Consequently, EPA conducted four "Listening Sessions" in 2004 in Pennsylvania, Indiana, and Texas to receive the testimony of environmental advocacy organizations, local citizens, industry representatives, state regulators, and academics. *See* 69 Fed. Reg. 9825 (March 2, 2004). EPA assembled a voluminous record of written and oral comments and exhibits that would bear on the scope of future regulatory policy.

In 2004, at the urging of activist groups opposed to mine placement of CCPs, Congress directed EPA to fund a study of mine placement by the National Academy of Sciences/National Research Council ("NRC"). That study, which took nearly a year and a half to complete, resulted in a 2006 report that concluded, among other things, that "enforceable federal standards be established for the disposal of [CCPs] in minefills" and that the scope of the preexisting Surface Mining Control & Reclamation Act ("SMCRA") "is broad enough to encompass such regulation during reclamation activities." National Research Council, *Managing Coal Combustion Residues in Mines*, p. 11 (March 1, 2006) ("NRC Report"). The NRC Report led EPA and the Office of Surface Mining Reclamation and Enforcement of the Department of Interior ("OSM") to assign the lead role in developing regulatory policy on CCP mine placement to OSM, the agency that administers SMCRA, with EPA continuing to play a role in the rulemaking. *See* 72 Fed. Reg. at 49716 n.1; *see also* 72 Fed. Reg. 12026, 12030 (March 14, 2007).

EPA has been accused by some activist groups of being dilatory in pursuing the Subtitle D rulemaking even though the Agency has been extremely accommodating to these organizations' demands for conducting and funding meetings, hearings, and

studies. USWAG believes these accusations are grossly unfair. The Agency's delay has been caused in part by the activist groups' demands, but it has also had a positive effect by making available to EPA volumes of new information that bear directly on future regulatory policy for CCW disposal. Without this new information, EPA would be developing regulations based on data more than a decade old. The administrative record on which EPA based its 2000 regulatory determination was assembled prior to 1995,[5] and even in its 2000 determination, EPA acknowledged the significant changes underway in the industry's management of these wastes. *See* 65 Fed. Reg. at 32216-17, 32228-29. EPA has wisely concluded that the dynamic evolution of industry management practices and state regulatory oversight since 1995 warrants a brief administrative "time out" in the form of the present NODA while the Agency assesses whether the updated factual record warrants a change in EPA's regulatory agenda and decision-making. EPA has a duty to digest the new information and to determine its implications for future CCW regulatory policy. USWAG commends EPA for soliciting public comment to advise the Agency on how the new data developed over the past 12 years should affect future regulatory policy. *See* 72 Fed. Reg. at 49716, 49719.

EXECUTIVE SUMMARY

EPA published this NODA on August 29, 2007, to update the public record on CCW disposal and to assess whether the concerns that led it to contemplate RCRA Subtitle D regulation for these wastes had been addressed. A large amount of new information is now available to EPA that was unknown in May 2000 when it announced

[5] *See* 72 Fed. Reg. at 49716 ("EPA's determination to develop regulations under Subtitle D of RCRA was based on a factual record developed prior to 1995."); *see also* 65 Fed. Reg. at 32217, 32231 (references to industry practices as of 1995).

plans to develop Subtitle D regulations to address (1) certain patterns of environmental damage from a few CCW sites, (2) evidence of insufficient controls at certain CCW disposal facilities, and (3) gaps in some state regulatory programs. 65 Fed. Reg. at 32216, 32221. The question now before EPA is whether, in light of the new information, there continues to be a need for federal regulation of CCW disposal.

1. In 2005, EPA and the U.S. Department of Energy ("DOE") conducted a study of newly constructed CCW landfills and surface impoundments to determine the extent to which trends noted by EPA in the 2000 Bevill regulatory determination toward increased dry handling of CCW and improved management controls had continued beyond the close of the Bevill record between 1994 and 2004. EPA and DOE jointly issued a report ("DOE/EPA Report") finding not only that those trends had in fact continued, but in several respects had significantly accelerated. For example, nearly all new disposal units had installed liners and nearly all new landfills were monitoring groundwater. The percentage of new surface impoundments with groundwater monitoring had increased by 20% above the number of surface impoundments constructed in the prior decade and 105% above the percentage of all CCW impoundments in operation in 1995. The percentage of new landfills was double that of new surface impoundments, a complete turnaround from the data in 1995 when surface impoundments predominated.

The DOE/EPA Report also addressed trends in state regulation. It found that more CCW had become subject to state regulatory controls during the test period and that deviations from state regulatory requirements were being granted only on the basis of sound technical criteria. Although not all state programs were equally robust, EPA

and DOE found state regulations were generally administered in a responsible manner and were improving. In fact, since 2005, several states announced proposals for revising their state programs. The gaps in state programs that were of concern to EPA in 2000 appear to be sharply narrowing.

2. Major change is also occurring among existing facilities. To assist our members, USWAG, in consultation with EPA staff and state regulators, developed a Utility Industry Action Plan for the Management of Coal Combustion Products ("Action Plan") aimed at addressing the concerns EPA identified in 2000. This plan focuses on establishing groundwater protection standards and monitoring, corrective action, prohibiting CCW disposal in unengineered sand and gravel pits, and considering dry handling technology when new disposal capacity for fly ash is needed. More than 75% of our members' coal-fired megawatts capacity have either agreed to implement the Plan or are operating in accordance with the Plan on their own and will keep USWAG apprised of their progress. Additional commitments are expected following the utilities' next budget cycles and when the cost of implementation has been funded.

3. The counter-proposal offered by Earthjustice is a radical departure from the Agency's approach to RCRA Subtitle D regulation. It would largely federalize the regulation of CCW disposal (including some beneficial use applications that EPA had determined do not warrant federal regulation) and essentially would supplant the states as the primary regulators of CCWs. The Earthjustice proposal more closely resembles a RCRA Subtitle C hazardous waste regulation and extends well beyond the concerns EPA identified in the 2000 regulatory determination. Its scope is far beyond anything authorized by RCRA Subtitle D.

4. EPA's Damage Case Assessment reaffirms what EPA recognized in 2000 – that nearly all the proven damage cases involve older, unlined sites where disposal occurred before 1993. Nearly all the 16 sites involving impacts on groundwater have completed or are undergoing corrective action. Eight sites involve surface water discharges addressed by the Clean Water Act. Sites that have completed corrective action or are addressed by a regulatory program other than RCRA should be removed from the list of proven damage cases. The trends to increased management controls at new and existing facilities discussed above make recurrence of this type of damage case less likely, especially those involving CCW disposal in unlined sand and gravel pits.

5. EPA's risk assessment on potential exposures to human health and the environment from the disposal of CCWs differs significantly from EPA's voluminous field data and real world observations. EPA does not attempt to validate its modeling or assumptions using actual field data from groundwater monitoring and uses outdated or disproved information in its analysis. The risk assessment also includes overly conservative assumptions in its modeling that drastically overestimate exposure risks and fails to include important attenuation processes for key constituents. Given the availability of abundant real world data on the risks associated with CCW disposal and the seriously flawed methodology used in the risk assessment, the assessment is an unreliable tool for developing future regulatory policy for CCW disposal.

6. The additional material added to the Bevill record by this NODA demonstrates that the concerns EPA expressed in the 2000 regulatory determination have been largely addressed through improved management practices and more robust state

regulatory programs. Today's utility industry management of CCWs is quite different from the practices prevailing in 1994 on which the 2000 determination was based. To the extent that isolated problems arise, the states are fully equipped to address those issues, and, of course, EPA retains enforcement authority over solid waste disposal mismanagement through its imminent and substantial endangerment authority under section 7003 of RCRA and its Superfund remedial authority. EPA can safely step back without investing the resources necessary to develop a new federal regulatory program and allow the states to remain the primary regulatory authority on CCW disposal.

I. Legal and Regulatory Background on Coal Combustion Waste Regulatory Policy.

According to the NODA, the May 2000 Bevill regulatory determination was based on a factual record assembled prior to 1995 and that since publication of the regulatory determination, additional information and data have become available about changes since 1995 in utility industry management practices. The Agency now seeks public comment on how these additional data should affect regulatory policy for CCWs disposed in landfills and surface impoundments. 72 Fed. Reg. at 49716. To address this question, it is necessary to review EPA's implementation of the Bevill process with respect to CCWs, including the Agency's previous determinations and statements of future actions.

The Bevill Amendment requires that, based upon the results of the study prescribed by RCRA § 8002(n), EPA shall "either determine to promulgate regulations under this subtitle [Subtitle C] . . . or determine that such regulations are unwarranted."

RCRA § 3001(b)(3)(C), 42 U.S.C. § 6921(b)(3)(C).[6] In response to that statutory requirement, "[t]he Agency concluded that these wastes do not warrant regulation under Subtitle C of RCRA and is retaining the hazardous waste exemption under RCRA Section 3001(b)(3)(C)." 65 Fed. Reg. at 32214. The 2000 determination, concerned primarily with CCWs when co-managed with certain low volume non-combustion wastes (*see ibid*.), was preceded in 1993 by a regulatory determination that CCWs managed separately from other wastes do not warrant Subtitle C regulation "and that the site or region specific State approach is appropriate for addressing the limited human health and environmental risks involved with the disposal of [these] wastes." 58 Fed. Reg. 42466, 42477 (Aug. 9, 1993). The effect of these two determinations is to remove Subtitle C regulation of CCW disposal as an available option.[7]

Despite the Agency's determination that hazardous waste regulation is inappropriate for these wastes, EPA nonetheless announced plans to develop national

---

[6] The history of the Bevill Amendment demonstrates that its primary purpose was to establish an alternative mechanism for determining the proper level of waste regulation under RCRA based on actual dangers posed by a particular Bevill waste (including CCWs) instead of merely relying on administrative listing or technical characteristic testing. *See Environmental Defense Fund v. EPA*, 852 F.2d 1309, 1314 (D.C. Cir. 1988). In a departure from the waste characterization methodology outlined in section 3001(b)(1) of RCRA, the Bevill Amendment suspended EPA's authority to subject these wastes to hazardous waste regulation and instead directed EPA to conduct a study addressing eight factors and then submit a report to Congress with its findings and recommendations. *See* RCRA §§ 3001(b)(3)(A)(i), 8002(n), 42 U.S.C. §§ 6921(b)(3)(A)(i), 6982(n). Thereafter, the amendment directs EPA to issue a regulatory determination whether hazardous waste regulation is warranted based on the record assembled in the study and a subsequent rulemaking. RCRA § 3001(b)(3)(C), 42 U.S.C. § 6921(b)(3)(C). Unless EPA determined that RCRA Subtitle C regulation is warranted, EPA may not adopt hazardous waste regulations for the Bevill waste. RCRA §§ 3001(b)(3)(A)(i), 3001(b)(3)(C), 42 U.S.C. §§ 6921(b)(3)(A)(i), (b)(3)(C).

[7] The Agency reserved the option of reevaluating risk from CCWs "if levels of mercury or other hazardous constituents change due to any future Clean Air Act air pollution control requirements for coal burning utilities." 65 Fed. Reg. at 32221. Since implementation of the emission controls that could trigger this reevaluation are still in the future, this issue is outside the NODA's scope.

RCRA Subtitle D solid waste regulations. 65 Fed. Reg. at 32216. To address the possible impact of the post-determination data on future regulatory policy, we must carefully examine what led the Agency to conclude in 2000 that federal solid waste regulations were needed for CCW disposal and whether the new data change the factual basis for that conclusion.

In the 2000 regulatory determination, EPA listed four reasons for proposing to issue Subtitle D regulations:

- Composition of the waste could present danger to human health and the environment under certain conditions;
- Identification of 11 documented cases of proven damage resulting from management of CCWs in landfills and surface impoundments;
- Insufficient controls in place under current disposal practices, especially with respect to groundwater monitoring;[8] and
- Gaps in state oversight.

Id. at 32221.

Despite its plans to develop Subtitle D regulations, EPA made it clear that it was not contemplating a wholesale federalization of CCW disposal regulation and did not envision a full-scale regulatory program comparable to the Part 258 municipal solid waste regulatory program. EPA was quite emphatic that its intent was not to supplant the states as primary regulators of CCW disposal, but to create an "incentive for *states* to close the remaining gaps in coverage." *Id*. at 32217 (emphasis added). This conclusion rested on two factors:

[8] *Id*. at 32216 ("there is sufficient evidence that adequate controls may not be in place – for example, while most states can now require newer units to include liners and groundwater monitoring, 62% of existing utility surface impoundments do not have groundwater monitoring. This, in our view, justifies the development of national regulations.").

- increasing regulatory oversight by states with the positive trend "of imposing basic environmental controls such as liners and groundwater monitoring" (*id*. at 32216);[9] and

- the statutory directive to EPA in the Bevill Amendment that EPA "consider actions of state and other federal agencies with a view to avoiding duplication of effort" (*id*. at 32217).

In short, even if there were no new data beyond the record before the Agency in 2000, the most that EPA ever considered as necessary was "gap-filling" regulations aimed at supplementing state programs to bolster protection of groundwater through establishment of a groundwater protection strategy that included groundwater monitoring. The Agency also emphasized its commitment to a "partnership with the states to finalize voluntary industrial solid waste management guidance that identifies baseline protective practices for industrial waste management units, including fossil fuel combustion waste management units." *Id*. at 32221. The industrial waste management guidance was completed in 2003,[10] and USWAG has formally endorsed this joint federal-state voluntary guidance as an appropriate template for managing CCW disposal.

II. The DOE/EPA Report Demonstrates Major Improvement in Industry Management of CCWs at New and Expanded Disposal Units and in State Regulatory Oversight of CCW Disposal.

In 2005 and 2006, the DOE and EPA jointly conducted a study of current and recent (1) management practices for CCW disposal by industry, (2) state regulatory requirements for CCW management and (3) implementation of state requirements by state authorities. This study examined landfills and surface impoundments that were

---

[9] *See also id*. at 32217 ("with the exception of relatively few states, the regulatory infrastructure is generally in place at the state level to ensure adequate management of these wastes.").

[10] *See* EPA, *Guide for Industrial Waste Management* (April 16, 2003).

permitted, built, or laterally expanded between January 1, 1994, and December 31, 2004, to determine what changes, if any, in CCW disposal management practices and state regulatory controls had occurred since the close of the administrative record for the Bevill regulatory determination and EPA's *1999 Report to Congress: Wastes from the Combustion of Fossil Fuels* ("*1999 Report to Congress*") prior to 1995 on which the 2000 determination was based.

In a report titled *Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004* ("DOE/EPA Report"), DOE and EPA found dramatic improvement in the management of CCWs in new or expanded disposal units, including the use of liners and the monitoring of groundwater. DOE/EPA Report at S-5 – S-7. They also found a net increase of regulatory controls for CCWs destined for landfills since 1988 and that the grants of variances from regulatory controls by state regulators had sound scientific support. *Id.* at S-7 – S-11. The report documents the pronounced improvement in the management of CCWs by utilities at new and expanded disposal facilities and strengthened regulatory oversight of CCW disposal by state regulatory agencies. The key findings of the DOE/EPA Report are discussed below.

A. The DOE/EPA Report Documents Nearly Universal State-of-the-Art Design at New and Expanded CCW Disposal Units.

The DOE/EPA Report began by addressing the changes in the management practices of CCW disposal in newly expanded or constructed surface impoundments and landfills between 1994 and 2004. As previously noted, EPA's decision in the 2000 regulatory determination to develop national solid waste regulation for CCW disposal stemmed, in part, from a finding "that, in 1995, these wastes were being managed in 40 percent to 70 percent of landfills and surface impoundments without reasonable controls

in place, particularly in the area of groundwater monitoring." 65 Fed. Reg. at 32221. DOE/EPA's purpose in conducting this study was to review recent practices to "provide a perspective on the chronological adoption of control measures in CCW units based on State regulations." DOE/EPA Report at S-1. The findings of the DOE/EPA Report make clear that there has been profound improvement in the management practices for landfills and surface impoundments that were constructed or expanded between 1994 and 2004, and the controls in place at these units have both significantly increased and improved.

DOE/EPA compiled information for these sites from data submitted by USWAG members ("surveyed units") and by regulatory agencies in nine states that are the leading consumers of coal for electricity generation ("nonsurveyed units"). *Id.* at 9-11. Through these submissions DOE/EPA were able to identify 56 units that were either permitted, built, or laterally expanded between 1994 and 2004. *Id.* at 15-16. DOE/EPA found that these units represented the vast majority of units expanded or constructed during 1994 through 2004 because they represented 64% of CCWs available for disposal and 71% of the total national coal-fired generating capacity. *Id.* at 19-20. DOE/EPA determined that "the information obtained and analyzed [from these sampled units] can be used to identify general trends in CCW disposal practices from 1994 to 2004." *Id.* at 21.

1. LANDFILL MANAGEMENT.

As an initial matter, DOE/EPA found that the trend to dry handling of CCWs had dramatically increased since 1995. According to the *1999 Report to Congress,* under half of existing units in 1995 were landfills. *See 1999 Report to Congress* at 3-22—

3-23. DOE/EPA found that during the period between 1994 and 2004 about two-thirds of newly expanded or built units were landfills. DOE/EPA Report at 21-22.

There has also been an improvement in the percentage of recently expanded or constructed landfills that have groundwater monitoring. Only one nonsurveyed landfill (identified by EPA after the survey was conducted) was constructed without groundwater monitoring between 1994 and 2004, while 97% of the surveyed and nonsurveyed units had groundwater monitoring.[11] *Id.* at 34-35. This is an increase from the data used in the *1999 Report to Congress* that found that 88% of landfills had groundwater monitoring. *Id.* at 35.

The use of liners at CCW landfill units has dramatically increased and is now virtually universal at new units. Of the surveyed and nonsurveyed units, only one landfill did not have a liner and that landfill manages only bottom ash that the host state classifies as inert. *Id.* at 31. Data used in the 2000 regulatory determination indicated that only 75% of landfills had liners. *Id.* at 32; 65 Fed. Reg. at 32216.

Additionally, the Report noted an improvement in the types of liners used at landfills. Data used in the *1999 Report to Congress* demonstrated that 43% of the landfills constructed between 1985 and 1995 had no liners or soil-only liners.[12] DOE/EPA Report at 34 The use of more effective combination and multiple liners has

[11] The only landfill without groundwater monitoring manages only bottom ash and is located in a state that classifies bottom ash as "inert." DOE/EPA Report at 34. This particular landfill has state requirements that include a site suitability assessment, capping, and 5-year post-closure care.

[12] Nothing in the DOE/EPA Report makes a blanket claim that composite or multiple liners are necessary for all CCW management units or that the lack of a liner or use of a soil-only liner at such units is necessarily inappropriate. EPA recognized in the 2000 Bevill regulatory determination that many unlined units “may not need to be lined due to site-specific conditions.” 65 Fed. Reg. at 32231.

increased at landfills from less than 10% since the *1999 Report to Congress* data to more than 50%. *Ibid*.

Furthermore, all of the surveyed landfills were authorized by at least one permit, and many had more than one. *Id.* at 26-27. This represents an increase from the data used in the *1999 Report to Congress* which showed that 94% of landfills had permits. *Id.* at 27. All of the surveyed landfills had permits that required liners, groundwater monitoring, closure/post-closure care requirements, and unit inspections. *Id.* at 29. The vast majority of the surveyed landfills had permits that contained requirements for groundwater protection standards, corrective action to contain potential contamination migration, and financial assurance mechanisms. *Ibid.* The *1999 Report to Congress* data included a more limited picture of permit requirements, but it demonstrated that 94% of landfills were subject to closure/post-closure requirements, 88% were required to conduct groundwater monitoring, and 77% were subject to groundwater protection standards. According to the DOE/EPA Report, all surveyed landfills are subject to closure/post-closure requirements and groundwater monitoring, and 90% are subject to groundwater protection standards. *Id.* at 28.

2. SURFACE IMPOUNDMENT MANAGEMENT.

For surface impoundments, 63% are required by their permits to monitor groundwater and an additional 12% (two units) monitor groundwater voluntarily (total of 75%). Only four units do not have groundwater monitoring. *Id.* at 35. The percentage of units with groundwater monitoring has increased from the *1999 Report to Congress* data of 65% of units constructed between 1985 and 1995 with such monitoring. *Ibid.* The two states (Indiana and Missouri) that hosted the four units that did not have

groundwater monitoring do not require monitoring in their regulations, but both require monitoring on a case-by-case basis through water pollution control permits. *Id.* at 35.

The use of liners at surface impoundments has increased even more dramatically. All of the surveyed and nonsurveyed surface impoundments were constructed or expanded with liners, which is a significant change from data used in the 2000 regulatory determination that indicated that only 60% of surface impoundments had liners. *Id.* at 32. Additionally, the Report noted an improvement in the types of liners used at surface impoundments. Data used in the 1999 Report to Congress demonstrated that 74% of surface impoundments constructed between 1985 and 1995 had no liners or soil-only liners, while 50% of recently expanded/constructed surface impoundments use combination or multiple liners. *Id*. *at 34*.

Like CCW landfills, all of the surveyed surface impoundments were authorized by at least one permit. *Id.* at 26-27. This represents an increase from the data used in the *1999 Report to Congress* which showed that 85% of surface impoundments had permits. *Id.* at 27.

DOE/EPA found that the number of other permit requirements (*i.e.*, groundwater protection standards, corrective action, closure/post-closure care, inspections and financial assurance) was lower for surface impoundments than for landfills. However, many states regulate these impoundments as wastewater treatment facilities under state water pollution control programs, and under those programs, the states determine the need for specific protective measures on a case-by-case basis. *Id.* at 31.

In sum, the DOE/EPA Report documents the sharp increase in controls across the board – liners as well as groundwater monitoring – for landfills and surface

impoundments expanded or constructed since 1995. It confirms the continuation of the positive trend EPA observed in the 2000 regulatory determination of increased use of environmental controls such as liners and groundwater monitoring under state regulatory authorities. *See* 65 Fed. Reg. at 32216-17. The DOE/EPA Report is important evidence of changing industry practices that should influence the Agency's thinking with respect to future regulatory policy on CCW disposal.

B. The DOE/EPA Report Documents Improvements in State Regulatory Programs Applicable to CCW Disposal Units.

DOE/EPA also reviewed data on state regulatory controls on CCW disposal to determine whether there had been improvements in state oversight since 1995, which was identified as one of the bases for the 2000 regulatory determination. *Id*. at 32221. DOE/EPA conducted a pilot study on five states (Illinois, Indiana, Pennsylvania, Virginia and Wisconsin) to determine whether a comparison between the regulatory controls identified in the *1999 Report to Congress* and the current regulations could be accomplished for the 26 states with proven or potential damage cases or that hosted newly expanded or constructed CCW disposal units. DOE/EPA Report at 11-12. However, because the *1999 Report to Congress* data were often aggregated, it was impossible to compare current regulatory requirements with the data used for the 1999 Report. *Id.* at 12. Instead, EPA decided that the study should focus on the *implementation* of existing regulatory programs and that the researchers should limit their review of existing programs to specific states (the original pilot states and Alabama, Florida, Georgia, Missouri, Ohio and Texas) and particular regulatory controls. *Ibid*. DOE/EPA found that the vast majority of states exercise control over the

disposal of CCW and that there has been a trend in recent years toward more stringent state requirements.

DOE/EPA reviewed the permitting requirements for CCWs being disposed of in landfills and surface impoundments in the eleven states. They found that ten states regulate CCWs as nonhazardous industrial solid waste[13] and regulate landfills receiving such waste under solid waste regulatory programs, while Alabama regulations exclude CCWs from the definition of solid waste.[14] *Id.* at 42. Four states (Florida, Illinois, Ohio and Texas) provide certain exemptions from solid waste permitting requirements for specific types of CCW landfills. *Ibid.* DOE/EPA later identified an additional three states (Colorado, Maryland and Utah) that also had exemptions from solid waste permitting requirements for CCW landfills (*i.e.*, on-site disposal of CCWs). *Id.* at 42-43.

The DOE/EPA Report determined that the vast majority (71%) of the total net disposable CCWs generated for all states in 2004 were disposed of in states that neither exempt certain CCW landfills from solid waste permitting requirements[15] or exclude CCWs from the definition of solid waste. *Ibid.* Additionally, the Report found that four states (Florida, Illinois, Texas and Colorado) that exempt certain CCW disposal

---

[13] The term "nonhazardous industrial solid waste" is used to encompass a wide variety of terms employed by states.

[14] Although Alabama excludes CCWs from the definition of solid waste, it has expansive authority under other regulatory programs to regulate CCW disposal sites, including the (1) National Pollutant Discharge Elimination System program which prohibits discharges to groundwater from surface impoundments, (2) Safe Drinking Water Act which requires monitoring for contamination in drinking water systems, and (3) Hazardous Substance Cleanup Fund, which imposes remediation and other corrective action measures for releases from CCW management areas. Ala. Admin. Code r.335-6-6; Ala. Code §§ 22-23-30 *et seq.,* 22-30A-1 *et seq.*

[15] Ohio exempts fly ash, bottom ash and boiler slag from solid waste regulations, but does not extend this exemption to flue gas desulfurization ("FGD") wastes. OAC 3745-27-04(E). FGD waste volumes in Ohio are included in this calculation.

sites from solid waste permitting requirements nevertheless regulate these facilities under alternative authorities. *Id.* at 46.

In Florida, certifications under that state's Power Plant Siting Act cover on-site landfills as well as power plants and impose the same substantive requirements on landfills that would otherwise be prescribed by permits. *Ibid.* On-site CCW landfills in Illinois must comply with design and operating standards that apply to nonhazardous solid waste landfills that receive other chemical wastes. These standards include liner systems, leachate-collection systems and groundwater monitoring programs. *Ibid.* In Texas, an exempt CCW landfill must be registered with the state and must submit information on waste composition, management methods, and engineering plans or the facility geology.[16] *Ibid.* In Colorado, exempt landfills must obtain Special Use Permits from local governing authorities that plan and regulate land use within their jurisdictions.[17] *Id.* at 47.

DOE/EPA reviewed the permit requirements applicable to surface impoundments in the 11 states and found that nine states regulate impoundments as water pollution control facilities rather than as solid waste management units. *Id.* at 47. Additionally, Pennsylvania requires a solid waste permit for all surface impoundments that receive CCWs for disposal and Wisconsin regulates surface impoundments used for disposal

---

[16] The Texas Commission on Environmental Quality also conducts a technical review of the documentation submitted by owners/operators pursuant to Technical Guidance Documents ## 1-3 & 6 and any deficiencies must be addressed and resubmitted to the Commission before commencing disposal activities. Immediate notification is also required for changed information regarding waste composition, waste management methods, facility engineering plans and specifications, or the geology of the facility location. Closure of the units and post closure care are governed by the Texas Risk Reduction Program rules (30 TRRP - TAC 350).

[17] Exempt Colorado landfills must also undergo State review and meet the State's substantive technical requirements. 6 CCR 1007-2, Part 1.

as solid waste landfills. *Ibid.* All of the states require impoundments that discharge water from a point source into state waters to obtain an NPDES permit. For CCW impoundments that do not discharge to a point source, seven states require other water pollution control permits and Texas requires compliance with permitting requirements for solid waste landfills.[18] *Ibid.* Ten of the 11 states address groundwater monitoring, liners and leachate-control systems through NPDES or other water pollution control permits, while Pennsylvania places these requirements in solid waste permits. *Ibid.*

DOE/EPA also used the current regulatory requirements obtained from the 11 states and data obtained in 1988 (the latest useable set of data) to determine whether states had tightened or relaxed several regulatory requirements related to CCW disposal. DOE/EPA then determined, based on the net disposable CCWs for each of the states, the ratios of CCWs disposed of that had relaxed or tightened controls. DOE/EPA determined that significantly more states, accounting for the vast majority of the reviewed net CCW disposal capacity, had tightened their regulatory requirements than had relaxed their requirements. This was true for each of the eight sets of requirements examined: regulatory designation of CCWs, solid waste permitting, liners, groundwater monitoring, leachate collection, closure/post-closure care, siting, and financial assurance. *Id.* at 49-51.

In sum, the DOE/EPA Report demonstrates that the vast majority of states rely on varying permit or other authorities to impose environmental controls on CCW disposal units. Furthermore, the DOE/EPA Report documents the trend showing that state regulatory requirements for CCW disposal have become more stringent in recent

[18] There are some exemptions from these Texas permitting requirements.

years. In fact, that trend continues to this day. Several states have recently proposed amendments to their existing CCW disposal and beneficial use regulations. Florida plans to develop a new rule to establish design, operation and closure requirements for CCW storage or disposal facilities, including requirements or protocols for beneficial use of CCWs.[19] Maryland has proposed regulations that would establish new requirements for generation, storage, handling, processing, disposal, recycling, beneficial use, or other uses of coal combustion byproducts.[20] Ohio has proposed draft rules for industrial waste, groundwater, and multi-program regulations and has proposed draft rules for beneficial use of industrial waste.[21] Iowa is currently considering a rulemaking petition submitted by USWAG's Iowa member utilities that would regulate the use of CCPs as fill material in quarry and sand and gravel reclamation projects and ravine filling activities under the state's solid waste landfill or monofill permit regulations.[22] The effect of this proposal would be to codify in state regulations the restrictions on placement of CCPs in sand and gravel pits without appropriate site-specific engineering and management controls to protect groundwater that USWAG has incorporated into the Action Plan discussed in detail in section III of these Comments. These developments in state regulatory oversight of CCW disposal since the 2000 regulatory determination demonstrate that the gaps in state programs that EPA identified in 2000

---

[19] *See* Florida Department of Environmental Protection website at http://www.dep.state.fl.us/waste/quick_topics/publications/shw/solid_waste/ChamberPaper07-16-03.pdf.

[20] 34 Md. Reg. 2287 (Dec. 21, 2007).

[21] *See* Rules Proposed on August 1, 2006 to OAC 3745-500, 501, 503, 506, 507 & 525 and Rules Proposed on November 8, 2006 to OAC 3745-525-801—811.

[22] *See* Proposed Amendments to Iowa Administrative Code—Chapter 108, submitted by the Iowa Utility Ass'n, Feb. 4, 2008.

have narrowed and continue to be narrowed. Hence, it would now be appropriate for EPA to reconsider whether it still needs to plan for an expanded federal role as state regulatory gaps continue to contract.

C. *The DOE/EPA Report Demonstrates that States Fully Implement Their Programs that Regulate CCW Disposal Units.*

To assess actual implementation of these state program requirements, the DOE/EPA Report reviewed permits supplied for recently expanded or constructed units to identify all instances where a variance from state regulatory requirements was requested for a CCW disposal unit. DOE/EPA Report at 13-14. The DOE/EPA Report categorized each of these requests by the type of requirement for which the variance was requested (*e.g.*, groundwater monitoring), determined whether the request had been granted, and identified the rationale for granting or rejecting the request. *Ibid.* DOE/EPA conducted this review to determine whether states were adequately implementing their CCW regulatory programs or were lax in requiring compliance with those programs. DOE/EPA found that variances from state regulations are granted only on the basis of sound technical justifications, demonstrating effective state regulation of CCW disposal.

DOE/EPA identified seven requests for variances related to liner requirements. *Id.* at 55. All of these variance requests were for landfills and were technical variances of construction methods, liner materials, or leachate collection systems that would provide equal or greater protection than the regulatory requirements. *Ibid.* Two of these variances were rejected, three were granted with stipulations, and two were granted after the effectiveness of the alternative was demonstrated. *Id.* at 52.

DOE/EPA identified only four requests related to groundwater monitoring, all of which sought a variance from a requirement to monitor for organic constituents, which are unlikely to be present in CCWs. *Id.* at 56. Three variances for closure/post-closure requirements were requested. *Ibid.* One was granted and two were granted with stipulations. Fifteen requests were made for variances from cover requirements. Five were granted because the regulatory requirements were designed to protect against municipal solid waste landfill vectors, three were granted because the regulations allow for alternatives that provided equal or better protection, and seven were granted with stipulations. *Ibid.* Eight variance requests were made from groundwater protection standards. *Id.* at 58. Two requests were granted but they did not authorize exceedences from otherwise applicable groundwater protection standards, three requests were granted with stipulations, and three were rejected. *Ibid*.

After reviewing these and other variance requests and rationales, DOE/EPA concluded that "State regulators have not issued variances unless a sound scientific basis supports the request. Variances are generally granted only when the underlying regulation was developed for settings unlike those of CCW units . . . or when the operator has demonstrated that an alternative approach or materials will achieve the same objective as intended by the regulation." *Id.* at 67.

In sum, the DOE/EPA Report accurately documents the overall tightening of state regulatory controls applicable to CCW disposal units. In addition, it demonstrates the seriousness with which state regulators administer their programs. States base their approval of regulatory requirements on technically-supported justifications. This record assembled by DOE and EPA manifestly puts to rest the myth often repeated by

some interest groups that the absence of federal regulations amounts to no regulation. Plainly, the states take their regulatory responsibilities for overseeing CCW disposal seriously. There is no demonstrated justification for EPA to supplant the states as the primary regulators of CCWs.

III. Utility Industry Management of CCW Disposal Has Undergone Major Improvements Since EPA Assembled the Record on which It Based Its 2000 Bevill Regulatory Determination.

In the previous section, we outlined the new record evidence from the DOE/EPA Report documenting the major progress achieved by newly constructed and expanded CCW management units since 1994. In this section, we identify important changes in management practices achieved by the industry at *pre-existing* CCW disposal facilities during the same time period. This change represents continuation of the trend observed by EPA in its May 2000 Bevill regulatory determination. *See* 65 Fed. Reg. at 32215-16 ("the utility industry has made significant improvements in its waste management practices over recent years . . . the use of liners and groundwater monitoring at landfills and surface impoundments has increased substantially over the past 15 years"). Today's CCW management by utilities looks very different than it did in 1994 on which the Agency based its 2000 regulatory determination.

As noted earlier, when EPA issued its determination, the Agency made a finding that "there is sufficient evidence that adequate controls may not be in place." *Id*. at 32216. The principal concern on the Agency's part was its finding that "62% of existing utility surface impoundments do not have groundwater monitoring. *Ibid*. In consultation with EPA's Office of Solid Waste, USWAG has developed and sponsored to its members an Action Plan, which we believe provides an appropriate template for

addressing the concerns EPA expressed in the 2000 regulatory determination regarding CCW disposal.[23]

At the outset, USWAG wishes to underscore (as we do in the Action Plan) that disposal is not the utility industry's preferred option for managing the residues from the combustion of coal in boilers used to generate electricity. The industry's long-term goal is to achieve 100% beneficial use of these materials. In the immediate future, however, 100% beneficial utilization is not a realistic option. Nevertheless, intermediate goals for increased beneficial use of CCPs *are* feasible and USWAG is committed to achieving maximum feasible CCP beneficial use. This is consistent with EPA's own goals. According to EPA's Strategic Plan, EPA has established a strategic target for 2011 of "increas[ing] the use of coal combustion ash to 50 percent from 32 percent in 2001." US EPA, *2006-2011 EPA Strategic Plan,* p. 62 (Sept. 30, 2006). In fact, EPA established the Coal Combustion Products Partnership ("C^2P^2") to formalize the Agency's commitment in partnership with other governmental agencies and with industry to reduce or eliminate barriers to beneficial use of CCPs and thereby to facilitate achieving this strategic target. *See* EPA, C^2P^2 Program Fact Sheet, p.2. As a C^2P^2 partner, USWAG is on record in support of the Agency's goal.

In 2006, beneficially-used CCPs represented nearly 43.5% of the 124.8 million tons of coal combustion residues generated nationwide. *See* American Coal Ash

[23] The Action Plan has been included in the docket of this NODA. *See* 72 Fed. Reg. at 49719. This is not the first time USWAG has sponsored a voluntary plan for addressing an issue of concern identified by EPA. Prior to the *1999 Report to Congress*, USWAG and EPRI jointly developed guidance for addressing risks of environmental damage from co-management of coal mill rejects and CCWs. EPA invited public comment on this guidance in the 2000 regulatory determination. 65 Fed. Reg. at 32226. USWAG recently asked its members whether there have been any further incidences of environmental damage involving coal mill rejects and CCWs since publication of the guidance. We are not aware of a single additional case.

Association, 2006 Coal Combustion Product (CCP) Production and Use Survey (Aug. 24, 2007) (copy attached as Appendix A). This is more than double the percentage of CCPs utilized in 1985 as reported by EPA in its first Bevill Report to Congress,[24] and is a mere 1½% from the Resource Conservation Challenge Strategic Plan goal of "increas[ing] the use of coal combustion products to 45%" by 2008. EPA deserves much credit for facilitating this sharp increase in the CCP utilization rate through such innovative programs as C^2P^2 and the Resource Conservation Challenge.

Despite the industry's and EPA's goal of maximum possible beneficial use of CCPs, disposal of some of these materials as waste in an environmentally responsible manner remains necessary for the immediate future. The Action Plan embodies the industry's commitment to address four recommendations presented by EPA staff based on the Agency's concerns expressed in the 2000 Bevill regulatory determination:

- Adopt groundwater performance standards at facilities that manage CCWs;
- Implement a comprehensive groundwater monitoring program to measure conformance with the groundwater performance standards;[25]
- Prohibit placement of CCWs in sand and gravel pits without appropriate engineering controls to protect groundwater; and
- Consider using dry handling technology prior to constructing or expanding a landfill or surface impoundment to manage fly ash on utility property.

---

[24] EPA, Report to Congress, *Wastes from the Combustion of Coal by Electric Utility Power Plants*, p. 4-45 (1988) ("The combined utilization rate for all high-volume coal combustion wastes . . . was about 21 percent in 1985."). Total quantities generated in 1985 were 59.1 million tons. American Coal Ash Association, Coal Combustion Byproducts Production and Use: 1966-1994.

[25] To assist utilities in implementing the groundwater monitoring portion of the Action Plan, USWAG and EPRI co-sponsored development of a guidance manual for implementing groundwater monitoring at CCW disposal facilities. EPRI, *Groundwater Monitoring Guidance for the Industry Action Plan on Coal Combustion Product Management* (Dec. 2005) (available on USWAG's website at www.uswag.org/gmgccpm.pdf).

Specific provisions of the Action Plan are modeled on the joint EPA-ASTSWMO *Guide for Industrial Waste Management* (April 16, 2003) and on existing EPA regulations promulgated under the Agency's RCRA Subtitle D authority. The Action Plan document identifies those sources at the relevant places in the text. The Plan also includes provisions for corrective action under state oversight. Because of the multiple operating company organization at many of today's utility corporate families, USWAG authorized participation in the Plan either on a company-wide or on a facility basis and calculated this participation on a megawatt basis. Numerous changes were made to the Plan at the specific suggestion of EPA staff. Thus, although USWAG is ultimately responsible for the content of this document, it is fair to acknowledge that EPA staff made a significant contribution to its development and we very much appreciate their assistance.

USWAG also consulted with an ASTSWMO committee of state regulatory officials responsible for state regulatory oversight of CCW disposal. The state officials suggested a few changes in the draft, and USWAG agreed and incorporated nearly all their requested changes. They also sought confirmation that the Action Plan would not supersede their own state programs. To provide that assurance, USWAG included in multiple places in the document a statement that the Action Plan does not "supersede any applicable federal, state, tribal or local laws and regulations, or any existing permit, agreement or approval by an appropriate governmental agency." Action Plan, pp. 2, 6. In addition, many USWAG members have briefed state regulatory officials in their own states on the content of the Action Plan. The reports USWAG received from these

briefings were quite positive. We are not aware of any state agency that opposes implementation of the Action Plan.

Finally, USWAG briefed an environmental group – the Clean Air Task Force ("Task Force") – on the content of the Action Plan. Although USWAG hoped that a common interest in advancing environmentally sound management of CCW disposal and addressing agency concerns about certain past practices would lead to a constructive dialog on implementing the Action Plan, we were disappointed by the harshly negative tone of the Task Force's wholesale attack on the Action Plan submitted to former Acting Assistant Administrator Thomas P. Dunne. When EPA staff provided us with a copy of the Task Force's criticisms, we reviewed their letter and prepared a side-by-side chart listing each of the Task Force's criticisms and USWAG's reply. The Task Force's criticisms were primarily directed at options drawn directly either from EPA's RCRA Subtitle D rules or from the *Guide for Industrial Waste Management*. Their complaint was not that USWAG had misapplied particular Subtitle D standards in the Action Plan but that the Agency's Bevill determination had decided against Subtitle C regulation. The Task Force had simply not accepted the 2000 Bevill nonhazardous waste regulatory determination as the framework for future EPA regulatory policy.[26]

A copy of the Task Force letter has been included in the NODA docket (*see* 72 Fed. Reg. at 49716 n.5) but our reply to their letter, dated August 31, 2005, is not in the

[26] That apparently remains the position of the Task Force and its allies because, as we discuss in section IV, the proposed framework for regulation jointly submitted by Earthjustice and the Clean Air Task Force, as well as others, is tantamount to a Subtitle C rule in all but name.

docket. We therefore attach it to these comments as Appendix B, together with the side-by-side chart.[27]

Finally, we point out that the environmental benefits to be gained from implementation of the Action Plan are likely to be achieved long before EPA could complete the rulemaking process. Under the Action Plan, the prohibition of disposal in sand and gravel pits without proper engineering controls to protect groundwater and the commitment to consider the option of dry handling technology for fly ash in new or expanded disposal units are effective immediately. The schedule for implementing the groundwater monitoring program in the Action Plan is the same as EPA's schedule for implementing groundwater monitoring at existing municipal solid waste landfills in the Part 258 rules. *See* 40 C.F.R. § 258.50(c).

We are pleased to report that USWAG members representing 181,155 coal-fired MW, or more than 75% of total coal-fired capacity operated by USWAG member utilities have either committed to the plan or have otherwise advised USWAG that they are managing their CCWs consistent with the Plan. Of these totals, nearly 88% represents utilities that have formally committed to implementing the Plan. In fact, these figures almost certainly understate the level of performance in accordance with the Plan because we know that a number of USWAG member companies that have not signed up for the Plan are conducting groundwater monitoring at many of their CCW disposal facilities. Absent confirmation that they are managing their CCWs consistent with all elements of the Action Plan, we have not included them in the percentage of utilities

[27] Although we disagreed with most of the Task Force's criticisms of the Plan, we were persuaded that one of the Task Force's comments about the Action Plan was sound, and we amended the Plan to reflect their comment. *See* Letter from USWAG to Acting Assistant Administrator Dunne dated Aug. 31, 2005, p.2 (appendix C).

meeting Action Plan requirements.[28] Furthermore, USWAG expects additional commitments following the utilities' next budget cycles and when the cost of implementation has been funded. This strong commitment to the Action Plan criteria by coal-burning USWAG member utilities squarely addresses the concerns about disposal practices at existing facilities raised by EPA in the 2000 regulatory determination.

IV. EPA Should Reject the Regulatory Proposals Submitted by Various Activist Organizations as Contrary to EPA's Bevill Regulatory Determination and to Sound Public Policy.

The NODA discloses that EPA has received and placed into the docket a proposed regulatory framework for regulation of CCWs submitted by 27 environmental stakeholder groups led by Earthjustice and the Clean Air Task Force. 72 Fed. Reg. at 49716 n.4. For simplicity, we shall refer to the document as the Earthjustice proposal.

Although nominally a proposed RCRA Subtitle D rule, the Earthjustice proposal significantly departs in many ways from EPA's existing Subtitle D program. Contrary to the 2000 Bevill regulatory determination, the proposal

- would federalize regulation of CCW disposal, thereby supplanting the states' primary role as regulators of CCWs, instead of serving the function of a "gap-filling" regulation where states may have fallen short;
- would adopt federal regulations on aspects of CCW management that were never identified in the Bevill determination as areas of concern;
- would regulate many beneficial uses of CCPs as disposal despite EPA's determination that additional regulation of beneficial uses (other than mine placement) was not warranted; and
- suggests, but does not specifically propose, a hazardous waste listing of CCWs as a sanction for noncompliance with the regulations Earthjustice proposed.

[28] Although USWAG's sponsorship of the Action Plan focused primarily on its member utilities, we informed non-member utilities that their participation in the Plan would be welcome. One non-member utility has committed to the Action Plan at all of its facilities.

Earthjustice's proposal is a radical departure from EPA's approach to Subtitle D regulation. For example, unlike the Part 258 municipal solid waste landfill rules, the Earthjustice proposal would apply to all CCW management units, including units that stopped receiving CCWs prior to promulgation of their proposal. *Compare* Earthjustice proposal § 253.1(c) *with* 40 C.F.R § 258.1(c). Unlike EPA's Subtitle D regulations (indeed, even the Subtitle C rules), the Earthjustice proposal would ban both the construction of new surface impoundments and the expansion of existing impoundments and would also require that all existing surface impoundments to be closed within two years. *See* Earthjustice proposal §§ 253.31-.32. It is difficult to imagine any action more disruptive of energy generation and delivery than the sudden removal of a major percentage of the industry's CCW storage and disposal capacity.[29]

The proposed location restrictions would be applicable to existing CCW management units as well as new units, and existing units would have to close if certain demonstrations are not approved by EPA or state regulatory authorities. Earthjustice proposal Part 253 Subpart B. Groundwater monitoring would have to be implemented at all CCW units within one year, and, unlike current Subtitle D regulations, no waiver

[29] The 2004 petition for rulemaking submitted by the Hoosier Environmental Council ("HEC") and the Clean Air Task Force seeks the same draconian ban on CCW management in surface impoundments with its demand that EPA prohibit the placement of CCWs in surface water, but the HEC petition does not even provide for the two year lead time contained in the Earthjustice proposal. *See* 72 Fed. Reg. at 49719. The other demand in the petition – a prohibition on the placement of CCWs in groundwater (*see also* Earthjustice proposal § 253.10) – arises primarily in the context of mine placement, which is outside the scope of this NODA, and is being addressed by the Office of Surface Mining. *See* 72 Fed. Reg. at 12027 ("[CCP] placement in mines [should] be designed to minimize reactions with water and the flow of water through [CCPs].") (quoting NRC Report at 8 (internal quotation marks omitted)). Even in the context of CCW disposal in landfills and surface impoundments, a categorical prohibition is not justified. In many areas of the country, there can be significant fluctuations of the water table. Whether disposal of CCWs at such a location poses a threat to the environment should be left to the state regulatory agency in light of the engineering controls for the unit and the existing state groundwater quality classification at the site. The HEC petition should be rejected.

would be permitted even in locations where the demonstrations of no potential of migration of hazardous constituents to the uppermost aquifer (authorized by 40 C.F.R. §§ 257.21(b) and 258.50(b)) can be made. The groundwater point of compliance would be set at 50 meters from the waste management unit boundary, one third the distance in the municipal solid waste landfill regulations, and would require monitoring for a broad range of constituents beyond the primary drinking water constituents. *Compare* Earthjustice proposal § 253.30(f) & Appendix I *with* 40 C.F.R. § 258.40(a)(1), (d) & Table 1. The corrective action proposal is so prescriptive that it far exceeds EPA's long abandoned Subpart S corrective action proposal. *See* 55 Fed. Reg. 30798 (July 27, 1990).

The Earthjustice proposal is a fundamentally misguided and ultimately illegal approach to regulating CCW disposal and is totally divorced from the specific concerns raised by EPA in the 2000 Bevill regulatory determination. It completely ignores the role of the states as principal regulators of solid waste under Subtitle D of RCRA, which the regulatory determination emphasized would remain paramount. *See* 65 Fed. Reg. at 32217. Some of the co-sponsors of this proposal have long trumpeted the myth that state regulation amounts to no regulation. To be sure, not every state has done a perfect job, but as we discussed earlier in commenting on the DOE/EPA Report, most states have done a responsible job, often in differing ways reflecting the unique conditions found in their own states and regions. There is not the slightest justification for federalizing CCW disposal regulation with such an unashamedly punitive proposal.

Moreover, federalizing CCW disposal regulation, as these 27 advocacy groups propose, would also be contrary to RCRA. In defining the objectives of Subtitle D,

Congress spoke clearly about the respective roles of the federal and state governments in regulating solid wastes:

> The objectives of this subtitle are to *assist* in *developing* and *encouraging* methods for the disposal of solid waste which are *environmentally sound* and which *maximize* the *utilization* of valuable resources including energy and materials which are recoverable from solid waste and to encourage resource conservation. Such objectives are to be accomplished through Federal *technical and financial assistance to States or regional authorities* for comprehensive planning pursuant to Federal guidelines designed to foster cooperation among Federal, State, and local governments and private industry.

RCRA § 4001, 42 U.S.C. § 6941 (emphasis added). The italicized words define the limited Federal role – assist with developing and encouraging environmentally sound solid waste disposal regulations. The statement then specifies the methodology for achieving these objectives – Federal technical and financial assistance to states and regional authorities and guidelines to foster cooperation among Federal, state, and local governments and private industry.[30] Congress also specified that maximizing utilization of resources recoverable from solid waste and encouraging resource conservation is the policy of RCRA Subtitle D, while the Earthjustice proposal heads in the opposite direction by increasing regulation of certain CCP-utilization applications that the Bevill regulatory determination found do not warrant additional regulation. *See* 65 Fed. Reg. at 32229-30 ("We have not identified any beneficial uses that are likely to present

[30] We think it is significant that the statement of objectives says nothing about Federal regulations, and the only authorization for regulations in Subtitle D is to the criteria for sanitary landfills in section 4004, which EPA promulgated in 1979 and have been applicable to CCW landfills since that time (40 C.F.R. Part 257, Subpart A), and to the mandate in section 4010(c) to revise those criteria and to regulate certain Subtitle C exempt hazardous wastes. The states have raised legitimate questions whether EPA has authority to adopt Subtitle D regulations (as opposed to guidelines) applicable to CCW disposal facilities. *See* Comments of Fossil Fuel Combustion Waste Work Group of Association of State & Territorial Solid Waste Management Officials, RCRA Docket No. F-2000-FF2F-FFFFF, pp. 3-4 (Sept. 19, 2000).

significant risks to human health or the environment; and . . . no documented cases of damage to human health or the environment have been identified."). In fact, this aspect of the Earthjustice proposal would ensure the failure of the combined efforts of governmental agencies (*e.g*., EPA and DOE) to meet the EPA Strategic Plan goal of 50% CCP utilization by 2011. *See* EPA, *2006-2011 EPA Strategic Plan*, p. 62 (Sept. 30, 2006). In almost every aspect, the Earthjustice proposal is wholly contrary to congressional and EPA's Subtitle D policy. The proposal should be rejected.

V. The Historical Proven Damage Cases Are Not Indicative of Present CCW Disposal Practices and Would Not Have Been Prevented by Federal Solid Waste Regulation.

Another of the bases for the 2000 regulatory determination on CCWs was that the Agency "identified eleven documented cases of proven damages to human health and the environment by improper management of these wastes in landfills and surface impoundments." 65 Fed. Reg. at 32221. Since the 2000 determination, EPA has received information on 135 sites alleged to be CCW damage cases. EPA reevaluated the sites addressed in the 2000 regulatory determination and considered information received on new sites. 72 Fed. Reg. at 49718. Based on this exhaustive review, EPA has identified 24 proven damage cases from a universe of approximately 600 landfills and surface impoundments and has requested comment on the extent to which this information should be considered in setting future regulatory policy on CCW disposal. *Id*. at 48718-19.

EPA's Damage Case Assessment document, included in the NODA docket, makes several important points: First, corrective action has been completed or is

ongoing at nearly all of the proven damage cases relating to groundwater.[31] Furthermore, as documented in a submission from USWAG to EPA dated August 23, 2005 (attached as Appendix C), several utility owned/operated CCW disposal sites that are listed as proven damage cases have been addressed or are being addressed to the satisfaction of state authorities. USWAG renews its request for EPA to remove the sites that have completed corrective action from the Agency's list of proven damage cases. Once corrective action has been completed, a site should not remain on the list of proven damage cases in perpetuity.

Second, a common characteristic of a vast majority of the proven damage cases is that the CCW disposal occurred decades ago. In fact, several predate the adoption of RCRA in 1976 and some even predate the establishment of EPA and federal environmental regulation in 1970. Given that the DOE/EPA Report demonstrates enormous changes in industry practices between 1995 and 2004, it seems illogical to draw firm conclusions about current risks from damage cases involving management practices of a bygone era.

To determine how and whether EPA should use the Damage Case Assessment information in its decision-making, the Agency should evaluate whether the damage case scenarios presented in the assessment are indicative of current disposal practices and whether RCRA regulation could have prevented the particular damage. The damage cases consist of 16 proven cases of damage to groundwater and eight cases involving discharges to surface water. The 16 groundwater damage cases involved four

[31] Apparently, EPA has not received information as to the corrective action status of one case, but does not identify the case. 72 Fed. Reg. at 49719; Damage Case Assessment at 7. If EPA wishes to obtain the missing information, USWAG would be pleased to assist EPA in attempting to locate the information upon request.

unlined landfills, five unlined surface impoundments, six unlined sand and gravel pits, and one failure of an engineered liner at a surface impoundment. *Id.* at 48718-19.

For those damage cases that involve contamination of groundwater, EPA should determine before it proceeds with any Subtitle D CCW disposal regulations whether such regulations would appreciably reduce the likelihood of these types of damage cases in the future. For instance, of the 16 proven damage cases to groundwater, six were from unlined sand and gravel pits. 72 Fed. Reg. at 49718-19. Given that the CCW disposal in unengineered sand and gravel pits is prohibited by USWAG's Action Plan,[32] it is becoming less likely that groundwater contamination from future disposal in sand and gravel pits will occur.[33] One proven groundwater damage case involved the failure of an engineered liner at a surface impoundment. It is improbable that federal regulation would have prevented this damage case.

As EPA implicitly suggests by separating damage cases involving damages to surface water from those involving groundwater contamination, the RCRA program is not designed to regulate discharges to surface waters. Discharges to surface waters have already been comprehensively addressed by Congress through the adoption of the Clean Water Act, and by EPA through development of the National Pollutant Discharge Elimination System ("NPDES") regulatory program, which regulates the

---

[32] As noted earlier, the Iowa Utility Association has petitioned the state's regulatory agency to codify this prohibition through regulations that would apply state landfill and monofill standards to such disposal. *See* note 22 and accompanying text.

[33] Obviously future damage from past disposal would not be prevented by future regulations. However, EPA's existing authority under CERCLA and RCRA § 7003 would remain applicable as enforcement tools. *See* 65 Fed. Reg. at 32233 ("we will also take enforcement action under RCRA section 7003 when we identify cases of imminent and substantial endangerment. We will also use Superfund remedial and emergency response authorities under . . . (CERCLA), as appropriate, to address damages that result in risk to human health and the environment.").

discharge of pollutants from point sources to waters of the United States. *See* Federal Water Pollution Control Act § 402, 33 U.S.C. § 1342; (40 C.F.R. Part 122). Accordingly, as USWAG has suggested in the past, EPA should remove from the list of proven Bevill Amendment damage cases those sites where the damage was exclusively from discharges to surface waters. Moreover, RCRA expressly excludes NPDES discharges from EPA's RCRA jurisdiction and hence surface water damage would not and could not be addressed by potential RCRA regulations. *See* RCRA § 1004(27), 42 U.S.C. § 6903(27) (excluding industrial point source discharges subject to NPDES permitting from the definition of solid waste).

Finally, for the remainder of the damage cases, all of the disposal sites were unlined units. 72 Fed. Reg. at 48718. Given that the DOE/EPA Report found that 98% of recently expanded or constructed CCW disposal units were constructed with liners and that the use of multiple and combination liners had dramatically increased (DOE/EPA Report at 31), these types of units are associated with older disposal facilities that are being phased out in the industry.

In determining whether and how to use the Damage Case Assessment in proceeding with next steps on the 2000 Bevill regulatory determination, EPA should consider these factors as the Agency determines whether federal solid waste regulation could have prevented these damage cases and whether it would do so in the future.

VI. EPA's Draft Risk Assessment Is Fundamentally Flawed and Does Not Accurately Predict Field Conditions and Real World Observations.

For nearly 28 years, EPA has been engaged in the study of fossil fuel combustion wastes as a precursor to determining appropriate regulatory policy for these waste streams. These studies were required by Congress' enactment of the Bevill

Amendment in 1980, which directed EPA to conduct a "detailed and comprehensive study and submit a report on the adverse effects on human health and the environment, if any, of the disposal and utilization" of CCWs. RCRA § 8002(n), 42 U.S.C. § 6982(n). EPA began its study in 1981 by focusing initially on CCW disposal, and seven years later completed that study when it submitted its Report to Congress on *Wastes from the Combustion of Coal by Electric Utility Power Plants* (Feb. 1988). EPA did not prepare a risk assessment at that time, but did collect massive amounts of field data on CCW management from governmental and industry sources. EPA used this research to support its first Bevill regulatory determination on large volume coal combustion wastes. 58 Fed. Reg. 42466 (Aug. 9, 1993).

The following year EPA began the second phase of its study that focused on the "remaining" fossil fuel combustion wastes including co-managed CCW wastes. When this study was completed, it formed the basis for EPA's 1999 Report to Congress on these "remaining" waste streams, which in turn provided part of the foundation for the 2000 Bevill regulatory determination. *See* 65 Fed. Reg. at 32218 n.1. Although EPA did prepare a quantitative groundwater risk assessment during this phase of the study, the EPACMTP groundwater model used was universally criticized. As a result, EPA did not use the groundwater pathway risk analysis based on that model in support of its regulatory determination. *See id*. at 32222-23.

Since the 2000 determination, the Agency continued its study of CCW disposal. As discussed earlier, EPA, in collaboration with DOE, studied newly expanded and constructed CCW units and state regulatory requirements on CCW disposal. *See* 72 Fed. Reg. at 49716-17. At the same time, EPA exhaustively studied damage cases

involving CCW units. *See id*. at 49718-19. Given that EPA has conducted more than a quarter century of extensive research on the effects of disposal and utilization of CCWs on human health and the environment and has assembled voluminous real world evidence on CCWs in disposal units, we are mystified that the Agency persists in its effort to model the groundwater pathway to evaluate whether "onsite CCW management settings" (but none later than 1995)[34] pose risks to human health or ecological receptors when EPA has in its possession reams of groundwater data showing what actually is occurring in the vicinity of CCW disposal units. *Id*. at 49717. The most troublesome aspect of the draft risk assessment is its implication that time has stood still at utility CCW disposal sites since 1995 despite EPA's finding in its 2000 regulatory determination that the trend was toward increasing state regulatory oversight of these facilities and increasing use of liners and groundwater monitoring. 65 Fed. Reg. at 32215-16, 32228-29. Therefore, unless that trend came to a sudden halt (which clearly it has not),[35] a risk assessment based on 1995 data will be highly misleading as an assessment of CCW management today and inevitably will overstate the risks of CCW disposal.[36]

There is no rational justification for relying on a risk assessment that ignores all the recently collected data. In fact, any regulations based on a risk assessment that

---

[34] As EPA acknowledges, the database on which the assessment is based was derived from industry data submitted in 1995. 72 Fed. Reg. at 49718.

[35] *See*, *e.g*., sections II and III of these Comments.

[36] To add to the mystery, EPA notes that "the main technical aspects of the CCW risk assessment were completed in calendar year 2003" (72 Fed. Reg. at 49717 n.10), but it is unclear what was done with the draft between 2003 and the NODA publication in 2007 when EPA completed its additional study of management standards at newly constructed disposal units and the characteristics of proven environmental damage from CCW disposal sites.

models historic rather than current industry practice (especially when more recent data were available) would be vulnerable to legal challenge under well-established principles that reject the use of models that fail to reflect real world observations. *See*, *e.g.*, *Appalachian Power Co. v. EPA*, 249 F.3d 1032, 1053-55 (D.C. Cir. 2001); *Chemical Manufacturers Ass'n v. EPA*, 28 F.3d 1259, 1264-66 (D.C. Cir. 1994). Moreover, the arbitrariness of this modeling effort is further demonstrated by the fact that the conclusions drawn from the assessment disagree with nearly every important conclusion drawn by EPA in the Bevill study based on extensive real world data. This type of discrepancy cannot be ignored. In the face of modeled conclusions that lack confirmation from 28 years of EPA study of actual CCW disposal, there is no need for EPA to commit additional resources for a third attempt at modeling risk for CCW disposal sites. Instead, EPA should base its regulatory decisions on its own extensive experience with CCW disposal and the recognized trend toward improved management of these wastes and should disregard the theoretical projections based on an incomplete and distorted database.

Nevertheless, despite our disagreement with the use of risk modeling in the present context of the availability of extensive real world data, USWAG retained a well known expert on risk modeling, ENSR Corporation ("ENSR"),[37] to conduct a technical review of the methodology used in developing the draft risk assessment. ENSR has provided us with a detailed report, attached as Appendix D.

ENSR has identified a host of flaws in the risk assessment that undermine the accuracy of its projections. We discuss below several key errors in the analysis, but do

[37] ENSR is a leading global environmental health and safety firm and is a recognized leader in providing risk assessment expertise to the regulated community.

not address every error identified in ENSR's report. We urge EPA to review the entire ENSR report for a more detailed technical analysis of these and additional errors.

- **The Risk Assessment Violates EPA Policies on Probabilistic Analysis**

In 1997, EPA published a guidance document entitled *Guiding Principles for Monte Carlo Analysis* (EPA/630/R-91/001 (March 1997)) that detailed procedures for conducting probabilistic ("Monte Carlo") risk assessments, the type of analysis EPA conducted to assess the human health and ecological risks for CCW disposal. This guidance document requires that to be viable statistical tools, risk assessments, at a minimum, should use sound technical methods, and be both transparent and reproducible. *Id.* at 1. The Office of Management and Budget ("OMB") recently issued a Memorandum to Executive Branch agencies that made the same point. *See* OMB Updated Principles for Risk Analysis, p.11 (Sept. 19, 2007) ("OMB Risk Analysis Memorandum"). EPA's risk assessment, however, fails to meet these basic standards in several ways.

As ENSR notes in its report, one of the risk assessment's flaws is that the assessment and its supporting documentation are not sufficiently transparent to allow third parties to conduct a review to determine the overall appropriateness of the analysis. ENSR Report at 2-1. This has the effect of limiting the ability of the public to participate in a meaningful review or reproducing EPA's analysis before it is used in Agency decision-making. Examples of this lack of transparency include the lack of documentation of the mechanics of the risk assessment and the lack of input (and output) distributions used in the analysis. *Id.* at 2-2—2-3. This risk assessment also does not fully account for the dependence of input variables (*e.g.*, the interdependence

of body weight and water ingestion rates for children and link between the rate of fish consumed from a water body and the size of the water body).[38] ENSR Report at 2-4; *see* Risk Assessment at F-5—F-6, C-16—C-17.

Additionally, the ecological risk assessment component of EPA's report does not even incorporate a full probabilistic, Monte Carlo analysis. ENSR Report at 2-3; *see* Risk Assessment at 4-21—4-24. The only probabilistic inputs to the ecological risk assessment were the distributions of media concentrations (surface water, sediment); all other exposure parameters were overly conservative point estimates.

Given these serious issues with the risk assessment, many of the comments discussed in ENSR's report and identified below are necessarily based on the incomplete documentation contained in the risk assessment's analysis. Examples of these and other violations of EPA Monte Carlo guidance are discussed in greater detail below.

- **EPA Relies on Outdated and Disproved Data in its Analysis**

The risk assessment relies on the Toxicity Characteristic Leaching Procedure ("TCLP") to characterize the potential leaching from CCW disposal units.[39] Risk Assessment at 4-32. ENSR's report details several studies, including EPA's own

---

[38] The dependence of input variables can be one of the key weaknesses of Monte Carlo analyses. Because this type of analysis randomly selects input characteristics from distributions of variables, failures to control for variable dependence can result in inaccurate modeling. Variables are often dependent in the real world and may be impossible to model accurately. If dependent variables are not controlled for in the Monte Carlo model, randomly assigning characteristics can generate scenarios that would never occur in the real world (*e.g.*, the impossibility of a CCW disposal site that has the precipitation of the Everglades, the population of Manhattan and the soil permeability of the Mojave).

[39] The risk assessment also models the leaching of the entire mass of each constituent from the CCW disposal unit, which is unsupported by the scientific literature that indicates that only a small fraction of most constituents is available to be leached from CCW. ENSR Report at 3-7.

research, that have found the TCLP to be an inappropriate mechanism for evaluating leaching from coal combustion products. ENSR Report at 3-1—3-2. The TCLP was designed to measure potential leaching from municipal solid waste landfills ("MSWLFs"), while the various site-specific environmental conditions at CCW disposal sites as well as the lack of multiple types of co-managed wastes (*e.g.*, organic wastes) are typically very dissimilar to MSWLFs. The improper use of the TCLP is especially troubling given EPA's observation that the risk assessment results are very sensitive to the leachate concentrations. Risk Assessment at 4-26.

Another area where EPA appears to ignore updated information is its use of a reference dose (the maximum acceptable oral dose of a toxic substance) for boron.[40] In the risk assessment, EPA appears to use a reference dose of 0.09 mg/kg per day. ENSR Report at G-5. As EPA is well aware, the Agency has updated its reference dose in the Integrated Risk Information System ("IRIS") database to 0.2 mg/kg per day. *See* IRIS Database: Boron and Compounds Summary, last updated Aug. 5, 2004. While the updated value of 0.2 mg/kg per day is presented in Table 3-9 of the Risk Assessment, the outdated value is presented in Table G-1 in Appendix G "Human Health Benchmarks." Risk Assessment at 3-35 and G-5, respectively. Appropriate use of the updated value would result in a decrease in the human health risk associated with boron by a factor of 2.2. ENSR Report at 1-2. Additionally, the risk assessment has not updated the toxicity values for aluminum and may not have used the updated value for barium. Risk Assessment at G-5. Updating these two values, however, does not

[40] EPA has proposed not to regulated boron with a national primary drinking water maximum contaminant level ("MCL") *See* 72 Fed. Reg. 24016, 24028 (May 1, 2007).

appear to have an effect on the risk assessments' screening or results for these two constituents. ENSR Report at 4-5.

- **EPA Does Not Validate Its Modeling Predictions Through Comparisons with Field Data**

EPA used the EPACMTP groundwater model in the risk assessment to calculate chemical constituent concentrations at several locations along the groundwater pathway from the CCW disposal unit to potential receptors. Risk Assessment at 3-8. Among these predictions is the chemical concentrations at or beneath the disposal site. As discussed above, it is unclear why EPA predicted these concentrations when it has voluminous groundwater monitoring data readily available or could gather this information from CCW disposal sites or from state records. Even more surprising is the absence of any indication in the risk assessment that EPA attempted to reconcile its predicted groundwater concentrations with actual field data. EPA ignores the real world evidence and proceeds to determine risk to receptors without subjecting its model to this fairly basic validation test. In skipping this real world validation, EPA also ignores its own guidance on the need for and desirability of confirming models by validating predictions with field data. *Ibid.*

- **EPA Uses Assumptions in the Risk Assessment that Overestimate Risk**

In several key areas of the risk assessment, EPA makes assumptions in its modeling and input distributions that cause its analysis to overestimate the probabilities of exposure risk. *See id.* at 3-4—3-5 & 4-2—4-4. One area where these assumptions appear to be overly conservative and drastically overestimate risks is the Agency's modeling of the drinking water well pathway in the risk assessment. *Id.* at 3-4—3-5; *see* Risk Assessment at 2-11. The risk assessment model assumes that there always is a

drinking water well in the vicinity of a CCW disposal unit, the well is downgradient from the disposal unit, and no surface water bodies are present to disrupt the groundwater flow. *See* ENSR Report at 3-4—3-5. This model ignores scenarios where (1) water is supplied through a municipal or public water utility, (2) wells are located upgradient or cross-gradient from a CCW disposal site, and (3) CCW disposal sites are located near surface water bodies that disrupt the migration of groundwater flow between the disposal unit and the assumed downgradient drinking water well. *Ibid.* Each of these scenarios is associated with virtually no exposure risks and would drastically reduce the probability for exposure from groundwater in the risk assessment. *Ibid.* In making these assumptions and eliminating scenarios associated with little risk, EPA also ignores its own previous finding based on real world evidence that CCW sites pose limited potential for human exposure because they are both frequently located significant distances from population centers and are typically near surface water bodies that dilute and divert groundwater plumes. *See* 58 Fed. Reg. at 42475; *1988 Report to Congress* at 5-68—5-97.[41]

Another important component of the risk assessment that used unreasonably conservative assumptions to dramatically overestimate exposure risks is the model that EPA used to predict exposures from fish consumption. ENSR Report 4-2—4-3; *see*

[41] In EPA's 1993 regulatory determination, EPA found, based on a random study of 100 CCW disposal sites, that only 29% of sites have any population within one kilometer and 34% of sites have public drinking water systems within five kilometers. EPA also found that these sites tend to be near surface water bodies – 58% were located within 500 meters of a surface water body, which tended to dilute and divert contaminant plumes. EPA concluded from these data that "exposure to coal combustion waste groundwater contaminants 5 kilometers from the source of contamination is not expected to occur." 58 Fed. Reg. at 42475, *citing 1988 Report to Congress* at 5-68—5-97. Moreover, given the availability of EPA's own survey of the geography surrounding CCW disposal sites, EPA's resort to municipal solid waste landfill survey data in the risk assessment as a proxy to estimate well distance from CCW disposal units is wholly improper.

Risk Assessment 2-12—2-13. EPA's model assumes that all of the population residing near CCW disposal units are anglers and consume locally-caught fish. ENSR Report at 4-3; *see* Risk Assessment at 2-12 n 7. Due to a lack of available data and an Agency default policy decision, EPA also assumed that *all* the fish consumed by these receptors are contaminated by the groundwater plume from a CCW disposal unit. ENSR Report at 4-4; *see* Risk Assessment at 3-31. The model ignores the portion of the populations near CCW disposal units that (1) are not anglers, (2) do not consume fish, (3) do not consume locally-caught fish, and (4) do not consume *all* of their fish from a water body contaminated by CCW disposal units. Incorporating any of these very real portions of the population would reduce the risk assessments' quantified exposure risks associated with fish consumption.

- **The Risk Assessment's Model of Groundwater Transport Fails to Account for Important Attenuation Processes**

When modeling the transport of metals in groundwater, the risk assessment appears to overlook critical chemical processes that control the mobility of certain metals, including especially arsenic. ENSR Report at 3-5—3-6. A well known property of arsenic is that when arsenic appears in groundwater in a reduced form, it is soluble and mobile. In oxidizing environments, however, it readily bonds with negatively charged ions to create insoluble molecules that precipitate out of the groundwater solution. *Ibid.* As a result, the transport of arsenic in groundwater is directly dependent upon its redox state. It is unclear if and how this critical process was incorporated into the risk assessment. *Id.* at 3-5. Although the risk assessment did model the less mobile form of arsenic in its sensitivity analysis, it found that the difference in calculated risk between oxidized and reduced arsenic varied by only a factor of two, which

suggests that the risk assessment's model did not adequately incorporate redox conditions. *Id.* at 3-6; *see* Risk Assessment at 4-30. EPA is well aware of the importance of the redox state of arsenic for groundwater mobility and the groundwater monitoring field observations, which the Agency describes as "evidence [that] suggests that arsenic III is rapidly converted to arsenic V during subsurface transport, with the result that drinking water standards are rarely exceeded in offsite groundwater." Risk Assessment at 4-30. EPA's risk assessment model, however, appears to overlook the redox state of arsenic, even though it is a critical factor controlling the transport of arsenic in groundwater and the exposure risks associated with this chemical.

In sum, EPA chose to conduct a risk assessment to model the exposure risks associated with CCW disposal units even though the Agency has ample experience derived from 28 years of studying these facilities and has extensive knowledge based on real world data of the actual risks associated with CCW disposal. In conducting the risk assessment, EPA neither incorporates available field data and real world observations nor validates the assessment's modeling through comparison with these data. In a dynamic industry undergoing the significant change in waste management practices that EPA and DOE have documented and USWAG has supplemented in these comments, a risk assessment based on pre-1994 data is of doubtful validity. Additionally, EPA's risk assessment violates Agency policy on probabilistic analysis, uses outdated and disproved information, ignores critical chemical attenuation processes, and incorporates unreasonably conservative assumptions to vastly overestimate the exposure risks associated with CCW disposal units. Given these

critical flaws, EPA should dismiss the risk assessment as an unreliable basis for making future regulatory decisions regarding CCW disposal.

VII. The Conditions That Led EPA in 2000 to Contemplate RCRA Subtitle D Regulations Have Significantly Changed – Further Development of Subtitle D Regulations Is No Longer Necessary.

The totality of information added in the NODA to the Agency's record on CCW disposal presents a very different picture than the one painted in the 2000 Bevill regulatory determination. Although EPA acknowledged in the 2000 determination the improvements since its 1988 Report to Congress and identified trends toward increased environmental controls at CCW land disposal facilities, the Agency was obviously troubled by management practices (as of 1994) at some older disposal facilities that had resulted in environmental damage. Similarly, while EPA had praised the states for increasingly robust regulatory oversight of CCW disposal, the Agency expressed concern about regulatory gaps in a few state programs. Those conditions have significantly changed since the prior record closed in 1994.

As we describe in detail in sections II and III, the picture today is

- one of nearly universal state-of-the-art management controls at newly constructed or expanded facilities,
- continuation of the trend toward groundwater protection and monitoring at existing facilities, and
- a strong preference for dry handling technology when constructing new disposal capacity.

A large percentage of USWAG member companies are committed to these changes, and we have every expectation that the trend toward improvement of management standards at existing facilities will continue. In addition, most states in which coal-burning utilities are located have demonstrated a strong commitment to vigorous

regulatory oversight, including ongoing actions by several states to upgrade their regulatory programs. The regulatory gaps that concerned EPA in 2000 are rapidly disappearing. In short, the rationale for federal regulatory intervention in a subject area Congress largely has left to the states no longer exists.

Let us briefly summarize the key statistics that demonstrate changes in industry management of CCWs and compare them with those reported in the 2000 Bevill regulatory determination (*see* 65 Fed. Reg. at 32216 (Table)):[42]

Trend Toward Dry Handling

Unit	Total Universe-1995	Constructed 1994-2004
Landfills	just under 50%	approx. 66%
Surface Impoundments	just over 50%	approx. 33%

As of 1995, the number of surface impoundments exceeded the number of landfills managing CCWs. In the decade since the Bevill record closed in 1994, twice as many landfills as surface impoundments were constructed. This trend will almost certainly accelerate in the coming years. All USWAG members that have committed to implementing the Action Plan have agreed to consider dry handling technology for any new or expanded fly ash disposal facility. A large number of USWAG members, including companies that have not as yet signed-up for the Action Plan, indicated that such consideration is already part of their expansion planning process.

[42] We acknowledge that the universe of 1994-2004 units studied by DOE and EPA is a more limited universe than the 1995 data used in the 2000 Bevill regulatory determination. Nevertheless, as DOE and EPA pointed out in their report, the data "can be used to identify general trends in CCW disposal practices from 1994 to 2004." DOE/EPA Report at 21.

Trend Toward Liners

Unit	Total Universe in 1995	Constructed 1985-1995	Constructed 1994-2004
Landfills	57%	75%	97% (37/38)
Surface Impoundments	26%	60%	100% (18/18)

These data demonstrate that lining new or expanded CCW disposal units has become virtually universal. In the period studied by DOE and EPA, all but one new facility was lined.

Trend Toward Groundwater Monitoring

Unit	Total Universe in 1995	Constructed 1985-1995	Constructed 1994-2004
Landfills	85%	88%	97% (37/38)
Surface Impoundments	38%	65%	78% (14/18)

This table shows that the trend toward groundwater monitoring has accelerated in the decade studied by DOE and EPA. More than three-quarters of all surface impoundments and all but one landfill constructed between 1994 and 2004 have groundwater monitoring.

Additionally, USWAG coordinated with EPA staff to develop an Action Plan to address EPA's concerns about *in service* CCW disposal facilities. The Action Plan includes requirements adopting groundwater performance standards and implement groundwater monitoring at facilities that manage CCW, prohibiting the placement of CCWs in sand and gravel pits without appropriate engineering controls to protect groundwater and requiring the consideration of dry handling technology prior to the

construction or expansion of a landfill or surface impoundment to manage fly ash on utility property. As discussed in section III above, USWAG members have committed an overwhelming majority of USWAG's total coal-fired generating capacity to the Action Plan and we expect additional commitments as members plan their next budget cycles. Due to the widespread promotion and adoption of the management principles promoted by the Action Plan, current CCW disposal practices are dramatically and continually improving.

Our recommendation that additional federal regulation is no longer necessary is also supported by EPA's damage case assessment. This assessment reaffirms EPA's conclusion in 2000 that most of the proven damage cases involve older, unlined sites, where the disposal occurred before 1993. 65 Fed. Reg. at 32225. New regulations cannot prevent the consequences of past disposal. The improved management practices throughout the industry make environmental damage from future CCW disposal far less likely. Nor are new regulations needed to authorize EPA or the states to require utilities to remediate damage attributable to improper disposal of CCWs. Such authority already exists. *See* note 33.

Although the total number of proven damage cases has increased to 24 since the 2000 regulatory determination, the nature and origin of the typical CCW damage case has not changed – most of these sites are still older facilities where the disposal occurred long ago and did not reflect today's improved management practices. 72 Fed. Reg. at 49718-19. The important fact about the 16 proven cases involving damage to groundwater is that corrective action has been completed at six of these sites and is underway at nine additional sites, usually with state regulatory oversight. *Id*. at 49719.

The remaining eight cases involving discharges to surface waters, as EPA correctly notes, are already being addressed by a Clean Water Act program and therefore are irrelevant to whether EPA should go forward with RCRA Subtitle D regulations. *Id*. at 49718.

EPA reports a total of 135 allegations of damage cases that it received and reviewed. *Ibid*. It is important not to confuse alleged damage cases with proven damage cases, which number less than 18% of the total alleged. The Bevill Amendment is quite specific in defining the relevance of damage cases in regulatory decision-making. EPA may take into account damage cases only insofar as "documented cases in which danger to human health or the environment from surface runoff or leachate has been *proved*." *Ibid*. (emphasis added) (internal quotation marks omitted) (*quoting* RCRA § 8002(n)(4), 42 U.S.C. § 6982(n)(4)). Of the 135 alleged damage cases, four were not CCW sites, six involved mine placement, which is outside the scope of the NODA, and 62 were dismissed due to lack of evidence of damage or lack of evidence that the damage was caused by CCWs. 72 Fed. Reg. at 49719. EPA is quite right in focusing its attention on proven cases.

The totality of the data covered by this NODA show a dramatic change in the management of CCWs by utilities that warrant a fresh look at EPA's regulatory strategy for CCW disposal. The state-of-the-art controls at nearly all landfills and more than three-quarters of surface impoundments constructed since 1994, together with the increase in groundwater monitoring at existing disposal units, demonstrate the industry's response to EPA's concern in 2000 that "adequate controls may not be in place." 65 Fed. Reg. at 32216. The DOE/EPA Report documents the rigor in state

regulation of CCW disposal in most states. This should allay most of EPA's concerns about "significant gaps either in states' regulatory authorities or in their exercise of existing authorities." *Id*. at 32230. And the fact that nearly all the proven damage cases involving groundwater contamination have resulted in corrective action that has either been completed or is currently underway demonstrates that the industry and the states (and in a few cases, EPA) respond promptly where damage from CCW disposal can be proven. 72 Fed. Reg. at 49719.

In sum, EPA's concerns in the 2000 Bevill regulatory determination regarding the management of CCWs have largely been addressed through the advent of improved utility CCW management programs and the development of more robust state regulatory regimes. Any residual problems that remain plainly do not warrant the investment of federal resources necessary to develop and implement a national program. Such a program would be unnecessary and, equally important, disruptive to state regulatory regimes which have matured considerably over the past dozen years in their oversight of CCW disposal. To the extent that isolated problems arise, EPA and the states have ample authority to address these cases on a site-specific basis. In short, the concerns regarding CCW management identified by EPA in the 2000 regulatory determination have been dramatically reduced and no longer justify the resources necessary to develop a new federal regulatory program.

USWAG looks forward to continuing to work with the Agency as it studies the comments submitted in response to the NODA and prepares to make the regulatory decisions that are now ripe for resolution. Please direct any questions you may have or any requests for additional information to USWAG's Executive Director, James R.

Roewer, 202-508-5645, jim.roewer@uswag.org, or to USWAG counsel, William R. Weissman of Venable LLP, 202-344-4503, wweissman@venable.com. We thank you for giving these comments your careful consideration.

Appendix A

August 24, 2007

ACAA Releases 2006 CCP Production and Use Survey

The American Coal Ash Association today released its annual Coal Combustion Products (CCP) Production and Use Survey. CCPs are inorganic materials left over when coal is burned to generate electricity. They include fly ash, bottom ash, boiler slag, cenospheres as well as resulting air emission control system materials from flue gas desulfurization (FGD).

The data, reporting 2006 totals, originates from the voluntary responses of 58 electric utilities (approximately one-half of all coal-fired utility producers), past survey comparisons, U.S. Department of Energy information and other sources.

Results show that 124.8 million tons of CCPs were produced in 2006; slightly more than 43 percent were beneficially used rather than landfilled, an increase of 3 percent over 2005. The EPA and industry have jointly targeted a goal of 50 percent beneficial use by 2011.

Fly ash production in 2006 increased by 1.3 million tons over 2005 to 72.4 million tons. Almost 45 percent (32,423,569 tons) was used in 12 of 15 applications tracked by ACAA; an increase of about 5 percent from the previous year. Of the total used, 46 percent (15,041,335 tons) was consumed in concrete, concrete products and grout; an additional 4.1 million tons were consumed in cement production.

Flue gas desulphurization (FGD) materials include products from forced oxidation scrubbers and other processes that remove sulfur dioxide from the flue gas stream. FGD gypsum production was approximately 12.1 million tons of which 79 percent (9,561,489 tons) was used — mainly in gypsum panel products, such as wallboard. This is a slight increase (2.5%) over 2005.

Bottom ash production was 18.6 million tons of which 45 percent (8,378,494 tons) was used. Structural fills and embankments accounted for the largest application. Production figures increased by more than 1 million tons, while utilization increased about 4.5 percent as compared to 2005. Bottom ash, like fly ash, is widely used in many applications. Its primary applications are in structural fills and road base construction.

Boiler slag reached slightly more than 2 million tons of which 83 percent was used (1,690,999 tons) — a decrease from the 96.6 percent reported in 2005. Boiler slag is used primarily in blasting grit and as roofing granules, with lesser amounts in structural and asphalt mineral fills. The volume of available slag is expected to decline in the coming years as older cyclone and slag-tap boilers units are retired. (Please note that boiler slag statistics were not extrapolated.)

Comparisons of data from year to year are affected by the companies who voluntarily report data as well as the start or completion of projects from year to year. However, 2006 again reconfirms the multi-year trend of increasing utilization as more persons realize the value of using these valuable products.

ACAA is an active sponsor of the U.S. Environmental Protection Agency's Coal Combustion Products Partnership or "C^2P^2." This initiative helps promote awareness and understanding of the benefits of using CCPs to conserve natural resources, support sustainability, reduce greenhouse gas emissions and eliminate the need for added land fill space. Additional information about CCPs can be found at www.acaa-usa.org, www.FGDProducts.org, and www.epa.gov/epaoswer/osw/conserve/c2p2/.

American Coal Ash Association
15200 E. Girard Ave., Ste. 3050
Aurora, CO 80014-3955

Phone: 720-870-7897
Fax: 720-870-7889
Internet: www.ACAA-USA.org
Email: info@acaa-usa.org

2006 Coal Combustion Product (CCP) Production and Use Survey

CCP Categories (Short Tons)	Fly Ash	Bottom Ash	Boiler Slag*	FGD Gypsum	FGD Material Wet Scrubbers	FGD Material Dry Scrubbers*	FGD Other*	FBC Ash*
CCP Production Category Totals**	72,400,000	18,600,000	2,026,066	12,100,000	16,300,000	1,488,951	299,195	1,580,912
CCP Production Total								**124,795,124**
CCP Used Category Totals***	32,423,569	8,378,494	1,690,999	9,561,489	904,348	136,639	29,341	1,078,291
All CCP Used Total								**54,203,170**
CCP Use By Application******	**Fly Ash**	**Bottom Ash**	**Boiler Slag**	**FGD Gypsum**	**FGD Material Wet Scrubbers**	**FGD Material Dry Scrubbers**	**FGD Other**	**FBC Ash**
1. Concrete/Concrete Products /Grout	15,041,335	597,387	0	1,541,930	0	9,660	0	4,571
2. Cement/ Raw Feed for Clinker	4,150,228	925,888	17,773	264,568	0	0	0	0
3. Flowable Fill	109,357	0	0	0	0	9,843	0	0
4. Structural Fills/Embankments	7,175,784	3,908,561	126,280	0	131,821	0	0	360,115
5. Road Base/Sub-base/Pavement	379,020	815,520	60	0	0	249	0	453,602
6. Soil Modification/Stabilization	648,551	189,587	0	0	0	299	1,503	179,003
7. Mineral Filler in Asphalt	26,720	19,250	45,000	0	0	0	0	0
8. Snow and Ice Control	0	331,107	41,549	0	0	0	0	0
9. Blasting Grit/Roofing Granules	0	81,242	1,445,933	0	232,765	0	0	0
10. Mining Applications	942,048	79,636	0	0	201,011	115,696	0	0
11. Wallboard	0	0	0	7,579,187	0	0	0	0
12. Waste Stabilization/Solidification	2,582,125	105,052	0	0	0	0	27,838	81,000
13. Agriculture	81,212	1,527	0	168,190	0	846	0	0
14. Aggregate	271,098	647,274	416	0	0	0	0	0
15. Miscellaneous/Other	1,016,091	676,463	13,988	7,614	338,751	46	0	0
CCP Category Use Totals	**32,423,569**	**8,378,494**	**1,690,999**	**9,561,489**	**904,348**	**136,639**	**29,341**	**1,078,291**
Application Use To Production Rate	44.78%	45.05%	83.46%	79.02%	5.55%	9.18%	9.81%	68.21%
Overall CCP Utilization Rate								**43.43%**

Cenospheres Sold (Pounds):	**11,146,420**

* As submitted based on 57 percent coal burn.

** CCP Production totals for Fly Ash, Bottom Ash, FGD Gypsum, and Wet FGD are extrapolated estimates rounded off to nearest 50,000 tons.

*** CCP Used totals for Fly Ash, Bottom Ash, FGD Gypsum, and Wet FGD are per extrapolation calculations (not rounded off).

**** CCP Uses by application for Fly Ash, Bottom Ash, FGD Gypsum, and Wet FGD are calculated per proportioning the CCP Used Category Totals by the same percentage as each of the individual application types' raw data contributions to the as-submitted raw data submittal total (not rounded off).

Appendix B

Utility Solid Waste Activities Group
c/o Edison Electric Institute
701 Pennsylvania Avenue, NW
Washington, DC 20004-2696
202-508-5645
www.uswag.org

USWAG

August 31, 2005

HAND DELIVERY

Mr. Thomas P. Dunne
Principal Deputy Assistant Administrator
U.S. Environmental Protection Agency
Office of Solid Waste & Emergency Response (Mail Code 5101T)
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460

Re: Draft Utility Industry Action Plan for the Management of Coal Combustion Products ("CCPs")

Dear Mr. Dunne:

At your staff's suggestion, USWAG representatives met with Armond Cohen and Lisa Evans, respectively Executive Director and counsel for the Clean Air Task Force ("CATF"), on June 22, 2005, to brief them on the proposed Utility Industry Action Plan for the Management of Coal Combustion Products ("Action Plan"). I was joined at that meeting by Jim Meiers of Cinergy Corporation, the new chairman of USWAG's Ash Management & Solid Waste Committee, and by our counsel, Bill Weissman of DLA Piper Rudnick Gray Cary US LLP. Mr. Meiers previously participated in the development of the EPA/ASTSWMO Guide for Industrial Waste Management as a member of EPA's Industrial Waste Focus Group.

We viewed the meeting as an opportunity to seek common ground with CATF on the issues that our industry is working to address through the proposed Action Plan. We were under no illusion that the Action Plan would receive the CATF's enthusiastic endorsement, but approached the meeting hopeful that a mutual interest in advancing environmentally sound management of CCP disposal and addressing specific Agency concerns about past practices might provide common ground on which to support implementation of the Action Plan.

The dialog at the meeting was cordial and professional. We responded to all the questions posed by Mr. Cohen and Ms. Evans and in doing so conveyed substantial information on utility industry trends for CCP management. We also described the historical background of the Action Plan as an initiative proposed by the Office of Solid Waste to accelerate addressing the concerns expressed by EPA in the May 22, 2000 Bevill regulatory determination (65 Fed. Reg. 32214) more rapidly than would be possible through the rulemaking process, and also informed them, as your staff has informed us, that EPA's work on the pending RCRA Subtitle D

rulemaking would continue. Finally, we expressed USWAG's optimism that the vast majority of our member companies, as well as many nonmember utilities, would commit to the Action Plan.

Despite some criticism expressed by Ms. Evans about the scope of the Action Plan and a more general opposition to addressing environmental concerns through voluntary agreements, we took some comfort from a remark made by Mr. Cohen that the Action Plan could be a first step in a long-term "partnership" between USWAG and the CATF. In response, we invited Mr. Cohen to provide us with a written proposal of the type of "partnership" he envisioned. We were therefore dismayed when the only letter forthcoming from CATF was the letter to you (joined by the Hoosier Environmental Council) dated July 12, 2005, strongly opposing the Action Plan and sharply attacking our industry's good faith. We have written to Mr. Cohen (copy attached) expressing our disappointment with the CATF's caustic response to our initiative.

Mr. Cohen has since apologized for failing to send us his written "partnership" proposal and has provided us with a general outline of his ideas. However, given CATF's inability to discern anything positive in the Action Plan or in the industry's cooperation with the Agency's efforts to accelerate addressing the concerns expressed in the Bevill determination, we have regrettably concluded that the mutual trust essential for any partnership to work is simply not there. Given the wide gulf between us, any attempt to form a partnership at this time would retard addressing the issues EPA has asked us to address rather than accelerating the process. Notwithstanding the CATF's hostility to moving forward with the Action Plan, USWAG's desire to work with EPA and the States to implement the Action Plan is undiminished.

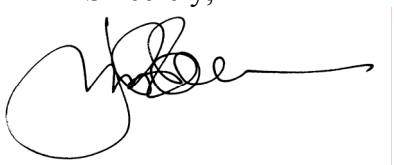
We have carefully reviewed the specific criticisms of the Action Plan contained in Attachment 1 of the CATF July 12 letter. In nearly all the criticisms, CATF objects to options that were drawn from EPA RCRA Subtitle D regulations or the Guide for Industrial Waste Management. In effect, CATF's criticisms are aimed at the Agency's rulemaking decisions in promulgating the Part 257 and 258 regulations and the Guide for Industrial Waste Management. The latter, as you know, was the product of a multi-year Federal/State effort in which industrial and citizen group stakeholders played an active role. When one reads the criticisms and juxtaposes them with the applicable provision in either the Part 257 or 258 rules or the industrial waste guidance document, it becomes apparent that the CATF opposes the Action Plan not because we have misapplied the Agency's RCRA Subtitle D policies, but because the CATF opposes the Agency's Bevill determination "that regulation of fossil fuel combustion (FFC) wastes under subtitle C of the Resource Conservation and Recovery Act (RCRA) is not warranted." 65 Fed. Reg. at 32215. In short, the CATF is still "fighting the last war."

To assist the Agency in its review of the CATF's criticisms, we have prepared a chart listing each of the CATF's criticisms of specific provisions of the Action Plan in the left column and identifying in the adjacent column to its right the corresponding regulatory source of the provision at issue. A copy of that chart is enclosed. In one case, the CATF was correct in pointing out that we had omitted one of several factors listed in the Part 258 rules for qualifying for an alternate compliance point for groundwater monitoring – "whether the ground water is currently used or reasonably expected to be used for drinking water". The omission was inadvertent. We propose to add the omitted factor to the Plan. In addition, we propose one other change that would move the Plan closer to the Agency's industrial waste guidance. We are enclosing a "strike and replace" version of the Action Plan that highlights the two changes.

One other message comes through from the CATF letter. In restating their demand that the Agency promulgate a comprehensive set of RCRA regulations, they fault the Action Plan for failing to address a range of subjects covered by the Part 258 municipal solid waste landfill rules and the Subtitle C regulatory program, such as financial assurance, closure, and post-closure. During our briefing, we explained to the CATF representatives that the Agency staff had asked us to focus only on the subjects of concern identified in the May 2000 Bevill determination and that the Agency's rulemaking agenda was focused on filling gaps in state regulatory programs, not in supplanting the states' primary responsibility for nonhazardous solid waste regulation where no gaps or concerns had been identified. Again, it is apparent that the CATF's broad agenda is for EPA to supersede state regulatory policy regarding CCP waste management with a comprehensive Federal regulatory program akin to the Agency's RCRA Subtitle C jurisdiction. There can be no doubt that the states would have strong objection to such an agenda. And it is also clear from EPA's own statements in the Bevill determination that supplanting the states as the primary regulatory authority over CCP waste management is not the Agency's intention. *See*, *e.g*., 65 Fed. Reg. at 32217 ("EPA believes that subtitled D controls will provide sufficient clarity and incentive for *states* to close the remaining gaps in coverage" (emphasis added)).

If you or your staff have any further questions about the Action Plan, please do not hesitate to call us.

Sincerely,



James R. Roewer
Executive Director

Enclosures

cc: Matthew Hale
Lillian Bagus
Thea McManus
Richard Kinch

RESPONSE TO CATF/HEC CRITICISM OF ACTION PLAN

CATF/HEC Concerns from Attachment 1	Source of Action Plan Provision
1.a CATF argues the Action Plan performance standard should not be limited to constituents with primary MCLs.	The Action Plan adopts the monitoring criteria approach proposed by EPA staff and is consistent with the groundwater monitoring criteria set forth in 40 C.F.R. Part 257 for solid waste disposal facilities. Facilities must monitor constituents to ensure that the disposal unit is not causing an exceedance of an MCL specified in Appendix I to the regulation. *See* 40 C.F.R. § 257.3-4(a) (facilities "shall not contaminate an underground drinking water source..."); § 257.3-4(c)(2)(i) (defines "contaminate" as an MCL exceedance). In addition, the design criteria in § 258.40(a)(1) "must ensure that the concentration values listed in Table 1 of this section will not be exceeded in the uppermost aquifer at the relevant point of compliance . . . ." Table 1 lists chemicals with MCLs.
1.b. The Action Plan performance standard applies to "a designated drinking water source aquifer." CATF believes this standard is too narrow in scope.	The Action Plan is based on the ground water performance standard in 40 C.F.R. § 257.3-4(a): "facility . . . shall not contaminate "an underground *drinking water source*" (emphasis added).
1.c. CATF criticizes the Action Plan provision that allows an "appropriate government agency" to approve an alternative groundwater performance standard. CATF alleges this provision is "too loose", is "vaguely described", and is not as stringent as the Part 258 requirements.	CATF is correct in pointing out that the Action Plan omits one of several factors listed in 40 C.F.R. § 258.40(d) for qualifying for an alternative compliance point for groundwater monitoring. The omission was inadvertent. We propose to add the omitted factor to the Plan.
2.a. CATF again argues the Action Plan performance standard should not be limited to constituents with primary MCLs.	See comment in response to 1.a.
2.b. CATF objects to semi-annual groundwater monitoring. Its preference is for quarterly monitoring.	Parts 257 and 258 both call for semi-annual monitoring. 40 C.F.R. §§ 257.24(b), 258.54(b). CATF's call for quarterly monitoring as a baseline standard is not consistent with either the regulations or the Industrial Solid Waste Subtitle D Guide (p. 9-16 Table 3).
2.c. CATF argues that Action Plan standards for state-issued waivers to groundwater monitoring are not as stringent as those found in 40 C.F.R. § 258.50(b), which lets states "suspend" MSWLF monitoring requirements if owner demonstrates that there is "no potential for migration of hazardous constituents to uppermost aquifer during the active life of the unit and the post-closure care period."	The Action Plan adopts the basic approach taken in the "suspension" provisions found at 40 C.F.R. §§ 257.21(b) and 258.50(b) but linked to the performance standard in section III of the Action Plan: "the national primary drinking water maximum contaminant levels ('MCLs') occurring at the lesser of 150 meters from the CCP Unit boundary or the property boundary . . . ." A regulator may grant a waiver upon demonstration of no potential for violating the performance standard (or a state-approved alternative performance standard). The scope of many state groundwater monitoring programs extend beyond national primary drinking water MCLs, and given the confirmation in section II of the Action Plan that the Plan does not supersede state, local or tribal laws, rules, or permit conditions, those states with broader requirements are likely to tailor their groundwater waiver standards to those state or local standards.
2.d. CATF asserts that Action Plan provision that allows a "reasonable" period of time to determine whether there has been a statistically significant increase in constituent levels is not definite enough and that a specific time frame should be set.	The Action Plan follows the language in 40 C.F.R. §§ 257.23(i)(2) and 258.53(i)(2): "*Within a reasonable period of time* after completing sampling and analysis, the owner or operator must determine whether there has been a statistically significant increase over background at each monitoring well" (emphasis added**).** *See* Action Plan § IV.B.

RESPONSE TO CATF/HEC CRITICISM OF ACTION PLAN

2.e. CATF asserts that "assessment monitoring" is "not defined", "its parameters are not determined", and "does not automatically lead to detection monitoring (sic) when assessment monitoring confirms contamination."	The Subtitle D Guide advocates a stepwise approach to assessment monitoring that is adopted in the Action Plan. The Action Plan specifies that assessment monitoring standards are to be determined in consultation "with the appropriate governmental agency." Action Plan § IV.B. Once a statistically significant increase in one or more sampling parameters is detected, the Guide recommends steps to verify whether the change is attributed to factors unrelated to the unit. *See* Guide at pp. 9-46 - 9-47. If another source of the exceedance is verified or subsequent sampling demonstrates no statistically significant change, then the Guide recommends resuming the original detection monitoring schedule. *Id. See also* 40 C.F.R. §§ 257.25(e), 258.55(e). However, if the statistically significant increase is confirmed and attributed to the unit, the Guide recommends coordination with State officials to determine the next steps. This is the approach used in the Action Plan. Confirmation of an exceedance of the assessment monitoring groundwater monitoring performance standard must be reported to regulators within 90 days to coordinate and determine an appropriate course of action. Action Plan § IV.B. [CATF mistakenly refers to the next steps as detection monitoring when assessment monitoring confirms contamination.]
2.f. CATF complains that assessment monitoring is triggered only when exceedances are detected "during two consecutive semi-annual monitoring events", which may not result in assessment monitoring for more than a year.	Although CATF has overstated the amount of time that would elapse after a CCP disposal unit confirmed a statistically significant increase over background for one or more monitoring constituents and establishment of an assessment monitoring program, we have concluded that "two consecutive semi-annual monitoring events" (Action Plan § IV.B) may be longer than necessary to confirm that an elevated reading is not the result of sampling error or otherwise unrelated to the unit. The Industrial Solid Waste Guide sets forth a reasonable schedule for determining whether it is necessary to establish an assessment monitoring program. Subtitle D Guide at 9-46. We propose to modify the Action Plan along the lines suggested by the Guide.
2.g. No explicit requirements for corrective action in the plan even after contamination of groundwater is determined. A reference is made to the corrective action requirements in 40 C.F.R. Part 258, but the requirement is unclear.	The CATF criticism is wholly without foundation. Section IV.B. explicitly states that "[i]f assessment monitoring and analysis confirms a statistically significant CCP-derived increased over background that exceeds Groundwater Performance Standards for one or more constituents, then a participating owner or operator shall, within 90 days of such confirmation, consult with the appropriate governmental agency and begin to develop a risk-based management plan to address contamination."
3. CATF complains that the prohibition of placement of CCPs into sand and gravel pits without appropriate site-specific engineering and management controls is not a full prohibition, does not specify safeguards, and does not prohibit placement into groundwater.	While it is true that many of the damage cases involve sand and gravel pits, appropriate engineering and management controls were lacking in these cases. Any future CCP placement in sand and gravel pits would require controls to protect groundwater and would be subject to the groundwater performance standard in section III of the Action Plan. Although we agree that placement of CCPs in groundwater would not be a sound management practice in many circumstances, a blanket prohibition is unwarranted. Whether such a practice is sound in a given situation and will not thwart achievement of the groundwater protection standard in the Action Plan should be determined on a case-specific basis.

RESPONSE TO CATF/HEC CRITICISM OF ACTION PLAN

4.a. CATF faults the Action Plan for not prohibiting construction or expansion of surface impoundments at new and existing power plants, or alternatively require a set of mandatory safeguards at new and expanded surface impoundments.	CATF appears to be unaware that existing EPA regulations have established a zero discharge standard for fly ash surface impoundments at new sources. *See* 40 C.F.R. **§** 423.15(g). As a practical matter, this will make the construction of new surface impoundments at facilities subject to those regulations difficult, if not impossible, to permit. CATF may also be unaware that increasingly restrictive discharge standards at NPDES-regulated impoundments will make continued management of CCPs in ash ponds problematic over time. The requirement in the Action Plan to "consider" the option of dry handling for fly ash prior to constructing a new landfill or surface impoundment on utility property will result in utilities having to explain the result of their consideration to state permitting authorities.
4.b. CATF believes the requirement to retain records of "consideration" the option of dry handling for fly ash prior to constructing a new landfill or surface impoundment on utility property in accordance with established records retention policies is meaningless.	CATF is apparently unaware that many states have rules regarding the retention of records generated in connection with state regulatory activities, such as permitting. Even if such regulations did not apply to the documents generated during such consideration, every company has internal record retention policies and the Action Plan constitutes a commitment to adhere to such a policy. A utility company participant in the Action Plan would be putting its permit application for a new impoundment at risk if the state permit authority requested evidence of such consideration and the company was unable to produce such records.
5. CATF complains that the Action Plan fails to address other subject areas such as closure, post-closure and financial assurance.	CATF has misunderstood the nature and scope of the Action Plan. The scope was intended to address areas of concern identified in the 2000 Bevill regulatory determination and to supplement state programs where gaps in those programs were identified. EPA has never suggested that its Subtitle D rulemaking would cover the full range of management standards for CCP disposal facilities or supplant state regulatory programs. *See*, *e.g.*, 65 Fed. Reg. 32214, 32217 (May 22, 2000) ("EPA believes that subtitle D controls will provide sufficient clarity and incentive for states to close the remaining gaps in coverage").

Appendix C

Utility Solid Waste Activities Group
c/o Edison Electric Institute
701 Pennsylvania Avenue, NW
Washington, DC 20004-2696
202-508-5645
www.uswag.org

USWAG

August 23, 2005

Mr. Richard J. Kinch
Chief, Industrial & Extractive Waste Branch
U.S. Environmental Protection Agency
Municipal and Industrial Solid Waste Division
Office of Solid Waste (Mail Code 5306W)
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Re: Supplemental Information Submission and Request Regarding CCP "Proven" Damage Cases - RCRA Docket No. RCRA-2003-0003

Dear Mr. Kinch:

I am writing to follow up on our previous discussions regarding USWAG's desire to supplement the proposed RCRA Subtitle D rulemaking record with respect to sites that EPA believes are "proven" CCP damage cases. In particular, we wish to clarify the record as it relates to sites where alleged damage occurred in the past but has since been resolved to the satisfaction of regulatory authorities. While these sites may technically meet EPA's "proven" damage case criteria, they do not reflect conditions or legal requirements applicable to current CCP management and, therefore, are not relevant to EPA's goal of addressing "regulatory gaps" in the Bevill rulemaking process.

To this end, USWAG is engaged in collecting new documents and information from our members on certain damage case sites and reviewing existing information on those sites in the rulemaking docket. Based on these efforts to date, we have prepared the enclosed document titled "USWAG Supplement Information and Request" regarding 10 sites that are listed by EPA as "proven" damage cases that we believe have been "resolved" to the satisfaction of the applicable regulatory authorities. The document provides a brief background summary for each site, describes response/corrective action(s) that have been taken to date, and includes copies of source documentation that are attached as Exhibits.

To the extent that our members were able to provide estimates of funds expended in conducting response activities at these 10 sites, we have included that

information. However, response activities at many of these sites date back over many years, even decades, and our members who were able to provide cost information used a variety of methods to track and estimate those costs. Accordingly, the cost figures provided should be considered site-specific estimates which are not appropriate for making industry-wide comparisons or assumptions. If you or others at the Agency have any specific questions regarding costs incurred at a particular site, please let us know and we will do our best to provide an answer.

We believe all of the sites identified in the attached documents warrant reclassification by EPA as resolved to the satisfaction of regulators. Additionally, while conducting this site-by-site review, we developed information that calls into question EPA's original basis for listing several sites on the CCP damage case list. In such instances, we present the information and ask the Agency to remove the site from EPA list of proven CCP damage cases.

In trying to clarify issues related to specific damage case sites, we have gained a greater appreciation of the difficulty that EPA has experienced in the past trying to resolve the many damage case allegations. We are continuing to collect information on sites and will supplement this submittal as new information is developed.

In the meantime, we look forward to EPA's response to the requests made in the attached document. If you have any questions or need additional information on these sites, please do not hesitate to contact me.

Sincerely,

James R. Roewer
Executive Director

Enclosures

cc: Thea McManus (without Exhibits)
Alexander Livnat (without Exhibits)

USWAG Information Submittal & Request
For Reclassification/Removal of "Proven" Damage Cases

1. Martin Creek Reservoir, Texas

a. Background. Martin Creek reservoir was constructed in the early 1970s to provide cooling water for a lignite coal-fired power plant then being constructed by the Texas Utilities Generating Company (now TXU Power). In 1976, TXU provided over 280 acres on the reservoir to the State of Texas for the creation of Martin Creek Lake State Park, which opened to the public that same year. *See Texas Department of Parks and Wildlife (TPWD) Pamphlet* (Exhibit 1).

The first of three operating units at TXU's new Martin Lake Steam Electric Station came on-line in 1976, followed by the second in 1978, and the last in 1979. During the initial start-up phase of the power plant, it was discovered that the stormwater management design resulted in periodic overflows of water from the plant's coal combustion product (CCP) management ponds to the reservoir. *See Letter from Jeffrey Saitas, Executive Director of the Texas Natural Resource Conservation Commission (TNRCC) to Elizabeth Cotsworth, EPA Office of Solid Waste* (Apr. 5, 2000) ("TNRCC Letter to EPA") (Exhibit 2). As discussed below, TXU worked closely with the TNRCC (now called the Texas Commission on Environmental Quality or TCEQ) to change the design and operating procedures of the new plant to eliminate uncontrolled discharges from the CCP storage ponds.

In 1978 and 1979, during the start-up phase of the plant, the Texas Parks and Wildlife Department (TPWD) reported incidents of fish kills, which it attributed to elevated levels of selenium. *See TPWD Report on Monitoring of Fish in Texas Reservoirs* (1988) (Exhibit 3). Because the water discharged from the CCP ponds were known to include selenium, TPWD implicated the CCP ponds as the source of elevated selenium in the water and fish in the reservoir during the start-up phase. *See id.,* p. 1, *citing* Garrett, G.P. and Inman, C.R., *Selenium Induced Changes in Fish Populations of a Heated Reservoir*, Presented at Southeastern Association of Fish and Wildlife Agencies, New Orleans, Louisiana, Nov. 18-21 (1984). As a result, TNRCC reported to EPA that the discharges from the CCP ponds "likely contributed" to the fish morbidity recorded at the reservoir. *TNRCC Letter to EPA,* p. 3.

b. Corrective Measures Completed. During and after plant start-up, TXU worked with the State to modify plant design and operations to prevent further uncontrolled discharges from the CCP management ponds. *See TNRCC Letter to EPA,* pp. 2-3. TXU implemented a number of design and management improvements, including increasing freeboard capacity of its CCP management ponds, lining ponds with synthetic membranes, installing leak detection systems, monitoring ground and surface water, and biomonitoring of fish. *See id.* These changes have been incorporated into the facility's operating permit. *See id., p. 2.*

In 2000, the TNRCC, reported to EPA that TXU's plant had implemented proper design and operational changes in response to those early discharges from the CCP management ponds. *See id.,* pp. 2-3. The TNRCC confirmed that monitoring of fish tissue pursuant to TXU's operating permit have not indicated aquatic toxicity from selenium that could be attributed to the discharges from the CCP ponds. *Id.* Additionally, the TNRCC detailed significant changes in the laws, regulations, and permit requirements that have been implemented since the late 1970s and concluded that the State's laws and requirements effectively regulate the management of CCPs and that additional federal regulation is unwarranted. *See id.,* pp. 1-3.

c. Additional Issues. EPA's record regarding the Martin Creek reservoir needs to be updated and corrected to reflect the information presented above. In its 2000 report concluding that Martin Creek was a proven ecological damage case, SAIC states:

> *This lake is a cooling water reservoir for a power plant and was the site of a series of major of fish kills in 1978 and 1979. Investigations determined that unpermitted discharges from ash settling ponds resulted in elevated levels of selenium in the water and fish. The TPWD monitoring program continues to document elevated levels of selenium in and other metals in fish at the lake. The Texas Commissioner of Health has issued a fish consumption advisory for this lake. There is also evidence of elevated selenium concentrations in birds nesting near the lake.*
>
> *Conclusion: Based on the conclusions of scientific investigations and continued response of the TPWD, the case appears to be a damage case.*

See Letter Report from SAIC to Dennis Ruddy, p.23 (Apr. 20, 2000) (*SAIC Report*) (Exhibit 4).

SAIC's conclusion implies TPWD conducted an investigation or relied on scientific evidence demonstrating that elevated levels of selenium in surface water and fish mortality was caused by discharges from the CCP ponds. This is not correct. As indicated above, TPWD concluded that the discharges to the Martin Creek reservoir during start-up resulted in elevated levels of selenium in the lake based on unpublished presentation (Garrett *et al.* cited above) which neither proves a causal link between the CCP discharges and the fish mortality, or addresses other potential causes of elevated selenium or the observed fish mortality such as loadings of selenium from other natural and man-made sources (*e.g.,* natural sediment levels, lignite mining), seasonal changes in water characteristics like temperature and water levels. *See, e.g., TPWD Report on Monitoring of Fish in Texas Reservoirs,* pp. 4-9 (documenting elevated levels of selenium in other Texas lakes not associated with CCP management); *ATSDR Health Consultation for Martin Creek Reservoir*, Discussion Section (Sept. 17, 1998) (rocks and soil are a natural source of selenium levels in water) (Exhibit 5).

Thus, while the State of Texas has expressed that the early releases from the CCP ponds "likely" contributed to increased selenium levels in surface water and fish mortality *(see TNRCC Letter to EPA,* p. 3.), this statement is not based on any scientific evidence. USWAG could not identify any report, investigation, or data in the record which either (1) documents increased levels of selenium in Martin Creek reservoir surface water, or (2) demonstrates that the discharges from CCP units were the source of the fish mortality or linked in any way to elevated levels of selenium in birds nesting near the reservoir. Moreover, the record is completely devoid of any evidence that alternative sources of selenium were ever considered or assessed.

Regardless of the source of selenium, the State of Texas has since determined that the elevated levels of selenium detected in fish at Martin Creek reservoir have not and do not pose a risk to humans. In 2003 the Texas Department of Health (TDH) (now the Texas Department of State Health Services or DSHS) published an updated assessment of potential health risks associated with the consumption of fish taken from Martin Creek reservoir. *See TDH Quantitative Risk Characterization of Martin Creek Reservoir* (Sept. 24, 2003) (Exhibit 6). In its report on the study, TDH concluded that based on advances in biology of selenium, the better understanding of the levels of selenium that cause toxicity, new information on the benefits of selenium consumption and typical dietary levels of selenium consumption, and the availability of nationally promulgated referenced doses for selenium, it had determined that the State's appropriate health-based assessment comparison (HAC) value for fish tissue should have been set at 6 mg/kg, not the 2 mg/kg that applied to Martin Creek in the past. *See id.,* p. 15. TDH determined the 6 mg/kg HAC value still provided a two-fold margin of safety for public consumption. *See id.,* p. 11.

TDH analyzed all the data from fish tissue samples taken from the Martin Creek reservoir over a nineteen year period (1984 to 2003). The study found that the average selenium level in fish taken from the reservoir during this period was 2.45 mg/kg, or less than half of TDH's HAC value (6 mg/kg) for selenium. *Id.,* pp. 11-12, 15-16. The average selenium level in fish taken from the reservoir in 2002 1.6 mg/kg, or about a quarter of the HAC. *Id.,* p. 15. Based on these findings, TDH concluded that fish in the reservoir were not adulterated with selenium or any other chemical contaminants that posed a risk to public health. *Id.,* p. 16. As a result of TDH's study, the State (1) rescinded a previously issue fish advisory on selenium for the reservoir (*see* TCEQ Press Release dated October, 14, 2003 (Exhibit 7), and (2) removed the reservoir from the State's Clean Water Act § 303(d) list of impaired waters. *See TCEQ Fact Sheets On Draft 2004 Texas Water Quality Inventory* (selenium parameter removed from 303(d) List and fish consumption fully supported for three Texas lakes at issue) (Exhibit 8). The findings of the TDH study demonstrate that while the selenium levels in Martin Creek reservoir were elevated over those typically found in freshwater lakes, they did not pose a risk to human health dating back to the early 1980s.

d. Requests by USWAG. Based on the information and documentation cited above, USWAG requests that EPA remove Martin Creek reservoir from the list of CCP damage cases. Alternatively, if EPA denies this request and maintains the

reservoir on the damage case list, USWAG requests that EPA identify Martin Creek in the docket as a site where the previously identified damage has been resolved to the satisfaction of the State.

2. Welsh Reservoir, Texas

a. Background. Welsh reservoir was created in 1976 to provide cooling water for the Southwestern Electric Power Company (SWEPCO) Welsh Power Plant. The Welsh Plant was constructed thereafter and began operating in the late 1970s. The plant manages CCPs in surface impoundments that discharge water into the reservoir pursuant to a Clean Water Act National Pollution Discharge Elimination System (NPDES) permit. The plant has operated the CCP ponds in compliance with that permit; no unpermitted or uncontrolled discharges involving selenium from Welsh Power Plant are documented in the record.

Shortly after the plant began operating, TPWD detected elevated selenium levels in fish tissue the nearby Martin Creek reservoir (*see* Section 1 above). As a result, TPWD sampled other nearby cooling water reservoirs, including Welsh. *See TDH Quantitative Risk Characterization of Welsh Reservoir,* p. 3 (Sept. 29, 2003) (Exhibit 9). The sampling at Welsh also disclosed elevated levels of selenium in fish tissue as compared to other freshwater lakes. *See TPWD Report on Monitoring of Fish in Texas Reservoirs*, pp. 4-9.

b. Facility Response. When the selenium issue was first raised, the Welsh Plant was operating in compliance with applicable CCP pond discharge requirements. There is nothing in the record to indicate that an unpermitted or uncontrolled discharge from the facility was the source of selenium detected in the reservoir. Nevertheless, SWEPCO (now a division of American Electric Power) voluntarily worked with the State in the early 1980s to investigate whether the plant was a potential source of selenium. *See id.,* p. 6. TPWD noted that the Welsh Plant burned bituminous rather than lignite coal, which has a lower content of selenium. *Id.* It also reported on 1982 sediment sampling was conducted under the Plant's permit to determine the effects of discharges from the ash ponds on the reservoir. These samples are important evidence because they show low levels of selenium – 1 mg/kg or less at all sampling points. *Id.* TPWD affirmed that these levels were <u>not regarded as indicative of selenium contamination</u>. In the absence of scientific evidence demonstrating that the ash ponds were the source of the selenium (or evidence ruling out other potential sources of selenium) the only statement that TPWD was willing to make on the issue of selenium source identification at Welsh was that the CCP pond discharges "*may be a source* for the elevated levels of selenium in fish from the Welsh reservoir." *Id.,* pp. 8-9.

Nevertheless, in response to selenium concerns, the Welsh Plant worked thereafter in coordination with TNRCC to modify its plant design and operations to prevent any such discharge from occurring. *See TNRCC Letter to EPA*, pp. 2-3. In April 2000, the TNRCC reported to EPA its satisfaction with the design and operational

changes at the Welsh Plant in response to concerns about selenium. *Id*. Additionally, the report to EPA from TNRCC details the significant changes in the laws, regulations, and permit requirements that have been implemented since the late 1970s and concludes the State's laws and requirements effectively regulate the management of CCPs and additional federal regulation is unwarranted. *See id.,* pp. 1-3.

c. Additional Issues. EPA's record regarding the Welsh reservoir is incomplete, both with respect to relevant historical facts from the early 1980s and with respect to new studies and conclusions reached by the State of Texas regarding the site. In its 2000 report concluding that Welsh was a "proven" ecological damage case, SAIC states:

> *Serving as a cooling reservoir for a power plant, this lake receives discharges from an open ash settling pond system. The Texas Parks and Wildlife Department (TPWD) monitoring program documents elevated levels of selenium and other metals in fish and the Texas Commissioner of Health has issued a fish consumption advisory for selenium. The TPWD's report concludes that "discharges from the open ash settling ponds may be the source of the elevated levels of selenium in fish."*
>
> *Conclusion: Based on the conclusions of the TPWD, this case appears to be a damage case.*

See SAIC Report, p. 23.

As described above, TPWD's statement that the CCP ponds "may be a source" of selenium was not a conclusion, but rather an acknowledgement that the facts do not provide a basis to conclude that the discharges from the ponds at Welsh caused the increased selenium levels. The only scientific investigation documented by TPWD on source identification (*i.e.,* the sediment sampling conducted in 1982 to determine if the ash ponds were as source of selenium loadings) indicates that the ponds were *not* a source. Moreover, the record is completely devoid of any evidence that alternative sources of selenium were ever considered or assessed.

Regardless of the source of selenium, a study issued by TDH in September of 2003 (after EPA made its finding of proven damage) demonstrated that there is no evidence of damage based on human health risk at Welsh reservoir. *See TDH Quantitative Risk Characterization of Welsh Reservoir,* pp. 11-16. As with its study on Martin Creek reservoir, TDH concluded that based on advances in biology and toxicology of selenium, it concluded the State's appropriate HAC value for fish tissue should have been set at 6 mg/kg, not the 2 mg/kg calculated in the 1980s. *Id.,* p. 15. TDH determined the 6 mg/kg HAC value still provided a two-fold margin of safety for public consumption. *See id.,* p. 11.

TDH collected additional fish tissue from Welsh reservoir and analyzed it along with data from fish tissue sampling at Welsh dating back to 1986. *See id.,* p. 12. Based

on this analysis, the Department concluded that consuming fish from the reservoir posed no apparent health risk. *Id.,* p. 15. The report analyzed all the data from fish tissue samples over a 19 year period (1986 to 2003). The study found that the average selenium level in fish taken from the reservoir during this period was 3.6 mg/kg, well below the TDH HAC value of 6 mg/kg for selenium. *Id.,* p. 12. The average selenium level in fish taken from the reservoir in 2003 was even lower at 1.85 mg/kg. *Id.,* p. 15. Based on these findings, TDH concluded that fish in the reservoir were not adulterated with selenium or any other chemical contaminants and posed no threat to public health. *Id.,* p. 16. As a result of TDH's study, the State (1) rescinded a previously issued fish advisory on selenium for the reservoir (*see* TCEQ Press Release) and (2) removed the reservoir from the State's Clean Water Act § 303(d) list of impaired waters. *See TCEQ Fact Sheets On Draft 2004 Texas Water Quality Inventory.*

The findings of the TDH study demonstrate that while the selenium levels in fish from Welsh reservoir were higher than those typically found in freshwater lakes, they did not pose a risk to human health or the environment dating back to the early 1980s. Moreover, there is no evidence in the record linking any other metals associated with CCP management at the Welsh Plant to any health or ecological damage.

d. Requests by USWAG. Based on the foregoing information and documentation, we request that EPA remove Welsh reservoir from the list of CCP damage cases. Alternatively, if EPA denies this request and maintains Welsh on the damage case list, USWAG requests that EPA reclassify the reservoir as a site where the previously identified damage has been resolved to the satisfaction of the State.

3. Brandy Branch Reservoir, Texas

a. Background. Brandy Branch reservoir was constructed in 1983 to provide cooling water to the SWEPCO H.W. Pirkey steam electric power plant. The Pirkey Plant was constructed thereafter and began operating in 1985. It is important to note that the Pirkey plant was constructed several years after the issue of elevated selenium levels at the Martin Creek and Welsh reservoirs was first identified (*see* Sections 1 and 2 above). SWEPCO took steps to prevent the potential discharge of water from CCP ponds into the Brandy Branch reservoir by designing the Pirkey plant with a closed-loop ash management system, which prevented the discharge of effluent to the reservoir from ash-handling activities. The plant also has lined ash ponds, leak detection systems, and a program to monitor ground and surface water, as well as the tissue of fish taken from the reservoir. *See TNRCC Letter to EPA,* pp. 2-3.

The investigations into selenium levels at Martin Creek led TPWD to conduct sampling in the Brandy Branch reservoir, where elevated levels of selenium fish tissue were also detected. *See TDH Quantitative Risk Characterization of Brandy Branch Reservoir,* p. 3 (Sept. 29, 2003) (Exhibit 10). Plant personnel determined that drainage from the Plant's lignite storage stormwater runoff basin may have been a potential source of selenium loading to the reservoir. However, there was no information to link ash handling at Pirkey with the elevated selenium levels. As indicated above, the close-

loop ash management system at Pirkey prevents ash-handling water from being discharged into the reservoir and, thus, was not a source of the elevated selenium levels at issue.

b. Facility Response. In the late 1990s, the Pirkey plant altered its lignite coal storage practices to prevent the potential discharge of coal pile stormwater runoff into the reservoir. The plant converted discharge from the lignite runoff base for use as make-up water for the flue gas desulfurization system. The Executive Director of the TNRCC expressed the agency's satisfaction with the design and operation of Brandy Branch in a letter to EPA dated April 5, 2000. *See TNRCC Letter to EPA,* pp. 1-3.

In 2003, TDH published an assessment of potential health risks associated with the consumption of fish taken from Brandy Branch reservoir. *See TDH Quantitative Risk Characterization of Brandy Branch Reservoir*. As with its assessments of the Martin Creek and Welsh reservoirs, TDH concluded that consuming fish from the Brandy Branch reservoir does not pose any risk to human health. *Id.,* p. 15. The report analyzed all the data from fish tissue samples taken from reservoir over an 18 year period (1986 to 2003). *Id.,* p. 12. The study found that the average selenium level in fish taken from the reservoir during this period was 2.23 mg/kg, or less than half of TDH's hazard assessment comparison (HAC) value (6 mg/kg) for selenium. *Id.,* pp. 11-12. The average selenium level in fish taken from the reservoir in 2002 was even lower, recorded at 0.76 mg/kg. *Id.,* p. 13. Based on these findings, TDH concluded that fish in the reservoir were not adulterated with selenium or any other chemical contaminants and posed no threat to public health. *Id.,* p. 16. As a result of TDH's study, the State (1) rescinded a previously issued fish advisory on selenium for the Brandy Branch reservoir (*see* TCEQ Press Release), and (2) removed Brandy Branch from the State's Clean Water Act § 303(d) list of impaired waters. *See TCEQ Fact Sheets On Draft 2004 Texas Water Quality Inventory*.

c. Additional Issues. In its April 2000 report to EPA, SAIC cites to a TPWD report which characterizes the ash-handling system at Brandy Branch as "closed" and that input from the reservoir is limited to "a small number of permitted outfalls". *See SAIC Report*, p. 23. Based on the uncertainty expressed in the TPWD report about the source of elevated selenium in the reservoir, SAIC concluded that there was insufficient evidence to conclude that Brandy Branch is a damage case. *Id.* While incomplete in its reasoning, SAIC's conclusion was correct. As indicated above, the Pirkey plant has a closed-loop ash handling system that prevents effluent from ash management operations from being discharged into the reservoir. While there were historic discharges of stormwater from lignite coal storage areas at Pirkey that potentially contained selenium, there is no evidence in the record of any discharge of water from the closed-loop ash management system into the reservoir.

Nevertheless, in June 2003, SAIC reversed itself by erroneously concluding "a direct discharge from ash ponds into [Brandy Branch] reservoir resulted in increased selenium levels in the water body" and designating the reservoir a "proven" CCP damage case. *See Brandy Branch Reservoir Summary* (Jun. 19, 2003) (Exhibit 11).

The only basis in the record to explain SAIC's action is found in comments filed by the HEC on September 19, 2000, responding to the April 2000 SAIC report. *See Letter from Brian Wright and Jeff Stant to EPA, RCRA Docket* No. F-2000-FF2F-FFFFF, pp. 15-16 (Exhibit 12). In addressing Brandy Branch, the letter states "selenium contamination from water sluiced from CCW surface impoundment [sic] led Texas Parks and Wildlife Department (TPWD) to declare a selenium fish consumption advisory for the reservoir." *Id.,* p. 15. The letter goes on to allege that HEC contacted "Kirk Wiles at TPWD" and that Mr. Wiles confirmed TPWD had decided with "no uncertainty" that the discharge from a CCW impoundment was responsible for the elevated selenium levels in Brandy Branch. *Id.* HEC's letter concludes by alleging that SAIC's first report on Brandy Branch in April 2000, which concluded that the site was not a damage case, had "deliberately cast doubt on the source of the selenium contamination when none exists among the TPWD."

Other than the report of HEC's conversation with Mr. Wiles, there is nothing in the record to support the allegation that CCP ponds discharged water into Brandy Branch. Accordingly, we contacted Mr. Wiles in an effort to resolve the inconsistency between HEC's allegations and the fact that Pirkey has a closed-loop system that does not discharge into the reservoir. Mr. Wiles advised (1) that he never made the statements that were attributed to him by HEC in its June 2003 letter to EPA; (2) he has never worked for TPWD (he works for the Texas Department of State Health Services – previously called TDH); (3) the scope of TDH's investigations at Brandy Branch (and all the reservoirs) were limited to documenting selenium levels in fish tissue samples and that TDH did not determined the source of elevated levels of selenium detected in those samples; and (4) he does not recall any specific conversation with Mr. Stant or HEC during which he gave an opinion on the question of the source of selenium levels detected in Brandy Branch surface water or fish tissue. Mr. Wiles can be reached at (512) 719-0215.

d. Request by USWAG. Based on the foregoing information and documentation, USWAG requests that EPA remove Brandy Branch from the damage case list.

4. <u>Belews Lake, North Carolina</u>

a. Background. Belews Lake is a man-made reservoir created in 1972 to provide make-up and cooling water for Duke Power's Belews Creek Steam Station (BCSS) located near Walnut Cove, North Carolina. BCSS became operational in 1975 and, in accordance with regulatory requirements existing at the time, the plant discharged CCP pond water into the reservoir. In the late 1970s and early 1980s, elevated levels of selenium were detected in water and fish taken from the reservoir.

b. Corrective Measures Completed. In 1984, Duke invested approximately $2 million (1984 dollars) in a major plant modification at BCSS. *See Evaluation of SAIC Report Submitted to EPA by Duke Power*, pp. 3-4 (Oct. 27, 2000) (Exhibit 13). Duke's modifications included converting BCSS operations from wet sluicing of ash to a dry ash

handling system and the construction of a 20 acre landfill. *Id.* The annual operation and maintenance cost for dry ash handling operations at BCSS is approximately $500,000 per year. *Id.* Since these changes were made to the plant, selenium levels in water and fish taken from the reservoir have decreased and fish diversity has increased. *Id.* In 2000, based on these improvements, the State of North Carolina rescinded the fish advisory on Belews Lake in 2000. *See Report from U.S. EPA National Listing of Fish Advisories* (Exhibit 14). The lifting of the selenium advisory for all species of fish for Belews Lake can be confirmed by contacting the North Carolina Department of Health and Human Services (DHHS) Division of Public Health in Raleigh. The phone number for the NC-DHHS office responsible for rescinding the advisory at Belews Lake is (919) 733-3410.

c. Requests by USWAG. Based on the information and documentation cited above, USWAG requests that EPA identify Belews Lake in the docket as a site where the previously identified "proven damage" has been resolved to the satisfaction of the State through implementation of corrective measures.

5. Chisman Creek Site, Virginia

a. Background. The Chisman Creek Site was a third-party sand and gravel mine site located near Yorktown, Virginia. From 1957 to 1974, petroleum coke (pet-coke) ash and coal combustion ash were hauled to the site from the nearby Yorktown Power Station by a local contractor and placed into three contractor-owned sand and gravel surface mines, known locally as borrow pits. The borrow pits were unlined, located in highly permeable sands, and poorly maintained. In 1980, contamination of a nearby residential well with trace metals was linked to the site and led to the initial investigation by local and state agencies. Following final designation as a Superfund site in 1985, Virginia Electric and Power Company, a unit of Dominion Resources, Inc. (Dominion), owner of the power station that generated the pet-coke and coal ash, agreed to remediate the site under EPA oversight. A paper describing the history of the site and the response action by Dominion was recently published by the Department of Interior Office of Surface Mining and Southern Illinois University as part of the *Proceedings of State Regulation of Coal Combustion By-Product Placement of Mine Sites: Technical Interactive Forum*, Harrisburg, Pennsylvania, May 4-6, 2004 (*Mine Placement Proceedings*), pp. 93-99. *See* Williams, Robert J., *Chisman Creek Superfund Site: A Retrospective Review* (2004) (Exhibit 15).

b. Corrective Measures Completed. As detailed in the *Mine Placement Proceedings*, in 1981, the Virginia Department of Environmental Quality (VDEQ) identified Chisman Creek to EPA as a candidate site for listing on the Superfund National Priorities List (NPL). In 1983, despite objections and an appeal filed by Dominion, EPA listed the Chisman Creek Site on the NPL. EPA began the Remedial Investigation (RI) and Feasibility Study (FS) in January 1984. The RI/FS process took 32 months to complete and the results are summarized in the Mine Placement Proceedings. *See Mine Placement Proceedings*, pp. 95-96.

Dominion remained in close contact with officials and citizens of York County regarding the cleanup and future development of the site. Early EPA plans included land use controls and the installation of barbed wire fences around the site. Many citizens objected to the presence of this type of fence in their neighborhood and discussions ensued regarding potential future uses of the site. Dominion initially evaluated the site as a potential company office site, future golf course, commerce park, and transportation facility. In discussions with York County officials, the use of the site for public recreation emerged as a prime need. Dominion proposed a conceptual plan to York County, which was reviewed and endorsed by a local citizen committee. The York County Board of Supervisors approved the plan and in December 1986, EPA certified the conceptual plan, paving the way for final design and remedial construction. Dominion agreed to perform the remedial action and began design, land acquisition, and construction in late 1986. *Id.*

Major site construction was completed in December 1988 with minor work continuing into 1989. Operation of a water treatment plant began in August 1989. Dominion completed the remedial action for approximately $10,000,000, including payment of approximately $750,000 in EPA oversight costs. In 1995, water quality improved to the point where the treatment plant ceased operation and water began being discharged to the local sewerage system. Surface water and sediment quality has improved and is no longer monitored. Groundwater quality has improved, allowing a reduction in sampling frequency. EPA has classified Chisman Creek Superfund Site as a *Construction Completed – Long Term Monitoring* site. *Id.,* pp. 96-97.

c. Additional Issues. EPA's record regarding Chisman Creek is dated and, therefore, not accurate. Relying on findings in the Agency's March 8, 1988 Report to Congress (based on a 1982 Dames and Moore study), EPA concluded that the Chisman Creek Site was a "proven" CCP damage case. In particular, EPA stated that the listing was based on (1) the detection of selenium in drinking water wells in excess of MCLs; (2) evidence of surface water and sediment contamination; and (3) that the site was remediated under CERCLA. *See EPA Review of Chisman Creek Disposal Site,* p. 3 (Jun. 11, 2001) (Exhibit 16).

EPA conclusions need to be updated based on data that were subsequently collected which confirm that pet-coke ash <u>not</u> CCPs were the driving source of contamination as Chisman Creek. During the time period in question, the Yorktown Power Station used a variable blend of fuel including central Southwest Virginia/West Virginia bituminous coal and delayed petroleum coke derived from Venezuelan crude oil. *See Mine Placement Proceedings*, pp. 95-96. The pet-coke was supplied by a refinery located adjacent to Yorktown Power Station. From 1957 to 1974 the cumulative fuel mix ratio was 51% coal and 49% coke. *Id.* Data collected by EPA and Dominion on the chemical composition of coal, pet-coke, and ash generated by the combination of those fuels demonstrate that pet-coke ash was the driving source of contamination at Chisman Creek. *See id.,* p. 98. The primary contaminants of concern at the site were nickel and vanadium, not selenium. The data showed that nickel and vanadium were present in much higher levels in petroleum coke and in relatively lower levels in

bituminous coal. *Id.* Moreover, a side-by-side analysis of typical coal ash leachate from the Yorktown plant verses the combined coal/pet-coke ash leachate at the Chisman Creek site demonstrates that leachate with pet-coke ash contained substantially higher levels of all the constituents of concern, including selenium. *Id.,* p. *98.*

d. Requests by USWAG. Based on the information and documentation discussed above, it is evident that the "proven" damage identified by EPA at Chisman is attributable to pet-coke ash rather than CCPs. At a minimum, the data demonstrate that it is not reasonable for EPA to attribute the alleged damage to CCPs. Even if EPA assessment of Chisman Creek is limited to selenium levels (which ignores the fact that vanadium and nickel were the drivers for the CERCLA remediation), the data still indicate that the primary source of the contamination was pet-coke ash. Accordingly, USWAG requests that EPA remove Chisman Creek from the CCP "proven" damage case list and reclassify it as a pet-coke site.

6. Hyco Lake, North Carolina

a. Background. Hyco Lake is a man-made reservoir located in Person and Caswell counties in North Carolina close to the Virginia border. The reservoir was constructed to provide cooling water for the Roxboro coal-fired electric power plant constructed by Carolina Power & Light (CP&L) (now Progress Energy). The Roxboro Plant began operating in 1965 and reached full capacity in 1980. In 1988, the State of North Carolina issued a fish consumption advisory for Hyco Lake. In response, CP&L cooperated with the State investigating whether elevated selenium detected in fish tissue were associated with NPDES permitted discharges from two CCP management units at the facility.

b. Corrective Measures Completed. Thereafter, CP&L agreed to convert from wet-sluicing of CCPs to a dry ash handling system at the Roxboro Plant. The dry handling system process consists of a forced air process that moves ash from the plant's electrostatic precipitators to four concrete silos for storage. The system also included the construction of a new on-site landfill for CCP disposal. The dry handling system became operational in 1990 at a total design, construction, and an accrued on-going operational cost exceeding $40 million. In 1994, the State of North Carolina limited the fish advisory to three species (carp, white catfish and sunfish). In 1999, the fish advisory for Hyco was further limited to one species (carp). On August 28, 2000, North Carolina, citing to improved water quality and fish tissue sampling, completely rescinded the fish advisory for Hyco Lake reservoir. *See North Carolina Department of Health and Human Services Press Release* (Aug. 28, 2001) (Exhibit 17).

c. Requests by USWAG. Based on the information and documentation cited above, USWAG requests that EPA identify the Hyco Lake in the docket as a site where the previously identified "proven damage" has been resolved to the satisfaction of the State through implementation of corrective measures.

7. Highway 59 Ash Landfill, Wisconsin

a. Background. The Highway 59 Ash Landfill was a sand and gravel pit site that received coal ash generated from the Valley Power Plant from 1969 to 1978. The site was initially closed, capped, and revegetated in 1979. Sometime thereafter, elevated levels of boron and sulfate were detected in offsite wells west of the landfill. Wisconsin Electric Power Company (WEPCO) (now WE Energies) coordinated with the Wisconsin Department of Natural Resources (WDNR) pursuant to its landfill license to investigate and address potential concerns regarding the site.

b. Corrective Measures Completed. In the late 1990s, WEPCO completed a Remedial Design Report, which it submitted to and was approved by WDNR. This remedy included, among other things, removal of saturated ash from the pit, replacement of ash above groundwater, reburning ash at the Prairie Power Plant, installation of a synthetic cap, and long term groundwater sampling. *See Letter from WDNR to WEPCO* (Apr. 4, 2000) (Exhibit 18). Work at the site has been completed to the satisfaction of the State at a cost of about $3.5 million. Long-term monitoring continues.

d. Requests by USWAG. Based on the information and documentation cited above, USWAG requests that EPA identify the Highway 59 Site in the docket as a site where the previously identified "proven damage" has been resolved to the satisfaction of the State through implementation of corrective measures.

8. Cedar Sauk Landfill, Wisconsin

a. Background. The Cedar Sauk Landfill was a third-party sand and gravel pit site that received coal ash generated from the Port Washington Power Plant from 1969 to 1979. As with the Highway 59 Landfill site discussed above, after the Cedar Sauk site was initially closed, elevated levels of boron and sulfate were detected in groundwater near the facility. WEPCO coordinated with the WDNR pursuant to its landfill license to investigate and address potential concerns regarding the site.

b. Corrective Measures Completed. During the 1990s, WEPCO submitted a modification to the landfill closure to address concerns regarding impact to groundwater. The modification included, among other things, installing a composite cover over the entire landfill. *See Letter from WDNR to WEPCO* (Mar. 20, 1997) (Exhibit 19). Work at the site has been completed to the satisfaction of the State at a cost of approximately $2.5 million. Long-term groundwater monitoring continues.

c. Requests by USWAG. Based on the information and documentation cited above, USWAG requests that EPA identify the Cedar Sauk Site in the docket as a site where the previously identified "proven damage" has been resolved to the satisfaction of the State through implementation of corrective measures.

9. Possum Point Site, Virginia

a. Background & Corrective Action. EPA's *Technical Background Document For The Report To Congress On Remaining Wastes From Fossil Fuel Combustion: Potential Damage Cases,* p. 2-2 (Mar. 15, 1999) (Exhibit 20) states at the Possum Point site

> oil ash, pyrites, boiler chemical cleaning wastes, coal fly ash, and coal bottom ash were comanaged in an unlined pond, with solids dredged to a second pond. Levels of cadmium above 0.01 mg/L were recorded prior to 1986 (the primary MCL is 0.005 mg/L). After that time, remedial actions were undertaken to segregate wastes (oil ash and low-volume wastes were believed to be the source of contamination). Following this action, cadmium concentrations were below 0.01 mg/L.

b. Requests by USWAG. As indicated above, EPA has concluded that coal ash was *not* believed to be the source of contamination at Possum Point. Rather, EPA attributed elevated levels of cadmium to oil ash and low volume waste at the site and led the Agency to list Possum Point as a damage case. There is no information in the record to indicate CCPs were attributable or "clearly implicated" as a source of contamination relative to the oil ash. Accordingly, USWAG requests that EPA remove Possum Point from the CCP "proven" damage case list and reclassify it as a "oil ash" site. This request is consistent with EPA classification of other similar oil ash sites, such as the Brayton Point site in Massachusetts. *See* EPA Draft November 2004 Damage Case List, p. 3 (Exhibit 21) (groundwater impacts likely attributable to oil combustion waste").

10. Alliant Nelson Dewey Site, Wisconsin

a. Background. The Nelson Dewey Site is a former CCP management area constructed by Wisconsin Power and Light (WPL) in the early 1960s adjacent to the Nelson Dewey Generating Station. The Site originally included ash settling ponds that received wet sluiced ash from the combustion of coal and an ash landfill. The Wisconsin Department of Natural Resources (WDNR) issued WPL (now an Alliant Energy company) a license to operate the Site in 1979, which included groundwater monitoring requirements. *See WDNR Report on Plans and Specifications for Ash Disposal Facility* (Feb. 28, 1979) (Exhibit 22). In approving the operation of the Site in 1979, WDNR noted that elevated levels of ash constituents from past operations had been detected in monitoring wells on and around the disposal area. *Id.,* p. 5. In the 1980s, ash-related constituents continued to be detected in the groundwater on the Site by WPL in monitoring conducted pursuant to its license for the facility.

b. Facility Response /Site Closure Completed. In 1986, WDNR and WPL jointly investigated the feasibility of converting ash management operations at Nelson Dewey to dry handling as a means to prevent further impact to groundwater. *See WDNR Memorandum of Meeting Ash Disposal Facility* (Oct. 30, 1986) (Exhibit 23). In coordination with WDNR, WPL implemented a program to convert from wet sluicing to

dry ash handling operations at Nelson Dewey at an estimated cost of $2 million (1984 dollars). *See id.* WPL also modified its CCP landfill cover design, closed and capped the landfill at the end of its useful life, and instituted an expanded groundwater monitoring program. The State approved these modifications through a review process under regulations governing the Site operating license. *See Letters from WDNR to WPL* dated Sept. 10, 1992, Mar. 8, 1993 and May 15, 1996 (*WDNR Approval Letters*) (Exhibit 24). The final closure plan for the work approved by WDNR has been fully implemented by WPL and subsequent groundwater monitoring has demonstrated that constituents of concern in groundwater have decreased over time. *See SAIC Report*, p.3. WDNR site managers Brad Wolbert (608/275-7769) and Gene Mitchell (608/275-3466) can confirm that closure of the site as required under the license has been completed to the satisfaction of the State.

c. Request by USWAG. Based on the information and documentation cited above, USWAG requests that EPA identify the Nelson Dewey Site as a site where the previously alleged "proven damage" has been resolved to the satisfaction of the State through implementation of the modifications and site closure measure described above.

Appendix D

Prepared for:
Utility Solid Waste Activities Group
Washington, DC

Comments on USEPA's *Draft Human and Ecological Risk Assessment of Coal Combustion Wastes* Dated August 6, 2007

February 7, 2008

ENSR Corporation
February 2008
Document No.: 12706-001-100

ENSR | AECOM

Contents

Executive Summary

The following is a brief summary of the major technical concerns noted in the U.S. Environmental Protection Agency's (USEPA) Draft Human and Ecological Risk Assessment for Coal Combustion Wastes (August 2006) (CCW Risk Assessment).

1. The CCW Risk Assessment violates the Agency's policy of transparency, clarity, consistency and reasonableness in risk characterization. Because of the poor presentation of the methods and a serious lack of supporting information, it is not possible to validate the results of the CCW Risk Assessment and, therefore, it is not possible to identify all of the flaws.

2. The risk assessment did not use the updated facility information provided in the USEPA/Department of Energy (DOE) report (2006) rendering the results of questionable relevance.

3. The risk assessment did not appropriately evaluate the existence or location of drinking water wells in the vicinity of a facility; it relied upon inappropriate municipal landfill data for estimating distances to drinking water wells, and it did not account for instances where those wells may be cross- or up-gradient and, therefore, not affected by any release, nor did it account for cases where groundwater is not used as a source of drinking water. These assumptions have led to a gross over-estimation of potential drinking water risks.

4. It is not clear from the documentation provided whether or not appropriate toxicity information was used in the human health and ecological risk calculations. The constituent for which this is the most critical issue is boron. In the human health evaluation, two different oral toxicity values are presented in Chapter 3 and Appendix G of the USEPA's draft risk assessment report. If the wrong value (presented in Appendix G) was used in the risk calculations, then the human health risk results for boron using the correct value (presented in Section 3) would be 2.2-fold lower than those presented in Section 4. In addition, the toxicity criteria identified as being used for boron in the ecological risk assessment has been incorrectly derived, as discussed in detail in Sections 1 and 5 of these comments. Use of the corrected value would result in a 3 orders of magnitude lower estimate of ecological risk for boron.

5. The Agency has not met any of their own guiding principals for a probabilistic or Monte Carlo analysis (USEPA 1997a,b). For example, point estimates for several human health exposure parameters are default values based solely on USEPA policy rather than scientifically defensible distributions based on available data. Where distributions are used, none of the required supporting information is provided. A review of the data that were provided indicates that the distributions used are often unrealistic. In addition, the ecological risk assessment is based entirely on point estimates (that is, a probabilistic analysis was not conducted for the ecological risk assessment).

6. Use of toxicity characteristic leaching procedure (TCLP) data as the primary means to estimate the metals concentration in coal combustion product leachates is not accurate. There is an extensive body of literature including USEPA's own studies (e.g., USEPA, 2006) that demonstrates the inappropriateness of TCLP as a method to estimate actual leachate concentrations, especially for coal combustion products.

7. For a number of the parameters, model predictions should have been compared to actual field data to evaluate the validity of the model outputs, but this was not performed. In particular, model-predicted concentrations in groundwater could easily be compared to actual groundwater monitoring data from coal combustion product waste management units.

8. The risk assessment appears to have inadequately modeled the transport of arsenic in groundwater. Arsenic mobility is dominated by groundwater redox conditions. It is not clear that this effect was included in the risk assessment. In addition, the fact that model predictions are so at odds with actual field data suggests

these processes are not appropriately considered, thus resulting in incorrect model predictions and an overestimate in the range of risks.

9. The arsenic concentrations in groundwater predicted by the modeling are similar to naturally occurring background concentrations of arsenic in groundwater in many parts of the United States. Therefore, the calculated risks for arsenic in groundwater due to coal combustion products are no greater than for background arsenic (and most likely to be significantly less than background based on the overly conservative assumptions in the risk assessment).

10. The fish consumption rate distribution is unrealistic, and overestimates risk. For example, the maximum fish ingestion rate distribution has been truncated at 1500 g/day (3.3 pounds per day). No discussion of the basis for this truncation is provided. This exposure level equates to approximately 2,312 fish meals per year, or more than 6 fish meals/day assuming a typical fish meal size of 227 grams (half a pound). Moreover, this distribution has been applied to both adults and children, where there are many examples in the literature that children eat less fish than adults. It has also been unrealistically assumed that all fish consumed is derived from the affected water body.

11. The ecological risk assessment (ERA) is an overly conservative screening-level evaluation that lacks distribution functions of exposure factors and receptor characteristics to conduct a Monte Carlo analysis analogous to that conducted for the human health risk assessment (HHRA). Conservative benchmarks have been selected independently of the appropriate media with no regard for likely ecological receptors or exposure pathways. In addition, the ERA is neither sufficiently scientifically detailed nor ecologically realistic enough to technically support any level of policy decision-making.

12. The ERA lacks transparency in its development and presentation, especially for a major guidance document with wide-spread regulatory implications, including the fact that significant portions of the ERA are derived from old USEPA documents that are not publicly available and cannot be reviewed; details are lacking and/or inappropriate methods have been used to derive dietary exposure for critical sensitive receptors (e.g., sandpiper); and the selection process for constituents of interest is incomplete and this deficiency is inadequately addressed through use of non-chemical-specific “risk attenuation factors.”

13. The ERA screening benchmarks and comparisons are based on an obsolete database of screening values and methodologies, such benchmarks used are outdated and therefore inappropriate.

1.0 Introduction

ENSR is pleased to submit to the Utility Solid Waste Activity Group (USWAG) these comments on the United States Environmental Protection Agency's (USEPA or Agency) August 6, 2007 *Draft Human Health and Ecological Risk Assessment of Coal Combustion Wastes* (herein referred to as the CCW Risk Assessment).

USEPA has released this draft CCW Risk Assessment for the purpose of identifying "CCW constituents, waste types, exposure pathways, and receptors that may produce risks to human and ecological health and to provide information about those scenarios that EPA can use to develop management options for CCW management" (USEPA, 2007, p 1-2). In addition, the Agency states that the CCW Risk Assessment is "intended to evaluate, at a national level, risk to individuals who live near WMUs used for CCW disposal" (USEPA, 2007, p 2-1).

Overall, because of fundamental inadequacies in the risk assessment design, the CCW Risk Assessment does not meet the stated objectives, and should not be used as the basis for regulation.

Organization of the Comments

Because of the poor presentation of the methods and a serious lack of supporting information, it is not possible to identify all of the flaws in the CCW Risk Assessment. However, based on our review, the comments presented herein address the more obvious and critical flaws in the risk assessment. Primary areas of the CCW Risk Assessment addressed by specific comments are:

- The use of probabilistic or Monte Carlo techniques,
- The fate and transport components of the analysis,
- The construction of the human health risk assessment component, and
- The construction of the ecological risk assessment component.

Each of these topics is presented in the following sections, and the overarching comments are provided below.

Overarching Comments

1. The CCW Risk Assessment violates the Agency's policy of transparency, clarity, consistency and reasonableness in risk characterization.

USEPA eloquently discussed the issues of transparency, clarity, consistency and reasonableness in risk characterization in Carol Browner's March 21, 1995 letter to the Regions on the USEPA Risk Characterization Program. The presentation of all aspects of the modeling (fate and transport, human exposure, ecological exposure) supporting the CCW Risk Assessment lacks transparency and clarity. As discussed in Section 2 of these comments, the presentation of the Monte Carlo (distributional) analysis does not meet even the minimum standards of model documentation identified by USEPA in their *Guiding Principles for Monte Carlo Analysis* (USEPA, 1997, pp 1-3). Input distributions for all parameters are poorly documented and no documentation is provided for output distributions. Without this information, it is not possible to recreate and verify what the Agency has done. For this reason alone, it cannot be used as the basis for regulation.

In addition, many of the parameters used in the modeling of constituent transport and exposure are unreasonable, internally inconsistent, and not scientifically defensible. These do not meet the requirement for consistency and reasonableness in risk characterization, specific examples of which are provided below.

2. The CCW Risk Assessment results are based on outdated and inappropriate information.

It should be noted that although the CCW Risk Assessment was conducted in 2003, it is only now being released for public review.

- The CCW Risk Assessment used, as the basis for the waste management scenarios, data primarily from the Electric Power Research Institute (EPRI) from 1995, even though these data are known not to be representative of current conditions based on a study conducted by USEPA and the Department of Energy (DOE, 2006). USEPA notes the reasons for not using the newer data are that the data were obtained (2006) after the risk assessment had been conducted, and the data were not as complete as the data available from EPRI. The DOE study provided an expanded set of information on CCW management practices, including newly constructed facilities and lateral expansions. While USEPA admits that the risk assessment represents a "snap-shot in time," the snap-shot is no longer relevant. By not incorporating the data in the DOE report, the CCW risk assessment results are incomplete and inaccurate.

- The information on distance to drinking water wells was based on a 1988 study of municipal solid waste landfills, which USEPA acknowledges is likely a conservative estimate for coal-fired power plants, which are not located in as populated areas as municipal landfills. For these reasons, it is inappropriate to use these data as the basis for the CCW Risk Assessment. Moreover, the stated objective of the risk assessment is to evaluate the risk to individuals living near CCW waste management units. The risk assessment fails to account for the fact that CCW-related drinking water risks are zero for individuals that use groundwater that is cross-gradient or up-gradient of waste management units, or that CCW-related drinking water risks are zero for individuals that do not use groundwater as a source of drinking water. By not accounting for these very real scenarios, the risk assessment does not meet the stated objective and has inaccurately and greatly overstated the drinking water risk to individuals living near coal combustion product waste management units.

- It is not clear from the documentation provided whether or not appropriate and/or current toxicity information was used, nor are the implications of this issue discussed as an uncertainty in the risk assessment report. For the human health assessment, toxicity criteria are presented in Chapter 3 and Appendix G, and the criteria presented in these two locations are not the same. Several of the values presented in Appendix G are out of date relative to those presented in Chapter 3. While several changes or updates could be made to clarify this issue, it is most critical for boron. Boron was identified as a risk driver in the CCW Risk Assessment results for the human health drinking water pathway for several surface impoundment scenarios. If the out-dated human health reference dose presented in Appendix G (0.09 mg/kg-day) was used in the CCW Risk Assessment, potential risks would be overstated by a factor of 2.2 relative to the current reference dose (0.2 mg/kg-day) presented in Chapter 3. In the ecological risk assessment, the boron surface water benchmark used in the risk assessment (0.0016 mg/L) (USEPA, 1998) was recently shown to have been derived incorrectly and the corrected value of 1.1 mg/L (Rodolakis, 2006) dramatically reduces the boron ecological Hazard Quotients by three orders of magnitude.

3. The application of the Monte Carlo approach to this risk assessment is flawed and has led to overestimates of risk.

The CCW Risk Assessment has not followed the *Guiding Principles for Monte Carlo Analysis* (USEPA, 1997). Many of the parameters used in the human health risk assessment are point estimates, not based on the scientific literature, but based on USEPA policy (see Table F-1), where data are available to develop scientifically-defensible distributions. In addition, the ecological risk assessment is based entirely on point estimates without regard for reasonableness of the scenario (e.g., diets are composed of a single prey item and total diet is contaminated). The result is that the ecological risk assessment is only comprised of the first, most conservative, tier in a multi-tiered risk assessment approach. While the use of policy-based point

estimates may be appropriate for a screening level assessment, they are not appropriate for use in a detailed risk assessment, especially one to be used as the basis for regulatory decision making, nor is their use consistent with the Monte-Carlo, probabilistic approach. The CCW Risk Assessment should use scientifically-based values and distributions, and not those based on policy.

References

DOE. 2006. Coal Combustion Waste Management at Landfills and Surface Impoundments. Contract 68-W6-0061. May 2006.

Rodolakis, T. 2006. Revision to the Surface Water SCV for Boron. Poster presented at November 2006 SETAC conference in Montreal [findings of poster were confirmed by Dr. Glenn Suter of EPA]. [Abstract presented below.]

USEPA. 1995. EPA Risk Characterization Program. Memorandum from Carol M. Browner, Administrator, to Assistant, Associated and Regional Administrators. March 21, 1995.

USEPA. 1997. Guiding Principles for Monte Carlo Analysis. EPA/630/R-97/001. March 1997.

USEPA, 1998. Non-Groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2). Office of Solid Waste, Washington, DC. June.

USEPA. 2002. Constituent Screening for Coal Combustion Wastes. Draft Report prepared by Research Triangle Institute for Office of Solid Waste, Washington, DC. September.

USEPA. 2007. Draft Human Health and Ecological Risk Assessment of Coal Combustion Wastes. August 6, 2007.

USEPA. 2008. Integrated Risk Information System (IRIS). Environmental Criteria and Assessment Office. U.S. Environmental Protection Agency, Cincinnati, OH. [URL: http://www.epa.gov/iris/index.html].

Abstract

Revision to the Surface Water SCV for Boron. Rodolakis, T. MACTEC Engineering, Wakefield, MA, USA. In 1996, Oak Ridge National Laboratory (ORNL) published secondary chronic values (SCVs) for surface water (Suter and Tsao, 1996). Although SCVs were originally developed as screening benchmarks, regulators have applied the SCVs to a variety of uses. For example, at one radiological site, the Connecticut Department of Environmental Protection (CTDEP) based an action level for boron in surface water on the published SCV (1.6 ug/L). Exceeding the action level would have resulted in expensive monitoring, investigation, and potential remediation. However, during a comment period, it was discovered that the boron SCV had been inadvertently miscalculated units in the fish study from which the SCV was derived (Hamilton, 1995) had accidentally been transcribed in the ORNL document as ug/L instead of mg/L. The SCV was re-calculated using the corrected concentrations, and the results were corroborated by Dr. Suter. The recalculated boron SCV should be 1,100 ug/L.

2.0 Construction and Implementation of the Monte Carlo Analysis

In March 1997 USEPA published a document titled *Guiding Principles for Monte Carlo Analysis* (USEPA, 1997a). This document supported the development of agency policy on the use probabilistic analysis techniques in risk assessment (USEPA, 1997b). The goal of this policy is essentially to outline the conditions that must be satisfied when submitting to the Agency a risk assessment that uses probabilistic techniques. These conditions support the development and documentation of an approach to the use of probabilistic risk assessment that is based on the use of sound technical methods, and is transparent and reproducible. The "Guiding Principles for Monte Carlo Analysis" can be summarized from USEPA 1997a (pp 1-3) as follows:

- The purpose and scope of the risk assessment should be clearly stated.
- The methods used in the analysis (including all models, data and assumptions that may have a significant impact on the results) are to be documented and easily located. Sufficient information is to be provided to allow the results of the analysis to be independently reproduced.
- The results of the sensitivity analyses are to be presented and discussed.
- The presence or absence of moderate to strong correlations or dependencies between the input variables is to be discussed and accounted for.
- Information describing each input and output distribution is to be provided in the report.
- The numerical stability of the central tendency and the higher end of the output distributions are to be presented and discussed.
- Calculations of exposures and risks using point estimate methods are to be reported if possible.
- Since fixed exposure assumptions are sometimes embedded in the toxicity metrics, exposure estimates from the probabilistic output distribution are to be aligned with the toxicity metric.

These principles can be further summarized to state that the overall goal of Agency policy is that risk assessments conducted using a probabilistic technique are to be thoroughly and clearly documented in such a way as to allow transparency of process and reproducibility of results. This is particularly important where a risk assessment will be used for regulatory analysis and/or when such risk assessments rise to the level of being substantially influential over the risk management process.

1. The Agency has not met any of the guiding principles for Monte Carlo analysis.

The human health risk assessment conducted for coal combustion products, as documented in the CCW Risk Assessment, falls substantially short of Agency policy goals for probabilistic analysis in risk assessment. Of particular concern is a lack of transparency in the documentation that contributes to a sense that the risk assessment may not be reproducible and leaves one unable to accurately assess the soundness of the technical methods used. The general approach outlined for the human exposure assessment and risk characterization seems appropriate but the limited documentation does not allow for adequate assessment of the appropriateness of the overall evaluation, its key inputs, and assumptions. Given the potential for a risk assessment such as the one conducted for coal combustion products to have substantial influence over future regulatory or risk management decisions, this lack of transparency does a disservice to all potential stakeholders. Example areas of concern are discussed in the following sections; however, it should be noted that due to the vague documentation provided, our specific concerns cannot be limited to only these examples.

2. The mechanics of the Monte Carlo analysis are not adequately or clearly documented.

This is true from the development of input distributions, the use of fate and transport models, and the prediction of human exposure to the linkage of all of the predictions calculated in these three major steps.

Under the problem formulation (Section 2.0), it is stated that national distributions were developed to represent several potentially site-specific variables in every model run. These variables included:

- Distance to nearest drinking water well
- Distance to nearest surface water body
- Aquifer depth, thickness, gradient, and hydraulic conductivity (based on site-specific hydrogeologic setting)
- Soil hydrologic properties (based on site-specific soil type)

Of these multiple variables, distributions are only clearly identified in Appendix C of the risk assessment for distance to the nearest drinking water well and distance to nearest surface water body. However, the documentation for these distributions is incomplete.

The distribution for distance to the nearest drinking water well is simply identified as a nationwide distribution of nearest downgradient residential well distances taken from a survey of municipal solid waste landfills. No statistical analysis is presented to explain why the distribution documented in Table C-1 is the appropriate fit for the survey data. The distribution is simply documented in a table assigning distances of 0.6 m to 1610 m to percentiles. No graphical representation of the distribution is provided. This is inconsistent with agency policy (USEPA, 1997a, pp 1-3) outlining the conditions to be satisfied for acceptance of a probabilistic analysis. This policy states that documentation of input and output distributions should be provided. Such documentation should include both tabular and graphical representation of the distribution. It should also be noted that the reference cited for the survey of municipal solid waste landfills is dated 1988. While the fact that the survey is likely not representative of landfills and surface impoundments at plants generating coal combustion products is discussed in the CCW risk assessment, it is not discussed that such a survey at almost 20 years old may not be currently representative of either municipal waste landfills, or coal combustion product landfills and surface impoundments. Additionally, the assignment of 10^{th} percentile increments to distances from a minimum of 0.6 m to 1610 m without documenting the appropriateness of the distribution imparts a false sense of accuracy to the distribution.

The distribution for distance to the nearest surface water body is similarly poorly documented. The limited discussion of the development of the distribution indicates that the distance to the nearest fishable surface waterbody was manually measured on U.S. Geological Survey (USGS) maps and aerial photographs for a limited but randomly selected subset of facilities with coal combustion product landfills or surface impoundments. The resulting distribution (presented in Table C-2 of the risk assessment) assigns percentiles from a minimum distance of 10 m to a maximum of 3000 m. No discussion is presented as for the basis of this distribution and no graphical representation of the distribution is presented. This limited documentation does not meet the criteria for transparency in the risk assessment (USEPA, 1995).

The distribution of distance to the nearest surface water body also does not appear to account for facilities where no fishable surface water body may be present or where the nearest fishable surface water body may be more than 3000 m away. This would seem to force the assumption that every coal combustion product landfill or surface impoundment is located between 10 and 3000 m of a fishable surface water body. Similarly, the distribution of distance to the nearest well does not account for facilities where groundwater does not serve as the source of drinking water. The analysis assumes the presence of a down-gradient drinking water well at every CCW management unit; the evaluation of the assumed down-gradient surface water body was

conducted independently of the down-gradient well. In reality, if a surface water body were located between a CCW management unit and a down-gradient well, it could either prevent groundwater migration to the well or at a minimum could affect the concentrations that may reach the well. The risk assessment does not quantitatively address this scenario, nor is it addressed qualitatively in the uncertainty discussion.

It was stated as part of the problem formulation that national distributions were developed for parameters including aquifer depth, thickness, gradient, hydraulic conductivity and soil hydrologic properties. It is not clear that such distributions were developed and used in the risk assessment. Appendix C gives the impression that these parameters may have been accounted for by assigning coal combustion facilities to hydrogeologic regions in the Hydrogeologic Database (HGDB) developed by the American Petroleum Institute. However it is not clear from Figure 3-2, Monte Carlo looping structure, of the risk assessment whether a single national distribution is used for these parameters during every run or whether values specific to individual facilities are being derived from the HGDB during every run.

The above examples are, in our opinion, representative of the limited and vague documentation provided for inputs to, and use of the inputs in, the Monte Carlo analysis. This vague documentation describing both inputs and the mechanics for use of inputs is prevalent throughout the risk assessment document.

3. The Agency has not provided graphical or tabular distributions for all of the input parameters, and more importantly, for the output distributions.

Without the parameter distributions defined in tabular or graphical format, it is not possible to critique the appropriateness of the distributions, or the potential flaws. More importantly, the output distributions for both intermediate results and the final risk assessment results are not provided. Therefore, the full range of information provided by these distributions is not available for the risk manager. Representing the risk results as single 50^{th} and 90^{th} percentile point estimates undermines the potential usefulness of the probabilistic analysis. In addition, without the output distributions, it is not possible to compare the distribution and range of outcomes to evaluate to what extent they are realistic and consistent with other independent information or data. For example, the mean body weight used in the risk assessment for the child aged 12-19 years of 58.2 kg or 128 pounds is reasonable, however, as discussed in Section 4 of these comments, the minimum and maximum values provided are not reasonable (29 pounds to 661 pounds). By providing only the 50^{th} and 90^{th} percentile point estimates of the results and not providing the ranges of the output distributions, the Agency is not providing all of the information needed to put the results into context and determine their reasonableness.

4. The Agency has not fully applied the Monte Carlo analysis to all components of the risk assessment resulting in risk estimates that are biased high.

The benefit of a probabilistic risk assessment is that the full set of information on a parameter can be used in the evaluation of risk, not just single point estimates or agency default values. However, the human health risk assessment uses point estimates for several parameters that are based solely on Agency policy; this undermines the credibility and the usefulness of the probabilistic risk assessment and results in skewed estimates of risk in that the Agency policy defaults are meant to represent a reasonable maximum exposure scenario, and not meant to capture the range of reasonable estimates. A Monte Carlo analysis has not been applied to the ecological risk assessment at all, and the report should be clear on this point. Only conservative point estimates were used to evaluate potential exposure and effects in the ecological risk assessment. The ecological risk assessment is nothing more than a simple refinement of a screening level assessment. While this step is appropriate for screening out conditions which do not show the potential for risk under the worst case scenario, this conservative level of analysis is not appropriate for identifying situations or constituents which are likely to cause risk to ecological receptors. At a minimum, the Monte Carlo analysis should be applied to the ecological risk assessment parameters (e.g., dietary composition, exposure duration, area use factors). Application of a more detailed scenario-specific baseline ecological risk assessment is needed for decision making purposes.

5. The Agency has not accounted for dependence of variables in the risk assessment.

As discussed in Section 4, with regard to childhood exposures, the life of a child is considered in stages represented by four cohorts (ages 1 to 5, 6 to 11, 12 to 19, and 20 to 70). Body weight and drinking water ingestion rates are provided for each age cohort. However, the ranges of these distributions are widely overlapping, and selection of inputs for each age group distribution needs to be consistent with the next age group. For example, body weights should increase from age cohort to age cohort for a given MCA simulation. Because of the greatly overlapping distributions, it is possible that weights can increase and decrease drastically between cohorts. This is clearly inappropriate. This is but one example – the CCW Risk Assessment needs to control for the dependency of all input variables, consistent with the Agency's guiding principles for MCA.

References

USEPA. 1995. EPA Risk Characterization Program. Memorandum from Carol M. Browner, Administrator, to Assistant, Associated and Regional Administrators. March 21, 1995.

USEPA. 1997a. Guiding Principles for Monte Carlo Analysis. EPA/630/R-97/001. March 1997.

USEPA. 1997b. Policy for Use of Probabilistic Analysis in Risk Assessment at the U.S. Environmental Protection Agency. Fred Hansen, Deputy Administrator. May 15, 1997.

3.0 Fate and Transport Analysis

1. The CCW Risk Assessment relies far too much on TCLP data to characterize potential leaching from disposal units.

TCLP is known to provide results that are not representative of potential leaching from CCBs to groundwater. In its sensitivity analysis, USEPA has specifically noted that the CCW Risk Assessment results are very sensitive to the leachate concentrations used for both landfills and surface impoundments.

- A literature review conducted by the State of Washington (2003) documents the relative performances of different types of leaching tests to answer different types of questions. As stated in this paper, "Single scenario/batch leaching tests, such as the TCLP and the [synthetic precipitation leaching procedure] SPLP, typically are designed as compliance tests and not necessarily to predict the character of leachate generated at a specific site." (pg 62) Their literature review demonstrated that "one should not expect batch test (e.g., TCLP or SPLP) results to match actual field leachates except where there is a reasonable match between field and laboratory test conditions." (pg. 63)

- TCLP was developed as a regulatory method only to provide a bright-line determination of whether a waste material is hazardous due to potential toxicity. The conditions under which the test is performed are intended to represent conditions of disposal in a municipal landfill in which many different kinds of wastes, especially organic wastes, are present. This scenario typically bears little resemblance to waste management practices for coal combustion products.

- In 1999, the USEPA Scientific Advisory Board (SAB) called attention to the fact that TCLP was being widely used beyond its original, regulatory intent, and that there was need to develop a range of alternative methods to evaluate potential leaching. The SAB noted the following environmental conditions that limit the ability of the TCLP method to appropriately characterize leaching: kinetics, liquid/solid ratios, pH, colloid formation, particle size, age, volatilization, and interaction with other materials (USEPA SAB, 1999).

- Significant research has been conducted on various methods for evaluating the potential leaching from coal ashes; much of the research is presented regularly at the International Ash Utilization Symposia (www.flyash.info). These studies demonstrate that due to the complex geochemical processes that take place over time in coal ash, the short-term, batch-type leach tests such as TCLP are unable to provide results representative of leaching to groundwater under actual field conditions. (There is a significant body of published research on this subject, including research conducted by Hassett, Heebink, et al., of Energy & Environmental Research Center at the University of North Dakota; Sorini of the Western Research Institute; numerous EPRI studies; Kim, Kazonich, et al., of the DOE National Energy Technology Laboratory; Rice, Fishman, et al., from the USGS, etc. A few specific references are provided below.)

- USEPA itself in its 2006 study of potential leaching from CCBs (the Vanderbilt study, USEPA, 2006) noted the limitations of TCLP and, for its own study, did not consider TCLP an appropriate method for evaluating potential leaching from coal combustion products (pp. 11 to 13). Instead laboratory methods developed by Kosson were used.

In its CCW Risk Assessment, the USEPA recognized this reliance on TCLP data as a potential limitation and discussed it in their sensitivity analyses. Figure 4-5 of the risk assessment provides a comparison of arsenic and selenium concentrations from the Vanderbilt study (USEPA, 2006) compared to the data used in the risk assessment. Based on these comparisons, USEPA concludes that the heavy reliance on TCLP data "does not appear to be a significant source of uncertainty (pg. 4-32)" for the risk assessment. However, close

examination of the data ranges presented on Figure 4-5 of the CCW Risk Assessment does not support this conclusion.

- First, these graphs include comparisons between the data ranges used by USEPA in the CCW Risk Assessment and the actual leachate data provided by EPRI. USEPA notes that the EPRI data are considered the most representative of actual leachate concentrations (see Appendix A of the CCW Risk Assessment). Comparison of the USEPA database ranges with the EPRI data show that the data used by the USEPA is biased. For arsenic in landfills, the medians (50^{th} percentile) of the two datasets are similar, but USEPA's 95^{th} percentile is nearly an order of magnitude greater than the EPRI data. Similarly for selenium, the medians are similar, but USEPA's 95^{th} percentile is more than an order of magnitude lower than the EPRI data. For surface impoundments, even the medians for the USEPA database are significantly greater than the EPRI data. While the log-scale on the figures may make the datasets appear similar, an order of magnitude difference in starting concentration is a significant discrepancy. Based on these comparisons, USEPA concludes that the selenium risk results may be biased low, but it does not make the converse conclusion that the arsenic risk results may be biased high. USEPA must be consistent in its evaluation of the sources of bias in the risk assessment.

- For arsenic, when the USEPA's database is compared to its own leaching test results from the Vanderbilt study, a similar bias is also apparent. Of the six Vanderbilt tests, the natural pH value result for five of the tests is lower than the 50^{th} percentile of the USEPA's database used in the risk assessment. In addition, the range in the Vanderbilt test results extends approximately one order of magnitude below the range used by the USEPA.

- Based on the Vanderbilt study, USEPA itself concludes (USEPA, 2006): "Further evaluation of leaching of arsenic and selenium from CCRs that considers site specific conditions is warranted." (pg. xiii) It should be noted here that both arsenic and selenium are metals whose mobility is strongly affected by geochemical conditions in the environment (either the natural environment or the test conditions). Therefore, it is not possible, nor appropriate, to extrapolate from the relative performance of these two metals to the larger group of all constituents considered in the CCW Risk Assessment.

While there is a large body of research on this subject, a few select references are provided here.

Electric Power Research Institute (EPRI). 1998. Leaching of Inorganic Constituents From Coal Combustion By-Products Under Field and Laboratory Conditions. EPRI Technical Report TR-111773.

David J Hassett, Debra F Pflughoeft, Loreal V Heebink (EERC). 2003. Leaching of CCBs: Observations from over 25 Years of Research. Proceedings of the 2003 International Ash Utilization Symposium,

International Ash Utilization Symposia. Biennially 1995-2007. Proceedings and selected papers available at www.flyash.org.

Rice, CA, GN Breit, NS Fishman, J Bullock, and J Motooka (USGS). 1997. Geochemical analysis and modeling coal combustion waste leachates. In Proceedings: 1997 International Ash Utilization Symposium, Lexington, Kentucky.

Sorini, Susan S. 1995. Leaching tests: Commonly used methods, examples, and applications to CCB, and needs for the next generation. In Proceedings of the Coal Combustion By-Products Associated with Coal Mining, an Interactive Forum. (Office of Surface Mining)

Washington State Department of Ecology. December 2003. As Assessment of Laboratory Leaching Tests for Predicting the Impacts of Fill Material on Ground Water and Surface Water Quality: A Report to the Legislature. Publication No. 03-09-107.

USEPA. February 2006. Characterization of Mercury-Enriched Coal Combustion Residues from Electric Utilities Using Enhanced Sorbents for Mercury Control. EPA/600/R-06/008.

USEPA Science Advisory Board. February 26, 1999. Waste Leachability: the Need for Review of the Current Agency Procedures.

2. The USEPA risk assessment has used the various components of the EPACMTP model and other models to calculate chemical concentrations at several steps from the release from the waste management unit through the transport in groundwater to a potential receptor. None of the concentrations calculated by the modeling have been provided nor have they been compared to field observations to determine whether the results are realistic. Where field data are available, this step should have been performed in order to judge the reliability of the model predictions.

Representative amounts of field data are not likely to exist for some of these interim model results (such as porewater concentrations in the unsaturated zone below the units). However, it is well known that groundwater is being monitored on a regular basis in the immediate vicinity of numerous units across the country. The collected data are typically reported to regulatory authorities and should be available to USEPA through either the regulatory authorities and/or with the aid of EPRI. Therefore, USEPA has access to real field data to evaluate its model predictions, but it has not performed this analysis. Use of the real, observed concentrations of the various constituents in groundwater in the vicinity of waste management units is a critical step in validating the model predictions.

While it is recognized that a formal calibration of the stochastic models is not appropriate, it is still important to ensure, where possible, that the model predictions are consistent with reality, thus providing a validation of the models and their inputs. The importance of model validation is well-documented in the scientific literature, but it is also endorsed by the USEPA, for example:

- In its "Resolution on the Use of Mathematical Models by EPA for Regulatory Assessment and Decision-Making," the EPA SAB stated "There is a need for models used in regulatory application to be confirmed with laboratory and field data." (pg. 3)

- USEPA's Federal Register Notice (1992) providing Guidelines for Exposure Assessment describes model validation as "the process by which the accuracy of the model results is compared with actual data from the system being simulated. There are numerous levels of validation of an environmental fate model, for example, such as [sic] verifying that the transport and transformation concepts are appropriately represented in the mathematical equations, verifying that the computer code is free from error, testing the model against laboratory microcosms, running field tests under controlled conditions, running general field tests, and repeatedly comparing field data to the modeling results under a variety of conditions and chemicals. In essence, validation is an independent test of how well the model (with its calibrated parameters) represents the important processes occurring in the natural system." (pg. 22908)

- More recently in its Draft Guidance on the Development, Evaluation, and Application of Regulatory Environmental Models, the USEPA (2003) used the term model corroboration to be performed as part of model evaluation. "Model corroboration includes all quantitative and qualitative methods for evaluating the degree to which a model corresponds to reality." (pg 22 of 60) In its review of this draft guidance, the USEPA SAB commented that "a solid performance evaluation of how well the model replicates historical events, including analyses of the model's processes as well as its predictions, is an important part of evaluating its response." (pg. 19-20)

- In the Vanderbilt study (USEPA, 2006) cited in the CCW Risk Assessment, the USEPA performed just this type of validation of the leaching tests by comparing the results to field-measured leachate concentrations. This type of validation should be extended to the CCW Risk Assessment.

The fact that the risk assessment does not provide a comparison between model-predicted concentrations and groundwater concentration data that is widely known to be available, makes it difficult to evaluate how representative the risk assessment results are with respect to its objectives of estimating a reasonable range of potential risks. Based on USEPA's own review of available data (USEPA, 1993), it seems likely that the current risk assessment is over-predicting groundwater concentrations, resulting in a risk assessment that is not appropriate.

USEPA Science Advisory Board. January 1989. Resolution on the Use of Mathematical Models by EPA for Regulatory Assessment and Decision-Making. EPA-SAB-EEC-89-012.

USEPA. May 29, 1992. Notice: Guidelines for Exposure Assessment. Federal Register FR 22888.

USEPA. 1993. Final Regulatory Determination of Four Large-Volume Wastes from the Combustion of Coal by Electric Utility Power Plants. Federal Register 42466 Vol. 51 No. 151.

USEPA Council for Regulatory Environmental Modeling. November 2003. Draft Guidance on the Development, Evaluation, and Application of Regulatory Environmental Models.

USEPA SAB. August 2006. Review of the Agency Draft Guidance on the Development, Evaluation, and Application of Regulatory Environmental Models and Models Knowledge Base. EPA- SAB-06-009.

3. The probability of impact to a drinking water well is not handled appropriately in the Monte Carlo simulation. It appears that for the drinking water pathway, <u>EACH AND EVERY</u> Monte Carlo simulation assumes there is an impact to a drinking water well, and the model then provides an estimate of the concentration at that well.

In reality, not only are there many instances where no drinking water wells will be present now or in the future, but there are also scenarios where wells may be present, but they are not located downgradient from the waste management units. Neither of these very common scenarios are included in the Monte Carlo simulations, and their exclusion has resulted in an overestimation of risk.

Many power stations are located adjacent to major surface water bodies, as these water bodies provide cooling water needed for the operations. For these facilities, there is no residential (or other) property present downgradient of the facilities, and so the probability of the presence of a drinking water receptor is 0%. Even where plants are located such that there are properties owned by others in the area, in many instances, no drinking water wells will be present, or the wells will not be located downgradient. Most industrial areas in this country where power generating stations are located are provided drinking water through a municipal or other public water utility, so groundwater is not used as a domestic drinking water supply. In areas not served by municipal water, the Monte-Carlo simulations should randomly select the location of a potential drinking water well which could be located in any direction from the facility, not just in the downgradient direction. Where these randomly located wells are outside the assumed plume area, the resultant risks would be 0, and this not-unlikely outcome should be included in the distribution of results. This latter treatment of drinking water well locations is consistent with the stated objective "to evaluate, at a national level, risk to individuals who live near WMUs used for CCW disposal" (USEPA, 2007, p 2-1); note the objective is not to evaluate risks solely to individuals who may have a drinking water well within the plume downgradient of a waste management unit.

In addition, where there is a surface water body present between the unit and the drinking water well, groundwater flow will be disrupted by the surface water body and most likely not migrate to the drinking water well. In temperate areas of the US, groundwater is most likely to discharge to the surface water body. In arid regions, the surface water body is likely to recharge water into the aquifer, thus creating a barrier to further downgradient flow. In flow-through systems (where groundwater both discharges to and is recharged by the surface water body) chemical changes and dilution will take place in the surface water body, thus invalidating the assumptions of the groundwater transport modeling used in the CCW Risk Assessment. The data

distributions provided by the USEPA in the risk assessment (Appendix C) show that the median distance to a drinking water well is 427m while the median distance to a surface water body is 120m. Clearly, it would not be possible for contaminants in the groundwater to migrate to reach a significant proportion of the population of drinking water wells considered, due to the intervening presence of a surface water body.

USEPA acknowledged these facts in its 1993 Final Regulatory Determination for management of coal combustion products (58 FR 42466): "Potential for human exposure to groundwater contamination from coal combustion wastes is limited because of the location of most coal combustion sites. Based on a random study of one hundred sites, only 29 percent of the sites have any population within 1 kilometer, and only 34 percent of the sites have public drinking water systems within 5 kilometers." Furthermore, "Coal combustion units also tend to be near surface water bodies. The same RTC study revealed that 58 percent of the sites are within 500 meters of a surface water body. The volume and flow rate of surface water would tend to dilute and divert the contaminant plume."

Therefore, the probabilities of risk generated by the Monte Carlo analysis are not appropriate or accurate because the Monte Carlo simulations do not consider the appropriate probability that a drinking water well will be present at all, nor that the well could be present in any direction from the facility. The risk probabilities are therefore inaccurate and conservative to the point that they are not a useful indicator of the range of potential risks from coal combustion product management units.

4. In modeling the transport of constituents in groundwater in the risk assessment, all chemical reactions that take place during transport are captured in a single parameter which is termed the "effective soil-water partitioning coefficient." Based on the outcome of the risk assessment, it appears that this parameter is not adequate to represent some important attenuation processes, most importantly, the mobility of arsenic which is controlled by redox conditions.

- The mobility and attenuation of certain metals, including arsenic, iron, manganese, and selenium, is controlled by the redox conditions of the groundwater. For example, in reducing environments, arsenic occurs in a reduced form that is soluble, and so is mobile in groundwater systems. Under oxidizing conditions, it occurs in an oxidized form that bonds with other ions, creating an insoluble molecule that precipitates out of solution. It is not clear that this very common process that controls the fate of arsenic in groundwater is adequately included in the CCW Risk Assessment.

- The master variables for the effective soil-water partitioning coefficient used in the modeling include groundwater ionic strength, pH, soil organic carbon, and availability of iron oxide sorption sites. This latter parameter may account for some of the redox affects that are important in transport and attenuation of arsenic (and other metals). However, it appears that this parameter was used in the generation of the isotherms, but was not varied in the risk assessment itself, which only varied pH and organic carbon. Therefore, it is unclear how the redox effects were actually incorporated in the risk assessment.

- The importance of these processes in attenuating the transport of many metals in groundwater is clear when actual groundwater data are examined. While elevated levels of metals may be present in leachate and even in monitoring wells adjacent to waste management units, only rarely are these same metals transported any significant distance from the units. USEPA should be well aware of this based on their participation in hundreds of groundwater contamination studies. Research with respect to coal combustion products in particular has been presented at the Ash Utilization Symposia (www.flyash.org) and is an active research area for EPRI.

- In the risk assessment, USEPA states that "there is evidence at CCW disposal sites that suggests that arsenic III is rapidly converted to arsenic V during subsurface transport, with the result that drinking water standards are rarely exceeded in offsite groundwater in spite of high landfill leachate concentrations." (pg. 4-30) This contradiction between actual arsenic concentrations observed in

groundwater and the results of the risk assessment suggest that arsenic attenuation processes are not being adequately simulated in the risk assessment models. The fact that USEPA has made this statement of conditions observed in actual fact, and yet they continued to perform the risk assessment with results that violate reality renders the entire risk assessment suspect.

- The USEPA does discuss the issue of arsenic mobility in their sensitivity analysis. To address this, they conducted Monte-Carlo simulations using the less mobile form of arsenic. They concluded the difference in calculated risk was a factor of 2. This conclusion further supports the idea that the risk assessment is not adequately simulating arsenic attenuation. For arsenic V to be present and stable, the groundwater must be aerobic that is, under oxidizing conditions. Under these conditions, the arsenic is relatively insoluble and not mobile in groundwater. If the modeling were adequately capturing arsenic reaction processes, there should be a much more significant difference between the results for the two different arsenic species.

There are thousands of papers and articles discussing the transport of metals in groundwater; some examples follow:

Adriano, Domy C. Trace Elements in Terrestrial Environments: Biogeochemistry, Bioavailability and Risks of Metals. New York: Springer.

EPRI. 1986. Mobilization and Attenuation of Trace Elements in an Artificially-Weathered Fly Ash. EPRI Report EA-4747.

EPRI. 2000. Environmental Chemistry of Arsenic: A Literature Review. EPRI Technical Report 1000585.

EPRI. 2004. Chemical Attenuation Coefficients for Arsenic Species Using Soil Samples Collected from Selected Power Plant Sites: Laboratory Studies. EPRI Technical Report 1000505.

EPRI. 2008 (in preparation). Chemical Constituents in Coal Combustion Product Leachate: Arsenic. EPRI Technical Report.

International Ash Utilization Symposia. Biennially 1995-2007. Proceedings and selected papers available at www.flyash.org.

Welch AH and KG Stollenwerk. 2003. Arsenic in Groundwater: Geochemistry and Occurrence Kluwer Academic Publishers.

5. Use of the total mass of the constituent in the waste is an inaccurate representation of the leaching process from the landfill units for most constituents.

Literature and research document that only a small fraction of most constituents is available to be leached from coal combustion products (see, for example, many of the same references cited in Comment 1 above). The US DOE National Energy Technology Laboratory has conducted specific tests to evaluate the range of extractable mass for various constituents from fly ash (see references below). Based on these studies, most constituents were shown to leach less than 2% of their mass in water, and less then 20% of their mass in a sulfuric acid solution. None of the constituents tested was shown to leach more than 65% of its mass to any of the solutions used. Therefore, by modeling leaching of these relatively immobile constituents (such as lead) throughout the hundreds of years required until the total mass is removed results in an unrealistic loading to groundwater and transport of these constituents to unrealistic distances. This assumption leads to a great overestimate of concentrations of certain constituents at receptor locations, and consequently overestimates risk.

Kim, Ann G and George Kazonich (NETL). 1999. Mass Release of Trace Elements from Coal Combustion By-Products. In Proceedings: 1999 International Ash Utilization Symposium, Lexington, Kentucky.

Kim, Ann G and George Kazonich (NETL). 2001. Release of Trace Elements from CCB: Maximum Extractable Fraction. From ACAA 14th International Symposium on Management and Use of CCP, Jan 2001, San Antonio, Texas.

Kim, Ann G, George Kazonich and Michael Dahlberg (NETL). 2003. Relative Solubility of Cations in Class F Fly Ash. Environ. Sci. & Tech, Vol., 37, No. 19, pp. 4507-4511.

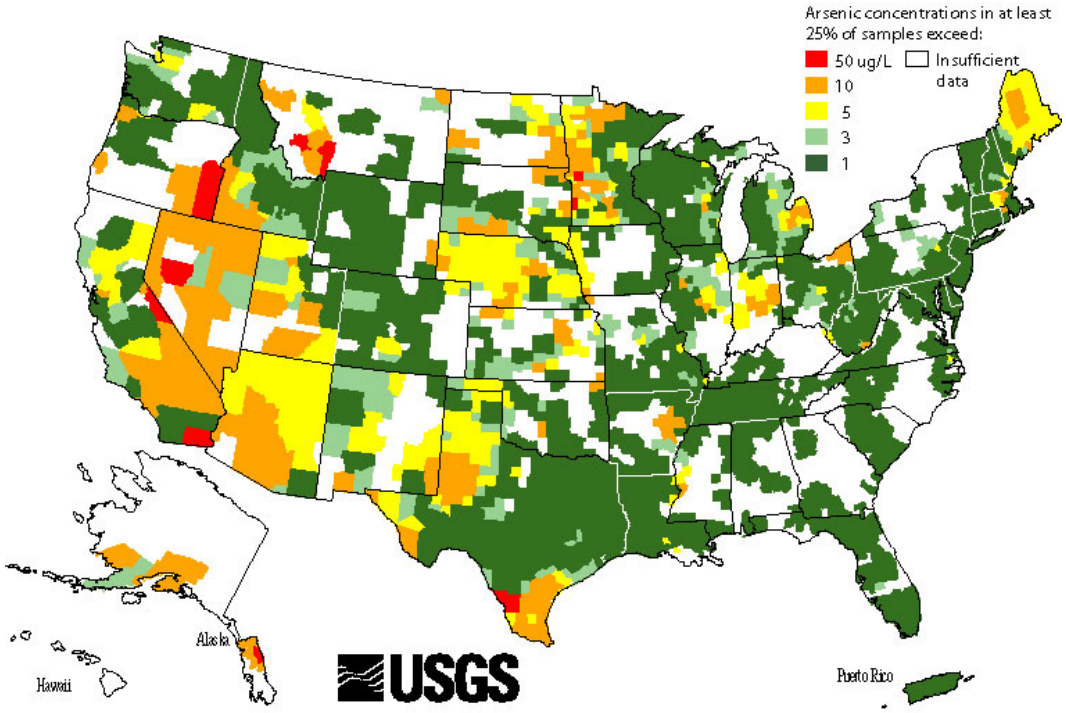
6. Use of a 10,000-yr simulation period for source and transport modeling is not representative.

Use of this 10,000-year simulation period is unrealistic in that it assumes all other conditions within the modeling are essentially unchanged during this period (for example, groundwater hydraulic gradients, locations of surface water bodies, locations of receptors, etc.). In reality, it can be expected that these conditions will change drastically over 10,000 years, just as such changes have taken place in the last 10,000 years. The most recent Ice Age came to a close approximately 15,000 years ago, and entire hydrologic systems have been created and modified since that time. It would not be surprising for just as significant changes to take place in the next 10,000 years due to natural and/or man-made factors (such as climate change). Therefore, modeling over 10,000 years creates results that are highly uncertain and unrealistic.

7. The calculated risks for arsenic in groundwater due to coal combustion products are no greater than those for background levels of arsenic in groundwaters of the US (and most likely significantly less than background based on overly conservative assumptions in the risk assessment).

Arsenic is a naturally-occurring metal present in many natural geologic materials throughout the United States. Under anaerobic chemical conditions (see discussion of arsenic mobility above), it dissolves from these materials into the surrounding groundwater. Groundwater typically loses oxygen and becomes more anaerobic as it becomes older and flows away from recharge areas. Therefore, much of the groundwater in the United States is naturally anaerobic. Where these groundwaters are in contact with or have migrated through geologic materials containing arsenic, arsenic would be expected to be naturally present in the groundwater.

The USGS has conducted significant research on the presence of arsenic in groundwater, much of which is available on-line. The following map prepared by USGS shows arsenic concentrations in groundwater on a county basis.



Source: USGS. (on-line) Arsenic in ground water of the United States. http://water.usgs.gov/nawqa/trace/arsenic/

The drinking water standard (MCL) for arsenic is 10 ug/l. Clearly there are significant areas in the US where natural arsenic concentrations in groundwater are above this level. Although USEPA's risk assessment doesn't present the predicted concentrations of arsenic in groundwater, based on the risk levels presented, the associated concentrations calculated in the risk assessment must be within the ranges of natural background. For example, based on the toxicity information provided in USEPA's Integrated Risk Information System (IRIS) database [http://www.epa.gov/iriswebp/iris/index.html], the following risks would be associated with the arsenic concentrations presented on the map above:

Concentration	Risk
50 ug/L	2.5×10^{-3}
10 ug/L	5×10^{-4}
5 ug/L	2.5×10^{-4}
3 ug/L	1.5×10^{-4}
1 ug/L	5×10^{-5}

Note that all of the risk levels associated with naturally occurring levels of arsenic in groundwaters of the US are greater than the "target" risk level of 10^{-5} identified by USEPA in the CCW Risk Assessment. Therefore, even if the risks estimated by the risk assessment are reasonable (which they are not), they are no greater than background, and so the conclusions of the risk assessment do not support the need for further regulation or management of CCW.

4.0 Human Health Risk Assessment

1. The human health risk assessment exposure parameter distributions are vague and inappropriate.

For the human health risk assessment, distributions were developed for a wide range of human exposure assumptions including body weight, fish ingestion rate, exposure duration and drinking water ingestion rate. Just enough general detail is provided regarding the approach used to fit distributions to statistical data to give the impression that the approach used was technically sound. However, the documentation for specific individual parameters is at the same time sufficiently vague so as to prevent an independent reviewer from determining if the resulting distributions are appropriate. For example, distributions for assumptions such as body weight and drinking water ingestion rate were assigned minimum and maximum values with the intention of limiting the Monte Carlo analysis to sampling a finite range of values for each distribution. While this seems like a reasonable step, no discussion or documentation is provided regarding the statistics or data used to limit the range of such distributions.

With regard to childhood exposures, the life of a child is considered in stages represented by four cohorts (ages 1 to 5, 6 to 11, 12 to 19, and 20 to 70). For each iteration in the probabilistic analysis, the specific cohort being assessed was selected based on the exposure duration. This requires that for each iteration the child is assessed through all of the appropriate age cohorts starting with year 1 until the age corresponding to the exposure duration is reached. While not explicitly documented in the approach to the Monte Carlo analysis, this would also seem to require that other age dependent variables such as body weight and drinking water ingestion rate corresponding to the appropriate cohort also be sampled in each iteration. However, the interdependency of these variables is not discussed.

Children may be more sensitive receptors than adults. This is primarily due to the fact that children may eat more food or drink more water per unit of body weight than an adult. Therefore, in risk assessment they may typically be predicted to experience a higher average daily exposure. The distributions developed for the risk assessment, and the technique used to sample from these distributions in the risk assessment, may contribute to artificially inflated estimates of average daily dose. This is because the minimum and maximum values imposed on the distributions for body weight and drinking water ingestion rate overlap between cohorts. Thus, it is possible to sample an unrealistically low body weight for a child cohort while at the same time sampling an unrealistically high drinking water ingestion rate for that same cohort. For example, the minimum value imposed on the body weight distribution for child cohort 2 (ages 6 to 11) is 6 kg (13 lbs) and the maximum value imposed on the distribution for drinking water ingestion rate is 4.2 liters per day (see table below). Given that the mean body weight and drinking water ingestion rate for this cohort are 30.7 kg (68 lbs) and 0.79 liters per day, the combination of sampling from the extreme and opposite ends of these distributions will likely substantially overestimate risk for this population.

Given the overlapping of minimum and maximum values imposed on exposure assumption distributions, and the potential for the Monte Carlo analysis to sample from artificially low or artificially high ends of the distributions for each childhood cohort, the distributions established for estimating childhood exposure in particular are not appropriate. However, the relatively incomplete documentation and the lack of a graphical representation of the probability density function for the assumed distributions and the results make it difficult, if not impossible, to adequately assess the technical appropriateness of the distributions, and the stability or reasonableness of the results. Furthermore, the exact approach used to implement the sampling of childhood exposure distributions as part of the Monte Carlo analysis is inadequate. It is impossible to tell from the provided documentation whether any logic checks have been implemented to minimize or eliminate the potential for exposure combinations to be drawn from extreme and opposite ends of the described distribution. Thus, the appropriateness of the exposure assessment cannot be adequately assessed based on the documentation provided by USEPA.

Summary of the Range of Values Imposed on the Exposure Distributions Assigned to the Four Child Cohorts Defined in the Draft CCW Risk Assessment

Parameter	Units	Minimum	Maximum
Exposure Duration (child)	year	1	50
Body Weight (ages 1-5)	lbs	8.8	110
Body Weight (ages 6-11)	lbs	13	441
Body Weight (ages 12-19)	lbs	29	661
Body Weight (ages 20-70)	lbs	33	661
Drinking Water Ingestion Rate (ages 1-5)	L/day	0.26	3.8
Drinking Water Ingestion Rate (ages 6-11)	L/day	0.034	4.2
Drinking Water Ingestion Rate (ages 12-19)	L/day	0.033	5.4
Drinking Water Ingestion Rate (ages 20-70)	L/day	0.104	11
Fish Ingestion Rate (adult, child)	g/day	0	1500

2. The Fish Consumption Rate Distribution Overestimates Exposure and Risk

The distribution of freshwater fish consumption rate used in the USEPA's draft CCW Risk Assessment is lognormal with a population estimated mean of 6.48 grams per day and standard deviation of 19.9 grams per day. As discussed below, this distribution was developed from percentile data provided in the USEPA's Exposure Factors Handbook (USEPA, 1997), which in turn were taken from the study of Ebert et al. (1993). As used in the draft CCW Risk Assessment, the fish consumption rate distribution is intended to apply to all age groups.

There are a number of significant limitations associated with the fish consumption rate distribution that make its application in the CCW Risk Assessment inappropriate and result in overestimates of potential exposure and risk from fish consumption. These limitations include both the poor documentation of the derivation of the probability distribution, as well as assumptions made in the use and application of the underlying data. The major limitations include the following:

- The lack of documentation and transparency in the development of the fish consumption rate distribution make it difficult to judge the technical defensibility of the chosen parametric distribution;
- The assumption that the fish consumption rate distribution represents all of the population residing near a coal combustion product waste management unit, including those who do not fish or do not eat local freshwater fish, is not realistic or appropriate;

- The application of the adult consumption distribution to child age groups is not realistic or appropriate;

- The assumption that all of the fish consumed comes from an affected water body is not realistic or appropriate; and

- The consumption rate distribution may be overestimated due to the survey methodology used (i.e., recall bias) in the study upon which the distribution is based.

As noted above, the fish consumption rate distribution is assumed to be lognormal with a mean of 6.48 g/day, a standard deviation of 19.9 g/day, a minimum of 0 and a maximum of 1500 g/day. Percentile data provided in USEPA's Exposure Factors Handbook (USEPA, 1997) were fit to various parametric models and based on goodness of fit tests, the lognormal distribution was identified as the most appropriate model. While a lognormal distribution may be appropriate, the lack of the documentation, including the goodness of fit tests, and the lack of a graphical representation of the probability density function make it difficult, if not impossible, to adequately assess its technical appropriateness.

Another major shortcoming of the assumed distribution is the maximum or truncation of the distribution at 1500 g/day (3.3 pounds per day). No discussion of the basis for this truncation is provided. This exposure level equates to approximately 2,312 fish meals per year, or more than 6 fish meals/day assuming a typical fish meal size of 227 grams (half a pound). This is clearly unrealistic, and it is not clear why such an extreme maximum was chosen, as this rate is well above high end consumption rates reported in the literature for Native Americans and other sensitive fish consuming subpopulations. The USEPA default subsistence fish consumption rate is 150-160 g/day (which equates to approximately 246 fish meals per year) (USEPA, 1997). Native American subsistence anglers in Oregon have been reported to consume 540 g/day (Harris and Harper, 1997). However, subsistence fish consumption rates of 300 to 600 g/day require access to large productive water bodies, such as the Columbia River, which is not representative of all of the water bodies targeted in the CCW Risk Assessment. In fact, it is not possible for a small water body to yield the fish biomass needed to support subsistence fish consumption. The CCW Risk Assessment does not address this implausibility or, equally important, acknowledge the interdependency of fish consumption rate and water body size. Because the CCW Risk Assessment does not provide graphical representations of the input or output distributions, it is not possible to quantitatively understand how this artificially high truncation of the distribution has affected the results. While the effect of truncating at a lower more realistic rate is uncertain, it would narrow the output distribution and likely result in lower, and more realistic, upper percentile values.

A major drawback of the fish consumption rate distribution used in the USEPA's draft CCW Risk Assessment is that it represents consumption for anglers and their family members only (Ebert et al., 1993). It does not represent consumption rates for the general population that resides in the area of a coal combustion product waste management unit, but does not fish or consume locally caught fish. Freshwater fish consumption rates for the general US population are lower than rates for anglers (Ruffle et al., 1994; Finley et al., 1994). Available fish consumption data could be used to develop a distribution for the general population, or a combined distribution could be developed that includes both the general and angling populations. Another option to address this deficiency is to include the probability that the receptor is an angler. This could be based on the percentage of licensed anglers within a state (and assuming that fraction is representative of the area near the facility).

Another limitation is that the fish consumption rate distribution is assumed to represent all age groups. This is an unrealistic assumption to apply to children, who are likely to consume less freshwater fish due to their smaller size and body weight and different food preferences from those of adults. Data are available for which distributions could be developed for fish consumption by age group (Ruffle et al., 1994). At a minimum, the distribution for adult anglers could be scaled according to body weight, on a year by year basis or at least for the four age groups used in the draft CCW Risk Assessment (1-5 years, 6-11 years, 12-19 years, and 20+ years).

Another major drawback of the draft CCW Risk Assessment is the assumption that the fraction of contaminated fish consumed by the receptor is a fixed constant of 100%. This translates to the assumption that all fish come from the stretch of the water body that intersects the groundwater plume downgradient of the waste management unit. USEPA states that this assumption was made due to lack of data and "EPA policy." However, it is unrealistic to assume that someone consumes fish only from an impacted water body, particularly if the water body is small and supports a limited fish population. The variability in fraction contaminated could be accounted for by developing a distribution that accounts for the probability that anglers fish at multiple water bodies. If data are limited, this could be a simple uniform or triangular distribution. The fraction contaminated will also differ for populations living near the coal combustion product waste management unit versus populations living far away. The variability in this parameter could be included in the CCW Risk Assessment by developing a distribution that accounts for population census data as a function of distance from the waste management unit, with a decreasing probability of consuming fish caught with increasing distance from the affected water body.

The fractions of trophic level 3 and 4 fish consumed were assumed to be fixed constants of 0.36 and 0.64, respectively. These were based on the Maine angler study, and thus are likely not representative of trophic level 3 and 4 fractions for other parts of the US. A distribution that accounts for the variability in fish types as well as preferences should have been developed.

It is also worth noting that the Maine survey, as with other mail recall surveys, may be subject to recall bias. Connelly and Brown (1995) found that anglers reported significantly higher rates of fish consumption and numbers of days fished in a 12-month mail recall survey compared to 12-month diary studies (where participants record daily fish consumption). This difference is greater for anglers who fish more frequently than for those who fish less frequently, resulting in even greater disparities between upper percentiles based on diary studies versus those based on recall surveys. These data suggest that the Maine angler data are more likely to overestimate than underestimate fish consumption rates for freshwater sport anglers.

Connelly, N. and T. Brown. 1995. Use of Angler Diaries to Examine Biases Associated with 12-Month Recall on Mail Questionnaires. Transactions of the American Fisheries Society, 124 (3): 413-422.

Ebert, E. et al. 1993. Estimating consumption of freshwater fish among Maine anglers. N. Am. J. Fisheries Management, 13:737-745.

Finley, B. et al. 1994. Recommended Distributions for Exposure Factors Frequently Used in Health Risk Assessment. Risk Analysis, 14(4):533-553.

Harris, S. and B. Harper. 1997. A Native American Exposure Scenario. Risk Analysis, 17(6):789-795.

Ruffle, B. et al. Lognormal distributions for fish consumption by the general U.S. population. Risk Analysis, 14(4):395-404.

USEPA. 1997. Exposure Factors Handbook. Volume II. Food Ingestion Factors. EPA/600/P-95/002Fb.

3. The documentation of the toxicity values used in the Draft CCW Risk Assessment is inconsistent within the risk assessment report. At a minimum this documentation should be clarified and if necessary the calculations updated to reflect the use of the appropriate toxicity values.

It is not clear from the documentation provided whether or not appropriate and/or current toxicity information was used, nor are the implications of this issue discussed as an uncertainty in the risk assessment report. For the human health risk assessment, toxicity criteria were presented in Chapter 3 and Appendix G. The criteria

presented in these two locations are not the same. It appears that several of the values presented in Appendix G may be out of date or incorrect relative to those presented in Chapter 3. While several changes or updates could be made to clarify this issue, it is most critical for constituents identified as risk drivers such as boron.

Boron was identified as a risk driver in the CCW Risk Assessment results for the human health drinking water pathway for several surface impoundment scenarios. If the out-dated human health reference dose (RfD) presented in Appendix G (0.09 mg/kg-day) was used in the CCW Risk Assessment, potential risks may have been overstated by a factor of 2.2 relative to the current reference dose (0.2 mg/kg-day) presented in Chapter 3. Given that the risk assessment was conducted in 2003, USEPA should insure that the most up to date toxicity values are incorporated into the risk calculation prior to finalizing draft CCW Risk Assessment.

The RfD for aluminum presented in both Chapter 3 and Appendix G has also been updated since the risk assessment was conducted. The value has decreased by a factor of two from 2 mg/kg-day to 1 mg/kg-day (as reported in USEPA, 2007). Aluminum was screened out from the detailed analysis in an early stage of the CCW Risk Assessment (USEPA, 2002), where constituents with hazard quotients less than 1 were not carried on for further evaluation. If one assumes that the initial hazard quotient for aluminum was 1, the decrease in the RfD would result in a screening level hazard quotient of 2. Table 2-3 of the CCW Risk Assessment lists the constituents (and their hazard quotients) that were identified in the screening analysis (USEPA , 2002). Full-scale modeling was conducted in the CCW Risk Assessment on a subset of these constituents; those constituents with a hazard quotient greater than 6 for any of the human health pathways were included in the detailed CCW Risk Assessment. As the maximum screening level hazard quotient for aluminum using the updated RfD is only 2, it would not have been selected for the detailed analysis even if the updated RfD had been used in the evaluation. Thus the change in the aluminum toxicity information would result in no change in the outcome of the risk assessment.

By contrast, the RfD reported for barium in Chapter 3 of the risk assessment report (0.2 mg/kg-day) is 2.9 times that reported in Appendix G of the risk assessment report (0.07 mg/kg-day). The RfD presented in Chapter 3 is the appropriate RfD to use for barium. The screening level hazard quotient for barium was less than 1 (see Table 2-3); if this hazard quotient were based on the use of the outdated RfD presented in Appendix G then the screening level hazard quotient may be overestimated by a factor of 2.9. However, any change to the RfD values for barium would have no significant effect on the CCW Risk Assessment results.

4. The risk characterization for lead is incomplete.

The risk characterization for lead is based solely on a comparison of the groundwater concentration to the Treatment Technology Action Level (TTAL) for lead of 15 ug/L. The USEPA models for lead exposure in children (IEUBK) and adults (ALEM) should have been used. It cannot be determined with the information provided what affect the use of these models would have on the risk assessment results.

5. The risk characterization scenarios are inappropriate.

The risk assessment has evaluated potential risks associated with landfills and surface impoundments for unlined units, clay-lined units, and composite-lined units (Tables 4-3 through 4-10). However, risk results are also provided for a category called “all units combined.” This category has no basis in reality and these results should be removed from the risk assessment.

6. The risk characterization should have provided more information to put the results in context.

In addition to the fact that none of the output distributions are presented in the Draft CCW Risk Assessment, as discussed previously, there are several other flaws in the risk characterization that prevent the results from being viewed in context, and this context is necessary if informed risk management decisions are to be made.

- The draft CCW Risk Assessment adopted for this assessment a risk criteria of "1 chance in 100,000 (10^{-5} excess cancer risk)." The footnote to this criteria in Section 1 of the risk assessments correctly notes that the OSWER typical cancer risk range is 10^{-6} to 10^{-4}, and that the point of departure for hazardous waste listings is 10^{-5}. A bright line at this level is not appropriate for this risk assessment; the results should be put in the context of the risk range, especially considering the following issues.

- The risk results need to be put into context. Currently the background cancer risk in the US is 1 in 2 for men and 1 in 3 for women. These are orders of magnitude above the target risk range of 10^{-4} (1 in 10,000) to 10^{-6} (1 in 1,000,000) used for USEPA decision making.

- Arsenic is the only potential carcinogen identified for the Monte Carlo analysis. As noted in Section 3 above, it is likely that many of the model-predicted arsenic concentrations in groundwater in the draft CCW Risk Assessment are consistent with background levels in the US (see the discussion of the USGS map). The calculated risk for the landfill scenarios is within the background groundwater risks provided in Section 3 above, and the surface impoundment calculated risks are only slightly above the highest concentration provided by the USGS. Note that the USGS truncated their data display at 50 ug/L, which is the former drinking water standard for arsenic.

- The uncertainty in the toxicity values needs to be addressed more fully in the risk characterization. The text merely states that the toxicity values are derived using a health-protective approach, but there are many issues (e.g., extrapolation from animals to human, extrapolation from high test doses to low environmental doses) that the report needs to address to better describe the uncertainty in these values.

- The report does not address adequately the fact that for each parameter modeled, there is a different peak arrival time at the point of exposure, and these arrival times can range up to 100s if not 1,000s of years. For each constituent and scenario, the distribution of the arrival times should be presented so that the reviewer can put the temporal framework in context. The report does correctly acknowledge that the risks are not additive under this peak arrival time scenario, i.e., that it is unlikely that the peaks will coincide for any two or more constituents.

- The report states that the noncancer results were based on the child receptor, however, it is unclear from the model description how these results could have been calculated separately, and which child cohort was selected. These methods and results need to be clearly described in the report.

ACS. 2006. Cancer Facts and Figures – 2006. American Cancer Society. [http://www.cancer.org/downloads/STT/CAFF2006PWSecured.pdf]

USEPA. 1996. Recommendations of the Technical Review Workgroup for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. Technical Review Workgroup for Lead. U.S. Environmental Protection Agency. December 1996.

USEPA. 2007. Risk-Based Concentration Table. Superfund Technical Support Section. U.S. Environmental Protection Agency, Region III, Philadelphia, PA. April 2007. [URL: http://www.epa.gov/reg3hwmd/riskmenu.htm]

5.0 Ecological Risk Assessment

1. The evaluation of potential ecological risks is overly conservative and only represents a screening level evaluation.

Although the CCW Risk Assessment was conducted in two phases, termed the screening analysis and the full-scale analysis, the full-scale ecological risk assessment (ERA) would still be considered a screening level evaluation in the USEPA risk assessment framework (USEPA, 1997). Screening-level risk assessments may be used as a first step in priority setting, and the conservative assumptions made at this stage "should consistently be biased in the direction of overestimating risk." (USEPA, 1997, pg. 1-2) This level of risk evaluation is appropriate to identify scenarios that would not result in significant risk under even the worst-case scenario. These potential hazards would be "screened out" and require no further assessment. However, if the screening level assessment indicates the potential for risk, then a more comprehensive assessment may be warranted to estimate the risk more accurately.

Therefore, if potential hazards to ecological receptors are identified at the screening level (i.e., in the current CCW Risk Assessment), then a more definitive baseline ERA should be conducted in which the conservative assumptions used in the screening level ERA are replaced with more realistic exposure assumptions and comparisons made to ecologically relevant benchmarks. USEPA has not taken this next step to develop a more representative ERA in its CCW Risk Assessment. Therefore, this ERA is only appropriate for identifying scenarios which can be "screened out" if they do not result in ecological risks under the worst-case scenario. Due to the use of conservative assumptions, a screening level ERA cannot be used to definitively identify situations or contaminants which result in risks to ecological receptors. USEPA guidance supports this statement when it indicates that basing a site cleanup on the results of a screening level ERA using conservative assumptions would be "not be technically defensible." (USEPA, 1997, pg 2-6) Several of the conservative, screening level assumptions incorporated into the full-scale ERA presented in the CCW Risk Assessment are discussed below.

The CCW Risk Assessment indicates that the ecological screening levels (also identified as chemical stressor concentration limits (CSCLs)) used in the screening and the full-scale analyses are identical and were derived during a previous risk assessment (USEPA, 1998). The only difference between the two assessments was in the media concentrations that were compared against the CSCLs. While Monte Carlo simulations were incorporated into the modeling of the media concentrations in the full-scale analysis, only discrete point values, not distributions, were used in the derivation of the CSCLs. This means that there are a number of conservative assumptions that are built into the exposure assumptions used to derive CSCLs, and they do not reflect the potential variability that is present among ecological receptors. This approach negates the utility of the Monte Carlo process which is used to incorporate and summarize the concurrent effect of ranges or distributions of exposure variables. It may be noted that the authors recognized the importance of evaluating exposure assumption distributions in the human health risk assessment and did incorporate distributions (e.g., body weights, ingestion rates) and Monte Carlo simulations in evaluating human health exposure to modeled media concentrations, but the CCW Risk Assessment did not do the same for the ERA.

Some conservative point values included in the derivation of ingestion-based CSCLs for wildlife receptors (i.e., birds and mammals) include: the selection of single values for receptor body weights and ingestion rates, the exclusive use of no observed adverse effect level (NOAEL) based toxicity studies to assess effects, setting the CSCL equal to a hazard quotient (HQ) of 1, assuming all prey ingested in the diet are coal combustion product-contaminated, assuming diets are exclusively either coal combustion product-contaminated fish or benthic invertebrates in the aquatic scenarios, assuming 100% bioavailability of all constituents, selecting single bioconcentration factors (BCFs) instead of regression-based equations that better represent changes in bioconcentration with changes in media concentrations, and assuming that upper trophic level 3 and 4 fish are present at each site (smaller water bodies modeled in the risk assessment would likely support a relatively

limited fish community and may not have trophic level 4 fish). Each of these conservative assumptions is designed to over-estimate the potential for ecological risk. The use of multiple conservative assumptions compounds the level of conservatism resulting in highly improbable scenarios (e.g., kingfisher obtaining 100% of diet from coal combustion product-contaminated trophic level 3 fish in a stream segment the length of the groundwater plume or a 13 acre lake adjacent to disposal site).[1] While this is typical for screening level assessments, it is not appropriate for the evaluation that the Agency has conducted here.

The CSCLs selected in each medium (i.e., surface water and sediment) were the lowest CSCLs derived for each compound due to direct contact or ingestion of prey items in that medium. Therefore, the CSCL represents the value that is protective of the most sensitive receptor, whether they are aquatic or sediment-dwelling receptors or wildlife receptors feeding on contaminated prey. This assessment assumes that all receptors are likely to be present and exposed to coal combustion product contamination at each facility. It would be more appropriate to derive separate CSCLs for direct contact and ingestion for each compound in each medium (instead of selecting the lowest value) and evaluate the direct contact and ingestion pathways separately (similar to evaluating drinking water and fish consumption exposures separately in the HHRA). This would better identify the risk drivers in each scenario and allow more appropriate risk management decisions.

Direct contact exposure of fish or benthic invertebrates to surface water or sediment is more likely to occur at most sites than wildlife exposure to contaminated prey. The wildlife receptors evaluated in the risk assessment (i.e., mink, river otter, bald eagle, osprey, great blue heron, mallard, lesser scaup, kingfisher, spotted sandpiper, herring gull) are found in fairly specific ecological habitats and are not likely to be present in the vicinity of all facilities. As discussed previously, the use of conservative exposure assumptions is likely to over-estimate potential risks to wildlife receptors. Although it is not clear from the documentation, if an elevated wildlife-based HQ is calculated in the ERA, it would be appropriate to identify whether the exposure pathway(s) responsible for the majority of the risk, as modeled, actually exists. Species distribution data and GIS mapping could be incorporated into a Monte Carlo analysis to assess the likelihood of wildlife species (based on habitat availability) being present near facilities. This information, as well as distributions of receptor sizes and diets, would allow a more realistic evaluation than the screening level assessment in the current report.

The CCW Risk Assessment does indicate that the CSCLs are 'fairly conservative' since they are generally based on no effect data and that an HQ of 10 may not be ecologically significant for evaluating impacts to many natural populations. HQs between 1 and 10 may be appropriate for assessing risks to threatened and endangered species. In the Wastes from the Combustion of Coal by Electric Utility Power Plants - Report to Congress (USEPA, 1988), plants or animals of concern were located within a 5km radius of the waste management units at between 12% and 32% of the sites. Therefore, an HQ of less than 10 would overestimate risks at between 88% and 68% of the sites where such habitats and ecological receptors were non-existent. All of the 50th percentile HQs and the majority of the 90th percentile HQs were below 10 (Table 4-14 and 4-15), indicating that risks at these levels are generally not ecologically significant.

2. There is a lack of transparency in the ecological risk assessment that makes it difficult to evaluate.

Transparency in risk assessment documentation is necessary in order to effectively communicate the methodology and results to decision makers, interested stakeholders, and the public. The ERA is lacking in transparency in terms of methods and critical assumptions which makes it difficult to evaluate the results.

[1] The kingfisher territory size is larger than the water bodies modeled in the risk assessment and a diet of all fish is an oversimplification of the kingfisher diet. Mean territory size for kingfishers ranges from 0.24 to 1.4 miles of shoreline and diets include significant amounts of insects, amphibians, and crayfish (USEPA, 1993).

For example, the ERA results are presented for receptors exposed to CCW constituents in two Waste Management Unit (WMU) types (landfills and surface impoundments). However, there is no explanation as to why the HHRA evaluated exposure from multiple unit types (clay lined, unlined, composite lined) while the ERA results were extrapolated as representative for all liner types combined. This information would be relevant for managing wastes for protection of ecological receptors. Potential ecological risks should be presented for each unit type in order to "screen out" specific WMUs which do not result in elevated HQs and focus efforts on unit types that may need additional evaluation.

The CCW risk assessment indicates that two significant portions of the ERA are presented in other documents: the initial screening level analysis (USEPA, 2002) and the derivation of the CSCLs (USEPA, 1998). The screening level analysis document (USEPA, 2002) does not appear to be publicly available on-line so it could not be evaluated. The CCW risk assessment indicates that the ecological benchmarks are presented in Appendix H, but the majority of the CSCL derivation and discussion is presented in Appendices I and J of the *Draft Final Non-groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 Draft Final Report* (USEPA, 1998). The unavailability or confusing reference citation to key underlying documents prevents public review and appropriate evaluation of the CCW risk assessment process.

The use of the spotted sandpiper CSCL as a sediment ingestion benchmark requires significant clarification. Table H-1 in the CCW risk assessment (USEPA, 2007) indicates that the ingestion exposure pathway is not being considered for sediment exposure and no discussion of a sediment ingestion-based benchmark is presented in the appendix. However, in Table H-3, the spotted sandpiper appears as the most sensitive receptor for seven constituents. If the reader refers to the 1998 risk assessment, Appendix J indicates that the sandpiper has been included in the sediment CSCL selection process in order to 'protect all ecological receptors.' However, no equation is presented in either document that shows how the spotted sandpiper sediment benchmark is derived. It appears that the sandpiper ingests 100% aquatic invertebrates (USEPA, 1998; Table 11.1 in Appendix J), but no water-to-invertebrate BCFs were identified (USEPA, 1998; Table 11.2 in Appendix J)[2]. This methodology for deriving a sediment ingestion benchmark is flawed. It would be more appropriate to use sediment to benthic invertebrate BCFs (not water-to-invertebrate BCFs) to derive sediment benchmarks for wildlife receptors.

The equations in Appendix H of the CCW risk assessment (USEPA, 2007) indicate that the lowest observed adverse effect levels (LOAELs) were used to derive wildlife benchmarks; however Appendices I and J of USEPA (1998) indicated that both LOAELs and no observed adverse effect levels (NOAELs) were used. The NOAEL-based values were used to derive the CSCLs for the CCW risk assessment (USEPA, 2007) since these represent the lowest of the wildlife benchmarks, therefore the text should be clarified to indicate that the more conservative values were used.

There are also three compounds (aluminum, boron, thallium) that do not have ecotoxicological profiles available in Appendix I of the 1998 risk assessment. Therefore, there is no detailed discussion of these constituents in either document. This lack of information is especially important since boron is identified as a constituent with an HQ greater than 1.

Table 2-3 of the CCW Risk Assessment (USEPA, 2007) identified eight constituents in surface water that warranted modeling in the full-scale ERA (arsenic, boron, cadmium, lead, selenium, aluminum, barium, and cobalt) and seven constituents (chromium, vanadium, beryllium, copper, nickel, silver, and zinc) that had HQs

[2] This lack of water to invertebrate BCFs is also a concern for calculation of benchmarks for the other invertebrate consuming receptors (mallard, lesser scaup). It appears that benchmarks were not derived when BCFs were not available, however this should be indicated in the text.

greater than 1 in the screening analysis but were not modeled in the full scale ecological analysis due to a lack of resources. It is unclear whether sediment exposures were considered in the screening analysis (in part because the screening analysis document (USEPA, 2002) could not be found on-line or obtained from the Agency or their contractor) or how decisions were made to include specific constituents in the full-scale sediment analysis (particularly because the list of constituents carried forward into the full-scale analysis in surface water and sediment were different[3]). The selection process for constituents considered in the full-scale analysis needs to be clarified, justified, and made consistent throughout the document. Alternatively, all constituents retained in the initial screening analysis could be modeled in the full-scale analysis instead of adding uncertainty to the ERA by limiting the analyte list and applying risk attenuation factors to estimate HQs for those constituents that were not included in the full-scale analysis.

3. The ERA relies on screening values and methodologies that were presented in the 1998 risk assessment. The current document should be reviewed for consistency with current EPA methods and more recent benchmarks.

By relying so heavily on the 1998 risk assessment and its dated literature, the current ERA ignores the last decade's scientific advances and does not take advantage of more current screening levels and methodologies. In addition, the use of dated values places the CCW document at variance with other EPA regional ERA guidance that periodically reviews and updates screening criteria or benchmarks (e.g., EPA Region 5 Ecological Screening Levels).

There are several inconsistencies regarding the ecological benchmarks that should be addressed. The more simplistic require a check between the CSCLs presented in Table H-3 in the 2007 CCW risk assessment and Table 5.1 in Appendix J of 1998 document. Since the 2007 CCW risk assessment states that all CSCLs were derived in the 1998 document, justification is needed when this is not the case (e.g., selenium aquatic value, total arsenic aquatic value, total chromium aquatic value, boron soil value, vanadium soil value). The report needs to clarify which surface water criteria for arsenic, chromium, and selenium were used to derive the surface water HQs (i.e., criteria for total metal or metal species).

The BCFs used to derive fish tissue concentrations for evaluating human consumption of fish in the 2007 CCW risk assessment (Table 3-5) should be consistent with those used to derive the ecological fish ingestion-based CSCLs (USEPA, 1998; Table 11.2). The use of different BCFs results in different values used to evaluate fish tissue exposure in the human health risk assessment and the ERA. Two constituents (molybdenum and thallium) have a BCF in the 2007 report but not in the 1998 report; therefore an update of the ingestion-based CSCLs is warranted for these constituents.

The boron surface water benchmark used in the ERA (0.0016 mg/L) was recently shown to have been derived incorrectly[4]. The corrected value (1.1 mg/L) dramatically reduces the boron HQs; in most cases to below 1. Additional screening values have been published by EPA and others since 1998, and it would be appropriate to include these updated values in the CSCL selection process. In some cases, updated values may be more relevant than values that were available in 1998. The freshwater threshold effect concentrations (TECs) for sediment (MacDonald, et al., 2000) may be more appropriate for the majority of facilities for assessing sediment-related risk than the coastal marine sediment screening values used in the 1998 risk assessment.

There is also some debate as to the most appropriate way to scale toxicity dose concentrations between test animals and ERA receptors. The 1998 and 2007 risk assessments applied the same cross-species scaling

[3] Table 4-15 presents sediment HQs for antimony and molybdenum which were not surface water constituents.

[4] Poster presented by Tony Rodolakis of MACTEC at the November 2006 SETAC conference in Montreal with results confirmed by Dr. Glenn Suter of EPA.

equation (Sample, et al., 1996) to both birds and mammals. Other scaling factors have been presented (Mineau, et al., 1996; Sample and Arenal, 1999) and alternative scaling factors or a no-scaling approach have also been used by USEPA.

The methodologies used in the ERA should be reviewed to ensure that the methods (e.g., the use of exposure factor point values (not distributions), the use of LOAELs and NOAELs, and scaling factors) are consistent with current USEPA policy.

MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems. Arch. Environ. Contam. Toxicol. 39:20-31.

Mineau, P. B.T. Collins, and A. Baril. 1996. On the use of scaling factors to improve interspecies extrapolation of acute toxicity in birds. Regulatory Toxicology and Pharmacology. Volume 24, pages 24-29.

Sample, B.E., D.M. Opresko, and G.W. Suter. 1996. Toxicological Benchmarks for Wildlife: 1996 Revision. Risk Assessment Program. Oak Ridge National Laboratory, Oak Ridge, TN. Document ES/ER/TM-86/R-3.

Sample, B. E. and C. A. Arenal. 1999. Allometric Models for Interspecies Extrapolation of Wildlife Toxicity Data. Journal Bulletin of Environmental Contamination and Toxicology. Volume 62, Number 6. pp. 653-663.

USEPA. 1988. Wastes from the Combustion of Coal by Electric Utility Power Plants—Report to Congress. EPA 530-SW-88-002. USEPA Office of Solid Waste and Emergency Remediation. Washington, DC. February.

USEPA. 1993. Wildlife Exposure Factors Handbook. Volume I of II. Office of Research and Development. Washington, DC. EPA/600-R/R-93/187a. December.

USEPA. 1997. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Interim Final). USEPA, Office of Solid Waste and Emergency Response. Washington, DC. EPA 540/R-97/006. June.

USEPA. 1998. Non-Groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2). Office of Solid Waste, Washington, DC. June.

USEPA. 2002. Constituent Screening for Coal Combustion Wastes. Draft Report prepared by Research Triangle Institute for Office of Solid Waste, Washington, DC. September.

USEPA. 2007. Human and Ecological Risk Assessment of Coal Combustion Wastes. Draft Report prepared by Research Triangle Institute for Office of Solid Waste, Washington, DC. August.