UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities; Proposed Rule 75 Fed. Reg. 35,128 (June 21, 2010)	)	Docket ID No. EPA-HQ-RCRA-2009-0640

COMMENTS OF EARTHJUSTICE, ENVIRONMENTAL INTEGRITY PROJECT, SIERRA CLUB, NATURAL RESOURCES DEFENSE COUNCIL, SOUTHERN ALLIANCE FOR CLEAN ENERGY, SOUTHERN ENVIRONMENTAL LAW CENTER, PHYSICIANS FOR SOCIAL RESPONSIBILITY, CLEAN AIR TASK FORCE, KENTUCKY RESOURCES COUNCIL, ENVIRONMENTAL JUSTICE RESOURCE CENTER

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

The U.S Environmental Protection Agency (EPA) is on the road to resolving a 30-year old question—how to ensure the safe disposal of the second largest industrial waste stream in the nation under the Resource Conservation and Recovery Act (RCRA). Past administrations have dodged this question through avoidance and delay. The catastrophic collapse of the TVA dam in December 2008, however, makes delay and avoidance no longer an option. In the face of one the greatest environmental disasters in U.S. history, with houses torn from their foundations and 20-foot ash-bergs still floating in the Emory River, EPA Administrator Lisa Jackson in January 2009 rightly committed to regulatory action under RCRA.

At issue, however, is the precise regulatory approach. Somewhere on the path to federally enforceable regulations, EPA lost its way. Now stalled at a fork in that road, the Agency has published a "co-proposal." In this co-proposal, EPA requests comment on two extremely different options. The first is to regulate ash as a "special waste" under subtitle C, with federally enforceable minimum standards applicable in every state. The second is to regulate coal ash as a non-hazardous waste under subtitle D of RCRA with standards states are under no obligation to adopt and which cannot even be enforced by EPA.

While this 230-page comment letter will help to complete the record, the choice is already clear. The subtitle C alternative is the only option consistent with the best available science and with the law. In these comments we provide EPA with lengthy documentation responsive to the factors that the statute directs EPA to consider under both sections 8002(n) and 3001(b) of RCRA. We address first the eight study factors of the Bevill Amendment's section 8002(n), followed by the subtitle C listing factors established pursuant to section 3001(b).

Our comments and the expert appendices attached provide extensive information about volumes and nature of the waste, the significant risk to human health and the environment, the gross deficiencies of current state regulatory programs and the substantial documented damage that has occurred throughout the U.S. from mismanaged ash. Congress requires that EPA examine the volume, toxicity, damage, current regulation and current mismanagement of coal ash—these are described in detail in our comments and the accompanying expert appendices. We also face squarely the question of whether subtitle C standards would have an impact on recycling, as well as the likely cost of compliance, as these are also among the "Bevill" factors.

While the amount of information we provide to the Agency is extensive, it supports a few salient points critical to EPA's decision making:

- ***Damage from Coal Ash is Serious, Pervasive and Mounting***

Damage cases (sites with documented groundwater or surface water contamination) have increased 17-fold since 1999 to 137 sites, even in the absence of any investigation on the part of EPA to find additional sites. These sites have poisoned drinking water, destroyed entire fish populations, killed scores of livestock, created myriad superfund sites, sickened families and destroyed livelihoods. They include leaks, major spills, and the pervasive contamination of underground drinking water sources. The contamination includes toxic metals at concentrations hundreds of times above safe drinking water standards and involve some of the most toxic

chemicals known to man and aquatic life, including arsenic, cadmium, chromium, lead, mercury and selenium. The damage at most of the newly identified sites is largely unmitigated, and it represents present disposal practices, not just historical practices.

EPA has identified 67 sites that it has defined as either "proven" or "potential" damage cases, based largely on review of data brought to the Agency by environmental organizations. Our comments incorporate two reports that we have previously shared with the Agency and which identify an additional 70 sites that meet EPA's damage criteria. Because our analysis was limited to selected states and the limited data available, we include evidence to show that contamination is highly likely at many other sites. Although evaluating the damage is one of EPA's responsibilities in determining how to regulate coal ash, the Agency has done very little to seriously investigate the problem. If that continues to be the case, we hope that EPA will at least review the data that we have gathered and presented at our own expense, and determine whether these sites are as contaminated as the data suggest. In addition to these 70 well-researched sites, our comments identify dozens of more contaminated sites that require EPA's evaluation and investigation.

- ***Coal Ash Poses A Substantial Human Health Hazard***

EPA's own risk assessments demonstrate the extremely high risk to human health from coal ash. Through ingestion of toxic metals and inhalation of particulates, coal ash contributes to heart disease, cancer, stroke and chronic lower respiratory disease. The extremely high risk of cancer from ingestion of arsenic, which is concentrated in the groundwater near many ash disposal sites, is a major factor in EPA's risk assessment. Yet our comments demonstrate that this high cancer risk – 1 in 50 at some coal ash sites for people drinking contaminated water- is actually substantially underestimated. The leading arsenic experts in the country observe that the risk is underestimated by a factor of 17.5, through the use of an outdated cancer slope factor. Similarly, our comments show that the EPA's risk assessment significantly underestimates the harm (hazard quotient) posed by lead by factor of 2-3 times. In light of this extremely high risk to human health, it is unreasonable and unacceptable for EPA to choose an option that does not effectively reduce this risk.

- ***Coal Ash Poses A Serious Threat to the Environment***

One of coal ash's most mobile toxins, selenium, is deadly at low concentrations to fish. Yet almost every one of the nation's hundreds of unlined coal ash dumps sits near a river, stream or lake. The loading of selenium to these waterways, by spills, seeps, surface discharges or groundwater pathways has poisoned dozens of aquatic environments and killed or impaired fish, amphibians, and the wildlife that feed on them. Selenium bioacculmulates, so this damage is deadly and long lasting. New data submitted in these comments, in fact, indicate that the dredged river at the site of the TVA disaster may have been given the "all clear" sign generations too soon.

- ***State Regulations are Grossly Deficient in the Majority of States***

Our thorough analysis of the state regulations reveals that the majority of states fail to

require essential safeguards for landfills and surface impoundments disposing of coal ash, including liners, groundwater monitoring, leachate collection, dust controls and financial assurance. The majority of states fail to prohibit the placement of coal ash in water tables, wetlands, unstable areas and floodplains. EPA's own analyses of state regulatory programs in 2005, 2006 and 2010 reveal that states have not improved their regulations to close these gaps over the last decade. EPA even acknowledges that, based on entrenched state resistance to regulating ash, the Agency expects only 48 percent of the total coal ash generated in the US to be governed by stricter state regulation, if these regulations are not made mandatory under subtitle C. Moreover, we include in our comments a thorough, up-dated analysis of state regulations in 37 states, comprising over 98 per cent of the coal ash generated nationally. Our analysis reveals a far grimmer picture of state regulatory programs than is contained in EPA's analyses.

- ***Environmental Justice Concerns Must Be Addressed***

The environmental justice implications of EPA's decision are extremely significant. By EPA's own admission, coal plants—which are usually accompanied by coal ash ponds and landfills—are disproportionately located in low-income communities. Almost 70 percent of ash ponds in the U.S. are in areas where household income is lower than the national median. Yet even more striking and disturbing environmental justice implications are found when the predicted impact of EPA's subtitle D option is considered. Using EPA's own prediction of which states will not adopt the subtitle D guidelines— which states will ignore minimum federal standards for coal ash disposal facilities — it is crystal clear that poor communities and communities of color will be significantly disproportionally hurt.

From an environmental justice perspective, the contrast between the two options is stark and disturbing. In view of the national disparity found by EPA, a federal coal ash rule that applies equally in all parts of the country is necessary to alleviate the disparate impacts of ash disposal under the present patchwork of state laws. EPA must reject a disparate impact on vulnerable populations and promulgate a subtitle C rule, which ensures equal protection under the law for every community in this nation. Failing to take this course of action would be a clear violation of the intent of presidential Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

- ***The Benefits Greatly Outweigh the Costs of the Rule***

The data show that the electric power industry can easily afford the modest compliance costs associated with subtitle C regulation, which will have a negligible affect on operating costs, and no effect on the availability of power, according to the National Electricity Reliability Council. Even assuming all costs are passed on to consumers, the rule would result in a one-time rate increase of between 0.5 and 1%, even in coal dependent states like Indiana, Pennsylvania, and Ohio.

Unfortunately, EPA has failed to account for the value of safer standards for coal ash by failing to "monetize" them. Our comments identify benefits that EPA has failed to quantify, and therefore effectively ignored in its economic analysis. These include the avoided cost of lawsuits and damage claims related to spills and fouled drinking water, bringing municipal water to wells

that are no longer usable, restoring ecosystems contaminated with heavy metals, and premature death and disease from exposure to wind-blown particles from ash dumps.

We agree that responsible recycling, especially applications that encapsulate ash in products like cement and wallboard, offer both economic and environmental benefits. But EPA has made life much harder for itself by greatly inflating the value of recycling, and then including a scenario in which those benefits disappear due to the "stigma" of subtitle C regulation. EPA's proposal assigned an annual value of nearly $23 billion to life cycle benefits of recycling, based on assumed reductions in fine particle pollution from cement kilns and wallboard plants, and to big energy savings in both sectors. Our comments show that the true value is closer to $1 billion, based on the Agency's own data and information from other federal agencies. Recycling can save money, to be sure, but wildly inflated values distort the debate and hide what may be the biggest reason to recycle coal ash: avoiding the cost of disposal.

- ***Stigma is Not Properly the Basis for EPA's Decision***

Stigma has been the watchword of the opposition to subtitle C, but it has no place in the center of this debate. No evidence has been offered to support dire industry predictions, and historical market evidence proves the falseness of their assumptions. Our comments discuss in detail the nature and history of the hazardous waste recycling market and why recycling will increase under more stringent subtitle C regulations. It would be contrary to law to base a decision on the unproved, unfounded and irrational fears proffered as fact by those who wish not to be regulated. Once EPA opens this door, it will never be able to close it; the Agency will be overwhelmed by hypothetical scenarios untethered to reality every time it even thinks about setting a health or safety standard.

In sum, the data flow in one direction only. Considering the factors mandated by Congress, it is unlawful and unreasonable for EPA to choose an option that will apply to less than half of this immense and highly dangerous waste stream. In light of the best scientific data and the applicable law, EPA cannot ignore the continued mismanagement of over 70 million tons of toxic coal ash each year. In light of the deadly dangers it poses to the nation's health, and particularly to our most vulnerable communities, regulation under subtitle C is required.

INTRODUCTION

On October 16, 2009, a few months shy of the one-year anniversary of the monumental disaster at Tennessee Valley Authority's Kingston Fossil Plant, the U.S. Environmental Protection Agency (EPA) made a wise decision. EPA determined that it must reverse its prior determinations that regulation of coal ash, or coal combustion residues (CCRs), under subtitle C of the Resource Conservation and Recovery Act (RCRA)[1] was not warranted. While residents of Harriman, Tennessee were still struggling with the billion-gallon coal ash spill that devastated their once-beautiful riverside hamlet, EPA decided that the management and disposal of coal ash should be regulated under the hazardous waste provisions of RCRA. In the wake of a disaster that at any other time or season would have taken many lives, the Agency was resolute, and it concluded that "continuing to regulate such CCRs under the non-hazardous waste provisions of RCRA, even with the promulgation of a national subtitle D rule, would not be protective."[2]

EPA clearly set forth the rationale for this decision, citing:

- "the growing record of proven damage cases to groundwater and surface water, as well as a large number of potential damage cases all of which demonstrates that CCRs have not been properly managed under the current scheme;"

- "a new type of damage case coming to light (i.e., breaches of surface impoundments) that was not considered previously, but has shown to have catastrophic impacts on human health and the environment if not properly controlled;" and

- "the results of the Agency's 2009 risk assessment which indicates that certain management practices – particularly units lacking liners and the prevalence of wet handling, can pose significant risks to human health and the environment."[3]

EPA was further persuaded that subtitle C regulation was essential on grounds that "recent research indicates that traditional leach procedures . . . may underestimate the actual leach rates of toxic constituents under different field conditions," that "state regulatory programs for the management of CCRs, including requirements for liners and groundwater monitoring are still lacking," and that "EPA continues to see cases of inappropriate management or absence of key protections."[4] Thus, EPA concluded that "without strong federal oversight, *which subtitle D of RCRA does not provide*, the disposal of CCRs will continue to present risks to human health and the environment."[5]

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[1] Resource Conservation and Recovery Act of 1976, 42 U.S.C. §§ 6901–6992k (2006) (amending Solid Waste Disposal Act, Pub. L. No. 89-272, 79 Stat. 992)
[2] U.S. Envtl. Protection Agency (EPA). Draft: Disposal of Coal Combustion Residuals From Electric Utilities and CERCLA Hazardous Substance Designation 72 (Docket ID: EPA-HQ-RCRA-2009-0640-0013) (provided to the Office of Mgmt. & Budget (OBM)) (draft proposed Oct. 16, 2009) [hereinafter 2009 Draft Proposed Rule].
[3] *Id*. at 75.
[4] *Id*.
[5] *Id.* (emphasis added).

When EPA published its regulatory proposal in the Federal Register on June 21, 2010,[6] subtitle D regulation was presented as an alternative to the subtitle C regulation EPA had determined was essential. After the Office of Management and Budget (OMB) spent nearly nine months reshaping EPA's initial proposal, EPA's decisive charge was spun into a retreat. The clarity and resolve reflected in EPA's original commitment to regulate had vanished, and the proposed rule presented subtitle C and subtitle D regulations as equally viable options. Thus, the proposed rule presents the public with two very different alternatives—regulation of coal ash under the hazardous waste provisions of subtitle C or regulation of coal ash as a non-hazardous waste under subtitle D of RCRA—with no stated preference for either one. The ambivalence evidenced in the present proposal, however, does nothing to change the pressing need for subtitle C regulation, which EPA was compelled to recognize in October, 2009.

In sum, based on a full consideration of the statutory factors Congress mandated EPA to consider under Section 8002 of RCRA, as well as the factors laid out in EPA's May 2000 Regulatory Determination and the regulatory criteria governing the listing of hazardous waste, EPA unequivocally must regulate coal ash under subtitle C of RCRA in order to protect human health and the environment.

The environmental justice implications of EPA's decision are extremely significant. By EPA's own admission, coal plants—which are usually accompanied by coal ash ponds and landfills—are disproportionately located in low income communities. Almost 70 percent of ash ponds in the U.S. are in areas where household income is lower than the national median. Yet even more striking and disturbing environmental justice implications are found when the predicted impact of EPA's subtitle D option is considered.

Using EPA's own prediction of which states will not adopt the subtitle D guidelines—which states will ignore minimum federal guidelines for coal ash disposal facilities — it is crystal clear that poor communities and communities of color will be significantly disproportionally impacted.

The contrast between the two options is stark and disturbing. In view of the national disparity found by EPA, a federal coal ash rule that applies equally in all parts of the country is necessary to alleviate the disparate impacts of ash disposal under the present patchwork of state laws. EPA must reject a disparate impact on vulnerable populations and promulgate a subtitle C rule, which ensures equal protection under the law for every community in this nation. Failing to take this course of action would be a clear violation of the intent of presidential Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

I. BACKGROUND

More than 30 years have passed since the Bevill Amendment[7] was enacted in 1980.

[6] EPA, Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities; Proposed Rule, 75 Fed. Reg. 35,128, 35,182 (proposed June 21, 2010) (to be codified at 40 CFR Parts 257, 261, 264 et al.) (hereinafter 2010 Proposed Rule).
[7] *See* Bevill Amendment, 42 U.S.C. § 6982(n) (1980).

Despite a clear Congressional mandate to provide regulation within two and half years, to date, there has still not been a determination about how to dispose of the Bevill wastes. Yet since 1980, EPA has studied coal combustion waste with mounting evidence that coal ash poses severe risks to human health and the environment.

A. RCRA's Passage and the Development of the "Special Waste" Terminology for Coal Combustion Waste

In 1976, Congress passed the Resource Conservation and Recovery Act (RCRA)[8] to regulate treatment and disposal of hazardous wastes in order to protect human health and the environment. Subtitle C of RCRA regulated hazardous wastes and contained directives to EPA to identify and list hazardous wastes under this title.

After RCRA's passage and pursuant to congressional directive, EPA published regulations in 1978 entitled "Proposed Guidelines and Regulations and Proposal on Identification and Listing."[9] In these regulations, EPA proposed deferring "applicability of most of the treatment, storage, and disposal standards for selected high-volume, relatively low risk waste categories until information is gathered and assessed to determine how they can best be handled."[10] Thus, EPA stated that it would address so-called high volume, low risk wastes (mining waste, utility waste, gas and oil drilling muds, gypsum piles, and cement kiln dust)—which it termed "special wastes"—in later regulations, and it solicited information and comments that would assist the agency in developing substantive standards.[11]

On May 19, 1980, these proposed regulations were promulgated as final regulations that listed specific types of hazardous wastes subject to subtitle C regulation under RCRA. EPA determined that the "special wastes" should be subject to the RCRA part 264 and 265 regulations (implementing subtitle C) without exemption.[12]

Just before these regulations were scheduled to take effect, Congress enacted the "Bevill Exclusion" on October 21, 1980, as part of the Solid Waste Disposal Act Amendments of 1980.[13]

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[8] Pub. L. No. 94-580, 90 Stat. 2795 (1976) (codified as amended at 42 U.S.C. §§ 6901 to 6992k).

[9] "Proposed Guidelines and Regulations and Proposal on Identification and Listing" for RCRA Subtitle C hazardous waste, 43 Fed. Reg. 58,946 (Dec. 18, 1978).

[10] *Id.* at 58,948.

[11] *Id.* at 58,992 ("A proposed rulemaking will be published at a later date regarding the treatment, storage and disposal of special waste. The Agency will be developing additional information in order to write substantive standards for special waste and hereby solicits information and comment from the public which may assist the agency in developing its proposals.")

[12] 45 Fed. Reg. 33,154, 33,174–75 (May 19, 1980)

[13] Pub. L. No. 96-482, 94 Stat. 2334, Solid Waste Disposal Act, Section 3001(b)(3)(A)(i) (codified at 42 U.S.C. § 6921(b)(3)(A)(i)) (SWDA) ("Notwithstanding the provisions of paragraph (1) of this subsection, each waste listed below shall, except as provided in subparagraph (B) of this paragraph, be subject only to regulation under other applicable provisions of Federal or State law in lieu of this subtitle until at least six months after the date of submission of the applicable study required to be conducted under subsection (f), (n), (o), or (p) of section 8002 of this Act and after promulgation of regulations in accordance with subparagraph (C) of this paragraph:(i) Fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels.").

The Bevill Exclusion, found in Section 3001(b)(3)(A)(i)[14] exempted large volume wastes generated by coal and other fossil fuel combustion from regulation under subtitle C temporarily while further studies were undertaken.[15] Namely, as Section 8002(n)[16] required, the EPA was directed to conduct studies and submit a Report to Congress on the adverse effects to human health and the environment regarding ash disposal on a specified timeline.[17] Section 3001(b)(3)(c)[18] specified that the EPA was required to promulgate regulations for these wastes or determine that no such regulations were needed in the six months following the study, hearings and public comment.[19]

While the Bevill Exclusion was the result of a successful industry lobbying effort to avoid regulation, its stated intent was to provide EPA with additional information about the composition, characteristics and hazards posed by these wastes, as expressed in the 1978 proposed "special waste" regulations. Thus, Congress required EPA to undertake a study of the coal combustion waste issue on a two-year time frame.[20] Two years after the Bevill amendment passed, EPA missed its October 31, 1982 deadline to complete the required report on fossil fuel combustion waste for Congress, and then missed its subsequent deadline to make a final regulatory determination on these wastes.[21]

Six years after EPA missed its deadline, in February of 1988, EPA finally published and submitted a Report to Congress on Wastes from the Combustion of Coal by Electric Utility Power Plants.[22] The report only addressed wastes generated from the electric utility power plant coal combustion, and failed to address co-managed utility coal combustion wastes, other fossil fuel combustion wastes, and non-utility boiler wastes.[23] EPA also failed to complete its Regulatory Determination on coal combustion wastes at that time.[24]

In 1991, due to EPA's continued failure to complete a Regulatory Determination on coal combustion wastes, a citizen group filed suit against the EPA.[25] On June 30, 1992, EPA settled the case, entering into a Consent Decree that established a schedule for EPA to complete the Regulatory Determinations for all coal combustion wastes. The Consent Decree divided coal

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[14] 42 U.S.C. § 6921(b)(3)(A)(i).
[15] *Id.* SWDA, Section 3001(b)(3)(A)(i) codified at 42 U.S.C. §§ 6921(b)(3)(A)(i).
[16] 42 U.S.C. § 6982(n).
[17] *Id.* at § 8002(n), 42 U.S.C. § 6982(n). The eight factors listed in SWDA Section 8002(n)(1)-(8) for study include: source and volumes of such waste, present disposal and utilization practices, potential danger to human health and the environment from disposal and reuse of the materials, documented cases where danger to human health or the environment from surface runoff or leachate has been proven, alternatives to current disposal methods, costs of such alternatives, impact of those alternatives on the use of coal and other natural resources, and the current and potential utilization of such materials.
[18] 42 U.S.C. § 6921(b)(3)(C).
[19] *Id.* § 3001(b)(3)(C); 42 U.S.C. § 6921(b)(3)(C).
[20] SWDA, § 8002(n).
[21] EPA, Fossil Fuel Combustion Waste Legislative and Regulatory Timeline, http://www.epa.gov/waste/nonhaz/industrial/special/fossil/regs.htm; SWDA § 3001(b)(3)(C).
[22] EPA, *Report to Congress: Wastes from the Combustion of Coal by Electric Utility Power Plants* (EPA 530-SW-88-002) (Feb., 1988).
[23] EPA, Fossil Fuel Combustion Waste Legislative and Regulatory Timeline, http://www.epa.gov/waste/nonhaz/industrial/special/fossil/regs.htm.
[24] 2010 Proposed Rule, 75 Fed. Reg. 35,136-37.
[25] *Gearhart v. Reilly* (Civil No. 91–2345 (D.D.C.)).

combustion wastes into two categories: (1) Fly ash, bottom ash, boiler slag, and flue gas emission control waste from the combustion of coal by electric utilities and independent commercial power producers; and (2) all other waste governed by RCRA Sections 3001(b)(3)(A)(i) and 8002(n).[26] The Decree provided a specific timeline for development of the regulatory framework applicable to coal combustion waste.

On August 9, 1993, pursuant to this Consent Decree, EPA published its Regulatory Determination for the first category of wastes and concluded that regulation under subtitle C of RCRA for these wastes was not yet warranted.[27] For the second category of wastes, EPA decided that additional study was necessary. EPA prepared a report to Congress—again following court-ordered deadlines—that was submitted in March 1999.[28]

Finally, on May 22, 2000, EPA published a regulatory determination for this second category of coal combustion wastes.[29] In this determination, EPA made the following findings:

- The wastes in this second category analyzed in the 2000 regulatory determination were nearly identical to the wastes analyzed in the first 1993 determination because the high volume wastes dominated the waste characteristics, even when co-managed with other waste. The wastes from the 1993 determination remained exempt though they were similar to the wastes currently being analyzed.[30] Thus, the "May 2000 Regulatory Determination addressed not only the remaining wastes, but effectively reopened the decision on CCRs that went to monofills," which were addressed in the 1993 determination.[31]

- "Public comments and other analyses… have convinced us that these wastes could pose risks to human health and the environment if not properly managed, and there is sufficient evidence that adequate controls may not be in place."[32] Information on damage cases indicated a potential risk to human health and the environment.

- A more complete groundwater assessment was needed to determine the risk from arsenic.[33]

- Improvements were being made in waste management practices due to increasing state oversight, although gaps remained in the current regulatory regime, which led it to retain

[26] EPA, *Report to Congress: Wastes from the Combustion of Fossil Fuels* vol. 1 (EPA 530-R-99-010) (Mar. 1999) [hereinafter *1999 Report to Congress v.1*], *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/volume_1.pdf.
[27] 58 Fed. Reg. 42,466 (Aug. 16, 1993), http://www.epa.gov/epawaste/nonhaz/industrial/special/mineral/080993.pdf.
[28] *See 1999 Report to Congress v.1*, ; EPA, Report to Congress: *Wastes from the Combustion of Fossil Fuels*, vol. 2 (EPA 530-R-99-010) (Mar. 1999) [hereinafter *1999 Report to Congress, v.2*], *available at* http://www.epa.gov/waste/nonhaz/industrial/special/fossil/volume_2.pdf.
[29] 65 Fed. Reg. 32,214, (May 22, 2000). http://www.epa.gov/fedrgstr/EPA-WASTE/2000/May/Day-22/f11138.htm
[30] *Id.* at 32,217.
[31] 75 Fed. Reg. 35,128, 35,137 (June 21, 2010).
[32] 65 Fed. Reg. at 32,216.
[33] *Id.* at 32,216.

the Bevill exemption.[34]

On the basis of these findings, EPA stated its intent to regulate under subtitle D, but cautioned repeatedly that the "waste might present sufficient potential threat to human health and the environment to justify subtitle C regulation."[35] Essentially, the finding reflected deep uncertainty. Numerous times, EPA stated that, if circumstances change, EPA would "revisit" its determination. EPA stressed the temporal and contingent nature of its determination by qualifying its rationales adding "at this time" at least a dozen times.[36]

EPA further outlined the factors that would be persuasive in regulating under subtitle C instead of subtitle D. In summary, EPA found that subtitle C regulation would be necessary: if a trend in protective CCR management did not continue; if available information indicated actual or potential damage to human health or the environment, adverse environmental effects, or inadequate state or federal regulation; if the report of the National Academy of Sciences regarding mercury—a major component of coal combustion waste—showed adverse health effects; or in the event of increased ''risk[s] posed by managing coal combustion solid wastes if levels of mercury or other hazardous constituents change due to any future Clean Air Act air pollution control requirements for coal burning utilities.''[37]

Between 2000 and 2009, EPA made little progress toward regulation of coal ash. A report from EPA's Office of the Inspector General investigating the agency's inaction on coal ash regulation underscored that: "EPA has not published a proposed rule on CCW landfill and surface impoundments in the approximately 9 years since its regulatory determination on CCW disposal in landfills and surface impoundments."[38] However, over the past nine years, EPA has gathered additional data, held public meetings, updated the damage cases and the quantitative risk impact assessment.[39]

EPA acknowledges in the present rulemaking that many of the concerns highlighted in its 2000 Regulatory Determination have been triggered over the past ten years:

> Review of the information developed over the past ten years has confirmed EPA's original risk concerns, and has raised significant questions regarding the accuracy of the Agency's predictions [in the 2000 Regulatory Determination] regarding anticipated improvements in management and state regulatory oversight of these wastes.[40]

The original Bevill Amendment suggested that EPA should regulate coal combustion wastes if further study yielded evidence proving that it was a threat to human health and the

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[34] *Id.* at 32,215.
[35] *Id.* at 32,218.
[36] *Id.* at 32,221, 32,222, 32,227,32,228, 32,230, 32,231, 32,232, 32,234, 32235.
[37] *Id.* at 32,214, 32,218, 32,221.
[38] EPA, Office of the Inspector General, *Response to EPA Administrator's Request for Investigation into Allegations of a Cover-up in the Risk Assessment for the Coal Ash Rulemaking* 6 (Rept. 10-N-0019) (Nov. 2, 2009), *available at* http://www.epa.gov/oig/reports/2010/20091102-10-N-0019.pdf.
[39] *Id.* at 3.
[40] 75 Fed. Reg. at 35,149.

environment. In the 30 years since that Amendment was passed, EPA's studies and research have produced a growing body of evidence that overwhelmingly support a subtitle C regulation.

II. RECONSIDERATION OF THE STUDY FACTORS OF SECTION 8002(N) OF RCRA, 42 U.S.C. § 6982(n)

In undertaking the "detailed and comprehensive study" required by the Bevill Amendment, EPA was required to consider adverse effects on human health and the environment from the disposal and utilization of CCRs taking into account eight specific factors.[41] In the preamble to the proposed rule, EPA reiterates the factors that the Agency promised in 2000 to continue to review:

> "[T]he extent to which [the wastes] have caused damage to human health or the environment"; (2) the adequacy of existing regulation of the wastes; (3) the results of an NAS report regarding the adverse human health effects of mercury; and (4) "risk posed by managing coal combustion solid wastes if levels of mercury or other hazardous constituents change due to any future Clean Air Act air pollution control requirements for coal burning utilities."[42]

EPA also specifically points to the need to consider new information on risk that was not available in 2000 and EPA states that its review could result in a subsequent revision to its determination.

Thus, in the preamble to EPA's proposed rule, the Agency reexamines the eight study factors set forth in section 8002(n) in light of "the most recent data . . . available."[43] Such reexamination is essential because considerable evidence has come to light since the 1988 and 1999 Reports to Congress. Evidence concerning volume, toxicity, state program gaps, and damage reveal substantially heightened risk and documented adverse impacts on health and the environment from the disposal and utilization of CCRs.

As discussed *infra*, the applicability of the eight study factors to the agency's ultimate listing decision is an important legal issue. Clearly, however, EPA considers evaluation of the eight factors of section 8002(n) central to the choice among the regulatory presented in the proposed rule:

> The final course of action will [. . .]result in the selection of a regulatory structure that best addresses the eight study factors identified in section 8002(n) of RCRA, and ensures protection of human health and the environment.[44]

In this section of our comments, each factor of section 8002(n) is evaluated in light of the considerable evidence and recent data that have come to light since EPA's 2000 Final Determination. In section 8002(n), Congress instructed EPA to examine a wide range of factors:

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[41] 42 U.S.C. § 6982(n).
[42] 75 Fed. Reg. at 35,137.
[43] *Id.* at 35,151.
[44] *Id.* at 35,133.

volume of coal ash; current disposal and use; potential danger from mismanagement, documented cases of proven threats to health and the environment, alternatives to current disposal, the cost of such alternatives, the impact of regulation on the use of coal and other resources, and current and potential reuse of coal ash. Reexamination of all eight study factors reveals that regulation of CCRs under subtitle C of RCRA is clearly warranted.

A. Analysis of "The Source and Volumes of Coal Ash Generated Per Year" Underscored the Need for Subtitle C Regulation

EPA's analysis of "the source and volumes of coal ash generated per year" must consider heightened risks from the substantial increase in volume of CCRs. As EPA points out in the preamble, the volume of CCR has increased substantially over the last two decades.[45] The total estimated generation of CCR in the 1999 Report to Congress is about 25 percent smaller than the total tonnage of CCR estimated in EPA's 2009 Regulatory Impact Analysis, reflecting an increase of over 35 million tons of annual waste generation. As EPA acknowledges, the 1988 and 1999 Reports to Congress were based on a much smaller volume of CCRs.[46] In fact, when Congress passed the Bevill Amendment in 1980, the total amount of coal ash generated (65,933,000 tons) comprised a volume 47 percent smaller than current generation (141,000,000 tons).[47] With the much larger volume of CCR comes a commensurate increase in the risk of harm posed by mismanagement. Larger volumes and higher total disposal costs have led some generators to dump their waste in increasingly risky ways, including in sham reuse projects,[48] in aging, leaking, and unstable impoundments and landfills, and in active and abandoned mines.

1. EPA Predicts Future Increases in Coal Ash Generation.

According to EPA, increasing coal use for electricity generation at existing plants and construction of a few new coal-fired plants will lead to modest annual production increases that average 1.1 percent per year from 2005 to 2015.[49] As more coal is burned in coal-fired power plants, there is a commensurate increase in CCRs at the rate of 10–20% of the total amount of coal burned. The Energy Information Administration (EIA) forecasts a 1.8% growth in coal production from 2015 to 2030. While this forecast is likely overstated, given that it assumes additions of coal-fired generating capacity and several coal-to-liquids (CTL) plants, EPA must assume that coal-fired power plants will continue to generate high volumes of waste for the foreseeable future.[50]

There will also be an increase in future CCR generation from the increase in Clean Air Act-mandated emission controls. In response to current and proposed requirements, additional NOx control and flue gas desulfurization (FGD) systems for SO_2 control will be more widely

[45] *Id.* at 35,151.
[46] *Id*.
[47] ICF Resource, Inc., *Coal Combustion Waste Management Study*, (Docket ID No.: EPA-HQ-2006-0796 7 (prepared for U.S. Dep't of Energy) (Feb. 1993).
[48] 75 Fed. Reg. at 35,147 (citing the BBBS Sand and Gravel Quarries in Gambrills, Maryland).
[49] EPA, *Materials Characterization Paper* In Support of the *Proposed Rulemaking – Identification of Nonhazardous Secondary Materials That Are Solid Waste Coal Refuse* 3 (Mar. 18, 2010).
[50] U.S. Dep't of Energy, Energy Information Administration (EIA), Annual Energy Outlook 2007 with Projections to 2030 (Publication DOE/EIA-0383) (Feb. 2007).

used. The installation of scrubbers will result in significant increases in the production of FGD sludge. Some estimates project a doubling or tripling of the number of wet scrubbers as a result of implementation of the Clean Air Interstate Rule (CAIR).[51] According to EPA, over half of the U.S. coal-fired capacity is projected to be equipped with SCR and/or FGD technology by 2020.[52] In fact, many coal plants across the country are in the process of installing new scrubber systems, and EPA predicts a 16% increase in scrubbed units between 2009 and 2015 alone.[53] The increase in scrubber sludge and increased coal burning is estimated to raise the total CCR generated to 175 million tons by 2015.[54]

2. The Steep Rise in the Volume of CCR Increases Risks from CCR Mismanagement.

Larger volumes of coal combustion wastes translates into increased risks associated with disposal, including increased numbers of dangerous hazardous waste dumps, increased volume of toxics released to the environment, and increasingly widespread disposal in states where there is no effective regulation.

a. New EPA Data on CCR Surface Impoundments Reveal a Far Greater Number of Units than Previously Known.

According to the 1999 Report to Congress, EPA estimated that there were approximately 600 active CCR disposal units in total, including about 300 landfills and 300 surface impoundments.[55] Following the catastrophic collapse of the coal ash dam at TVA's Kingston Fossil Plant in December 2008, EPA realized that it had to obtain much more information on the universe of operating coal ash ponds. In response to that need, EPA sent industry-wide Information Collection Requests (ICRs) in March, April and December of 2009. Based on the ICR responses, EPA now has much more detailed and accurate information regarding the inventory of surface impoundments operated by the nation's electric utilities. The Agency, in fact, received data on 629 surface impoundments.

The doubling of the estimated number of impoundments is not inconsequential. While the 1999 Report to Congress assumed a 40-year operating life for CCR management units, it is clear from the new surface impoundment data that utilities are routinely employing disposal units for far longer than four decades.[56] Sixty-four percent of the operating CCR surface impoundments (over 400 ponds) were built in the 1970s or earlier.[57] The total surface area occupied by these waste ponds exceeds 31,000 acres—an area over twice the size of Manhattan. These ponds have the capacity to store more than 37.6 *billion* cubic feet of coal ash, enough ash to flow over

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[51] EPA, *Characterization of Coal Combustion Residues from Electric Utilities – Leaching and Characterization Data* (EPA-600/R-09/151), at 7 (Dec. 2009).
[52] *Id.*
[53] EPA, *Steam Electric Power Generating Point Source Category: Final Detailed Study Report* 4-1-4-6 (2009).
[54] Memorandum from EPA, Clean Air Markets Division, to the Docket, entitled "Economic and Energy Analysis for the Proposed Interstate Air Quality Rulemaking" (Jan. 28, 2004).
[55] *1999 Report to Congress v. 2*, at 3-21.
[56] *Id*. at 3-66.
[57] EPA, Information Request Responses from Electric Utilities, Database of Survey Responses, *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.

Niagara Falls for more than four days straight.

Unfortunately, EPA did not send ICRs to utilities for information on landfills. Consequently, EPA is unable to estimate with accuracy the number of currently operating on-site and off-site CCR landfills. The Regulatory Impact Analysis contains an estimate similar to EPA's 1999 figure, of slightly over 300 units. However, in view of EPA's gross underestimate of the number of surface impoundments, one can expect that this figure similarly undercounts the total number of landfills operating today.

b. According to the Toxic Release Inventory (TRI), the Volume of Hazardous Chemicals in Coal Ash Is Presently Enormous and Accumulating Rapidly in CCR Surface Impoundments and Landfills.

According to EPA's Toxic Release Inventory (TRI), the volume of hazardous chemicals in coal ash is presently enormous and accumulating rapidly in CCR surface impoundments and landfills. The disastrous spill of toxic coal ash from TVA's Kingston plant dramatized how unsafe disposal practices can damage the environment and threaten the health of residents downstream. According to data reported by the industry to the TRI, power plants dump millions of pounds of toxic metals that are contained in coal ash into wet surface impoundments like the TVA pond that breached every year. Based on EPA's analysis, approximately 74 percent of these impoundments are unlined and over 400 are over 30 years old, increasing the risk that toxic pollutants such as arsenic and lead will leach into groundwater or nearby rivers and streams.[58]

Among many other metals, arsenic, chromium, lead, nickel, selenium, and thallium are present in coal ash. These metals are prone to leaching from ash into the environment and can be highly toxic at minute levels to either humans or aquatic life, or both.[59] Between 2000 and 2009, the power industry reported disposal of coal ash containing more than 164 million pounds of these six toxic pollutants into surface impoundments.[60] Each year, the power industry reports disposing well over 10,000 pounds of these metals into surface impoundments.[61]

In addition to disposal in wet ponds such as the Kingston impoundment, the power industry reported dumping approximately 215 million pounds of arsenic, chromium, lead, nickel, selenium, and thallium into landfills and other land disposal systems between 2000 and 2009.[62] Although not as dramatic as the Kingston spill, slow motion leaks from so-called "dry" landfills have contaminated groundwater and surface water across the United States.[63] In total, the power

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[58] 65 Fed. Reg. at 32,214, 32216 (reporting that 26% of all surface impoundments have liners).
[59] *See* Nat'l Research Council, Nat'l Academies, *Managing Coal Combustion Residues in Mines* 81–104 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc.
[60] *See* Attachment 1, Electric Utility Industry Disposal of Arsenic, Chromium, Lead, Nickel, Selenium, and Thallium in Surface Impoundments and Landfills.
[61] *Id.*
[62] *See* Nat'l Research Council, Nat'l Academies, Managing Coal Combustion Residues in Mines 81–104 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc.
[63] *See* EPA, *Coal Combustion Waste Damage Case Assessments* (July 9, 2007) [hereinafter *2007 EPA Damage Case Assessment*]; Env. Integrity Project & Earthjustice, *Out of Control: Mounting Damages From Coal Ash Waste Sites* (Feb. 24, 2010) (Jeff Stant, ed.) [hereinafter *Out of Control*], *available at* http://www.environmentalintegrity.org/news_reports/documents/OutofControl-

industry was responsible for dumping over *379 million pounds* of these six toxic pollutants into surface impoundments, landfills, and other land disposal systems between 2000 and 2009 alone.[64] Due to the lack of federal regulations establishing minimum safeguards, much of this pollution eventually makes its way into our drinking water sources, rivers, lakes, and streams.

These numbers are just the tip of the iceberg. Although disposal of these six pollutants has gradually decreased over the past ten years, coal-fired generation has also declined from 1,966,265 megawatt hours in 2000 to 1,764,486 megawatt hours in 2009.[65] When coal-fired generation increases, the amount of coal combustion waste, and the toxic pollutants contained in this waste, will also increase. Furthermore, our analysis includes just ten years of data and only six of the twenty-seven metals commonly found in coal combustion waste.

Attachment 3 identifies those plants that report disposing of the largest volumes of each pollutant between 2000 and 2009 to surface impoundments. At many plants, the amounts dumped into surface impoundments significantly exceed the disposal volumes at the Kingston facility. The data suggest that many communities are at risk, whether from sudden spills or the slow leaching of toxic pollutants from coal ash into the surrounding environment. Consider, for example:

- *Arsenic.* EPA samples measured arsenic levels far above drinking water standards in nearby waterways after the spill from Kingston's surface impoundment.[66] According to TRI data, at least 18 facilities reported depositing more arsenic in coal ash impoundments than Kingston. Between 2000 and 2009, for example, the Gorgas steam plant in Parrish, AL reported depositing nearly four times the amount of arsenic placed in the TVA Kingston impoundment over the same period.

- *Chromium.* The Kingston plant reported disposing of 724,000 pounds of chromium in surface impoundments between 2000 and 2009. But according to TRI data, the JM Stuart plant in Manchester, Ohio, tops the list for chromium disposal in impoundments, reporting 2,048,632 pounds between 2000 and 2009. A total of 16 facilities reported disposing of more chromium in surface impoundments than Kingston.

MountingDamagesFromCoal9AshWasteSites.pdf; Env. Integrity Project, Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment* 132–143 (Aug. 26, 2010) (Jeff Stant, ed.) [hereinafter *In Harm's Way*], *available at* http://www.environmentalintegrity.org/news_reports/documents/INHARMSWAY_FINAL3.pdf (documenting numerous coal combustion waste landfills that have contaminated ground and surface waters via direct discharges and leaks in disposal units).

[64] *See* Attachment 1, Electric Utility Industry Disposal of Arsenic, Chromium, Lead, Nickel, Selenium, and Thallium in Surface Impoundments and Landfills. During this same time period, the power industry reported recycling just 6,584,989 pounds of metals and metal compounds—significantly less than many other industries. Attachment 2, U.S. Envtl. Prot. Agency, TRI Transfers Off-Site for Further Waste Management (in pounds), for Metal and Metal Compounds, By Industry (2009), *available at* http://www.epa.gov/triexplorer/industry.htm.

[65] Energy Info. Admin., Dep't of Energy, Electric Power Monthly, tbl. 1.1 (Oct. 14, 2010), *available at* http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html.

[66] Appalachian Voices, Results of ICP-OES Analyses of the TVA Ash Spill Samples Collected 12-27-08 from the Emory River, 1, *available at* http://www.appvoices.org/resources/Preliminary_TVA_Ash_Spill_Sample_Data_AppVoices_December%202008.pdf; *and* Shaila Dewan, Metal Levels Found High in Tributary After Spill, *N.Y. Times*, Jan. 2, 2009, at A12.

- *Lead.* Duke's Gibson station in Owensville, Indiana disposed of 1,483,276 pounds of lead in surface impoundments between 2000 and 2009, or about three times the amount reported in Kingston for the same period. Sixteen plants reported releasing more lead to surface impoundments than Kingston.

- *Nickel.* The Gibson, JM Stuart, Ghent (Kentucky), Cayuga (New York), and Gaston (Alabama) plants reported the largest releases of nickel to surface impoundments between 2000 and 2009. Another fifteen plants disposed of nickel in amounts greater than Kingston between 2000 and 2009.

- *Selenium.* The JM Stuart plant in Ohio disposed of more than 162,000 pounds of selenium in impoundments between 2000 and 2009, or over 3 times the amount reported by Kingston. A total of 14 facilities report releases of selenium between 2000 and 2009 that exceed amounts disposed of in the Kingston impoundment.

c. The Sources Generating the Greatest Volumes of CCRs Are Located in States that Have the Most Lax Disposal and Reuse Safeguards.

The sources of greatest coal ash generation tend to be where regulatory controls are the weakest. With the exception of Pennsylvania,[67] state programs in the ten largest coal ash-producing are grossly deficient and lack many basic requirements for ensuring safe coal ash disposal. The top ten generating states, Pennsylvania, Texas, Ohio, West Virginia, Kentucky, Indiana, Florida, Georgia, North Carolina and New Mexico, together generate over fifty percent of the CCR produced in the United States annually. Section III.B.1 of these comments details the deficiencies of these and 27 other CCR-generating states.

B. Consideration of the "Present Disposal and Utilization Practices" Reveals the Need for Subtitle C Regulation.

Consideration of the "present disposal and utilization practices" reveals serious and widespread deficiencies in current state regulatory programs for disposal and reuse of CCRs, which has resulted in the construction and operation of unsafe storage and disposal units and dangerous reuse applications.

1. The Failure of States to Regulate Adequately the Disposal of Coal Combustion Waste Supports the Need for Federal Standards under Subtitle C of RCRA.

EPA has identified the adequacy of state regulation of the management of coal combustion residuals (CCRs) as a "central issue" in its determination of whether to regulate

[67] Pennsylvania Department of Environmental Protection recently passed new regulations governing the disposal of CCR in coal mines. While Pennsylvania regulations remain inadequate in several areas, it cannot be said that the state regulations are among the worst in the nation, considering the protection recently afforded to dumping in mines.

CCRs under Subtitle C of RCRA.[68] As discussed below, the glaring inadequacies of state regulatory authority make mandatory federal standards imperative for the protection of human health and the environment. Indeed, EPA's own reports have documented extensive deficiencies in state regulation of coal ash landfills and surface impoundments. Following EPA's request for comments, we conducted a comprehensive evaluation of the current landscape of state regulation of CCR disposal. Our analyses identify additional significant gaps in state programs, buttress EPA's data that indicate state programs are inadequate to protect health and the environment, and further demonstrate why regulation under subtitle C is necessary to guarantee the safe disposal of CCR nationwide.

a. EPA's Own Reports Document the Substantial Gaps Persisting in State Regulatory Programs.

In its May 2000 Regulatory Determination, EPA expressed significant concern about the lack of adequate state regulation of CCR disposal.[69] A decade later, many of the identified regulatory gaps persist. Two EPA reports completed after the 2000 Regulatory Determination detail such continuing substantial deficiencies, finding that state regulations routinely lack requirements for essential safeguards for the disposal of CCR in landfills and surface impoundments.[70] In April of this year, EPA updated its state regulatory analysis in the "Regulatory Impact Analysis."[71] The findings of these reports, as well as our recent analyses of state regulatory deficiencies, provide a solid basis for regulation of coal ash under Subtitle C of RCRA.

The *2010 RIA*, prepared by the EPA's Office of Resource Conservation & Recovery, illustrates a shocking absence of CCR disposal requirements across the nation. The report updated the *2005 DPRA Report*'s examination of the regulatory programs of 34 states; both reports found basic safeguards for CCR disposal seriously lacking. Among the key findings of the *2010 RIA*:[72]

- 85 percent of the states surveyed do not require groundwater monitoring and leachate collection at all surface impoundments (both new and existing).
- 45 percent of the states surveyed do not require post-closure groundwater monitoring at coal ash surface impoundments.
- Over 50 percent of the states surveyed do not require liners for surface impoundments.

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[68] 75 Fed. Reg. at 35,133.
[69] 65 Fed. Reg. at 32,218.
[70] *See* DPRA Inc., *Estimation of Costs for Regulating Fossil Fuel Combustion Ash Management at Large Electric Utilities Under Part 258* (Nov. 30, 2005), *available at* www.regulations.gov (Document ID No. EPA-HQ-RCRA-2006-0796-0469) [hereinafter *2005 DPRA Report*]; Dep't of Energy and EPA, *Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004* (Aug. 2006), *available at* www.regulations.gov (Document ID No. EPA-HQ-RCRA-2006-0796-0002) [hereinafter *2006 DOE/EPA Report*].
[71] Office of Res. Conservation & Recovery, U.S. EPA, *Regulatory Impact Analysis for EPA's Proposed RCRA Regulation of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry* (Doc. No. EPA-HQ-RCRA-2009-0640-0003) (Apr. 2010), *available at* www.regulations.gov [hereinafter *2010 RIA*].
[72] *2010 RIA*, at Appendix E, Baseline State Government Regulatory Requirements for CCR Disposal Units in Top-34 Coal Utility States.

- Over 50 percent of the states surveyed have no requirement for financial assurance for surface impoundments.
- 38 percent of the states surveyed do not require groundwater monitoring at all landfills (both new and existing).
- 26 percent of the states surveyed do not require fugitive dust controls at coal ash landfills.
- 15 percent of the states surveyed do not require liners, leachate collection systems, or financial assurance for coal ash landfills.

The *2006 DOE/EPA Report*, which reviewed in detail the regulatory frameworks of 11 states, also documented continuing substantial deficiencies in state regulation of CCR management. The report found that between 1999 and 2005 none of the states surveyed tightened regulatory controls on CCR landfill disposal; that is, no state added specific requirements governing liners, groundwater monitoring, leachate collection, closure and post-closure, siting, and financial assurance since the 2000 Regulatory Determination.[73] In addition, the report identified four states (Alabama, Florida, Illinois, and Texas) that had relaxed certain CCR disposal controls since 1988.[74] According to the EPA,[75] these four states collectively were responsible for generating 26.4 million tons of CCR, approximately 19% of total CCR generation in 2005.[76]

The report found that a substantial percentage of the large coal ash-producing states evaluated failed to mandate one of the most basic mechanisms for regulating waste disposal, namely the authority to *permit* CCR landfills and surface impoundments. Of the 11 states evaluated, five exempted CCR landfills from solid waste permitting requirements. Alabama excludes all CCR from its definition of solid waste; thus, solid waste permits are not required for CCR disposal. Similarly, Ohio exempts the large majority of its CCR by classifying it as "nontoxic," and landfills at which nontoxic CCR is disposed do not require solid waste permits. Florida, Illinois, and Texas all exempt on-site disposal of CCR from solid waste permitting requirements. Because EPA estimates that 70 percent of CCR disposal involves company on-site disposal, the exemption of on-site units from permitting creates a significant gap.[77] These five states generated 36.8 million tons of CCR in 2005—over 26 percent of the total CCW generated in the United States that year. The report identifies an additional three states (Colorado, Maryland, and Utah) that exempt on-site CCR landfills from state solid waste permitting requirements.[78] In addition, the report only identified one state (Pennsylvania) that required solid waste permits for all surface impoundments receiving CCR.[79] Based on these exemptions and exclusions, the report concluded that approximately 30 percent of all disposable coal ash

[73] *2006 DOE/EPA Report*, Table 22.
[74] *Id*. The *2006 DOE/EPA Report* also identifies nine states that reportedly tightened certain regulatory controls since 1988. However, the majority of such tightenings appear to have taken place before the 2000 Regulatory Determination.
[75] *2010 RIA*, Ex. 3D.
[76] All references to percentage of total CCR in the U.S. are based on 2005 CCR generation data presented in Exhibit 3D of the *2010 RIA*. In 2005, a total of 141.2 million tons of CCR was generated in the U.S. The top ten generators of CCR in 2005 were Pennsylvania, Texas, Ohio, West Virginia, Kentucky, Indiana, Florida, Georgia, North Carolina, and New Mexico.
[77] 75 Fed. Reg. 35,128, 35,158
[78] *2006 DOE/EPA Report*, tbl. 20.
[79] *Id.* at A-18.

generated in the United States is potentially *totally exempt* from solid waste permitting requirements.[80] While the *2006 DOE/EPA Report* points to other types of permits that may be issued for CCR management units (*e.g.*, construction permits, NPDES permits, storm water permits),[81] these are no substitute for a solid waste operating permit, without which the dangers posed by the mismanagement of coal ash are likely to have a significant negative impact on human health and the environment.

In addition to these wholly unacceptable gaps in the regulation of coal ash disposal that leave approximately 30% of the waste stream unregulated, many of the states in which solid waste permits are required for CCR management units do not make mandatory those regulatory controls that are needed to ensure adequate environmental protection. For landfills, the *2006 DOE/EPA Report* found that:

- No state surveyed requires a composite liner for all coal ash landfills.[82]
- 5 of the 11 states surveyed have no liner requirement for coal ash monofills.[83]
- 5 of the 11 states surveyed do not require groundwater monitoring at coal ash landfills.[84]
- No state surveyed requires quarterly groundwater monitoring for the active life of a coal ash landfill.[85]
- 5 of the 11 states surveyed do not require leachate collection systems at coal ash landfills.[86]

The findings pertaining to surface impoundments, which pose even greater risks than landfills,[87] revealed even more significant gaps in state regulatory authority:

- Only one of the states surveyed requires solid waste permits for all coal ash surface impoundments.[88]
- Only one of the states surveyed requires groundwater monitoring at coal ash surface impoundments.[89]
- Only one of the states surveyed requires a leachate collection system at coal ash surface impoundments.[90]
- Only one of the states surveyed requires corrective action for coal ash surface impoundments.[91]

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[80] *Id.* at 46. EPA acknowledges this significant regulatory gap as part of the discussion of existing state regulatory oversight in the preamble to its proposed rules. 75 Fed. Reg. at 35,151.
[81] *Id.* tbl. 9.
[82] *Id.* tbl. A.6.
[83] *Id.*
[84] *Id.* tbl. A.13.
[85] *Id.*
[86] *Id.* tbl. A.15.
[87] *See* Office of Solid Waste & Emergency Response, EPA, Human and Ecological Risk Assessment of Coal Combustion Wastes 2-4 (draft) (Apr. 2010) [hereinafter 2010 Risk Assessment].
[88] *2006 DOE/EPA Report*, tbl. A.4.
[89] *Id.* tbl. A.13.
[90] *Id.* tbl. A.15.
[91] *Id.* tbl. A.19. (only the five pilot states were surveyed for corrective action requirements).

- Only one of the states surveyed requires financial assurance for coal ash surface impoundments.[92]
- Only three of the states surveyed require liners at coal ash surface impoundments.[93]
- Only two of the states surveyed have siting restrictions for coal ash surface impoundments restricting their distance from public water supply wells, other potable water supplies, inhabited dwellings, floodways, wetlands, and the groundwater table.[94]

Even the most recent data submitted to EPA by the states themselves indicate that basic safeguards are simply not required by the majority of states. According to a survey by the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), only 33 percent of the states responding to the survey impose a requirement that coal ash surface impoundments have a liner, only 14 percent of the states require leachate collection at coal ash ponds, and only 31 percent of the states require financial assurance for coal ash ponds.[95] It is not clear from the ASTSWMO survey how many states responded, so these percentages may, in fact, overestimate the number of states that have regulatory safeguards.

b. EPA's Reports Provide an Incomplete Picture of State Regulatory Deficiencies.

As troubling as the regulatory deficiencies in EPA's reports are, a more comprehensive analysis of state regulations reveal that the situation is much worse than previously understood. Both of EPA's reports make clear that gross deficiencies in state regulatory authority persist, but even these reports fail to paint a complete picture of the abysmal state of current CCR management. For example, the *2006 DOE/EPA Report*'s conclusion that "improved disposal unit management practices and State application of environmental regulations appear to be occurring"[96] is based largely on self-survey data from a narrow sample of permitted new or expanded units in 11 states. As EPA has noted, new management units only represent about 10 percent of all disposal units; it will take decades to replace the large collection of older units.[97] In addition, even if it can be assumed that the new permitted units described in the *2006 DOE/EPA Report* are an indication of future disposal practices—which is questionable—it is clear that the problem of CCR mismanagement is far from solved. According to the report, at least 40 percent of the landfills and 50 percent of the surface impoundments permitted between 1994 and 2004 were not required to install composite liners.[98]

The *2006 DOE/EPA Report* contains the following pie charts to illustrate the distribution of liners installed in the new waste units.[99]

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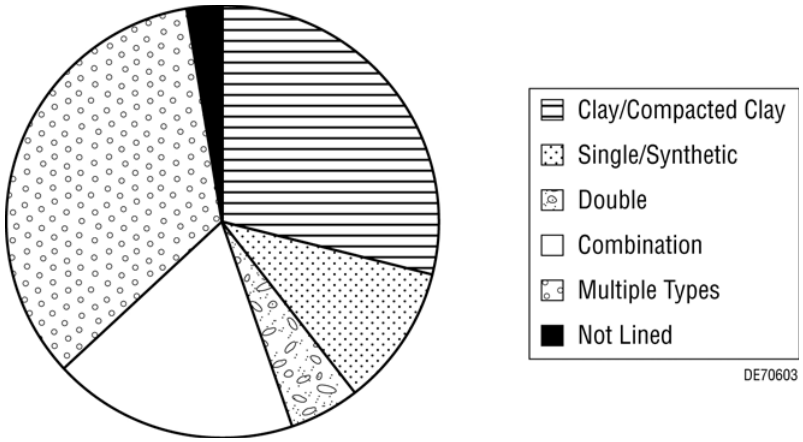
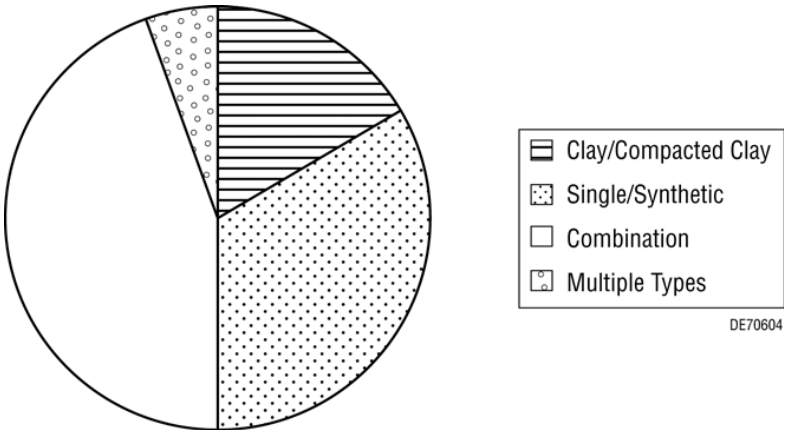
[92] *Id.* tbl. A.22. (only the five pilot states were surveyed for financial assurance requirements).
[93] *Id.* tbl. A.6.
[94] *Id.* tbl. A.20 (only the five pilot states were surveyed for siting restrictions.)
[95] Association of State and Territorial Solid Waste Management Officials (ASTSWMO) Survey (Feb.–Mar. 2009), (Docket ID No. EPA-HQ-RCRA-2009-0640-0025), *available at* www.regulations.gov.
[96] *Id. at* 67.
[97] 75 Fed. Reg. 35,128, 35,151.
[98] *2006 DOE/EPA Report* at 33.
[99] *Id*. at 33–34.



2006 DOE/EPA Report, Figure 3. Liner Types Reported for Landfills.



2006 DOE/EPA Report, Figure 4. Liner Types Reported for Surface Impoundments.

Furthermore, the *2006 DOE/EPA Report's* slightly improved incidence of liner use in 56 new units lacks significance when one considers the universe of coal ash disposal units that RCRA regulations must cover. Focusing on new units and expansions ignores the vast majority of units at which coal ash continues to be disposed, thus grossly underestimating the scope of concern. The findings of the *2006 DOE/EPA Report* are further limited by the survey's exclusion of non-permitted units, vertical expansions of existing disposal units, and units that are not owned by electric utilities.

As discussed above, the *2006 DOE/EPA Report* concluded that approximately 30 percent of the net *disposable* CCR generated in the United States is potentially totally exempt from regulation under state solid waste programs. While alarming in itself, this figure is actually an underestimation of the amount of potentially exempt CCR because it excludes the percentage of CCR that is totally exempt from regulation based on future beneficial reuse. According to EPA, approximately 50.1 million tons of CCR were beneficially reused and 10.5 million tons were dumped into mines in 2008, representing 45 percent of the total CCR generated that year.[100] Thus, well over half of all CCR generated in the United States is potentially exempt from solid

[100] 75 Fed. Reg. at 35,151.

waste regulation, either excluded completely from regulation (as in Alabama) or excluded by virtue of its future beneficial reuse.

The *2010 RIA* likewise fails to express fully the deficiencies that plague the current landscape of state CCR disposal regulation. Of particular significance, the report drastically underestimates the inadequacy of state regulations by ignoring exemptions from and opportunities for variance of state regulatory requirements and by failing to distinguish between the mandatory requirement of essential safeguards and state standards that are merely discretionary. For example, the *2010 RIA*'s survey of "Baseline State Governmental Regulatory Requirements for CCR Disposal Units in Top-34 Coal Utility States"[101] ignores the fact that Alabama and Utah exempt CCR landfills from groundwater monitoring and engineering control requirements (despite the fact that such exemptions were documented in the *2006 DOE/EPA Report*), that Ohio exempts its "nontoxic" CCR from such requirements, that Indiana exempts from certain requirements CCR that is disposed of at certain classes of landfill, and that five states exempt on-site CCR disposal from all requirements. In addition, our review of state regulations found that at least 13 states allow state regulators to grant variances from or waivers of regulations governing CCR disposal, and an additional five states leave the question of whether groundwater monitoring at CCR landfills is necessary up to the discretion of state regulators. Indeed, even the *2006 DOE/EPA Report* documented 52 requests for variances from CCR disposal requirements, of which 47 were granted by state regulators.[102] Nevertheless, the *2010 RIA* ignores this distinction, thereby allowing for gross exaggerations of the scope and effectiveness of state programs.

As EPA's own reports have revealed, the discretion given to state regulators and the variances that they subsequently grant may significantly compromise the safety of a waste disposal unit. For example, West Virginia regulators waived the liner requirement for a leachate collection pond at two facilities,[103] cover requirements at two structural fill sites, and allowed the construction of a landfill over an underground mine.[104] Indiana regulators allowed the use of ash as a liner and cover at three facilities and waived the cover requirement at a second landfill.[105] Georgia regulators waived entirely the leachate collection and treatment during the post-closure care period and daily cover;[106] and Ohio regulators waived the cover requirements on two FGD sludge ponds.[107] These variances reveal that when state law gives regulators discretion to waive basic safeguards such as liners and cover, the states use that discretion liberally.

c. State Programs Are Incapable of Adequately Regulating the Disposal of Coal Ash.

As part of its June 2010 proposal for rulemaking, EPA requested comments on the current management practices of state programs, including the specific requirements that states

[101] *2010 RIA*, Appendix E.
[102] *2006 DOE/EPA Report*, tbl. 23.
[103] *Id*. at 57.
[104] *Id*. at 66.
[105] *Id*. at 58.
[106] *Id*.
[107] *Id*. at 59.

have in place to regulate CCRs and the extent to which such requirements apply to older, existing units. We have reviewed the regulatory programs of 37 states, looking specifically at whether states have imposed requirements to address: (1) groundwater monitoring; (2) unit liners; (3) leachate collection systems; (4) financial assurance; (5) post-closure monitoring and maintenance; and (6) extent of permitting requirements—issues EPA has identified as having particular relevance to its decision-making process.[108] Our analyses of these issues provide an up-to-date and more comprehensive understanding of the significant regulatory gaps that currently exist in state programs. (The full analysis is set forth in Attachment 4 to our comments.) Our conclusion is that these programs do not and cannot adequately protect health and the environment from the dangers posed by CCR disposal. Such gaps illustrate the necessity for EPA to promulgate expeditiously mandatory minimum federal standards under subtitle C of RCRA for the safe disposal of CCR.

Table 1. Overview of Mandatory State Requirements for CCR Disposal

STATE REGULATORY REQUIREMENT	ALL (NEW AND EXISTING) LANDFILLS	ALL (NEW AND EXISTING) SURFACE IMPOUNDMENTS	NEW LANDFILLS	NEW SURFACE IMPOUNDMENTS
Groundwater Monitoring (during operation)	4 states/3.66%*	6 states/19.12%	7 states/13.24%	6 states/19.12%
Composite Liner	*No states have retroactive liner requirements*	*No states have retroactive liner requirements*	5 states/7.19%	4 states/19.61%
Leachate Collection System	*No states have retroactive leachate collection requirements*	*No states have retroactive leachate collection requirements*	12 states/30.21%	7 states/23.14%
Daily Cover	7 states/25.99%	N/A[a]	7 states/25.99%	N/A
Dust Controls	13 states/39.37%	1 state/10.88%	13 states/39.37%	1 state/10.88%
Run-off Controls	17 states/42.81%	3 states/13.7%	17 states/42.81%	3 states/13.7%
Separation from Water Table	*No states have retroactive siting requirements*	*No states have retroactive siting requirements*	21 states/56.64%	7 states/25.64%
Financial Assurance	16 states/41.78%	4 states/15.85%	14 states/38.2%	3 states/14.17%
Composite Final Cover	1 state/1.14%	1 state/1.14%	1 state/1.14%	1 state/1.14%
Groundwater Monitoring (30 years after closure)	5 states/25.64%	1 state/1.14%	5 states/25.64%	1 state/1.14%

* Number of states out of 37 surveyed with requirement/percentage total CCR generated in U.S. in 2005 by states.
a: We did not review daily cover requirements for surface impoundments.

[108] 75 Fed. Reg. at 35,157.

The above table is a damning indictment of current state of regulatory programs, revealing a widespread absence of mandatory basic safeguards. For example:

- Only 4 states (comprising less than 4 percent of the CCR generated in the U.S) require groundwater monitoring at all new and existing landfills in their states;
- Only 6 states (comprising 19 percent of the CCR generated in the U.S.) require groundwater monitoring at all new and existing surface impoundments;
- Only 5 states (comprising 7 percent of the CCR generated in the U.S.) require composite liners for all new landfills; and
- Only 4 states (comprising 19 percent of the CCR generated in the U.S.) require composite liners for all new surface impoundments.

Not only is the national picture dismal, but some of the largest coal ash-generating states in the country have no or nearly no coal ash regulatory programs. As described above, three states—Alabama, New Mexico, and Utah[109]—exempt coal ash completely from regulation as a solid waste, leaving the disposal of CCR virtually unregulated. In addition, Ohio excludes virtually all CCR from regulation by classifying it as "nontoxic" and, therefore, exempt.[110] Texas excludes all coal ash that is disposed of on-site (defined as anywhere within 50 miles of the place of generation) or destined for beneficial reuse (the vast majority the state's CCR) from regulation.[111] In these states, which together generate approximately 33.4 million tons of CCR each year (almost a quarter of total CCR generated in the U.S.), none of the basic safeguards such as groundwater monitoring that EPA recognizes as necessary are required.

i. States Fail to Require Groundwater Monitoring.

Despite the critical need to monitor for potential contamination of water resources at CCR disposal units, a majority of the states examined do not require groundwater monitoring for both existing and new CCR landfills. Commenters reviewed whether states required all of their operating landfills (and surface impoundments) to conduct groundwater monitoring, not just those built after a certain date. For the protection of public health, it is absolutely essential that all units be monitored. In fact, it is arguably more important for older units to be monitored because older units are more likely to be constructed without liners and leachate collection systems. When states "grandfather" older waste units, they likely are exempting a large proportion of the state's waste disposal units, because both landfills and surface impoundments are used for many decades.

The resulting analysis reveals that the majority of coal ash in the U.S. is not subject to mandatory groundwater monitoring when disposed in landfills. In addition to the states identified above that completely exempt all or most of coal ash disposal from regulation, at least seven other states provide for wholesale exemption from regulation of CCR that is disposed in on-site or in monofills, and another seventeen states leave the decision of whether to require such

[109] Ala. Admin. Code r. 335-13-1-.03(12) (2010); N.M. Code § 20.9.2.7(S)(9) (2010); Utah Admin. Code r. § 19-6-102(18)(b)(iii).
[110] Ohio Admin. Code 3745:27-01(S)(23) (2010).
[111] 30 Tex. Admin. Code §§ 335.2(d); 335.1(138)(H) (2010).

monitoring at landfills up to the discretion of state agency staff. Thus, at least 30 states (which as a whole generated 85 percent of the total CCR in the United States in 2005) lack mandatory groundwater monitoring requirements for both new and existing CCR landfills. Of the states in which groundwater monitoring of CCR landfills is mandatory, only semi-annual sampling is required.

Table 2. Is Groundwater Monitoring Mandatory at CCR Landfills?

Yes 7 out of 37 states surveyed 13.24% of total CCR	7 states require groundwater monitoring at CCR landfills: IL, NH, NJ, NV, LA*, MO*, WV*; 4 of these states (IL, NH, NJ, NV) require monitoring at new and existing units (representing 3.66% of total CCR)
No 30 out of 37 states surveyed 84.92% of total CCR	3 states exclude CCR from the definition of solid waste: AL, NM, UT 5 states leave question of whether to require monitoring to discretion of state regulators: AZ, KS, MD*, NC*, WI* 12 states provide for variance of monitoring requirements: IA, KY*, MN*, NY, ND, OK*, SD, TN, VA, WA, WY, GA 7 states exempt on-site or monofill disposal: CO, FL*, MS, MT, PA, TX* 4 states exempt CCR that meets certain toxicity criteria: IN, OH, MI, SC

*grandfathering of existing sites

Even fewer states require groundwater monitoring for all existing and new CCR surface impoundments. Of the 37 states examined, only six required any level of groundwater monitoring under state solid waste programs. Of those six, two states require monitoring of groundwater only after the closure of a disposal unit and one requires monitoring for surface impoundments located in specific areas associated with the water supply. Thus, at least 31 states (which as a whole generated 79% of the total CCR in the United States in 2005) lack mandatory groundwater monitoring requirements for all CCR surface impoundments. As discussed below, the fact that groundwater monitoring is not mandatory at the majority of CCR surface impoundments takes on particular significance in light of EPA's assumption that states without groundwater monitoring requirements for surface impoundments are unlikely to implement Subtitle D criteria on their own accord.

Table 3. Is Groundwater Monitoring Mandatory at CCR Surface Impoundments?

Yes 6 out of 37 states surveyed 19.12% of total CCR	6 states require groundwater monitoring at both new and existing CCR surface impoundments: LA, PA, WA, IL (only in recharge areas); MI (only after unit closure); VA (only after unit closure)
No 31 out of 37 states surveyed 79.07 of total CCR	2 states provide for variance of monitoring requirements: ND, NY 5 leave question of whether to require monitoring to discretion of state regulators: KY, NJ, OK, WI, WV 7 states specifically exclude or exempt CCR impoundments from monitoring requirements: AL, FL, IN, MT, NH, NM, CO* 17 states have no groundwater monitoring requirements for CCR impoundments: AZ, GA, IA, KS, MD, MN, MO, MS, NC, NV, OH, SC, SD, TN, TX, UT, WY

*grandfathering of existing units

Even in states where groundwater monitoring is mandatory or where regulators have exercised their discretion to require such monitoring, the specific requirements in place are not necessarily protective of health and the environment. For example, all of the states that require groundwater monitoring at CCR landfills require only that monitoring wells be sampled twice a year; yet semi-annual sampling is insufficiently protective. In order to ensure protection of groundwater and early detection of any contamination as well as understand seasonal variations in sampling results, quarterly sampling must be required.

Table 4. Is Quarterly Monitoring Required at CCR Landfills?

Yes 0 out of 37 states surveyed 0% of total CCR	None of the 7 states that require groundwater monitoring at CCR landfills require quarterly monitoring for active life of the unit.
No 37 out of 37 states surveyed 98.19% of total CCR	*Illinois requires quarterly monitoring for first five years of operation, but then allows for less frequent monitoring.* 4 of the states with qualified groundwater monitoring requirements (e.g., variance available, on-site/monofill exemptions) require quarterly groundwater monitoring at CCR landfills: MI, NY, PA, WA (14.61% of total CCR) 19 states call for semi-annual monitoring, in event groundwater monitoring is required at a particular unit: CO, FL, GA, IN, KY, LA, MS, MO, MT, NV, NJ, ND, SC, SD, TN, TX, VA, WV, WY 3 states call for annual monitoring, in event groundwater monitoring is required at a particular unit: IA, OH, OK 3 states leave monitoring frequency to the discretion of state regulators: MN, NH, IL (quarterly for first five years) 8 states have no groundwater monitoring requirements whatsoever: AL, AZ, SK, MD, NC, NM, UT, WI

Table 5. Is Quarterly Monitoring Required at CCR Surface Impoundments?

Yes 2 out of 37 states surveyed 11.88% of total CCR	2 states require quarterly groundwater monitoring at both new and existing CCR surface impoundments: PA, WA
No 35 out of 37 states surveyed 86.31% of total CCR	1 state requires semi-annual sampling: LA 4 of the states with qualified groundwater monitoring requirements at CCR landfills (e.g., variance available, on-site/monofill exemptions) call for quarterly sampling when groundwater monitoring is conducted: CO, IL, MI, NY (14.61% of total CCR) 6 leave question of whether to require monitoring to discretion of state regulators: KY, NJ, ND (semi-annual), OK, WI, WV (semi-annual) 7 states specifically exclude or exempt CCR impoundments from monitoring requirements: AL, FL, IN, MT, NH, NM, VA (after unit closure) 17 states have no groundwater monitoring requirements for CCR impoundments: AZ, GA, IA, KS, MD, MN, MO, MS, NC, NV, OH, SC, SD, TN, TX, UT, WY

Similarly, few states require the adequate minimum number of downgradient monitoring wells. A minimum of three wells is necessary to determine the direction of groundwater flow and, thus, the existence and extent of contamination originating at a CCR disposal unit. However, only a handful of states require the installation and sampling of three downgradient wells.[112] Without the ability to properly define groundwater movement and the presence and location of contaminants, a groundwater monitoring program cannot be effective.

Table 6. Are a Minimum of Three Downgradient Wells and One Upgradient Well Required at CCR Landfills?

Yes 4 out of 37 states surveyed 9.09% of total CCR	4 states require a minimum of three downgradient wells and one upgradient well at CCR landfills: NH, NJ, MO*, WV*; 2 of these states (NH, NJ) require monitoring at new and existing units (representing 0.65% of total CCR)
No 33 out of 37 states surveyed 89.1% of total CCR	7 of the states with qualified groundwater monitoring requirements (*e.g.*, variance available, on-site/monofill exemptions) require a minimum of three downgradient wells and one upgradient well at CCR landfills: IN, NY, OK, PA, SD, VA, WA 26 states do not require a minimum of three downgradient wells and one upgradient well at CCR landfills: AL, AZ, CO, FL, GA, IA, IL, KS, KY, LA, MS, MT, MN, MD, MI, NM, NC, ND, NV, OH, SC, TN, TX, UT, WI, WY

*grandfathering of existing sites

[112] Indeed, EPA identifies only *three* states that require a minimum of four monitoring wells (one upgradient and three downgradient) at CCR landfills. *2010 RIA*, at Exhibit E1.

Table 7. Are a Minimum of Three Downgradient Wells and One Upgradient Well Required at CCR Surface Impoundments?

Yes 2 out of 37 states surveyed 11.88% of total CCR	2 states require a minimum of three downgradient wells and one upgradient well at CCR surface impoundments: PA, WA
No 35 out of 37 states surveyed 86.31% of total CCR	*3 of the states with qualified groundwater monitoring requirements (e.g., variance available, on-site/monofill exemptions) require a minimum of three downgradient wells and one upgradient well at CCR surface impoundments: NJ, VA, WV* 32 states do not require a minimum of three downgradient wells and one upgradient well at CCR surface impoundments: AL, AZ, CO, FL, GA, IA, IL, IN, KS, KY, LA, MD, MI, MN, MO, MS, MT, NC, ND, NH, NM, NY, NV, OH, OK, SC, SD, TN, TX, UT, WI, WY

ii. States Fail to Require Adequate Liners for CCR Landfills and Surface Impoundments.

The risks stemming from the lack of adequate groundwater monitoring requirements are exacerbated by the often parallel deficiencies in state regulation of landfill and surface impoundment design requirements. While EPA has stated that only composite liners are sufficient to protect human health and the environment,[113] only 5 of 37 states mandate the installation of composite liners at all new CCR landfills and only 4 of 37 states require composite liners at all new CCR surface impoundments. Seven states lack any liner requirement for CCR landfills, composite or otherwise, and another 19 states exempt certain landfills from liner requirements or allow variance of such requirements by state regulators.

The deficiencies in the regulation of surface impoundments are even more severe. Twenty-seven of the states that were reviewed have no liner requirement whatsoever for CCR surface impoundments. Indeed, some of the largest CCR-generating states (*e.g.*, Texas, Ohio, Kentucky, and Indiana) lack this basic safeguard. The lack of adequate liners at CCR surface impoundments underscores the importance of mandatory groundwater monitoring. Without sufficient barriers separating the millions of gallons of wet coal ash that are stored in surface impoundments from the groundwater below, seepage of hazardous constituents into the groundwater is bound to occur.

[113] A composite liner system that consists of two components: the upper component must consist of a minimum 30-mil flexible membrane liner (FML), and the lower component must consist of at least a two-foot layer of compacted soil with a hydraulic conductivity of no more than 1×10(-7) cm/sec. 75 Fed. Reg. at 35,174.

Table 8. Type of Liner Required for New CCR Landfills

Composite 7.19% of total CCR	5 states require a composite liner at CCR landfills: LA, MS, NC, NV, WI
Clay 10.33% of total CCR	4 states require a clay liner at CCR landfills: MD, MO, NJ, WV
Soil 21.65% of total CCR	5 states require a soil liner at CCR landfills: IL, IN, MI, NH, PA
Variance available 16.27% of total CCR	10 states provide for variance of liner requirements at CCR landfills: GA, MN, NY, ND, OK, SD, TN, VA, WA, WY
Exemption 25.1% of total CCR	6 states exempt certain CCR landfills from liner requirements: SC, FL, MT, CO, OH, TX
No Requirement 17.65% of total CCR	7 states do not require liners at CCR landfills: AL, AZ, IA, KS, KY, NM, UT

Table 9. Type of Liner Required for New CCR Surface Impoundments*

Composite 19.61% of total CCR	4 states require a composite liner at CCR surface impoundments: LA, NY, PA, WV
Clay 3.79% of total CCR	2 states require a clay liner at CCR surface impoundments: IL (only in setback/recharge zones), OK
Soil 5.36% of total CCR	4 states require a soil liner at CCR surface impoundments: CO, ND, WA, WI
No Requirement 69.43% of total CCR	27 states do not require liners at CCR surface impoundments: AL, AZ, FL, GA, IN, IA, KS, KY, MD, MI, MN, MS, MO, MT, NJ, NV, NH, NM, NC, OH, SC, SD, TN, TX, UT, VA, WY

iii. States Fail to Require Leachate Collection Systems for CCR Landfills.

Fewer than half of the 37 state programs we reviewed require leachate collection systems for CCR landfills, and only seven states require such systems for CCR surface impoundments. Without leachate collection systems,[114] liquids that collect at a landfill can compromise even the best liner system. The pooling of water above a liner causes the liner to become saturated, thereby exhausting its permeability and eliminating its effectiveness at leakage prevention.

[114] Leachate collection systems capture pollutants that may have escaped through the flexible membrane layer located above it. Pumps are employed to move the leachate out of the landfill where it can be treated to safe levels.

Table 10. Is a Leachate Collection System Mandatory for CCR Landfills?*

Yes 12 out of 37 states surveyed 30.21% of total CCR	12 states require a leachate collection system at CCR landfills: LA, MI, MS, MO, MD, NH, NJ, NC, NV, PA, WV, WI
No 25 out of 37 states surveyed 67.98% of total CCR	7 states do not require a leachate collection system at CCR landfills: AL, AZ, NM, IA, KS, KY, UT (17.65% of total CCR) 8 states exempt certain CCR landfills from leachate collection requirements: CO (on-site), FL (on-site), IN (required only in karst), IL (monofill), MT (on-site), OH (nontoxic), SC (TCLP), TX (on-site) (34.06% of total CCR) 10 states provide for variance of leachate collection requirements: GA (at monofills), OK, MN, NY, ND, SD, TN, VA, WA, WY (16.27% of total CCR)

Table 11. Is a Leachate Collection System Mandatory for CCR Surface Impoundments?*

Yes 7 out of 37 states surveyed 23.14% of total CCR	7 states require a leachate collection system at CCR surface impoundments: NJ, NY, ND, PA, WA, WV, WI
No 30 out of 37 states surveyed 75.05% of total CCR	30 states do not require a leachate collection system at CCR surface impoundments: AL, AZ, CO, FL, GA, IN, IA, IL (requirement only applies on setback/recharge areas), KS, KY, LA, MD, MI, MN, MS, MO, MT, NV, NH, NM, NC, OH, OK, SC, SD, TN, TX, UT, VA, WY

iv. States Fail to Control Fugitive Dust at CCR Landfills and Surface Impoundments.

Operational safeguards at CCR disposal sites are also severely lacking under current state regulatory programs. Only 7 of the 37 states evaluated require daily cover at CCR landfills. Seven additional states require cover, but not on a daily basis. Five states allow for variance or waiver of cover requirements, and 18 states had no cover requirement of any kind. Fewer than half of the states examined require fugitive dust controls at CCR landfills, , and only one state (Pennsylvania) has mandatory dust controls for CCR surface impoundments. Of the states that require dust controls, none requires specific measures for the control of dust on a daily basis; significant discretion is left in the hands of state permitting authorities and facility operators. EPA found, however, that daily cover was necessary to protect the health of residents near CCR landfills in its 2010 report, *Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills*. The screening assessment found that daily cover was necessary to prevent NAAQS violations.

Table 12. Is Daily Cover Mandatory at CCR Landfills?*

Yes 7 out of 37 states surveyed 25.99% of total CCR	7 states require daily cover at CCR landfills: IL, LA, NV, NJ, NC, PA, WV
No 30 out of 37 states surveyed 72. 2% of total CCR	18 states do not require daily cover at CCR landfills: AL, AZ, FL (on-site), IN (required only at Type I), IA, KS, KY, MD, MI, MT (required only for Class II/on-site exempt), NH, NM, OH (nontoxic), SC (required only at Class III), TX, UT, VA, WA (53.64% of total CCR) 7 states require some cover at CCR landfills, but not daily: MS, MO, ND, OK, TN, WI, WY (10.85% of total CCR) 5 states provide for variance of daily cover requirements: CO (on-site), GA (monofill), MN, NY, SD (7.71% of total CCR)

Similarly, dust controls are necessary at CCR landfills to prevent exposure to airborne ash during landfill operations. Dumping, truck traffic on the surface of the landfill, and spreading can generate significant fugitive dust, sufficient to endanger the health of nearby residents. Our study found, however, that less than half of the states examined mandated dust controls at CCR landfills, and only a single state required dust controls at CCR surface impoundments.

Table 13. Are Dust Controls Mandatory at CCR Landfills?*

Yes 13 out of 37 states surveyed 39.37% of total CCR	13 states require dust controls at CCR landfills: IL, IN, IA, MD, MI, MO, NV, NJ, NC, PA, SC, WV, WI
No 24 out of 37 states surveyed 58.82% of total CCR	15 states do not require dust controls at CCR landfills: AL, AZ, CO (on-site), FL (on-site), GA, KS, KY, LA, MS, MT, NH, NM, OH (nontoxic), TX, UT (46.85% of total CCR) 9 states allow for variance of dust control requirements: MN, NY, ND, OK, SD, TN, VA, WA, WY (11.97% of total CCR)

Table 14. Are Dust Controls Mandatory at CCR Surface Impoundments?*

Yes 1 out of 37 states surveyed 10.88% of total CCR	Only 1 state requires dust controls at CCR surface impoundments: PA
No 36 out of 37 states surveyed 87.31% of total CCR	36 states do not require dust controls at CCR surface impoundments: AL, AZ, CO, FL, GA, IL, IN, IA, KS, KY, LA, MD, MI, MN, MO, MS, MT, ND, NY, NH, NM, NC, NV, NJ, OH, OK, SC, SD, TN, TX, UT, VA, WA, WI, WV, WY

v. States Fail to Require Run-on and Run-off Controls.

Good CCR landfill design includes run-on and run-off controls. Run-on must be diverted to prevent erosion to the landfill. Run-off of precipitation must be collected and managed to reduce the potential for off-site migration of contaminants. Less than half of the states examined required such controls for CCR landfills and only three states required such controls for CCR surface impoundments.

Table 15. Are Run-off Controls Mandatory at CCR Landfills?

Yes 17 out of 37 states surveyed 42.81% of total CCR	17 states require run-off controls at CCR landfills: IL, IN, IA, LA, MD, MI, MS, MO, MT, NV, NH, NJ, NC, PA, SC, WV, WI
No 20 out of 37 states surveyed 55.38% of total CCR	10 states do not require run-off controls at CCR landfills: AL, AZ, CO (on-site), FL (on-site), KS, KY, NM, TX, UT, VA (33.41% of total CCR) 10 states allow for variance of run-off controls at CCR landfills: GA (monofills), MN, NY, ND, OH, OK, SD, TN, WA, WY (21.97% of total CCR)

Table 16. Are Run-off Controls Mandatory at CCR Surface Impoundments?

Yes 3 out of 37 states surveyed 13.7% of total CCR	3 states require run-off controls at CCR surface impoundments: LA, MI, PA
No 34 out of 37 states surveyed 84.49% of total CCR	31 states do not require run-off controls at CCR surface impoundments: AL, AZ, CO, FL, GA, IL, IN, IA, KS, KY, MD, MN, MS, MO, MT, NV, NH, NJ, NM, NY, NC, OH, SC, SD, TN, TX, UT, VA, WI, WV, WY 3 states allow variance of run-off controls at CCR surface impoundments: ND, OK, WA

vi. States Fail to Require Isolation of CCR from Groundwater when Placed in Landfills and Surface Impoundments.

Coal ash must be isolated from contact with groundwater to prevent the migration of toxic contaminants from the waste into the underlying water table. This is the purpose of an impermeable composite liner. When coal ash is placed in contact with water, or when the separation from the water table is insufficient, soluble metals in the ash will migrate to the underlying groundwater. Although mandating separation from the water table is one of the most basic tenets of proper waste management, 16 of 37 states place no restriction on the location of ash landfills with respect to the water table and 30 of 37 states place no restrictions with regard to the location of coal ash surface impoundments.

Table 17. Can CCR Landfills to be Constructed in the Water Table?

Yes 21 out of 37 states surveyed 56.64% of total CCR	21 states prohibit the location of CCR landfills within a certain distance of the water table: CO, IA, IL, MD, MI, MN, MS, NC, NH, NJ, NV, NY, OH, OK, PA, SC, TN, TX, WA, WI, WV
No 16 out of 37 states surveyed 41.55% of total CCR	16 states place no restriction on the location of CCR landfills with respect to the water table: AL, AZ, GA, FL, IN, KS, KY, LA, MO, MT, ND, NM, SD, UT, VA, WY

Table 18. Can CCR Surface Impoundments to be Constructed in the Water Table?

Yes 7 out of 37 states surveyed 25.64% of total CCR	7 states prohibit the location of CCR surface impoundments within a certain distance of the water table: CO, NC, NY, OK, PA, WI, WV
No 30 out of 37 states surveyed 72.55% of total CCR	30 states place no restriction on the location of CCR surface impoundments with respect to the water table: AL, AZ, GA, FL, IA, IL, IN, KS, KY, LA, MD, MI, MN, MO, MT, MS, ND, NH, NJ, NM, NV, OH, SC, SD, TN, TX, UT, VA, WA, WY

vii. States Fail to Place Other Location Restrictions on CCR Landfills and Surface Impoundments.

While Commenters did not conduct an independent assessment of state regulation of disposal unit location, EPA's *2010 RIA* includes a synopsis of state government restrictions on locating CCR landfills and surface impoundments for the top 25 coal usage states.[115] The *2010 RIA*'s summary of six categories of location restrictions—water table, wetlands, floodplains, faulty areas, seismic zones, unstable karst terrain—highlights the inadequacy of state regulation of disposal unit siting. Only 5of the 25 states reviewed restricted the siting of CCR surface impoundments below the natural water table; only eight states placed such restrictions on CCR landfill siting. Only 5 of 25 states restricted the siting of CCR surface impoundments in wetland areas; 17 states restricted such siting for CCR landfills. Eight of the 25 states reviewed restricted locating CCR surface impoundments in floodplains; 20 of 25 states placed such restrictions on CCR landfills. A mere two states had restrictions on the siting of CCR surface impoundments in fault areas or seismic zones; seven states restricted locating CCR landfills in fault areas, and eight restricted such siting in seismic zones. Five states restricted the siting of CCR surface impoundments in areas of unstable (karst) terrain, and 12 states restricted the location of CCR landfills in such areas.

viii. States Fail to Require Financial Assurances for CCR Landfills and Surface Impoundments.

Financial assurance for landfills and surface impoundments is a critical safeguard and an important tool for ensuring safe waste disposal operations. Fewer than half of the states surveyed, however, require financial assurances for all CCR landfills, and only four states mandate financial assurances for all CCR surface impoundments.

[115] *2010 RIA* at 46–47.

Table 19. Are Financial Assurances Mandatory for CCR Landfills?

Yes 16 out of 37 states surveyed 41.78% of total CCR	16 states require financial assurances for CCR landfills: GA, IN, IA, LA, MI*, MS, MO*, NV, NH, NJ, NC, PA, SC, SD, WV, WI
No 21 out of 37 states surveyed 56.41% of total CCR	6 states have no financial assurance requirement: AL, AZ, KS, MD, NM, UT (11.71% of total CCR) 6 states exempt certain CCR landfills from financial assurances requirements: CO, IL, FL, MT, OH, TX (26.29% of total CCR) 9 states allow for variance of financial assurance requirement: KY, MN, NY, ND, OK, TN, VA, WA, WY (18.41% of total CCR)

* grandfathering of existing units

Table 20. Are Financial Assurances Mandatory for CCR Surface Impoundments?

Yes 4 out of 37 states surveyed 15.85% of total CCR	4 states require financial assurances for CCR surface impoundments: LA, MI*, PA, ND
No 33 out of 37 states surveyed 82.34% of total CCR	33 states have no financial assurance requirement for CCR surface impoundments: AL, AZ, CO, FL, GA, IN, IA, IL, KS, KY, MD, MN, MS, MO, MT, NH, NJ, NY, NV, NM, NC, OH, OK,SC, SD, TN, TX, UT, VA, WA, WI, WV, WY

* grandfathering of existing units

ix. States Fail to Require Safe Closure of CCR Landfills or Surface Impoundments.

Our analyses revealed significant deficiencies in the states' regulation of the closure of CCR disposal units at the end of their active lives. Only one of the state programs reviewed includes a mandatory requirement that final cover for all CCR landfills and surface impoundments include a composite element. Fourteen states require less protective materials such as clay or soil, and 22 state programs lack any mandatory requirements for final cover materials. Impermeable covers are essential for coal ash landfills and surface impoundments to prevent precipitation from infiltrating the closed unit. Impermeable covers are especially essential for coal ash landfills and ponds, because so many of these units are unlined. Water percolating through a closed, unlined landfill will facilitate the migration of contaminants from the ash into the underlying groundwater.

Table 21. Type of Final Cover Required for CCR Landfills

Composite 1.14% of total CCR	1 state requires a composite final cover for CCR landfills: LA
Clay 21.69% of total CCR	5 states require clay final cover for CCR landfills: MO, MD, PA, WV, WI
Soil 17.14% of total CCR	9 states require soil final cover for CCR landfills: IA, IL, IN, MI, MS, NJ, NH, NC, NV
Variance available 16.27% of total CCR	10 states allow for variance of final cover requirements for CCR landfills: GA, SD, VA, NY, ND, OK, TN, WA, WY, MN
Exemption 25.1% of total CCR	6 states exempt certain CCR landfills from final cover requirements: CO, FL, MT, OH, SC, TX
No Requirement 16.85% of total CCR	6 states have no final cover requirement for CCR landfills: AL, AZ, KS, KY, NM, UT

Table 22. Type of Final Cover Required for CCR Surface Impoundments

Composite 1.14% of total CCR	1 state requires a composite final cover for CCR surface impoundments: LA
Clay 11.94% of total CCR	2 states require clay final cover for CCR surface impoundments: OK, PA
Soil 2.68% of total CCR	2 states require soil final cover for CCR surface impoundments: MI, WA
Removal upon closure 3.72% of total CCR	3 states require that CCR surface impoundments be removed upon closure: ND, NJ, NY
No requirement 78.71% of total CCR	29 states have no final cover requirement for CCR surface impoundments: AL, AZ, CO, FL, GA, IN, IA, IL, KS, KY, MD, MN, MS, MO, MT, NV, NH, NM, NC, OH, SC, SD, TN, TX, UT, VA, WI, WV, WY

Long-term post-closure monitoring of coal ash landfills and surface impoundments is critical to ensure that contaminants are not migrating from the disposal units. Early detection of contaminated groundwater is necessary to protect the health of nearby communities. Such monitoring is essential, once again, because of the hundreds of unlined landfills and ponds that are currently in operation or that have already retired. All units, both those that will close and those already retired, must be monitored so that leaks are detected before substantial migration can occur. Lastly, it is necessary that post-closure monitoring be at least 30 years because coal ash is not a stable material, and its condition changes over time. Especially if exposed to the water table or precipitation, coal ash will evolve slowly and release its harmful contaminants over the course of decades. A dump that is not releasing contamination five years after closure says absolutely nothing about its potential to poison groundwater 10, 20, 30 or 50 years later. According to EPA's 2010 Risk Assessment, peak contaminant releases from CCR surface impoundments will not occur until over 70 years after waste placement, and the peak release

period for CCR landfills is thousands of years.[116] A post-closure monitoring period of at least 50 years is indeed reasonable and necessary. Almost no states, however, require a mandatory monitoring period of at least 30 years, as shown in the table below.

Table 23. Is 30 Years of Post-Closure Groundwater Monitoring Required for CCR Landfills?

Yes 5 out of 37 states surveyed 25.64% of total CCR	5 states require post-closure groundwater monitoring for 30 years at all CCR landfills: LA, MI, MO, NV, WV
No 32 out of 37 states surveyed 72.55% of total CCR	32 states do not require post-closure groundwater monitoring for 30 years at all CCR landfills: AL, AZ, CO (on-site), FL (on-site), GA (variance for monofills), IL, IN (Type III exempt), IA, KS, KY, MD, MN, MS, MT (on-site), NH, NJ, NM, NY, NC (on-site), ND, OH, OK, PA, SC, SD, TN, TX (on-site), UT, VA, WA, WI, WY

Table 24. Is 30 Years Post-Closure Groundwater Monitoring Required for CCR Surface Impoundments?

Yes 1 out of 37 states surveyed 1.14% of total CCR	1 state requires post-closure groundwater monitoring for 30 years at all CCR surface impoundments: LA
No 36 out of 37 states surveyed 97.05% of total CCR	36 states do not require post-closure groundwater monitoring for 30 years at all CCR surface impoundments: AL, AZ, CO, FL, GA, IL, IN, IA, KS, KY, MD, MI, MN, MS, MO, MT, NV, NH, NJ, NM, NY, NC, ND, OH, OK, PA, SC, SD, TN, TX, UT, VA, WA, WV, WI, WY

x. Grandfathering of Existing Units Encourages Prolonging Life of Aging Ponds and Landfills.

States routinely allow the continued operation of existing landfills and surface impoundments, without requiring the older units to comply with newly-imposed safeguards. This widespread practice encourages the use of existing units for as long as possible. In the 1999 Report to Congress, EPA estimated that the average age of surface impoundments and landfills was about 40 years. Yet many ponds and landfills are operating for decades longer.[117] Section III.B.1.d.i.2., *infra*, discusses in detail the aging of the nation's fleet of surface impoundments. The continued operation and expansion of hundreds of ponds and landfills without liners, leachate collection systems, monitoring and other basic safeguards is another critical reason why regulation under subtitle C is essential.

[116] 2010 Risk Assessment, at 4-11.
[117] *See* EPA, Coal Combustion Residuals Impoundment Assessment Reports, http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.

d. The Results of EPA's Analyses of State Regulations Differ from New Findings Presented by Commenters.

EPA's *2010 RIA* purports to summarize the baseline state requirements for CCR landfills and surface impoundments.[118] However, because the requirements outlined for certain states do not apply to *all* CCR disposal units in said states, such requirements fail to represent a baseline. Where a state requires groundwater monitoring at landfills, but exempts from such requirements those units that are located on-site at a power plant, it would be inaccurate to characterize groundwater monitoring at landfills as a minimum requirement. A regulatory baseline exists only where all units must meet certain minimum requirements. Thus, the "minimums" listed in Appendix E to the *2010 RIA* are more properly characterized as potential requirements—standards that might or might not apply to any particular disposal unit.

The yes/no dichotomy utilized in Appendix E both overstates and oversimplifies regulatory requirements for the 34 state programs it attempts to summarize. For example, Exhibit E1 answers "Yes" for whether groundwater monitoring of CCR landfills is required in Colorado. While some landfills in Colorado may in fact require such monitoring, where CCR is disposed of on-site, Colorado's waste management regulations do not require groundwater monitoring.[119] In addition, and as discussed *infra* in section III.B.1.e., EPA's yes/no assignments in Appendix E do not take into account the many states that allow for variance of regulatory requirements. Such oversimplifications are made with respect to the majority of states programs assessed in the *2010 RIA*. Thus, EPA vastly overestimates the adequacy of current state regulation of CCR disposal.

Our independent review of state regulatory authority reveals that the actual "baseline" of state regulation of CCR disposal is woefully inadequate. The following discussion and side-by-side comparison of the discrepancies between EPA's characterization of baseline state regulatory requirements and our analysis of such requirements demonstrates the shortcomings of the *2010 RIA*'s assessments as well as the lack of the minimum requirements necessary for the safe disposal of CCR.

i. Groundwater Monitoring

1. CCR Landfills

In its review of groundwater monitoring requirements at CCR landfills, the *2010 RIA* indicates that 31 of 34 states surveyed require groundwater monitoring.[120] However, this count is over-inclusive to the point of rendering the regulatory review meaningless. Our review of state regulations, on the other hand, revealed that mandatory groundwater monitoring of all CCR landfills is the exception rather than the norm (only 7 out of 37 states require groundwater

[118] *2010 RIA*, Appendix E.
[119] 6 CO ADC 1007-2:1-1.4(1).
[120] *2010 RIA*, Exhibit E1.

monitoring at all CCR landfills) and that *2010 RIA* significantly overstates the current level of state regulation.[121] Table 25 presents a side-by-side comparison of the *2010 RIA*'s characterization of state groundwater monitoring requirements at landfills with our review of the states' requirements. The difference is dramatic. Based on the *2010 RIA*'s count, one could assume that the majority of CCR disposal in the United States requires groundwater monitoring; this is not the case. Our analysis reveals the many exemptions and loopholes that allow CCR disposal to take place without any groundwater monitoring.

[121] A detailed state-by-state regulatory analysis is set forth in Attachment 4 to these comments.

Table 25. Is Groundwater Monitoring Mandatory at CCR Landfills?

STATE	2010 RIA EX. E1 (34-STATE REVIEW)	EARTHJUSTICE 2010 37-STATE REVIEW
AL	Yes	No – CCR excluded from definition of solid waste
AZ	No	No
CO	Yes	No – on-site disposal exempt[a]
FL	Yes	No – on-site disposal exempt[a]
GA	Yes	No – variance available for monofills[b]
IA	Yes	No – variance available
IL	Yes	Yes
IN	Yes	No – Type III and IV landfills exempt[c]
KS	Yes	No – left to discretion of regulators
KY	Yes	No – variance available
LA	Yes	Yes (but existing units grandfathered)
MD	No	No – left to discretion of regulators
MI	Yes	No – Type III and industrial waste landfills exempt
MN	Yes	No – variance available
MS	Yes	No – on-site exempt[a]
MO	Yes	Yes (but existing units grandfathered)
MT	Yes	No – on-site exempt[a]
NC	Yes	No – left to discretion of regulators
ND	Yes	No – variance available
NH	N/A	Yes (but only limited requirements)
NJ	N/A	Yes
NM	No	No
NV	Yes	Yes
NY	Yes	No – variance available
OH	Yes	No – nontoxic CCR exempt
OK	Yes	No – variance available
PA	Yes	No – monofills exempt[b]
SC	Yes	No – certain CCR exempt per TCLP[d]
SD	N/A	No – variance available
TN	Yes	No – variance available
TX	Yes	No – on-site exempt[a] and most CCR beneficially reused
UT	Yes	No – CCR excluded from definition of solid waste
VA	Yes	No – variance available
WA	Yes	No – variance available
WI	Yes	No – left to discretion of regulators
WV	Yes	Yes (but existing units grandfathered)
WY	Yes	No – variance available
	31 Yes/3 No	**7 Yes/30 No** **(3 of 7 states requiring monitoring exempt existing landfills; 8 states had no requirement; 12 allowed for variance of requirements on the books; 10 exempted significant sections of CCR)**

a: Most CCR disposal is onsite (approximately 70 percent).
b: CCR is usually disposed in a "monofill" in which only CCR is placed.
c: Indiana commonly classifies CCR as a type III waste.
d: Since CCR rarely fails the TCLP test, see section III.C.1.b, *infra*, CCR will usually be exempt.

2. Surface Impoundments

The assessment of which states require groundwater monitoring at CCR surface impoundments that is presented in the *2010 RIA* is of particular significance given EPA's assumption that "states with groundwater monitoring requirements at new units, or with some coverage of the units in question, would upgrade their existing programs to provide fuller coverage" following adoption of EPA's Subtitle D option.[122] (This is discussed in detail, *infra*, in section III.B.1.f.) After examining state regulations in 37 states, we determined that EPA has again greatly overestimated the extent of state regulatory requirements.[123] The table below compares our findings with EPA's findings in the *2010 RIA* regarding groundwater monitoring at CCR surface impoundments.

[122] *2010 RIA* at 124.
[123] A detailed state-by-state regulatory analysis is set forth in Attachment 4 to these comments.

Table 26. Is Groundwater Monitoring Mandatory at CCR Surface Impoundments?

STATE	2010 RIA EX. E2 (34-STATE REVIEW)	EARTHJUSTICE 2010 37-STATE REVIEW
AL	No	No
AZ	No	No
CO	Yes	No – on-site disposal exempt[a]
FL	Yes	No – on-site disposal exempt[a]
GA	No	No
IA	No	No
IL	No	Yes[b]
IN	No	No
KS	No	No
KY	Yes	No
LA	Yes	Yes
MD	No	No
MI	Yes	Yes – post-closure monitoring; only for nits closed in place as landfills
MN	Yes	No
MS	No	No
MO	Yes	No
MT	No	No
NC	Yes	No
ND	Yes	No – variance available
NH	N/A	No
NJ	N/A	No
NM	No	No
NV	Yes	No
NY	Yes	No – variance available
OH	No	No
OK	Yes	No – left to discretion of regulators
PA	Yes	Yes
SC	Yes	No
SD	N/A	No
TN	No	No
TX	No	No
UT	Yes	No
VA	No	Yes – post-closure monitoring only
WA	N/A	Yes – groundwater monitoring OR leachate detection system
WI	Yes	No – left to discretion of regulators
WV	Yes	No – left to discretion of regulators
WY	No	No
	17 Yes/16 No	**6 Yes/31 No**

a: Most CCR disposal is onsite (approximately 70 percent).

b: While EPA's summary indicates that Illinois does not require groundwater monitoring at CCR surface impoundments, we included Illinois in our count because groundwater monitoring is required for all surface impoundments located in specific areas, *i.e.*, recharge areas and setback zones. 35 Illinois Admin. Code § 616.441.

ii. Liner Requirements for CCR Landfills

The *2010 RIA*'s review of engineering control requirements indicates that 23 of 34 states surveyed require composite liners at CCR landfills.[124] As in the *2010 RIA*'s assessment of states' groundwater monitoring requirements, this count is dramatically over-inclusive. Our review of the relevant state programs found that only 3 states mandate composite liners at all new CCR landfills. The *2010 RIA* again overstates the current level of state regulation by (apparently) including in its count states that may require composite liners at some units, but not without exception. The table below compares EPA's characterization of liner requirements for CCR landfills with our review of the states' requirements.[125]

[124] *2010 RIA*, Exhibit E3.
[125] A detailed state-by-state regulatory analysis is set forth in Attachment 4 to these comments.

Table 27. What Type of Liners Are Required for CCR Landfills?

STATE	2010 RIA EX. E3 (34-STATE REVIEW)	EARTHJUSTICE 2010 37-STATE REVIEW
AL	Composite	No liner requirement
AZ	No	No liner requirement
CO	Clay or synthetic	No – on-site disposal exempt[a]
FL	Composite or double	No – on-site disposal exempt[a]
GA	Composite	No – variance available
IA	No	No liner requirement
IL	Clay or composite	Soil
IN	Clay	Soil for Type III/No liner requirement for Type IV[b]
KS	Composite	No liner requirement
KY	No	No
LA	Composite	Composite
MD	No	Clay
MI	Composite	Soil
MN	Clay	No – variance available
MS	Composite	Composite
MO	Composite	Clay
MT	Composite	No – on-site disposal exempt[a]
NC	Composite	Composite
ND	Clay or synthetic	No – variance available
NH	N/A	Soil
NJ	N/A	Clay
NM	No	No liner requirement
NV	Composite	Composite
NY	Composite	No – variance available
OH	Composite	No – "nontoxic" CCR exempt
OK	Composite	No – variance available
PA	Composite	Soil
SC	Composite or clay	No – certain CCR exempt per TCLP[c]
SD	N/A	No – variance available
TN	Composite	No – variance available
TX	Composite	No – on-site exempt
UT	Composite	No liner requirement
VA	Composite	No – variance available
WA	Composite	No – variance available
WI	Composite	Composite
WV	Composite	Clay
WY	Composite	No – variance available
	23 composite **6 clay** **5 no requirement**	**5 composite** **4 clay** **4 soil** **10 allow for variance of liner requirements** **6 exempt certain units from liner requirements** **7 have no liner requirements**

a: Most CCR disposal is onsite (approximately 70 percent).
b: Indiana commonly classifies CCR as a Type III waste.
c: Since CCR rarely fails the TCLP test, see section III.C.1.b, *infra*, CCR will usually be exempt.

iii. Liner Requirements for CCR Surface Impoundments

The baseline for liner requirements at CCR surface impoundments is overstated by the *2010 RIA*.[126] The report identifies 12 states that require composite liners at all new CCR surface impoundments, whereas our review of state programs indicates that only four states require composite liners at such units. Again, EPA mischaracterizes the baseline and inappropriately attributes minimum requirements to states that do not actually require a particular liner type at every disposal unit. The *2010 RIA*'s assessment would suggest that approximately half of the states subject to review have minimum liner requirements. However, as indicated in the table below, our analysis revealed that 27 of the 34 states reviewed have no minimum liner requirements for CCR surface impoundments.[127]

[126] *2010 RIA*, Exhibit E4.
[127] A detailed state-by-state regulatory analysis is set forth in Attachment 4 to these comments.

Table 27. What Type of Liners Are Required for CCR Surface Impoundments?

STATE	2010 RIA EX. E4 (34-STATE REVIEW)	EARTHJUSTICE 2010 37-STATE REVIEW
AL	No	No liner requirement
AZ	No	No liner requirement
CO	Clay or soil	Soil
FL	Composite	No liner requirement
GA	No	No liner requirement
IA	No	No liner requirement
IL	No	Clay – only in setback/recharge areas
IN	No	No liner requirement
KS	Composite	No liner requirement
KY	Composite	No liner requirement
LA	Composite	Composite
MD	No	No liner requirement
MI	Clay or composite	No liner requirement
MN	No	No liner requirement
MS	No	No liner requirement
MO	Composite	No liner requirement
MT	No	No liner requirement
NC	Composite	No liner requirement
ND	Clay or synthetic	Soil
NH	N/A	No liner requirement
NJ	N/A	No liner requirement
NM	No	No liner requirement
NV	Composite	No liner requirement
NY	Composite	Composite
OH	No	No liner requirement
OK	Composite	Clay
PA	Composite	Composite
SC	No	No liner requirement
SD	N/A	No liner requirement
TN	No	No liner requirement
TX	No	No liner requirement
UT	No	No liner requirement
VA	No	No liner requirement
WA	No	Soil
WI	Composite, synthetic, or clay	Soil
WV	Composite	Composite
WY	Composite	No liner requirement
	12 composite **3 clay** **1 soil** **18 no requirement**	**4 composite** **2 clay** **4 soil** **27 have no liner requirements**

e. The Disparity Between EPA's Analysis of State Regulations and New Analysis by Commenters is Vast.

There are profound implications to the significant disparity between EPA's assessment of state regulatory requirements in the *2010 RIA* and Commenters' analysis, which is summarized above and set forth in further detail in Attachment 4. In the *2010 RIA*,[128] the Agency relies primarily on its analysis of state laws to create its lists of engineering controls for surface impoundments and landfills found in Appendices F and K of the *2010 RIA*. In these appendices, EPA lists hundreds of ponds and landfills (purportedly representing all 495 plants) and assigns levels of safeguards (e.g., types of liners, monitoring, leachate collection) on a plant-by-plant basis depending primarily on the Agency's understanding of state law. In other words, EPA did not base these Appendices on specific knowledge of the actual facilities, but rather based on presumptive compliance with requirements that EPA assumed were applicable.[129] Because EPA greatly overestimated the regulatory requirements of many states, this overestimation is reflected in the safeguards assigned to particular units. For example, for all coal ash ponds in Kentucky listed in Appendix F at Exhibit F3, EPA indicates that each pond has a composite liner, because EPA mistakenly interpreted Kentucky state law to require a composite liner (see Table 27, above). However, Kentucky does *not* require ponds to be lined, and thus the attribution of composite liners to all of these ponds is likely in error. It is more probable that all the coal ash ponds in Kentucky are *unlined.*

What difference does this make? First it provides EPA with a false picture of the safeguards in place at existing units on a national scale. Because the evaluation of present disposal practices is a critical factor in EPA's decision-making for this rule, it is absolutely critical that EPA have a much more accurate assessment of the systemic deficiencies in the regulations that apply (or not) to the enormous universe of operating landfills and surface impoundments. EPA must recalculate its assessment in Appendices F and K to more accurately assess the level of safeguards that really apply across the country. It defeats the fundamental purposes of RCRA to proceed on the false premise that coal ash is being managed more safely than it really is.

Second, the overestimation of state regulatory requirements also has significant impact on the Agency's calculation of costs and benefits in the *2010 RIA*. EPA's method of determining which states will adopt subtitle D regulations relies on the agency's interpretation of state law. As described in detail below, by misinterpreting state regulatory requirements, EPA estimates that far more states will improve their state programs under a subtitle D rule. Because EPA proceeds to assign costs and benefits based on this over-optimistic calculation, the Agency assigns considerably more health and environmental benefits to state regulation pursuant to a subtitle D option than is appropriate. This phenomenon is described more fully in the section below and in Appendix A (Comments of Frank Ackerman).

[128] *See* Appendix E of the *2010 RIA.*

[129] EPA may have added some data from a voluntary survey circa 1995, but if so, this information applies to a minority of units in the Appendices and is dated information.

f. The Predicted Failure of States to Adopt Subtitle D Criteria

The gross deficiencies in many state programs discussed above will not be cured by EPA's promulgation of federal criteria under subtitle D. Under subtitle D, states are not required to adopt the federal criteria, and, in fact, EPA predicts that a great many states will not do so. EPA projects what the post-D world will look like in some detail in the *2010 RIA* by actually estimating the number and identity of states that will not adopt the subtitle D regulations. EPA performs this analysis in the context of determining the difference in cost and benefits between the subtitle C and D options. Since the engineering controls (the costs of the rule) are very similar under both options, EPA finds substantially lower costs to industry under subtitle D only by estimating a much lower compliance rate with the subtitle D regulations. EPA states in the preamble that "[t]he main differences in cost are based on the assumption that there will be less compliance or slower compliance under a RCRA subtitle D option.[130] In turn, to calculate benefits, EPA assumes that some states will adopt and enforce the proposed subtitle D standards and that health and environmental benefits will accrue accordingly. Thus, assumptions about which states will adopt the subtitle D standards are central to the ultimate cost/benefit results for the subtitle D option in the RIA.

As discussed above, EPA assumes that a state will adopt a subtitle D program based on one factor: whether the state requires any groundwater monitoring at surface impoundments. (This goal of monitoring is to ensure early warning of poisons in drinking water long before harmful chemicals can reach the tap. Groundwater monitoring is relatively inexpensive and very effective, if done properly.) EPA examined 37 states to determine whether the states required any groundwater monitoring at all at coal ash ponds. Even if a state required monitoring at only new ponds, or only at ponds over a valuable aquifer, or only at ponds once a year for a very few parameters, this monitoring met the Agency's low benchmark for assuming the state would incorporate additional, more stringent standards into its subtitle D program. EPA explains:

> To model the Subtitle D option, EPA assumed that states with groundwater monitoring requirements at new units, or with some coverage of the units in question, would upgrade their existing programs to provide fuller coverage – because they already have a regulatory infrastructure – but other states with no program would not.[131]

EPA further emphasizes that "states that do not currently regulate units would not change their practices simply because EPA issued national rules."[132] Thus, if a state has any regulations requiring groundwater monitoring, EPA predicts that those states will "upgrade their existing programs" and that industry in those states will be forced to comply with the subtitle D regulations.

But based on EPA's own analysis of 37 coal ash-generating states, the Agency concludes

[130] 75 Fed. Reg. at 35,139. EPA states, "The main differences in cost are based on the assumption that there will be less compliance or slower compliance under a RCRA subtitle D option.
[131] *2010 RIA* at 124.
[132] Id.

that 30 states would *not* upgrade their existing programs. EPA then calculated the amount of coal ash generated in those 17 states where EPA expected the subtitle D program to be adopted and where compliance with the regulations was expected. According to EPA, 48 percent of the coal ash generated in the United Stats is generated in those 17 states; Table 27, below, lists the 30 states not expected to implement the subtitle D requirements and the 17 that are expected to do so.

Table 28. Distribution of States According to 2010 RIA Analysis[133]

Subset A States Expected to Implement Subtitle-D Requirements (17 states) (48% of disposed tonnage)	**Subset B** States *Not* Expected to Implement Subtitle-D Requirements (30 states) (52% of disposed tonnage)
Colorado	Alabama
Florida	Alaska
Kentucky	Arkansas
Louisiana	Arizona
Michigan	California
Minnesota	Connecticut
Missouri	Delaware
North Carolina	Georgia
North Dakota	Hawaii
Nevada	Iowa
New York	Illinois
Oklahoma	Indiana
Pennsylvania	Kansas
South Carolina	Massachusetts
Utah	Maryland
Wisconsin	Maine
West Virginia	Mississippi
	Montana
	Nebraska
	New Hampshire
	New Jersey
	New Mexico
	Ohio
	Oregon
	South Dakota
	Tennessee
	Texas
	Virginia
	Washington
	Wyoming
Note: Because there are no coal-fired electric utility plants in Idaho, Rhode Island, Vermont, and Washington, D.C., these areas are not listed in either subset above.	

EPA explains how this benchmark relates to determining the costs and benefits of the rule as follows: "[g]iven these factors, the percentage of waste disposed of in states with some level of groundwater monitoring programs is a reasonable estimate of benefits for the subtitle D approach."[135] Thus, in the many comparative calculations of the costs and benefits of the C and D options that follow in the *2010 RIA*, the Agency estimates that subtitle D will impose only 48 percent of the cost of the subtitle C option, but in turn it will reap 48 percent of the benefits of the stronger option. For example, EPA finds under subtitle D that only 48 percent of groundwater contamination will be detected before extensive damage has occurred, and therefore only 48 percent of cancers will be prevented, as compared with 100 percent of cancers prevented under subtitle C.[136]

All of these estimates hinge on EPA's baseline assumptions about the current status of state regulation, and as explained above, EPA's analysis of state law contains errors and attributes greater regulatory authority to many states than they actually have. Based on our own analysis of existing state regulations, we conclude that EPA has dramatically overestimated the percentage of benefits (and compliance) under subtitle D. We found, using the same criteria that EPA employed, that only *six states* had any mandatory requirements for groundwater monitoring at surface impoundments.[137] Taking into account only these six states, the amount of coal ash generated in the states predicted to adopt comprehensive subtitle D regulations drops dramatically to only 19 percent of U.S. coal ash generated.[138] Thus, our analysis reveals that 79 percent, not 52 percent, of the coal ash generated in the United States would not be subject to mandatory monitoring requirements when disposed in an ash pond and would not be subject to more stringent regulation in a post-D world.

EPA's predictions regarding the magnitude and location of noncompliance under subtitle D has tremendous implications for measuring the effectiveness of the subtitle D option to achieve EPA's stated goal of "address[ing] the risks from CCRs"[139] Simply by the numbers, it is apparent that subtitle D can only be marginally effective because it will bring less than half of the nation's waste under control. Further, when looking at the states where EPA anticipates noncompliance and where the state regulatory programs will not improve, it becomes apparent that the risks of harm remain substantial under the proposed subtitle D scheme. The list of states that will not adopt federal guidelines includes five of the top ten coal ash-generating states. It includes states that collectively have 350 waste ponds and generate over 73 million tons a year of coal ash. The states are home to 48 of the 49 high hazard dams, 55 of the nation's 71 significant hazard dams, and 69 damage cases. Included on this list are states such as Alabama that have no regulations whatsoever that apply to coal ash.

Again, this damning survey based on EPA's analysis does not capture the full extent of the regulatory gap in the states. Based on our analysis, nine of the nation's top ten CCR generating states will refuse to adopt the federal program. Accordingly, the coal ash waste stream that would continue to evade regulation in these states would balloon to 111 million tons

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[135] *2010 RIA*, at 124.
[136] *Id.*
[137] These six states are Illinois, Louisiana, Michigan, Pennsylvania, Virginia, and Washington.
[138] *See* Table 3, *supra.*
[139] 75 Fed. Reg. at 35,128.

annually. The states where programs will not improve are home to 107 of the country's 137 damage cases. Forty-eight of the nation's 49 high hazard dams are in these states, as are 65 of the nation's 71 significantly rated dams, and 542 ponds in total. Attempting to address the threat to the nation from coal ash without addressing ash in these states is like trying to put out a fire with a squirt gun.

According to both EPA's and our own analyses, Tennessee is one of the states that will *not* improve its program.[140] Yet any rule intending to reduce the risks posed by coal ash should, at a minimum, ensure that another catastrophic spill of deadly magnitude like the one in Kingston will be avoided. This rule will do nothing of the sort for the majority of the waste generated in the United States—not in Tennessee nor in any of the other states where high hazard dams are found, save one. Lastly, the uneven geological distribution of benefits bestowed by a subtitle D rule has very significant environmental justice implications, which are discussed in section VII, *infra*. Given what EPA now knows about coal ash mismanagement in these 30 states, it cannot assume that benefits will flow from allowing state regulation to continue under subtitle D, much less knowingly allow the mismanagement to continue under a "D" regime.

2. The States' Failure to Enforce Existing Subtitle D "Open Dumping" Guidelines has Resulted in the Proliferation of Illegal Open Dumps.

The RCRA subtitle D guidelines that apply currently to the disposal of coal ash are found in 40 C.F.R. Part 257.[141] The extent to which states are currently enforcing these guidelines offers a measure that EPA must use to predict the future effectiveness of subtitle D. In fact, the failure of *any* state to adopt these guidelines and the continuing failure of states to enforce the guidelines has resulted in the operation of numerous illegal "open dumps." In short, given the lack of current subtitle D adoption and enforcement by states, the prognosis for new D guidelines is exceedingly grim. Today's straightforward open dumping standards are routinely violated, yet these blatant violations appear to be wholly ignored by state regulators.

Under RCRA, states must prohibit any solid waste management practice or disposal that constitutes the open dumping of solid waste.[142] RCRA distinguishes between two kinds of solid waste disposal facilities—sanitary landfills and open dumps.[143] Sanitary landfills have "no reasonable probability of adverse effects on health or the environment;" while open dumps are the solid waste disposal facilities that *do* present a risk of adverse effects.[144] While RCRA clearly prohibits open dumps and the open dumping of solid waste,[145] many CCR units have fallen through the regulatory cracks and are currently operating in violation of this federal prohibition.

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[140] Southern Alliance for Clean Energy, et al., *The State of Coal Ash Regulation In Tennessee* (Oct. 26, 2010), *available at* http://www.cleanenergy.org/index.php?/Reports-and-Publications.html.
[141] Criteria for Classification of Solid Waste Disposal Facilities and Practices, 40 C.F.R. §§ 257.1–57.4.
[142] 42 U.S.C. §§ 6944(b), 6943(a)(2).
[143] 42 U.S.C. § 6944.
[144] *Id.*
[145] 42 U.S.C. §§ 6941–49; 42 USC § 6945(a) ("Upon promulgation of criteria under section 6907(a)(3) of this title, any solid waste management practice or disposal of solid waste or hazardous waste which constitutes the open dumping of solid waste or hazardous waste is prohibited…").

Rules promulgated pursuant to RCRA's statutory prohibition describe the criteria used to define open dumps.[146] The criteria pertaining to protection of surface water and groundwater are particularly relevant to coal ash disposal. In sum, a solid waste disposal facility or site will be deemed an open dump if (1) it contaminates an underground drinking water source beyond the solid waste disposal boundary,[147] or (2) if it causes a discharge of pollutants in violation of the Clean Water Act.[148] Many CCR disposal sites are in violation of the criteria, and examples of these violations are described below.

a. Open Dumping Established by Groundwater Contamination

The subtitle D guidelines define open dumps as solid waste management facilities that contaminate groundwater: "A facility or practice shall not contaminate an underground drinking water source beyond the solid waste boundary or beyond an alternative boundary. . . ."[149] The regulation provides the following definitions to determine whether a facility meets this standard for constituting an "open dump." To "contaminate" means to actively cause the exceedance of a maximum contaminant level (MCL) listed in Appendix I to 40 CFR 257.[150] "Underground drinking water source" means either an active drinking water supply or a potential drinking water supply, defined as any groundwater with less than 10,000 mg/L total dissolved solids.[151] "Solid waste boundary" means the perimeter of the disposal area, which in most cases is an area smaller than the property of the facility housing the dump.[152] An "alternative boundary" might be used instead of the solid waste boundary to monitor compliance with the open dumping prohibition. An alternative boundary can be established by a state or by a court, but only if the state or court "finds that such a change would not result in contamination of groundwater which may be needed or used for human consumption."[153] All of the above can be summarized by saying that any coal ash disposal or storage causing an exceedance of a listed MCL in groundwater that might be used for drinking water is prohibited. Like all subtitle D regulations, responsibility for the enforcement of this prohibition rests with the states and citizens.[154]

States have not been able to meet this enforcement responsibility, as seen by the large number of apparent violations of the open dumping prohibition. These include the following coal ash dumps:

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[146] "Facilities failing to satisfy either the criteria in §§ 257.1 through 257.4 or §§ 257.5 though 257.30 are considered open dumps, which are prohibited under [42 USC § 6945]." 40 C.F.R. § 257.3.
[147] 40 C.F.R. § 257.3-4.
[148] *Id.* § 257.3-3.
[149] *Id.*§ 257.3-4(a).
[150] *Id.*§ 257.3-4(c)(2).
[151] *Id.*§ 257.3-4(c)(4).
[152] *Id.*§ 257.3-4(c)(5).
[153] *Id.*§ 257.3-4(b).
[154] "The Congress finds with respect to solid waste…that…the collection and disposal of solid wastes should continue to be primarily the function of State, regional, and local agencies…" 42 USC § 6901(a). "Within one year of October 21, 1976, and from time to time thereafter, the Administrator shall…develop and publish suggested guidelines for solid waste management. Such suggested guidelines shall…provide minimum criteria to be used by the States to define those solid waste management practices which constitute the open dumping of solid waste or hazardous waste and are to be prohibited…" 42 U.S.C. § 6907(a).

- *Duke Energy's Gibson Generating Station, Princeton, Indiana*: Wells downgradient of the CCR landfill have shown levels of arsenic exceeding the Appendix I limit of 50 ug/L.[155] The Indiana Department of Environmental Management has not taken official action.[156]

- *Mirant's Brandywine Coal Ash Landfill, Brandywine, Maryland*: Levels of cadmium as high as 500 ug/L in onsite groundwater significantly exceed the Appendix I MCL of 10 ug/L.[157]

- *Consumer Energy's Karn and Weadock Generating Facilities,Essexville, Michigan*: Arsenic over 400 ug/L was detected in groundwater near the landfill and beyond property line.[158]

- *Progress Energy's Lee Plant,Goldsboro, North Carolina*: Arsenic has been measured at up to 440 ug/L in groundwater migrating toward homes less than half a mile away.[159]

- *Duke Energy's Belews Creek Steam Station, Belews Creek, North Carolina*: Groundwater monitoring since 2005 has shown arsenic exceeding Appendix I levels.[160]

- *UGI's Hunlock Power Station,Hunlock Creek, Pennsylvania*: Multiple downgradient wells have shown arsenic concentrations exceeding Appendix I levels, as high as 119 ug/L.[161]

- *SCE&G's Wateree Station in Eastover, South Carolina*: On-site groundwater at over 100 ug/L contains arsenic exceeding Appendix I standards.[162]

- *Eastern Kentucky Power Cooperative's Spurlock Station, Maysville, Kentucky*: Groundwater has been documented beyond the landfill boundary with arsenic concentrations as high as 160 ug/L, exceeding Appendix I standards by over 3 times.[163]

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[155] Appendix I retains an MCL for arsenic that is outdated. It is important to note that the Appendix I standard is 5 times the current MCL of 10 ug/L. Despite the significantly higher arsenic standard, open dumping violations are still rampant at CCR disposal sites.
[156] Envtl. Integrity Project & Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* (Feb. 24, 2010) at 19.
[157] *Id.* at 25.
[158] *Id*. at 28.
[159] *Id.* at 40.
[160] *Id*. at 50.
[161] *Id*. at 81.
[162] *Id*. at 89.
[163] Env. Integrity Project, Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment* 69 (Aug. 26, 2010) (Jeff Stant, ed.) [hereinafter *In Harm's Way*], *available at* http://www.environmentalintegrity.org/news_reports/documents/INHARMSWAY_FINAL3.pdf.

- *First Energy's Bruce Mansfield Power Plant, Little Blue Run Surface Impoundment, Greene Township, Pennsylvania*:[164] Onsite groundwater wells show exceedances of Appendix I MCLs for fluoride and lead.[165] Off-site residential wells have exceeded Appendix I MCLs for barium, cadmium, and lead.[166]

- *Allegheny Energy's Hatfield's Ferry Power Station, Masontown Pennsylvania*:[167] Groundwater exceeds Appendix I levels for arsenic, with concentrations as high as 3.4 mg/L. Although Pennsylvania has been involved in enforcing surface water laws, it has taken no action on the groundwater issue.

- *AES'Cayuga Coal ash Disposal Landfill, Lansing, New York*:[168] Groundwater wells have exceeded the Appendix I MCL for selenium.

This is by no means a complete list. Table 29 shows the results of damage reports compiled by Environmental Integrity Project, Earthjustice, and Sierra Club.[169] Forty sites fit the current definition of open dumping—these landfills and impoundments have caused on-site groundwater to exceed Appendix I MCLs. Fifty-four sites have caused groundwater to exceed current EPA MCLs—these sites would therefore be subject to the remediation requirements of the proposed changes to the subtitle D open dumping criteria. It is important to remember that groundwater monitoring requirements are often absent or inadequate. This list is limited to those sites for which data are available, but we expect that many more sites have been contaminating groundwater in violation of the RCRA regulations. Although this list is incomplete, it vividly demonstrates that faith in state enforcement of subtitle D regulations is misplaced. The current criteria, contrary to their statutory purpose, have failed to ensure that there is "no reasonable probability of adverse effects on health or the environment."[170] The proposed changes to the subtitle D criteria will not do anything to improve compliance, and if anything will make the situation worse (see Section VI.C *infra*).

[164] *Id*. at 161.
[165] The Appendix I MCL for fluoride is 4 mg/L; groundwater concentrations have been as high as 6.4 mg/L. The lead concentrations have been as high as 2,700 ug/L, over 50 times higher than the Appendix I MCL of 50 ug/L.
[166] The Appendix I MCLs for barium, cadmium and lead are 1 mg/L, 0.01 mg/L, and 0.05 mg/L, respectively. Groundwater concentrations for these three metals have been as high as 6 mg/L, 0.85 mg/L, and 1.8 mg/L, respectively.
[167] *In Harm's Way*, at 174.
[168] *Id*. at 112.
[169] *Id.* at 174; *Out of Control*.
[170] 42 U.S.C. § 6944(a).

Table 29. On-site groundwater data exceeding Federal Primary Maximum Contaminant Levels (MCLs) or RCRA open dumping MCLs.[171] (Table adapted from "In Harm's Way" and "Out of Control" damage reports.[172])

State	Facility	County	Pollutant	Maximum Result	Federal Primary MCL	Dates Exceeded	Exceedance well(s)	Appendix I MCL	Dates Exceeded	Exceedance well(s)
AR	Flint Creek Power Plant	Benton	Barium	2.4 mg/L	2 mg/L	1996	B-02	1.0 mg/L	1996	B-02
			Cadmium	0.01 mg/L	0.005 mg/L	1995	B-01, B-04, B-05	0.01 mg/L	N/A	N/A
			Chromium	0.128 mg/L	0.1 mg/L	10/28/2009	NE-01	N/A	N/A	N/A
			Lead	0.5 mg/L	0.015 mg/L	1996	B-02	0.05 mg/L	1996	B-02
			Selenium	0.152 mg/L	0.05 mg/L	5/2008 - 1/2009 & 1/2010 (B-02); 8/2009 (NE-3)	B-02; NE-3	0.01 mg/L	5/2008 - 1/2009 & 1/2010 (B-02); 8/2009 (NE-3)	B-02; NE-3
			Silver	0.2 mg/L	N/A	N/A	N/A	0.01 mg/L	1996	B-02
AR	Independence Steam Station	Independence	Arsenic	0.016 mg/L	0.01 mg/L	1990-1995	C-409, C-410	0.05 mg/L	N/A	N/A
			Cadmium	0.006 mg/L	0.005 mg/L	1990-1995	C-410	0.01 mg/L	N/A	N/A
			Lead	0.023 mg/L	0.015 mg/L	1990-1995	C-410	0.05 mg/L	N/A	N/A
CT	Montville Generating Station	New London	Arsenic	0.262 mg/L	0.01 mg/L	2007-2009	MW-1, MW-6	0.05 mg/L	2007-2009	MW-1, MW-6
			Beryllium	0.0138 mg/L	0.004 mg/L	2007-2009	MW-6	N/A	N/A	N/A
DE	NRG/Indian River	Sussex	Arsenic	1.45 mg/L	0.01 mg/L			0.05 mg/L		
			Chromium	0.211 mg/L	0.1 mg/L			N/A	N/A	N/A
			Thallium	0.0084 mg/L	0.002 mg/L			N/A	N/A	N/A
FL	C.D. McIntosh, Jr. Power Plant	Polk	Arsenic	0.0165 mg/L	0.01 mg/L	2010	29-S, 19-S, 21-D, W-9, 17-S	0.05 mg/L	N/A	N/A
FL	OUC/ Curtis Stanton Energy Center Power Plant	Orange	Alpha radiation	65.4 pCi/L	15 pCi/L	2003		N/A	N/A	N/A
FL	Seminole Generating Station	Putnam	Arsenic	0.19 mg/L	0.01 mg/L			0.05 mg/L		
			Lead	0.15 mg/L	0.015 mg/L			0.05 mg/L		
FL	Big Bend Station	Hillsborough	Arsenic	0.110 mg/L	0.01 mg/L	2003		0.05 mg/L	2003	
			Thallium	0.016 mg/L	0.002 mg/L	2003		N/A	N/A	N/A

Shaded cells indicate exceedances; blank cells indicate unavailable data

[171] 40 C.F.R. § 257, Appendix I.
[172] *In Harm's Way*, at 124–31; *Out of Control*, at 19.

Table 29 (cont.) On-site groundwater data exceeding Federal Primary Maximum Contaminant Levels (MCLs) or RCRA open dumping MCLs.

State	Facility	County	Pollutant	Maximum Result	Federal Primary MCL	Dates Exceeded	Exceedance well(s)	Appendix I MCL	Dates Exceeded	Exceedance well(s)
IA	George Neal Station North	Woodbury	Arsenic	0.218 mg/L	0.01 mg/L	2001-2008	MW1R, MW3R, MW5R, MW19,	0.05 mg/L	2001-2008	MW3R, MW4, MW20
IA	George Neal Station South	Woodbury	Arsenic	0.0839 mg/L	0.01 mg/L	2000-2008	MW2, MW10	0.05 mg/L	2000-2008	MW2
IA	Lansing Power Station	Lansing	Arsenic	0.023 mg/L	0.01 mg/L	2002-2010	MW11	0.05 mg/L	N/A	N/A
IA	Marion Plant	Williamson	Cadmium	0.088 mg/L	0.005 mg/L	2004-2009	S1, S2, C1, S3, S5,	0.01 mg/L	2004-2009	S1, S2, C1
IL	Venice Power Station	St. Clair and Madison	Arsenic	0.215 mg/L	0.01 mg/L	1996-2009	MW5, MW6, MW7, MW1, MW4, MW3	0.05 mg/L	1996-2009	MW5, MW6, MW7, MW3
			Cadmium	0.006 mg/L	0.005 mg/L	1999	MW1	0.01 mg/L	N/A	N/A
IL	Rocky Acres CCB	Vermillion	Arsenic	*Exceedance**	0.01 mg/L			0.05 mg/L	N/A	N/A
			Barium	*Exceedance**	2 mg/L			1 mg/L		
			Chromium	*Exceedance**	0.1 mg/L			N/A	N/A	N/A
			Lead	*Exceedance**	0.015 mg/L			0.05 mg/L	N/A	N/A
IN	Duke Energy/ Gibson Power Plant	Gibson	Arsenic	0.071 mg/L	0.01 mg/L			0.05 mg/L		
KY	Mill Creek Station	Jefferson	Arsenic	0.015 mg/L	0.01 mg/L	1994-1995	MW-2, PW-1, PW-	0.05 mg/L	N/A	N/A
KY	Shawnee Fossil Plant	McCracken	Arsenic	0.012 mg/L	0.01 mg/L	2008	D-77***	0.05 mg/L	N/A	N/A
			Selenium	0.087 mg/L	0.05 mg/L	2008	D-74A, D-74B	0.01 mg/L	2008	D-74A, D-74B
LA	Big Cajun 2 Power Plant	Pointe Coupee Parish	Selenium	1.32 mg/L	0.05 mg/L	1994-1999	MW-85B, MW-85C, MW-85D, MW-85E	0.01 mg/L	1994-1999	MW-85B, MW-85C, MW-85D, MW-85E
LA	Dolet Hills Power Station	De Soto Parish	Arsenic	0.0156 mg/L	0.01 mg/L	12/2009	OW-33	0.05 mg/L	N/A	N/A
			Lead	0.023 mg/L	0.015 mg/L	8/2009, 12/2009	OW-36	0.05 mg/L	N/A	N/A
			Selenium	0.173 mg/L	0.05 mg/L	2008	MW-2A	0.01 mg/L	2008	MW-2A
LA	Rodemacher Power Station	Rapides Parish	Arsenic	0.0575 mg/L	0.01 mg/L	2009	W-4, W-15, W-17, W-18, W-21, W-1	0.05 mg/L	2009	W-4, W-15, W-17, W-18
			Lead	0.0209 mg/L	0.015 mg/L	2009	W-9, W-10	0.05 mg/L	N/A	N/A

Shaded cells indicate exceedances; blank cells indicate unavailable data
* Exceedances reported without numerical values
** Data read from graph
*** Well reported as upgradient appears to be downgradient

Table 29 (cont.) Onsite groundwater data exceeding Federal Primary Maximum Contaminant Levels (MCLs) or RCRA open dumping MCLs. Shaded cells indicate exceedances; blank cells indicate unavailable data

State	Facility	County	Pollutant	Maximum Result	Federal Primary MCL	Dates Exceeded	Exceedance well(s)	Appendix I MCL	Dates Exceeded	Exceedance well(s)
MD	Mirant/Brandywine Coal Ash Landfill	Prince George's	Cadmium	0.5 mg/L	0.005 mg/L		B10	0.01 mg/L		B10
MI	Karn/Weadock Generating Facility	Bay	Arsenic	0.997 mg/L	0.01 mg/L			0.05 mg/L		
NC	Dan River Steam Station	Rockingham	Lead	0.0392 mg/L	0.015 mg/L	1998-2008		0.05 mg/L	N/A	N/A
NC	Duke/Belews Creek	Stokes	Arsenic	0.073 mg/L	0.01 mg/L	2007	OB-4	0.05 mg/L	2007	OB-4
			Nitrate	158 mg/L	10 mg/L			10 mg/L		
			Selenium	0.02 mg/L	0.05 mg/L	N/A	N/A	0.01 mg/L		
NC	Full Circle/Swift	Nash	Arsenic	0.068 mg/L	0.01 mg/L	2004		0.05 mg/L	2004	
			Lead	0.093 mg/L	0.015 mg/L	2004		0.05 mg/L	2004	
NC	Progress/Cape Fear Steam Plant	Chatham	Chromium	0.1 m/L	0.1 mg/L			N/A	N/A	N/A
			Lead	0.0533 mg/L	0.015 mg/L			0.05 mg/L		
NC	Progress/Lee Steam Plant	Wayne	Arsenic	0.440 mg/L	0.01 mg/L			0.05 mg/L		
			Lead	0.047 mg/L	0.015 mg/L			0.05 mg/L	N/A	N/A
NC	Progress/Sutton Steam Plant	New Hanover	Arsenic	0.29 mg/L	0.01 mg/L			0.05 mg/L		
ND	Antelope Valley Station	Mercer	Arsenic	0.035 mg/L**	0.01 mg/L	1984-2010	MP-12A, MP-13B, MP-22	0.05 mg/L	N/A	N/A
ND	Leland Olds Station	Mercer	Arsenic	0.0789 mg/L	0.01 mg/L	1982-2009	22-ADB, 22-ABC, 22-	0.05 mg/L	1982-2009	22-ABC
			Lead	0.0716 mg/L	0.015 mg/L	2006	22-DCC	0.05 mg/L	2006	22-DCC
NE	Sheldon Station	Lancaster	Selenium	0.0728 mg/L	0.05 mg/L	2002-2009	MW-3	0.01 mg/L	2002-2009	MW-3
NV	NV Energy/Reid Gardener Generating Station	Clark	Arsenic	0.73 mg/L	0.01 mg/L	2007	14 wells	0.05 mg/L	2007	14 wells
			Chromium	0.11 mg/L	0.1 mg/L	2007	1 well	N/A	N/A	N/A
			Nitrate	13 mg/L	10 mg/L	2007	1 well	10 mg/L	2007	1 well
			Selenium	0.15 mg/L	0.05 mg/L	2007	12 wells	0.01 mg/L	2007	12 wells

* Exceedances reported without numerical values
** Data read from graph
*** Well reported as upgradient appears to be downgradient

Table 29 (cont.) Onsite groundwater data exceeding Federal Primary Maximum Contaminant Levels (MCLs) or RCRA open dumping MCLs.

State	Facility	County	Pollutant	Maximum Result	Federal Primary MCL	Dates Exceeded	Exceedance well(s)	Appendix I MCL	Dates Exceeded	Exceedance well(s)
NY	Cayuga Generation Plant	Tompkins	Arsenic	0.019 mg/L	0.01 mg/L	2007-2008	17 wells	0.05 mg/L	N/A	N/A
			Selenium	0.76 mg/L	0.05 mg/L	2007-2008	MAGDXX-8106	0.01 mg/L	2007-2008	8 wells
OH	Cardinal Plant	Jefferson	Arsenic	0.1 mg/L	0.01 mg/L	2004	S-2***	0.05 mg/L	2004	S-2***
OH	Gavin Power Plant	Gallia	Alpha Particles	1,497 pCi/L	15 pCi/L	2007	9801	N/A	N/A	N/A
			Arsenic	0.057 mg/L	0.01 mg/L	1994-2008	7 wells including 94128	0.05 mg/L	1994-2008	7 wells including 94128
			Barium	13.8 mg/L	2 mg/L	2008	94126***	1.0 mg/L	2008	94126***
			Cadmium	0.007 mg/L	0.005 mg/L	2008	9801	0.01 mg/L	N/A	N/A
			Lead	0.051 mg/L	0.015 mg/L	2008	9801	0.05 mg/L	2008	9801
OH	Muskingum River Plant	Washignton	Alpha Particles	128 pCi/L	15 pCi/L	2005-2008	M-9612, OB-2	N/A	N/A	N/A
OK	Northeastern Station	Oologah	Arsenic	0.094 mg/L	0.01 mg/L	2008-2009	MW2S,MW2D,MW8S,MW8D	0.05 mg/L	2008-2009	MW2D,MW8S
			Barium	8.69 mg/L	2 mg/L	2008-2009	MW7D	1 mg/L	2008-2009	MW7D
			Chromium	0.225 mg/L	0.1 mg/L	2008-2009	MW2S,MW2D,MW8S,MW7D	N/A	N/A	N/A
			Lead	0.208 mg/L	0.015 mg/L	2008-2009	MW1D,MW2S,MW2D,MW3S,MW6D,	0.05 mg/L	2008-2009	MW6D,MW7D,MW8S
			Thallium	0.003 mg/L	0.002 mg/L	2008-2009	MW1S, MW2S	N/A	N/A	N/A
OR	Boardman Plant	Morrow	Selenium	0.019 mg/L	0.01mg/L	1987-1989	053, 120	0.05 mg/L	N/A	N/A
PA	Bruce Mansfield Power Station	Beaver	Arsenic	0.036 mg/L	0.01 mg/L	2006-2010	14 wells	0.05 mg/L	N/A	N/A
			Fluoride	6.4 mg/L	4 mg/L	1994-2006	1 well	4.0 mg/L	1994-2006	1 well
			Lead	2.69 mg/L	0.015 mg/L	1996	2 wells	0.05 mg/L	1996	2 wells
PA	Hatfield's Ferry Power Station	Greene	Arsenic	3.419 mg/L (total)	0.01 mg/L	2005-2010	MW-213A, MW-217A, MW-218A	0.05 mg/L	2005-2010	MW-213A, MW-217A, MW-218A
			Chromium	0.104 mg/L	0.1 mg/L	2009	MW-217A	N/A	N/A	N/A

Shaded cells indicate exceedances; blank cells indicate unavailable data
* Exceedances reported without numerical values
** Data read from graph
*** Well reported as upgradient appears to be downgradient

Table 29 (cont.) Onsite groundwater data exceeding Federal Primary Maximum Contaminant Levels (MCLs) or RCRA open dumping MCLs.
Shaded cells indicate exceedances; blank cells indicate unavailable data
* Exceedances reported without numerical values

State	Facility	County	Pollutant	Maximum Result	Federal Primary MCL	Dates Exceeded	Exceedance well(s)	Appendix I MCL	Dates Exceeded	Exceedance well(s)
PA	Allegheny/Mitchell Power Station	Washington	Arsenic	0.02 mg/L	0.01 mg/L	2007	GW-4, GW-5	0.05 mg/L	N/A	N/A
PA	Orion/Fern Valley Landfill	Allegheny	Arsenic	0.363 mg/L	0.01 mg/L	1995-2002	N/A	0.05 mg/L	1995-2002	
PA	RRI/Seward	Indiana	Antimony	0.1 mg/L	0.006 mg/L	2007-2008	MW-7	N/A	N/A	N/A
			Arsenic	0.02 mg/L	0.01 mg/L	2007-2008	MW-6R	0.05 mg/L	N/A	N/A
			Cadmium	0.041 mg/L	0.005 mg/L	2007-2008	MW-5R, MW-6R,	0.01 mg/L	2007-2008	MW-5R, MW-6R,
			Chromium	0.33 mg/L	0.1 mg/L	2007-2008	MW-8R	N/A	N/A	N/A
			Lead	0.05 mg/L	0.015 mg/L	2007-2008	MW-8R	0.05 mg/L	2007-2008	MW-8R
			Selenium	*Exceedance**	0.05 mg/L	2007-2008	MW-6R, MW-7R,	0.01 mg/L	2007-2008	MW-6R, MW-7R,
PA	UGI/Hunlock Power Station	Luzerne	Arsenic	0.119 mg/L	0.01 mg/L	1999-2009	MW-5, MW-7, MW-6	0.05 mg/L	1999-2009	MW-5, MW-7, MW-6
SC	Grainger Generating Station	Horry	Arsenic	0.917 mg/L	0.01 mg/L	2000	4R, 3	0.05 mg/L	2000	4R, 3
SC	SCE&G/Urquhart Station	Aiken	Arsenic	*Exceedance**	0.01 mg/L			0.05 mg/L	N/A	N/A
SC	SCE&G/Wateree Station	Richland	Arsenic	0.18 mg/L	0.01 mg/L			0.05 mg/L		
SD	Big Stone Power Plant	Grant	Arsenic	0.1322 mg/L	0.01 mg/L	2007-2009	11 total wells	0.05 mg/L	2007-2008	BC-101, BC-4
			Lead	0.1086 mg/L	0.015 mg/L	2007-2008	BC-1, BC-101, BC-5,	0.05 mg/L	2007	BC-101
TN	Cumberland Steam Plant	Stewart	Arsenic	0.022 mg/L	0.01 mg/L	2008-2009	93-2, 93-1, 93-2R, 93-4	0.05 mg/L	N/A	N/A
			Selenium	0.15 mg/L	0.05 mg/L	2008-2009	93-2	0.01 mg/L	2008-2009	93-2
TN	Gallatin Fossil Plant	Sumner	Beryllium	0.023 mg/L	0.004 mg/L	2008-2009	GAF-19R	N/A	N/A	N/A
			Cadmium	0.0064 mg/L	0.005 mg/L	2008-2009	GAF-19R	0.01 mg/L	N/A	N/A

** Data read from graph
*** Well reported as upgradient appears to be downgradient

Table 29 (cont.) On-site groundwater data exceeding Federal Primary Maximum Contaminant Levels (MCLs) or RCRA open dumping MCLs.

State	Facility	County	Pollutant	Maximum Result	Federal Primary MCL	Dates Exceeded	Exceedance well(s)	Appendix I MCL	Dates Exceeded	Exceedance well(s)
TN	Johnsonville Fossil Plant	Humphreys	Arsenic	0.570 mg/L	0.01 mg/L	1986, 1988, 1991-1994	C6, C1, (Area A); SS16, SS13 (Areas 2 & 3)	0.05 mg/L	1986, 1988, 1991-1994	C6, C1, (Area A); SS16, SS13 (Areas 2 & 3)
			Cadmium	0.260 mg/L	0.005 mg/L	1986, 1988, 1991-1994	C5, C1, (Area A); SS16, SS13 (Areas 2 & 3)	0.01 mg/L	1986, 1988, 1991-1994	C5, C1, (Area A); SS16, SS13 (Areas 2 & 3)
			Chromium	0.16 mg/L	0.1 mg/L	1986, 1988, 1991-1994	Active Ash Disposal Island	N/A	N/A	N/A
			Lead	0.39 mg/L	0.015 mg/L	1986, 1988, 1991-1994	C5, C1, (Area A); SS16, SS13 (Areas 2 & 3)	0.05 mg/L	1986, 1988, 1991-1994	C5, C1, (Area A); SS16, SS13 (Areas 2 & 3)
TN	Trans-Ash CCW Landfill	Benton	Arsenic	0.27 mg/L	0.01 mg/L			0.05 mg/L		
TN			Chromium	*Exceedance**	0.1 mg/L			N/A	N/A	N/A
TN			Lead	*Exceedance**	0.015 mg/L			0.05 mg/L	N/A	N/A
TN			Mercury	*Exceedance**	0.002 mg/L	2009	MW-5, Gibson Wells	0.002 mg/L	2009	MW-5, Gibson Wells
TN	John Sevier Fossil Plant	Hawkins	Cadmium	0.0068 mg/L	0.005 mg/L	2008-2009		0.01 mg/L	N/A	N/A
TX	Fayette Power Project (Sam Seymour)	Fayette	Arsenic	0.023 mg/L	0.01 mg/L	2009	C2L-412	0.05 mg/L	N/A	N/A
			Selenium	0.0746 mg/L	0.05 mg/L	2009	RP-67	0.01 mg/L	2009	RP-67
WV	AEP/Mitchell Generating Station	Marshall	Antimony	*Exceedance**	0.006 mg/L	2008		N/A	N/A	N/A
			Arsenic	*Exceedance**	0.01 mg/L	2005-2006		0.05 mg/L	N/A	N/A

Shaded cells indicate exceedances; blank cells indicate unavailable data
* Exceedances reported without numerical values
** Data read from graph
*** Well reported as upgradient appears to be downgradient

b. Open Dump By Violating the Clean Water Act

A second criterion defines open dumps as facilities that discharge pollutants "in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under Section 402 of the Clean Water Act."[173] Many coal plants are in violation of the Clean Water Act, either by discharging without a NPDES permit or by discharging in violation of a NPDES permit. These include the following:

- *Duke Energy's Gibson Generating Station, Princeton, Indiana*: Discharges of wastewater with selenium concentrations as high as 14 ug/L occur without a permit.[174]

- *Mirant's Brandywine Coal Ash Landfill, Brandywine, Maryland*: A citizen suit alleges that this landfill has discharged arsenic, mercury, and other pollutants without a NPDES permit.[175]

- *Reliant Energy's Seward Generating Station, New Florence, Pennsylvania*: For years an ash pile outfall has been discharging in violation of NPDES permit limits for iron, aluminum, manganese, and pH.[176]

- *Reliant Energy's Fern Valley Coal Combustion Waste Landfill, Elrama, Pennsylvania*: It appears that over 90% of the water discharging from this site does not pass through permitted outfalls. The NPDES permit for the controlled outfall through which the small remainder flows does not include limits for arsenic, selenium or lead.[177]

- *Portland Generating Station's Bangor Quarry Ash Disposal Site, Bangor, Pennsylvania*: Known discharges of boron, selenium, and cadmium are apparently unauthorized by the site's NPDES permit.[178]

- *American Electric Power's John Amos Power Plant, Winfield, West Virginia*: Discharges violate NPDES permit limits for selenium, contributing to selenium concentrations in the receiving waters that exceed state standards and concentrations in fish that exceed proposed EPA criteria.[179]

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[173] 40 C.F.R. § 257.3-3(a).
[174] *Out of Control,* at 19.
[175] *Id.* at 26.
[176] *Id*. at 72.
[177] *Id.* at 78.
[178] *Id*. at 85–86.
[179] *Id.* at 105–06.

- *American Electric Power's James M. Gavin Power Plant, Cheshire, Ohio*: Discharges have exceeded NPDES permit limits for boron and Allowable Effluent Toxicity on multiple occasions.[180]

In addition to the NPDES violations noted above, some high and significant hazard dams have unpermitted seeps that discharge into surface water in violation of the Clean Water Act. Such violations would also constitute illegal open dumping under section 257.3-3.

The documentation of seeps is found in the impoundment assessment reports generated as part of EPA's national effort to assess the management of coal ash in surface impoundments following the collapse of the TVA dam. In 2009—2010, EPA assessed all of the known units with a dam hazard potential rating of "high" or "significant." Inspection reports assessing the structural integrity of the impoundments were generated for each dam, and EPA subsequently posted the inspections on its website.[181] An examination of these inspection reports reveals likely unpermitted seeps that discharge to surface water at the following two facilities:

- *Alabama Power Company's William Crawford Gorgas Electric Generating Plant, Walker County, Alabama:* The Rattlesnake Dam exhibits seepage of five gallons per minute. The seepage area is located just north of Riverbend Lane – only 500 feet from the Black Warrior River.[182]

- *American Electric Power's Big Sandy Power Plant, Louisa, Kentucky:* Likely unpermitted overflow to the Big Sandy River.[183]

In sum, the regulation of coal ash disposal practices under subtitle D is intended to prevent the risk of adverse health and environmental impacts. The mechanisms built into the law include state-enforced prohibitions of unpermitted surface water discharges and groundwater contamination. Yet the risk is not diminished if states consistently fail to enforce the basic requirements of Subtitle D. The lists above show that many landfills and surface impoundments are discharging selenium and other pollutants in violation of NPDES permits and that seeps from surface impoundments and landfills discharge without abatement. Many more sites are leaching arsenic, fluoride, lead, and other contaminants into aquifers that are potentially or actively supplying drinking water. These prohibited "open dumps" illustrate that states are not enforcing current federal guidelines. The present guidelines are few and straightforward. It is unreasonable to believe that states will do a much better job with the much more complex guidelines proposed under EPA's subtitle D option.

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[180] *In Harm's Way*, at 124–31.
[181] EPA, Coal Combustion Residuals Impoundment Assessment Reports, http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm.
[182] PCR Eng'rs & Consultants, *Final Report: CCR Impoundments Inspection Report, Gorgas Steam Plant, Walker County, Alabama* (Sept. 2009), *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm.
[183] CHA, *Final Report: Assessment of Dam Safety, Coal Combustion Surface Impoundment (Task 3), American Electric Power, Big Sandy Generating Station, Louisa, Kentucky* (Feb. 17, 2010), *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm.

3. Proliferation of Disposal Units Constructed and Operated without the Basic Safeguards Necessary to Prevent and Detect the Release of Contaminants.

The failure of states to require basic safeguards has resulted in the proliferation of disposal units constructed and operated without the basic safeguards necessary to prevent and detect the release of contaminants.

a. Present Disposal Practices: Disposal Units Continue to Display a Lack of Basic Safeguards.

As EPA indicates in the preamble, many coal ash disposal units, particularly surface impoundments, lack liners and groundwater monitoring systems. The 1999 Report to Congress reported that 74 percent of the surface impoundments and 43 percent of the landfills constructed before 1995 had no liners or soil-only liners and that 62 percent of the surface impoundments and 15 percent of the landfills lacked groundwater monitoring.[184] Because these data were based on a voluntary industry survey of 181 facilities (less than a third of the operating disposal units) conducted by the Electric Power Research Institute, it is likely that the controls were overestimated when applied to the entire universe of disposal units.[185] Another voluntary survey by the Utility Solid Waste Activities Group of 56 permitted units constructed or expanded between 1995–2004, revealed a much higher usage of liners and groundwater monitoring, but the data do little to change the percentage of units with basic controls since the new permitted units constitute less than 5 percent of the universe of operating landfills and impoundments.[186]

There is no reason to expect a dramatic improvement in the overall picture of basic controls at coal ash disposal sites. As described in section III.B.1.c of these comments, *supra*, most states still do not require the installation of liners and groundwater monitoring and other basic safeguards. In fact, to reiterate, approximately 76 percent of the coal ash currently generated in the United States is managed in states that *do not require* groundwater monitoring at either existing or new surface impoundments. Monitoring of groundwater around CCR disposal unit is the single most important safeguard to prevent the poisoning of drinking water sources from the deadly constituents in CCR. But other critical safeguards are missing as well at a majority of coal ash disposal units. EPA in its preamble describes some of the available data. The docket contains additional detailed data concerning surface impoundments, informed by the response of utility companies to EPA's information request letters.

C. "The Potential Danger to Human Health and the Environment From the Disposal and Reuse of CCRs" Reveals the Need for Subtitle C Regulation.

Most fundamentally under RCRA and in keeping with Section 6982(n)(3), EPA must analyze the potential danger to human health and the environment from the disposal and reuse of CCR. To fulfill this statutory mandate, EPA must consider the toxicity of the waste and evaluate

[184] 65 Fed. Reg. 32,216.
[185] 2010 Risk Assessment, at 1-2 (citing Electric Power Research Institute (EPRI) Comanagement Survey).
[186] EPA & U.S. Dep't of Energy, Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994-2004, DOE/PI-0004, 2006 at 31-36.

the threat it poses in a variety of current and historical disposal scenarios, as well as a wide range of current reuse applications. There are robust data available demonstrating that the threat to human health and the environment posed by CCR from both current and past disposal and reuse is significant and increasing. This section reviews the data revealing rising toxicity, increasing waste volume, documented high risk to people and ecosystems, rampant historic mismanagement, and careless and dangerous reuse applications—all of which cause grave threats to health and the environment through poisoning of groundwater, surface water, air, soil and catastrophic collapse.

1. Changes in Composition of CCR Pose New Risks.

EPA must account for the new risks posed by the escalating toxicity of CCRs that is resulting from installation of badly needed air pollution controls. According to EPA, use of air pollution control (APC) technologies at coal-fired power plants to reduce mercury emissions and other pollutants will be responsible for significant changes in the chemical and physical properties of CCRs. These air pollution control technologies include the use of selective catalytic reduction for post-combustion NOx removal, electrostatic precipitators or fabric filters for particulate capture, sorbent injection for increasing mercury control, and flue gas desulfurization or other scrubber technologies to reduce acidic gases in the stack emissions. The multi-pollutant controls will reduce the air emission of multiple pollutants, but it will also result in the transfer of the pollutants from the flue gas to the CCRs.

Changes in APC technologies also will result in a greater amount of residue generated for each unit of electricity produced and an overall increase in the total content of mercury and other hazardous air pollutants (e.g., arsenic, selenium, chromium) in fly ash, FGD residues, and other APC residues.[187] The mobility of metals may also be altered as a result of changes in material pH, carbon and chloride content, and interaction with the broader class of CCRs, including pyritic coal rejects from coal washing or high-sulfur coal rejects.[188] Emerging APC technologies are also likely to create new APC residues, such as spray dryer ash or spent sorbents from mercury or post-combustion NOx control technology.

While EPA predicts far greater use of such technologies in the years to come, the agency has also documented that the change is well underway. Since coal-fired power plants represent the largest source of anthropogenic mercury emissions in the United States,[189] the EPA is developing regulations to reduce mercury and other hazardous air pollutants from power plant

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[187] Susan A. Thorneloe, EPA, et al., *Evaluating the Fate of Metals in Air Pollution Control Residues from Coal-Fired Power Plants*, 44 *Envtl. Sci. Technol.* 7,351, 7,351 (Aug. 31, 2010) [hereinafter Thorneloe, *Evaluating the Fate of Metals*], *available at* http://pubs.acs.org/doi/pdfplus/10.1021/es1016558 (citing C. Senior,S. Thorneloe, B. Khan, & D. Goss, *Fate of Mercury Collected from Air Pollution Control Devices*, Envtl. Mgmt 15–21 (2009); *and* J. Kilgroe et al., Contr*ol of Mercury Emissions from Coal-Fired Electric Utility Boilers: Interim Report* (EPA-600/R-01-109) (Dec. 2001) (prepared for the Office of Research & Dev., Nat'l Risk Mgmt & Research Lab.)).

[188] *Id.*; Electric Power Research Institute, *Impact of Air Emissions Controls on Coal Combustion Products* (EPRI 1015544) (2008); D.S. Kosson et al., *Characterization of Coal Combustion Residues from Electric Utilities - Leaching and Characterization Data* (EPA- 600/R-09/151) (Dec. 2009) (prepared for EPA, Office of Research &Dev., Nat'l Risk Mgmt. & Research Lab.); *and* F. Sanchez, et al., *Environmental assessment of waste matrices contaminated with arsenic*, 96 J. Hazardous Materials 229–257 (2003).

[189] U.S. Gov't Accountability Office, *Mercury Control Technologies at Coal-Fired Power Plants Have Achieved Substantial Emissions Reductions* (2009).

stack emissions. These regulations will likely result in expanded use of activated carbon injection (ACI).[190] A draft Consent Decree calls for the proposed rule no later than March 16, 2011 and a final rule no later than November 16, 2011.[191] But not all states are waiting for EPA. In fact, 20 states have already implemented mercury regulations.[192] A recent report indicated that 12 GW of coal-fired generated electricity already has ACI in use for mercury control and that there are contracts in place to install mercury controls at over 60 GW of additional coal-fired generation.[193]

Coal-fired power plants are also rapidly installing scrubbers to reduce SO_2emissions. Both wet and dry FGD processes are used, producing different types of FGD solids varying from dry powder to wet sludges.[194] With the promulgation of the EPA's Clean Air Transport Rule (CATR), which will replace the Clean Air Interstate Rule (CAIR), over half of the U.S. coal-fired capacity is projected to be equipped with SCR and/or FGD technology by 2020.[195] A survey conducted of 368 coal-fired utility boilers adding FGD technology found 316 will be lime or limestone-based, with up to 225 expected to use either lime or limestone forced oxidation resulting in FGD gypsum.[196] The remaining utility boilers will use some form of dry scrubber. All FGD residues will be increasing in response to CAIR requirements with a doubling or tripling in the amount of FGD gypsum.[197] In addition, the current practice of seasonal use of post-combustion NOx control will likely be extended to year-round implementation.

In short, these necessary advances in air pollution controls have serious implication for CCR toxicity. The impact of these changes in air pollution control on the characteristics of CCRs and the leaching potential of metals is the focus of ongoing research by EPA's Office of Research and Development (ORD).[198] However, there is enough data available already to suggest that increasing toxicity puts a premium on protective regulation.

a. More Accurate Testing Confirms CCR Toxicity.

Since 2006, ORD has published three reports that examine the fate of mercury and other heavy metals in air pollution control residues to ensure "that emissions being controlled in the flue gas at power plants are not later being released to other environmental media" such as drinking water sources, rivers and streams.[199] EPA describes the results of the ORD studies at

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[190] Thorneloe, *Evaluating the Fate of Metals,* at S4 (providing Supporting Information).
[191] *Id.* (citing U.S. District Court for the District of Columbia, Civil Action No. 08-2198. In *1:08-cv- 02198-RMC*, (2010), *available at* http://www.eenews.net/features/documents/2010/04/15/document_pm_01.pdf.
[192] Thorneloe, *Evaluating the Fate of Metals*, at S4.
[193] *Id.*
[194] *Id*. at S7.
[195] *Id.* at S4.
[196] *Id.* at S7.
[197] *Id.*
[198] 75 Fed. Reg. at 35,139.
[199] EPA, Office of Research and Development, *Characterization of Coal Combustion Residues from Electric Utilities—Leaching and Characterization Data* (EPA/600/R-09/151) at ii (Dec. 2009), *available at* http://www.epa.gov/nrmrl/pubs/ 600r09151/600r09151.html (citing EPA, *Characterization of Mercury- Enriched Coal Combustion Residuals from Electric Utilities Using Enhanced Sorbents for Mercury Control* (EPA–600/ R–06/008) (Feb. 2006), *available at*http://www.epa.gov/ORD/NRMRL/pubs/600r06008/600r06008.pdf; *and* EPA,

some length in section I.E.2. of the preamble to the 2010 Proposed Rule.[200]

Central to these ORD studies is the rejection of an older leach test, the toxicity characteristic leaching procedure (TCLP). Historically, estimating metal release from CCRs has been based on the results of a single-point extraction test, the TCLP, which was designed to simulate a single "mismanagement" or near-surface disposal scenario.[201] For nearly two decades, however, the EPA Science Advisory Board (SAB) has identified significant problems with the accuracy of the TCLP. In 1999, in fact, the SAB wrote a pointed letter to EPA Administrator Carol Browner, criticizing EPA's continued reliance on the TCLP, stating definitively "it is time to make improvements." In unequivocal terms, the SAB stated "**The Committee's single most important recommendation is that EPA improve leach test procedures, validate them in the field, and then implement them."**[202] In 2006, the National Academy of Sciences also acknowledged the inaccuracy of the TCLP and weighed in with explicit criticism of its use for testing coal ash.[203]

Since at least 2006, the EPA itself has acknowledged the need for a more sensitive test that would vary the pH of the leaching solution because of the range of field conditions that CCRs are exposed to during disposal and reuse.[204] For example, CCRs are frequently placed in contact with acid mine drainage and co-disposed with acidic coal refuse (pyrites). Both of these common disposal scenarios expose CCRs to a wide range of pH conditions that can accelerate leaching of toxic metals. Recognizing the importance of having a robust, mechanistic environmental assessment methodology, EPA conducted a review of available methods, sought Science Advisory Board input, and ultimately selected the tiered assessment approach of the Leaching Environmental Assessment Framework (LEAF).[205]

EPA relies on LEAF for the latest testing of a wide range of CCRs generated by plants employing air pollution controls. This is not the first time, however, that EPA opted not to use the limited TCLP for a leach test evaluating waste material at the pH levels that the waste is actually likely to encounter when disposed.[206] Using the LEAF test, EPA tested 73 different CCRs from 31 coal-fired boilers.[207] The results of the tests were dramatically different from the

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Characterization of Coal Combustion Residuals from Electric Utilities Using Wet Scrubbers for Multi-Pollutant Control (EPA–600/ R–08/077) (July 2008), *available at* http://www.epa.gov/nrmrl/pubs/600r08077/600r08077.pdf.

[200] 75 Fed. Reg. at 35,139–42.

[201] Thorneloe, , at 7351.

[202] Letter from EPA, Science Advisory Board, to Carol Browner, Administrator, EPA, Re: "Waste Leachability: The Need for Review of Current Agency Procedures" (Feb. 26, 1999) (emphasis in original), *available at* www.yosemite.epa.gov/sab/sabproduct.nsf/.../$File/eecm9902.pdf.

[203] Nat'l Research Council, Nat'l Academies, Managing Coal Combustion Residues in Mines (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc at 123-129.

[204] *See* EPA, *Characterization of Coal Combustion Residues from Electric Utilities Using Wet Scrubbers for Multi-Pollutant Control* (EPA/600/R-08/077) (July 2008), *available at* http://www.epa.gov/nrmrl/pubs/600r08077/600r08077.htm, *and* EPA, *Characterization of Mercury-Enriched Coal Combustion Residues from Electric Utilities Using Enhanced Sorbents for Mercury Control* (EPA-600/R-06/008) (Feb. 2006), *available at* http://www.epa.gov/nrmrl/pubs/600r06008/600r06008.pdf

[205] Thorneloe, *Evaluating the Fate of Metals*, at 7351.

[206] *See* 75 Fed. Reg. 35,139, fn. 11, referencing EPA's use of multi-pH leach testing in support of listing a mercury-bearing sludge from VCM–A production, 65 Fed. Reg. 67,100 and and EPA/600/R–02/019, September 2001, Stabilization and Testing of Mercury Containing Wastes: Borden Catalyst.

[207] 75 Fed. Reg. 35,139.

TCLP tests of similar CCRs. While TCLP test results rarely exceeded the toxicity characteristic for metals (the level at which a waste is deemed a "hazardous" waste[208]), the LEAF test confirmed that CCRs can leach metals, such as arsenic, barium, chromium and selenium, at levels that far exceed federal thresholds established for hazardous waste. Specifically, EPA found, at the highest leach level for particular CCRs:

- Arsenic, a potent carcinogen, leached from fly ash at a concentration 1,800 times the federal safe drinking water standard, more than 3 times the threshold established for hazardous waste and over 76 times the level of previous leach tests (TCLP);[209]

- Antimony, which damages the heart, lung and stomach, also leached from fly ash at a concentration 1,800 times the federal safe drinking water standard and over 900 times the level of previous TCLP tests;[210]

- Chromium, which can cause cancer and stomach ailments, leached from fly ash at a level 73 times the federal safe drinking water standard, over 1.5 times the threshold for hazardous waste, and 124 times the level of previous TCLP tests;[211]

- Selenium, which causes circulatory problems in humans and is a bioaccumulative toxin extremely deadly to fish, leached from fly ash at nearly 600 times the federal drinking water standard, 29 times the threshold for hazardous waste and nearly 66 times the level of previous TCLP tests.[212]

- Selenium also leached from FGD gypsum at 320 times the federal drinking water standard, 16 times the threshold for hazardous waste, and nearly xx time the level of previous TCLP test.[213]

Previous leach data in the EPA's 1999 Report to Congress[214] and test data produced by the utility industry[215] have never revealed such high concentrations of pollutants because they used single point leach tests that could not mimic the conditions under which CCRs are actually disposed.[216] It is important to note that the above data and the additional data found in the

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[208] *See* 40 C.F.R. § 261.11.
[209] 75 Fed. Reg. 35141.
[210] *Id.*
[211] *Id.*
[212] *Id.*
[213] *Id.*
[214] *See*, for example, U.S. EPA, Report to Congress on Wastes from the Combustion of Coal by Electric Utility Power Plants (EPA530-SW-88-002), February 1988 and U.S. EPA, Report to Congress on Wastes from the Combustion of Fossils Fuels (EPA530-R-99-010), March 1999, available at http://www.epa.gov/osw/nonhaz/industrial/special/fossil/regs.htm.
[215] *See*, for example, Electric Power Research Institute, Sustainable Management of Coal Combustion Products, Recent EPRI Research, October 16, 2009, at page 8, submitted to Office of Management and Budget on October 16, 2009, available at http://www.whitehouse.gov/omb/2050_meeting_101609/.
[216] For a more detailed discussion of the EPA's LEAF test results and comparison to data from TCLP testing, see Attachment 7, Evans, Lisa. Failing the Test: *The Unintended Consequences of Controlling Hazardous Air Pollutants from Coal-Fired Power Plants,* May 2010.

preamble of the proposed rule are not preliminary data. The data have been peer reviewed, and results were published in *Environmental Science and Technology* on August 30, 2010.[217]

Furthermore, EPA indicates in the preamble that the very high leaching values found by using the LEAF test may still not accurately characterize the full leaching potential of the waste. EPA admits there is a potential underestimation by the LEAF test because actual field conditions for CCR disposal can exhibit a pH below the lowest bound of the test's pH range.[218]

2. EPA's "Human and Ecological Risk Assessment of Coal Combustion Wastes" Demonstrates Extremely High Risk to Human Health and the Environment from Mismanagement of CCRs.

As EPA notes in the preamble, the Agency's Health and Ecological Risk Assessment of Coal Combustion Wastes (April 2010) provides "further confirmation of the high risks presented in the mismanagement of CCRs disposed in landfills and surface impoundments."[219] The risks found in this assessment are, in fact, *extremely high* when compared with EPA's target level of protection of human health and the environment. For this rule and for other EPA listing determinations, EPA defined the target level to be an incremental lifetime cancer risk of no greater than one in 100,000 (10^{-5}) for carcinogenic chemicals and a hazard quotient of 1.0 for noncarcinogenic chemicals.[220] Yet the CCR risk assessment found that at 90th percentile "the management of CCRs in unlined or clay-lined waste management units (WMUs) result in risks greater than the risk criteria of $10^{-5}$for excess cancer risk to humans or an HQ greater than 1 for noncancer effects to both human and ecological receptors which are the criteria generally used in EPA's listing determination procedure."[221]

More specifically, as EPA indicates in its preamble:

- 90th percentile risk estimates, for arsenic from unlined surface impoundments are as high as 1 in 50 (2000 times EPA's target goal) and non-cancer effects estimates for cobalt were as high as 500 (500 times the target hazard quotient);[222]

- 90th percentile risk estimates, for arsenic, antimony and molybdenum that leak from unlined landfills, reveal individual lifetime cancer risk is as high as 1 in 2000, 50 times EPA's target goal.[223]

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[217] Thorneloe, Susan A., David S. Kosson, Florence Sanchez, Andrew Garrabrants, Gregory Helms. Evaluating the Fate of Metals in Air Pollution Control Residues from Coal-Fired Power Plants, Environmental Science and Technology, Vol . 44, No. 19, August 31, 2010 at 7351.
[218] 75 Fed. Reg. 35140.
[219] 75 Fed. Reg. at 35,144.
[220] *Id.* EPA uses these same target levels in other EPA listing decisions. *See*, *e.g.*, Final Rule for Nonwastewaters from Productions of Dyes, Pigments, and Food Drug and Cosmetic Colorants (70 Fed. Reg. 9144), *available at* http://www.epa.gov/wastes/law-regs/state/revision/frs/fr206.pdf)
[221] *Id.*
[222] 75 Fed. Reg. at 35,145.
[223] *Id.*

Additional risks above EPA's benchmark for both 90th and 50th percentile estimates for lined and unlined landfills and surface impoundments are summarized in the preamble and set forth in the risk assessment. These risks are from a long list of chemicals harmful to human health and the environment, including, selenium, boron and lead (in addition to the metals mentioned above).

Clearly the risks found by EPA far exceed target levels for listing, as EPA admits. Congress mandates that EPA consider these risks to human health and the environment in deciding whether CCR warrants regulation under subtitle C.[224] Consequently the agency's obligation to regulate CCRs under subtitle C is clear. In this section of our comments, however, we describe numerous ways in which EPA's 2010 Risk Assessment significantly underestimated the risk posed by coal ash to human health and the environment. Despite the high risks acknowledged in EPA's risk assessment, the assessment nevertheless failed in several critical ways to assess fully and accurately the scope and scale of the risks posed by coal ash.

a. EPA Significantly Underestimated the Cancer Risks to Human Health From Arsenic.

EPA significantly underestimated the cancer risks to human health from arsenic by relying on an out-dated cancer slope factor. The cancer risks associated with arsenic ingestion emerged as a principal factor in the risk assessment's conclusion that there are ". . . potentially significant risks to human health from CCR disposal in landfills and surface impoundments."[225] The two key exposure pathways considered in the human risk assessment were (1) ingestion of groundwater contaminated by migration of a hazardous CCR constituent, and (2) consumption of fish caught by recreational fisherman from surface waters impacted by contaminants migrating from coal ash disposal sites. A major finding of the draft document was that "[a]rsenic in certain types of WMUs [waste management units] managing certain types of CCR may present lifetime cancer risks above EPA's range of concern to highly exposed groundwater users."[226] Similarly, the risk assessment concluded that lifetime cancer risks exceeding EPA's range of concern were associated with ingestion of fish impacted by arsenic arising from surface impoundments.

However, the risk assessment document reached its conclusions regarding the arsenic-associated CCR risks by relying on a cancer slope factor (CSF) for arsenic ingestion of 1.5 $(mg/kg\text{-}d)^{-1}$ obtained from EPA's IRIS database. That slope factor, which was first published in IRIS in 1988, is based on a study of the *prevalence of skin cancer* in a population ingesting arsenic in drinking water. Its use has long been acknowledged by multiple offices of EPA and the broad scientific community to yield an underestimate of the actual cancer risk posed by inorganic arsenic ingestion, which in addition to skin cancer is recognized as a cause of cancer of the lung and bladder in humans. For example, in 2000 - 2001, EPA's Office of Water used independent estimates of arsenic induced lung and bladder cancer, rather estimates derived from the IRIS CSF, as a basis for lowering the maximum contaminant level for arsenic in drinking water from 50 µg/L to 10 µg/L.[227]

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[224] 42 U.S.C. §§ 6942(n)(4), 6921(b)(3)(C).
[225] 2010 Risk Assessment, at 4-40.
[226] *Id*. at ES-10 (stating that EPA's stated range of concern for excess cancer risk was 10^{-6} to 10^{-4} (page ES-2)).
[227] Arsenic in Drinking Water: Final Rule, EPA-815-Z-01, 66 Fed. Reg. 6976 (Jan. 22, 2001).

Although the 2010 risk assessment included a nonspecific acknowledgement that "some benchmarks in IRIS are quite dated,"[228] the narrative contained no explicit indication that use of the IRIS CSF for arsenic would substantially underestimate the cancer risk. By contrast, the "Regulatory Impact Analysis For EPA's Proposed RCRA Regulation Of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry" (hereafter "RIA") issued by the EPA Office of Resource Conservation and Recovery on April 30, 2010 did explicitly state that "the skin cancer based risk assessments no longer represent the current state of the science for health risk assessment for arsenic."[229] Consequently, the RIA contained an impact analysis based in part on the findings of the National Research Council report "Arsenic in Drinking Water: 2001 Update," which yielded a combined CSF for lung and bladder cancer of 26 $(mg/kg\text{-}d)^{-1}$.[230] Further support for use of a revised CSF for inorganic arsenic ingestion arises from another recent document produced by the EPA National Center for Environmental Assessment entitled, "Toxicological Review of Inorganic Arsenic In Support of Summary Information on the Integrated Risk Information System (IRIS)".[231] Although still under review by the EPA SAB for technical accuracy and science policy implications, this externally peer-reviewed final draft derived an oral CSF of 25.7 $(mg/kg\text{-}d)^{-1}$.

Medical toxicologist Dr. Michael Kosnett[232] along with three scientists, Allan H. Smith, MD. PhD,[233] Kenneth P. Cantor,[234] and Marie Vahter,[235]who together served on the Subcommittee on Arsenic in Drinking Water of the Natural Research Council (for either or both of the 1999 and 2001 reports) draw the following conclusion from EPA's use of the cancer slope factor of 1.5 mg/kg/d:

> Because estimates of lifetime cancer risk increase linearly with the CSF, a direct consequence of the draft CCR risk assessment's utilization of a CSF of 1.5 $(mg/kg\text{-}d)^{-1}$ instead of 26 $(mg/kg\text{-}d)^{-1}$ is an underestimation of the cancer risk associated with each CCR disposal scenario by a factor of 17.3 (i.e. 26 ÷ 1.5). *Accordingly, a revision of the risk assessment utilizing the CSF of 26 derived in Appendix K4 of the RIA is indicated at this time. In addition to reinforcing EPA's current draft conclusions regarding the health risk of CCR disposal, use of the alternative CSF may elevate the risk associated with some additional disposal scenarios, such as ingestion of fish impacted by certain CCR landfills, into EPA's stated range of concern.*[236]

A copy of this letter is appended to these comments as Appendix B.[237]

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[228] 2010 Risk Assessment, at 4–56.
[229] 2010 RIA, at 256, & Appendix K4.
[230] *See* 2010 RIA, at 120, & Appendix K4, at 263–66.
[231] National Center for Environmental Assessment, EPA, *Toxicological Review of Inorganic Arsenic In Support of Summary Information on the Integrated Risk Information System (IRIS)* (EPA/635/R-10/001) (Feb. 2010).
[232] *See* http://yosemite.epa.gov/sab/SABPEOPLE.NSF/WebPeople/KosnettMichael?OpenDocument.
[233] Professor of Epidemiology, School of Public Health, University of California, Berkeley.
[234] Epidemiologist, Division of Cancer Epidemiology and Genetics, National Cancer Institute, Bethesda, MD.
[235] Professor, Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden.
[236] *See* Appendix B, (emphasis added).
[237] *See also* Letter from Mary A. Fox, PhD, MPH, Assistant Professor in the Department of Health Policy and Management, Johns Hopkins University Bloomberg School of Public Health (submitted to the docket). Dr. Fox wrote "Cancer risks from arsenic exposure have also been underestimated. To date cancer risk assessments of

b. EPA Underestimated the Risks to Human Health from Lead in its 2010 Risk Assessment.

EPA also underestimated the risks to human health posed by lead. In a letter attached to these comments from Phillip Goodrum, Ph.D of Environmental Resource Management (ERM), Dr. Goodrum points out that EPA made a fundamental error in its calculation of risk from lead.[238] Dr. Goodrum writes:

> This analysis demonstrates that the use of an MCL of 15 µg/L is not sufficiently protective. A reduction by a factor of 2 or 3 to 10 or 5 µg/L would provide a more appropriate action level for drinking water concentrations to assess risks associated with the CCW scenarios.

The implication of EPA's underestimation of the reference concentration for lead is a probable underestimation of the Hazard Quotient by 2-3 times. Given the high incidence of lead contamination in groundwater at coal ash sites and the serious neurological damage that can result from lead exposure, EPA should reassess the risk posed by lead in its risk assessment. It is essential for EPA's assessment to accurately reflect the risk to children and adults potentially exposed to ash and contaminated water.

c. EPA Underestimated the Risk to Human Health because it did not Fully Consider the Impact from Multiple Pathways.

By failing to consider impacts from multiple pathways of exposure, EPA further underestimated risks. For certain coal ash toxicants, threats to human health are multiplied due to the ability of the toxicant to reach and endanger humans via more than one exposure pathway.[239] These multiple pathways can also result in different forms of harm being inflicted on the body. One salient example is that of arsenic. Arsenic readily leaches into water, potentially allowing arsenic to contaminate groundwater and, eventually, drinking water supplies. Contaminated drinking water is a primary route of arsenic exposure. Chronic exposure to arsenic in drinking water can cause several types of cancer, including skin cancer, bladder cancer, lung cancer, and kidney cancer. Recent studies also have linked arsenic ingestion to cardiovascular disease and diabetes mellitus. Ingestion of lower levels of arsenic can cause nausea and vomiting, decreased production of red and white blood cells, and cardiovascular effects including abnormal heart rhythm, damage to blood vessels, and damage to the peripheral nervous system. Arsenic can also enter the body via other pathways. Inhalation of arsenic—for example, from coal ash fugitive dust—also poses threats to health; it can cause or increase the danger of lung cancer. Arsenic can also be absorbed through the skin, as may occur in cases such as exposure to coal ash used in structural fill, or inadequate cleanup after a coal ash spill.

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arsenic exposure have been based on studies of skin cancer. Epidemiological evidence on arsenic ingestion now shows greater risk of several internal organ cancers (e.g., bladder and lung) so risk estimates using the skin cancer data will underestimate total cancer risks from arsenic ingestion." *Id.*

[238] *See* Appendix C.

[239] Material in this section was drawn from the Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health & Human Services, ToxFAQs, at http://www.atsdr.cdc.gov/tfacts2html, and Steven G. Gilbert, PhD DABT, A Small Dose of Toxicology, CRC Press, 2004.

Arsenic absorbed through the skin increases the risk of skin cancer. Thus, the pathway of exposure to arsenic is significant, and the choice of pathway is significant in determining the nature of the health threat.

The increased danger due to multiple pathways to exposure is a factor in other toxicants besides arsenic.

- Lead exposure can result from ingestion by mouth or by inhalation of lead dust. Children are particularly susceptible to harm from lead; such harm may include damage to the brain and nervous system, behavior and learning problems such as hyperactivity, slowed growth, hearing problems and headaches. High levels of lead in children can result in swelling of the brain, kidney disease, and possible death. Adults are also susceptible to harm from lead, including reproductive problems in both men and women, high blood pressure and hypertension, nerve disorders, memory and concentration problems, and muscle and joint pain. It is now well accepted that there is no safe level of lead exposure, particularly for children, so the impact of multiple pathways is a particular concern.

- Boron when inhaled can cause irritation of the eyes, nose and throat; when ingested, it can damage the intestines, liver, kidneys, brain, and testes, and exposure to large amounts of boron over short periods of time can lead to death.

- Chromium VI when ingested via contaminated water can cause stomach and small intestine ulcers, and frequent ingestion can cause anemia and stomach cancer. Contact with the skin by some compounds of chromium VI can result in skin ulcers. And when inhaled in large amounts, chromium VI an cause lung cancer, breathing problems such as asthma and wheezing, and nose ulcers.

- Thallium exposure may result from ingestion by mouth, or may occur from inhalation of thallium dust. Chronic inhalation of thallium causes nervous system effects. Ingesting large amounts of thallium over a short time leads to vomiting, diarrhea, temporary hair loss, and adverse effects on the nervous system, lungs, heart, liver and kidneys.

The application of this principle varies from toxic to toxic. There are cases where a toxicant is dangerous when exposure occurs via one pathway, but less so via another. For example, cadmium if ingested is not likely to cause harm, as oral ingestion results in low levels of absorption. The lungs, however, readily absorb cadmium, so inhalation exposure results in much higher levels of absorption. This makes exposure to coal ash dust a risk factor for kidney disease, obstructive lung diseases such as emphysema, and possibly lung cancer. Cadmium also affects calcium metabolism and can result in bone mineral loss and associated bone pain, osteoporosis and bone fractures.

d. EPA Underestimated the Synergistic Risks to Human Health.

The 2010 Risk Assessment fails to account for the cumulative impact of simultaneous exposure to the multiple hazardous constituents of CCRs. Coal ash toxicants can be more

harmful in combination than they are individually. However, while the properties of coal ash toxicants are understood as they function individually, little is known about what happens when these toxic substances are mixed — as routinely happens in coal ash. Concurrent exposure to multiple contaminants may intensify existing effects of individual contaminants, or may give rise to interactions and synergies that create new effects. For example, aluminum, manganese and lead all have adverse effects on the central nervous system; barium, cadmium and mercury all have adverse effects on the kidney. Where several coal ash contaminants share a common mechanism of toxicity or affect the same body organ or system, exposure to several contaminants concurrently produces a greater chance of increased risk to health. Yet the EPA has not taken into account in its 2010 Risk Assessment the possibility of synergistic interactions, despite the common occurrence of multiple contaminants in combination in coal ash.[240] Assessing exposure to CCR mixtures requires an understanding of the toxic effects of CCR constituents, briefly summarized in Table 29, below. Additional support for assessing the cumulative impact of coal ash contaminants is found in the letter from Mary A. Fox, PhD, MPH, Assistant Professor in the Department of Health Policy and Management at the Johns Hopkins University Bloomberg School of Public Health, attached to these comments as Appendix D.

[240] Foran, J.A. "Comments on the Draft U.S. EPA Human and Ecological Risk Assessment of Coal Combustion Wastes." February 5, 2008. Earthjustice. 2007. Attached to this document as Appendix E.

Table 30. Health effects of coal combustion residual (CCR) constituents

CCW Constituent	Health Effect(s) of Concern (Exposure by Ingestion)	Information Source
Aluminum	Neurological	ATSDR 2007
Antimony	Longevity, changes in blood glucose and cholesterol	EPA IRIS
Arsenic	Cancer, hyperpigmentation, keratosis of skin	EPA IRIS
Barium	Nephropathy	EPA IRIS
Beryllium	Gastrointestinal	EPA IRIS
Boron	Decreased fetal weight	EPA IRIS
Cadmium	Significant proteinuria	EPA IRIS
Chromium (III)	No effects observed	EPA IRIS
Chromium (VI)	No effects observed	EPA IRIS
Cobalt	Blood	ATSDR 2007
Copper	Gastrointestinal	ATSDR 2007
Fluorine	Cosmetic fluorosis of teeth	EPA IRIS
Iron	NA	NA
Lead	Neurological	CDC 2005
Manganese	Neurological	EPA IRIS
Mercury	Kidney	ATSDR 2007
Molybdenum	Increased uric acid levels	EPA IRIS
Nickel	Decreased body and organ weight	EPA IRIS
Potassium	NA	NA
Selenium	Selenosis – hair and nail loss	EPA IRIS
Silver	Argyria - benign skin pigmentation	EPA IRIS
Strontium	Bone growth and mineralization	EPA IRIS
Thallium	Change in blood chemistry	EPA IRIS
Vanadium	Decreased hair cystine	EPA IRIS
Zinc	Decreased red blood cell copper and enzyme activity	EPA IRIS

The simultaneous occurrence of multiple contaminants from coal ash contamination is documented at over 100 damage cases.

e. EPA Underestimated the Risks Posed by Fugitive Dust.

The 2010 Risk Assessment fails to account fully for risks posed by fugitive dust associated with CCR disposal. Several reviewers, including one peer reviewer, criticized EPA's draft 2009 *Health and Ecological Risk Assessment for Coal Combustion Wastes* due to the absence of any assessment of risk from fugitive dust, which, the scientist stated, can be "a significant problem."[241] To correct this oversight, EPA published a screening assessment of the risks posed by coal combustion waste landfills.[242] The screening assessment acknowledges significant potential harm from fugitive dust. According to EPA, when coal ash blows from dry storage

[241] Industrial Economics, Incorporated. Peer review of "Draft Human and Ecological Risk Assessment for Coal Combustion Wastes" (Sept. 25, 2008).
[242] EPA, Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills, [draft], (Sept. 2009) (Docket ID No. EPA-HQ-RCRA-2009-0640-0142).

sites, particulate matter can readily exceed the national ambient air quality standards (NAAQS) for levels of particulate matter in the air. EPA concluded "there is not only a possibility, but a strong likelihood that dry-handling [of coal ash] would lead to the NAAQS being exceeded absent fugitive dust controls."[243] To compound the problem, high background levels of particulate matter may add to the potential for fugitive dust from coal ash to lead to significant human health risks.

Further, EPA found that protective daily practices to control dust, such as moistening dry coal ash or covering it, minimizes the dangers to health. However, dust controls often are not applied at CCR disposal sites or are only applied only weekly or monthly. EPA found such infrequent practices to "have the potential to lead to significant risks," adding that:

> "[e]ven at the median risk, yearly management leads to a PM10 concentration almost an order of magnitude above the NAAQS.…[It is even] "uncertain whether weekly controls would have the potential to cause NAAQS exceedences…only daily controls can definitively be said not to cause excess levels of particulates in isolation."[244]

Notwithstanding this acknowledged risk, EPA notes that many states do not require daily cover to control fugitive dust at coal ash landfills and most states do not require final caps on coal ash ponds to control dust.[245]

While the screening assessment represents an important step toward evaluation of fugitive dust risks, it falls far short of a qualitative risk assessment. Its numerous shortcomings understate the risk posed by airborne CCR. Specifically, the methodology employed is overly simplistic and not sufficiently conservative. For example, it is unreasonable to analyze the percentiles of landfill sizes and distances to receptors without acknowledging the extreme variability of emission factors for wind erosion, drop operations, and entrained road dust from equipment travel on unpaved landfill roads and their considerable contribution to total emissions of airborne particulates from a CCW landfill. A detailed evaluation of the Screening Assessment is attached at Appendix G.

f. EPA's 2010 Risk Assessment is Based on Erroneous Assumptions.

The 2010 Risk Assessment is further flawed because it relies on numerous erroneous assumptions regarding the design of CCR disposal units. The following deficiencies related to the model used by EPA in its 2010 risk assessment caused EPA to *underestimate* the impacts to human health and the environment. These deficiencies are discussed in detail in a report by Geo-Hydro, Inc. attached to these comments as Appendix J. The report's findings are summarized below.

1. The conceptual model of a CCR landfill in the risk assessment differs

[243] *Id.*
[244] *Id.*
[245] *Id.* *See* also our discussion of state regulatory controls, *infra*.

significantly from most existing CCR landfills, and because of these differences, the model underestimates the magnitude and concentration of migration away from a typical landfill.

2. The conceptual model of a CCR impoundment in the risk assessment differs significantly from most existing CCR impoundments, and because of these differences, the model underestimates the magnitude and concentration of migration away from a typical impoundment.

3. EPA used a groundwater flow model and a geochemical attenuation model that are structurally and numerically incapable of simulating conditions that are known to exist at and downgradient of many CCR disposal units. Those limitations were such that migration, and therefore exposure and risk, from simulated sites would inherently be under-computed.

4. Contaminated groundwater can flow further than one mile from the CCR disposal unit. The large volumes of disposed wastes, high concentrations of contaminants in CCR-derived leachate, and disposal setting of highly conductive materials virtually assures some plumes extend more than one-mile downgradient. The hydraulic properties of valley-floor alluvial sediments under typical gradients easily produce flow velocities of 1 ft/day. Over the 30 plus years that CCRs have routinely been collected and stored on generating facility properties, many plumes may have traveled over two miles from their origin.

g. A Calculation of Risk Based on the Erroneous Assumption that Leachate from CCR Landfills and Surface Impoundments will Always Flow toward Large Bodies of Water, and thereby Avoid Human Receptors, Understates Potential Harm.

The 2010 Risk Assessment calculated risks on the erroneous assumption that leachate from CCR landfills and surface impoundments will always flow toward large bodies of water, diminishing risk by way of dilution. EPA and industry commenters have posited that the direction of groundwater flow is largely, if not fully, controlled by the topography between a waste disposal facility and nearby surface water bodies. Always assuming a direction of flow towards the water body greatly limits the number of people potentially exposed to contaminated groundwater. However, human receptors located in *any direction* from CCR landfills can potentially be exposed to coal ash contaminants depending on the site-specific flow system. For that reason, a meaningful assessment of risk must be based upon site-specific evaluations, not generic assumptions.

The reasons why contaminated groundwater from CCR disposal units may not flow directly toward an adjacent water body include:

1. CCR landfills and ponds adjacent to rivers are located in alluvial valleys. Alluvial valleys are composed of highly variable geologic materials ranging from coarse sand and gravel channel deposits to fine-grained silt

and clay overbank and channel-fill materials. In such valleys, the channels tend to align with the axis of the valley, thus promoting flow parallel to the edge of a major river, not toward it. This downstream component of flow biases the migration path of contaminants downstream of the facility, along the alluvial valley, potentially impacting human receptors. In addition, groundwater flow is also affected by river stages (high and low water).

2. Anthropogenic activities such as pumping centers related to industrial, residential or agricultural water supply systems are capable of modifying the direction of groundwater flow over wide areas. For example, Depending on the location of any well fields that supply the public system, the system itself may have the potential to draw CCR contaminants into the wells, exposing the served population through the supposedly safe water system.

3. Mounding of groundwater and/or leachate under landfills, utility cooling water ponds and surface impoundments often create radial flow paths from the disposal facility that are capable of driving contaminated groundwater in directions contrary to topographic, down-to-the river flow.

A more detailed discussion of the factors affecting the flow direction of releases from CCR disposal units, along with specific examples of contamination caused by units located near large bodies of water is found in Appendix I.

h. EPA's 2010 Risk Assessment Underestimates Risk from Retired CCR Disposal Units.

In its 2010 risk assessment, EPA does not assess the risks posed by retired CCR disposal units. To its credit, EPA acknowledges the long-term leaching problem posed by old CCR disposal units. As EPA states in its assessment, "[a]rrival times of the peak concentrations [of CCR contaminants] at receptor wells are much longer for landfills (hundreds to thousands of years) than for surface impoundments (most less than 100 years)."[246] Thus, EPA must account in its risk assessment for the reality that contaminant plumes, and associated human exposures, will likely continue to increase for decades to come due to pollution from sources that exist today. The failure to consider the combination of growing plumes, more concentrated plumes, and future increases in population density in the vicinity of on-site and off-site CCR-disposal facilities renders the estimate of human exposures presented in the risk analysis incomplete and misleadingly low. If EPA had assessed the continuing and increasing loading of contaminants from hundreds of retired ponds and landfills, the risk estimates surely would have increased.

[246] EPA 2010 Risk Assessment at 4-11.

i. EPA's 2010 Risk Assessment Fails to Fully Account for Surface Water Pollution from Unlined and Poorly Managed Surface Impoundments and Landfills.

The 2010 Risk Assessment does not account fully for surface water discharges from unlined and poorly managed surface impoundments and landfills. This omission is significant given that the electric utility industry is the second largest discharger of toxic and nonconventional pollutants nationwide.[247] In 2009 alone, the electric utility industry reported discharging nearly two million pounds of metals to surface waters from coal combustion waste surface impoundments and landfills and power plants.[248] In addition to direct discharges to surface waters, the electric utility industry is poisoning waterways through slow motion leaks of toxic pollution from unlined and poorly managed coal combustion waste impoundments and landfills.[249]

Our analysis of the limited data available through the EPA Enforcement and Compliance History Online (ECHO) database indicates that power plants routinely discharge toxic pollutants such as selenium from coal combustion waste impoundments, landfills, and other handling systems at levels that exceed water quality standards.[250] Data compiled from permit applications, monitoring reports, and sampling conducted for the USEPA identified at least thirty sites in which routine long-term discharges of selenium exceed 20 micrograms, and sometimes 100 micrograms.[251] We have already learned the hard way that releasing selenium into rivers and lakes can decimate fish populations and make the surviving species unsafe to eat.[252] For example, EPA's 2007 Coal Combustion Waste Damage Case Assessments includes Belews Lake, North Carolina, where the discharge of selenium from a power plant wiped out 16 of 20 fish species in the 1980s.[253]

The limited monitoring data available show that the electric utility industry also release other pollutants at levels that exceed drinking water standards or limits meant to protect recreational uses like swimming and fishing.[254] The EPA has established a maximum contaminant level of

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[247] EPA, *Interim Detailed Study Report for the Steam Electric Power Generating Point Source Category* (821-R-06-015) 1-1 (Nov. 2006).

[248] *See* EPA, Toxics Release Inventory Explorer, *available at* http://www.epa.gov/triexplorer/. Actual discharges of these pollutants are likely significantly higher, as federal rules do not presently include any effluent limits on metals in coal combustion waste wastewater and states fail to meet their independent obligation to require facilities to monitor or report these discharges. *See* 40 C.F.R. pt 423.

[249] *See 2007 EPA Damage Case Assessment*; *Out of Control; and In Harm's Way* (documenting numerous coal combustion waste sites that have contaminated ground and surface waters via direct discharges and leaks in disposal units).

[250] *See* Attachment 18 (selenium chart). Selenium is a toxic pollutant found in coal combustion waste that is deadly to aquatic life in small amounts, and can damage the liver and other soft tissues in humans. EPA has determined that chronic exposure to selenium at level above 5 micrograms per liter is harmful to freshwater fish and other aquatic life. The acute, or short-term safe level for freshwater aquatic life is no more than 20 micrograms per liter.

[251] *See* Attachment 18 (selenium chart).

[252] *2007 EPA Damage Case Assessment,* 25.

[253] *Id.*

[254] *See* Attachment 17 (arsenic chart).

10 micrograms per liter for arsenic in drinking water.[255] States like Tennessee use the same threshold in waters used for recreational purposes, recognizing that arsenic becomes increasingly concentrated as it moves up the food chain, which could potentially make some fish unsafe to eat.[256] EPA data from the ECHO database identify at least 20 power plants where arsenic levels in wastewater discharges routinely exceed 20 micrograms per liter, or at least twice the recommended federal standard for drinking water or recreational waters.[257]

Because so little monitoring data exists, our analysis almost certainly understates the danger posed to public health and the environment from discharges of toxic pollution from coal combustion waste surface impoundments and landfills. In addition, our analysis examines discharges of just two of the twenty-seven metals EPA has identified in coal combustion waste wastewater.[258] The electric utility industry discharges enormous quantities of toxic pollution that poses a significant risk to public health and the environment into our waterways each year.

i. EPA Must Consider Discharges to Surface Water in the Risk Assessment.

While EPA did evaluate risks posed by groundwater transport to surface waters, EPA claims that the risks from direct discharges to surface waters is outside the scope of the risk assessment because these discharges are regulated under the Clean Water Act.[259] However, RCRA does not preclude EPA from considering potential danger and damage from coal combustion waste disposal that is caused by Clean Water Act discharges.[260] In fact, the statute directs EPA to evaluate *all* "potential danger" from disposal and evaluate damage to human health and the environment from leachate.[261] Furthermore, the RCRA open dump regulations demonstrate that Clean Water Act discharges are not *per se* excluded from the scope of RCRA.[262] Finally, EPA itself includes sites that have caused damage to the environment from direct discharge to surface waters in its 2007 report documenting coal combustion waste damage cases.[263]

First, the section 8002(n) criteria direct EPA to evaluate the (1) "potential danger, if any, to human health and the environment from the disposal and reuse of [coal combustion waste]" and (2) "documented cases in which danger to human health or the environment from surface runoff or leachate has been proved . . . ."[264] The criteria do not exclude potential danger from disposal of coal combustion waste that is the result of a direct discharge to surface waters. The disposal of these wastes in surface impoundments and landfills creates discharges to surface waters. In other words, direct discharges are directly related to, and a component of, the disposal

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[255] 40 C.F.R. § 141.62(b)(16).
[256] Tenn. Comp. R. & Regs. 1200-4-3.03(4).
[257] *See* Attachment 17 (arsenic chart).
[258] EPA, *Steam Electric Power Generating Point Source Category: 2007/2008 Detailed Study Report* 2-7 tbl. 2-3 (Aug. 2008).
[259] EPA, 2010 Risk Assessment, at 4-39.
[260] *See* 42 U.S.C. § 6982(n).
[261] 42 U.S.C. § 6982(n)(3), -(4).
[262] *See* 40 C.F.R. § 257.3-3(a) (stating that facilities that discharge in violation of the Clean Water Act are open dumps).
[263] EPA, *Coal Combustion Waste Damage Assessments*, at 12.
[264] *Id.*

of coal combustion waste. As RCRA directs EPA to evaluate all potential danger from these wastes, it must assess the danger posed to public health and the environment by direct discharges to surface waters.

EPA has recognized this obligation implicitly in the past. In its 2007 report, Coal Combustion Waste Damage Assessments, EPA specifically stated that proven damage cases are not limited "to those sites with a primary MCL exceedance(s) in ground water distant from the waste management unit."[265] Thus, EPA noted that "[a] case still may be considered proven under the scientific investigation test if a scientific study demonstrates there is documented evidence of another type of damage to human health or the environment (e.g., ecological damage)."[266]

In keeping with this observation, EPA has identified direct discharge to surface waters as the basis for consideration as a proven damage case. For example, EPA identified the Georgia Power Company's Plant Bowen coal combustion waste impoundment as a proven damage case based on "unpermitted discharge of water containing ash slurry into the Euharlee Creek resulting in a temporary degradation of public waters."[267] Belews Lake in North Carolina is listed as a proven damage case based on "[s]cientific evidence of extensive impacts on fish populations due to direct discharge to a surface water body."[268] Additionally, the Basin Electric Power Cooperative W.J. Neal Station Surface Impoundment in North Dakota is an EPA damage case based on a site inspection that "found documentation of releases to ground water and surface water from the site."[269] There is no justification for failing to exclude the exposure pathway documented in these damage cases from the risk assessment. The statute directs EPA to consider all potential danger to human health and the environment and all damage from leachate, and EPA's risk assessment should consider risks posed by direct discharges of leachate from surface impoundments and landfills.

Second, the RCRA open dumping regulations provide further support that direct discharges from coal combustion waste surface impoundments and landfills are within the scope of EPA's RCRA risk assessment. A facility is a RCRA open dump if the facility "cause[s] a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under Section 402 of the Clean Water Act, as amended."[270] Although several courts have held that citizens may not enforce violations of 40 C.F.R. § 257.3-3(a), EPA has expressly stated that the regulation is valid for determining whether a facility is an open dump.[271]

> [T]oday's amendments . . . modify the surface-water criterion of § 257-3.3. As originally promulgated, that standard would have made discharges violating requirements under Section 402 or Section 404 of the Clean Water Act open

[265] *Id.*
[266] *Id.* at 12–13.
[267] *Id.* at 20.
[268] *Id.* at 25.
[269] *Id.* at 36.
[270] 40 C.F.R. § 257.3-3(a).
[271] EPA, Final Rule: Guidelines for Development and Implementation of State Solid Waste Disposal Facilities and Practices, 46 Fed. Reg. 47,048, 47,050 (Sept. 23, 1981).

> dumping practices as well. A party causing such a violation could simultaneously be subject to penalties under the CWA and a citizen suit to enjoin 'open dumping' under RCRA. Today's amendment eliminates this double liability. However, since the open dump inventory classification for purposes of the State planning program does not impose legal sanctions under RCRA, *the Criteria retain the provision that a violation of Section 402 or Section 404 makes a facility an open dump* . . . EPA believes that the CWA enforcement mechanisms are sufficient to handle violations under Section 402 and 404.[272]

Thus, EPA's assertion that Clean Water Act discharges are somehow outside the scope of review because the risk assessment was undertaken pursuant to RCRA is without merit. EPA must consider all potential danger from coal combustion waste disposal and all damage from leachate when determining whether Subtitle C regulations are warranted.[273] Danger and damage to public health and the environment caused by Clean Water Act discharges are not exempt, and EPA must evaluate risks posed by both direct discharges to surface waters and groundwater transport to surface water.

ii. Risks to Aquatic Ecosystems and Wildlife.

The risks that EPA did identify underscore the importance of evaluating additional impacts from pollution of surface water more fully. Importantly, EPA's risk assessment found substantial risk from coal combustion waste disposal sites to aquatic ecosystems and the wildlife they support from groundwater transport to surface water and sediment pathway.[274] EPA evaluated ecological risks for both landfills and ponds, based on predicted exposures of wildlife and vegetations to toxic metals that migrate from groundwater to surface water and sediment.[275] Predicted exposures are compared to ecological hazard quotients for specific pollutants, e.g., concentrations that are thought to be safe for aquatic life.[276]

EPA states that "[t]he ecological risk results and damage cases suggest the potential for adverse ecological effects to plants, terrestrial organism, and aquatic systems from CCW releases into the subsurface and subsequent connection with surface waters, particularly for CCW managed in unlined surface impoundments."[277] The results are shocking:

- Unlined impoundments are predicted to leak boron into surface waters at concentrations up to 2,375times higher than levels estimated to be safe for aquatic life.[278] Even clay-lined impoundments will release boron at levels 854 times above the HQ, or safe level, according to the EPA.[279]

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[272] *Id.* (emphasis added).
[273] 42 U.S.C. § 8002(n).
[274] EPA, 2010 Risk Assessment, at 4-26.
[275] *Id.*
[276] *Id.*
[277] EPA, 2010 Risk Assessment, at 4-26.
[278] *Id.* at 4-29 tbl. 4-21.
[279] *Id.*

- Based on predicted exposures to river otters, lead from unlined impoundments will reach surface waters at concentrations 22 times higher than the HQ, or safe level, while arsenic and selenium concentrations will be more than 10 times higher.[280]

- Toxic metals can also be embedded in the sediment at the bottom of rivers or lakes, where they can be very difficult to remove, and poison plants and bottom feeding fish. The EPA's study predicts lead leached from unlined surface impoundments will reach levels that are 311 times higher than levels considered harmless, while arsenic will exceed the safe threshold by 127 times.[281] Lead and arsenic from unlined landfills are also expected to contaminate sediments at levels 58 and 11 times above no risk thresholds respectively.[282]

Table 31: Summary of 90th Percentile Full-Scale CCW Ecological Risk Results: Groundwater to Surface Water Pathway, Aquatic Receptors[284]

Chemical	Unlined Units	Clay-Lined Units	Exposure Pathway	Receptor
Landfills				
Boron	281	78	direct contact	aquatic biota
Lead	8	0.4	ingestion	river otter
Selenium	2	0.7	direct contact	aquatic biota
Arsenic	2	0.1	direct contact	aquatic biota
Barium	2	0.2	direct contact	aquatic biota
Surface Impoundments				
Boron	2,375	854	direct contact	aquatic biota
Lead	22	7	ingestion	river otter
Arsenic	13	4	direct contact	aquatic biota
Selenium	12	4	direct contact	aquatic biota
Cobalt	6	3	direct contact	aquatic biota
Barium	3	1	direct contact	aquatic biota
Cadmium	1	0.7	direct contact	aquatic biota

[280] *Id.*
[281] *Id.* at 4-31 tbl. 4-23.
[282] *Id.*
[284] EPA, Risk Assessment, 4-29 tbl. 4-21.

Table 32: Summary of 90th Percentile Full-Scale CCW Ecological Risk Results: Groundwater to Surface Water Pathway, Sediment Receptors[285]

Chemical	Unlined Units	Clay-Lined Units	Exposure Pathway	Receptor
Landfills				
Lead	58	1	direct contact	aquatic biota
Arsenic	11	3	ingestion	river otter
Cadmium	5	1	direct contact	aquatic biota
Antimony	2	0.5	direct contact	aquatic biota
Surface Impoundments				
Lead	311	58	direct contact	aquatic biota
Arsenic	127	55	ingestion	river otter
Cadmium	30	9	direct contact	aquatic biota

iii. Significant Risks to Human Health

In addition to these ecosystem impacts, EPA's risk assessment evaluated risks to human health from the consumption of fish contaminated by pollution from coal combustion waste impoundments and landfills. EPA found that risk "[r]esults at that 90th percentile exceeded an HQ of 1 for selenium in unlined (HQ of 3) and clay-lined (HQ of 2) impoundments managing conventional CCW, and also exhibited excess cancer risks just above 1 in 100,000 for arsenic in unlined (3 in 100,000) and clay-lined (2 in 100,000) impoundments comanaging CCW."[286] Thus, it is clear from EPA's risk assessment that coal combustion waste disposal poses a significant danger to both human health and the environment from the groundwater to surface water fish consumption pathway. Additional risks from surface water pollution need to be assessed as well.

iv. Damage Cases

Numerous damage cases also document the serious adverse impacts to human health and the environment from coal combustion waste disposal from this pathway. The risk assessment needs to account for these real world examples.

Table 33: Summary of EPA Proven Damage Cases: Groundwater Transport to Surface Water

Site Name/ Location	Reported Damage
PEPCO MD Generating Station- Offsite Disposal Facility, MD	Vegetative damage, iron precipitation and low pH
Alliant Nelson Dewey Ash Disposal Facility, Wisconsin	Boron levels would have exceeded States recently promulgated health based regulations.
WEPCO Cedar-Sauk Landfill, Wisconsin	Vegetative damage in wetland due to boron uptake, selenium in groundwater exceeded MCL

[285] EPA, 2010 Risk Assessment, 4-31 tbl. 4-23.
[286] EPA, 2010 Risk Assessment, 4-13.

Table 34: Summary of EIP/Earthjustice Damage Cases: Groundwater Transport to Surface Water

Site Name/ Location	Reported Damage
Consumer Energy-Karn/Weadock Generating Facility, Michigan	Elevated levels of arsenic and boron in groundwater. Contamination flowing into Saginaw Lake and Bay.
UGI Development Company, UGI Hunlock Power Station, Pennsylvania	Contaminated groundwater leaching into Susquehanna River. Groundwater concentrations of arsenic, iron, and manganese significantly above MCL.
South Carolina Electric and Gas -Wateree Station, South Carolina	Arsenic in groundwater 18 times MCL. Fish in Wateree river have elevated levels of arsenic in tissue
TVA- John Sevier Fossil Plant, Tennessee	Cadmium in groundwater exceeds MCL which discharges into Holston River and its tributaries. High levels of boron and strontium also found in banks of Holston River.
NRG Energy- Indian River Generating Station, Delaware	On-site groundwater exceeds MCL for arsenic, chromium, and thallium. Off-site surface water in Island Creek exceeds EPA's freshwater CCC for aquatic life for aluminum and iron.
Tampa Electric Company-Big Bend Station, Florida	Arsenic in on-site groundwater has been measured at 11 times the federal primary MCL. Many other pollutants and trace elements have also been measured at levels far above secondary Drinking Water Standards and Florida Groundwater Clean-up Target Levels
Mirant MD Ash Management LLC, Brandywine Coal Ash Landfill, Maryland	MDE has documented cadmium levels that exceed the primary MCL, and levels of, aluminum, chlorides, iron, manganese, sulfates, and total dissolved solids at levels that exceed secondary MCLs. Cadmium and lead levels also exceed water quality criteria regularly in Mataponi Creek downstream of the discharges from this Landfill.
RRI Energy- Seward Generating Station, Pennsylvania	Surface water quality monitoring downstream from the ash sites contained 27 exceedances of Pennsylvania Water Quality Criteria for Fish and Aquatic Life, including exceedances for aluminum, nickel, and zinc.
SCANA- Urquhart Station, South Carolina	Sampling of a replacement well positioned near a wetland showed that arsenic was greater than the 0.01 mg/L standard. This result indicates that groundwater adjacent to the wetland is contaminated.

Southern Illinois Power Cooperative-Marion Plant , Illinois	Groundwater contains high levels of cadmium, boron, and iron. Saline Creek is a discharge point for Shallow Groundwater.
Louisville Gas and Electric -Mill Creek Plant, Kentucky	Groundwater contaminated with arsenic 1.5 times the MCL and TDS 2.5 times Secondary MCL. Eventually flows into Ohio River.
TVA-Shawnee Fossil Plant, Kentucky	Arsenic, boron, and selenium contaminated groundwater feeds into Ohio River via an on-site creek.
CLECO Power-LLC Dolet Hills Power Station, Louisiana	Selenium has been reported at the CCW landfill monitoring wells at 3.5 times the MCL in a groundwater zone that discharges to the surface water.
Allegheny Energy Supply Company- Hatfield's Ferry Power Station, Pennsylvania	From 1984 until 2001, CCW leachate and shallow groundwater that contacted CCW was directed, without any treatment, to an earthen impoundment, and then discharged into an unnamed tributary of Little Whiteley Creek. The CCW leachate discharges caused exceedances in NPDES limits for aluminum, manganese, and thallium.
TVA- Johnsonville Fossil Plant, Tennessee	TVA data show that groundwater on the island contains high levels of arsenic, aluminum, boron, cadmium, chromium, iron, lead, manganese, molybdenum, sulfate, and total dissolved solids (TDS) far above federal Maximum Contaminant Levels (MCLs), Secondary MCLs (SMCLs), and federal health advisory levels. This groundwater discharges into the Tennessee River.
NRG Energy/ Montville Power LLC, Montville Generating Station, Connecticut	"In the northeastern part of the Montville Station, average concentrations (2007–2009) of arsenic in one groundwater Monitoring Well, NRG-MW-6, were more than 20 times the federal Maximum Contaminant Level (MCL). Average concentrations of beryllium also exceeded the MCL in this well."
CLECO Power-LLC Rodemacher Power Station, Louisiana	"Groundwater monitoring wells at compliance boundaries for a a CCW landfill, seven ponds, and a coal pile at the Rodemacher Station have been contaminated with arsenic up to 5.75 times the federal Maximum Contaminant Level (MCL) and lead exceeding the MCL."

First Energy-Bruce Mansfield Power Plant Little Blue Run Surface Impoundment, West Virginia	Discharges to surface water have caused exceedances of Pennsylvania Water Quality Criteria for arsenic at least eight times in three locations between 2003 and 2010. There have been numerous off-site surface water contaminations including exceedances of arsenic, boron, cadmium, lead, and selenium.
Otter Tail Power- Big Stone Power Plant, South Dakota	"Exceedances have been measured in downgradient groundwater for arsenic at more than 13 times the federal MCL at 0.1322 mg/L, boron up to 34 times the federal Lifetime Health Advisory Level at 204 mg/L, lead up to 7 times the federal Action Level at 0.1086 mg/L, strontium up to 1.5 times the federal Lifetime Health Advisory at 6.03 mg/L, chloride up to 13 times the federal Secondary MCL (SMCL) at 3,330 mg/L, and sulfate up to 112 times the state standard and 224 times the federal SMCL at 56,000 mg/L."
Lower Colorado River Authority-Fayette Power Project, Texas	"Groundwater sampling at LCRA's Fayette Power Project (FPP) has found levels of selenium, cobalt, and molybdenum exceeding Texas Protective Contamination Levels (PCLs) and federal MCLs."

v. Direct Discharge to Surface Water

The potential danger to human health and the environment from direct discharges of coal combustion waste leachate is likely greater than the significant risk posed by the groundwater to surface water pathway. Although EPA did not evaluate risk from direct discharges to surface water, the same kinds of impacts to human health and the environment caused by groundwater transport to surface water will be present where there are direct discharges. The concentrations of pollutants will often be much higher in direct discharges as opposed to the discharges from slow motion leaks into groundwater that has a hydrogeological connection to surface waters. As discussed previously, power plants routinely discharge selenium above water quality standards that protect aquatic life.[287] In addition, large direct releases can have acute catastrophic effects on an ecosystem.

EPA has identified at least three damages cases where direct discharges to surface waters are identified as the basis for listing as a proven damage case: Belews Lake, North Carolina; Basin Electric Power Cooperative W.J. Neal Station Surface Impoundment, North Dakota; and Georgia Power Company's Plant Bowen, Georgia.[294] Fly ash produced by a coal-fired power plant in North Carolina was disposed of in a settling basin, which released selenium-laden effluent into Belews Lake in the 1980s.[295] As a result, 16 of the 20 species of fish in the lake were completely eliminated.[296]The 44-acre unlined Basin Electric Power Company W.J. Neal Station Surface Impoundment in North Dakota, discharged polluted wastewater directly into a marsh, contaminating the marsh with arsenic, cadmium, lead, zinc, and other toxic pollutants.[297] The Plant Bowen surface impoundment released 2.25 million gallons of coal ash slurry containing 281 tons of ash was released into a tributary of Euharlee Creek.[298] In addition, the Plant Bowen impoundment discharged approximately 80 tons of coal ash slurry into "Euharlee Creek through a stormwater drainage pipe resulting in a temporary degradation of public waters."[299]

In addition to EPA's damage cases, our analysis has identified at least eleven damage cases that are, at least in part, the result of direct discharges to surface water:

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[287] *See* Attachment 18 (selenium chart).
[294] *2007 EPA Damage Case Assessment*, at 25.
[295] *Id.* at 25.
[296] *Id.*
[297] *Id.*
[298] *Id.* at 20.
[299] *Id.*

Site Name/ Location	Reported Damage
Mirant MD Ash Management LLC-Brandywine Coal Ash Landfill, Maryland	In 2008 the Maryland Department of the Environment reported exceedances of water quality criteria for aquatic life in surface water.
RRI Energy-Seward Generating Station, Pennsylvania	Surface water quality monitoring downstream from the ash sites contained 27 exceedances of Pennsylvania Water Quality Criteria for Fish and Aquatic Life, including exceedances for aluminum, nickel, and zinc. In addition, Outfall 12 which flows directly from the coal ash pile.
Orion Power Holdings, Inc.-Fern Valley Coal Combustion Waste Landfill, Pennsylvania	Surface water downstream from the plant has higher levels of arsenic, boron, chloride, sulfate, and TDS compared to surface water upstream. This deteriorating surface water quality has caused a decrease in mean species diversity and equitability.
RRI Energy-Portland Generating Station's Bangor Quarry Ash Disposal Site, Pennsylvania	Surface water discharges have caused concentrations of boron, cadmium, hexavalent chromium, and selenium in Brushy Meadow Creek to exceed Pennsylvania's Water Quality Criteria Continuous Concentration for Fish and Aquatic Life.
Trans-Ash, Inc.-CCW Landfill, Tennessee	Tennessee Department of Environment and Conservation issued a notice of violation for releasing CCW into an unnamed tributary to Cypress Creek. TVA has acknowledged that leachate from this site discharges to surface water on the eastern side of the landfill.
American Electric Power- John Amos Plant Little Scary Creek Creek Fly Ash Impoundment, West Virginia	Fish taken from the Little Scary Creek in 2006 had selenium concentrations in their tissue that was 7 times higher than EPA's proposed criterion.
American Electric Power- Mitchell Generating Station, West Virginia	Effluent discharges from the Mitchell Generating Station have caused exceedances in the selenium limits in Connor Run Creek. Data from the West Virginia Department of Environmental Protection stated that the Connor Run Creek fish had an average tissue selenium concentration of 24.4mg/kg.
AES-Cayuga Coal Ash Disposal Landfill, New York	The CCW leachate prior to being discharged from the pond contains levels of arsenic, boron, cadmium and other metals that exceed federal and/or state groundwater standards.
American Electric Power- General James M. Gavin Power Plant	In April and July 2009 exceedances of the daily maximum concentration for boron were reported from Outfall 007. In addition Outfall 001 discharges from a decommissioned fly ash pond into Stingy Run that eventually goes into the Ohio River.

American Electric Power-Muskingum River Plant, Ohio	Outfall 002 discharges ash pond effluent directly into the Muskingum River. Leachate from the pond has concentrations of arsenic above the MCL and sulfate above the SMCL.
First Energy-Bruce Mansfield Power Plant Little Blue Run Surface Impoundment, West Virginia	Discharges to surface water have caused exceedances of Pennsylvania Water Quality Criteria for arsenic at least eight times in three locations between 2003 and 2010. There have been numerous off-site surface water contaminations including exceedances of arsenic, boron, cadmium, lead, and selenium.

In summary, electric utility industry discharges millions of pounds of toxic pollutants into our lakes, rivers, streams, and wetlands. The discharges from coal combustion waste surface impoundments and landfills routinely exceed water quality standards to protect aquatic life for metals like selenium. EPA risk assessment fails to fully account for the potential danger posed by these discharges because it does not evaluate direct discharges to surface waters. EPA's risk assessment found that coal combustion waste disposal creates significant risks for the environment and public health from groundwater transport to surface water. The risks posed by direct discharges are likely to be much higher, and EPA should account for these risks when determining whether Subtitle C regulations are warranted. Regardless, EPA's risk assessment and the numerous damage cases and scientific data demonstrate that coal combustion waste disposal poses a significant potential danger to human health and the environment, and warrants regulation under Subtitle C regulation.

D. Analysis of the Documented Cases in which Danger to Human Health or the Environment from Surface Runoff or Leachate has been Proved from CCR Mismanagement Indicates Unequivocally that Federal Oversight Pursuant to Subtitle C of RCRA is Warranted.

In section 8002(n)(4) of RCRA, Congress required EPA to take into account the "documented cases in which danger to human health or the environment from surface runoff or leachate has been proved."[300] To perform this analysis, EPA has developed over two decades an elaborate system of cataloging potential and proven "damage" cases. While these comments will show that the number of proven and potential damage cases, as defined by EPA, have increased substantially since the 2000 Determination, we also assert that EPA's interpretation of this requirement is unlawful, and if pursued, will lead to results contrary to RCRA.

In section 8002(n)(4), Congress required EPA to assess cases where "danger," not "damage," has been proved. The distinction between danger and damage is critical—danger speaks to the *threat* posed to health or the environment, while damage represents harm that has already occurred. The clear interest of Congress in RCRA is the prevention of "damage" through the identification of danger. This is apparent in the language of sections 7002 and 7003 of RCRA.[301] In both sections, Congress authorized citizens and EPA, respectively, to bring suit in the event that solid waste handling, storage, treatment, transport or disposal "*may* present an imminent and substantial *endangerment* of human health or the environment."[302](Emphasis added.) Congress was interested foremost in prevention of harm (i.e. in danger, not damage). Thus to file suit under either section, neither damage nor even a release of waste was required. Courts have in fact found that imminence does not require a showing that actual harm will occur immediately so long as risk of threatened harm is present.[303] Similarly, the First Circuit Court of Appeals concluded that citizens may file suit under section 7002 when there is "a reasonable prospect of future harm ... so long as the threat is near-term and involves potentially serious harm."[304]

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[300] 42 U.S.C. § 6982(n)(4).
[301] 42 U.S.C. §§ 6972 and 6973.
[302] 42 U.S.C. §§ 6972(a)(1)(B) and 6973(a).
[303] *Raytheon Co. v McGraw-Edison Co., Inc,* 979 F. Supp 858 (E.D. Wis. 1997).
[304] *Maine People's Alliance v. Mallinckrodt, Inc.* 471 F. 3d 277 (1st Cir. 2006).

That said, there is a wealth of evidence that both proven "danger" and damage has occurred at a great many CCR storage, disposal and reuse sites. The following section discusses such evidence and its implications. In sum, the dramatic increase in the number of damage cases, the severity of the harm occurring at the sites, and their distribution throughout the U.S., particularly in the states that generate the greatest volumes of CCRs, demonstrate the need for subtitle C regulation.

Management of CCR by states in the absence of minimum safeguards has contaminated water supplies, harmed or endangered human health, and harmed biota and the environment throughout the US. As of September 2010, some 137 damage sites in 35 states have been either documented by the Environmental Integrity Project, Earthjustice and Sierra Club[305] or identified as proven or potential damage sites by EPA.[306] This is more than 17 times the number of damage cases identified in EPA's 1999 Report to Congress on Wastes from the Combustion of Fossil Fuels and a three-fold increase from the number of damage cases acknowledged in EPA's 2000 Regulatory Determination on these wastes.

The majority of the coal combustion waste damage cases identified by EPA and public interest groups reveal that current disposal practices are contaminating ground and surface waters with toxic pollution. CCR damage cases are not an artifact of past practices. The contamination is pervasive, occurring to date in at least 35 states at levels that have exceeded health-based standards in the large majority of instances. The pollution from many CCR disposal sites is migrating off-site and poses a grave threat to drinking water sources and our rivers, lakes, and streams. This contamination has real consequences for Americans, and many citizens living near CCR disposal sites testified about the adverse health effects they experience at the public hearings held by EPA in conjunction with this proposed rule. For the most part, states have failed to take action to halt and clean up contamination.

Yet EPA's investigation of damage cases is woefully inadequate. In light of EPA's statutory mandate, EPA must investigate and account for the overwhelming data documenting CCR damage cases across the United States. These data irrefutably demonstrate that subtitle C regulations are necessary to protect public health and the environment.

1. EPA's Investigation of Damage Cases Is Grossly Incomplete.

The 17-fold increase in damage cases from 1999 becomes even more remarkable when one considers that EPA has never undertaken its own, independent, systematic evaluation of sites

[305] *See* Envtl. Integrity Project & Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* (Feb. 24, 2010) *available at* http://www.earthjustice.org/sites/default/files/library/reports/ej-eipreportout-of-control-final.pdf; Envtl. Integrity Project, Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment* (Aug. 26, 2010) http://www.earthjustice.org/sites/default/files/files/report-in-harms-way.pdf [Hereinafter EIP, Earthjustice, and Sierra Club are collectively referred to as "EIP," and the reports are referred to collectively as "EIP reports.")

[306] *2007 EPA Damage Case Assessment.*

damaged by CCR. It has relied from the beginning largely on private third parties, initially the utilities themselves, to bring forward evidence of damage cases. In its 1988 Report to Congress (RTC), EPA relied heavily on two studies commissioned by the organizations representing the utility industry in Washington, DC—the Utilities Solid Waste Activities Group (USWAG) and Edison Electric Institute (EEI)—to identify "documented cases" of damage. The 1988 RTC states:

> To supplement these two major studies, in 1987 EPA conducted a literature review of all readily-available sources, which revealed only two additional case studies on proven damages occurring in 1980 and 1981. The Agency has not identified any proven damage cases in the last seven years; however, no attempt was made to compile a complete census of current damage cases by conducting extensive field studies.[307]

The first industry study, done by the Envirosphere Company, identified nine cases that appeared to show damage to the environment, and the second study, by Dames and Moore, "identified seven cases that presented a potential danger to human health and the environment."[308] Not surprisingly, both studies downplayed the impacts. Envirosphere "noted that the information available on the potential impacts of utility waste disposal were inconclusive"[309] and Dames and Moore "concluded that none of these cases represented a "documented" case of such danger."[310] Thus they rejected sites such as Chisman Creek, a Superfund site in Virginia where EPA had identified coal combustion wastes as a major source of contamination of drinking water wells; Michigan City, Indiana, where coal ash ponds had contaminated underlying groundwater with arsenic up to 100 times the MCL; and Clinch River, Virginia, where the collapse of an ash pond levee wiped out more than 200,000 fish for more than 90 miles downstream.[311]

All told, EPA identified only two sites in the 1988 RTC that met its "test of proof" for damage cases. EPA's first Regulatory Determination on CCW in 1993 identified four more damage sites that met this "test of proof." In its 1999 Report to Congress, EPA considered more information voluntarily submitted by the utilities, in addition to sites in its Superfund Program's CERCLA Information System.[312] From this review, EPA identified a total of six proven damage sites and two potential damage sites in the 1999 RTC.[313]

Despite identifying only minimal damage through industry submissions, and rather than using its authority to conduct its own investigations, EPA looked to environmental groups and citizens to obtain additional information. Often, however, the information presented by citizens was not complete enough to meet EPA's "test of proof." In these cases EPA rejected further examination without timely investigation or follow-up. The evidentiary threshold used by EPA was too high, and it was higher than "tests of proof" for a previous regulatory determination on

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[307] EPA, *Report to Congress: Wastes from the Combustion of Coal by Electric Utility Power Plants* (EPA 530-SW-88-002), at 5-53 &5-54 (Feb., 1988).
[308] *Id.*
[309] *Id.*
[310] *Id.*
[311] *Id.* at 5-54 to 5-63.
[312] These included about 14 "comanagement" sites (submitted by the Electric Power Research Institute or EPRI).
[313] *1999 Report to Congress v. 2,* at 3-47 to 3-49, 4-17 & 4-18.

another Bevill waste.[314] As a result of this unreasonably high threshold, out of 59 proposed damage cases that citizen/environmental organizations submitted in comments on the 1999 RTC, the Agency accepted nine as "proven" damage cases and 25 as "potential" damage cases in its 2000 Regulatory Determination. As for the 25 other cases submitted by citizens, without any attempt to independently verify the accuracy of the information, examine sites, or look further into case histories or files of state regulatory agencies, EPA rejected 18 as "indeterminate due to insufficient information"[315]

In addition to rejecting these 25 sites with minimal examination, EPA readily admits in its 2007 Coal Combustion Waste Damage Case Assessment that it did not evaluate at all some 44 of the 135 total sites—nearly a third of the sites that were brought to its attention from 1999 to 2002--because they "involved allegations with little or no supporting information." [316]

Thus without attempting to independently verify claims of contamination or inspect any sites, the Agency's 2007 identification of damage sites[317] rejected sites like the Cardinal Fly Ash Reservoirs in Ohio; of that site EPA said that

> [t]he State has ground water monitoring data for the site, but the representatives could not confirm the presence of any suspected impacts. The data do not show any exceedences of primary or secondary MCLs. Furthermore, according to the State's hydrogeologists, interpretation of the data is occluded by mining impacts in the area. There are no exceedences of primary or secondary MCLs at this site. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment.[318]

Yet American Electric Power (AEP) first reported exceedances of MCLs in the groundwater surrounding these large ash ponds to the Ohio Environmental Protection Agency (OH EPA) in 1993 and reported statistically significant increases of CCR constituents in groundwater monitoring wells to OH EPA in early 1999 and 2000.[319] Indeed, OH EPA had confirmed that groundwater monitoring at the site indicated that "fly ash related constituents" had entered the groundwater surrounding the two ponds with statistically significant increases of arsenic and a number of other parameters in 2004.[320] In fact, an OH EPA report concluded that the ash ponds were in direct contact with the underlying groundwater in 2006, and AEP itself admitted in 2007 that continued inundation of the aquifer by water from one of the ponds would, in the short term, have "a significant influence on groundwater quality from ash pond recharge."[321] Samples from ash pore water in the pond contained arsenic at more than 46 times

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[314] *See Comments on the U.S. Environmental Protection Agency's Coal Combustion Waste Damage Case Assessment* (July 2007), EPA, Notice of Data Availability RCRA Docket No. EPA-HQ-RCRA-2006-0796, Earthjustice, Clean Air Task Force et al., 2–4 (Feb. 11, 2008).
[315] *2007 EPA Damage Case Assessment*, at 2–3.
[316] *Id.* at 7.
[317] *Id.*
[318] *Id.* at 59.
[319] *In Harm's Way*, at 120–24.
[320] *Id.*
[321] *Id.*

the MCL, molybdenum at 37 times EPA's Lifetime Health Advisory, and boron at 4 times EPA's Child Health Advisory. Not surprisingly, monitoring of groundwater leaving the pond area showed that arsenic had been measured at 0.10 mg/L, 10 times the MCL, while molybdenum and boron had been measured 10 times and nearly 2 times their Health Advisory standards, respectively (there are no MCLs for molybdenum or boron). The Tidd-Dale subdivision 2,000 feet downstream from these ponds relies on private drinking water wells that are directly in the path of this contamination.[322]

EPA similarly relied on the word of OH EPA to reject contamination alleged at the AEP Gavin Plant's ash ponds and landfill in its *2007 EPA Damage Case Assessment*:

> The representatives could not confirm the presence of any suspected impacts and the State has not undertaken any regulatory action at the site. There is no evidence of damage at this site. Therefore, this site is categorized as a case without documented evidence of proven or potential damage to human health or the environment. [323]

In contrast, the examination of this site in the second EIP Report found the underlying groundwater to be contaminated with arsenic up to 0.057 mg/L (5.7 times the MCL), barium up to 13.8 mg/L (6.9 times the MCL), lead up to 0.051 mg/L (3.4 times the MCL) and cadmium exceeding the MCL.[324] Widespread, major exceedances have also been occurring for alpha radioactivity, with readings as high as 1,497 pCi/L (99.8 times the MCL). Molybdenum has been measured at 0.409 mg/L (more than 10 times the federal Lifetime Health Advisory Level). All of these parameters except cadmium have been exceeding MCLs (or the LTHA for molybdenum) since the mid-1990s. The contamination appears to be spreading as the number of wells contaminated with alpha activity above the MCL has doubled from 1994 to 2009 and has reached a monitoring well 700 feet south of the landfill and in the direction of contaminant flow. NPDES permit violations for the landfill and the closed fly ash/bottom ash pond have also occurred for copper, boron, and sulfate. Acute toxicity to aquatic life has been documented in whole effluent toxicity tests by AEP in Stingy Run and Kyger Creek immediately downstream of the permit discharges. While OH EPA has not taken any enforcement actions, it has required AEP to perform assessment monitoring at four wells.[325]

EPA similarly rejected the Muskingum fly ash pond in Ohio as a damage site, claiming that OH EPA representatives had maintained that there were no exceedances of primary or secondary MCLs at the site.[326] Monitoring data establish, however, that concentrations of alpha activity have been up to 8.5 times the MCL in shallow groundwater exiting the site, and sulfate, iron and TDS have been exceeding their respective MCLs. Arsenic and mercury in seepage from the ash pond's dam were also more than 3 times their respective MCLs. Ohio Department of Natural Resources' (DNR) records indicate that there are 70 private wells within 2 miles of the

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[322] *Id.*
[323] *2007 EPA Damage Case Assessment*, at 61.
[324] *In Harm's Way*, at 125–132.
[325] *Id*.
[326] *2007 EPA Damage Case Assessment*, at 62.

Muskingum ash pond and 63 wells within 1.5 miles of the Gavin landfill and ash ponds. In both cases many of these wells are in the direction of contaminant flow.[327]

EPA has also rejected cases that even more clearly meet the criteria for proven damage cases. For example, a catastrophic release of caustic ash slurry from the collapse of an ash pond dike in June 1967 at the Clinch River Plant in Virginia killed an estimated 217,000 fish for 90 miles downstream of the spill, wiped out mussels and other aquatic life, and left the river ecosystem damaged for more than a decade. Yet even though EPA acknowledged this spill as a damage case in its 1993 Regulatory Determination, it now rejects the Clinch River spill as a damage case because "there was no evidence of comanagement (of CCR) at this site."[328] There is no logical explanation for the Agency's decision on this case.

In August 2007, environmental organizations formally submitted a summary of 15 additional cases of damage to US EPA in comment on the Notice of Data Availability (NODA) for RCRA Docket No. EPA-HQ-RCRA-2006-0796 and once again specifically asked the Agency to investigate these sites for inclusion on its damage case list and, where warranted, to pursue remedial action. Yet the discussion in the preamble to the proposed rule provides no indication that the Agency has considered or investigated 14 of the 15 sites that were submitted. Environmental groups have since submitted two reports that document substantial evidence of damage to groundwater, surface water, drinking water and/or aquatic life at 70 damage sites in every major region of the US.[329] Fourteen of the 15 cases summarized in our comment on the 2007 NODA are examined in these reports. In addition, in these comments we provide information on 37 additional cases and note 10 more sites on the National Priority List that warrant careful examination by EPA for recognition on its damage case list.[330]

As EPA moves to a final rule, it is essential that the Agency consider the 117 sites in the two 2010 reports from EIP, Earthjustice and Sierra Club and the additional sites identified in these comments. We also ask that EPA consider all other sites that it has "rejected" or declared "indeterminate" in order to fulfill its responsibility under the statute to consider damage from coal ash sites.

2. CCR Damage Cases Are Not An Artifact of Past Practices

An examination of the 137 damage cases shows that 85 percent of the cases involving wet storage or disposal are occurring at operating surface impoundments and 62 percent of the cases involving dry disposal are occurring at operating landfills.[331] Rather than being an artifact of past practices, damage is an ongoing reality at operating units, both new and old. Some 121 power plants, one-fourth of the 495 plants identified in EPA's Regulatory Impact Analysis, are involved in these damage cases.[332] The conditions that spawned these damage cases—mismanagement of coal ash in unlined or inadequately lined

[327] *In Harm's Way*, at 128–29, 145–49.
[328] *2007 EPA Damage Case Assessment*, at 60.
[329] *See* EIP Reports, *Out of Control and In Harm's Way*.
[330] *See* Appendix F_1, at 12 and Attachment B (within App. F_1) *Additional Documented and Potential Damage Cases*, at 16-27.
[331] *See* Appendix F_4, Table A-3.
[332] *See* Appendix F_1, at 2.

landfills, pond and pits—are practices that continue today. Placement of CCR in wetlands, water tables, and unlined gravel pits are unfortunately 21st century disposal practices.[333] Even worse, the absence of monitoring at many of these sites means that there are likely many more CCR-contaminated sites of which regulators and nearby residents are simply unaware.

3. Concentrations of Toxic Contaminants Routinely Exceed Health Standards at CCR Damage Cases

The toxicity found at these damage sites is very high and persistent. Exceedances of MCLs have been measured in shallow groundwater downgradient of the waste for every one of EPA's appendix VIII parameters at these sites.[336] These include antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver, and thallium, all of which are highly toxic and persistent in the contaminated environments at ash sites.[337]

MCL exceedances have been documented most frequently for highly toxic trace elements such as arsenic, cadmium, chromium, lead and selenium.[338] The MCL for total chromium has been exceeded at 20 of the damage cases identified by EPA and environmental groups (hereinafter EPA/EIP damage cases). The MCL for arsenic has been exceeded at 66 sites, almost half of the damage cases, with a maximum value 342 times the MCL. Measured arsenic concentrations have exceeded the MCL by more than 10 times at 26 sites, and have been equal to or greater than 100 times the MCL in downgradient groundwater at 6 sites. These include Michigan City ash ponds and Yard 520 landfill in Indiana, Hatsfield's Ferry landfill and UGI Hunlock ash pond in Pennsylvania, Karns and Weadock landfill in Michigan, and Indian River Burton Island landfill in Delaware. The MCL for lead has been exceeded at 30 sites, one-fifth of all damage cases to date, with a maximum value 179 times the MCL. Lead has exceeded the MCL by more than 10 times at 6 sites. The MCL for selenium has been exceeded at 26 sites with the highest concentration 37 times the MCL. The MCL for cadmium has been exceeded at 28 sites, with a maximum concentration 170 times the MCL, and 10 sites have exceeded the cadmium MCL by more than 10 times.

Other highly toxic but less frequently monitored appendix VIII parameters have exceeded their MCLs by multiple times in groundwater contaminated by CCR. Mercury has exceeding the MCL at four sites by as much as 450 times, antimony has exceeded the MCL at three sites by as much as 52 times, beryllium has exceeded the MCL at four sites by as much as 30 times, thallium has exceeded its MCL at five sites by as much as 8 times, and barium has exceeded the MCL at seven sites by as much as 7 times. Nickel has exceeded its former MCL and current

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[333] Appendix F_1, at 10.
[336] *See* 40 C.F.R. Pt. 261, Appendix VIII.
[337] *See* Appendix F_4, Table 2 and Appendix F_5 for data on exceedances of Appendix VIII metals and other constituents at CCR damage sites
[338] *Id.* All measurements quoted below are contained in the Appendix.

lifetime health advisory (LTHA) of 0.1 mg/L at seven sites by as much as 30 times. The LTHA for silver, another infrequently measured parameter, has been exceeded at two sites.

There are many other contaminants in CCR that leach into the groundwater and surface waters at CCR sites at harmful levels, causing significant damage that has not been sufficiently appreciated due to EPA's focus on exceedances of primary MCLs.[339] Harmful concentrations of boron are a common occurrence at CCR damage sites. Some 33 sites, nearly one-quarter of recognized damage cases, have boron concentrations in groundwater exceeding EPA's Child Health Advisory of 3.0 mg/L. Boron concentrations have exceeded this standard by more than 10 times at 5 sites with the highest concentration, 520 mg/L, exceeding the standard by 173 times. Many more damage sites are exceeding state groundwater standards for boron with values as high as0.315 mg/L in North Carolina, 0.90 mg/L in Wisconsin, 1.0 mg/L in Minnesota, 1.4 mg/L in Florida and Nevada, and 2 mg/L in Illinois.

Molybdenum has exceeded EPA's LTHA at nine damage sites with six of those exceeding the standard by more then 10 times and the highest concentration, 22 mg/L, exceeding the standard by 550 times. More sites would likely be exceeding this standard if more states required monitoring for this parameter. Other metals exceeding their LTHAs include strontium and zinc each at four sites and copper exceeding EPA's Action Level at one site.

High sodium levels are commonly found in CCR leachate. The EPA's health-based Drinking Water Advisory (DWA) for sodium of 20 mg/L, set to protect people on saltrestricted diets, has been exceeded in contaminated groundwater at seven sites with concentrations more than 10 times this standard at every site and a maximum recorded value of 40,000 mg/L, which is 2,000 times the standard. Sodium would also likely be found at many more sites if monitoring was routinely required for this metal.

Very few states require monitoring for radioactivity at CCR sites despite elevated radioactivity commonly found around sites where large volumes of CCR are deposited. Of the three sites in Ohio where alpha particles were monitored, this parameter exceeded the MCL of 15 pCi/L at all three, with the maximum concentration, 1,497 pCi/L, exceeding the standard by almost 100 times.

Although no federal standards have been set for cobalt and vanadium and most sites are not monitored for these metals, these constituents have exceeded groundwater standards set by several states at CCR-contaminated sites. Health-based standards established by Florida and Minnesota for vanadium have been exceeded at four sites, and the residential Protective Concentration Level (PCL) for cobalt in Texas has been exceeded at one site in that state.

Sites with high manganese and sulfates are only identified by EPA as exceeding non-health-based Secondary Maximum Contaminant Levels (SMCL) when, in actuality, the groundwater may have been contaminated by CCR with concentrations of these parameters that render it toxic for human or livestock consumption and that far exceed human health-based standards. The LTHA for manganese,0.3 mg/L, has been exceeded at 31 sites examined by EIP. These exceedances are often significant. Manganese exceeded the LTHA by more than 10 times

[339] *Id.* Measurements quoted for specific sites are contained in Appendix F_5.

in at least 11 of those sites, with a maximum concentration 333 times the LTHA. The maximum concentration of sulfate, 56,000 mg/L, exceeds EPA's health-based DWA of 0.5 mg/L by 112 times. EIP found this standard exceeded at 31 damage sites with at least three sites exceeding the DWA by more than 10 times. If EPA's assessments would divulge the concentrations of sulfate and manganese measured, the numbers of damage sites exceeding these health-based standards would be notably higher.

4. The Migration of Contaminants from CCR Sites Pose Grave Threats to Drinking Water and Surface Water Sources.

The contamination from many CCR sites is moving, posing far greater threats to human health and the environment than federal decision makers may have appreciated. Rather than merely contaminating underlying groundwater, the contamination from many of these sites is traveling offsite and moving farther away from the disposal area than EPA's assessment of damage cases indicates. EPA has identified only two sites where migration of contaminants moved a significant distance in groundwater from the waste boundary, traveling 250 feet from the landfill at the Port Washington Plant in Wisconsin and 400 feet from the waste boundary of the Miamiview Landfill in Ohio. In contrast, public interest groups have identified 22 coal ash sites where contamination has traveled from 200 feet to 1 mile in groundwater beyond the waste boundary. Due to the rarity of off-site monitoring at coal ash disposal sites as well as the vulnerable geologic settings (e.g. karst geology) at many sites, there are undoubtedly many more sites where dangerous migration of contamination remains undetected.

Examples of off-site migration documented by EIP include:[340]

- At the Flint Creek CCW landfill in Arkansas, a 2009 groundwater assessment found selenium at 3 times the MCL, sulfate at 8 times the SMCL and 4 times EPA's health-based Drinking Water Advisory (DWA), and TDS at 5 times the SMCL in a monitoring well 360 feet downgradient from the landfill. A leachate seep discharges beyond the landfill into a stream that drains into unmonitored ash ponds which discharge off-site to a recreational reservoir without limits or monitoring of ash metals. Selenium was up to 8.4 times the MCL, chromium up to 3.4 times the MCL, boron up to 4 times EPA's Child Health Advisory, sulfate up to 4.5 times the DWA and TDS up to 7.4 times the SMCL in samples of this seep collected from 2007 to 2010.

- At the Venice Plant in Illinois, a contaminant plume with measured concentrations of arsenic up to 38 times the MCL extends off-site some 400 feet beyond the boundary of closed ash ponds.

- At the Sheldon Plant in Nebraska, two wells 400 feet downgradient of a closed, clay-lined coal ash landfill at the property line have measured steadily rising selenium and sulfate concentrations up to 1.5 times the MCL for selenium and 1.4 times the SMCL for sulfate as of 2008.

[340] *See Out of Control; In Harm's Way.*

- At the Gavin Plant in Ohio underlying groundwater is contaminated with alpha activity, arsenic, barium, cadmium, lead and molybdenum, all exceeding MCLs by several to as much 99 times for alpha activity. Molybdenum has been measured exceeding the EPA's Lifetime Health Advisory (LTHA) by 2.5 times, manganese and chloride nearly twice the SMCL, and TDS 3 times the SMCL in an off-site downgradient groundwater monitoring well 700 feet south of the waste boundary.

- At the Spurlock Plant in Kentucky, arsenic levels have consistently exceeded the MCL since 2005, reaching as high as16 times the MCL in 2009 in samples from a monitoring well some 750 feet downgradient of the CCW landfill.

- At the Northeastern Plant in Oklahoma, a contaminant plume moving rapidly offsite from a coal ash landfill exceeds the MCLs for arsenic and lead by more than 9 times and chromium by more than two times 900 feet beyond the boundary of the landfill. Closer to the landfill, selenium has been measured at up to 1.85 mg/L, 37 times the MCL and nearly twice the toxicity characteristic, barium measured at more 4 times the MCL, thallium exceeding the MCL and average vanadium concentrations 5 to 8 times over state health standards set by Minnesota and Florida. All concentrations were measured in sampling from 2005 to the present day.

- At the Boardman Plant in Oregon, vanadium has been rising since the 1990s in wells monitoring a coal ash fill, reaching 0.126 mg/L, 2.5 times state health standards, in 2006 in a well 1,500 feet downgradient of the fill.

- At the Hatfield's Ferry Plant coal ash landfill in Pennsylvania, total arsenic has been measured at 342 times the MCL, and boron and molybdenum have been measured at 5 times and 33 times their LTHAs, respectively, in contaminated groundwater 1,500 feet downgradient of the landfill.

- At the Dolet Hills Plant in Louisiana, TDS and sulfate concentrations have reached levels more than four times higher than their SMCLs and more than twice the health based DWA for sulfate in a contaminant plume one half mile (2,640 feet) downgradient of bottom ash ponds. Metals have not been normally sampled at the plant's CCW sites which have operated since at least 1986, but 2009 sampling found arsenic and lead exceeding their MCLs and selenium exceeding its MCL by more than 3 times in wells closer to the waste units.

- At the Seminole Plant in Florida, groundwater at the property line, one mile (5,280 feet) downgradient of an unlined FGD sludge landfill, had a chloride concentration of 590 mg/L (twice the SMCL), a sulfate concentration of 780 mg/L (3.1 times the SMCL and more than 1.5 times the health-based DWA), a TDS concentration of 3,100 mg/L (6.2 times the SMCL), a boron concentration of 4 mg/L (exceeding the EPA Child Health Advisory and 2.9 times the Florida standard), and 12 mg/L of iron (40 times the SMCL). The source of this plume was unmistakably the FGD landfill, where the shallow underlying groundwater in the same round of sampling had a chloride concentration of 21,000 mg/L, a sulfate concentration of 1,100 mg/L, a TDS concentration of 59,000 mg/L, a boron concentration of 344 mg/L, and an iron concentration of 29 mg/L.

EIP has documented contamination that has traveled at least 1,000 feet if not substantially further from the waste boundary at eight sites. These include the Boardman Plant ash disposal area in Oregon, Hatsfield's Ferry Ash Landfill and the Bruce Mansfield Little Blue Impoundment in Pennsylvania, the Industrial Excess Landfill in Ohio, the Lincoln Quarry Ash Landfill in Illinois, the Dolet Hills Ash Ponds in Louisiana, Seminole Flue Gas Desulfurization Landfill in Florida, and the Colstrip Ash Ponds in Montana.

5. State Regulatory Responses Have Been Inadequate.

State regulatory agencies have done little to respond to contamination from CCR disposal sites. Repeated evidence of contamination at monitoring points rarely results in any action beyond assessment monitoring to address the problem. For example, of 35 sites that contaminated groundwater in the In Harms Way Report,[341] monitoring data clearly indicate the contamination was moving offsite at 29 of the sites. In other words, the farthest downgradient well before the property line was found to be contaminated over baseline concentrations and relevant standards at these 29 sites. States had required assessment monitoring in onsite wells in response to increases in contamination at 18 of the sites. Off-site monitoring had only occurred at 8 sites (and this was not required in most of these instances, but done voluntarily by the utilities). Efforts to investigate the source or determine the extent of contamination have only occurred at four sites. At no site has the contamination been halted or remediated.

Even when people are likely to be in harms way, state agencies routinely fail to take action to halt or clean up contamination from CCR disposal sites. At 15 of the 35 sites referred to above, state and county well records indicate at least five private residential (drinking water) wells are within two miles of the site. At 13 of those sites, wells are located in the direction that contamination is moving. These include the Joliet #9 site in Illinois, the Cardinal, Gavin, Muskingum and Uniontown (a.k.a., Industrial Excess Landfill) sites in Ohio, the Northeastern site in Oklahoma, the Fayette site in Texas, the Flint Creek site in Arkansas, the Lansing site in Iowa, the Big Stone site in South Dakota, the Bruce Mansfield and Hatfield's Ferry sites in Pennsylvania, and the Rodemacher site in Louisiana. All of these sites except for Muskingum and Uniontown are also within five miles of at least one downgradient public water supply well with a much higher pumping capacity. Among these cases, state agencies have sampled off-site drinking water wells only at the Uniontown and Bruce Mansfield sites. Contamination of numerous wells has been documented at both of them.

Even after contamination is found in off-site drinking water wells, the following examples illustrate that regulators have taken decades to act and done little to halt the contamination or stop further human exposure until it is too late:

- At the Industrial Excess Landfill in Uniontown, dozens of residential wells were contaminated by the use of at least one million tons of industrial coal ash in a sand and gravel quarry where solvents and other industrial wastes were disposed in the 1960s and 70s before the site was closed and eventually became a Superfund NPL site in 1986. Court documents establish that coal ash was the only metal-laden waste dumped at this

[341] *In Harm's Way.* Executive Summary..

site that could be the source of antimony at 52 times the MCL, beryllium at 30 times the MCL, cadmium at 53 times the MCL, lead at 46 times the MCL, chromium at 17 times the MCL, arsenic at 13 times the MCL, thallium at 6.5 times the MCL and nickel at 22 times its former MCL in residential wells and monitoring wells. In 1987 USEPA required 100 homes west of the site to be provided with free public water. Yet despite the OH EPA's assertion that metal concentrations were rising in contaminant plumes from the site in the mid 1990s, USEPA determined that this cleanup remedy was complete in 2005 without remediating contamination flowing from the landfill to the north and south into neighborhoods. Wells as much as 1,000 feet offsite to the north have had exceedances of MCLs for cadmium, chromium, lead, selenium, and thallium in samples collected from 1997 to 2001. Yet 19 monitoring wells were decommissioned in 2004, including 8 where exceedances have occurred in residential areas not provided with public water. In fact, analysis for metals was stopped at all remaining monitoring wells in 2004. Residents in these areas who cannot afford a hook-up fee continue to use private wells and face potentially daily exposure to high levels of toxic metals. Since the early 1990s, high cancer incidence has been reported in neighborhoods immediately to the southwest, west and northeast of the landfill.[342]

- At the Bruce Mansfield's massive unlined Little Blue Surface Impoundment, multiple drinking water wells have been contaminated with cadmium up to 170 times the MCL, lead 120 times the MCL, barium 3 times the MCL, arsenic up to 2.5 times the MCL, and other constituents such as boron, chloride, fluoride, sulfate, manganese, and aluminum exceeding secondary MCLs and Health Advisories. Pennsylvania Department of Environmental Protection (PADEP) and First Energy entered into a settlement agreement in 1994 to address groundwater contamination. Since then, PADEP has issued two Notices of Violations (NOVs) for fugitive dust and required resampling of 10 wells with elevated arsenic. In addition, PADEP permitted an increase in the height of the dam for the impoundment in 2006 to accommodate more fly ash and scrubber sludge from the Bruce Mansfield Plant. The resulting increase in ash water height has increased head (downward) pressure, pushing the groundwater contamination farther offsite and resulting in levels of arsenic, antimony, hexavalent chromium, lead, boron, cadmium, thallium, selenium, and other constituents in off-site springs and seeps in excess of Pennsylvania's water quality standards. At least 22 private wells have now been contaminated above MCLs, SMCLs, and health advisories, and many of the affected homes have been purchased by First Energy. To date, PADEP has not required a remediation plan or assessed penalties.[343]

- Since 1962, Midwest Generation has dumped bottom ash and boiler slag from its Joliet 9 and Joliet 29 Power Plants into an unlined ash landfill in the Lincoln Quarry in Joliet, Illinois. Despite the existence of 94 wells within a mile of the Landfill in a setting described by Illinois Environmental Protection Agency (IEPA) as "an area with very high geologic vulnerability and a high potential for potable well contamination," in 1996 IEPA exempted the landfill from complying with Illinois Class 1 Groundwater Protection Standards as long as it maintained a pumping operation to keep groundwater from

[342] *In Harm's Way*, at133–43.
[343] *Id*. at 161–73.

leaving the landfill. The exemption applied relaxed standards for cadmium, boron, selenium, and molybdenum in groundwater onsite that allowed cadmium levels up to 52 times the MCL in this groundwater. The landfill failed to maintain the inward gradient, however. Contaminated groundwater began flowing north, west and south out of the Main Quarry as noted in the summer of 2002 by IEPA staff and admitted by Midwest Generation in October of 2005. In April 2006, Midwest Energy sampled wells to the south of the landfill for boron only and found them contaminated with boron up to 1.5 mg/L, which is far above natural levels but does not exceed the Illinois groundwater standard of 2.0 mg/L. The results indicated contamination had spread as much as 1,000 feet to the south of the Landfill and led Midwest to buy out or drill deeper wells for 18 residences. Monitoring data had documented levels of arsenic up to 10 times the MCL, boron up to five times the state standard and more than 3 times EPA's Child Health Advisory, molybdenum up to 70 times the LTHA, and dozens of additional exceedances of IL groundwater quality standards (AGQS) for copper, barium, sulfate TDS, pH, ammonia, chloride, nitrate, sodium and fluoride in monitoring wells on the perimeter of the landfill from 2007 to 2009. IEPA finally prepared a draft NOV in August 2009 for some 50 of the exceedances of AGQS, but never sent the NOV to Midwest Energy. The state has conducted very little, if any, off-site sampling, leaving this task to the discretion of the utility. Thus, IEPA has taken no enforcement actions or other significant steps to address the substantive contamination that has been flowing offsite in violation of this CCW landfill's operating permit for many years.[344]

- Twelve Wells in the hamlet of East Mount Carmel, Indiana that supply drinking water to a bait shop, a church and ten trailer homes have been contaminated with boron up to twice the USEPA Child HA, manganese 34 times the SMCL and 6 times the LTHA, iron 23 times the SMCL, and sulfate and TDS nearly twice their SMCLs. The contamination is from unlined ash ponds 500-600 feet away on property of Duke Energy's 3,000 megawatt Gibson Power Plant. Sodium levels in the wells have been as high as 347 mg/L in the semipublic well of the church, used by many residents. This is 17 times higher than EPA's health-based Drinking Water Advisory for ingestion of sodium by individuals on a salt-restricted diet. Regularly monitored groundwater nearer the ponds on the plant property has arsenic levels up to 7 times higher than the MCL and selenium levels exceeding the MCL. Discharges from the ash ponds have also contaminated Gibson's 3,400 acre cooling lake with selenium up to 0.013 mg/L, nearly three times the federal surface water quality standard or Criterion Continuous Concentration, forcing a ban on fishing in this once popular fishing lake. In turn, discharges from the cooling water lake to the Cane Ridge Wildlife Area, a unit of the Patoka River National Wildlife Refuge, contaminated the water, soil and biota with selenium levels that posed a high hazard to wildlife. This forced the US Fish and Wildlife Service to drain and remediate the contamination through discing of a wetland nesting area used by the federally endangered Least Tern. Fish whole body selenium levels in the wetland were 9-30 ug/g.[345] The safe dietary level of selenium for wildlife is 3.0 ug/g.[346] Least Tern eggs

[344] *Id*. at 41–47
[345] USFWS, Briefing Statement: Duke Energy's Gibson Lake Selenium Contamination – Ramifications for Cane Ridge and Interior Least Terns (May 28, 2008).

gathered at the site in 1996 and 2004 contained 3.53-5.48 ug/g of selenium with levels rising over time and hatchling mortality was high.[347] In 2010, Duke provided a public water line to residents in East Mt. Carmel and assisted the USFWS in restoring the selenium damaged wetland in 2008. Yet Duke has refused to provide water to residents who live near East Mt. Carmel north of the ponds who are complaining about the taste and smell of their water. The Indiana Department of Environmental Management has declined to take any enforcement action, conduct any sampling or otherwise require any remedial steps to address the contamination of private wells near the site or the selenium contamination in the Cane Ridge Wildlife Area. There have been at least two residents with kidney illnesses and complaints of other ailments from residents of the ten trailers in East Mt. Carmel who are also blanketed regularly with coal ash dust blowing from the near full ash ponds in the summer.[348]

- In Colstrip, Montana, a groundwater contaminant plume from two evaporation ponds (the closed Stage I and still active Stage II Ponds) of the Colstrip Power Plant contaminated private wells in a subdivision. It also contaminated the well for a local Moose Lodge 1,000 feet away. This well had concentrations of boron at 20 mg/L, more than six times the EPA Child HA, sulfate at 6,000 mg/L, twelve times the EPA health-based DWA, and TDS at 9,500 mg/L, nineteen times the SMCL. Owners of the plant knew that they were contaminating peoples' wells in the 1980s, but did not make this information publicly available until they were forced to replace the Moose Lodge Well in 1998. Residents, a number of whom who were made ill from drinking water from the Moose Lodge well, filed a lawsuit against the Power Plant in 2003. In 2008 the owners of the Plant (PPL Montana) settled with 57 Colstrip residents for $25 million in damages. Another contaminant plume from the Effluent Holding Pond (EHP) for Plant Units 3 and 4 has now traveled a mile to the south contaminating private property that has since been purchased by PPL Montana and also migrated far to the west. Ranchers who own these lands filed a suit in 2007 over the damages from the contamination. In February 2010, 22 years after the contamination of drinking water wells by CCW had become had become a demoralizing public health issue in Colstrip, the Montana Department of Environmental Quality (MDEQ) proposed an Administrative Order on Consent (AOC) with PPL Montana to address the problem. The AOC will remediate CCW contamination at the main plant site, the Stage I and II ponds, the Units 3 and 4 EHP and any leaks or spills in the attendant pipelines between these units. However, with compliance boundaries and timeframes for compliance with remediation objectives unclear, citizens fear the AOC could allow Colstrip's operators to continue to discharge from all three sites indefinitely instead of fixing the ponds and complying with the "closed loop" permit originally approved for the plant. In the meantime, the Montana Legislature enacted a law in

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[346] Lemly, A.D. 1993. Guidelines for Evaluating Selenium Data from Aquatic Monitoring and Assessment Studies. *Environmental Monitoring and Assessment* (28):83-100.
[347] USFWS, Briefing Statement: Duke Energy's Gibson Lake Selenium Contamination – Ramifications for Cane Ridge and Interior Least Terns (May 28, 2008).
[348] *Out of Control,* at 19–22; *and* 2010 discussions of EIP staff with East Mt. Carmel residents.
[353] *Id*. at 31–36.

2007/2008 that prevents the MDEQ from enacting any regulations setting standards for CCW from any new coal plants that might be built in Montana.[353]

Despite the substantial and well-documented offsite damage to communities at these five sites, it is notable that not one of them is identified as a proven or potential damage case by EPA.[354] Based on past experience, state agencies are not able to protect public health and the environment with respect to CCR disposal. Strong federal regulations are critical to keep CCR out of drinking water and surface waters, and ensure the safe disposal of CCR.

E. Safe disposal requirements are technologically feasible and practical

Fortunately, there are alternatives to the current methods of disposal responsible for the damage detailed above. 42 U.S.C. §§ 6982(n)(5) directs EPA to study alternatives to current disposal methods, and these factors also compel subtitle C regulation of CCRs.

1. Safe disposal methods are available and technically feasible

EPA admits that improved disposal management practices, such as the installation of liners and groundwater monitoring, are indeed practical for CCR disposal.[355] In fact, the disposal practices that EPA requires in its subtitle C option are similar to the requirements under subtitle D for municipal solid waste landfills, which have been in effect since 1991.[356] The design standards for municipal solid waste landfills, like EPA's proposed subtitle C rule, require the use of a composite liner,[357] leachate collection system,[358]groundwater monitoring,[359] run-on/runoff control system,[360] fugitive dust control[361] and final impermeable cap.[362] Operating standards for municipal solid waste landfills are also similar to the proposed subtitle C requirements and include location restrictions,[363]corrective action,[364]and closure requirements.[365] No new technologies need to be developed to satisfy the requirement for installation of these basic landfill controls. Existing technologies have been in use for decades, and can easily be put to use in the CCR context. For the last ten years they have been applied to the much larger waste stream of municipal solid waste, which, at 253 million tons per year, dwarfs the CCR waste

[354] *See* 75 Fed. Reg. 35,128, 35,234–35,239 (June 21, 2010).
[355] 2010 Proposed Rule, at 75 Fed. Reg. at 35,156.
[356] *See* Criteria for Municipal Solid Waste Landfills, 56 Fed. Reg. 51,016 (Oct. 9, 1991) (codified at 40 C.F.R. Pt. 258).
[357] 40 C.F.R. § 258.40
[358] *Id.*
[359] 40 C.F.R. § 258.51.
[360] 40 C.F.R. § 258.26.
[361] 40 C.F.R. § 258.24.
[362] 40 C.F.R. § 258.60
[363] 40 C.F.R. §§ 258.10–16.
[364] 40 C.F.R. § 258.58.
[365] 40 C.F.R. § 258.60.

stream.[366] Furthermore, EPA estimates that there were roughly 2,300 municipal solid waste landfills in operation in 2000, a much larger universe of units on which to impose safeguards and permitting requirements.[367] In fact, in a few states that already require basic safeguards for CCR disposal, technologies such as liners, leachate collection systems, and groundwater monitoring have been applied successfully and without undue economic burden to the regulated industry or the state regulatory program.[368]

2. The Capacity of Existing Subtitle C Landfills Is Not Relevant

While it is clear that there are commonplace disposal solution (*e.g.* composite liners etc.) that would allow industry to comply with EPA's proposed subtitle C rule, industry spreads confusion by arguing that subtitle C landfilling is not a viable alternative to current methods of disposal. Specifically, the argument is that subtitle C landfill capacity is too limited to handle the disposal of large volumes of coal ash. While subtitle C hazardous waste landfill capacity is indeed limited, it is not the case that industry will have to send CCR to existing subtitle C facilities. There is no reason to believe that utilities will choose the expensive option of disposal in commercial subtitle C landfills when much less expensive disposal and reuse options will be available to them under the proposed regulations. EPA already has come to the obvious conclusion that a subtitle C rule will not shift disposal patterns in a way that substantially increases the disposal of CCR in offsite commercial facilities.[369] EPA assumes, no doubt correctly, that landfills currently receiving CCRs will obtain interim status and subtitle C permits.

Certainly, the long lead-in time afforded by the proposed subtitle C rule will provide ample time for industry and state permitting authorities to adequately provide needed capacity on site or nearby.[370] Generally, after EPA lists a new hazardous waste, surface impoundments brought into the subtitle C program must retrofit or close within four years.[371] EPA's proposed rules for CCR offer an even more generous (and unnecessarily long)[372]grace period of seven years. The proposed rules allow existing CCR surface impoundments to continue receiving CCR waste for five years after the proposed regulations take effect, and they authorize an additional two years before closure.[373] EPA has emphasized that this grace period is sufficient to "close out existing units, *and find or put in place new disposal capacity for these wastes*.[374]

Moreover, as a practical matter, the grace period will extend even longer than seven years because the realities of the state authorization process under RCRA will likely extend the compliance date. While federal regulations become effective six months after adoption,

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[366] *See* EPA, Summary of the Municipal Solid Waste Program, http://www.epa.gov/reg3wcmd/solidwastesummary.htm. However, the tonnage managed in landfills may be roughly the same, given the high recycling and combustion rates for MSW.
[367] *See* Final Rule, Nonwastewaters From Productions of Dyes, Pigments, and Food, Drug, and Cosmetic Colorants, 70 Fed. Reg. 9144, 9146, *available at* http://www.epa.gov/wastes/laws-regs/state/revision/frs/fr206.pdf.
[368] *See*, *e.g.*, the Wisconsin Department of Natural Resources coal combustion waste regulatory program.
[369] 2010 Proposed Rule, 75 Fed. Reg. 35,138.
[370] *Id.*
[371] *See id*. at 35,177; *see also* RCRA § 3005(j); 42 U.S.C. § 6925(j).
[372] *See* Appendix N.
[373] *See* 2010 Proposed Rule, at 35,176–77.
[374] *Id*. at 35,178 (emphasis added).

authorized states must go through the often lengthy process of adopting the regulations in order to implement them.[375] EPA estimates it will take an additional two to eight years for state regulations to become effective.[376] Thus, using a middle-of-the-road estimate that it will generally take about five years for state regulations to become effective, utilities will have *more than ten years* to continue disposing of CCR at existing surface impoundments. For instance, if EPA finalizes the RCRA rule for CCR in 2012, utilities could continue using existing CCR surface impoundments until *2022*. In other words, utilities would not be required to dispose of *any* waste at offsite or onsite landfills of any kind for a decade. Ten years is more than enough time for utilities to find or construct alternatives to existing subtitle C disposal facilities. Industry itself recognizes that compliance with new closure requirements is achievable within ten years.[377]

The proposed rules provide even greater concessions for the continued use of existing CCR landfills. Once the new regulations take effect, newly constructed or expanded CCR landfills will have to comply with new liner and leachate collection and removal requirements.[378] Existing landfills, however, are exempt under the proposed regulations.[379] Indeed, existing CCR landfills are authorized to continue receiving CCRs in perpetuity, subject to minimal requirements such as groundwater monitoring.[380] Utilities can therefore continue using grandfathered CCR landfills for the foreseeable future in lieu of subtitle C facilities.

Notably, the majority of utilities currently dispose of CCR waste in on-site landfills.[381] If utilities were to construct or expand on-site landfills, this would obviate the need to rely on off-site subtitle C facilities. For example, under the proposed regulations, utilities could create new on-site landfill capacity in conformance with new standards once existing capacity is reached. Utilities have made no showing that it would be difficult or impractical to rely on new or expanded on-site facilities.

Finally, the subtitle C regulations will lessen the volume of CCR waste that will require disposal. CCR waste can provide an affordable and effective substitute for a variety of materials.[382] By requiring CCR wastes to be disposed in a safer, more protective manner, disposal costs will increase, and this will prompt generators to take greater advantage of re-use

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[375] *See* 2010 Proposed Rule, 75 Fed.Reg. at 35,179, 35,188. Only Iowa and Alaska are not authorized to run RCRA programs.
[376] *See id*. at 35,179.
[377] *See id*. at 35,178 ("USWAG has argued strenuously against a closure requirement in the first place, and has asserted that, if such a requirement were imposed, industry would require ten years to comply."); *see also* EOP Group, Inc., 2009, *Cost Estimates for the Mandatory Closure of Surface Impoundments Used for the Management of Coal Combustion Byproducts at Coal-Fired Electric Utilities* (2009), at 3 ("[I]t is unreasonable to assume that the mandatory closure of all CCB surface impoundments could occur any faster than within ten years of promulgation of a mandatory closure rule.")
[378] *See* 2010 Proposed Rule, 75 Fed.Reg. at 35,175.
[379] *See id*.
[380] *See id.* (providing that existing CCR landfills may continue receiving CCR waste but must meet groundwater monitoring, corrective action, and other subtitle C requirements).
[381] *See 2010 RIA*, at 4.
[382] *See, e.g., id.* at 149.

opportunities.[383] The anticipated increase in re-use, and the corresponding decrease in disposal, is consistent with EPA's findings as well as its experience with other hazardous materials.[384]

EPA should not allow unsafe practices to continue based on the false premise that CCRs might overwhelm the capacity of existing subtitle C hazardous waste landfills. Existing subtitle C landfills are not the only option for CCR waste disposal in the short-term or the long-term. The utility industry's argument that a subtitle C listing of CCR waste would create a crisis due to inadequate hazardous waste landfill capacity is simply wrong. Accordingly, this issue is a red herring and should not affect EPA's decision to finalize the proposed regulation of CCR as a special waste under subtitle C of RCRA.

F. Analysis of the Costs of Responsible Disposal Confirms the Regulation under Subtitle C is Necessary and Appropriate

The costs of responsible CCR disposal are in no way prohibitive. The RIA estimates that the engineering controls, land disposal restrictions, and ancillary requirements associated with federally enforceable Subtitle C standards would cost $1,474 million per year on an annualized basis. The electric power industry can easily absorb these modest expenditures, which will be distributed among nearly 500 facilities, and account for about 1% or less of the industry's annual operating cost. And even if all of these expenses are passed along to consumers, the effect on electricity rates would be negligible.

Some power companies already face significant liability for the cleanup of CCR sites that are already badly contaminated, or will be in the near future. As EPA has recognized, those liabilities are unavoidable and ought not to be charged to the rule, which is primarily designed to keep CCR damage from spreading even further. For that reason, it is far more important to accurately account for the benefits that would result from the relatively small investment in prevention and cleanup that Schedule C standards would require. Each of these points is explained further below.

1. Subtitle C proposal would have a negligible impact on operating revenues, electricity prices, or availability of power

Coal-fired generation accounts for about 45% of US electricity generation, and has actually increased nearly 9% (more than any other source) in the 12 months ending in August of 2010, compared to the year ending in August of 2009.[385] Operating costs for investor-owned power plants exceeded $267 billion in 2008, according to the latest data available from the US Department of Energy. [386] Coal plant operating costs could approach $120 billion, assuming

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[383] *See id.* at 157 ("In fact, EPA concludes that the increased costs of disposal of CCR under subtitle C of RCRA . . . will actually increase their usage in non-regulated beneficial uses, simply as a result of the economics of supply and demand.").
[384] *See id*. S*ee also* 2010 Proposed Rule, 75 Fed.Reg. at 35,215.
[385] Energy Info. Admin., U.S. Dep't of Energy, Electric Power Monthly, Executive Summary (Nov. 2010), *available at* http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html.
[386] Energy Info. Admin., U.S. Dep't of Energy, Revenue and Expense Statistics for Major Investor-owned Utilities, (Jan. 2010), *available at* http://www.eia.doe.gov/cneaf/electricity/epa/epat8p1.html.

they are proportionate to their share of total generation. In that case, spending $1.5 billion to prevent spills and groundwater contamination would amount to a little over 1% of total operating costs for the sector, and that estimate is conservative, as it does not include operating costs for publicly owned plants also subject to the rule. Even if coal plant operating costs are slightly lower, the rule would add little to what is already a very large base, and could be recovered from customers with little impact on rates (see below).

These costs will certainly vary by plant, e.g., generators with large surface impoundments that must be dewatered and closed will pay more than those with secure dry landfills that could remain open under EPA's Schedule C proposal. But operators sitting on large ash ponds have already reaped the benefit of this cheaper disposal option, so it is not unreasonable to expect them to bear a greater share of regulatory costs today.

The estimated cost of the rule will have only a minimal impact on electricity rates, even in regions that are more dependent on coal-fired power plants. The attached analysis by the Monitor Group of the likely impact of EPA's Schedule C proposal found that even if *all* regulatory costs were passed through to consumers, electricity rates would rise between one half and one percent in the first year in coal-dependent states like Indiana, Ohio, Colorado, Tennessee, Wisconsin, Minnesota, and Pennsylvania, and even less in other regions.[387] That one –time adjustment amounts to less than a dollar per month per household, and is much less than the average rate increase of 3% in electricity prices over the past decade, and the even higher increases that have occurred more recently.

Not surprisingly, given these minimal impacts on operating cost and price, the CCR disposal methods required by subtitle C would not affect reliability of the U.S. electrical grid. As noted elsewhere in our comments, a report issued by the North American Electric Reliability Corp. (NERC) specifically assessed the extent to which a subtitle C rule would force retirements of existing plants.[388] Even under NERC's worst-case analysis, less than 0.4 gigawatts would be likely to retire.[389] In fact, NERC concludes that unless disposal costs are forced up to $1000 per ton and above, there would be little impact from EPA's regulation of coal ash disposal.[390] Since hazardous waste disposal costs are currently about $70 per ton, it is extremely unlikely that coal ash disposal, which requires fewer safeguards than hazardous waste disposal, could approach even $100 per ton.

2. Cleanup costs are unavoidable

Following the TVA Kingston spill in December of 2008, EPA evaluated CCR surface impoundments, and found that at least 49 of these had a "high hazard potential," which means

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[387] *See* attached Power Point from Monitor Group, Impact of Regulation on Coal Combustion Waste: Summary of Review and Analysis 6 (Sept. 23, 2010) (estimating a higher cost for Schedule C regulation prior to publication of proposal, but including some costs that electric generators have either already absorbed, or will incur in the future even in the absence of a new federal standard) (Attachment 13).
[388] North American Energy Reliability Corp., *2010 Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulations* (Oct. 2010).
[389] *Id*. at 21.
[390] *Id*. at 22.

that a structural failure would likely cause loss of human life.[391] While a hazard potential rating does not measure the actual condition of the impoundment, the structural integrity of 22 of 37 impoundments recently inspected by EPA earned a "fair" or "poor" rating.[392] As noted in the RIA, TVA, Duke Power, and a number of other facilities have recently announced plans to phase out their ash ponds, and other companies are sure to follow.

Dam safety concerns are only one aspect of the problem. The USEPA has identified 67 CCR sites as either "actual" or "potential" damage cases, based on contamination of groundwater or surface water with toxic pollutants like arsenic and selenium. The Environmental Integrity Project, Earthjustice and the Sierra Club have since submitted a detailed analysis, based on monitoring data obtained from state files, which identify 70 additional sites that meet the same criteria EPA used to define damage cases (the information has been submitted to the docket). Many of these sites actually qualify as "open dumps" that are prohibited under federal law, and are therefore must be closed or cleaned up. Federal law defines an open dump as any waste disposal site that poses an unreasonable risk to human health or the environment; under part 257.3-4 of the federal solid waste rules (subtitle D), a leaking landfill or impoundment is an open dump if it elevates arsenic, selenium, and certain other contaminants above primary drinking water standards (MCL's) in an aquifer that is or can be used for drinking water.[393]
At least 40 of the 70 CCR sites examined in the EIP/Earthjustice/Sierra report have exceeded primary MCL's defined in the rule, 24 of those within the last five years (data submitted to the docket). If more up-to-date primary MCL standards were applicable instead, 50 sites would have already triggered the open dumping prohibition, 33 of those in the last five years. States may define an "alternate boundary" based on certain criteria, but our initial research indicates that almost none have done so. It should be noted that this analysis is limited to sites in selected states for which reviewers were able to obtain groundwater monitoring data.

These sites are candidates for closure, if they cannot be cleaned up, based on federal law enacted nearly 30 years ago. While EPA is prohibited from enforcing these requirements, and citizens have lacked the resources to do so, we do not think closure or cleanup costs that would be required to comply with Subpart 257.3-4 ought to be treated as "new" or assigned to EPA's proposed subtitle C option, simply because responsible parties have chosen to ignore the law for nearly three decades.

When estimating the cost of subtitle C regulations, EPA has attempted to exclude "baseline" expenditures, including those for future cleanups that are likely to happen anyway. We support the Agency's analysis, but recommend that EPA go further and determine which sites already violate the open dumping rules and which sites are likely to, then evaluate the likely cost of either closing these sites, or cleaning them up to meet the standards of section 257.3-4. While some of these expenditures may have been anticipated in EPA's analysis, it is not clear

[391] EPA, Fact Sheet: Coal Combustion Residues (CCR) – Surface Impoundments with High Hazard Potential Ratings, (updated Aug. 2009), *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/ccrs-fs/.
[392] EPA, Coal Combustion Residuals Impoundment Assessments Reports, *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm

[393] 42 U.S.C. §§ 6907, 6945; 40 C.F.R. pt. 257.3-4.

that the Agency looked at all pollutants on the Appendix I list in determining either how many sites required cleanup, or the scope of remediation required.

3. The failure to account for benefits

The cost of EPA's proposed subtitle C option is quite low, given that it would prevent catastrophic spills or damage to drinking water aquifers that are certain to accumulate in the absence of federally enforceable standards. But as documented in comments submitted by Frank Ackerman and Liz Stanton of the Stockholm Institute, EPA's Regulatory Impact Analysis falls woefully short of accounting for the benefits of the Subtitle C regulation. These missing benefits, which include non-cancer health effects, natural resource damages, litigation and damage claims, and the replacement of drinking water supplies, are discussed by Ackerman and Stanton, and the discussion below is limited to several additional concerns not included in their review.

Recycling

EPA's Regulatory Impact Analysis monetizes the annual "baseline" benefits of recycling at more than $25 billion a year (Table 5C-5). At the urging of the Office of Management and Budget, EPA has included a scenario in which the "stigma" associated with Subtitle C would allegedly cause these benefits to collapse, which tilts the playing field against the kind of standards needed to protect public health. We agree with EPA's suggestion that responsible recycling is much more likely to expand if disposal costs increase, as they would under Subtitle C regulations, and do not agree there is any reasonable basis for the so-called stigma effect.

The recycling benefits claimed in EPA's RIA are almost entirely illusory, as they assume particulate matter emissions that do not exist or are already being eliminated under Clean Air Act rules, and energy savings for cement kilns and wallboard manufacturers that are completely disproportionate to the actual energy consumed in both sectors. Our proposed corrections are based on data from the USEPA, the Department of Energy, and the US Geological Survey, and are documented in the Ackerman/Stanton study, but we offer the following additional comments here:

- Virtually all of the claimed benefits from recycling accrue from two applications, cement kilns and wallboard manufacturing. As indicated by the attached chart, based on data from the American Coal Ash Association, CCR recycling within these sectors has grown very slowly or not at all since 2001, while lower value land-based applications like structural fills have grown more rapidly. (See Attachment 14.) To the extent that EPA's analysis assumes that all sectors would grow equally but for the "stigma effect" of subtitle C, that is not supported by the historical data.

- The Agency needs to be much clearer about the claimed "raw material" savings that result from CCR substitution in cement and wallboard manufacturing, as well as structural fills, and various land applications that is driving the real growth in CCR recycling markets. For example, Column G of Exhibit 5C-1 suggests that recycling

ash to make clinker saves $80 a ton in raw materials, which seems high for the relatively low cost feedstock that is otherwise used. Synthetic gypsum actually cost slightly more than mined gypsum in 2008,[394] and both cost less than $9 per ton, so the claimed raw material cost savings of $4.50 to $12 a ton in Exhibit 5C-1 are unlikely to be correct. Table 5C-1 of the RIA assumes annual savings of $60 million when CCR is used as road base, or about $40 per ton. But the crushed stone and sand and gravel that is normally used for road base costs less than $10 per ton. [395] Table 5C-1 also estimates that the raw material cost of the aggregate replaced by CCR is also close to $40 per ton, which also seems well above market rates.

Some of the raw material savings in Exhibits 5C-1 and 5C-4 may include avoided transportation costs, but that is not explained in the RIA. And to the extent that reduced transportation costs make the difference, that may limit future opportunities for CCR that is generated too far from potential markets.

Fugitive emissions from coal ash

EPA's subtitle C alternative includes fugitive dust controls and a requirement to cap and close CCR disposal sites. The Agency recognizes that these will likely reduce exposure among workers and nearby communities to particulate matter blown off exposed ash or sludge piles, or stirred up when CCR is transported to and from the disposal site. While only a small fraction of these releases may be comprised of fine particles (PM 2.5), it is important for EPA to monetize the value of reducing even the larger particles that can irritate the lungs and create a public nuisance for those living in proximity to these sites. In addition, EPA should determine the extent to which EPA's rule will reduce exposure to PM2.5, and monetize those benefits, which are valued at $486,312 per ton in Table 5C-5 of the RIA.

The attached table shows 2008 fugitive PM emissions (unspeciated) from CCR transport, storage, disposal, or handing at Texas coal-fired power plants, as reported to the state's emission inventory. (See Attachment 15.) The data may overcount or undercount PM emissions for some facilities, as it is compiled from summary descriptions in the inventory that are not always clear. Reported emissions are based on "normal" operations, and therefore do not include much higher releases that may occur, e.g., during windstorms or very dry weather. But even small reductions in fine particles released from CCR sites could make a big difference to public health, e.g,, a 500 ton reduction nationwide would yield benefits of nearly a quarter of a billion dollars a year. EPA should arrive at a fair value for these and other benefits to public health and the environment that would result from the modest investment required under the subtitle C option.

There is no evidence that the CCR disposal methods required by subtitle C will adversely impact the reliability of the U.S. electric grid. As discussed earlier in this section, a report issued

[394] USGS, Minerals Yearbook: Gypsum, at 33.1, and 33.6, tbl. 1 (Jul. 2010) [Advance Release].
[395] USGS, Minerals Yearbook: Crushed Stone, at 71.1, tbl. 1 (Mar. 2010), *available at* http://minerals.usgs.gov/minerals/pubs/commodity/stone_crushed/myb1-2008-stonc.pdf.;
USGS, Minerals Yearbook: Sand and Gravel (Construction), at 64.4, tbl. 1 (May 2010), *available at* http://minerals.usgs.gov/minerals/pubs/commodity/sand_&_gravel_construction/myb1-2008-sandc.pdf.

by the North American Electric Reliability Corp. (NERC) specifically assessed the extent to which a subtitle C rule would force retirements of existing plants.[396] NERC's conclusions agree with EPA.

G. Analysis of the impact of disposal methods mandated under the proposed subtitle C rule indicates that there will be no adverse impact on the use of coal and other natural resources.

EPA concludes in the preamble that the disposal methods required under both options, subtitle C and D, "are not expected to impact the use of coal or other natural resources."[399] EPA does point out, however, that an increase in beneficial use, which is predicted by EPA under subtitle C, will conserve the natural resources by avoiding the use of virgin materials, such as gypsum, aggregate, and ingredients in Portland cement.[400]

H. The Current and Potential Utilization of Coal Ash Favors Regulation under Subtitle C

A subtitle C designation for coal ash will increase the flow of ash to uses that are genuinely beneficial and prevent sham recycling under the guise of beneficial use. Regulations that require responsible management of coal ash will increase disposal costs and create a powerful incentive for generators to divert as much of the waste stream as possible to beneficial uses. Opting for either of the weaker regulatory options ("D" or "D prime") will dampen this economic incentive considerably. Industry insists that a "special waste" listing under subtitle C will stigmatize coal ash and discourage beneficial use. However, there is no evidence to support the speculative argument that a hazardous waste label, much less a "special waste" label, would prompt market players including consumers to act against their economic (and environmental) interests, particularly if EPA is willing to cooperate with industry to educate the public about the environmental benefits afforded by safe, encapsulated uses. Historically, even when EPA has subjected beneficial uses themselves to regulation — which EPA is not proposing to do here — beneficial use has only increased. There is no reason to believe that beneficial use will diminish under a rule that expressly exempts it from RCRA regulation. To the contrary, effective regulation may be expected to decrease negative public perceptions that arise in response to the serious damage caused by unsafe coal ash disposal and most notably the disastrous TVA Kingston spill.

In any case, EPA cannot reasonably or legally decline to establish the essential safeguards that are needed to address proven threats to human health and the environment in order to accommodate hypothetical concerns about stigma. As Congress made clear, RCRA is intended first and foremost to protect human health and the environment. To the extent it seeks to encourage recycling and reuse, it does so with the express intent of reducing the health and environmental threats posed by waste disposal. In short, safety must trump stigma concerns.

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[396] North American Energy Reliability Corp., *2010 Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulations* (Oct. 2010).
[399] 2010 Proposed Rule, 75 Fed. Reg. at 35156.
[400] *Id.*

1. Beneficial use will continue to increase under subtitle C.

Beneficial use of coal ash has steadily increased over the past decade, and it should increase *at an even greater rate* with the passage of a Subtitle C regulatory determination. For a comprehensive analysis, see Appendix B. There is a well-established demand for coal ash that is put to beneficial use, as evidenced by the annually increasing amount of coal ash that is beneficially used. *See* Table 5 (showing increased in beneficial use in every year for which there is data available). EPA's 1999 Report to Congress[401] revealed that in 1997, only 29,176,482 tons of coal ash were reused.[402] In the intervening 11 years, the amount of coal ash reused has more than doubled. Similarly, the percentage of coal ash generated that was reused climbed from 26.8% in 1997 to 44.53% in 2008.[403]

Looking at only the safe, encapsulated uses of coal ash uses that do not pose actual and potential dangers (*see* Section II.D.d., *supra*), there is an upward trend that should become even more dramatic in the event EPA promulgates a Subtitle C rule for coal ash. For example, use of fly ash in concrete increased by 232,002 short tons between 2001 and 2008. *See* Attachment 15. Consequently, even if RCRA regulation stops the unsafe uses of coal ash that now are counted as beneficial uses, increase in the use of coal ash in truly beneficial applications would be expected to continue based on recent trends.

[401] *1999 Report to Congress v. 1&2.*
[402] *Id.* at 3-36.
[403] *Compare 1999 Report to Congress v. 1&2., to* American Coal Ash Ass'n, 2008 Coal Combustion Product (CCP) Production & Use Survey Report (2008), *available at* http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.

Table 34. Annual Increases in Beneficial Use of Coal Ash 2001 to 2008

YEAR	2001	2002	2003	2004	2005*	2006	2007	2008
COAL ASH REUSED (short tons)	37,119,321	45,523,256	46,384,405	49,089,818	49,612,541	54,203,170	56,039,005	60,593,660
% CHANGE FROM PRIOR YEAR	N/A	22.6	1.9	5.8	1.1	9.3	3.4	8.1
Source: American Coal Ash Ass'n, Coal Combustion Product Production & Use Survey Reports 2001–2008, *available at* http://acaa.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=3.								
*Note: In 2005, no data was reported for any reuse in the "FGD/Other" category, so the total was marked zero, which means this number reflected on this chart is lower than the true total reused and that the percent change from the previous year is likely higher and the percent change to the following year is likely lower.								

Based on regulatory experience, EPA has good reason to predict that beneficial use will increase at a greater and faster rate after promulgation of more stringent regulations under Subtitle C. Since 1980, when EPA first promulgated regulations that listed hazardous wastes pursuant to Section 3001 of RCRA,[404] industry has argued that the stigma of a listing would discourage beneficial reuse, and EPA has properly rejected those unsubstantiated claims. Thus, in the preamble to the final 1980 regulations, EPA stated:

> EPA does not agree with the largely unsubstantiated claims of commenters that controlling the use and recycling of hazardous waste will necessarily discourage *bona fide,* environmentally sound re-use and reclamation activities . . . Commenters' claims about the chilling effect of regulating recycle and re-use activities also seem somewhat exaggerated. In many cases, Federal or State regulation of these activities should legitimatize, not stigmatize, them in the eyes of the public and increase the flow of wastes to well-operated facilities.[405]

EPA's stated position in 1980 has proven correct, as set forth in Appendix N, Comments of Rick Fortuna (detailing percentage increases in waste recycling following EPA regulation).

As EPA explains in the proposed rule, more stringent regulation has spurred increases in reuse for three related reasons: 1) increasing costs of disposal, but not recycling, creates a greater economic incentive for generators to recycle, *i.e.* recycling becomes the cheaper option; 2) "[t]he economic driver—availability of a lowcost, functionally equivalent or often superior substitute

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[404] 42 U.S.C. § 6921.

[405] U.S. EPA, Final Rule: Hazardous Waste Management System: Identification and Listing of Hazardous Waste, 45 Fed. Reg. 33,084, 33,092 (May 19, 1980) (to be codified at 40 C.F.R pt. 261).

for other raw materials—will continue to make [coal ash] an increasingly desirable product; and (3) "material inevitably flows to less regulated applications," which are less burdensome to those deciding the ultimate fate of the materials.[406] Thus, "EPA's experience with the RCRA program indicates that industrial generators of RCRA-regulated wastes are often able to increase recycling and materials recovery rates after a subtitle C regulation."[407] There is no reason for EPA to second-guess its well-founded conclusion in the proposed rule:

> In summary, based on our experiences, we expect that it will be more likely that the increased costs of disposal of CCRs as a result of regulation of CCR disposal under subtitle C would *increase their usage in non-regulated beneficial uses*, simply as a result of the economics of supply and demand.[408]

This dynamic has played out several times over the past thirty years, and there is no evidence to suggest that the basic economic drivers will not be dispositive again the case of CCRs. *See* Appendix N.

a. The stigma argument is unfounded.

While industry argues that a stigma will overwhelm these powerful market forces, all of the available evidence supports EPA's conclusion that stigmatization of beneficial use is unlikely even if coal ash were listed as a "hazardous waste" as opposed to a "special waste." EPA states that:

> EPA's experience suggests that it is unlikely that a material that is not a waste in the first place would be stigmatized, particularly when used in a consolidated form and while continuing to meet long established product specifications. In fact, EPA's experience with past waste regulation, and with how hazardous waste and other hazardous materials subject to regulation under subtitle C are used and recycled, suggests that a hazardous waste ''label'' does not impose a significant barrier to its beneficial use and that non-regulated uses will increase as the costs of disposal increase.[409]

While industry disputes this conclusion, EPA should not give weight to speculative claims that a Subtitle C listing for coal ash when disposed will "stigmatize" safe reuses. There is no evidence that regulation has created any such stigma in the past, that it will create a novel stigma in the case of coal ash, or that any such a stigma would not be effectively addressed through simple incentives and public education.

[406] 2010 Proposed Rule, at 35,185–86.
[407] *Id.* at 35,134.
[408] *Id.* at 35,187 (emphasis added).
[409] *Id.*, at 35,186.

b. There is no historical example to support the stigma argument

There is no historical evidence that stronger regulation of wastes stigmatizes safe reuse; as discussed above reuse *increases* in response to regulation. EPA stated in the preamble that it "does not have sufficient information to conclude that regulation under RCRA subtitle C will stigmatize CCRs destined for beneficial use," and there do not appear to be any examples of stigmatized subtitle C wastes that prove otherwise.[410] For this reason, EPA has requested information on "actual examples" where concerns about stigma effect were born out over time.[411] However, even the American Coal Ash Association (ACAA), "a trade organization devoted to recycling the materials created when we burn coal to generate electricity," that proclaims to have as members the "world's foremost experts on coal ash," cannot produce an example.[412] In a recent letter to EPA, ACAA conceded that: "Unfortunately we cannot find any case history information on this subject."[413]

c. There are counter examples that discredit the stigma argument

While there are no ready examples of stigma as a result of regulation under the RCRA program, there are important counter-examples of the way in which RCRA regulation encourages beneficial use. At the outset, it is worth noting that over 1.78 million tons of hazardous wastes were recycled in the United States in 2007 alone.[414] These wastes include electric arc furnace dust ("EAF" or "steel dust"), electroplating wastewater, chat, used oil, spent enchants, and spent solvents. None of these materials has suffered a diminution in reuse as a result of Subtitle C listing. For example, a high percentage of EAF is recycled precisely *because* it was listed by EPA as a hazardous waste under Subtitle C of RCRA when disposed.[415] As EPA has affirmed, "there is little doubt that without its regulation as a hazardous waste, a significantly greater amount of electric arc further dust would be diverted from recycling to disposal in non-hazardous waste landfills."[416]

EAF, listed as hazardous waste K061, is the byproduct of steel mills captured through air pollution controls. Zinc concentrations in EAF dust are 15–30%, and lead and iron are also major constituents.[417] Nevertheless, EAF has been recycled at a rate of 42–51%,[418] in products

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[410] *Id.*, at 35,159.
[411] *Id.*, at 35,222.
[412] ACAA, http://www.acaa-usa.org/ (last visited Nov. 12, 2010).
[413] Letter from Thomas Adams, Exec. Dir., ACAA, to Mathy Stanislaus, Assistant Administrator, Office of Solid Waste & Emergency Response, EPA, Re: Stigma Studies (Aug. 4, 2009) (EPA-HQ-RCRA-2009-0640-0017).
[414] U.S. EPA, National Biennial RCRA Hazardous Waste Report (Based on 2007 Data), at 2-5 (2007), *available at* http://www.epa.gov/osw/inforesources/data/br07/national07.pdf (click on report).
[415] 2010 Proposed Rule, 75 Fed. Reg. at 35,186.
[416] 2010 Proposed Rule, at 35,186; *see also* Appendix N, Comments of Rich Fortuna.
[417] *See* EPA, *Regulatory Impact Analysis for USEPA's 2007 Supplemental Proposed Revisions to the Industrial Recycling Exclusions of the RCRA Definition of Solid Waste* (EPA-HQ-RCRA-2007-0932-0010.29), at 35 (Jan. 22, 2007).
[418] 2010 Proposed Rule, at 35,186.

ranging from roadbeds to cement.[419] Now, EAF is used so often in a variety of applications that generation has not been able to keep up with increasingly high demand.[420]

In addition to the examples cited by EPA, there are robust recycling markets for many types of electronic wastes containing listed pollutants at high enough quantities to qualify them as hazardous waste when disposed. For example, in 2005, more than 172,000 tons of electronics, consisting of CPUs, cathode ray tubes (CRTs), LCDs, notebook computers, and cell phones, were recycled.[421] Similarly, in 2007, "approximately 414,000 tons of electronics were collected in the US for recycling.[422] These high recycling rates continue despite the fact that some of these electronics contain high levels of heavy metals and are listed as hazardous wastes when disposed. For example, although CRT glass (the video display components in twentieth century televisions) "typically contains enough lead to require managing it as hazardous waste," CRTs are routinely recycled.[423] Also, as discussed below, it is worth noting that the encapsulated use of materials that will be deemed hazardous upon disposal, *i.e.* CRTs, does not discourage consumers from purchasing televisions and other electronics for use in the home.

d. Coal Ash is more likely to be recycled than other subtitle C wastes

Industry argues that coal ash is different from the other subtitle C wastes that are recycled successfully. We agree that coal ash is different but not for the reasons suggested by industry. A Subtitle C listing is *more likely* to encourage recycling of CCRs than other hazardous wastes because so much of CCR is generated every year. The high availability of coal ash and other CCRs will make it cheaper than virgin materials, driving down the costs of recycled products and making them even more attractive to end users. As recycled coal ash products out compete products made with virgin materials, the recycling marker will continue to grow.

Coal ash is the second largest industrial waste stream in the United States.[424] Therefore, it can be potentially "sold" to reuse manufacturers at low lost, for free, or even at a negative cost to reuse manufacturers (i.e., generators would pay reuse companies to take their coal ash for reuse). In contrast, virgin materials typically require mining (as in natural gypsum) or other

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[419] Tech Trak, "A Hungry New Competitor on the EF Dust Recycling Scene," American Metal Market (Mar. 2008), *available at* 49,

[420] *Id.* at 35,186 &n.144.

[421] EPA, *Resource Conservation Challenge Update* 3 (Mar. 2008), *available at* http://www.epa.gov/wastes/rcc/resources/rcc-rpt3.pdf. Other reports by U.S. EPA had estimated that the amount of electronics recycled in 2005 was more than double this amount, placing the estimate at "345,000 to 379,000 tons." EPA, Fact Sheet: Management of Electronic Waste in the United States (Apr. 2007), *available at* http://www.epa.gov/osw/conserve/materials/ecycling/docs/fact7-08.pdf.

[422] EPA, Reuse & Recycle – eCycle, http://www.epa.gov/epawaste/partnerships/plugin/reuse.htm (last visited Nov. 14, 2010).

[423] *See* "Fact Sheet: Management of Electronic Waste in the United States" (EPA530-F-08-014) at 4 (Apr. 2007, rev. July 2008), *available at* http://www.epa.gov/osw/conserve/materials/ecycling/docs/fact7-08.pdf (reporting that "[i]n 2005, approximately 61 percent, or 107,500 tons, of CRT monitors and TVs collected for recycling were exported for remanufacture or refurbishment," meaning that approximately 176,000 tons constituted 100 percent of CRT televisions and monitors collected for recycling).

[424] Testimony of Lisa Evans, Attorney, Earthjustice, Before the Subcomm. on Energy & Mineral Res., Comm. on Natural Res., U.S. House of Representatives (June 10, 2008), *available at* http://www.earthjustice.org/library/legal_docs/evans-testimony-emrsubcom.pdf.

acquisition or extraction costs. This cheaper price of coal ash will incentivize its use and ensure the marketability of the end product. Although utility and reuse industry commenters expressed concern that "stigma would alter consumer preferences thereby decreasing end-users' willingness to pay for products that include CCPs,"[425] the aggressively low cost of the product should overcome this concern if it exists.

e. No stigma attaches to a "Special Waste" Label

To the extent that a hazardous waste listing would have any chilling effect on legitimate beneficial uses — which it should not — EPA already has addressed the concern by proposing to designate coal ash not as a "hazardous waste" but as a "special waste" under Subtitle C.[426] While industry argues that the hazardous waste label creates a negative public perception, the special waste label, even if it were literally affixed to a product, cannot be expected to have a similar impact.

Nor is it the case that a Subtitle C listing in itself, even without a "hazardous waste" designation, will create a stigma. The general public is not familiar with RCRA, much less Subtitle C. Nevertheless, industry insists that selection of EPA's "C" option will be equivalent to a "hazardous waste" listing. On the one hand, the argument is that semantics matter enough to create a stigma and on the other hand, the "special waste" designation is dismissed as mere semantics. Industry cannot have it both ways. Insofar as there is a potential stigma problem, it is largely about semantics, and the "special" designation is a solution. To the extent the argument is about the perception of a sophisticated audience familiar with RCRA, the differences between a special waste listing and a hazardous waste listing are material. The designations are not interchangeable: EPA is proposing to define an entire new category of "special wastes" that include "any of the following wastes that are managed under the modified subtitle C requirements," and these requirements will be less stringent than the provisions applicable to hazardous wastes in many respects.

For all of these reasons, we agree with the Agency that "listing CCRs destined for disposal as a special waste, rather than a hazardous waste could, in large measure, address potential issues of stigma."[427]

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[425] 2010 Proposed Rule, at 35,186.

[426] Long before EPA published the June 21, 2010 proposed rule, representatives from the beneficial reuse industry met with and wrote to EPA to discuss fears that stigma would hurt their businesses under a Subtitle C designation. Although these parties failed to provide a single precedential case where such a stigma had occurred after even a hazardous waste listing, EPA agreed to delete the word "hazardous" from the Subtitle C designation (thereby using the authority afforded it in the Bevill Amendment to alter certain aspects of Subtitle C).
See Docket EPA-HQ-RCRA-2009-0640 at www.regulations.gov for materials submitted by industry to EPA before the release of EPA's co-proposal on June 21, 2010; Letter from Thomas Adams, Exec. Dir., ACAA, to Mathy Stanislaus, Assistant Administrator, Office of Solid Waste & Emergency Response, EPA, Re: Stigma Studies (Aug. 4, 2009) (EPA-HQ-RCRA-2009-0640-0017).

[427] 2010 Proposed Rule, at 35,174.

f. Potential stigma effects can be addressed with public education and incentives

Any potential stigma effects that are unaddressed by the "special waste" designation— for instance, the stigma that may have attached in light of the well-publicized TVA Kingston disaster— can be addressed through proactive efforts to promote safe, encapsulated beneficial uses.

Promotion and public education detailing the safety of recycled coal ash products could allay public concerns about the use of coal ash in products and affirmatively raise the "green" profile of products such as coal ash concrete, which has a smaller carbon "footprint" than concrete made with virgin Portland cement. Public education about various aspects of hazardous waste recycling has been utilized for years with great success. For example, some programs simply educate the public about how to safely handle and recycle household hazardous wastes.[428] There are even a few existing programs that have recycling and reuse educational materials specifically addressing coal ash, and these programs can serve as an excellent model for future federal efforts.[429] In the meantime, EPA plans to continue its promotion of the beneficial reuse of coal ash in products,[430] and there is no reason why the agency, the beneficial reuse industry, and conservation advocates cannot undertake additional public outreach and education efforts.

In fact, industry commenters make clear that public education is an effective tool to eliminate stigma. For example, one reuse company provided the following example ostensibly to show stigma, but what the example really illustrates is how "discussion and explanation" can allay expressed concerns about the use of coal ash:

> In early 2010, during the design of a parking structure for a public transit authority of suburban Minneapolis, SouthWest Transit of Eden Prairie, Minnesota, our client directed us to prohibit the use of Fly Ash in any of the ready-mixed concrete to be used in the project. Specifically cited were concerns regarding using a hazardous waste material, expressly Fly Ash for ready-mixed concrete, on a public project. Only after prolonged discussion and explanation of the known behavior of these materials in ready-mixed concrete did the transit authority permit specification of CCRs for beneficial use.[431]

This is a perfect example of alleged stigma being *completely mitigated* through explanation alone by the reuse company itself.

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[428] *See, e.g.,* County of Santa Clara, Department of Environmental Health, Household Hazardous Waste Program Home, *available at* http://www.sccgov.org/portal/site/deh/agencychp/?path=%2Fv7%2FEnvironmental%20Health%2C%20Department%20of%20%28DEP%29%2FHazardous%20Materials%20Compliance%20Division%2FHousehold%20Hazardous%20Waste%20Home.

[429] *See, e.g.,* Wisconsin Dep't Envtl. Resources, "Beneficial Use of Industrial By-Products," http://www.dnr.state.wi.us/org/aw/wm/solid/beneficial/ (last revised May 3, 2007).

[430] Although the C2P2 website has been suspended from EPA's website during the rulemaking process, EPA states that it will continue promotion of uses deemed beneficial in the future. 2010 Proposed Rule, at 35,187.

[431] Letter from Walker Parking Assoc. to U.S. EPA, Re: rcradocket@epa.gov, Attention Docket ID No. EPA-HQ-RCRA-2009-0640 (Doc. No. EPA-HQ-RCRA-2009-0640-57721, at 1–2 (Sept. 13, 2010).

Proof of safety would be perhaps the most foolproof public relations tool to ensure consumer confidence in products containing coal ash. For example, EPA could issue guidance prescribing how utilities (at the time of generation) or reuse companies (after incorporation into the final product) should test materials with each new shipment (out or in, respectively) for leachability, off-gassing, and/or other potential environmental or human health concerns applicable to the type of use. Clear information for the public about what testing levels are considered safe alongside the testing results will effectively address consumer fears, if there are any.

In addition, reuse of these products in government buildings, and continued incentives for use by standards-setting groups such as the U.S. Green Building Council, will stimulate the market for coal ash products and ensure that any stigma is quickly overcome. Extensive use of products containing coal ash in government buildings and grounds would help assure the public that the products do not pose risks that are any different in kind than products made with virgin materials. Furthermore, EPA's encouragement of standards-setting organizations to incentivize (through LEED points or otherwise) use of products containing coal ash would further help bolster public support for regular use of products containing coal ash.

g. Standards-setting associations will not stigmatize coal ash products

Standards-setting associations already have indicated their willingness to approve the use of coal ash products. Professional organizations that set industry standards for performance, safety, and environmental sustainability have decided to accept coal ash for uses that meet the definition of "beneficial reuse" according to EPA. For example, the United States Green Building Council ("USGBC"), the "[n]on-profit organization dedicated to sustainable building design and construction" and creator of the LEED building sustainability rating system[432] has already stated that an EPA Subtitle C designation would not alter their LEED standards. The USGBC has publicly stated that "the issues encompassed in the two proposals will not directly cause any changes to the LEED rating systems."[433] In making this determination, the USGBC recognized that "[u]nder both proposals, the Bevill exemption for beneficial use (such as concrete) would remain in place."[434] This USGBC policy is extremely advantageous to the reuse industry, because the LEED ratings are what determine whether a building is a certified green building. USGBC's statement means that, even with a Subtitle C designation, reuse of coal ash in beneficial uses would still earn builders the same LEED points that would be awarded absent a Subtitle C listing.

In addition, the American Society for Testing and Materials (ASTM) addressed unclear language in a previous letter dated December 23, 2009 to clarify that a hazardous designation for

[432] U.S. Green Building Council Homepage, http://www.usgbc.org/ (last visited Nov. 14, 2010).
[433] Letter from Scot Horst, Senior Vice President, LEED, U.S. Green Bldg. Council, Re: EPA Proposal for "Standards for the Management of Coal Combustion Residuals Generated by Commercial Electric Power Producers" and Effects on LEED (Aug. 27, 2010).
[434] *Id.*

coal ash would *not* cause ASTM to remove fly ash from its concrete standard,[435] and that a hazardous designation would simply require that the standard be "revised to reflect this classification."[436] ASTM did not say what the effect of a "Special Waste," classification would be, but presumably it would cause at most only more modest revisions to the standard.

h. The beneficial reuse industry would continue to use coal ash even if it were listed as hazardous

Many industry players engaged in recycling coal ash into products have stated already that they would continue to use coal ash after a Subtitle C designation. In a survey conducted by the National Precast Concrete Association released on September 1, 2010, 84 percent of precast concrete producers said they would continue to use fly ash even after a Subtitle C listing.[437] Eighty percent also believed EPA could reduce the impact of stigma *even from a hazardous waste designation* with easy measures like providing education or requiring reuse in federal projects.[438] Similarly, a survey conducted by the National Ready Mixed Concrete Association of 1,500 members found that 69 percent of ready mix concrete producers will continue to use fly ash even with a Subtitle C designation. [439] Concrete manufacturers are the largest beneficial user of fly ash, reusing 15.8 million tons of fly ash in 2008 alone.[440]

The willingness of many recyclers to continue using coal ash even after a hazardous waste listing suggests that other industry players are advancing groundless stigma arguments to avoid regulation. In any case, the businesses that will continue to use coal combustion waste in their products will be motivated to undertake public education efforts of their own in the event they are genuinely needed.

i. Consumers regularly purchase products that contain or are themselves hazardous wastes

Finally, despite all indications that regulation under Subtitle C will encourage rather than discourage beneficial use of coal ash, industry argues that coal ash is different from all other listed wastes for two reasons. The first is that, unlike reuse of coal ash, other products that have

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[435] *Contra* 2010 Proposed Rule, 75 Fed. Reg. at 35,187 (stating "Recently, chairpersons of the [ASTM] International Committee C09, and its subcommittee, C09.24, in a December 23, 2009 letter indicated that ASTM would remove fly ash from the project specifications in its concrete standard if EPA determined that CCRs were a hazardous waste when disposed." However, according to a recent letter from ASTM clarified that ASTM simply meant that standards would have to be revised if coal ash was designated as hazardous waste under Subtitle C of RCRA. Letter from James A. Thomas, President, ASTM International, to U.S. EPA, Re; Hazardous Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities Docket (June 26, 2010).

[436] Letter from James A. Thomas, President, ASTM International, to U.S. EPA, Re: Hazardous Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities Docket (June 26, 2010).

[437] M. Blastow & D. Marsh, Precast Producer Survey, *Concrete Products* (Sept.1, 2010), *available at* http://www.concreteproducts.com/ready-mixed/epa-coal-ash-rule-precast-survey-20100901/index.html.

[438] *Id.*

[439] CP Staff, Ready Mixed Producer Survey, *Concrete Products* (Sept. 1, 2010), *available at* http://www.concreteproducts.com/ready-mixed/epa-coal-ash-rule-ready-mixed-producer-survey-20100901/index.html.

[440] *Id.*

been recycled without facing a stigma require significant processing before reuse, such that "in virtually all of these recycled product situations, the product is readily distinguishable chemically and physically from the hazardous waste used to produce the product."[441] However, the same is true of the coal ash products that will reach consumers (*e.g.* wallboard and concrete). Because coal ash and other coal combustion wastes are incorporated into and encapsulated within these products, they do not bear any resemblance to the constituent fly ash or gypsum.

Moreover, it is not the case that all other recycled waste products incorporate hazardous wasted in a physically or chemically altered form. For example, when an old mercury-containing light bulb, such as a fluorescent or compact fluorescent light (CFL) bulb, is recycled, the process is simple: crush the bulbs, separate the bulbs into their component parts (including mercury), and then distill the mercury to remove pollutants.[442] Then, 99.99% pure mercury is sold back to companies that put it right back into CFLs or other mercury-containing products, where it remains loose in the light bulb. In short, the recycled form of the mercury is *precisely* one of the forms that would otherwise be classified as hazardous waste, and it ends up in a product where it is much less safely encapsulated than coal ash in concrete.[443]

The second argument industry makes is that other recycled hazardous wastes are used in industrial settings, not residences. They state: "products from recycled hazardous waste typically are utilized only in industrial settings, and in situations where both the recycled product and the virgin product for which it substitutes are clearly hazardous materials."[444] This is wrong. People use products that incorporate hazardous wastes and products that are themselves hazardous wastes (upon disposal) all the time and even in their homes. Indeed many of these products are designed for household use. Mercury-containing CFL bulbs are a prime example: "An estimated 4 billion household sockets in the United States [are] being filled with these energy efficient lighting options."[445] Televisions and batteries are also good examples. Lead acid batteries are hazardous waste when disposed, but they are regularly sold in cars purchased and maintained by individual citizens. Notably, lead acid batteries are "the most recycled product in the U.S.," with more than 99% of batteries recycled.[446] A "new" lead acid battery typically contains at least 60 to 80 percent recycled lead.[447]

EPA has itself provided a list of household products that would be or contain components that would be hazardous waste when disposed[448]:

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[441] Letter from Richard Stoll, Attorney, Foley & Lardner, LLP, to Matt Hale, Dir., Office of Res. Conservation & Recovery, U.S. EPA, Re: Concerns Over "Stigma" for Coal Combustion Products, Doc. No. EPA-HQ-RCRA-2009-0640-0387.1, at 2 (Aug. 7, 2009) [hereinafter "Letter from Industry"].
[442] The Lamp Recycling Process, Bulbs.com, http://www.bulbs.com/recycle_process.aspx.
[443] *Id.*; *see also* 40 C.F.R. §§ 261.24, 261.33
[444] Letter from Industry, at 3.
[445] Waste Management, Think Green from Home: CFLs Contain Mercury and Need to be Recycled, https://www.thinkgreenfromhome.com/SafeConvenient.cfm.
[446] David Bello, *What's the Most Recycled Product in the U.S.?*, Scientific Am. (Apr. 18, 2010), *available at* http://www.scientificamerican.com/podcast/episode.cfm?id=whats-the-most-recycled-product-in-10-04-18.
[447] Battery Council International, Battery Recycling, http://www.batterycouncil.org/LeadAcidBatteries/BatteryRecycling/tabid/71/Default.aspx (2009).
[448] U.S. EPA, Table of Products That May Contain Mercury and Recommended Management Options, http://www.epa.gov/osw/hazard/tsd/mercury/con-prod.htm.

- Airflow/fan limit controls
- Antiques
- Appliances (Electric)
- Appliances (Gas-fired)
- Barometers
- Button cell batteries
- Clothes irons
- Electronics
- Gas flow regulators
- Heating and cooling systems
- Jewelry
- Lamps/Light bulbs
- Light switches (Silent)
- Mercury
- Paint (Latex)
- Pesticides
- Plumbing
- Security systems
- Shoes
- Sporting Equipment
- Television Sets
- Thermometers
- Thermostats
- Tilt Switches.

Additional examples of common household products that are or have components that are hazardous when disposed in certain circumstances but nonetheless have not been stigmatized in the reuse market include:

- mercury light bulbs;
- saccharine;
- acetone (U002), or nail polish remover;
- 1-butanol (U031), a compound

- which has many uses including a flavoring ingredient in a wide range of foods;
- methyl alcohol or methanol (U154);
- automotive products;
- toner cartridges;
- batteries;
- pharmaceuticals;
- paints; and
- home maintenance chemicals.

See Appendix B for further analysis.

Again, there is no evidence that stigma has affected the market for any of these everyday products that are designed to be used in residential settings and even *ingested* in the case of saccharine. Beneficial uses involving coal ash would be no more vulnerable to stigma than these other products given that it would be: (1) listed as a "special waste"; (2) fully encapsulated; and (3) present in building materials as opposed to products that are routinely handled. For these and all of the other reasons stated above, the stigma arguments advanced by industry are baseless.

2. EPA Cannot Properly Base Its Listing Determination on Stigma Concerns

Even if the stigma concerns raised by industry were legitimate—which they are not—they would not provide a valid basis for declining to regulate coal ash under RCRA Subtitle C. While the Bevill factors arguably require EPA at least to consider stigma, the Bevill factors do not govern EPA's final decision on its proposed rule. Regardless, EPA must make a decision that ensures protection of human health and the environment regardless of any potential stigma.

a. The Bevill factors do not govern EPA's current proposal to list and promulgate regulations for coal ash.

While the Bevill factors[449] are applicable to a threshold determination whether or not to regulate CCRs, the factors no longer apply after EPA makes a decision that regulation is warranted. Thus, the actual listing of CCRs under subtitle C are governed by the hazardous waste listing criteria set forth at 40 C.F.R. § 261.11(a). Under the Bevill Amendment, EPA was directed to consider the eight study factors for two purposes: to make a Report to Congress,[450] and to determine whether regulation is warranted or not.[451] Congress did *not* direct EPA to use the Bevill factors when listing the waste or promulgating the regulations themselves.

EPA already issued several Reports to Congress.[452] Furthermore, EPA already made the regulatory determinations required by the statute. First, EPA made a regulatory determination in August of 1993 to exempt large volumes of coal combustion wastes generated at electric utilities

[449] 42 U.S.C. § 6982(n).
[450] 42 U.S.C. § 6982(n).
[451] 42 U.S.C. § 6921(c).
[452] *See, e.g., 1999 Report to Congress v. 1&2.*

and disposed of in monofills from hazardous waste regulation.[453] Then, in March of 2000, EPA issued a revised regulatory determination that all large-volume wastes land-disposed or disposed of in surface or underground mines (monofilled or co-disposed with certain other wastes) would be regulated as hazardous waste under a contingent subtitle C listing.[454] Then, in May of 2000, EPA made another revised regulatory determination to regulate large volume coal ash disposed of or placed in mines under subtitle D (with beneficial uses still exempted).[455]

With these Reports to Congress and regulatory determinations executed, EPA fulfilled all of its statutory duties that involved consideration of the Bevill factors. While EPA may still revise its regulatory determination, when it makes its ultimate listing decision, EPA is statutorily required to consider only the relevant factors for listing wastes under subtitle C or Subtitle D.[456] Consequently, the statutory factors set forth in the Bevill Amendment do not apply to EPA's choice between "C" and "D" regulation.

The D.C. Circuit's decision in *Hazardous Waste Treatment Council v. U.S.E.P.A.* is directly on point.[457] There, the court held that EPA impermissibly considered stigma in deciding how to list recycled use oil when it was only permitted to consider stigma for purposes of deciding whether section 6921 criteria were "applicab[le]" to that waste stream.[458] The controlling statute, the Used Oil Recycling Act,[459] required EPA to "make a determination as to the applicability" of recycled used oil to the criteria and regulations promulgated under Section 6921 "relating to the characteristics of hazardous wastes." EPA was then required to report that determination to Congress. In making the applicability determination, Congress mandated that EPA "shall ensure that the recovery and reuse of used oil are not discouraged."[460]

Subsequently, after EPA had still failed to make a listing determination, the Hazardous and Solid Waste Amendments of 1984[461] were adopted as a "further prod"[462] to the Agency, requiring that EPA "shall propose whether to list or identify [recycled used oil] as hazardous waste *under Section 6921*."[463] When EPA then made its decision not to list, the D.C. Circuit

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[453] EPA, Final Regulatory Determination on Four Large-Volume Wastes From the Combustion of Coal by Electric Utility Power Plants, 58 Fed. Reg. 42,466 (Aug. 9, 1993) (to be codified at 40 C.F.R. pt. 261).

[454] EPA, Regulatory Determination on Wastes from the Combustion of Fossil Fuels (Mar. 5, 2000) (not cited in Federal Register, to be codified at 40 C.F.R. pt. 261) (also determining that beneficial uses would be exempted from regulation)., *available at* http://www.publicintegrity.org/assets/pdf/CoalAsh-Doc7.pdf.

[455] EPA, Notice of Regulatory Determination on Wastes From the Combustion of Fossil Fuels, 65 Fed. Reg. 32,214 (May 22, 2000) (to be codified at 40 C.F.R. pt. 261).

[456] *See* 40 C.F.R. §§ 261.11(a), (c). Also, If EPA chooses to designate coal ash as a "special waste," it may also consider modifications of various statutory requirements pertaining to landfills and surface impoundments. *See* 42 U.S.C. § 6924(x).

[457] Hazardous Waste Treatment Council v. U.S. EPA, 861 F.2d 270, 275 (D.C.Cir. Oct, 07, 1988) [hereinafter HWTC].

[458] *Id.* at 272 ("Section 8 did not direct the EPA to list used oil, but merely to "determin[e]" whether used oil meets the statutory and regulatory criteria, and then report that determination to Congress. The Agency complied with section 8, reporting to Congress its determination that certain types of used oils should be listed as a hazardous waste because of their toxic constituents.").

[459] Used Oil Recycling Act of 1980 (UORA), 42 U.S.C. § 6935(a), at §§ 7 &8 (1982 & Supp. II 1984).

[460] *Id.*

[461] Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6935 (Supp. II 1984).

[462] H.Rep.No. 198, pt. I, 98th Cong., 1st Sess. 64 (1983), U.S.Code Cong. & Admin.News 1984, 5576.

[463] Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6935(b) (Supp. II 1984) (emphasis added).

held that it was obliged to make its decision based not on the applicability criteria relevant to the report but instead "under 6921" itself. Once the reporting obligation was fulfilled, the applicability factors were "dead."[464] As the Court explained: "[o]nce the Agency had . . . submit[ted] its report to Congress on January 16, 1981, section 8 had served its purpose and was without further effect. A fortiori, its proviso, which applied solely to the Agency's initial determination, died along with the rest of section 8."[465]

Here, the Bevill factors are similarly inapplicable to EPA's final listing decision. EPA was subject to a Congressional reporting requirement for coal ash, and the relevant statutory provision sets forth study factors but not listing factors.[466] While EPA must determine whether to promulgate regulations based on consideration of the Bevill factors,[467] once it has made the decision to regulate, the ordinary listing factors apply. This makes sense. Once EPA has found that regulation of coal ash is warranted, it would defeat RCRA's overarching purpose to regulate coal ash less protectively than the statute and implementing regulations require. Because none of the relevant provisions of the Bevill Amendment requires EPA to *list* coal combustion waste pursuant to the Bevill study factors, EPA must make a final listing decision based on the regulatory listing criteria, which do not include stigma or even encouragement of reuse as a factor.

b. The Bevill factors do not require EPA to consider stigma in deciding whether regulation is warranted.

Not only is EPA not permitted to consider stigma in determining whether to list coal ash as a Subtitle C waste, the Bevill factors do not require EPA to consider stigma in making its threshold determination whether regulation is warranted. The Bevill factors are as follows:

> **(1)** the source and volumes of such material generated per year;
> **(2)** present disposal and utilization practices;
> **(3)** potential danger, if any, to human health and the environment from the disposal and reuse of such materials;
> **(4)** documented cases in which danger to human health or the environment from surface runoff or leachate has been proved;
> **(5)** alternatives to current disposal methods;
> **(6)** the costs of such alternatives;
> **(7)** the impact of those alternatives on the use of coal and other natural resources; and
> **(8)** the current and potential utilization of such materials.[468]

None of these factors directs EPA to consider the impacts of regulation on beneficial use or reuse, much less potential stigma impacts. Unlike the statute at issue in *Hazardous Waste Treatment Council*, which provided that EPA "shall ensure that the recovery and reuse of used

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[464] *Id.* at 275.
[465] *Id.*; *see also Natural Resources Defense Council, Inc. v. U.S. E.P.A.*, 25 F.3d 1063, 1067 (D.C. Cir, 1994) (adopting this same interpretation of the case).
[466] 42 U.S.C. § 6982(n).
[467] 42 U.S.C. § 6921(c).
[468] 42 U.S.C.A. § 6982(n).

oil are not discouraged,"[469] the Bevill study factors require only that EPA consider "the current and potential utilization of such materials." Thus, there is no need for EPA to consider stigma to determine whether regulation of coal ash is appropriate, and indeed, EPA's previous studies of these factors in 1993 and again in 1999 did not even mention the word stigma.[470]

In 2000, when EPA made yet another a determination (this time that regulation was warranted under Subtitle D), EPA considered stigma but admitted that it is unorthodox and in fact contrary to the RCRA statute to make stigma a deciding factor. Thus, EPA admitted that "[*n*]*ormally, concerns about stigma are not a deciding factor in EPA's decisions under RCRA, given the central concern under the statute for protection of human health and the environment*."[471] Nevertheless, EPA decided to justify its decision in large part on stigma, reasoning that: (1) Subtitle D would be "fully effective in protecting human health and the environment"; and (2) beneficial use plays "a large and salutary role . . . for this waste."[472] In the intervening years since the 2000 regulatory determination, it has become apparent (1) that federally enforceable regulation of coal ash is essential and that Subtitle D would not be fully protective of human health and the environment[473] and (2) that many uses that were previously deemed "beneficial," including structural fills, have now been proven to cause significant harm including proven "damage cases."[474] Consequently, EPA cannot justify another decision to elevate stigma concerns over grave health and environmental concerns that mandate a Subtitle C designation. EPA is charged with protecting human health and the environment, and that is the lens through which EPA is directed to look at the Bevill study factors, including any factor that arguably implicates stigma. Congress specifically instructed EPA to "submit a report on the adverse effects on *human health and the environment*, if any, of the disposal and utilization" and that report is the document in which the Bevill factors come into play.[475]

c. EPA has fielded stigma concerns appropriately in the past.

In the past, EPA has given little weight to stigma arguments where the public could be educated that uses in different settings can have different toxicities. Thus, in 1990, EPA caused seven ozone-depleting chemicals to be listed as "toxic chemicals subject to reporting under section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)" despite concerns raised that the listing would stigmatize recycling of these chemicals.[476] EPA explained that by listing these chemicals as "toxic chemicals" it did *not* "contend" that these were "directly toxic," and it properly assumed that the public was savvy enough to recognize that toxic pollutants in different scenarios and degrees could be more, less, or non-toxic:

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[469] *Id.*
[470] *See* U.S. EPA, *Report to Congress: Wastes from the Combustion of Coal from Electric Utility Plants* (EPA/530-SW-88-002 (Feb. 1998); U.S. EPA, *Report to Congress: Wastes from the Combustion of Fossil Fuels* (EPA 530-R-99-010) (Mar. 1999).
[471] U.S. EPA, Notice of Regulatory Determination on Wastes From the Combustion of Fossil Fuels, 65 Fed. Reg. 32,214, 32,217 (May 22, 2000) (to be codified at 40 C.F.R. pt. 261).
[472] *Id.*
[473] *See* Section V, *infra*.
[474] *See* Section II.D.d., *supra.*
[475] 42 U.S.C. § 6982(n) (emphasis added).
[476] U.S. EPA, Final Rule: Ozone Depleting Chemicals; Toxic Chemical Release Reporting; Community Right-To-Know; Addition of Chemicals, 55 Fed. Reg. 31,594 (Aug. 3, 1990) (to be codified at 40 C.F.R. pt. 372).

> EPA does not contend that these chemicals are directly toxic. EPA hopes that industry, government, and the public will recognize and consider differences in degree and type of toxicity of different chemicals when making decisions about those chemicals."[477]

EPA went on to explain that "where EPA believes that a chemical meets the statutory criteria for listing, it cannot choose not to list the chemical simply because its listing may stigmatize the chemical.[478] Similarly, here, EPA cannot choose to avoid a Subtitle C listing on stigma grounds, and the public is capable of understanding that coal ash when dumped into unlined landfills and surface impoundments poses risks that do not pertain when it is put to a beneficial, encapsulated use.

Where EPA has been willing to entertain stigma concerns, it has determined that it could "avoid conceivable stigmatization" by altering the name of the material when recycled *even when* all announcement regarding permits for facilities managing these materials were required to refer expressly to "hazardous waste."[479] EPA explained:

> To avoid conceivable stigmatization, EPA proposed that hazardous wastes that are to be recycled be called "regulated recyclable materials." Most comments favored this approach, and we are adopting it in the final rule, choosing the less cumbersome name "recyclable material." As stated in the proposal, however, all Section 7004(b) announcements and notices regarding permits for facilities managing these materials must still refer to hazardous waste.[480]

Here, the special waste designation, which would apply to coal ash all the time, would go even further to address potential stigma concerns.

d. The courts disfavor stigma arguments.

Finally, courts are understandably skeptical about stigma arguments. For instance, in 2005, the Ninth Circuit reversed a preliminary injunction granted by the District Court of Montana (to enjoin implementation of a rule that would have reversed a ban on importation of cows from Canada following a mad cow epidemic) because the preliminary injunction was based in part on an unsubstantiated "stigma" claim. The court found that:

> The record does not support the district court's alarmist findings that the "irreparable economic harm" the district court foresaw from the stigma of Canadian beef will actually befall the American beef industry. Following the case of BSE diagnosed in a Washington State cow in 2003, consumer demand for, and confidence in, American beef remained strong. According to USDA, American demand for beef in 2004 is estimated to have increased seven to eight percent

[477] *Id.* at 31,596.
[478] *Id.*
[479] EPA, Final Rule: Hazardous Waste Management System; Definition of Solid Waste, 50 Fed. Reg. 614 (Jan. 4, 1985) (codified at 40 C.F.R. pts. 260, 261, 264, 265, &266).
[480] *Id.* at 646.

over 2003 levels. Yet, Canadian beef was flowing into this country throughout 2004 under permits issued by USDA. This evidence belies the district court's prediction of catastrophic injury to the U.S. beef industry.[481]

Similarly here, there is no reason to give credence to industry's "alarmist" stigma arguments.

3. Subtitle C Regulation is Needed to Prevent Uses of CCR that Endanger Human Health and the Environment.

While subtitle C will not discourage truly beneficial uses for all of the reasons discussed above, it should have the salutary effect of discouraging dangerous uses that are the functional equivalent of disposal. Many current reuses of CCW endanger, or threaten to endanger, human health and the environment; yet electric utilities and recyclers are increasingly relying on these riskiest "reuses" in the absence of federal regulation. While some safe, encapsulated uses that do not allow for leaching of ash contaminants should be promoted, reuses that threaten to introduce toxic pollutants into the environment— the uses falsely masquerading as "beneficial" —must be regulated pursuant to EPA's Subtitle C "special waste" proposal.

Of the 136 million short tons of coal ash generated in 2008, about 60.6 million short tons, or 44.5%, were "beneficially used," according to the reuse industry.[482] In fact, beneficial use increased 63% between 2001 and 2008. *See* Attachment 15. However, at least 21,967,519 tons, or over 36% of the coal ash reused in 2008, went to just two unsafe unencapsulated uses— structural fills/embankments (11,501,247 short tons) and mining applications (10,466,272 short tons). *See* Table 34. In fact, these two uses experienced the highest increases in coal ash (in tons) used between 2001 and 2008. Several of the remaining uses of coal ash are also either unencapsulated or have raised concerns with regard to leachability, as described *infra.*

[481] Ranchers Cattlemen Action Legal Fund United Stockgrowers of America v. U.S. Dep't Agriculture, 415 F.3d 1078, 1104–05 (9th Cir. 2005) (internal citations omitted).
[482] American Coal Ash Association, "Coal Combustion Product Production & Use Survey Report" (2008), http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.

Table 36. Coal Combustion Product (CCP) Reuse Trends 2001 to 2008

CCP Categories	CCP Utilization Totals 2008	CCP Utilization Totals 2001*	CCP Amount Change 2001-2008	CCP Utilization % Change 2001-2008^
Concrete/ Concrete Products/ Grout (2001 includes Cement)	14,015,616	13,628,275	387,341	2.842
Blended Cement (2008 only) / Raw Feed for Clinker	4,198,198	1,226,678	2,971,520	242.241
Flowable Fill	93,132	811,142	-718,010	-88.518
Structural Fills	11,501,247	4,574,749	**6,926,498**	**151.407**
Road Base/ Sub-base	1,802,025	1,675,785	126,240	7.533
Soil Modification /Stabilization	1,251,968	850,548	401,420	47.195
Mineral Filler in Asphalt	265,587	128,448	137,139	106.766
Snow and Ice Control	700,913	871,707	-170,794	-19.593
Blasting Grit/ Roofing Granules	1,637,867	1,530,028	107,839	7.048
Mining Applications	10,466,272	1,078,264	**9,388,008**	**870.660**
Gypsum Panel Products	8,533,732	6,224,872	2,308,860	37.091
Waste Stabilization/ Solidification	3,784,546	1,555,595	2,228,951	143.286
Agriculture	320,863	157,199	163,664	104.113
Aggregate (2008 only)*	901,462	1	901,461	90,146,100.000
Miscellaneous/Other	1,120,232	2,806,346	-1,686,114	-60.082
TOTALS	**60,593,660**	**37,119,637**	**23,474,023**	**63.239**
*** Aggregate total in 2001 was listed as 1 instead of the correct number, 0, in order to roughly calculate the percentage of change from 2001 to 2008.**				
^ Percent change = ((y2 - y1) / y1)*100				
Sources (adapted from):				
American Coal Ash Ass'n, "Coal Combustion Product Production & Use Survey Report" (2008), http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.				
American Coal Ash Ass'n, "Coal Combustion Product Production & Use" (2001), http://acaa.affiniscape.com/associations/8003/files/2001_rev_svy_11-02.pdf.				

Furthermore, these heavily-relied upon "reuses" have caused contamination of water sources. EPA stated in its May 2000 determination that commenters had failed to bring forth evidence of damage cases from reuses of coal ash. In 2010, however, EPA acknowledged that damage had occurred from formerly-labeled "beneficial" reuses (e.g. Gambrills, Maryland) but nonetheless stated that regulation of even unencapsulated uses was not warranted because the States were adequately controlling the "environmental issues" associated with reuse.[483] EPA states that of the 27 proven and 40 potential damage cases identified by EPA, unencapsulated fill projects have accounted for at least 7 proven and 1 potential EPA damage case.[484] EPA is failing to count one of the potential damage cases it has identified. Our analysis shows that EPA has identified two potential damage cased from unencapsulated fill projects—K.R. Rezendes South Main Street Ash Landfill in Massachusetts (former sand and gravel quarry) and the Lemberger Landfill in Wisconsin (former gravel pit). *See* Table 35. When considered along with the

[483] 2010 Proposed Rule, at 35,161–62.
[484] 2010 Proposed Rule, at 35,143, 35,155 n.61 (including Pines, IN and the Chesapeake Golf Course in Chesapeake, VA).

Environmental Integrity Project, Earthjustice, and Sierra Club's additional damage cases,[485] there are at least 18 damage cases from reuse of coal ash (excluding additional minefills, information on which may be found in Section II.D.e.) that have been identified in detail. *See* Table 36, below.

[485] *See* Env. Integrity Project, Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment* (Aug. 26, 2010) (Jeff Stant, ed.), *available at* http://www.environmentalintegrity.org/news_reports/documents/INHARMSWAY_FINAL3.pdf; *and* Env. Integrity Project & Earthjustice, *Out of Control: Mounting Damages From Coal Ash Waste Sites* (Feb. 24, 2010) (Jeff Stant, ed.), *available at* http://www.environmentalintegrity.org/news_reports/documents/OutofControl-MountingDamagesFromCoal9AshWasteSites.pdf.

Table 37. Damage Cases Caused By Reuse of Coal Combustion Waste (Excluding Minefills)

No.	State	Facility	Type of Reuse	Source
1	IN	Northern Indiana Public Service Corp. Yard 520, Township of Pines (Proven)	Construction fill, roads, driveways	EPA, Coal Combustion Waste Damage Case Assessments (2007)
2	MA	City of Beverly/Vitale Brothers Fly Ash Pit (Proven)	Former Sand and Gravel Mine	EPA, Coal Combustion Waste Damage Case Assessments (2007)
3	MA	K.R. Rezendes South Main Street Ash Landfill	Former sand and gravel quarry	EPA, Coal Combustion Waste Damage Case Assessments (2007)
4	MI	Lansing Board of Water & Light North Lansing Landfill (Proven)	Former Gravel Quarry Pit	EPA, Coal Combustion Waste Damage Case Assessments (2007)
5	VA	Chisman Creek Disposal Site (Proven)	Former Sand and Gravel Pits	EPA, Coal Combustion Waste Damage Case Assessments (2007)
6	WI	WEPCO Cedar-Sauk Landfill (Proven)	Former Sand and Gravel Pit	EPA, Coal Combustion Waste Damage Case Assessments (2007)
7	WI	WEPCO Highway 59 Landfill (Proven)	Former Sand and Gravel Mine	EPA, Coal Combustion Waste Damage Case Assessments (2007)
8	WI	WEPCO Port Washington (Proven)	Former Sand and Gravel Quarry	EPA, Coal Combustion Waste Damage Case Assessments (2007)
9	WI	Lemberger Landfill	Former Gravel Pit	EPA, Coal Combustion Waste Damage Case Assessments (2007)
10	MD	Gambrills	Sand and Gravel Quarry	EPA's Proposed Rule (2010)
11	VA	Chesapeake's Battlefield Golf Club	Structural Fill	EPA's Proposed Rule (2010)
12	IL	Rocky Acres	Structural Fill	EIP & Earthjustice, Out of Control Report (Feb. 2010)
13	NC	Swift Creek Structural Fill Site	Structural Fill	EIP & Earthjustice, Out of Control Report (Feb. 2010)
14	PA	Bangor Quarry	Quarry	EIP & Earthjustice, Out of Control Report (Feb. 2010)
15	TN	Trans-Ash, Inc. – CCW Landfill	Former Gravel Mine	EIP & Earthjustice, Out of Control Report (Feb. 2010)
16	IL	Joliet 9 Lincoln Stone Quarry Landfill	Former Quarry	EIP, Earthjustice, & Sierra Club, In Harm's Way (Aug. 2010)
17	LA	Big Cajun	Barge Mooring Facility Out of Coal Ash	EIP, Earthjustice, & Sierra Club, In Harm's Way (Aug. 2010)
18	OH	Industrial Excess Landfill Superfund Site	Former Sand and Gravel Quarry	EIP, Earthjustice, & Sierra Club, In Harm's Way (Aug. 2010)

Studies prepared for EPA have acknowledged the dangers some reuses can pose. Because coal ash contains potentially very high levels of toxic and (and possibly radioactive[486]) pollutants, these pollutants can transfer to the products in which it is reused or into various environmental media in the reuse process. For example, a 2006 report entitled "A Study of Potential Effects of Market Forces on the Management of Hazardous Secondary Materials Intended for Recycling," states:

> [W]hile hazardous waste recycling is not an inherently damaging activity, damages can result from it if recycling is practiced in a way that generates excessive social costs. A move from a sub-optimal to an optimal amount of recycling may thus involve two different sets of activities. First would be a reduction in waste mismanagement that result from hazardous waste recycling, which would increase the social benefits and lower the social costs of recycling operations (e.g., reduce leakages, spills). Second would be cessation of activities that occur under the guise of recycling but have little or no benefits and large costs, such as "sham recycling."[487]

The balance of this section will help provide information necessary for EPA to determine which current reuse practices fall in the latter category of offering little or no benefits and imposing large social and environmental costs.

a. Unencapsulated Uses Pose Similar Dangers to Unlined Disposal Units and Must Be Regulated Under Subtitle C.

Unencapsulated uses of coal ash warrant stringent federal regulation under Subtitle C of RCRA because they pose statistically high risks of leachability of toxic pollutants and have already caused at least 18 damage cases throughout the United States.

i. Structural fills and all other large-scale fill projects are dangerous and must be regulated.

Structural fills were the *second largest* reuse of coal ash in 2008, and also experienced the largest increases in uses of fly ash, bottom ash, and boiler slag from 2001 to 2008[488]. However, the EPA has stated that CCW used for "unencapsulated, general fill" is *unsafe* and *does not constitute "beneficial" use*.[489] Specifically, EPA defines beneficial use to exclude large-scale fill projects:

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[486] *See, e.g.,* U.S. EPA, RadTown USA, *Coal-Fired Power Plant Emissions*, http://www.epa.gov/radtown/coal-plant.html; Maria Hvistendahl, *Coal Ash Is More Radioactive than Nuclear Waste*, Scientific Am. (Dec. 17, 2007), *available at* http://www.scientificamerican.com/article.cfm?id=coal-ash-is-more-radioactive-than-nuclear-waste; U.S. Geological Survey, Radioactive Elements in Coal and Fly Ash: Abundance, Forms, and Environmental Significance (Fact Sheet FS-163-97), *available at* http://pubs.usgs.gov/fs/1997/fs163-97/FS-163-97.html.

[487] U.S. EPA, Office of Solid Waste, *A Study of Potential Effects of Market Forces on the Management of Hazardous Secondary Materials Intended for Recycling* 9 (prepared by ICF International) (Nov. 21, 2006).

[488] *Compare* American Coal Ash Association, "Coal Combustion Product Production & Use Survey Report" (2008), http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf, *with* American Coal Ash Association, "Coal Combustion Product Production & Use" (2001), http://acaa.affiniscape.com/associations/8003/files/2001_rev_svy_11-02.pdf.

[489] Proposed Rule, at 35,154.

> *Beneficial Use of Coal Combustion Products (CCPs)* means the use of CCPs that provides a functional benefit; replaces the use of an alternative material, conserving natural resources that would otherwise need to be obtained through practices such as extraction; and meets relevant product specifications and regulatory standards (where these are available). *CCPs that are used in excess quantities (e.g., the field-applications of FGD gypsum in amounts that exceed scientifically supported quantities required for enhancing soil properties and/or crop yields), placed as fill in sand and gravel pits, or used in large scale fill projects, such as for restructuring the landscape, are excluded from this definition*.[490]

Structural filling and other large-scale filling is dumping in disguise, placing toxic pollutants in close proximity to groundwater. In fact, EPA's Office of Solid Waste and Emergency Response was recently rebuked by the Office of the Inspector General for promoting structural fills and failing to disclose the dangers they pose on its website despite having evidence of the risks associated with these large scale fill projects including documented damage cases.[491]

In fact, of the 27 proven and 40 potential damage cases identified by EPA, unencapsulated large-scale fill projects including structural fills and fill in sand and gravel quarries (see next section) have accounted for at least 7 proven EPA damage cases and 1 potential EPA damage case, including the Battlefield Golf Course fill in Chesapeake, VA, summarized below.[492] In addition, Commenters the Environmental Integrity Project, Earthjustice, and the Sierra Club have identified still more damage cases from structural fills, including two mentioned below.

Battlefield Golf Course in Chesapeake, Virginia: The Battlefield Golf Course was listed by EPA in its 2010 Proposed Rule as an example of a damage case that has emerged since its 2007 Damage Case Report.[493] Coal ash in structural fill projects are listed as "beneficial uses" in Virginia, which allowed Virginia Dominion Power to use 1.5 million cubic yards of fly ash to contour this golf course without a liner.[494] EPA acknowledges that "concentrations of arsenic, boron, chromium, copper, lead and vanadium detected in groundwater collected from on-site monitoring wells were considered to be significantly above background concentrations," but listed this only as a potential damage case. EPA claims "potential" was used because there were no exceedances of primary federal Maximum Contaminant Levels (MCL) in residential wells.[495] EPA then goes on to state, however, that boron, "a leading indicator of fly ash

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[490] Proposed Rule, at 35,129 (second emphasis added).
[491] U.S. EPA, Office of the Inspector General, *Early Warning Report: Website for Coal Combustion Products Partnership Conflicts with Agency Policies*, Report No. 11-P-0002 (Oct. 13, 2010), *available at* http://www.epa.gov/oig/reports/2011/20101013-11-P-0002.pdf.
[492] Proposed Rule, at 35,143, 35,155 n.61 (including Pines, IN and the Chesapeake Golf Course in Chesapeake, VA).
[493] Proposed Rule, at 35,231.
[494] *Id*.
[495] *Id.* at 35,231–32.

migration," was found in 25 residential wells, the secondary MCL for manganese was exceeded in 9 residential wells, and the "action level" for lead was exceeded in 6 residential wells.

This last pollutant, lead, is on EPA's list of "Primary" Drinking Water Standards, so it is puzzling why this was not considered a proven damage case. Even though lead has an "action level" listed instead of a traditional MCL, EPA's standard states that "if more than 10% of tap water samples exceed the action level, water systems must take additional steps."[496] There were 55 residential samples taken,[497] so 6 samples with lead exceedances constitutes 10.9% of samples with exceedances, meaning the threshold for remediation was met. However, EPA simply attributed these many exceedances to background without acknowledging that if these exceedances are from the golf course, which is certainly possible considering the high number of residential wells also spiking for boron, a known tracer pollutant for coal ash, this would constitute a proven damage case.

Swift Creek Structural Fill, ReUse Technology, Inc./Full Circle Solutions, Inc., Rocky Mount, North Carolina: The Swift Creek Structural Fill accepted ash from six electric generating utility power plants, and the off-site contamination of groundwater from this site would meet EPA's criteria for a proven damage case. For example, lead was measured at more than twice the MCL in off-site groundwater downgradient from the structural fill site, and arsenic and sulfate levels also exceeded MCLs in off-site groundwater. In addition, arsenic, barium, lead, and mercury (primary pollutants), and sulfate (secondary pollutant) levels in on-site groundwater all exceeded MCLs, with lead concentrations were as high as 0.93 mg/L, more than 6 times the MCL, and arsenic concentrations were as high as 0.068 mg/L, nearly 7 times the MCL.[498] The State of North Carolina issued a notice of violation for improper waste placement in 2002. Groundwater monitoring conducted in 2004 (13 years after ash placement) detected the elevated pollutant concentrations, and a corrective action system was subsequently installed in 2008. This is yet another example showing that structural fills must be stringently regulated, and that all unencapsulated "uses" previously or currently deemed beneficial must be subject to a strict monitoring system and regulated as the disposal sites they are.

Rocky Acres, Oakwood, Illinois: State testing at the Rocky Acres structural fill in Illinois showed that levels of lead, iron, and manganese exceeded state groundwater standards in two residential wells, prompting the Illinois EPA to tell residents to stop drinking their well water.[499] Levels of these three pollutants, lead, iron, and manganese, as well as arsenic, barium,

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[496] U.S. EPA, National Primary Drinking Water Standards (EPA 816-F-09-004) n.7 (last updated May 2009), *available at* http://water.epa.gov/drink/contaminants/upload/mcl-2.pdf.

[497] Tetra Tech EM Inc., *Final Site Inspection for the Battlefield Golf Club Site, City of Chesapeake, Virginia* 6 (Apr. 16, 2010) (prepared for U.S. EPA Region III), *available at* http://www.epa.gov/reg3hwmd/CurrentIssues/finalr-battlefield_golf_club_site/11-9-10_redacted_DTN_0978_Final_Battlefield_SI_Report.pdf.

[498] Environmental Integrity Project & Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* xiv, 46–49 (Feb. 24, 2010), *available at* http://www.environmentalintegrity.org/news_reports/documents/OutofControl-MountingDamagesFromCoalAshWasteSites.pdf. *See also* Sierra Club, North Carolina Chpt., *Unlined Landfills? The Story of Coal Ash Waste in Our Backyard* (Apr. 7, 201), *available at* http://nc.sierraclub.org/work/docs/FINAL_coal_ash_report.pdf.

[499] Environmental Integrity Project & Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* xxiv, 16–18 (Feb. 24, 2010), *available at*

nickel, and chromium were also measured in groundwater underneath the site at levels that exceed Illinois groundwater quality standards in 2009; and four of these metals— arsenic, barium, chromium, and lead— exceeded EPA's primary MCLs.[500] These results of the state's testing of the water at and around this site led IEPA to classify this site as an open dump, and the company's defense was that this was a "beneficial use project." If future unencapsulated fill projects like this one are not regulated like disposal sites and are instead exempted from any RCRA regulation (and also exempted from any monitoring requirements), the monitoring that was done at this site to reveal the pollutant exceedances would likely never be done at future sites in most states.

In sum, EPA's decision to regulate structural fills and all other large-scale fill projects like disposal sites is justified extensively in the literature on beneficial reuse and by the damage cases that have occurred already from this unencapsulated "use."

ii. Sand and gravel pits and/or quarries

Like structural fills, disposal in sand and gravel pits and quarries is an unencapsulated use with grave and previously underestimated risks to human health and the environment. There have already been at least *thirteen* damage cases caused by disposal of coal ash in sand and gravel pits or former quarries that led to contamination of water sources and/or ecological damage. Due to the pervasive damage they have caused (summarized below), they must be regulated, as EPA has proposed, like disposal sites pursuant to Subtitle C of RCRA.

BBBS Sand and Gravel Quarries in Gambrills, Maryland[501]: The pollution of groundwater and residential drinking wells at the sand and gravel quarries at in Gambrills, MD, verify that sand and gravel pits and quarries pose extremely grave risks to human health and the environment and must be regulated, like disposal sites, pursuant to Subtitle C of RCRA. This site was classified by EPA as a proven damage case after MCLs were exceeded in 34 residential wells "[arsenic (1), beryllium (1), cadmium (6), lead (20), 173 and thallium (6)]" and "SMCLs were exceeded in 63 wells [aluminum (44), manganese (14), and sulfate (5)]." Constellation Energy, whose contractor dumped coal ash from the Brandon Shores power plant into the former gravel pit from 1995 to 2007, was fined $1 million through a consent agreement with Maryland Department of Environment for the contamination in 2007 and agreed to settle the civil case filed by affected residents for an additional $54 million.[502]

City of Beverly/Vitale Brothers Fly Ash Pit: This unlined former sand and gravel mine was filled with fly ash, which contaminated a surface water drinking source, groundwater above primary and secondary MCLs, air quality, and was subject to an extensive history of administrative rulings. As EPA states "The case. . . meets the criteria for a proven damage case for the following reasons: (1) Scientific— (i) selenium and arsenic exceeded (health-based) primary MCLs, and (ii) there is evidence of contamination of nearby wetlands and surface

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http://www.environmentalintegrity.org/news_reports/documents/OutofControl-MountingDamagesFromCoalAshWasteSites.pdf.

[500] *Id.*

[501] Proposed Rule, at 35,147.

[502] *The Baltimore Sun,* Gambrills Residents, CEG Reach Water Settlement (Dec. 31, 2008), *available at* http://articles.baltimoresun.com/2008-12-31/news/0812300145_1_fly-ash-chess-world-constellation.

waters; and (2) Administrative— the facility was the subject of several citations and the State has enforced remedial actions."[503] This case demonstrates the multi-media effects of coal ash disposal in abandoned sand and gravel pits.

K.R. Rezendes South Main Street Ash Landfill, Freetown, Massachusetts: This coal ash monofill in a sand and gravel quarry caused on-site selenium levels to exceed the primary MCL in groundwater, and is another example of why unencapsulated uses are not beneficial and must not be exempted from federal regulation.[504]

Lansing Board of Water & Light (LBWL) North Lansing Landfill, Michigan: This former gravel quarry pit where coal ash was placed despite the fact that the operator was only licensed "for disposal of inert fill materials including soil, concrete, and brick" caused exceedances of the State health-based standard for lithium off-site and exceedances on-site including exceedances of the MCL for selenium.[505]

Virginia Power Yorktown Power Station Chisman Creek Disposal Site, Virginia Disposal of coal ash in abandoned sand and gravel pits caused exceedances of the primary MCL for selenium in residential wells off-site; sulfate above the secondary MCL and vanadium were also found in high levels off-site; arsenic, beryllium, chromium, copper, molybdenum, nickel, vanadium, and selenium were also found "above background levels" in on-site groundwater.[506]

WEPCO Cedar-Sauk Landfill, Wisconsin: Coal combustion waste placed in this abandoned sand and gravel pit caused selenium to exceed the MCL in groundwater and extensive vegetative (ecological) damage.[507]

WEPCO Cedar-Sauk Landfill, Wisconsin: Fly ash and bottom ash deposited in this former sand and gravel quarry caused boron to exceed health-based standards and likely migrate off-site.[508] In addition, this was deemed "one of the most seriously affected coal ash sites in the State" caused sulfate, boron, manganese, chloride, and iron to exceed the State's Enforcement Standards, and caused arsenic to exceed the State's Preventive Action Level (PAL) in nearby private wells.

WEPCO Port Washington Facility, Wisconsin: This site is an unlined former sand and gravel quarry and is in close proximity to drinking water wells, and it caused an off-site exceedance of a health-based standard for selenium.[509]

LEPCO Port Washington Facility, Wisconsin: Fly ash was dumped in this old gravel pit, which was permitted as a sanitary landfill, and fly ash and bottom ash were used for cover. The site caused the "seepage of landfill leachate onto adjacent property," with VOCs found in

[503] OSWER, U.S. EPA, *Coal Combustion Waste Damage Case Assessments* 14–15 (July 9, 2007)
[504] *Id.* at 38–39.
[505] *Id.* at 30–32.
[506] *Id.* at 17–18.
[507] *Id.* at 28–29.
[508] *Id.* at 27.
[509] *Id.* at 29–30.

residential wells off-site and cadmium and lead found in off-site river water. The site also caused contamination of on-site groundwater with VOCs and inorganic constituents including arsenic, barium, chromium, cadmium, and lead.[510]

RRI Energy's Portland Generating Station, Bangor Ash Quarry Disposal Site, Pennsylvania[511]**:** Groundwater concentrations in downgradient wells at this quarry exceeded primary and secondary MCLs for arsenic, aluminum, fluoride, boron, iron, manganese, sulfate, and total dissolved solids (TDS), and the site operator's consultant conceded that the landfill is responsible for the degradation. In addition, two NPDES permitted outfalls discharged concentrations of boron, cadmium, hexavalent chromium, and selenium into Brushy Meadow Creek at concentrations notably higher than Pennsylvania's surface water standards, the Water Quality Criteria Continuous Concentrations for Fish and Aquatic Life (CCC). For example, boron was measured from Outfall 001 at 86.6 mg/L, more than 54 times the state's CCC of 1.600 mg/L. in addition, selenium was measured at 41.3 µg/L from this Outfall, almost nine times the PA CCC of 4.6 µg/L (adjusted for a hardness of 400). These discharges were not authorized by RRI's NPDES permit for this site.

Trans-Ash, Inc. – CCW Landfill, TVA Johnsonville Plant, Tennessee: Coal ash was dumped into quarries at a former sand and gravel mine, causing exceedances of the primary MCL for mercury in residential wells, with mercury concentrations ranging from 0.011 to 0.013 mg/L – 5.5 to 6.5 times higher than the primary MCL, as well as on-site exceedances of the primary MCLs for arsenic, chromium, lead, and mercury.[512]

Industrial Excess Landfill Superfund Site, Uniontown, Ohio: This former sand and gravel pit has been designated a Superfund Site by the U.S. EPA, as there were exceedances of the MCLs for at least 10 pollutants— antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, and thallium— in off-site residential wells (there was also evidence of migration of radionuclides and anthropogenic radioisotopes into nearby residential areas).[513]

Joliet 9 Lincoln Stone Quarry Landfill, Illinois[514]**:** Midwest Generation bought out or replaced 18 off-site drinking water wells contaminated with boron from CCW dumped in its unlined landfill and two unlined ponds built in a quarry. Groundwater moving off-site became contaminated at levels 52 times over the MCL for cadmium. In August 2009, IEPA issued a Notice of Violation citing 50 exceedances of groundwater standards for arsenic, barium, copper, and molybdenum. Arsenic has exceeded the MCL by up to 8.3 times and molybdenum had exceeded the federal Lifetime Health Advisory by 70 times in 2 off-site monitoring wells.

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[510] *Id.* at 54.
[511] Environmental Integrity Project & Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* 85–88 (Feb. 24, 2010), *available at* http://www.environmentalintegrity.org/news_reports/documents/OutofControl-MountingDamagesFromCoalAshWasteSites.pdf.
[512] *Id.* at 102–105.
[513] Env. Integrity Project, Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment* 132–143 (Aug. 26, 2010) (Jeff Stant, ed.), *available at* http://www.environmentalintegrity.org/news_reports/documents/INHARMSWAY_FINAL3.pdf.
[514] *Id.* at 41–47.

These numerous examples of the harm caused by unencapsulated "reuse" in sand and gravel pits and quarries, in addition to the numerous examples of harm caused by "reuse" as structural fills, demonstrate that these unencapsulated uses are merely disposal in disguise, and must be regulated stringently under Subtitle C of RCRA to prevent the risks they pose of contaminating groundwater, surface water, and ecological systems with heavy metals and other harmful pollutants. Other unencapsulated uses are similar in that they are not consolidated into a product and are not subject to requirements for composite liners or groundwater monitoring. All of these unencapsulated uses must be regulated pursuant to Subtitle C to ensure that these and other safeguards are required and federally enforceable.

iii. Agricultural applications of coal ash can leach toxic pollutants into soils and crops.

Agricultural applications of coal ash, including for nutrient addition and soil modification or stabilization, are unencapsulated uses and cannot be exempted from RCRA regulation as beneficial uses. Agricultural applications place the toxic constituents commonly found in CCRs in direct contact with soil, potentially allowing these constituents to be taken up by crops or to travel as runoff into nearby surface waters. In addition, the varying quantities of CCRs placed, the frequencies of placement, the surface area of the fields, and the composition of the CCRs being applied to crops can pose varying degrees of danger to human health and the environment. Rather than leaving it up to industry to develop management standards[515] to regulate this extremely dangerous unencapsulated use, EPA must regulate it.

The potential dangers to human health and the environment from agricultural applications of fly ash are serious enough to warrant their strict regulation under Subtitle C of RCRA. The preamble to the proposed rule notes that a risk assessment of certain agricultural uses of coal ash, conducted in 1999 for the May 2000 regulatory determination (hereinafter, "1998 Risk Analysis"), concluded that the risks posed to human health are "within the range" of EPA's highest acceptable cancer threshold, 1×10^{-6}. This is presumably based upon the 1998 Risk Analysis's conclusion that "There were no exceedances for this scenario. Further, there were no risks in excess of 1E-7 nor any HQ's greater than 0.1." EPA states:

> In 1999 EPA conducted a risk assessment of certain agricultural uses of CCRs, since the use of CCRs in this manner was considered the most likely to raise concerns from a human health and environmental point of view. EPA's risk assessment estimated the risks associated with such uses to be within the range of 1×10^{-6}. The results of the risk assessment, as well as EPA's belief that the use of CCRs in agricultural settings was the most likely use to raise concerns, resulted in EPA concluding that none of the identified beneficial uses warranted federal regulation, because ''we were not able to identify damage cases associated with these types of beneficial uses, nor do we now believe that these uses of coal combustion wastes present a significant risk to human health or the environment.'' (65 FR 32230, May 22, 2000.) EPA also cited the importance of

[515] Proposed Rule, at 35,162.

beneficially using secondary materials and of resource conservation, as an alternative to disposal.[516]

Thus, EPA decided in 2000 that *no* beneficial uses warranted regulation and all could claim the Bevill exemption from RCRA regulation. In the Proposed Rule, EPA again has proposed exempting agricultural uses from regulation, but EPA recognizes that the use of "excess quantities" of FGD gypsum in agricultural applications must be regulated like a landfill and will not meet the definition of "beneficial use."[517] Specifically, EPA states that "*CCPs that are used in excess quantities (e.g., the field-applications of FGD gypsum in amounts that exceed scientifically supported quantities required for enhancing soil properties and/or crop yields) . . . are excluded from this definition [of beneficial reuse]*."[518]

At the same time, whatever uses qualify as non-"excess" would be exempted from RCRA pursuant to the Bevill amendment. EPA would leave these agricultural applications of coal ash up to industry standards without a regulatory backstop for unsafe applications. EPA provides only that that these uses "should be conducted with care, according to appropriate management practices, and with appropriate characterization of the material and the site where the materials would be placed."[519] The regulated industry would be its own gatekeeper with regard to what management practices would be "appropriate." Although EPA does state that it is formulating guidance for reuse of FGD gypsum in agriculture,[520] guidance is insufficient to ensure compliance before the crops grown in that gypsum soil enter the stream of commerce, and new research (see discussion *infra*) concerning agricultural uses makes identification of a "safe" level unlikely.

There are new data and analyses on the leachability of pollutants in FGD gypsum and fly ash (two commonly used types of coal ash for agricultural uses) and the risks posed by these agricultural applications (as well as by other unencapsulated uses and even encapsulated uses, as set forth in the balance of this subsection). This new information reveals the high potential for leaching and plant uptake of toxic pollutants such as arsenic, selenium, and other heavy metals. Industry cannot be relied upon to undertake the investigations necessary to derive new test data, nor can industry be relied upon to enforce against unsafe practices. The high leachability of pollutants such as arsenic and cadmium from FGD gypsum and fly ash, and the possibility that these leached metals would be absorbed by crops or leached into groundwater or surface water makes plain the need for EPA to regulate these uses like disposal.

a. New Data Available Since the May 2000 Determination and Even Since the Proposed Rule Reveal High Leachability of Pollutants from FGD Gypsum and Fly Ash When Applied to Soils.

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[516] Proposed Rule, at 35, 154 (citing Ctr. for Envtl. Analysis, Research Triangle Institute, Draft Final Report; Non-Groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2) (prepared for OSWER, EPA), *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/fsltech.htm (hereinafter "1998 Risk Analysis")).
[517] Proposed Rule, at 35,154.
[518] *Id.*
[519] Proposed Rule, at 35,154.
[520] Proposed Rule, at 35,162.

New data on the high leachability of toxic pollutants from coal ash, even in quantities that are not "excess," mandate that EPA prohibit this use in order to protect human health and the environment. Although EPA would regulate agricultural applications in "excess quantities," "excess quantities" is defined as reuse quantities "greater than were necessary for a specific project."[521] Testing performed by EPA and others has found that leachability of toxic pollutants from FGD gypsum and fly ash are higher than previously measured and that spreading coal ash onto soil and/or crops in particular is a method that can leach toxic pollutants. Thus, quantity is not the only factor in determining toxicity of coal ash – pH, frequency, accumulation, and other factors play a critical role. Because agricultural applications can exceed thresholds for safety depending on a variety of factors that may differ batch-by-batch, because over 320,000 short tons of coal ash is spread on crops *every year*, and because this application may increase toxicity in crops that humans, especially children, ingest on a regular basis, EPA must regulate all agricultural applications of coal ash pursuant to RCRA's subtitle C.

FGD gypsum, also known as "synthetic gypsum" or "scrubber waste," is the byproduct of the use of FGD systems or "scrubbers" to reduce emissions of air pollutants such as sulfur dioxide from the coal-fired boiler exhausts. The scrubbing process, while reducing air pollutants, transfers these pollutants to the FGD waste, a form of coal ash.[522] Because FGD gypsum has the same chemical make up as mined gypsum— calcium sulfide dehydrate, or $CaSO_4 \cdot 2H_2O$— it has been used as a replacement for mined gypsum in many applications, including use as an agricultural amendment.[523]

Agricultural applications of FGD gypsum and fly ash are common— 320,863 short tons of coal ash were reused for "Agriculture" in 2008 alone, with FGD waste comprising 281,752 of those tons.[524] Furthermore, these agricultural applications of coal ash have increased by over 104% between 2001 (when 157,199 short tons were used) and 2008. *See* Table 1. FGD gypsum has several purported beneficial purposes when applied to soils, including: providing nutrients (such as calcium to crops with high calcium requirements, such as peanuts, or to provide sulfur to fertilize soil); conditioning the soil; remediating high sodium soils; and reducing migration of nutrients and sediments to surface water.[525] However, a non-beneficial consequence of amending soils with FGD gypsum is that, in addition to the calcium, sulfate, and other pollutants that can be beneficial to soils in controlled quantities, the toxic pollutants in the gypsum are also being absorbed by the crops growing in those soils.

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[521] Proposed Rule, at 35,163.
[522] Proposed Rule, at 35,139.
[523] *See, e.g.,* U.S. EPA, Agricultural Uses for Flue Gas Desulfurization (FGD) Gypsum, Doc. No. EPA530-F-08-009 (Mar. 2008).
[524] *See* American Coal Ash Association, "Coal Combustion Product Production & Use Survey Report" (2008), http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf, *and* Attachment 19.
[525] *Id.*
[527] Ctr. for Envtl. Analysis, Research Triangle Institute, Draft Final Report; Non-Groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2), at 13 (prepared for OSWER, EPA), *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/fsltech.htm.

b. FGD Gypsum and Fly Ash Can Leach Toxic Pollutants At Much Higher Levels Than Previously Believed.

Underestimating Risks. EPA continues to rely upon studies that have underestimated the risks posed to human health and the environment to support its conclusion that agricultural applications should be afforded an exemption from regulation rather than regulated like other dangerous unencapsulated uses. For example, EPA continues to cite to the 1998 Risk Analysis as proof that agricultural applications do not pose risks higher than 1×10^{-6} despite the flaws in the study and despite new evidence calling that study's accuracy into question. For example, the 1998 Risk Analysis states:

> Because the FBC waste material is directly applied to the agricultural field at prescribed rates and frequencies, the size of the field has no impact on the constituent waste concentration in the soil and subsequent impacted media. It was found that the variation in the size of the field had little impact on stream concentrations and fish ingestion risks. Therefore, size of the agricultural field was not varied.[527]

This approach to field size is fundamentally flawed. In the 1998 Risk Analysis, EPA stated that using an "average" field size was similarly modeled for the Cement Kiln Dust Rule and went on to state without support that "prescribed rates and quantities" make field size irrelevant, even for "subsequent impacted media." CITE ask Lisa W Although the toxicity characteristic is based upon concentration and therefore the concentration of runoff may not change based on increased field size, the total quantity of pollutants that flow as runoff from a field 100 times the "average" field size can place 100 times *quantity* of pollutants into a receiving stream or lake. Deposition of these heavy metals in greater quantities enables greater bioaccumulation of heavy metals in aquatic species and up the food chain.

Next, EPA assumed there was no risk posed from fugitive dust emissions from agricultural applications of coal ash. EPA stated that "[a] comparison of constituents and starting concentrations between CKD and FBC revealed that the FBC risks from inhalation would likely be insignificant. Therefore, it was assumed that risks would be driven by other pathways and thus inhalation risks were not evaluated for this analysis."[528] EPA has now conducted new studies confirming that, in fact, "without fugitive dust controls, there could be exceedances of the National Ambient Air Quality Standards (NAAQS) for fine particulate matter in the air at residences near CCR landfills."[529] The surface area of fields where agricultural applications would be applied release fugitive dust just as landfills do, and EPA's continued reliance upon the 1998 Risk Analysis on this point ensures an underestimation of risk to environmental and human receptors.

Furthermore, EPA has not revised its 1998 Risk Analysis based on new data detailing leach rates from FGD gypsum and fly ash that are orders of magnitude higher than previously

[528] *Id.* at 21.
[529] Proposed Rule, at 35,171.

believed. See discussion *infra* and in section II.D.a. for a more detailed discussion these new risks.

Disregarding dangers. Furthermore, EPA has disregarded its own research detailing the risks of using coal ash for agricultural amendments. For example, EPA's 1998 Risk Analysis itself states that "[a]pplication of the waste to agricultural lands as a soil amendment *may provide risks from a variety of pathways*."[530] Nevertheless, EPA has not undertaken any meaningful assessment of risks associated with these pathways.

A study more recent than EPA's 1998 Risk Analysis concluded that a disadvantage of using coal ash as a soil amendment is that *coal ash can have high levels of boron and metals* and, specifically, "*can leach* [*selenium*] *and* [*arsenic*]." [531] The study further presented a critique of EPA's assumption that industry will adhere to management standards that promote low leachability because large quantities of coal ash are inherently necessary to achieve the intended benefits of this use. Specifically, EPA's 2007 study states that a disadvantage of using coal ash for soil amendments is that: "*Large quantities [are] generally necessary to achieve benefits*; Can have contaminants including Se, B, As and metals."[532] In other words, "large" quantities are necessary to achieve the benefits of using coal ash for agricultural applications; yet "excess" quantities of coal ash in agricultural applications is the only trigger for disposal regulation under EPA's proposed subtitle C rule.[533] If there is a "goldilocks" scenario between "large" quantities and "excess" quantities where agricultural applications are truly beneficial, EPA has not discovered it, and neither has industry. Until there is scientifically credible data to suggest that there is a "just right" scenario, this extremely dangerous unencapsulated use according to Subtitle C of RCRA.

Improved leach tests. Recent studies based upon a pH-sensitive leach test, namely the Leaching Environmental Assessment Framework (LEAF), reveal leach rates orders of magnitude higher than the rates suggested by previous tests such as the TCLP test.[534] *See* Section II.D.a, *supra,* for a complete analysis of the new leach test. EPA's own study, *Characterization of Coal Combustion Residues from Electric Utilities – Leaching and Characterization Data*,[535] was released in December 2009 (six months after the Proposed Rule was published in the Federal Register), showing drastically higher leach rates than the TCLP test previously relied upon by EPA and industry. The results of EPA's study showed that FGD gypsum and fly ash, the primary and secondary type of coal ash used in agricultural applications, respectively, both leach

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[530] *Id.* at 16–17.
[531] U.S. EPA, *The Use of Soil Amendments for Remediation, Revitalization, and Reuse* 20, 22 (Dec. 2007), *available at* http://www.epa.gov/tio/download/remed/epa-542-r-07-013.pdf (emphasis added).
[532] *Id.* at 22 (emphasis added).
[533] Proposed Rule, at 35,129.
[534] *See, e.g.,* U.S. EPA, Office of Research & Development, *Characterization of Coal Combustion Residues from Electric Utilities—Leaching and Characterization Data* (EPA/600/R-09/151) (Dec. 2009), *available at* http://www.epa.gov/nrmrl/pubs/600r09151/600r09151.html; *and* Susan A. Thorneloe et al., *Evaluating the Fate of Metals in Air Pollution Control Residues from Coal-Fired Power Plants*, 44 *Envtl. Sci. Technol.* 7,351 (Aug. 31, 2010), *available at* http://pubs.acs.org/doi/pdfplus/10.1021/es1016558.
[535] *Id.*

toxic and other coal ash pollutants, including antimony, arsenic, boron, cadmium, chromium, molybdenum, and selenium, at levels that greatly exceed MCLs[536]:

Table ES-3. Leach results for 5.4 ≤ pH ≤ 12.4 and at "own pH" from evaluation of twenty FGD gypsums.[537]

	Hg	Sb	As	Ba	B	Cd	Cr	Co	Pb	Mo	Se	Tl
Total in Material (mg/kg)	0.01 - 3.1	0.14 - 8.2	0.95 - 10	2.4 - 67	NA	0.11 - 0.61	1.2 - 20	0.77 - 4.4	0.51 - 12	1.1 - 12	2.3 - 46	0.24 - 2.3
Leach results (µg/L)	<0.01 - 0.66	<0.3 - 330	0.32 - 1,200	30 - 560	12 - 270,000	<0.2 - 370	<0.3 - 240	<0.2 - 1,100	<0.2 - 12	0.36 - 1,900	3.6 - 16,000	<0.3 - 1,100
TC (µg/L)	200		5,000	100,000		1,000	5,000		5,000		1,000	
MCL (µg/L)	2	6	10	2,000	7,000 DWEL	5	100		15	200 DWELL	50	2

Note: The shade is used to indicate where there could be a potential concern for a metal when comparing the leach results to the MCL, DWEL, or TC. Note that MCL and DWEL values represent well concentrations; leachate dilution and attenuation processes that would occur in groundwater before leachate reaches a well are not accounted for, and so MCL and DWEL values are compared to leaching concentrations here to provide context for the test results and initial screening.

Table ES-2. Leach results for 5.4 ≤ pH ≤ 12.4 and at "own pH13" from evaluation of thirty-four fly ashes.[538]

	Hg	Sb	As	Ba	B	Cd	Cr	Co	Pb	Mo	Se	Tl
Total in Material (mg/kg)	0.01 - 1.5	3 -14	17- 510	590 - 7,000	NA	0.3 - 1.8	66 - 210	16 - 66	24 - 120	6.9 - 77	1.1 - 210	0.72 - 13
Leach results (µg/L)	<0.01 - 0.50	<0.3 - 11,000	0.32 - 18,000	50 - 670,000	210 - 270,000	<0.1 - 320	<0.3 - 7,300	<0.3 - 500	<0.2 - 35	<0.5 - 130,000	5.7 - 29,000	<0.3 - 790
TC (µg/L)	200		5,000	100,000		1,000	5,000		5,000		1,000	
MCL (µg/L)	2	6	10	2,000	7,000 DWEL	5	100		15	200 DWEL	50	2

Note: The shade is used to indicate where there could be a potential concern for a metal when comparing the leach results to the MCL, DWEL, or TC. Note that MCL and DWEL values represent well concentrations; leachate dilution and attenuation processes that would occur in groundwater before leachate reaches a well are not accounted for, and so MCL and DWEL values are compared to leaching concentrations here to provide context for the test results and initial screening.

For FGD gypsum, these results reveal that selenium leaches at up to 16,000 µg/L, 50 times the MCL and 16 times the threshold that would require this waste to be a characteristic hazardous waste based on toxicity (as listed in the TC row of each chart, 1,000 µg/L).[539] In

[536] The following tables and notes are found in U.S. EPA, Office of Research and Development, *Characterization of Coal Combustion Residues from Electric Utilities—Leaching and Characterization Data* (EPA/600/R-09/151), at xiv (Dec. 2009) (emphasis in original), *available at* http://www.epa.gov/nrmrl/pubs/600r09151/600r09151.html.
[537] *Id.*
[538] *Id.*
[539] *See* 40 C.F.R. § 261.64.

addition, thallium leaches at 1,100 µg/L, 550 times higher than the primary MCL; cadmium leaches at up to 370 µg/L, 74 times higher than the primary MCL; arsenic leaches at concentrations up to 1,200 µg/L, 120 times higher than the primary MCL; and antimony leaches up to 330 µg/L, 55 times higher than the primary MCL. FGD gypsum leaches molybdenum at up to 1,900 µg/L, more than 45 times over the federal Lifetime Health Advisory and boron at up to 270,000 µg/L, also 45 times higher the federal Lifetime Health Advisory.

The results for fly ash reveal that it would be characterized as a hazardous waste based on *four* individual pollutant leach rates. Specifically: arsenic leaches up to 18,000 µg/L, 1,800 times the MCL and 3.6 times the level needed to become a characteristic hazardous waste (5,000 µg/L); barium leaches from fly ash at up to 670,000 µg/L, 335 times the MCL (2,000 µg/L) and 6.7 times the hazardous waste threshold (100,000 µg/L); chromium leaches at up to 7,300 µg/L, 730 times higher than the MCL (100 µg/L) and also exceeding the hazardous waste threshold (5,000 µg/L); and selenium leaches at up to 29,000 µg/L, exceeding the MCL of 50 by a factor of 580 and exceeding the hazardous waste threshold (1,000 µg/L) by a factor of 29.[540] In addition, antimony leaches at up to 1,833 times the MCL; boron leaches at up to 38.5 times the DWEL; cadmium leaches up to 64 times the MCL; lead leaches at up to more than 2.3 times the MCL; molybdenum leaches at up to over 650 times the DWEL; and thallium leaches at up to 395 times the MCL.

The carcinogenic, reproductive, gastrointestinal, and other impacts of these pollutants are well documented and acknowledged by EPA.[541]

c. The Toxic Pollutants That Leach From Coal Ash Are Absorbed By Crops Grown in the Coal Ash-Amended Soils and Accumulate Up the Food Chain.

Furthermore, these pollutants that leach from the coal ash used to amend soils are taken up by the crops grown in that soil. Researchers studying the effects of growing crops with coal ash constituting 5 to 20% of soil weight showed that the more coal ash was applied, the more arsenic and titanium were absorbed by crops, with basil and zucchini exceeding toxic levels at above 6 parts per million.[542] Soil with coal ash at 1.1% soil weight, in contrast, increased tomato yields up to 70% and found no groundwater contamination or fertility decline in three years.

Reuse of other types of coal ash such as fly ash for agricultural amendments pose similar toxic risks to plants that absorb toxic pollutants along with the nutrients being absorbed from the soil:

> Plants growing on soils amended with fly ash have been shown to be enriched in elements such as As, Ba, B, Mo, Se, Sr, and V (Furr et al., 1977; Adriano et al., 1980). Although trace amounts of some of these elements are required for plant and animal nutrition, higher levels can be toxic. Highly phototoxic elements often

[540] *Id.*
[541] *See, e.g.,* Proposed Rule, at 35,169–70.
[542] Matthew Cimitile, "Is Coal Ash in Soil a Good Idea?" *Scientific American* (Feb. 6, 2009), *available at* http://www.scientificamerican.com/article.cfm?id=coal-ash-in-soil.

> kill plants before the animals are able to accumulate large quantities of the element.[543]

Furthermore, even though transfer of toxic pollutants higher up the food chain can be limited where plants die before being consumed, many common coal ash pollutants that do not immediately kill plants when absorbed are nonetheless fatal to grazing animals upon ingestion of such plants. For example:

> Elements such as Se and Mo . . . are not particularly toxic to plants and may be concentrated in plant tissue at levels that cause toxicities in grazing animals. Soils amended with high rates of fly ash may accumulate enough Mo to potentially cause molybdenosis in cattle (Doran and Martens, 1972; Elseewi and Page, 1984).[544]

Even EPA's 1998 Risk Analysis, which EPA is now relying on for the proposition that agricultural applications do not require RCRA regulation, admitted that crops absorb the pollutants in from coal combustion wastes used as soil amendments: "Once applied to the agricultural lands, *contaminants are taken up by the plants grown on the amended soil*. Wind erosion and *runoff/erosion from the agricultural field to a nearby stream will also occur*."[545] EPA even included a picture of the fate of contaminants entering crops and nearby streams[546]:

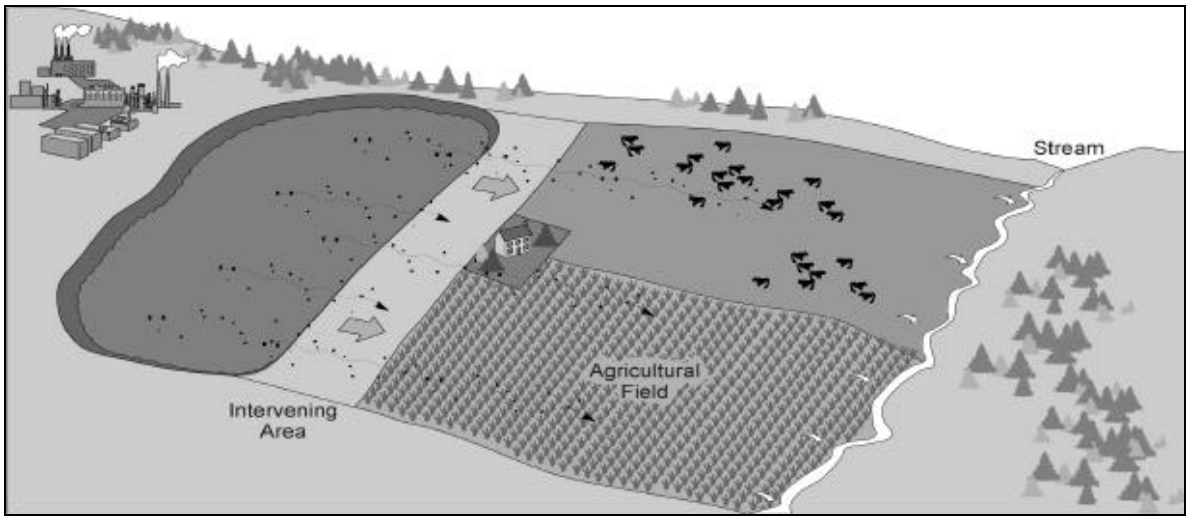

Figure 4.2 Depiction of Environmental Release and Transport for the Dewatered Surface Impoundment Scenario" (Where Ash from Dewatered Impoundment is Reused on Field)

[543] Md. Wasim Aktar, Pesticide Residue Laboratory, Dep't Agricultural Chemicals, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur-741252, Nadia, West Bengal, India, "Fly Ash Use in Agriculture: A Perspective," *in* Geoffrey S. Ashworth & Pablo Azevedo, eds, *Agricultural Wastes* 77-91 (2009).
[544] *Id.*
[545] Ctr. for Envtl. Analysis, Research Triangle Institute, Draft Final Report; Non-Groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2), at 17 (prepared for OSWER, EPA) (emphasis added), *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/fsltech.htm.
[546] *Id.*

EPA further explained that "[c]rops on the agricultural field receive dry deposition of particles from the agricultural field as well as uptake of contaminant through the roots."[547]

Another more recent article states that "Negative aspects of agricultural CCP application include (1) excessive trace element loadings that may increase food chain metals (Peralta-Videa et al., 2009), (2) high soluble salt loadings that may reduce initial plant growth (Palumbo et al., 2004), and (3) toxic substances leaching into the groundwater (Singh and Paul, 2001)."[548]

Given the extensive threats and potential threats posed by reuse of FGD gypsum and other types of coal ash for agricultural applications, and the proven migration of toxic pollutants from FGD gypsum and fly ash into crops and into receiving streams, EPA's final rule for coal ash regulation cannot exempt all of these agricultural applications as "beneficial" uses.

iv. Other Problematic Uses

Snow and Ice

Over 700,000 short tons of coal ash— primarily bottom ash but also 1,352 short tons of boiler slag— went to "snow and ice control" in 2008 alone,[549] despite the fact that this is an unencapsulated use of coal ash that involves pouring loose coal ash onto roads to prevent skidding in place of fine aggregate.[550] Numerous commenters have expressed concern about this unencapsulated use being applied to roads in their communities, yet the record is devoid of studies demonstrating that this use, which enables bottom ash to be applied to roads and then to run off into stream systems and groundwater, has been proven not to accumulate to concentrations that would exceed surface water quality standards or groundwater MCLs. Nor have studies been presented demonstrating that this use has been proven to be no more toxic than the materials being replaced (namely fine aggregate).

This use places necessarily places coal ash (and its toxic constituents) into direct contact with snow and ice, so that it will melt and run off of roads and into water systems. There can be no liner system, leachate collection system, or other protection associated with this use. Furthermore, use of coal ash in short tons for this material declined almost 20% between 2001 and 2008.[551] Due to the obvious concerns that this unencapsulated use raises to communities that rely on the water sources into which this coal ash runs off, this use must be regulated under Subtitle C of RCRA and *not* given an exemption from RCRA regulation.

Blasting Grit/Roofing Granules

In 2008 alone, 1,637,867 short tons of coal ash, primarily boiler slag (1,486,316 short tons) and the balance fly ash and bottom ash, were used for blasting grit/roofing granules, which represented an increase of over more than 7% compared to 2001, but a significant decrease from

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[547] *Id.* at 22.
[548] Sanchul Hwang et al., Phaselous vulgaris *Growth under the Influence of Manufactured Coal Ash Aggregates,* University of Kentucky Center for Applied Energy Research and the American Coal Ash Ass'n (2010), *available at* http://www.coalcgp-journal.org.
[549] American Coal Ash Association, "Coal Combustion Product Production & Use Survey Report" (2008), http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.
[550] 2010 Proposed Rule, at 35,163.
[551] *See* Attachment 19.

1997 use of 2,448,330 tons.[552] This use replaces sand for sandblasting and roofing granules.[553] However, EPA and the National Institute for Occupational Safety and Health (NIOSH) have found that blasting grit containing coal ash boiler slag can be hazardous to human health.[554] Traditional sand used as blasting grit/roofing granules has been shown to cause health risks, and alternative materials (such as recycled glass) may pose lower risks.[555] Because of the great potential dangers caused by this use, it must not be excluded as a beneficial use.

Aggregate

Aggregate is listed as a separate category by the ACAA but used primarily in other reuses such as road beds, asphalt, or concrete. Over 900,000 short tons of coal ash, primarily bottom ash (727,048 short tons) are incorporated into aggregate.[556] There is little data available on the potential health and environmental hazards posed by coal ash in aggregate, and more study is needed before EPA can reasonably exempt this use as "beneficial."

Excavation to allow more coal ash fill

Commenters agree with EPA's definition of "CCR landfills" to include the requirement that "[s]ites that are excavated so that more coal ash can be used as fill are also considered CCR landfills."[557] Excavation of an existing site for placement of additional ash must be treated like any other new placement of coal ash, especially due to the likely excess fugitive dust that would be releases and the coal ash-laden waters that could run off an excavated site.

b. Some Encapsulated Uses Also Pose Potential Dangers.

i. Raw Feed in Cement

Coal ash used as raw feed for clinker or blended cement made up almost 7% of the coal ash that was reused in 2008.[558] However, the mercury emissions from using coal ash as feed for cement has been deemed by at least one state to negate the emissions benefits of installing FGD systems ("air pollution scrubbers") created to reduce mercury emissions. The New York State Department of Environmental Conservation has decided to disapprove this use as "beneficial" unless a case-by-case determination shows it is beneficial. The DEC found that:

> Mercury removed by the coal plant air pollution control equipment will be concentrated in the [coal combustion fly ash]. If this CCFA is subsequently fed to a cement kiln, the temperatures found in the kiln will liberate the mercury from

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[552] U.S. EPA, *Report to Congress: Wastes from the Combustion of Fossil Fuels* (EPA 530-R-99-010), at 3-36 (Mar. 1999).
[553] *Id.*
[554] *See* Paul J. Mellon, Jr., Novetas Solutions LLC, EPA Coal Combustion Residuals Public Hearings (Oct. 27, 2010) http://www.newageblastmedia.com/EPA%20CCR%20Public%20Hearings_%20w%20pg%20no%20Knoxville%20TN%20Oct%2027%202010.pdf, *and* sources cited therein.
[555] *See, e.g.* New Age Blast Media, http://www.newageblastmedia.com/.
[556] *See* Attachment 19.
[557] Proposed Rule, at 35,130.
[558] *See* Attachment 19.

the CCFA and the environmental benefit of coal power plant emission control for mercury will have been negated.[559]

These findings were recently corroborated by an EPA study conducted to test volatilization of four metals— mercury, arsenic, lead, and selenium— in different reuse applications, including the production of cement clinker. The study, which tested many real coal ashes from several power plants, found that "virtually all of the metals tested were volatilized when exposed to a temperature of 1450°C," which is the temperature assumed to be achieved in a cement kiln.[560] To be clear, the finding was that virtually 100% of each pollutant volatized at that temperature and would be assumed to do the same in a cement kiln, making this use the most potentially toxic of the four reuses studied. The extremely high likelihood of toxic heavy metals being 100% or almost 100% volatized when fed into a cement kiln for clinker production makes this an extremely dangerous reuse that must not be exempted as a beneficial use.

ii. FGD gypsum in wallboard products

Although widely considered safe by those in the beneficial reuse industry and by government organizations, some studies are beginning to question whether "synthetic gypsum" wallboard may cause elevated mercury releases. FGD gypsum panel products were the fourth-largest reuse of coal ash in 2008, with 8,533,732 short tons of FGD waste recycled into panel products, representing more than a 37% increase from 2001.[561] However, one study found that flue gas desulfurization (FGD) gypsum plants can release 1,000 pounds of mercury annually or more, the equivalent of 1% of mercury emissions.[562]

These results may not reflect the full extent of pollution that is at issue. An EPA study of volatilization of mercury, arsenic, lead, and selenium from FGD gypsum in wallboard found that the non-mercury metals are less likely to volatize (and more likely to be retained in the FGD gypsum), even during the kettle calcining process (the phase in wallboard production deemed most likely to promote volatizing of metals).[563] However, depending on the temperature of the kettle calciner, the study found that mercury could volatize at 9–48% (first study) or 2–51% (study).[564] Given these serious concerns, more research must be conducted on this use before it is given the blanket exemption from regulation afforded by the "beneficial use" exclusion.

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[559] New York State Dep't Envtl. Conservation, Division of Solid & Hazardous Materials, Fact Sheet: Coal Combustion Fly Ash As an Ingredient in Cement Manufacturing; Today's Concrete Technology, "State to Ban Coal Fly Ash at Lafarge Ravena Cement Plant" (Dec. 7, 2009), *available at* http://www.todaysconcretetechnology.com/state-to-ban-coal-fly-ash-at-lafarge-ravena-cement-plant.html.

[560] Susan Alice Thorneloe-Howard, Principal Investigator, Office of Research & Development, U.S. EPA, *Evaluating the Thermal Stability of Mercury and Other Metals in Coal Combustion Residues Used in the Production of Cement Clinker, Asphalt, and Wallboard* (EPA/600/R-09/152) 3-1 (Dec. 2009) [hereinafter "Thorneloe-Howard, *Thermal Study*"], *available at* http://www.epa.gov/nrmrl/pubs/600r09152/600r09152.pdf.

[561] *See* Attachment 19.

[562] Jessica Marshall, USG, Fate of Mercury in Synthetic Gypsum Used for Wallboard Production Topical Report, Task 1 Wallboard Plant Test Results (Apr. 2005) (prepared for U.S. Dep't Energy), *available at* http://www.netl.doe.gov/technologies/coalpower/ewr/pubs/USGTask1TopRpt_A113004.PDF.

[563] Thornloe-Howard, *Thermal Study*, at 4-1 to 4-2.

[564] *Id.*

iii. Mineral filler in asphalt

Using bottom ash (257,806 short tons in 2008) and a relatively small amount of fly ash (7,781 short tons in 2008) as a mineral filler in asphalt is one of the less frequent uses tracked by the American Coal Ash Association, with only 265,587 short tons reused in 2008.[565] However, it is a potentially dangerous practice. A study conducted by EPA simulating manufacture of asphalt with coal ash found that mercury releases were a potential issue. Although some samples of coal ash from some power plants showed low mercury volatilization in the process, another sample (from "Facility B") showed:

> [S]ignificant loss of Hg into the gas-phase as a result of exposure to the asphalt manufacturing conditions. Facility B is the only facility included in this study that has an in-furnace SCR [selective catalytic reduction] design. This design type necessitates that the fly ash come in contact with the SCR catalyst surface regardless of whether ammonia is being injected or not. Further investigation of fly ashes from facilities with an in-furnace SCR design is probably warranted.[566]

The "significant" mercury volatilization ranged from 76.5% (SCR off) to 89.3% (SCR on). Consequently, asphalt manufacturing under certain circumstances does release high levels of mercury and should not be subject to a blanket exemption.

iv. Concrete and bricks

Fly Ash

Incorporating fly ash into concrete is considered the safest beneficial reuse by EPA, and we agree. In addition, using fly ash in concrete affords other environmental benefits such as CO_2 emissions reductions. However, some studies have found evidence of leachability of metals from fly ash in concrete. For example, one study of fly ash concrete found that "[a]rsenic, and to a lesser extent Cu and Zn, were the only metals that showed any significant leaching trends in the tests. Arsenic showed a correlation between the metal content in fly ash and the concentrations of the metals leached from the fly ash concrete."[567]

a. Bottom Ash

Bottom ash is less frequently used in concrete and less often tested for potential leachability or other toxic pollutant-related risks because it is a less desirable replacement for Portland cement in concrete due to its inferior strength. For example, a test of "Rockport bottom ash, when used alone as an aggregate, did not achieve the target strength requirements of 1000 psi in 3 days."[568] However, mixing the bottom ash with percentages of fly ash[569] and other

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[565] *See* Attachment 19.
[566] Thornloe-Howard, *Thermal Study*, at 4-1.
[567] Min-Hong Zhang, Marcia C. Blanchette, & V. Mohan Malhotra, *Leachability of Trace Metal Elements from Fly Ash Concrete: Results from Column-Leaching and Batch-Leaching Tests*, Materials Journal (Mar. 1, 2001), *available at* http://www.concrete.org/PUBS/JOURNALS/AbstractDetails.asp?ID=10196.
[568] Benjamin L. Phillips, et al., *Evaluation of Processed Bottom Ash for Use as a Lightweight Aggregate in the Production of Concrete Masonry Products,* University of Kentucky Center for Applied Energy Research, World of Coal Ash Conference (Apr. 11–15, 2005), *available at* http://www.flyash.info/2005/2phi.pdf

methods are leading to use of this product, in the amount of 720,948 short tons ash per year for concrete/concrete products/grout (although this use was down almost 59,000 tons as compared to 2001).[570] Levels of heavy metals in bottom ash have been tested to be detectable, "[t]he ashes were analysed for the presence of Cr, Mn, Pb, Zn, Cu, Ni and Co and detectable levels of all were found in both fly ash and bottom ash."[571] The leachability of these pollutants from bottom ash in concrete must be analyzed to determine the relative dangers this use poses to human health and the environment.

v. Road base/sub-base

Risks and Damage Case

The use of bottom ash and other types of coal ash for road base/sub-base has been proven at one Superfund site to leach toxic pollutants. The use of coal ash for construction projects throughout the Town of Pines, Indiana, including as uncovered roads, led to the town being declared a Superfund Site after levels of boron, molybdenum, arsenic, and other metals were found in residential wells.[572] Despite this, an estimated 1,802,025 short tons of coal ash (primarily fly ash, contributing 1,027,568 short tons) were reused in 2008 alone, a 7.5% increase from 2001 levels.[573] Due to the dangers posed to the Town of Pines, this is another use that requires more careful study.

vi. Miscellaneous

Certain other reuses in products would seem to pose obvious risks.[574] A Commonwealth of Pennsylvania publication suggests that FGD gypsum "can be used by itself or in a mixture with natural gypsum in manufacturing plaster of Paris, gypsum wallboard, roof tiles, cements, fillers for paper, paints, toothpaste, blackboard chalk, lipstick, Epsom salts, and many, many other products."[575] Incorporation of CCRs into toothpaste, Epsom salts, and lipstick warrant careful study due to the potential for ingestion of harmful constituents. These uses should not be subject to a blanket exemption under subtitle C of RCRA.

Minefilling promotes leaching of toxic pollutants and cannot be exempted as a beneficial use

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[569] *See, e.g., id.* (explaining that 30% bottom ash mixed with fly ash could achieve product standards).
[570] *See* Attachment 19.
[571] Snigdha Sushil & Vidya S. Batra, Ctr. for Energy & Envt., *Analysis of fly ash heavy metal content and disposal in three thermal power plants in India* (June 12, 2006), *available at* http://flyashbricksinfo.com/construction/analysis-of-fly-ash-heavy-metal-content-and-disposal-in-three-thermal-power-plants-in-india.html.
[572] U.S. EPA, Region 5 Superfund, Town of Pines Groundwater Plume, http://www.epa.gov/R5Super/npl/sas_sites/INN000508071.htm.
[573] *See* Attachment 19.
[574] *See, e.g.,* Ecohaus, http://www.ecohaus.com/C-715/squak+mountain+stone; Hubpages, http://hubpages.com/hub/Earth_Friendly_Countertops; *and* HGTV Pro, http://www.hgtvpro.com/hpro/di_kitchens/article/0,,hpro_20172_3456203,00.htm.
[575] Bureau of Topographic & Geologic Survey, Pa. Dep't Conservation & Natural Res., *Pennsylvania Geology*, vol. 39, at 10 (Winter 2009) (John A. Harper,ed.), *available at* http://www.dcnr.state.pa.us/topogeo/pub/pageolmag/pdfs/v39n4.pdf.

As discussed in further detail *infra*, minefilling is another unencapsulated use that poses human health and environmental risks. Minefilling was deemed unsafe when the National Academy of Sciences found in 2006 that "*the presence of high contaminant levels in many CCR leachates may create human health and ecological concerns at or near some mine sites over the long term*."[576] Furthermore, in 2007, the Clean Air Task Force found that 2/3 of 15 Pennsylvania minefills examined had degraded surface and/or groundwater.[577] Nonetheless, minefilling constituted the third highest source of CCW "reuse" in 2008 and represented the largest increase in tons "reused" from 2001 to 2008. *See* Table 2. Despite the grave risks posed by minefilling, EPA has decided not to regulate minefills at all, allowing these poorly-disguised dumps to continue receiving in excess of 10 million short tons of coal ash. Minefilling is akin to dumping without safeguards like a liner, and, accordingly must be regulated like a landfill according to Subtitle C of RCRA. The following section will discuss minefilling in further detail.

Unsafe reuses are increasing, and will continue to do so unless they are exempted from the definition of "beneficial use."

Unfortunately, unsafe reuse practices have been increasing. For example, "mining applications"— the controversial practice of minefilling that can place toxic constituents in direct contact with the water table — has increased by over 9 million tons, or 870.66%, between 2001 and 2008.[578] Similarly, dumping in structural fills increased 150%, from 4.57 million tons in 2001 to 11.5 million tons in 2008.[579]

In addition, a recent article co-authored by EPA staff explains that increasing air pollution controls in the coming years will cause more coal ash to be generated and cause the coal ash to be more highly concentrated with toxic pollutants, making coal ash increasingly more toxic. The article explains that the "annual amount of coal combustion residues (CCRs) generated is expected to grow with increasing demand for electricity and the resulting coal consumption" and further explains:

> With the promulgation of the U.S. EPA's Clean Air Interstate Rule (CAIR) (3-5), over half of the U.S. coal-fired capacity is projected to be equipped with SCR and/or FGD technology by 2020 (5, 6). The current practice of seasonal use of postcombustion NOx control will likely be extended to year-round implementation. In addition, coal-fired power plants, the largest source of anthropogenic Hg emissions in the U.S. (7), will likely expand the use of activated carbon injection (ACI) (8-10) to reduce Hg stack emissions.
>
> Changes in APC technologies will result in a greater amount of residue generated for each unit of electricity produced and an overall increase in the total content of

[576] Comm. on Mine Placement of Coal Combustion Wastes, National Academy of Sciences, *Managing Coal Combustion Residues in Mines* 4 (2006) (emphasis in original).
[577] Jeff Stant, Clean Air Task Force, *Impacts on Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines* vi (July 2006).
[578] *Compare* American Coal Ash Association, "Coal Combustion Product Production & Use Survey Report" (2008), http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf, *with* American Coal Ash Association, "Coal Combustion Product Production & Use" (2001), http://acaa.affiniscape.com/associations/8003/files/2001_rev_svy_11-02.pdf.
[579] *Id.*

> Hg and other hazardous air pollutants in fly ash, FGD residues, and other APC residues (3, 8). The mobility of metals may be altered as a result of changes in material pH, carbon and chloride content, and interaction with the broader class of coal combustion residues (CCRs), for example, pyritic coal rejects from coal washing or high-sulfur coal rejects (11-14). Also, APC residues may be comanaged with residues, boiler slag, bottom ash, and other wastes from electric utilities (11, 15). Emerging APC technologies are likely to create new APC residues to be managed such as spray dryer ash or spent sorbents from Hg or postcombustion NOx control technology (11).[580]

The same EPA study acknowledges that there are advantages to reusing coal ash but only "as long as evaluation approaches are in place to ensure that one environmental release (i.e., air emissions from power plants) is not being traded for another (i.e., leaching of metals from coal ash through land disposal or use in engineering and commercial applications)."[581] We agree.

Although some reuses have positive environmental benefits, that is not reason to exempt all reuses from disposal regulations as "beneficial uses." Only the reuses that are not more toxic than the virgin materials they are replacing and which have benefits including CO_2 emissions reductions should be deemed beneficial. Notably, only a small number of reuses have been demonstrated to have positive CO_2 reduction benefits— replacing Portland cement with fly ash, and using fly ash in brick. EPA should not allow other more dangerous uses ride on the coattails of concrete and bricks.

c. EPA's definition of beneficial use is overly broad

EPA's proposed definition of beneficial reuse must be refined and narrowed in order to avoid present and future promotion of unsafe reuses. EPA must revise the definition to exclude from the definition some uses that have proven dangerous; to require more research before some other uses can claim the total regulatory exemption; and to require ongoing research to ensure the continued safety of beneficial uses. The definition of beneficial use proposed by EPA is overly broad. It would allow uses that have been shown to pose environmental and human safety risks to claim the benefit of a total regulatory exclusion, and it fails to provide a regulatory backstop for "beneficial uses" that are later shown to be unsafe due to increasing coal ash toxicity, availability of new testing procedures, or other factors. EPA's broad current definition of "beneficial use" is:

> *Beneficial Use of Coal Combustion Products (CCPs)* means the use of CCPs that provides a functional benefit; replaces the use of an alternative material, conserving natural resources that would otherwise need to be obtained through practices such as extraction; and meets relevant product specifications and regulatory standards (where these are available). CCPs that are used in excess quantities (*e.g.,* the field-applications of FGD gypsum in amounts that exceed

[580] Susan A. Thorneloe, EPA, et al., *Evaluating the Fate of Metals in Air Pollution Control Residues from Coal-Fired Power Plants*, 44 *Envtl. Sci. Technol.* 7,351, 7,351 (Aug. 31, 2010), *available at* http://pubs.acs.org/doi/pdfplus/10.1021/es1016558.
[581] *Id.*

> scientifically supported quantities required for enhancing soil properties and/or crop yields), placed as fill in sand and gravel pits, or used in large scale fill projects, such as for restructuring the landscape, are excluded from this definition.[582]

This definition fails to exclude: 1) excessive applications/use of coal ash in the reuse method as would be determined by EPA; 2) applications with higher contaminant levels than the virgin materials they are replacing; or 3) uses that have been documented to be dangerous in EPA and other reports.

For example, without EPA's express exclusion of structural fills and other large-scale fill projects from the definition of beneficial use, these uses would have been easily exempted from regulation as "beneficial uses," as they would have met EPA's 3-pronged definitional test. The fact that EPA had to specifically single out excessive agricultural FGD applications, fill in sand and gravel pits, and large-scale fill projects from the definition of beneficial use shows that EPA's definition is too broad to ensure that unsafe uses are regulated like disposal units.

EPA must define "beneficial use" more narrowly: (1) to provide clear mechanisms for regular and long-term EPA-mandated monitoring and analyses of beneficial uses using the best available testing methods; and (2) to allow for future disapprovals of reuses if and when new data reveal previously unknown risks. The extent of the dangers posed by many products may not yet be known due to unavailability of data, imperfect analyses, or failure to test products in a manner that reliably detects leachability, off-gassing, or other potential dangers.

Without a clear federal definition of beneficial reuse in place, state determinations as to what is "beneficial use" will vary widely, potentially leaving citizens in some states disproportionately more vulnerable to damage from unsafe reuses. A report co-authored by EPA acknowledges that "[c]urrrently, there is wide disparity among the states as to how to establish if potential beneficial use applications are protective of human health and the environment."[583] Further, standards-setting organizations should not be entrusted with determining nation-wide standards certain reuses. This is especially a concern considering the large quantities of coal ash produced and reused each year that have been deemed unsafe by EPA but which nonetheless have product standards promoting them by these professional organizations.

III. CCR IS PROPERLY REGULATED AS A HAZARDOUS WASTE UNDER SUBTITLE C OF RCRA.

A. CCR meets the definition of hazardous waste under section 1004(5) of RCRA.

Pursuant to Section 1004(5) of RCRA, the term "hazardous waste" means

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[582] Proposed Rule, at 35,129–30.

[583] Susan A. Thorneloe, EPA, et al., *Evaluating the Fate of Metals in Air Pollution Control Residues from Coal-Fired Power Plants*, 44 *Envtl. Sci. Technol.* 7,351, 7,351 (Aug. 31, 2010), *available at* http://pubs.acs.org/doi/pdfplus/10.1021/es1016558.

> a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may—
>
> (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or
>
> (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.[584]

According to section 3001(b)(1) of RCRA, the Administrator has the duty to promulgate regulations that identify the characteristics of hazardous waste and that list particular hazardous wastes that fall within the meaning of section 1004(5).[585] Further, the Administrator has the duty to revise such criteria and regulation from time to time, as may be appropriate.[586] In addition, section 3001(b)(1) states that the Administrator

> [S]hall also identify or list those hazardous wastes which shall be subject to the provisions of this subtitle solely because of the presence in such wastes of certain constituents (such as identified carcinogens, mutagens, or teratagens) at levels in excess of levels which endanger human health.[587]

Coal combustion residues, because of their quantity, concentration, and chemical characteristics, may cause or significantly contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness and may pose a substantial present or potential hazard to human health or the environment when improperly treated, transported or disposed of, or otherwise managed.[588] Clear and convincing evidence of the ability of CCR to cause or significantly contribute to an increase in mortality or illness is demonstrated by aggressive leaching of arsenic and other dangerous contaminants from the ash. The ability of CCR to cause substantial harm to human health and the environment is found in the reports completed by EPA, EPA's Office of Research and Development, and numerous public interest groups.[589] Many of the findings of these reports have already been discussed in detail in these comments. Further evidence supporting a hazardous waste listing is discussed below.

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[584] 42 U.S.C. § 6902(5).
[585] 42 U.S.C. § 6921(b)(1).
[586] *Id.*
[587] *Id.*
[588] *See* 42 U.S.C. § 6902(5).
[589] *See* U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007); Kosson D., F. Sanchez, P. Kariher, L.H. Turner, R. Delapp, P. Seignette. 2009. U.S. EPA, Characterization of Coal Combustion Residues from Electric Utilities Using Multi-Pollutant Control Technology – Leaching and Characterization Data (EPA-600/R-09/151) Dec 2009, http://www.epa.gov/nrmrl/pubs/600r09151 /600r09151.html;
Envtl. Integrity Project and Earthjustice, Out of Control: Mounting Damages from Coal Ash Waste Sites (Feb. 24, 2010); Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 26, 2010).
See U.S. EPA 1998, ''Draft Final Report: Non-groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2)'' (June 5, 1998),

B. CCR meets the regulatory criteria for hazardous waste set forth in 40 C.F.R. § 261.11(a)(3).

In making listing determinations under subtitle C of RCRA, the Agency must consider the listing criteria set out in 40 C.F.R.§ 261.11. The relevant portion of the criteria directs EPA to list a solid waste as a hazardous waste only if:

> [i]t contains any of the toxic constituents listed in appendix VIII and, after considering the following factors, the Administrator concludes that the waste is capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.[590]

Sections 261.11(3)(i) through (xi) list the eleven factors that EPA must consider.[591]

In the preamble for the proposed rule, EPA considered the eleven factors in making the proposed special listing decision and definitively concluded that CCR met the criteria for listing.[592] First, EPA identified numerous appendix VIII toxic constituents present in coal ash, namely antimony, arsenic, barium, beryllium, cadmium, hexavalent chromium, lead, mercury, nickel, selenium, silver and thallium.[593] EPA next pointed out that the eleven factors are addressed in EPA's four risk assessments for CCR[594] and that EPA's 2010 risk assessment "correlates closely with the listing criteria in EPA's regulations."[595] In fact, EPA states that nine of the eleven factors set forth in section 261.11(a)(3) were addressed in the 2010 Risk Assessment, specifically factors (i) through (viii) and (x).[596] EPA states unequivocally that its four risk assessments support a finding that coal ash meets the criteria set out at 40 C.F.R. §

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www.epa.gov/osw/nonhaz/industrial/special/fossil/ngwrsk1.pdf); U.S. EPA 2002, ''Constituent Screening for Coal Combustion Wastes,'' October 2002, Document ID No, EPA– HQ–RCRA–2006–0796–0470); U.S. EPA, ''Human and Ecological Risk Assessment of Coal Combustion Wastes'' (April 2010); and U.S. EPA 2010, ''Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills.

[590] 40 C.F.R. § 261.11(a)(3).

[591] 40 C.F.R. § 261.11(a)(3)(i) – (xi).

[592] 74 Fed. Reg. 35166.

[593] *Id.*

[594] *See* U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007); Kosson D., F. Sanchez, P. Kariher, L.H. Turner, R. Delapp, P. Seignette. 2009. U.S. EPA, Characterization of Coal Combustion Residues from Electric Utilities Using Multi-Pollutant Control Technology – Leaching and Characterization Data (EPA-600/R-09/151) Dec 2009, http://www.epa.gov/nrmrl/pubs/600r09151 /600r09151.html; Envtl. Integrity Project and Earthjustice, Out of Control: Mounting Damages from Coal Ash Waste Sites (Feb. 24, 2010); Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 26, 2010); U.S. EPA 1998, ''Draft Final Report: Non-groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2)'' (June 5, 1998), www.epa.gov/osw/nonhaz/industrial/special/fossil/ngwrsk1.pdf); U.S. EPA 2002, ''Constituent Screening for Coal Combustion Wastes,'' October 2002, Document ID No, EPA– HQ–RCRA–2006–0796–0470); U.S. EPA, ''Human and Ecological Risk Assessment of Coal Combustion Wastes'' (April 2010); and U.S. EPA 2010, ''Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills.

[595] 74 Fed. Reg. 35166.

[596] *Id.* As for the two remaining factors, the factor set forth in Section 261.11(a)(3)(ix) applies to damage cases, which were not addressed in the EPA's risk assessment but are addressed by EPA in a separate report and in the preamble and factor (xi) that allows EPA to consider other factors, as appropriate.

261.11(a)(3) for listing a waste as hazardous.[597] We concur with this conclusion, and further we reiterate that EPA's risk assessments in many significant ways underestimate the risk posed by the appendix VIII toxic constituents. *See* section III.C.2, infra. In addition, for all eleven factors, EPA provides substantial justification in the preamble that CCR meets the regulatory criteria and that its decision making process comports with past listing decisions and agency guidance on application of the criteria. We agree with EPA's assessment.

For the same eleven factors, nevertheless, we provide comment when we find that EPA's analysis failed to reference additional relevant evidence supporting a listing decision.[598]

1. The nature of the toxicity presented by the constituent.

In the preamble EPA identifies numerous appendix VIII metals that are constituents of concern associated with CCR. EPA states in the preamble:

> Based on the information in ASTDR's Tox FAQs, EPA's IRIS system and TOXNET, the Agency believes that the metals identified [in CCR] are sufficiently toxic that they are capable of posing a substantial present or potential hazard to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed.[599]

Specifically, EPA lists a summary of the adverse health impacts for numerous appendix VIII metals commonly found in coal ash, including antimony, arsenic, barium, beryllium, cadmium, hexavalent chromium, lead, mercury, nickel, selenium, silver and thallium. EPA's *2010 Risk Assessment* found that many of these constituents presented risks above the risk criteria in one or more situations. In fact, arsenic was estimated in the risk assessment to pose extremely high risk when co-disposed with coal refuse in an unlined surface impoundment. To reiterate, EPA found this risk to be 1 in 50, representing a risk 2000 times the "point of departure" for listing a waste as hazardous.[600]

It is worth noting that in section III.C.2.a. of these comments, we provide evidence that the risk from arsenic was considerable underestimated. Further in section III.C.2.b., we note that the risk assessment underestimated the risk from lead. It is also worth noting that the risk assessment likely underestimated the leaching potential of CCR because it did not base predicted leaching on the data resulting from the Office of Research and Development's (ORD) 2006, 2008 and 2009 reports.[601] Consequently, if EPA were to re-examine the threat posed by the

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[597] *Id.*

[598] In July 2009, Earthjustice and numerous other environmental organizations submitted a petition for rulemaking pursuant to Section 7004 of RCRA to list CCR as a hazardous waste. We incorporate the data presented in that petition by attaching the petition to these comments as Attachment 8. Earthjustice, Sierra Club, Environmental Integrity Project, et al, Petition for Rulemaking Pursuant to Section 7004(a) of the Resource Conservation and Recovery Act Concerning the Regulation of Coal Combustion Waste and the Basis for Reconsideration of the 2000 Regulatory Determination Concerning Wastes from the Combustion of Fossil Fuels, filed July 10, 2009.

[599] 75 Fed. Reg. 35168.

[600] *Id.*

[601] *See* EPA, Office of Research and Development, *Characterization of Coal Combustion Residues from Electric Utilities Using Wet Scrubbers for Multi-Pollutant Control* (July 2008), *available at* http://www.epa.gov/nrmrl/pubs/600r08077/600r08077.pdf EPA, Office of Research and Development,

appendix VIII contaminants, in light of the new arsenic cancer slope and the ORD's leaching data, it is likely that the threat from toxic constituents in CCR would be even higher than currently documented.

In addition, it is also worth noting that coal combustion residues may contain a variety of additional toxic constituents listed in appendix VIII such as dioxins and polycyclic aromatic hydrocarbons (PAHs).[602] The presence particularly of PAHs in CCR may pose risk to human health and the environment. PAHs form during the combustion of coal and adsorb onto fly ash particles.[603] Lastly, CCRs contain many other potential harmful constituents that are not listed in Appendix VIII. These constituents will be discussed in more detail in subsection (xi), below.

2. The concentration of the constituent in the waste.

EPA concludes in the preamble that the twelve appendix VIII metals "are contained in CCRs at relatively high concentrations, such that if CCRs were improperly managed, they could leach out and pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed."[604] EPA points out that the findings of the *2010 Risk Assessment* confirm this finding. EPA also notes that these metals are present at many of the damage case sites and states that this further supports the substantial hazard they pose to health and the environment when mismanaged.[605] We concur in EPA's finding that the concentrations of appendix VIII metals in CCR pose a substantial present and potential hazard. In Appendix F to these comments, we indicate the presence of these constituents, often in high concentrations, at each of the 137 damage cases documented by EPA in their Damage Case Assessments[606] and by Environmental Integrity Project, Earthjustice and Sierra Club in their damage case reports.[607]

Utility industry defenders argue that coal ash is just like dirt. Yet, this couldn't be farther from the truth. Although CCR has some constituents in common with some soils, their concentration, availability and behavior differs radically from ordinary dirt. In the 2006 National Resource Council (NRC) Report on coal combustion residues, the NRC provides a table comparing the concentration in CCR of five appendix VIII metals with the mean concentrations of those same constituents in soil and source coal.[608] The NRC found that the concentrations of

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Characterization of Mercury-Enriched Coal Combustion Residues from Electric Utilities Using Enhanced Sorbents for Mercury Control, EPA-600/R-06/008 (Feb. 2006), *available at* http://www.epa.gov/nrmrl/pubs/600r06008/600r06008.pdf EPA, Office of Research and Development, *Characterization of Coal Combustion Residues from Electric Utilities—Leaching and Characterization Data* (EPA/600/R-09/151) at ii (Dec. 2009), *available at* http://www.epa.gov/nrmrl/pubs/ 600r09151/600r09151.html.

[602] Nat'l Research Council, Nat'l Academies, Managing Coal Combustion Residues in Mines 81–104 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc at 33.

[603] *Id.*

[604] 75 Fed. Reg. 35169.

[605] *Id.*

[606] *See* U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007).

[607] *See* Envtl. Integrity Project and Earthjustice, Out of Control: Mounting Damages from Coal Ash Waste Sites (Feb. 24, 2010); Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 2010).

[608] Nat'l Research Council, Nat'l Academies, Managing Coal Combustion Residues in Mines 81–104 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc at 36.

arsenic, cadmium, lead, mercury and selenium in CCR are far greater than in soils or source coal. The NRC also found that boron concentrations were much higher in CCRs than in the other media. The NRC table is reproduced on the following page.

Concentration in CCR of five appendix VIII metals

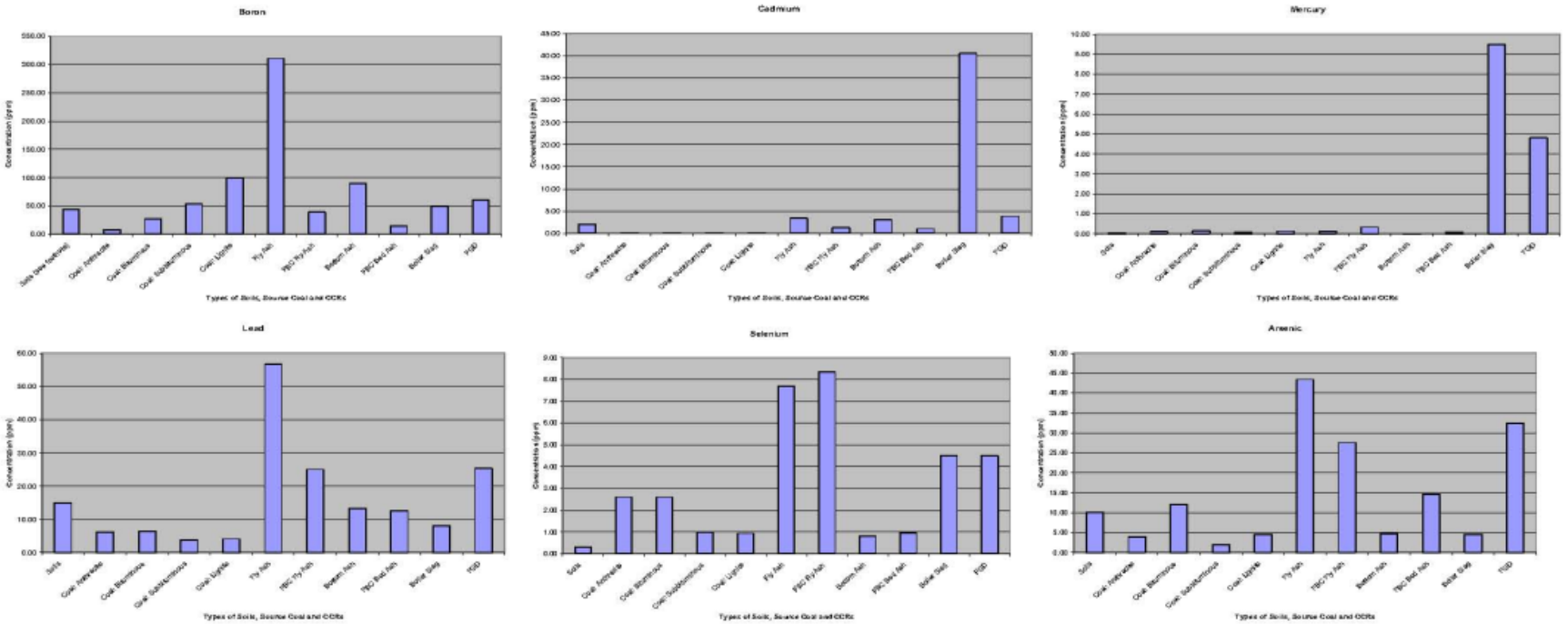

FIGURE 2.4 Bulk selected trace metal constituent concentrations in soils, source coal, and CCRs. For comparison with a familiar natural material, trace metal concentrations in soil are also presented.
NOTE: All graphs show concentration data in parts per million (ppm), however the scales vary between graphs. Soil data reflect a median value from the USGS soils database of the following states: Texas, New Mexico, Pennsylvania, Louisiana, Oklahoma, West Virginia, Maryland, Michigan, Arizona, Kentucky, New Jersey, Illinois, Indiana, New York, Tennessee.
SOURCE: USDOE,EIA, 2001; USGS, 2001a.

3. The potential of the constituent or any toxic degradation product of the constituent to migrate from the waste into the environment under the types of improper management considered in paragraph (a)(3)(vii) of this section.

The toxic constituents in CCR migrate into the environment via multiple pathways when mismanaged. Both EPA and NRC acknowledge that contaminants from CCR have the potential to migrate to drinking water supplies, surface water bodies, or biota at unacceptable concentrations, thereby creating risks to human health and the environment.[609]

EPA explains in the preamble that its *2010 Risk Assessment* used fate and transport models to assess the migration of CCR's toxic constituents through different exposure pathways to predict the risk to human health and the environment. EPA concludes that its risk assessment indeed demonstrates that CCRs have the potential to present a hazard to human health and the environment well above both a 1×10^{-4} to 1×10^{-6} cancer range and an HQ of 1, the benchmarks of hazardous waste listing.[610] EPA summarizes its findings in the preamble for migration via ingestion of groundwater, consumption of recreationally caught fish, ecological exposure via surface water, and particulate matter inhalation. In this section, we augment the information presented by EPA and suggest additional pathways through which the toxic constituents in coal ash will migrate.

a. Groundwater pathway

EPA describes the predicted risks to human health via the ingestion of groundwater contaminated by antimony, arsenic, barium, cadmium chromium, lead, nickel and thallium. The highest risk found by EPA was from arsenic when CCRs and coal refuse were disposed in unlined surface impoundments—resulting in a cancer risk of 2 in 100. However, as explained earlier in these comments, the results in the risk assessment were based on models of CCR management units that underestimated the migration potential of CCR constituents from landfills and surface impoundments.[611] Thus the cancer risks and hazard potentials found by EPA are likely to be greater than estimated in the *2010 Risk Assessment.*

Most of the 137 damage cases involve the migration of appendix VIII constituents to groundwater.[612] Appendix F describes the scope of this migration at the damage cases involving groundwater contamination.[613] In many instances the level of constituents in the groundwater far exceed drinking water standards and the constituents in the groundwater travel far from the disposal site. Data indicate that appendix VIII constituents have migrated from unlined landfills,

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[609] Nat'l Research Council, Nat'l Academies, Managing Coal Combustion Residues in Mines 81–104 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#tocat 50 and 75 Fed. Reg. 35170.
[610] 75 Fed. Reg. 35170.
[611] *See* Section III.C., *infra*.
[612] *See* U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007); Envtl. Integrity Project and Earthjustice, Out of Control: Mounting Damages from Coal Ash Waste Sites (Feb. 24, 2010); Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 26, 2010).
[613] *See* Appendix F.

surface impoundments and fill sites, clay-lined landfills and surface impoundments, and even sites that purportedly have a synthetic liner.[614] The prevalence of unlined CCR disposal sites both wet and dry greatly facilitates the migration of metals from CCR. The table below, summarizing the data in Appendix F, indicates the number of appendix viii constituents found in the 137 damage cases.

Parameter	EPA[a] Damage Cases	Out of Control[b] Damage Cases	In Harm's Way[c] Damage Cases
Antimony	1	2	0
Arsenic	27	20	16
Barium	1	4	2
Beryllium	3	1	0
Cadmium	14	5	7
Lead	9	11	10
Mercury	0	2	2
Nickel	3	1	3
Selenium	16	4	9
Silver	0	0	4
Thallium	1	3	1
Vanadium	2	1	1
Zinc	3	1	1

a:U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007)

b: Envtl. Integrity Project and Earthjustice, Out of Control: Mounting Damages from Coal Ash Waste Sites (Feb. 24, 2010)

c: Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 26, 2010).

EPA must also consider the evidence, amassed over the last ten years by its Office of Research and Development, that the leaching of toxic constituents from CCR is much greater than previously known. The studies documenting this aggressive leaching behavior are discussed in both in EPA's preamble to the proposed rule[615] and section III.C.1, *supra*. Given the demonstrated propensity of toxic constituents, such as antimony, arsenic, barium, cadmium, chromium, molybdenum, selenium and thallium, to leach from CCR, it necessary to ensure that the waste is isolated from groundwater. The common failure to successfully isolate the waste--and, in fact, the intentional disposal of coal ash *into* water tables, significantly aids the migration of appendix VIII contaminants, as well as other constituents harmful to health and the environment. As discussed in section III.B.2, *supra*, 30 of 37 states examined place no

[614] *See* U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007); Envtl. Integrity Project and Earthjustice, Out of Control: Mounting Damages from Coal Ash Waste Sites (Feb. 24, 2010); Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 26, 2010).
[615] 75 Fed. Reg. 35139-35142

restrictions with regard to the location of coal ash surface impoundments and 16 of the 37 states place no restriction on the location of ash landfills with respect to the water table.

When one combines the propensity for appendix VIII constituents to leach from CCR when in contact with water, particularly under conditions of changing pH[616] and the prevalence of unlined and poorly lined disposal units, it is clear that CCR poses "a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed."

b. Consumption of recreationally caught fish

EPA found in its *2010 Risk Assessment* that unlined and clay-lined surface impoundments co-disposing of CCR and coal refuse presented a risk of cancer from arsenic in recreationally caught fish above the benchmark, as did unlined surface impoundments containing CCR alone. Hexavalent selenium was estimated to result in exposures at least 3 times the reference dose and 2 times the reference dose from unlined and clay-lined surface impoundments, respectively.

Numerous damage cases have documented the issuance of state selenium fish advisories as a result of selenium migrating from CCR disposal sites into aquatic environments. At the following six damage case sites, fish were found with dangerously high selenium levels: Martin Creek Reservoir, Texas; Brandy Branch Reservoir, Texas; Welsh Reservoir, Texas; Savannah River Project, South Carolina, Belews Lake, North Carolina; and Hyco Lake, North Carolina.[617] At Belews Lake, selenium contamination caused widespread extirpation of at least 16 of the 20 fish species in the lake.[618]

Again, these documented cases of high selenium content in fish are likely to be the tip of the iceberg. Many states do not test fish frequently for exposure. In addition, new information has come to light from scientists studying the aftermath of the TVA spill in Kingston, Tennessee. The research indicates that impact to fish has been underestimated.[619] In addition, a recent peer-reviewed study of the TVA spill area at the 18-month mark concludes that sediments and the pore water in those sediments remain highly contaminated with arsenic and selenium.[620] The long-term presence of these high levels of metals raises great concern for the future health of the aquatic community in the Emory River. This study is attached as Appendix H to these comments.

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[616] EPA, Office of Research and Development, *Characterization of Coal Combustion Residues from Electric Utilities—Leaching and Characterization Data* (EPA/600/R-09/151) at ii (Dec. 2009), *available at* http://www.epa.gov/nrmrl/pubs/ 600r09151/600r09151.html.

[617] US EPA, Coal Combustion Waste Damage Case Assessments, July 9, 2007.

[618] See damage case documentation in U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007); Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 26, 2010) at 213-217.

[619] Tuberty, Shea, PhD.. The Dirty Side of Clean Coal Assessing the Kingston TVA Fly Ash Disaster, 2010.

[620] Ruhl, Laura, Avner Vengosh, Gary Dwyer, Heileen Hsu-kim, Amrika Deonarine. The Environmental Impacts of the Coal Ash Spill in Kingston, Tennessee: An Eighteen-Month Survey, Environmental Science and Technology, in press.

c. Ecological exposure

EPA also describes in the preamble the high degree of ecological risk from exposure to selenium, silver, nickel, chromium, arsenic cadmium, barium, lead and mercury from coal ash.[621] To describe ecological harm, EPA points to numerous studies documenting damage to ecosystems, including death, genetic deformities and injury to reproduction systems of aquatic organisms in water bodies contaminated by coal ash surface impoundments.[622]

EPA's 1998 "Non-Groundwater Pathways, Human and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2" (hereinafter *1998 Risk Assessment*) and *2010 Risk Assessment,* however, understate ecological risk. The *2010 Risk Assessment* relies entirely on groundwater as the source of selenium for the surface water pathway model. Groundwater is one component of that pathway, and it should be assessed, but focusing solely on one component overlooks the dominant and more important direct surface leachate/slurry water route of exposure, which has been the primary cause of major damage cases. Although EPA indicates that this concern was addressed in the *1998 Risk Assessment*, which considered direct exposure to surface impoundments, the 1998 analysis was restricted to "terrestrial receptors that obtain food and prey from the surface impoundments and excluded aquatic receptors living in the water column because surface impoundments are not intended to be a habitat for aquatic species."[623] Thus, the *1998 Risk Assessment* completely excludes downstream transport of contaminants from impoundments and the associated exposure of fish and wildlife. Yet, it is this downstream transport pathway that has led to the most serious damage cases.

All of the interconnected parts of a water-based exposure pathway must be considered together as a hydrological unit in order for a selenium risk assessment to be realistic. EPA's 1998 and 2010 analyses fail to do this and, thereby, substantially underestimate ecological risk. While EPA's explanation of its position provides a brief mention of "studies that illustrate the impact of CCRs on aquatic organisms in water bodies near CCR impoundments,"[624] and lists three examples (Lemly 1993, Sorensen et al. 1982, 1988), there is, in fact, a substantial body of literature to show the overwhelming importance of downstream transport and exposure and poisoning of fish and wildlife outside of CCR management units.[625] There have also been significant public health issues associated with this downstream transport of CCR contaminants. We believe it is imperative for EPA to recognize and utilize this body of scientific evidence. A list of relevant studies is attached to these comments as Attachment 5.

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[621] 75 Fed. Reg. 35171.
[622] *Id.*
[623] U.S. Envtl. Prot. Agency, ''Draft Final Report: Non-groundwater Pathways, Human Health and Ecological Risk Analysis for Fossil Fuel Combustion Phase 2 (FFC2)',' (June 5, 1998), Docket ID No. F–1999–FF2P–FFFFF, www.epa.gov/osw/nonhaz/industrial/ special/fossil/ngwrsk1.pdf.
[624] 75 Fed. Reg. 35172.
[625] *See* Studies of Ecological Impacts from Release of Appendix VIII Constituents from Coal Combustion Residues, appended to these comments as Attachment 5. Note that this list of studies was compiled for just 10 CCR surface impoundment damage cases (Belews, Hyco, Mayo, Martin, Welsh, Brady, Gavin/Amos, Savannah River, Gibson, Oak Ridge) out of several dozen known to exist, and thus it does not in any way represent a full list of the relevant reference documents available.

The National Research Council also examined the ecosystem damage from coal ash contaminants in their 2006 report. The NRC includes a summary of those adverse impacts in Chapter Four of their report, attached to these comments in its entirety in Attachment 6. In sum, the NRC states:

> As a consequence of CCR disposal in surface impoundments, contaminants have been found to accumulate in the tissues of organisms utilizing the impoundments or downstream habitats. Contaminants originating in CCRs enter food chains by a variety of mechanisms. These mechanisms include direct uptake by plants, epithelial accumulation by organisms in contact with the sediments and/or porewater (e.g., benthic invertebrates), and direct sediment ingestion by grazing (e.g., amphibian tadpoles) or dabbling wildlife (e.g., waterfowl). Uptake of some contaminants can be high, exceeding the concentrations known to be toxic to many organisms.[626]

Specifically, the NRC identifies diverse physiological injuries to organisms from exposure to CCR that harm growth, survival and reproductive success. The NRC points out that young fish and amphibians are particularly vulnerable to CCRs, that predators feeding on fish and amphibians from CCR disposal sites are also at risk of tissue damage, and most importantly, that reproductive failure has repeatedly been observed in organisms exposed to CCRs or CCR effluent. Decades of study of fish populations in North Carolina and Texas suggest that selenium from CCRs is readily accumulated in reproductive tissues and subsequently transferred to offspring.[627]

According to the NRC, from an ecological perspective, the greatest concerns regarding CCRs are not the effects on individual organisms, but the impacts on the integrity of populations and communities.[628] Changes in zooplankton and benthic invertebrate community composition have been observed in waters receiving CCR effluent from surface impoundments, as well as in experimental settings. Similarly, the diversity and density of macroinvertebrates have been adversely affected in streams receiving surface impoundment effluent. Such changes in invertebrate composition can have widespread environmental implications, including changes in nutrient and energy cycling and effects on predatory organisms that depend on invertebrates as a food source.

In addition to these studies documenting ecological harm, our own damage case record is rife with additional examples of the migration of toxic constituents from CCRs into aquatic environments when mismanaged. Appendices F and I of these comments describe numerous additional sites where ecosystems were harmed.

d. Particulate matter inhalation

Although EPA's *2010 Risk Assessment* did not consider risk from inhalation of fugitive

[626] Nat'l Research Council, Nat'l Academies, Managing Coal Combustion Residues in Mines 81–104 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc.at 74.
[627] *Id.* at 75.
[628] *Id*. at 76.

dust at coal ash disposal and reuse sites, EPA did conduct a screening level analysis of fugitive dust at coal ash landfills (discussed in these comments at section III.C.2.e., *supra*.) EPA explains in the preamble that it determined that without fugitive dust controls, there could be exceedances of the National Ambient Air Quality Standards for fine particulate matter in the air at residences near coal ash landfills. This risk and actual examples of injury are described more fully in the above-referenced section of these comments.

In sum, serious harm to human health and the environment from migration of appendix VIII constituents in coal ash is demonstrated in EPA's risk assessment and screening documents and documented in the 137 damage cases. Yet, we must again emphasize that migration of coal ash constituents is certainly occurring at hundreds of additional dump sites throughout the United States. The frequency and scale of coal ash mismanagement—its disposal in unlined quarries, ponds, pits and mines and its abundant use as fill in wetlands and over shallow aquifers – ensures the migration of toxic constituents from CCR at many other sites, not yet documented. Despite the lack of data at these mostly unmonitored sites, EPA must consider the great potential for harm that this widespread mismanagement poses to human health and the environment.

e. The persistence of the constituent or any toxic degradation product of the constituent.

We note that the scientific literature confirms that several constituents in CCR are toxic, persistent (maintain their concentration in sediments and do not degrade into less toxic byproducts), and bioaccumulative. Among these are selenium,[629] mercury, lead, chromium, cadmium, copper, nickel, zinc, silver, and arsenic. The toxicity and bioaccumulation of these elements in aquatic life, especially fish, has been well known for many years, and has been summarized repeatedly. For example, texts by Sorensen (1991),[630] Newman and McIntosh (1991),[631] and Di Giulio and Hinton (2008)[632] are just three of many examples of these literature summaries.

In fact, all the appendix VIII constituents are persistent and subject to migration in groundwater in solution attached to colloidal particles through a process called facilitated transport (Puls et al., 1991).[633] Two examples of the persistence of groundwater contamination at CCR disposal sites are the Montville, Connecticut and Venice, Illinois sites.[634] At the Montville site, disposal of CCR stopped in 1971, yet almost 40 years later the concentrations of arsenic in a monitoring well is more than 20 times the MCL. At the Venice site, more than 30 years after disposal, an arsenic contaminant plume extends 400 feet east of the old ash ponds

[629] See economic analysis of damage cases in Appendix I, attached to these comments.
[630] Sorenson, E.M.B. 1991. Metal Poisoning in Fish. CRC Press, Boca Raton, FL.
[631] Newman, M.C., and A.W. McIntosh. 1991. Metal Ecotoxicology Concepts and Applications. Lewis Publishers, Chelsea, MI.
[632] Di Giulio, R.T., and D.E. Hinton. 2008. The Toxicology of Fishes. CRC Press, Boca Raton, FL.
[633] Puls, R.W., R.M. Powell, D.A. Clark and C.J. Paul. 1991. Colloidal-Facilitated Transport of Inorganic Contaminants in Ground Water: Part II. Colloidal Transport. EPA/600/M-91/040.
[634] *See* Appendix F

with concentrations as high as 3.8 times the MCL.[635]

f. The potential for the constituent or any toxic degradation product of the constituent to degrade into non-harmful constituents and the rate of degradation.

In the preamble, EPA states that the twelve appendix VIII toxic constituents of concern, antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel selenium, silver and thallium, "do not decompose or degrade with the passage of time."[636] Thus these constituents pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed because "these toxic metals will persist in the environment for very long periods of time, and if they escape from the disposal site, will continue to provide a potential source of long-term contamination."[637] Certainly the recent report indicating the continuing presence of high concentrations of arsenic and selenium in the river sediments and pore water of the Emory River illustrates the long-term threat posed by CCR releases (see Appendix H).[638]

g. The degree to which the constituent or any degradation product of the constituent bioaccumulates in ecosystems.

At least five of the appendix VIII constituents, arsenic, cadmium, lead, mercury and selenium, readily bioaccumulate in aquatic ecosystems and at levels that are toxic for fish (Sorenson, 1991).[639] Selenium leaching from CCR tends to be in the form of, or readily becomes transformed into, selenates and selenites, which are highly toxic because they are readily assimilated by organisms. Appendix I to these comments contains considerable detail describing the harm to aquatic ecosystems arising from selenium contamination from CCR disposal sites at the Belews Lake, Roxboro, and Mayo sites in North Carolina; the Gavin site in Ohio; and the Martin Lake and Welsh sites in Texas.

h. The plausible types of improper management to which the waste could be subjected.

The absence of state and federal regulations mandating basic safeguards for coal ash disposal and reuse has resulted in mismanagement of this waste on a scale that far exceeds all other industrial solid waste streams, save mining waste. The 141 million tons of coal ash generated annually is over 23 times larger than the entire universe of hazardous waste generated each year in the U.S.[640] Yet the majority of states do not require safeguards fundamental to the safe storage or disposal of CCR. The extent of the failure of states to require basic safeguards is described in detail in section III.B.of these comments.

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[635] *Id.*
[636] 75 Fed. Reg. 35169.
[637] 75 Fed. Reg. 35169.
[638] Ruhl, Laura, Avner Vengosh, Gary Dwyer, Heileen Hsu-kim, Amrika Deonarine. The Environmental Impacts of the Coal Ash Spill in Kingston, Tennessee: An Eighteen-Month Survey, Environmental Science and Technology, in press.
[639] Sorenson, Elsa M. 1991. Metal Poisoning in Fish. CRC Press.
[640] 75 Fed. Reg. 35172.

In the absence of regulations, the utility industry has built a fleet of aging, leaking, and unstable dumps. Not only are these units subject to catastrophic collapse, as occurred at the TVA Kingston plant, these units are also likely to allow deadly contaminants to seep, leak and blow into our groundwater, surface water and air. The lack of regulations has also lead to dangerous dumping of *millions* of tons of CCR directly into groundwater in quarries and mines each year. To qualify for listing, section 261.11(c)(viii) only requires the showing of "*plausible* types of improper management to which the waste *could* be subjected." (Emphasis added.) For coal ash, this criterion is exceeded by leaps and bounds—EPA has not only documented a nationwide inventory of CCR dumps where the waste is currently being mismanaged, it has documented a continuing trend of mismanagement, evident in damage cases and newly permitted units without basic safeguards.[641]

The failure of states to regulate "beneficial" reuse of CCR, particularly as structural fill, has also lead to widespread "improper management." The potential harm and actual damage caused by CCR reuse is described in detail in preceding sections of these comments. Given the quantity of CCR generated annually, the lack of regulations, and the pressure to dispose of large amounts of CCR at the lowest possible cost, the scenarios of plausible mismanagement become unimaginable. If a U.S. utility can use 1.5 million tons of CCR to build a golf course -- the same CCR that caused arsenic contamination at the plant site- over a shallow aquifer, currently used as drinking water for residents surrounding the site, *any use*, no matter how dangerous, must be considered "plausible."[642]

EPA acknowledged several mismanagement scenarios and modeled such scenarios (with the exception of reuse) in its *2010 Risk Assessment*, resulting in the finding of human and ecological risk exceeding, often significantly, the Agency's risk benchmarks. For the purpose of evaluating this listing factor, improper management of CCR can be defined as management that causes a "substantial present or potential hazard to human health or the environment." The following types of mismanagement, common to past and current CCR disposal and reuse, have been found by EPA and the NRC to present "substantial present or potential hazard." The list below is by no means exhaustive. For additional examples of actual improper management that have caused a substantial present or potential hazard, EPA must consult the 137 cases of damage discussed in section III.D. and in Appendix F.

i. Unlined and clay-lined CCR surface impoundments

As described in EPA's *2010 Risk Assessment*, disposal of coal ash in unlined and clay-lined surface impoundments, particularly when coal ash is co-disposed with coal refuse, results in risk to human health well above EPA's benchmarks for numerous appendix VIII constituents, including arsenic, cadmium, lead, and selenium. In addition, boron, cobalt, molybdenum, and nitrate/nitrate also showed elevated risk. The table below provides the elevated risks for these

[641] *See*, for example, Holcomb Landfill, Holcomb, KS (unlined landfill permitted in 2007) and units described in DOE/EPA Report, described in detail in Section X of these comments.
[642] Cite to preamble discussion of Battlefield golf course and see also http://hamptonroads.com/2009/08/lawsuit-claims-dominion-saw-golf-course-coal-ash-dump and http://hamptonroads.com/2009/05/dominion-kept-7year-secret-fly-ashs-environmental-risks.

contaminants for CCR disposed in unlined and clay-lined surface impoundments.[643]

[643] *See,* for additional detail, Environmental Integrity Project and Earthjustice, Coming Clean: What the EPA Knows about the Dangers of Coal Ash, May 2009. Available at http://www.earthjustice.org/sites/default/files/library/reports/final-coming-clean-ejeip-report-20090507.pdf.

Elevated risks for contaminants for CCR disposed in unlined and clay-lined surface impoundments

Table A: Surface Impoundments: Highest Health Risks (Groundwater to Drinking Water)			
	90th Percentile HQ or Cancer Risk Value[1 2]		
Chemical	**Unlined Units**	**Clay-Lined Units**	**Potential health Risks**
Conventional CCW			
Arsenic (cancer risk)	1 in 500	1 in 1,111	Nausea; Vomiting; Diarrhea; Cardiovascular Effects; Encephalopathy; Dermal Effects; Peripheral Neuropathy; Skin, Bladder & Lung cancer
Nitrate/nitrite (MCL)	20	10	Methemoglobinemia, infants are particularly vulnerable
Molybdenum	8	5	Fatigue; Headaches; Joint Pains
Boron	7	4	Stomach, Intestines, Kidneys, Liver and Brain Damage; Death; Negative Effects on Male Reproduction
Selenium	2	1	Dizziness; Fatigue; Respiratory Effects; Selenosis (Hair Loss; Nail Brittleness; Neurological Abnormalities)
Lead (MCL)	3	0.7	Learning Disabilities; Kidney, Blood, and Nerve Damage; Children are especially vulnerable to Lead exposure
Codisposed CCW and Coal Refuse			
Arsenic (cancer risk)	1 in 50	1 in 143	Nausea; Vomiting; Diarrhea; Cardiovascular Effects; Encephalopathy; Dermal Effects; Peripheral Neuropathy; Skin, Bladder & Lung cancer
Cadmium	9	3	Diarrhea; Stomach Pains; Severe Vomiting; Bone Fracture; Reproductive Effects; Nerve Damage; Immune System Damage; Psychological Disorders
Cobalt	8	3	Vomiting and Nausea; Vision Problems; Heart Problems; Thyroid Damage
Lead (MCL)	9	1	Learning Disabilities; Kidney, Blood, and Nerve Damage; Children are especially vulnerable to Lead exposure
Molybdenum	3	2	Fatigue; Headaches; Joint Pains

Sources: U.S. Envtl. Prot. Agency (EPA), Human and Ecological Risk Assessment of Coal Combustion Wastes (released as part of a Notice of Data Availability) (Aug. 6, 2007) (draft), Table 4-7, Page 4-14 (does not include data on composite-lined units); and U.S. Department of Health and Human Services, Agency for Toxic Substances & Disease Registry, "Frequently Asked Questions About Contaminants Found at Hazardous Waste Sites" <http://www.atsdr.cdc.gov/toxfaq.html>.

[1] Values are HQs for all chemicals except arsenic; arsenic values are cancer risk.

[2] The Hazard Quotient (HQ) is the ratio of the exposure estimate (dose of contaminants) to a “no adverse effects level” considered to reflect a “safe” environmental concentration or dose.

EPA's *2010 Risk Assessment* also identified ecological risks greatly exceeding EPA's benchmark HQ of 1. The table below shows the HQ at 200, 200, and 20 for the Appendix VIII constituents; lead, arsenic and cadmium, respectively.

Table D: Surface Impoundments: Highest Ecological Risk (Groundwater to Sediment)			
Chemical	**90th Percentile HQ[1]**	**Pathway**	**Receptor**
Lead	200	ingestion	spotted sandpiper
Arsenic	100	ingestion	spotted sandpiper
Cadmium	20	direct contact	sediment biota

Source: U.S. Envtl. Prot. Agency (EPA), Human and Ecological Risk Assessment of Coal Combustion Wastes (released as part of a Notice of Data Availability) (Aug. 6, 2007) (draft), Table 4-15, Page 4-23.

[1]The Hazard Quotient (HQ) is the ratio of the exposure estimate to an effects concentration considered to represent a "safe" environmental concentration or dose. Values greater then 1 are indicative of risk to human health.

From EPA's 2009 Information Collection Requests (ICR), the Agency estimates that there are approximately 629 surface impoundments at 158 plants in 35 states.[644] EPA, however, does not know exactly how many of these ponds are unlined because the ICR did not request information regarding liners. EPA relies on a 1995 voluntary industry survey that indicates 74 percent of all surface impoundments built in 1995 or before are unlined.[645] According to EPA's database of 629 impoundments, 587 coal ash ponds were built in or before 1995. Therefore, by EPA's estimation, approximately 434 of the nation's 587 operating surface impoundments are unlined. One can assume that many of the 42 impoundments built after 1995 do not have liners, because not all states require liners. Based on the DOE/EPA 2006 report, EPA does know that 18 of the 42 surface impoundments were permitted between 1994 and 2004.[646] Of these units, all have some kind of liner, although it appears that only 1 or at most 9 have composite liners.[647] The report also found that at least half of the 18 new ponds have only clay or a single liner—and both are inadequate to prevent migration of contaminants and sufficiently reduce risk.[648]

Only a small percentage of the lined surface impoundments will have composite liners, because only four states require composite liners.[649] The age of the impoundments is also a factor determining whether the dump will be lined, since older impoundments are less likely to have safeguards. As has been noted earlier, EPA's data reveal that the largest and highest coal

[644] *See* Information Request Responses from Electric Utilities, Database of Survey Responses, available at http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/survey2-8-17-10.pdf.
[645] 65 Fed. Reg. 32216. Because this survey was voluntary, one can assume that the utilities responding to the survey are those that employ more safeguards. Thus reliance on the voluntary survey may cause EPA to overestimate the use of liners.
[646] U.S. Dep't of Energy & U.S. Envtl. Prot. Agency, Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994–2004 (Aug. 2006) at 33. This report did not track new surface impoundments that were not permitted. These units are likely not to have the same level of safeguards as permitted units.
[647] *Id.*
[648] *Id*. at 34.
[649] *See* Table 9, Section III., *supra.*

ash ponds are also the oldest.[650] Because EPA has estimated the percentage of lined facilities built before 1995, that date is used as a cut-off for estimating the presence of liners at the largest and highest dams. Based on EPA's finding that 74 percent of the ponds built before 1995 will be unlined:

- Of the 81 coal ash impoundments that are over 100 acres, 79 were built before 1995.
- Of the 35 ponds larger than 200 acres, all were built before 1995.
- Ninety-six percent of the 50 high hazard dams were built before 1995.
- Eighty-six percent of the 72 significant hazard dams were built before 1995.

Thus, when one adopts the best case scenario that only 74 percent of older units are unlined, it is obvious that the great majority of the tallest and highest capacity coal ash impoundments – arguably the most dangerous units-- are unlined.

Further, according to the *2010 Risk Assessment*, EPA found only "the composite-lined units … effectively reduced risks from all pathways and constituents below the risk criteria."[651] Therefore, since the great majority of surface impoundments, especially the larger ponds and higher dams, are unlined, the "plausible mismanagement" of CCR in ponds is a certainty and, as EPA has calculated, the risk is great that appendix VIII constituents will migrate from the inadequately lined ponds.

In addition to the fact that the majority of CCR surface impoundments are unlined or inadequately lined, it must be noted that the majority of these ponds also do not have groundwater monitoring or leachate collection systems. In 2000, EPA estimated that 62% of operating surface impoundments did not have groundwater monitoring.[652] Information in EPA's 2006 report indicates that even for the nation's newest permitted surface impoundments, a substantial percentage of ponds (46 percent) have *no requirement* in their permit to conduct groundwater monitoring.[653] In addition, the report also found that only 19 percent of the permits for the newly permitted surface impoundments contained groundwater protection standards.[654] Thus the risk posed to health and the environment by the hundreds of unlined and inadequately-lined CCR surface impoundments is conflated by the absence of monitoring systems that might identify the release of contaminants before they reach and harm human and aquatic receptors.

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[650] *See* Envtl. Integrity Project and Earthjustice, Coming Clean: What EPA Knows About the Dangers of Coal Ash (May 200), Attachments 1, 2 and 3.
[651] 75 Fed. Reg. 35144.
[652] 65 Fed. Reg. 32216.
[653] U.S. Dep't of Energy & U.S. Envtl. Prot. Agency, Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994–2004 (Aug. 2006) at 30.
[654] *Id.* Groundwater protection standards are contaminant concentrations in groundwater that cannot be exceeded. They can include primary and secondary drinking water standards, background concentration levels, and preventive action limits.

Lastly, surface impoundments, of course, also pose significant harm from spills, both large and small. Section VI.A, *infra*, discusses the frequency of spills, the aging universe of ponds, and the fact that many were not designed, constructed or built by professional engineers.

ii. Sand and gravel pits and quarries

Although disposal of CCR in sand and gravel pits is a common method of disposal, the risk of harm from this practice is high and the damage well documented. Eight of EPA's 27 proven damage cases involved dumping of CCR in sand and gravel pits.[655] The NRC specifically identified the danger of placing CCR in sand and gravel quarries in its 2006 report because of the high permeability of the strata underlying the CCRs and the depth of the water table.[656] The NRC explains:

> CCR placement in sand and gravel mines has resulted in environmental impacts at CCR landfills in several localities including Wisconsin, Virginia, and Massachusetts. EPA concluded that at each of these sites the permeable nature of the underlying substrate allowed CCR constituents to leach into ground- and surface waters. Shallow water tables aggravate the problem by enhancing the interaction of water with the CCRs and increasing the likelihood of leachate reaching the water table. For example, EPA concluded that the shallow water table at the Faulkner Landfill in Maryland was at least partly responsible for the contamination of groundwater that eventually resurfaced and impacted nearby wetland and stream communities.[657]

Despite the known risk of dumping coal ash in quarries, this practice is allowed in most states that generate CCR and in at least one state, Iowa, it is a favored method of disposal.[658] Because many states consider the filling of quarries with ash a "beneficial" use, most states to not regulate the practice.[659] Most often sand and gravel pits are filled under the guise of "structural fill" projects.[660] These reuse sites are very rarely lined or monitored. Because these units fly under the radar, it is not known how much coal ash has been dumped in pits and quarries or where these dumps are located.

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[655] U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007); at 8-10.
[656] *See* Nat'l Research Council, Nat'l Academies, Managing Coal Combustion Residues in Mines 81–104 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc. at 71.
[657] *Id.*
[658] Plains Justice, Iowa Coal Combustion Waste Disposal Report, (November 2007), available at http://plainsjustice.org/coal-combustion-waste-report/. Attached as Attachment 11 to these comments.
[659] *See*, e.g., The Massachusetts Solid Waste Act, Chapter 111, s. 150A, specifically exempts coal ash from solid waste regulations. The use of coal ash as fill or for any commercial or industrial purpose (or when stored for such use) does not need approval from the local board of health and is not regulated by the Department of Environmental Protection.
[660] *See*, e.g., the Copicut Road Project in Freetown, Massachusetts described in EPA's Coal Combustion Waste Damage Case Assessments at 38.

iii. Unlined CCR landfills

EPA estimates that there are over 337 currently operating CCR landfills.[661] However, EPA has few data on the exact number, location or design of these landfills. EPA's failure to issue an Information Collection Request to obtain such information has resulted in the need to extrapolate from a limited dataset, collected from a voluntary survey conducted in 1994 by the Electric Power Research Institute.[662] This survey indicated that 43% of all CCR landfills built before 1995 (approximately 300) were unlined (approximately 129 units).[663] Between 1994 and 2004, 38 permitted landfills were built or expanded, and 37 of these landfills were lined.[664] Thus approximately 39% of operating landfills are currently unlined.

However, EPA has acknowledged that all liners are not created equal. Based on the findings of EPA's *2010 Risk Assessment*, the Agency concludes that only a composite liner for CCR landfills offers sufficient protection. Although EPA has not gathered information on the universe of hundreds of older landfills, the DOE/EPA 2006 Report does provide some information concerning the 37 landfills permitted between 1994-2004—and this information is not reassuring. Of the 37 permitted landfills documented in the report, approximately 40% either had no liner (1 landfill), a single liner (4 landfills) or a clay liner (11 landfills).[665] None of these liners would reduce risks below EPA's benchmark values.

Furthermore, CCR landfills often lack groundwater monitoring systems. Again, EPA has few data on the exact number that employ this safeguard. The fact that 30 of 37 states, as described in section III.B.2, *supra*, do not require groundwater monitoring at landfills ensures that many operating units are not monitored. Thus, as with CCR ponds, releases from such landfills are not likely to be discovered in a timely manner, and consequently the risk that those releases will harm human health or the environment is significant.

iv. CCR landfills operated without daily cover to control fugitive dust.

As described above, EPA published in 2009 a screening assessment of the risks posed by coal combustion waste landfills entitled "Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills." The screening assessment acknowledges significant potential harm from fugitive dust. Specifically, fugitive dust from coal ash landfills can readily exceed the national ambient air quality standards (NAAQS) for levels of particulate matter in the air. Yet, as described in more detail in section III.B.2, *supra*, 30 of 37 top CCR-generating states do not require daily cover to control fugitive dust at coal ash landfills. In addition, 36 of 37 states do not require measures at coal ash ponds to control dust.[666] The lack of

[661] *2010 RIA* at 34.
[662] RIA at 37.
[663] 65 Fed. Reg. 32216.
[664] U.S. Dep't of Energy & U.S. Envtl. Prot. Agency, Coal Combustion Waste Management at Landfills and Surface Impoundments, 1994–2004 (Aug. 2006) at 33. This report did not track new landfills that did not require permits These dumps are likely not to have the same level of safeguards as permitted units.
[665] *Id.*
[666] *See* Table 14 in section III.B.2, *supra.*

fugitive dust controls places residents near the dump sites at great risk.[667]

Harmful levels of fugitive dust are not only a problem at coal ash disposal sites. At coal ash reuse sites, such as structural fill projects where large amounts of ash are placed, fugitive dust from dumping operations can also create dangerously unhealthy conditions.[668] Because beneficial use of ash is unregulated in most states, very few regulations require the suppression of airborne ash at fill projects. Yet use of coal ash as structural fill is the fastest growing and the second largest reuse application in the U.S. In 2008, the American Coal Ash Association (ACAA) reported 11.5 million tons of ash were used in fill and embankment projects.[669] The ACAA also reported that minefilling was the third largest application at over 10 million tons a year.[670] Fugitive dust is also a common problem at minefill sites, both at the site itself and during transport of the ash to the mine.

v. CCR surface impoundments over 25 years old and not designed, constructed or built by professional engineers

The vast majority of CCR impoundments (approximately 490 of 629 dams in the survey results)[671] were commissioned prior to 1985. These nearly 500 aging coal ash impoundments pose more than "plausible" scenarios of improper management that pose substantial hazards to health and the environment. As discussed above, these ponds are less likely to have liners (almost none will have a composite liner) and groundwater monitoring. In addition, older dams are far less likely than newer dams to be designed by a professional engineer (P.E.). Only about 66 percent of dams built before 1985 were designed by a P.E.; as were only 55 percent of the 242 dams built prior to 1975, and only 30 percent of the 90 dams built before 1965. Older dams are also likely to be larger and higher. And predictably, these older, larger, higher, unlined and unmonitored impoundments are substantially more likely to have problems. Of 40 dams with a history of leakage, 33 (83 percent) were commissioned prior to 1985, and two-thirds (22) were commissioned prior to 1975.

vi. CCR landfills and surface impoundments located in unsafe locations

EPA's Regulatory Impact Analysis surveyed the location of 495 coal-fired power plants to determine the number of plants located in seismic and karst zones. Due to lack of information, the RIA did not similarly quantify the number of CCR disposal units in proximity to the water

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[667] *See*, for example, Testimony of Gayle Queen before the House of Representative Subcommittee on Energy and Environment, December 10, 2010. Ms. Queen testified "Because of the coal ash, I have trouble breathing. I am not a smoker. My doctor has told me I have the lungs of an 80 year old woman because of breathing in the coal ash."

[668] *See*, for example, Testimony of Robyn Pierce before the House of Representative Subcommittee on Energy and Environment, December 10, 2010. Ms. Pierce testified:

> For 5 years hundreds of truckloads of coal ash were dumped daily in our community. We've since learned those same truck drivers and were required to have haz-mat licenses, and wore masks and protective clothing yet our children unknowingly played outside amongst this dangerous dust. Neighbors recall coming home and finding layers of gray chalky residue on vehicles and pool surfaces. None of my neighbors had any inkling of the dangers we were being exposed to.

[669] American Coal Ash Association. 2008 Coal Combustion Product (CCP) Production & Use Survey Report. http://acaa.affiniscape.com/associations/8003/files/2008_ACAA_CCP_Survey_Report_FINAL_100509.pdf.

[670] *Id.*

[671] "Approximately" because precise data was not available for all of the impoundments in EPA's survey.

table, wetlands and floodplains, locations that also pose a substantial risk of contaminant migration. EPA found that of 495 plants, 151 plants were located within one mile of a seismic zone and 138 plants within 1 mile of a karst zone (177 plants are located within three miles of a karst zone).[672] Construction of coal ash surface impoundments and landfills in active earthquake and unstable karst zones places human health and the environment at great risk.[673] Yet of 25 state regulations reviewed in 2000 by EPA, only two states have location restrictions in seismic impact areas for surface impoundments, and only eight states have location restrictions in seismic impact areas for landfill. Similarly, only five states had location restrictions in unstable (karst) areas for surface impoundments, and only 12 states have location restrictions in unstable areas for landfills.[674] The absence of regulations preventing the siting of CCR landfills and impoundments in dangerous locations exposes the likelihood of plausible improper management that presents a substantial present or potential hazard to human health or the environment.

For the other dangerous locations not quantified by EPA, regulatory restrictions are indeed inadequate to prevent mismanagement and protect human health and the environment from substantial present or potential hazards. For the very dangerous practice of placing CCR in or near the water table, only five states of the 25 state regulations reviewed have location restrictions below the natural water table for surface impoundments and only eight states have restrictions on placing coal ash below the natural water table in landfills. For floodplains, of the 25 state regulations reviewed, only eight states have location restrictions in floodplains for surface impoundments and 20 have location restrictions in floodplains for landfills. Lastly, for placement of CCR in wetlands, only five states have location restrictions in wetlands for surface impoundments and 17 states that have location restrictions in wetlands for landfills.

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vii. CCR disposal in coal mines

The danger posed by disposal of CCR in active and abandoned coal mines is described in detail in section VIII of these comments. The huge volume dumped in mines every year without adequate safeguards has contaminated groundwater and surface water at numerous sites throughout the U.S.[675] The lack of regulations controlling this dumping ensures continued damage from placement of CCR directly into groundwater and the continued substantial present or potential hazard to human health or the environment at the mine sites. We believe EPA has a duty under RCRA to regulate this disposal practice instead of passing the buck to the Interior Department.

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[672] *2010 RIA* at 72.

[673] At least two of EPA's damage cases occurred as a result of karst sinkholes, including the 2002 release of 2.25 gallons of ash and water when a sinkhole developed in an impoundment that eventually reached four acres in size at Georgia Power's Plant Bowen, Cartersville, GA. 75 Fed. Reg. 35237. *See also*, the TVA Colbert Fossil Fuel Plant in Alabama where the disposal area had been subject to collapse into a karst sinkhole. See EPA, Coal Combustion Waste Damage Case Assessments, July 2007 at 42.

[674] *2010 RIA* at 47

[675] *See* Clean Air Task Force, Impacts of Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines, July 2008 and Earthjustice, Waste Deep: Filling Mines with Ash is Profit for Industry, But Poison for People, February 2009.

viii. The quantities of the waste generated at individual generation sites or on a regional or national basis.

As described earlier in these comments, generation of CCR by coal-burning electric utilities in 2008 exceeded 141 million tons, and this amount is growing each year.[676] Annual generation is expected to reach 175 million tons by 2015.[677] As this waste stream grows in quantity, it is also becoming more toxic and therefore more dangerous.[678] While the enormous tonnage represented by annual national generation is important, an examination of state CCR production is critical for assessing "the present and potential hazard" for this listing factor. As described in detail in section III.B.2, the top 12 CCR-generating states have some of the least protective regulatory schemes.

When considering this factor, EPA should also consider the impact of CCR generation at individual power plant sites. Because of the large quantities of CCR that may be generated at individual plants and the length of time that a plant may have been generating the waste, it is common for older plants to have built up very large quantities of CCR disposed onsite. Approximately 70 percent of U.S. power plants dispose of CCR onsite.[679] A large (2000 MW) plant is capable of producing approximately 1 million tons of CCR per year. Over the course of 50 years, 50 million tons may be disposed at some sites. If this waste was not properly and securely disposed, there is very likely to be contamination of groundwater, surface water and air at these sites. The continued generation and disposal of large quantities of CCRs at sites where enormous volumes are already disposed and the environment is already compromised deserves special attention because these sites may be particularly vulnerable. At these sites such disposal, and the addition of toxic constituents that the additional disposal represents, poses a substantial present or potential hazard to human health or the environment.

ix. The nature and severity of the human health and environmental damage that has occurred as a result of the improper management of wastes containing the constituents.

In many places in these comments, we describe the nature, severity and scope of damage to human health and the environment from mismanagement of CCRs. Section III.D, *supra*, describes the 137 damage cases that have been documented by EPA and public interest groups. The reports referenced in that section provide much additional detail concerning the nature of the contamination. Certainly the litany of documented damage must lead EPA to conclude that the waste is capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.

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[676] See section X, supra. EPA,
[677] *Id.*
[678] *See* section x, supra, for detailed information concerning changes to the waste stream as a result of Clean Air Act requirements.
[679] 75 Fed. Reg. xx

x. Action taken by other governmental agencies or regulatory programs based on the health or environmental hazard posed by the waste or waste constituent.

Both state regulatory agencies and EPA have taken actions to address CCR contamination at numerous sites where damage has occurred from the release of toxic constituents. The table below lists many of these actions. While the large number of contaminated sites has led to some state and federal intervention, it must be emphasized that effective and timely state and federal actions are the exception rather than the rule. One cannot conclude from the listing of a government response in the table below that the response effectively and comprehensively addressed the CCR release noted. Each listing is an indication only that a governmental action was taken. The existence of these actions, which include the listing of CCR dumps on the Superfund National Priority List, alternative superfund actions, state superfund cleanups and federal and state enforcement orders, reinforce the fact that the waste is capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed.

State	Site	Owner	Action Taken (Y/N)	Source
IN	Town of Pines: Yard 520 Landfill Site (Brown's Landfill)	Northern Indiana Public Service Corp. (NIPSCO)	**(Federal Action)** EPA and the responsible parties signed an Administrative Order of Consent effective January 2003 under CERCLA to cover costs of connecting the affected areas to city water and to complete an RI/FS at the site. (USEPA 2003a).	1
KY	East Bend Scrubber Sludge Landfill	Cinergy	**(State Action)** According to the DEP, there were on-site exceedances of non-health-based standards for total dissolved solids, iron, and sulfate at this site. The State has taken regulatory action based on these exceedances.	1
MA	Salem Acres	South Essex Sewerage District	**(Federal Action)** The site has been placed on the NPL list, and EPA signed a Consent Order with the owner to clean up the lagoons	1
MD	Gambrills Fill Site	Constellation Energy	**(State Action)** Clean Up Actions, Put on Public Water, Constellation has had to Pay Fines.	1
MD	Morgantown Generating Station Faulkner Off-site Disposal Facility	PEPCO	**(State Action)** Remedial measures at the site included closure and capping of older units, installation of liners in newer units, installation of a slurry wall to prevent ground water migration, and sequestration of pyrites.	1
ND	R.M. Heskett Station	Montana-Dakota Utilities	**(State Action)** According to the NDDOH, the State required the company "... to install ground water monitoring wells and implement a closure plan.	1

State	Site	Owner	Action Taken (Y/N)	Source
ND	W.J. Neal Station Surface Impoundment	Basin Electric Power Cooperative	**(State Action)** The State required closure of the facility.	1
PA	PPL Martins Creek Power Station	PPL Generation, LLC	**(State Action)** State enforcement action taken by PA DEP in response to spill including a fine.	1
TN	Kingston Power Station	Tennessee Valley Authority	**(Federal Action)** Federal clean up action under CERCLA ongoing.	1
VA	Battlefield Golf Course	Dominion	**(Federal Action)** There has been a preliminary investigation by EPA of the fill under Superfund. Dominion has committed to provide a public water line costing approx. $6 million to the residents.	1
WI	Cedar-Sauk Landfill	WEPCO	**(State Action)** The State required remedial action.	1
WI	Dairyland Power Cooperative E.J. Stoneman Generating Station Ash Disposal Pond	DTE Energy	**(State Action)** The State required closure of the facility.	1
WI	Pulliam Ash Disposal Site	Wisconsin Power Supply Co. (WPSC)	(State Action) 1994, WDNR required an investigation of the ground water contamination and an upgrade of the monitoring network.	1
WI	WI Power & Light Co Nelson Dewey Generating Station	Alliant Energy	**(State Action)** As a result of the various PAL and ES exceedances, the State required a ground water investigation, and the facility took action to remediate ground water contamination and prevent further contamination.	1

State	Site	Owner	Action Taken (Y/N)	Source
SC	SCE&G Wateree Station	Included in Site Column	**(State Action)** DHEC cited the plant for violations of state groundwater standards in 2001	2
IL	Joliet 9	Edison International dba Midwest Generation	**(State Action)** Multiple state actions taken	3
OH	Uniontown	Hyman Budoff / Merle & Charles Kittinger	**(Federal Actions)** Numerous Actions taken	3

Citation Key	
1	EPA Damage case[a]
2	Out of Control[b]
3	In Harm's Way[c]

a: U.S. Envtl. Prot. Agency, Coal Combustion Waste Damage Case Assessments (July 9, 2007); b: Envtl. Integrity Project and Earthjustice, Out of Control: Mounting Damages from Coal Ash Waste Sites (Feb. 24, 2010) c: Envtl. Integrity Project et al., In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment (August 26, 2010).

xi. Such other factors as may be appropriate.

The 137 damage cases and risk assessments also found excess risks for human and ecological receptors from non-appendix VIII constituents of CCRs.[680] These constituents include aluminum, boron, chloride, cobalt, copper, fluoride, iron, lithium, manganese, molybdenum, nitrate/nitrite, strontium, sulfate, vanadium and zinc.[681] All of these constituents pose health threats that are documented by the Agency for Toxic Substances and Disease Registry (ATSDR) ToxFAQs, the EPA Integrated Risk Information System (IRIS), and the Toxicology Data Network (TOXNET) of the National Institutes of Health. While EPA notes that these constituents do not provide an independent basis for listing CCRs pursuant to section 261.11, the Agency "finds their presence in the damage case and risk assessment results to be relevant to the listing decision because of the potential to cause additive or synergistic effects to the Appendix VIII constituents."[682] We concur, but posit that health impacts from the above constituents should be considered whether or not they act synergistically with appendix VIII constituents. As seen in the ATSDR and EPA profiles, these constituents pose severe health impacts independently as well. A table listing the presence of these contaminants at the 137 damage cases can be found in Appendix F.

IV. REGULATION OF COAL ASH UNDER SUBTITLE D OR SUBTITLE D PRIME OPTIONS WOULD FAIL TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT

For all of the reasons set forth above, EPA can and must regulate CCRs under subtitle C of RCRA. EPA's alternative proposal to regulate under subtitle D embodies a dangerous policy that would leave pressing health and environmental threats unaddressed. It is also fatally flawed as a matter of law.

A. EPA's Subtitle D Criteria Do Not Comply With The RCRA Standard For Such Criteria Under Section 4004(a).

One of the options presented in EPA's co-proposal is regulation of coal ash under RCRA subtitle D pursuant to sections 1008(a), 2002, 4004, and 4005(a) of RCRA.[683] Under this approach, coal ash would remain classified as a non-hazardous RCRA solid waste, and EPA would develop national minimum criteria governing disposal facilities. Such a rule would not regulate the generation, storage, treatment or transport of coal ash prior to disposal.[684] Because of the limited scope of subtitle D authority, the rule would not require permits, nor could EPA enforce the requirements. Instead, only the states or citizens could enforce the requirements under RCRA citizen suit authority pursuant to section 7002.[685]

Section 4004(a) of RCRA provides that EPA shall promulgate regulations containing criteria for determining which facilities shall be classified as sanitary landfills and which shall be

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[680] 75 Fed. Reg. 35173
[681] *Id.*
[682] 75 Fed. Reg. 35173.
[683] 42 U.S.C. §§ 6907(a), 6912, 6944 and 6945(a).
[684] 75 Fed. Reg. 35,124.
[685] 42 U.S.C. § 6972.

classified as open dumps. These criteria constitute the subtitle D regulations for disposal of non-hazardous solid waste.[686] Section 4004(a) establishes the standard for these criteria as follows;

> [a]t a minimum, such criteria shall provide that a facility may be classified as a sanitary landfill and not an open dump only if there is no reasonable probability of adverse effects on health or the environment from disposal of solid waste at such facility.[687]

Thus EPA's proposed regulations under subtitle D must ensure that there will be "no reasonable probability of adverse effects on health or the environment" from the disposal as coal ash in landfills and surface impoundments. As explained below, EPA's proposed subtitle D regulations fall far short of the standard of ensuring no "reasonable probability" of harm. Therefore this proposed option would be illegal if promulgated.

B. Many States Are Unlikely To Adopt Subtitle D Criteria

Overall, there is no subtitle D criteria that can ensure "no reasonable probability of adverse effects on health or the environment from disposal" of coal ash and other CCRs. Decades of failure by state regulatory agencies to regulate the disposal of these wastes in any reasonably effective manner make this clear. In addition, any argument in favor of subtitle D regulation ignores the states' collective failure to enforce the subtitle D criteria that was promulgated by EPA *over three decades ago* in 1979.[688]

Section III.B.2, *supra,* describes the failure of states to enforce the subtitle D open dumping criteria found in sections 247.3-3 and 257.3-4.[689] The open dumping criteria found in these provisions are exceedingly straightforward. For example, for the key groundwater protection standard in section 257.3-4, a violation occurs when the groundwater exceeds a specified MCL beyond the solid waste boundary of a coal ash dump. Yet at site after site where contaminated groundwater tripped the standard, *for thirty years* the states declined to enforce this regulation.

In the present proposed rule, EPA has proposed a complicated scheme involving certifications by "independent professional engineers" who must determine if technical design standards are met, alternate performance standards are adhered to, proper notifications submitted, adequate demonstrations made, and ultimately, if statistically significant contamination is detected. To determine compliance with the proposed

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[686] As EPA explains: Under RCRA 4005(a), upon promulgation of criteria under 1008(a)(3), any solid waste management practice or disposal of solid waste that constitutes the ''open dumping'' of solid waste is prohibited. The criteria under RCRA 1008(a)(3) are those that define the act of open dumping, and are prohibited under 4005(a), and the criteria under 4004(a) are those to be used by states in their planning processes to determine which facilities are ''open dumps'' and which are ''sanitary landfills.'' EPA has in practice defined the two sets of criteria identically. See, e.g., Criteria for Classification of Solid Waste Disposal Facilities and Practices, 44 FR 53438, 53438–39 (Sept. 13, 1979). 75 Fed. Reg. 35192.

[687] 42 U.S.C. § 6944(a).

[688] Criteria for Classification of Solid Waste Disposal Facilities and Practices, Final Rule, 44 Fed. Reg. 53438, (September 13, 1979).

[689] 40 C.F.R. §§ 257.3-3 and 257.3-4.

regulations, state regulators must evaluate this avalanche of complex certifications. Given the complete absence of state oversight of the existing subtitle D criteria, it is unreasonable for EPA to credit the viability of this scheme. EPA cannot reasonably rely on states to verify extensive paperwork fueled by "self-implementing regulations" and "independent" engineers working for the regulated parties in order to enforce the criteria effectively— especially given state funding constraints.

Second, EPA itself admits that in most cases, states will do no such thing. In the preamble, EPA comments that the considerably lower cost for subtitle D regulations in comparison to subtitle C results from a difference in the expected *compliance* rate, not from a difference in required engineering controls. EPA states "[t]he main differences in cost are based on the assumption that there will be less compliance or slower compliance under a RCRA subtitle D option.[690] Remarkably, EPA methodically calculates the estimated magnitude of this noncompliance, and it is substantial. As spelled out in EPA's Regulatory Impact Analysis with great specificity, EPA anticipates that only 52 percent of the coal ash in the U.S. will be generated in states that will adopt and enforce the subtitle D criteria. By EPA's count, over 67 million tons of toxic ash will escape regulation each year, and this waste is generated in states with the highest disparity in race and income of residents living near coal ash dumps. With only 48 percent of coal ash generated in the U.S. disposed in states willing to adopt or enforce the regulations, it is impossible to meet the statutory standard of "no reasonable probability of adverse effects on health or the environment from disposal of solid waste."[691] Without criteria being adopted and enforced, the statutory distinction between allowable sanitary landfills and prohibited open dumps becomes meaningless.

In fact, EPA has greatly *underestimated* projected state noncompliance. Applying EPA's own yardstick that states not currently requiring groundwater monitoring at surface impoundments "would not change their practices simply because EPA issued national rules,"[692] the correct calculation of the percentage of coal ash in states without such regulatory requirements is 76 percent, not 52 percent. Thus it becomes even more unreasonable to adopt the proposed subtitle D option.

Lastly, as EPA knows, subtitle D regulations are not federally enforceable. EPA cannot leave unmotivated states and private citizens to undertake the extraordinarily resource-intensive task of enforcing the subtitle D criteria through citizen suit litigation. Given the overwhelmingly widespread damage that is occurring as a result of unsafe disposal across the country, it would be impossible to achieve effective enforcement at the scale that is needed through private actions. The inevitable outcome of "D" regulation is unchecked damage to human health and the environment in violation of RCRA.

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[690] 75 Fed. Reg. 35139. EPA states, "The main differences in cost are based on the assumption that there will be less compliance or slower compliance under a RCRA subtitle D option.

[691] 42 U.S.C. § 6944(a).

[692] RIA at 124.

C. The Proposed Subtitle D Regulations Are Significantly Weaker Than Existing Subtitle D Regulations

Even if it were appropriate to regulate CCRs under subtitle D— which it certainly is not— EPA's proposed subtitle D scheme is even less stringent than the existing subtitle D criteria that now apply to CCR disposal. In other words, EPA's proposed D option would make the current untenable situation even worse.

In two determinations, EPA admits that the current regulatory scheme is inadequate to comply with section 4004(a) criteria and that additional regulations under subtitle D are warranted. However, the regulatory scheme EPA proposes eliminates the few key protections that apply now. The groundwater protection provision currently applicable to coal ash, section 257.3-4, requires utilities to close dumps that contaminate groundwater with arsenic, selenium, lead, cadmium and other common coal ash constituents. According to the regulations, a dump that contaminates groundwater is an open dump, and open dumps are simply prohibited and must be closed.[693]

EPA's proposed regulations provide far less protection to groundwater. First, EPA has entirely removed the groundwater protection requirement from the current scheme.[694] Section 257.3-4 no longer applies to coal ash dumps. Under EPA's new scheme, such dumps can release deadly contaminants into groundwater, and these dumps remain in compliance until there is a "statistically significant" increase in a listed parameter that is voluntarily reported by the operator of the dump to the state. Worse still, the operators do not have to monitor for the toxic constituents that are common at coal ash dumps, namely any of the heavy metals such as arsenic, cadmium, chromium, lead, mercury, nickel or selenium.

Even when a statistically significant exceedance is found by the operator to occur, there is no requirement to close the dump. Rather the operator must simply increase the extent of its monitoring. Only after finding that the dump is indeed contaminating groundwater must something be done. However, all that is required is that the utility develop an assessment of corrective measures within 90 days of providing notice that contamination is occurring. Following the assessment, the utility must implement a corrective measure of its choosing. There is no state or federal oversight to ensure that the company moves quickly enough or resolves the problem in the end.

Lastly, EPA is proposing another fundamental change in the subtitle D regulatory scheme that will significantly weaken groundwater protection. Section 257.3-4(a) currently prohibits the contamination of an aquifer, defined as "a geologic formation… capable of yielding usable quantities of ground water to wells or springs."[695] EPA proposes to replace "usable quantities" with "significant quantities."[696] This change removes protection from those communities that depend on groundwater for drinking or

[693] 40 C.F.R. § 257.3-4 and 42 U.S.C. § 6945(a). *See also* discussion in Section III.B.2, *supra.*
[694] 75 Fed. Reg. 35240. *See* proposed 40 C.F.R. § 257.40.
[695] 40 C.F.R. § 257.3-4(c)(1).
[696] 40. C.F.R. § 257.40(b).

agricultural use, who may not have access to a public water system, but whose use may not meet the impermissibly vague standard of "significant." An examination of EPA's damage case list, as well as the additional sites documented by public interest groups, reveals many dump sites where coal ash contamination poisoned a relatively small cluster of residential wells. EPA's proposed regulation allows these communities' water to be poisoned with no legal recourse. Such disregard for the safety of small communities certainly does not establish a "reasonable probably of no adverse impact on health" and is *prima facie* unlawful.

D. The Proposed Subtitle D Regulations Do Not Protect Health or the Environment

The following deficiencies certainly do not comprise a comprehensive list of subtitle D's failure to protect human health or the environment to the standard of section 4004(a). For the reasons discussed above, we do not believe EPA has the discretion under RCRA to implement a subtitle D option. However, we comment on specific major aspects of the subtitle D scheme below. We also submit comments to the record on particular aspects of the proposed subtitle D (and subtitle C) schemes in Appendices I, M, and N.

1. Subtitle D Regulations Cannot Impose Land Disposal Restrictions

EPA asserts that it does not have authority to impose land disposal restrictions ("LDR") under subtitle D, and therefore cannot impose a ban on surface impoundments. EPA argues that the practical effect of its requirement that all surface impoundments have composite liners under subtitle D is to force the phase out of all existing noncompliant ponds. However, wet storage of coal ash, even in units with a composite liner, pose a far greater risk of harm to human health and the environment than dry disposal of ash in an engineered landfill. Allowing this dangerous disposal to continue fails to establish a reasonable probability that there will be no adverse impact on heath or the environment, as required by section 4004(a).

Further, liner or no liner, wet storage of coal ash poses unacceptable risks of catastrophic collapse. Such risks are avoided when the waste is dry disposed. In section VII of these comments, we discuss the inherent danger of coal ash impoundments and explain why the proposed regulatory scheme that incorporates MHSA requirements is still insufficient. Catastrophic failure is an avoidable risk posed by an outdated and unnecessarily hazardous method of disposal that must be phased out. Failure to do so, fails to establish a reasonable probability that there will be no adverse impacts on heath or the environment.

2. Subtitle D Standards Cannot Require Owners and Operators of Coal Ash Disposal Facilities to Maintain Financial Assurance

EPA's proposed subtitle D standards do not include any requirement for owners or operators of coal ash disposal facilities to maintain financial assurance (demonstrate adequate financial resources) sufficient to cover closure, post-closure care, necessary clean up and liability

from facility operations. Yet according to EPA, financial assurance requirements "protect public health and the environment by promoting the proper and safe handling of hazardous materials and protecting against a liable party defaulting on closure or clean-up obligations."[697] The absence of financial assurance can "place the public at risk because of the potential financial inability to close or clean up the site." [698]

Furthermore, according to the EPA, "having the financial wherewithal to perform closure and/or cleanup is critical to protecting human health and the environment from toxic and hazardous waste and substances that are polluting the land, air, and water."[699] The EPA explains that "financial responsibility requirements achieve this protection by: (1) promoting the proper handling of hazardous and toxic waste and substances; (2) ensuring that funds will be available to address contamination; (3) preventing the shifting of clean-up costs from the responsible party to the taxpayer or other parties; and (4) making facilities and land available to the public for reuse."[700]

EPA considers financial assurance regulations an essential component of its hazardous waste compliance program, as evidenced by EPA's 2003 "Enforcement Alert," which specifically addresses RCRA financial assurance requirements.[701] The Alert called financial assurance requirements a "fundamental compliance obligation" and stated the "failure to comply with financial assurance requirements puts human health and the environment at risk."[702]

At least one court has recognized the important role played by financial assurance regulations in forcing waste-handling facilities to employ better operation and management practices. In *Safety-Kleen, Inc., (Pinewood) v. Wyche*, the Court held that the South Carolina hazardous waste facility financial assurance regulations (equivalent to the federal RCRA regulations) were exempt from the federal bankruptcy law's automatic stay because the requirements were part of the State's "police and regulatory power."[703] The Court of Appeals

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[697] U.S. EPA, Compliance and Enforcement National Priority: Financial Responsibility Under Environmental Laws, 1 (2005).
[698] *Id.* at 2.
[699] *Id.*
[700] *Id.*
[701] U.S. EPA, Office of Regulatory Enforcement, Enforcement Alert, Vol. 6, No. 2 (April 2003).
[702] *Id.*
[703] 274 F.3d 846, 865 (4th Cir. 2001). The Court explained:

The incentive for safety is obvious: the availability and cost of a bond will be tied directly to the structural integrity of a facility and the soundness of its day-to-day operations. When the EPA promulgated its financial assurance regulations…, it spelled out how the regulations would promote environmental protection at active hazardous waste facilities. Specifically, the EPA emphasized that the financial assurance requirements would give landfill owners and operators "an incentive to locate, design, and operate facilities to minimize closure and post-closure costs" and to "improve operating procedures and reduce the risk of accidents." Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; Financial Requirements, 47 Fed. Reg. 15032, 15044-45 (Apr. 7, 1982) … To put it more bluntly, sloppy "design and operating procedures ... are more likely to be avoided" with the financial assurance requirements and the resulting incentive to reduce bond costs.

found that financial assurance regulations serve the primary purpose of deterring environmental misconduct by promoting the safer design and operation of hazardous waste facilities.

Furthermore, in a federal register notice last January, EPA set forth *in detail* the rationale behind imposing financial assurance requirements on the electric utility sector.[704] In that notice, EPA acknowledged that the electric power generation, transmission and distribution industry was "the sector reporting the second-largest quantity of on-site release of hazardous substances."[705] Specifically, EPA noted that

> this sector reported 161 million pounds of on-site releases of hazardous substances or approximately 7.5 percent of the total on-site releases of hazardous substances by U.S. industry reporting to TRI. Of this total, 93.8 percent (or approximately 150 million pounds) was released from fossil fuel electric power generation, primarily to land, with additional on-site releases to air and surface water.[706]

In addition to the enormous volume of releases from coal-fired power plants, EPA pointed to the severity of the damage resulting from releases of hazardous substances and the high cost of cleanup. EPA described the numerous documented damage cases, including four National Priority List sites.[707] The Agency noted

> The severity of the consequences impacting public health and the environment as a result of releases and exposure of hazardous substances posed by the Electric Power Generation, Distribution, and Transmission industry is evident in the large costs associated with past and estimated future costs necessary to protect public health and the environment through what are often extensive and long-term remediation efforts. That is, these facilities release hazardous substances which have, in some instances, resulted in contamination that requires long-term management and treatment. Remediation of these sites, therefore, has been quite costly.[708]

Despite the Agency's acknowledgement that financial assurance requirements are essential to public health and safety, these requirements are entirely absent from EPA's subtitle D regulations. In fact, EPA asserts that it lacks the authority under subtitle D to require any financial assurance.

Finally, it must be noted that the failure to require financial assurance has real-world consequences. On January 26, 2010, Perry County Associates, LLC and Perry-Uniontown Ventures I, LLC, the permittee and owner of the Arrowhead Landfill, respectively, filed for

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[704] 75 Fed. Reg. 816.
[705] *Id.* at 821.
[706] Id. at 829.
[707] Chisman Creek, VA; Salem Acres, MA; Lemberger Landfill, WI and US Department of Energy Oakridge Reservation, TN.
[708] 75 Fed. Reg. 829-30.

Chapter 11 bankruptcy reorganization.[709] The Arrowhead Landfill is the repository for the 3 million tons of coal ash that was removed from Kingston, Tennessee following the 2008 TVA disaster. The Arrowhead Landfill has been the object of citizen suits for violation of the Clean Air Act, the Clean Water Act and RCRA as a result of the coal ash disposal.[710] In fact, on July 14, 2010, EPA sent the Arrowhead Landfill a Letter of Concern following an inspection of the facility, requesting that the landfill owner take steps to comply with numerous Clean Water Act provisions.[711] The proximity of residences in Uniontown, Alabama to the enormous ash disposal operation at the Arrowhead Landfill raises substantial concerns for the health of the community.

In sum, the inability to properly operate and maintain a coal ash disposal facility, including executing safe closure and post-closure care, will greatly endanger the residents of Uniontown, Alabama, as well hundreds of other communities located near coal ash dumps. Certainly the failure of subtitle D standards to require any financial guarantees is a clear violation of the standards set forth in section 4004(a) of RCRA.

3. Subtitle D Regulations Cannot Establish "Cradle to Grave" Requirements

EPA's proposed subtitle D scheme does not establish "cradle to grave" requirements. The proposed criteria does not address the generation, storage, treatment or transport of coal ash prior to disposal. The handling of ash prior to disposal, however, can and does harm human health and the environment. In sections III.C.2.e, supra, these comments discuss the risk posed by fugitive dust that often occurs during storage and transport of coal ash. Failure to address these risks to air, groundwater, soil, and surface water from ash handling fails to establish a reasonable probability that there will be no adverse impacts on heath or the environment.

4. The Proposed Subtitle D Standards Do Not Require A Solid Waste Operating Permit And Therefore Cannot Establish A Reasonable Probability That There Will Be No Adverse Impacts On Human Health Or The Environment.

Solid waste operating permits are critical to ensuring coal ash disposal facilities design, construct, operate and close their waste facilities safely. Permits are important because they can dictate the use of specific operating practices and control technologies that may be essential for minimizing releases. Permits also provide an important enforcement vehicle, as well as a process by which the public can be informed and

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[709] *In re Perry Uniontown Ventures I, LLC,* Nos. 10-00275 and 10-00276 (Bankr. S.D. Ala. filed Jan. 26, 2010).
[710] Thirty-four residents filed suit against the landfill operator, Phill-Con Services, LLC. *Abrahams v. Phill-Con Services, LLC*, No. 2:10-cv-00326 (S.D. Ala. filed June 25, 2010). Sixty-four residents also filed a state lawsuit for damages and injunctive relief in state court. *Abrahams v. Phill-Con Services, LLC*, No. CV-2010-21 (Perry County Cir. Ct. filed June 21, 2010), removed to Bankruptcy Court as *Abrahams v. Phill-Con Services, LLC (In re Perry Uniontown Ventures I, LLC)* , Adv. Proc. No. 10-00075 (Bankr. S.D. Ala. filed July 20, 2010). See letter from David A. Ludder to Gwendolyn Keyes Fleming, Regional Administrator, U.S. Environmental Protection Agency, Region 4 dated October 2010, attached to these comments as Appendix L.
[711] Letter from Christopher L. Plymale, Chief, East NPDES Enforcement Section, Water Protection Division, US Environmental Protection Agency, Region 4 to Eddie Dorsett, President, Phill-Con Services, July 14, 2010.

participate in the siting, operation and closure of the waste disposal unit. The inability to require solid waste permits for all coal ash disposal facilities is a significant and dangerous gap in EPA's proposed subtitle D scheme. The existence of this critical gap fails to establish a reasonable probability that there will be no adverse impacts on health or the environment.

5. Subtitle D Standards Cannot Address Facility-Wide Pollution And Historic Dumping And Therefore Cannot Establish A Reasonable Probability That There Will Be No Adverse Impacts On Human Health Or The Environment.

The absence of facility-wide corrective action standards is a fatal flaw in EPA's proposed subtitle D regulations. Given the magnitude of historic dumping on power plant properties, it is a gross oversight not to require an investigation of all onsite disposal facilities, both operating and retired. Section III.C.2.h. *supra,* discusses the substantial risks posed by retired dumps. The absence of a requirement in the subtitle D scheme to address this risk fails to establish a reasonable probability that there will be no adverse impact on heath or the environment.

6. Subtitle D Standards Cannot Require Utilities to Identify Current and Past Disposal Units And Therefore Cannot Establish A Reasonable Probability That There Will Be No Adverse Impacts On Human Health Or The Environment.

With the listing of coal ash as a hazardous waste, utilities and landfill owners must comply with section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).[712] Section 103(c) requires coal ash generators, past or present owners of disposal facilities, and some transporters to notify the EPA of the existence of facilities where coal ash has been disposed, specifying the amount to be found there, and any known, suspected, or likely release from the site. Given the dearth of data on where and how *billions* of tons of coal ash have been disposed over the last six decades, it is essential for the protection of health and the environment to collect such information. In a 1993 Department of Energy report, the Department found that there are 759 retired coal ash disposal units with a cumulative total of 1 billion tons of waste, but no information is available on where those units are located or the conditions of the disposal.[713] Identification of hundreds of historic dump sites will undoubtedly help to safeguard water supplies, especially since most older dumps are unlined and thus more likely to release harmful contaminants. Without this information, subtitle D fails to establish a reasonable probability that there will be no adverse impact on health or the environment.

[712] 42 U.S.C. §9603(c).

[713] ICF Resource, Incorporated, Coal Combustion Waste Management Study, prepared for U.S. Department of Energy (February 1993), Docket ID No.: EPA-HQ-2006-0796.

7. Subtitle D's Reliance On Independent Professional Engineers In Lieu Of Government Oversight To Guarantee Regulatory Compliance Cannot Establish A Reasonable Probability That There Will Be No Adverse Impacts On Human Health Or The Environment.

Subtitle D relies almost entirely on the existence of "independent professional engineers and hydrologists" to evaluate a utility's compliance with subtitle D criteria and inform the state in a timely and effective manner when problems arise. Subtitle D relies on utility consultants to design an effective monitoring program, to notify the state when groundwater monitoring reveals contamination, to design remedial actions, and to certify that cleanup has been successful. However, at numerous sites, the performance of experts working for utility companies or private landfill owners has not always been timely, forthright or in the public interest. The questionable conduct of "independent" professional engineers and hydrologists at three recent coal ash contamination sites was revealed in court filings. At the Colstrip, Montana site, the Town of Pines Superfund Site in Indiana and the Battlefield Golf Course in Virginia,[714] experts, working for and with the utilities, attempted to hide or obscure evidence of contamination from state regulators. While this behavior may not be representative of the consulting industry, there is ample evidence that such behavior does exist and that it causes harm to health and the environment.

In fact, the existence of "independent" professional engineers knowledgeable about the threats posed by the unstable dam at the TVA plant in Kingston should be reason enough to reject this untenable scheme. If independent consultants could be trusted to make the disclosures necessary to protect human health and the environment, such consultants would have disclosed the danger of a blowout in Tennessee to the State or federal government well before it occurred. In view of subtitle D's complete reliance on "independent" professional engineers for ensuring compliance with many critical parts of the regulations, this scheme fails completely to establish the probability that there will be no adverse impact on health or the environment.

8. EPA's Subtitle D Prime Criteria Do Not Comply independent With The RCRA Standard For Such Criteria Under Section 4004(a).

Under EPA's subtitle D prime option, existing surface impoundments would not have to close or install composite liners but could continue to operate for their "useful" life.[715] For all the reasons stated above, the subtitle D prime option is arbitrary, capricious and in violation of RCRA. Furthermore, its provision allowing the continued operation of unlined impoundments is unlawful for the reasons specified in Section VIII, supra. Continued operation of unlined surface impoundments, in many instances, poses the threat of imminent and substantial endangerment of human health or the environment, and thus is prohibited under section 7002(a)(1)(B) of RCRA.[716] A detailed discussion of the present threats posed by surface impoundments is found in prior sections of these comments and in the expert reports attached as Appendices I, M and N. In addition,

[714] *See Fentress Families Trust v. Dominion Virginia Power*, No. CL09-710 (Va. Cir. Ct.); *Sears v. Virginia Electric & Power Co.*, No. Cl09-001914 (Va. Cir. Ct).
[715] 75 Fed. Reg. 35134.
[716] 42 U.S.C. § 6972(a)(1)(B).

these comments address the need for EPA to use its authority pursuant to section 7003(a) of RCRA to address coal ash impoundments that are posing a threat of imminent and substantial endangerment.[717]

V. EPA FAILED TO COMPLY WITH EXECUTIVE ORDER 12898 BY FAILING TO IDENTIFY AND ADDRESS SIGNIFICANT DISPARATE IMPACTS OF THE SUBTITLE D OPTION

Under Executive Order 12898, each Federal agency must make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations.[718] While EPA performed an environmental justice analysis on the current impact of coal ash disposal nationally and found disparate impacts, the Agency did not examine the effect of choosing one regulatory option over another. The decision before EPA is not whether to regulate coal ash, which assuredly affects low-income populations disproportionately. The instant decision is whether to regulate the toxic waste under subtitle C or subtitle D of RCRA. EPA must therefore identify any disproportionate impact on minority and low-income populations that results *from this choice*. According to the Executive Order, if disparate impacts are identified, EPA must address those impacts. Most importantly, the Agency must make achieving environmental justice a factor in its decision to choose one option over the other.

By EPA's own admission, coal plants—which are usually accompanied by coal ash ponds and dry coal ash landfills—are disproportionately located in impoverished areas. Earthjustice's own environmental justice analysis of the national rule also found disparate impact. Our analyses agree that almost 70 percent of ash ponds in the United States are in areas where household income is lower than the national median.[719] We also found that, of the 181 ZIP codes nationally that contain coal ash ponds, 118 (65.19 percent) have above-average percentages of low-income families.[720] Given the serious health threats posed by coal ash, it is

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[717] 42 U.S.C. § 6873(a).

[718] *Executive Order 12898, entitled Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Fed. Reg. 7629, Feb. 16, 1994). *See also* Interim Guidance on Considering Environmental Justice During the Development of an Action (July 2010) (http://www.epa.gov/environmentaljustice/resources/policy/considering-ej-in-rulemaking-guide-07-2010.pdf.

[719] U.S. Census Bureau, Census 2000 Summary File 3 (SF 3) - Sample Data, All 5-Digit ZIP Code Tabulation Areas (860), Table P53 "Median Household Income in 1999 (Dollars)", available at http://factfinder.census.gov/servlet/DCSubjectKeywordServlet?_ts=307978361769.

[720] U.S. Census Bureau, Census 2000 Summary File 3 (SF 3) - Sample Data, All 5-Digit ZIP Code Tabulation Areas (860), Table P76 "Family Income in 1999" (downloaded June 23, 2009), available at http://factfinder.census.gov/servlet/DownloadDatasetServlet?_lang=en&_ts=263843114140. "Low-income" defined as earning less than $20,000 annually. ZIP codes containing coal ash ponds compared to a national mean percent "low-income" of 12.61%, calculated based on the "Family Income in 1999" dataset; United States Environmental Protection Agency (U.S. EPA). Database of coal combustion waste surface impoundments (2009). Information collected by EPA from industry responses to Information Collection Request letters issued to the companies on March 9, 2009. Sufficient data to determine ZIP code Census Data was available for 511 of the nation's 584 known coal ash impoundments. Many impoundments are adjacent to one another surrounding

particularly troublesome that coal ash impoundments are disproportionately located in low-income communities, where residents are more likely to rely on groundwater supplies and less likely to have access to medical insurance and care.

Yet even more striking and disturbing environmental justice implications are found when the predicted impact of EPA's subtitle D option is considered. Using EPA's data, this disparity is significantly worse in states that are not expected to adopt stricter standards for coal ash regulation should EPA choose to regulate coal ash under the weaker, non-mandatory Subtitle D scheme. The states that are not expected to adopt new controls face a greater disparate impact among low-income communities than the country as a whole. In these states, minority and child populations also carry an unfair share of the burden of coal ash disposal.[721] Using the same method of environmental justice analysis used by EPA, we also found that the race and income disparity is especially problematic in certain geographic areas, such as EPA Region 4.[722]

In sum, at the heart of EPA's environmental justice analysis must be an evaluation of the impact of each of the two regulatory options on vulnerable populations. Most importantly, it is essential that EPA examine the impact of its proposed subtitle D option. As explained in detail in section III.B.1.f, *supra*, EPA predicts under subtitle D *a dramatic drop in the level of industry compliance in specific states*. Using EPA's own prediction of which states will not adopt the subtitle D guidelines—which states will eschew the minimum federal guidelines for coal ash disposal facilities in their state—it is crystal clear that poor communities and communities of color are left out in the cold. The contrast between the two options is stark, as described below. EPA must reject a disparate impact on vulnerable populations and promulgate a subtitle C rule, which ensures protection of all communities equally in all 50 states.

A. EPA's Regulatory Impact Analysis Found Environmental Justice Implications.

According to the EPA's own environmental justice analysis for the proposed coal ash regulations, the myriad risks of coal ash "may have a disproportionately higher effect on low-income populations."[723] In the *2010 RIA*, EPA used 2000 Census data to determine if minority and low-income populations are disproportionately represented, as compared to state and national percentages, in ZIP Code Tabulation Areas (ZCTAs) containing electric utility plants. EPA found, by three separate measures, that low-income populations near plants slightly exceed statewide and national averages. Two out of three of these measures found that minority populations near plants are lower than state and national averages, while a third measure found a very slight excess of non-white individuals near plants.

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generating facilities, and are listed with identical geographic coordinates in the EPA data—hence why only 181 ZIP codes contain 511 ash impoundments.

[721] "Minority" defined as non-white, calculated by subtracting "white population" from "total population" for each Census geography.

[722] EPA Region 4 includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and six Tribes.

[723] Environmental Protection Agency, 40 C.F.R. Parts 257, 261, 264, 265, 268, 271 and 302, Proposed Rules, Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities," 418.

EPA analyzed ZCTA census data in three ways: (a) by calculating what ratio of plants are in ZCTAs whose percent minority or poverty rate exceeds statewide percentages; (b) by calculating minority and poverty rates for all people in ZCTAs containing plants in a given state, and comparing these aggregations with statewide percentages; and (c) by aggregating all plant-containing ZCTA Census data nationally, and comparing it with national averages.[724]

The first method of comparison showed that 52 percent of plants have low-income populations above their statewide benchmarks. The second method of comparison found that 62 percent of states have higher poverty rates near plants than statewide. Finally, poverty population near plants nationally (12.9 percent) exceeded the national average percent poverty (11.9 percent), by 8 percent. All three measures demonstrated a disproportionate representation of low-income individuals near plants. In view of the national disparity found by EPA, a federal coal ash rule that applies equally in all states is necessary to alleviate the disparate impacts of ash disposal under the present patchwork of state laws.

B. Environmental Justice Impacts Compel EPA To Select the Subtitle C Regulatory Option.

The two options for regulation of coal ash are totally different in terms of projected impact. Under the stronger subtitle C option, EPA retains enforcement authority, and the regulatory scheme is mandatory in every state. In contrast, under the weaker subtitle D scheme, EPA issues "guidelines" that are not federally enforceable and that states may choose *not* to adopt. EPA predicts that subtitle D will allow a continuation of the current state-to-state inequality in coal ash regulation and, in fact, lists 30 states that it predicts will not adopt the federal guidelines as law. EPA identifies these states by their decades of poor regulation of pre-existing coal ash disposal units.[725]

Comparing these two groups of states (states that will adopt federal guidelines and states that won't), it is possible to measure the impact on poor and minority communities if EPA picks the "weaker" subtitle D option. While EPA found that coal ash regulation raised broad environmental justice issues, the Agency never calculated the difference in impact between the two options it proposed. Yet the difference is dramatic. EPA's selection of subtitle D would have a much greater disproportionate impact on poor and minority communities. *Communities living near coal plants in the states that will not implement subtitle D are more likely to be impoverished, non-white, and to contain a larger-than-average child population*. In other words, a weak EPA rule would apply new safeguards for coal ash regulation in states where coal ash presents a relatively small, or even non-existent, environmental justice problem, while failing to add protections in states where environmental justice communities are heavily impacted by coal ash disposal.

[724] *Id.*

[725] See discussion in Section III.B.2.f, *supra* and Table 28 listing states that will not adopt the subtitle D regulations.

Demographic Groups Surrounding Coal-Fired Electric Utility Plants

Demographic Group	**Demographic Statistics Comparison Method**	**Subset A** States Expected to Implement Subtitle-D Requirements (17 states)	**Subset B** States *Not* Expected to Implement Subtitle-D Requirements (30 states)
Below Poverty Line	To national average	+2%	+13%
	To expected state avg.	+8.5%	+28.0%
Minority	To national average	-35%	+5%
	To expected state avg.	-16.4%	+23.0%
Child	To national average	-2%	+9%
	To expected state avg.	+1.2%	+9.2%

The above chart compares demographic characteristics near coal plants with national and statewide average demographics to determine whether environmental justice communities are disproportionately affected by coal ash production and disposal. The analysis, prepared by Michael Patoka of the Center for Progressive Reform at the University of Maryland School of Law, uses the same method that EPA used when performing its own environmental justice analysis for the proposed coal ash rule. Mr. Patoka's analysis, however, distinguishes between states that are expected to implement subtitle D requirements, should EPA adopt this non-federally enforceable option, and states that EPA has predicted will not adopt subtitle D requirements. It shows far worse disparate impacts in the latter.

The percent of the population living near coal plants on an income below the poverty level ("poverty population") exceeds the national average by 2 percent in states that are expected to adopt new controls, and by 13 percent in states that are not. By this measure, the harm to poverty populations is 6.5 times more disproportional in states that will not adopt new controls. The poverty populations near plants exceed their respective statewide averages by 8.5 percent in states that are expected to adopt new controls, and by 28 percent in states that are not. By this measure, the harm is 3.3 times worse in states that are not expected to adopt new controls.

The minority populations near coal plants are 5 percent higher than the national average and 23.5 percent higher than their respective statewide averages in states that are not expected to adopt new controls under subtitle D. This pattern is reversed in states that are expected to adopt new controls. In those states, the minority populations are 35 percent *lower* than the national average and 16.4 percent *lower* than their respective state averages.

The child population exceeds statewide averages by 9.2 percent in states that are not expected to adopt new requirements, but by 1.2 percent in states that are. The harm to children is 7.7 times more disproportional in states that will be left out of regulatory improvements under subtitle D.

EPA has identified the five states with the largest disparities in poverty, minority, and child populations near coal plants. For poverty, the states with the worst disparities are Mississippi, Alabama, Illinois, New Jersey, and Connecticut. For minority populations, the five states are Connecticut, Arizona, Oregon, Tennessee, and Kansas. For child populations, the five are Oregon, Hawaii, New Mexico, Arizona, and California. All of these states are expected *not* to adopt subtitle D requirements.[726]

Clearly, disparate impacts of coal ash disposal would be far worse for poor, minority, and child populations under the subtitle D regulatory option. EPA must avoid this outcome by promulgating a mandatory national rule under subtitle C.

C. Regional Differences In The Environmental Justice Impact of Coal Ash

The disproportionate impacts of coal ash disposal are worse in states that are not expected to adopt new controls under a subtitle D regulatory framework, but other geographic trends also show that the environmental injustices of coal ash are not shared equally throughout the United States.

The environmental justice trend for coal ash is especially magnified in EPA Region 4. Throughout EPA Region 4, coal-fired utility plants are sited in areas with disproportionately high poverty and minority populations—particularly when compared to national averages, but also when compared to state averages. Vulnerable populations are therefore unfairly impacted by the production and storage of toxic coal ash. For example, Mississippi and Alabama are the two states in the nation with the worst disproportionate impact for populations living below the poverty line and Tennessee is among the top five with the worst disproportionate impact to minorities.[727]

The greatest disparity in Region 4 as compared to the nation as a whole is in regards to minority populations. Nationally, the minority population surrounding coal-fired utility plants is 13 percent *lower* than the national average percent minority population of 24.9 percent. In EPA Region 4, the minority population near coal plants—30.0 percent—is 21 percent *higher* than the national average. The minority populations near coal plants in Region 4 also cumulatively exceed their respective state averages by 19 percent. In a few particular states, this metric soars far higher than 19 percent. For example, in Alabama, the minority population near coal plants is 46 percent higher than in the state as a whole; in Mississippi it is 34 percent higher; and in Tennessee there is nearly twice as high a share of non-white individuals living near coal plants as would be expected given the state average (an 89 percent exceedance).

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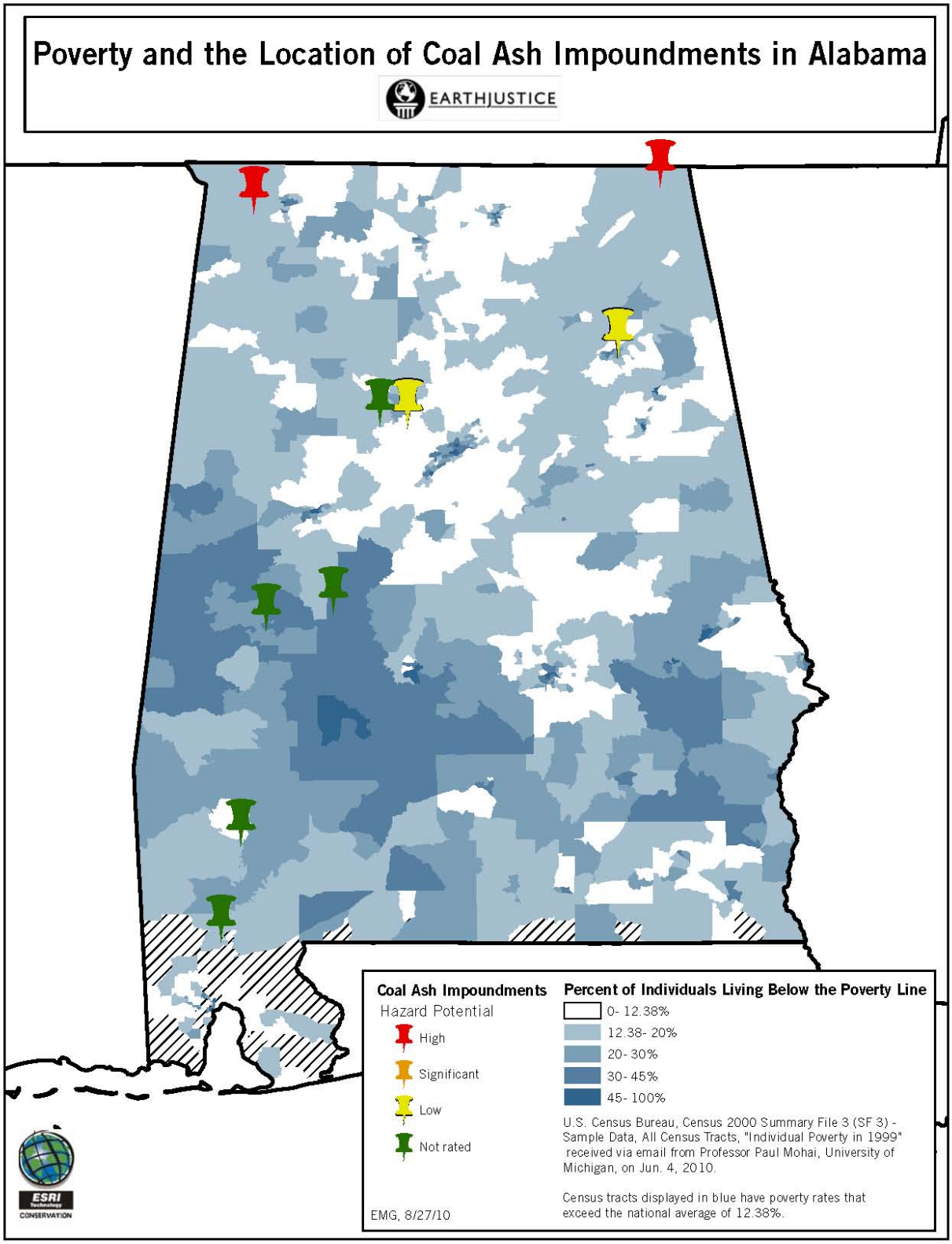
[726] *See* U.S. EPA, Regulatory Impact Analysis for EPA's Proposed Regulation of Coal Combustion Residues Generated by the Electric Utility Industry, Office of Management and Budget (OMB) Review Draft 148-65 (2009), *available at* http://www.regulations.gov/search/Regs/home.html#document.
Detail?R=0900006480a51278 at 224-25, 235-36.

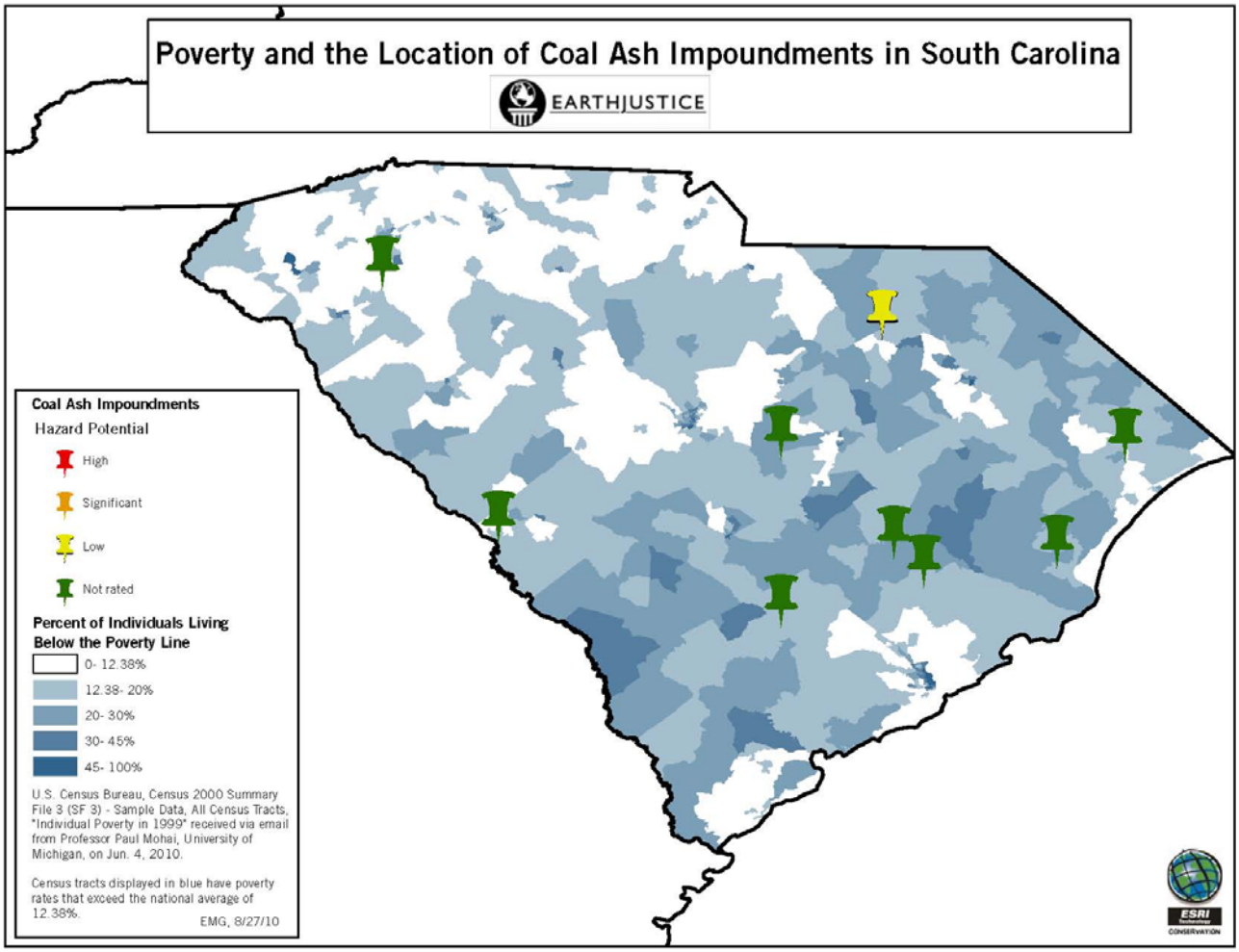
[727] *See* U.S. EPA, Regulatory Impact Analysis for EPA's Proposed Regulation of Coal Combustion Residues Generated by the Electric Utility Industry, Office of Management and Budget (OMB) Review Draft 148-65 (2009), *available at* http://www.regulations.gov/search/Regs/home.html#document.
Detail?R=0900006480a51278, 224-225.

The burden of coal ash storage and, ultimately, the threat of contamination—borne unequally by poverty populations nationwide—have a more dramatic disproportionate impact in Region 4. The national average percent poverty population is 11.9 percent.[728] Near coal plants nationwide, the poverty rate is 12.9 percent, or 8 percent higher than the national average. In Region 4, the poverty rate near coal plants is 14.9 percent, a figure which exceeds the national average by 25 percent. As with the minority population, the poverty population is particularly concentrated near coal plants in Alabama, Mississippi, and Tennessee. In Alabama and Mississippi, the poverty rate near coal plants is more than twice the national average. At 24.5 percent; near coal plants in Alabama, the poverty rate is 106 percent higher than the national average; and at 26.5 percent in Mississippi, it is 115 percent higher than the national average. Finally, the poverty rate near coal plants in Tennessee exceeds the national average by 41 percent. The maps below show the correlations between poverty rates and coal ash impoundment siting in Alabama and South Carolina. Poverty rates are shown by Census Tract. All areas where the poverty rate exceeds the national average are shown in blue.[729]

[728] *Id.*

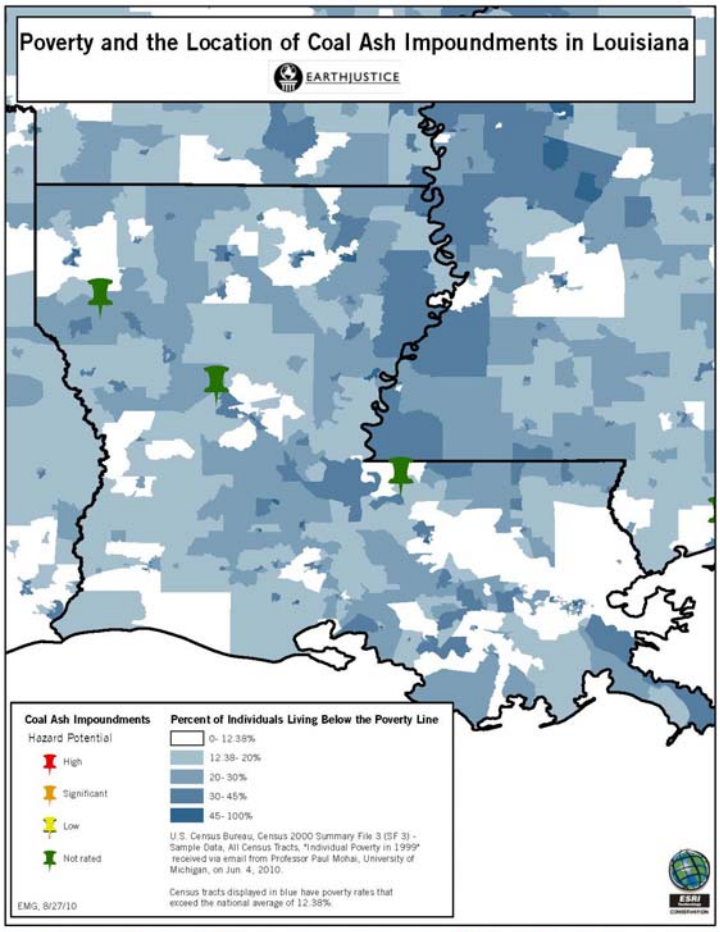
[729] Poverty rates in these maps were calculated by dividing the population living below the poverty line in each geography by the "population for whom poverty status has been determined" therein. This method yielded a calculated national poverty rate of 12.38%. In the EPA's RIA and in the other analyses discussed in these comments, the national poverty rate was given as 11.9% because these analyses calculated the poverty rate by dividing the population living below the poverty line by the *total* population in each geography.


Poverty and the Location of Coal Ash Impoundments in Alabama
EARTHJUSTICE
Coal Ash Impoundments
Hazard Potential
High
Significant
Low
Not rated
EMG, 8/27/10
Percent of Individuals Living Below the Poverty Line
0- 12.38%
12.38- 20%
20- 30%
30- 45%
45- 100%
U.S. Census Bureau, Census 2000 Summary File 3 (SF 3) - Sample Data, All Census Tracts, "Individual Poverty in 1999" received via email from Professor Paul Mohai, University of Michigan, on Jun. 4, 2010.
Census tracts displayed in blue have poverty rates that exceed the national average of 12.38%.
ESRI
CONSERVATION



Outside of Region 4, disparate impacts are also particularly dramatic in Louisiana, Arizona, and New Mexico. In Louisiana, shown in the map below, the three coal ash ponds are all in environmental justice communities. The poverty rate near coal ash ponds in Louisiana is about twice the national average, while the percent non-white population is 87 percent higher than the national average. In Arizona and New Mexico, also shown below, the poverty rates near ash ponds exceed the national average by 52 percent and 225 percent, respectively. The two ash ponds in New Mexico area in areas with a combined percent non-white population of 93 percent, or about four times the national average and three times the statewide average.[730]

[730] U.S. Census Bureau, Census 2000 Summary File 3 (SF 3) - Sample Data, All Census Tracts, "Individual Poverty in 1999" received via email from Professor Paul Mohai, University of Michigan, on Jun. 4, 2010.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Percent of Individuals Living Below the Poverty Line
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20- 30%
30- 45%
45- 100%
U.S. Census Bureau, Census 2000 Summary File 3 (SF 3) - Sample Data, All Census Tracts, "Individual Poverty in 1999" received via email from Professor Paul Mohai, University of Michigan, on Jun. 4, 2010.
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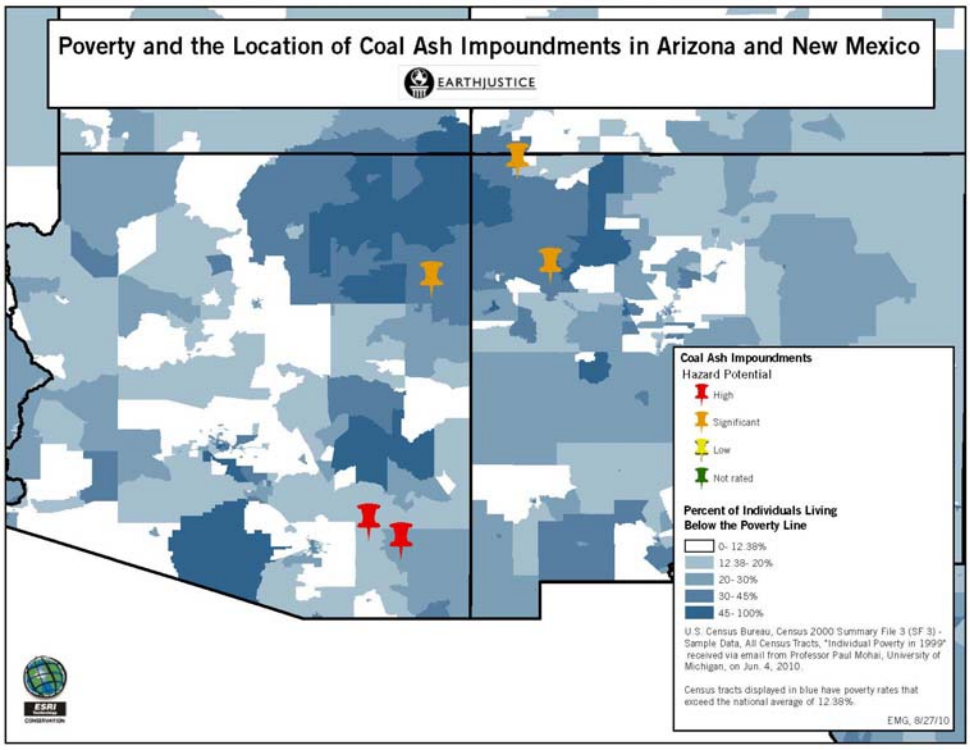
EMG, 8/27/10
ESRI


Poverty and the Location of Coal Ash Impoundments in Arizona and New Mexico
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EMG, 8/27/10
ESRI

Federal regulation of coal ash is necessary in part because, under the mélange of current state regulations, minority and low-income populations, particularly in a handful of states, face unfair exposure to the risks of coal ash. Most notoriously, the Arrowhead Landfill in Perry County, Alabama has been poster child for environmental justice impacts. Perry County is the dumping ground for millions of tons of ash recovered after the TVA ash spill in Kingston, Tennessee in December of 2008. The ash flowing into this low-income and predominantly African American community at a rate of about 8,500 tons per day contains dangerous levels of arsenic, lead, and other heavy metals.[731] The landfill is located in a Census tract with a 33 percent poverty rate and a 62 percent non-white population.[732] It is also located in a state with absolutely no regulations applying to coal ash disposal. Under its subtitle D rule, EPA predicts none will be forthcoming. For Perry County, the news is very bad—the owner of the Arrowhead Landfill has filed for bankruptcy, the landfill permit requires no monitoring for common coal ash contaminants, and the state allows the owner to use ash as daily cover. Federal regulation under subtitle C would ensure that the burdens of coal ash disposal, exemplified by Perry County, are more fairly shared and, when encountered, protections are consistently applied.

It is clear that environmental justice impacts are much greater under subtitle D than subtitle C and that these impacts are incompatible with protecting human health and achieving both the goals of Executive Order 12898 and the goals of RCRA. EPA therefore must select the subtitle C regulatory option, and must ensure that federal regulation of coal ash disposal alleviates existing environmental injustice.

VI. PROPOSED SUBTITLE C REGULATIONS MUST BE STRENGTHENED TO ASSURE THE INTEGRITY OF IMPOUNDMENTS CONTAINING COAL COMBUSTION RESIDUALS[733]

Commenters assert that EPA's proposal to address surface impoundment integrity under RCRA is insufficient. This is true, in no small part, because the agency proposes to rely on MSHA regulations directed primarily at protecting miners on the minesite rather than utilizing more protective standards for siting, design, construction and monitoring that were developed pursuant to Congressional mandate for **public** protection under the 1977 Surface Mining Control and Reclamation Act. The first subsection addresses the sufficiency of the proposed regulations regarding impoundment stability; the four specific questions for which EPA solicited comments are addressed in part 2.

Commenters further assert that the public safety and environment are best protected by the phasing out of all existing coal combustion residual impoundments through a closure process under subtitle C, and that no new impoundments be authorized. The use of water as a mechanism for conveyance of the various coal combustion wastes should be replaced by

[731] Shaila Dewan, "Clash in Alabama Over Tennessee Coal Ash," *New York Times*, 29 Aug. 2009, *available at* http://www.nytimes.com/2009/08/30/us/30ash.html.
[732] U.S. Census Bureau, Census 2000 Summary File 3 (SF 3) - Sample Data, All Census Tracts, "Individual Poverty in 1999" received via email from Professor Paul Mohai, University of Michigan, on Jun. 4, 2010; U.S. Census Bureau, Census 2000 Summary File 3 (SF 3) - Sample Data, All Census Tracts, "Race" received via email from Professor Paul Mohai, University of Michigan, on Jun. 4, 2010.
[733] This section of the comments was drafted by J. Michael Becker, Appalachian Center for the Economy and the Environment, with assistance from Tom FitzGerald, Director, Kentucky Resources Council, Inc.

pneumatic or other systems for dry collection, management and legitimate reuse or disposal. Wet coal ash management is a matter of utility convenience rather than engineering necessity. As the TVA release and the scores of less catastrophic releases into soil, surface and groundwater demonstrate, using water to evacuate the ash as slurry from the combustion process come with hidden but nevertheless significant costs. These costs should be internalized and borne by the companies and their shareholders. Otherwise they will continue to be experienced as the damage to private and public lands and water resources that results from spills and other releases.

Additionally, the agency must adopt on an interim basis the standards developed by the Office of Surface Mining Reclamation and Enforcement in conjunction with the U.S. Army Corps of Engineers, and those developed by the NRCS pursuant to Public Law 83-566. Those engineering, inspection, maintenance and other standards incorporate the most robust federal regulations in place for management of the wastes.

A. The Adequacy of EPA's Proposals to Address Surface Impoundment Integrity Under RCRA

1. MSHA Regulations, Even As Modified in EPA's Proposal Are Insufficient to Protect Public Safety and the Environment.

In the June 21, 2010 Federal Register, EPA proposes two approaches to regulation of coal combustion residuals from electric utilities, and "[u]nder both alternatives EPA is proposing to establish dam safety requirements to address the structural integrity of surface impoundments to prevent catastrophic releases." According to the Agency, this rule change is intended to prevent the catastrophic release of CCRs from impoundments such as that which occurred at Martin's Creek, Pennsylvania, and Kingston, Tennessee. The Martin's Creek spill resulted in the release of more than 85,000 cubic yards of ash slurry into the Delaware River. The TVA Kingston spill was nearly six times as large, resulting in a release of 5.4 million gallons of ash. According to reports, both of these releases were caused by embankment instability. In the case of Martin's Creek, a faulty stop log was blamed for the spill.[734] In Kingston the failure was more complex, due to the liquefaction of the material used to create the impoundment.[735]

The proposed rulemaking devotes less than one (1) page of the proposed rule's 113-page preamble to the issue of stability and structural integrity of existing coal combustion residual impoundments. That discussion, which provides the sole rationale for relying on the impoundment definition and standards developed by the Mine Safety and Health Administration under the Coal Mine Safety and Health Act of 1969, is reprinted below:

a. Special Requirements for Stability of CCR Surface Impoundments

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[734] *See* Pennsylvania Department of Environmental Protection, DEP Sues PPL for Martins Creek Ash Spill, Nov. 18, 2005, *available at* http://www.portal.state.pa.us/portal/server.pt/community/newsroom/14287?id=514&typeid=1

[735] Tennessee Valley Authority, Root Cause Analysis for Kingston Ash Slide, 2010 *available at*: http://www.tva.gov/kingston/rca/

To detect and prevent potential catastrophic releases, EPA is proposing requirements for periodic inspections of surface impoundments. The Agency believes that such a requirement is critical to ensure that the owner and operator of the surface impoundment becomes aware of any problems that may arise with the structural stability of the unit before they occur and, thus, prevent the past types of catastrophic releases, such as at Martins Creek, Pennsylvania and TVA's Kingston, Tennessee facility. Therefore, EPA is proposing that inspections be conducted every seven days by a person qualified to recognize specific signs of structural instability and other hazardous conditions by visual observation and, if applicable, to monitor instrumentation. If a potentially hazardous condition develops, the owner or operator shall immediately take action to eliminate the potentially hazardous condition; notify the Regional Administrator or the authorized State Director; and notify and prepare to evacuate, if necessary, all personnel from the property which may be affected by the potentially hazardous condition(s). Additionally, the owner or operator must notify state and local emergency response personnel if conditions warrant so that people living in the area down gradient from the surface impoundment can be evacuated. Reports of inspections are to be maintained in the facility operating record.

To address surface impoundment (or impoundment) integrity (dam safety), EPA considered two options. One option, which is the option proposed in this notice, is to establish standards under RCRA for CCR surface impoundments similar to those promulgated for coal slurry impoundments regulated by the Mine Safety and Health Administration (MSHA) at 30 CFR 77.216. Facilities relying on CCR impoundments would need to (1) submit to EPA or the authorized state plans for the design, construction, and maintenance of existing impoundments, (2) submit to EPA or the authorized state plans for closure, (3) conduct periodic inspections by trained personnel who are knowledgeable in impoundment design and safety, and (4) provide an annual certification by an independent registered professional engineer that all construction, operation, and maintenance of impoundments is in accordance with the approved plan. When problematic stability and safety issues are identified, owners and operators would be required to address these issues in a timely manner.

In developing these proposed regulations for structural integrity of CCR impoundments, EPA sought advice from the federal agencies charged with managing the safety of dams in the United States. Many agencies in the federal government are charged with dam safety, including the U.S.Department of Agriculture (USDA), the Department of Defense (DOD), the Department of Energy (DOE), the Nuclear Regulatory Commission (NRC), the Department of Interior (DOI), and the Department of Labor (DOL), MSHA. EPA looked particularly to MSHA, whose charge and jurisdiction appeared to EPA to be the most similar to our task. MSHA's jurisdiction extends to all dams used as part of an active mining operation and their regulations cover ''water, sediment or slurry impoundments'' so they include dams for waste disposal, freshwater supply, water treatment, and sediment control. In fact, MSHA's current impoundment

regulations were created as a result of the dam failure at Buffalo Creek, West Virginia on February 26, 1972. (This failure released 138 million gallons of stormwater run-off and fine coal refuse, and resulted in 125 persons being killed, another 1,000 were injured, over 500 homes were completely demolished, and nearly 1,000 others were damaged.) MSHA has nearly 40 years of experience writing regulations and inspecting dams associated with coal mining, which is directly relevant to the issues presented by CCRs in this rule. In our review of the MSHA regulations, we found them to be comprehensive and directly applicable to the dams used in surface impoundments at coal-fired utilities to manage CCRs. We also believe that, based on the record compiled by MSHA for its rulemaking, and on MSHA's 40 years of experience implementing these regulations, these requirements will prevent the catastrophic release of CCRs from surface impoundments, as occurred at TVA's facility in Kingston, Tennessee, and will generally meet RCRA's mandate to ensure the protection of humans and the environment. Thus, we have modeled our proposal on the MSHA regulations in 30 CFR Part 77 and we have placed the text of the salient portions of the MSHA regulations in the docket for this rulemaking. The Agency requests comment on EPA's proposal to adopt the MSHA standards (with limited modifications to deal with issues specific to CCR impoundments) to address surface impoundment integrity under RCRA. MSHA's regulations cover impoundments which can present a hazard and which impound water, sediment or slurry to an elevation of more than five (5) feet and have a storage volume of 20 acre-feet or more and those that impound water, sediment, or slurry to an elevation of 20 feet or more. EPA seeks comment on whether to cover all CCR impoundments for stability, regardless of height and storage volume, whether to use the cut-offs in the MSHA regulations, or whether other regulations, approaches, or size cut-offs should be used. If commenters believe that other regulations or size cut-offs should be adopted (and not the size-cut offs established in the MSHA regulations), we request that commenters provide the basis and technical support for their position. The second option that EPA considered, but is not being proposed today, is to establish impoundment integrity requirements under the Clean Water Act's NPDES permit system. Existing regulations at 40 CFR 122.41(e) require that permittees properly operate and maintain all facilities of treatment and control used to achieve compliance with their permits. In addition, regulations at 40 CFR 122.44(k) allow the use of best management practices for the control and abatement of the discharge of toxic pollutants. Guidance could be developed to use best management practices to address impoundment construction, operation, and maintenance, consistent with the requirements of 40 CFR 122.41(e) and 122.44(k). Associated permit conditions could require that surface impoundments be designed and constructed in accordance with relevant state and federal regulations. The Agency requests comments regarding the alternate use of NPDES permits rather than the development of RCRA regulations to address dam safety and structural integrity.[736]

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[736] 75 Fed. Reg.at 35175-6

The modified MSHA regulations as proposed by EPA contain some of the elements necessary for proper regulation of impoundments until they are phased out; however they are still insufficient to adequately protect public safety and the environment from structural or other failures associated with impoundments containing CCRs. Unfortunately, this is largely due to the limited jurisdiction of the MSHA. Therefore, Commenters support those improvements that EPA has proposed to the MSHA regulations, most notably the requirement to develop Emergency Action Plans with inundation maps. The proposed modifications must be retained to enable EPA to adequately protect public safety and the environment.

In order to fully protect public safety and the environment, however, EPA should rely not on the MSHA standards alone, but also should incorporate such additional standards as have been developed by FEMA, the Natural Resource Conservation Service, and the Office of Surface Mining Reclamation and Enforcement, agencies with decades of experience managing and overseeing the operation of earthen impoundments similar to those being used to impound CCRs.

The final rule should incorporate the requirements for demonstrating and maintaining structural integrity of structures impounding CCRs into the subtitle C Special Waste framework, since without such a framework there is no enforceable mechanism to assure that state regulations are at least as protective as those within the federal program.

Currently, there is great variation among state regulation and enforcement of coal ash impoundments due to the current lack of enforceable federal standards. Table 1 illustrates the current state of enforcement based upon EPA's own impoundment survey data. A particular concern reflected in this data is the lack of comprehensive hazard ratings. The vast majority of CCR impoundments in the United States (429 of 629) are not rated either for their potential to fail or the magnitude of harm that would result if catastrophic failure occurred. This situation must be addressed in order for any set of regulations to have a practical impact, since without a comprehensive inventory of impoundments and a hazard classification, downstream populations and public facilities may be at risk without knowing so and without the opportunity to prepare for worst-case scenarios involving catastrophic failures of such structures. One component of EPA's strategy to address risks posed by impoundment of CCRs must be to complete an inventory of the type and detail proposed by Congressman Nick Rahall in H.R. 493, and to assure that all impoundments develop an Emergency Action Plan in coordination with local and state emergency response agencies.

Table 38

State	Total Number of Impoundments	Percent with Regulatory Inspections	Percent with Recent Company Assessments	Percent with Hazard Ratings	Number of High Hazard Dams
AL	15	0.00%	73.33%	46.67%	2
AR	2	0.00%	100.00%	0.00%	0
AZ	15	66.67%	66.67%	66.67%	9
CO	40	5.00%	7.50%	15.00%	0
DE	3	0.00%	0.00%	0.00%	0
FL	9	100.00%	100.00%	88.89%	0
GA	29	6.90%	79.31%	34.48%	2
IA	43	0.00%	81.40%	0.00%	0
IL	25	0.00%	96.00%	28.00%	2
IN	53	11.32%	73.58%	7.55%	1
KS	13	15.38%	38.46%	7.69%	0
KY	44	34.09%	93.18%	54.55%	7
LA	11	0.00%	18.18%	0.00%	0
MA	7	0.00%	0.00%	0.00%	0
MI	10	90.00%	60.00%	10.00%	0
MN	21	19.05%	4.76%	19.05%	0
MO	32	3.13%	56.25%	0.00%	0
MS	1	100.00%	100.00%	0.00%	0
MT	9	0.00%	22.22%	100.00%	1
NC	26	50.00%	100.00%	100.00%	12
ND	8	12.50%	37.50%	0.00%	0
NM	8	0.00%	62.50%	50.00%	0
NY	6	100.00%	16.67%	0.00%	0
OH	29	65.52%	100.00%	72.41%	6
OK	5	100.00%	100.00%	0.00%	0
PA	30	63.33%	66.67%	40.00%	1
SC	22	0.00%	68.18%	4.55%	0
TN	18	0.00%	100.00%	83.33%	3
TX	31	25.81%	83.87%	100.00%	0
UT	6	0.00%	100.00%	83.33%	0
VA	11	36.36%	100.00%	72.73%	0
WI	18	5.56%	88.89%	0.00%	0
WV	12	83.33%	83.33%	83.33%	4
WY	17	29.41%	100.00%	41.18%	0

In order to fully understand why reliance on MSHA impoundment regulations is insufficient to assure protection of the public and natural resources below structures impounding coal combustion residuals, some background into the limited jurisdiction of the Mine Safety and Health Administration is necessary.

Congress enacted the Coal Mine Safety and Health Act in 1969, and created MSHA in 1978 through amendments to the act. The Mine Safety and Health Act (as the amended act is known) provides, "the first priority and concern of all in the coal or other mining industry must be the health and safety of its most precious resource –the miner."[737]Part (g) of this section states the purpose of the act and the administration:

> to establish interim mandatory health and safety standards and to direct the Secretary of Health and Human Services and the Secretary of Labor to develop and promulgate improved mandatory health or safety standards *to protect the health and safety of the Nation's coal or other miners*;[738]

These sections make clear that the Congressional mandate to MSHA was protection of miners at the mine site. In assessing MSHA's regulations it is important to understand the mission and scope of that agency, as well as the development of additional federal regulatory requirements – deemed by Congress, past and present, necessary to provide a thorough regulatory system of the coal-slurry impoundments under MSHA's jurisdiction.

After a decade of debate, eight years after adoption of the 1969 Coal Mine Health and Safety Act, and five years after the Buffalo Creek Disaster, Congress enacted the Surface Mining Reclamation and Control Act, (SMCRA) on August 3, 1977. The Act created a new agency with in the Department of the Interior, the Office of Surface Mining Reclamation and Enforcement, and tasked that agency with an obligation to develop a comprehensive set of regulations "to protect society and the environment from the adverse effects of surface coal mining operations."[739]

In directing the Secretary of the Interior to develop regulations governing disposal of coal mining wastes in impoundments, Congress was keenly aware of a disastrous breach of a coal-slurry waste impoundment at Buffalo Creek, West Virginia in 1972.[740] The failure of this impoundment killed 125 people, injured over 1,000 more, and left over 4,000 homeless. Instead of turning to the 1969 Coal Mine Safety and Health Act and the regulations developed under that Act for guidance, Congress intended for impoundment safety regulations under SMCRA to be developed by the Office of Surface Mining in consultation with the U.S. Army Corps of Engineers:

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[737] 30 U.S.C. § 801(a).
[738] Emphasis added.
[739] 30 USC § 1201.
[740] The House Interior and Insular Affairs Committee Report makes clear that the inclusion of the surface operations and surface effects of underground mines under the regulatory ambit of the 1977 Act was intended in part to protect the public from future disasters such as that which occurred at Buffalo Creek. *See* H.R. Rep. 95-218, 95th Cong. 1st Sess. At 84. ("Moreover, the necessity to include regulation of the surface effects of underground coal mining is also apparent to the committee. The Buffalo Creek disaster, in which over 125 people were killed, resulted from the failure of an impoundment constructed from waste from an underground mine.")

> The Secretary, with the written concurrence of the Chief of Engineers, shall establish . . . standards and criteria regulating the design, location, construction, operation, maintenance, enlargement, modification, removal, and abandonment of new and existing coal mine waste piles . . . . Such standards and criteria shall conform to the standards and criteria used by the Chief of Engineers to insure that flood control structures are safe and effectively perform their intended function.[741]

Coal mine waste piles, as the term is used in 30 U.S.C. §1265(f), includes all "existing and new coal mine waste piles consisting of mine wastes, tailings, coal processing wastes, or other liquid and solid wastes, and used either temporarily or permanently as dams or impoundments." [742]

It is in SMCRA, not in the Mine Safety and Health Act, that Congress has provided the best guidance for EPA to use in determining what standards and what components are needed to effectively manage CCRs disposed of in impoundments in order to protect the public. To that end, Congress directed that OSM, in order to "protect society and the environment" from the adverse effects of coal mine waste piles, develop regulations with the concurrence of the Chief of the U.S. Army Corps of Engineers, that would conform to the standards and criteria used by the Chief of Engineers for flood control structures. Congress further directed that

> In addition to engineering and other technical specifications the standards and criteria developed pursuant to this subsection must include provisions for: review and approval of plans and specifications prior to construction, enlargement, modification, removal, or abandonment; performance of periodic inspections during construction; issuance of certificates of approval upon completion of construction; performance of periodic safety inspections; and issuance of notices for required remedial or maintenance work.[743]

In doing so, Congress explained the conscious and deliberate decision to direct the Secretary of Interior to seek the Corp's concurrence rather than to direct the Secretary to rely on MHSA's regulations:

> [T]he corps' experience and expertise in the area of design, construction, maintenance, et cetera, which were utilized for carrying out the congressionally authorized surveys of mine waste embankments in West Virginia following the disastrous failure of the mine waste impoundments on Buffalo Creek, is to be applied in order to prevent similar accidents in the future.

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[741] 30 U.S.C. § 1265(f)

[742] Significantly, Congress did not exempt smaller impoundments from the obligation to protect the public and environment. While 30 U.S.C. 1265(f) specifically governs the design, construction and operation of coal mine waste piles "consisting of" mine wastes, tailings and coal processing wastes used as dams or embankments, Congress also directed development of regulations for impoundments impounding water, at 30 U.S.C. 1265(b)(8), demanding that the regulations provide that the impoundment dam construction achieve necessary stability with an adequate margin of safety comparable to structures constructed under Public Law 83-566. Again, while fully cognizant of the Coal Mine Safety and Health Act requirements, Congress chose to require that the NRCS standards be utilized for water impoundments, not those developed under the 1969 Act.

[743] 30 U.S.C.§ 1265(f)

Congress further explained that the regulations for impoundments were to be developed by the Chief of Engineers and incorporate the safety, design and engineering standards of the Corps of Engineers.[744]

In explaining the relationship between H.R. 2 (the bill that would become, as melded with S.7, the 1977 law), Congress further explained the conscious decision to go beyond MSHA's requirements with respect to impoundments:

> Under the Coal Mine Health and Safety Act of 1969, as amended, the Secretary of Interior regulates certain health and safety aspects of both surface mines and surface activities of underground mines.[745] The implementation of this act, though, has been directed at the protection of the miner while on the site of the mining operation. In several instances, H.R. 2 specifies that certain activities are to be conducted in such a way as to provide for the protection of the health or safety of the public – both on and off the minesite. For example, standards are set forth controlling the design, construction, and use of impoundments for the disposal of mine wastes. Such provisions are not duplicative of the Coal Mine Health and Safety Act **but are supplementary to the authority granted to the Secretary of Interior by that act.**[746]

In developing rules intended to protect public safety and the environment, EPA should be guided by Congress' deliberate decision to direct that coal waste impoundments meet standards **beyond** those developed under the Coal Mine Health and Safety Act. EPA should instead incorporate the additional provisions developed by OSMRE and the Chief of Engineers that Congress thought necessary to protect the public and environment, as opposed to the more limited focus on protection of miners on the minesite.

Moreover, the adoption of applicable rules for coal combustion residual impoundment regulation would appear to be consistent with the current thinking of Congress on this matter, as reflected in H.R. 493, a bill sponsored by West Virginia Congressman Nick Rahall, and the subject of a hearing before the House Subcommittee on Energy and Mineral Resources on February 12, 2009. The bill, shelved by Congressman Rahall **only** because of this Administration's subsequent announcement of an intent to propose regulation of CCR impoundment stability, would have directed that the Secretary of Interior utilize the authority under Section 515 of the Surface Mining Control and Reclamation Act over "other wastes" to develop "design, engineering and performance standards that provide for safe storage and disposal" of CCR **and** that the regulations require "that an impoundment for the storage or disposal of other wastes, wherever located, shall be designed, constructed and maintained in accordance with requirements that are substantially similar to the most stringent requirements

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[744] H.R. 95-218, supra, at 125.

[745] The creation of MSHA within the Department of Labor would occur when Congress revisited and amended the 1969 Coal Mine Health and Safety Act. At the time of enactment of SMCRA, the regulatory functions of the 1969 Act rested with MHSA.

[746] H.R. Rept. 95-218, 95th Cong. 1st Sess. at 141. (Emphasis added.)

that apply to impoundments under paragraphs (8), (11), and (13) of section 515(b) and section 515(f) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1265(b), (f)).”

With respect to existing impoundments, the Act would have exempted existing impoundments from meeting the “design and construction requirements of the regulations” provided that “the impoundment meets all performance standards established under the regulations and an ‘as built’ certification is provided from a registered professional engineer certifying that the impoundment meets those requirements and is constructed in a manner that is safe and will effectively perform the intended function without failure.”

Additionally, H.R. 493 directed that an inventory be completed for all CCR impoundments to include:

(A) an assessment of the design, location, construction, operation, maintenance, stability, and engineering of the embankments and basins of each such impoundment;

(B) an assessment of risks to surface and groundwater posed by each such impoundment and the continued use of the impoundment; and

(C) a determination on the degree of risk each such impoundment and the continued use of such impoundment poses to human and environmental health.

Based on the assessments and the determination of degree of risk, the Secretary would be given authority to issue any order for repair, construction, or closure of the impoundment necessary to ensure that any such impoundment is safe and effectively performs the intended function, notwithstanding the compliance of the owner or operator of the impoundment with performance standards or the “as built” certification required under this Section.

Finally, H.R. 493 would have applied to **all** embankment structures used to retain CCRs, irrespective of the height of the embankment or the volume of acre-feet of disposed material.

For these reasons, and to fulfill its obligation to protect the environment, EPA should require that existing impoundments demonstrate structural integrity and proper siting by incorporating OSMRE’s engineering and other technical specifications and criteria for review and approval of plans for operation, maintenance and removal or closure of all existing impoundments, for performance of periodic safety inspections; and issuance of notices for required remedial or maintenance work. Where the owner of an existing impoundment cannot demonstrate to the satisfaction of the agency that the design, location, construction, operation, maintenance, stability, and engineering of the embankments and basins of each such impoundment is such that continued use of such impoundment does not pose a threat to public safety and the environment, EPA should invoke its authority to require abatement of imminent harm and direct the repair or closure of the impoundment.

Specific comments concerning the inadequacy of the MSHA regulations, and recommendations for incorporation of standards from SMCRA and PL 83-566 follow.

i. MSHA's Threshold Impoundment Size And Height Requirements Make Them Underprotective of Public Safety, Life And Property.

In order to be classified as an impoundment, 30 C.F.R. § 77-216 requires that the structure be either: 1) 5 feet tall (measured from the upstream toe of the structure) and impound 20 acre-feet or more of water, sediment or slurry; or 2) impound water, sediment or slurry to a level of 20 feet or more above the upstream toe. Only a structure meets either of these thresholds must meet the design, inspection, and reporting requirements for impoundments.

These standards underprotect public safety, as was made graphically clear, in the community of Ages, Kentucky in 1981, when an impoundment structure made of and holding slurried coal waste from a nearby coal processing plant catastrophically collapsed and released a mass of coal waste that crushed to death Nellie Ball Woolum, the retired postmistress of that Harlan County community.While MSHA had regulatory jurisdiction over the structure, but the structure was not classified by MSHA **as** an impoundment nor subject to the more rigorous engineering, inspection and other requirements attendant thereto, because although the aggregate height of the structure was greater than 5 feet, each lift of the structure was only four feet in height so that the structural design avoided triggering the regulatory threshold. This example makes clear that all CCR impoundments must be subject to regulations mandating minimum stability, regardless of their height and storage volumes.

EPA's requirements for the stability of impoundments must cover all impoundments in order to assure that smaller cells will not be used to avoid regulatory jurisdiction, as happened in the Ages tragedy. Otherwise, due to space restrictions, and even simply to avoid regulation, new cells may be built on older, capped, cells, therebyincreasing the potential for instability despite the limited impoundment volume in the individual cell.Such stacked or grouped small cells also pose a significant threat to safety and the environment and should not be excluded from regulation.[747]

For additional background on the insufficiency of MSHA regulations to protect against loss of life, see also the 1984 National Coal Issue of the West Virginia Law Review article *Federal Regulation of Coal Mine Waste Disposal: A Blueprint For Disaster,* which focused on need for reform and inter-agency coordination in coal waste regulation. That article is incorporated herein by reference as if fully set forth below.

2. Recommendations For Inclusion of OSMRE and NRCS Standards

In stark contrast to the artificial threshold distinction under the MSHA regulations, which proved to be fatally ineffective in protecting life and property from catastrophic damage in the

[747] *See* Michael et. al. Potential of Breakthrough of Impounded Coal Refuse Slurry into Underground Mines, 16 GeoScienceWorld, 299.

Ages failure, the regulations developed by the Office of Surface Mining Reclamation and Enforcement impose several important additional design, operation and maintenance obligations on such structure over and above those required in 30 CFR 77-216. The OSM rule is reprinted below in its entirety. These regulations apply to large impoundments **and** to smaller impoundments of any size that create failure risks as described in Class B and C designations under NRCS TR-60.[748] :

> **§ 816.49 Impoundments.**
> (a) *General requirements.* The requirements of this paragraph apply to both temporary and permanent impoundments.
> (1) Impoundments meeting the Class B or C criteria for dams in the U.S. Department of Agriculture, Soil Conservation Service Technical Release No. 60 (210-VI-TR60, Oct. 1985), "Earth Dams and Reservoirs," 1985 shall comply with "Minimum Emergency Spillway Hydrologic Criteria" table in TR–60 and the requirements of this section. The technical release is hereby incorporated by reference. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR Part 51. Copies may be obtained from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161, order No. PB 87–157509/AS. Copies can be inspected at the OSM Headquarters Office, Office of Surface Mining Reclamation and Enforcement, Administrative Record, 1951 Constitution Avenue, NW, Washington, DC, or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: *http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html*
> (2) An impoundment meeting the size or other criteria of §77.216(a) of this title shall comply with the requirements of §77.216 of this title **and this section**.
> (3) *Design certification.* The design of impoundments shall be certified in accordance with §780.25(a) of this chapter as designed to meet the requirements of this part using current, prudent, engineering practices and any design criteria established by the regulatory authority. The qualified, registered, professional engineer or qualified, registered, professional, land surveyor shall be experienced in the design and construction of impoundments.
> (4) *Stability.* (i) An impoundment meeting the Class B or C criteria for dams in TR–60, or the size or other criteria of §77.216(a) of this title shall have a minimum static safety factor of 1.5 for a normal pool with steady state seepage saturation conditions, and a seismic safety factor of at least 1.2.

[748] The NRCS Standards contained in TR-60 define Class B dams as those where failure could damage isolated homes, main roads or minor railroads or could result in disruption of utility service. Class C dams are those located where failure could cause loss of life, serious damage to homes, industrial or commercial buildings, roads and utilities. TR-60, which is incorporated herein by reference as if fully set forth below, applies to **all** Class B and C dams without a height, volume or "effective height" (i.e. volume x height) threshold. TR-60 was revised subsequent to the OSM rule, and the nomenclature was changed for these classes of structures. What was formerly Class B is now classified as "Significant Hazard Class" and Class C is "High Hazard," making the terminology consistent with that used by FEMA.

(ii) Impoundments not included in paragraph (a)(4)(i) of this section, except for a coal mine waste impounding structure, shall have a minimum static safety factor of 1.3 for a normal pool with steady state seepage saturation conditions or meet the requirements of §780.25(c)(3).
(5) *Freeboard.* Impoundments shall have adequate freeboard to resist overtopping by waves and by sudden increases in storage volume. Impoundments meeting the Class B or C criteria for dams in TR-60 shall comply with the freeboard hydrograph criteria in the "Minimum Emergency Spillway Hydrologic Criteria" table in TR-60.
(6) *Foundation.* (i) Foundations and abutments for an impounding structure shall be stable during all phases of construction and operation and shall be designed based on adequate and accurate information on the foundation conditions. For an impoundment meeting the Class B or C criteria for dams in TR–60, or the size or other criteria of §77.216(a) of this title, foundation investigation, as well as any necessary laboratory testing of foundation material, shall be performed to determine the design requirements for foundation stability.
(ii) All vegetative and organic materials shall be removed and foundations excavated and prepared to resist failure. Cutoff trenches shall be installed if necessary to ensure stability.
(7) Slope protection shall be provided to protect against surface erosion at the site and protect against sudden drawdown.
(8) Faces of embankments and surrounding areas shall be vegetated, except that faces where water is impounded may be riprapped or otherwise stabilized in accordance with accepted design practices.
(9) *Spillways.* An impoundment shall include either a combination of principal and emergency spillways or a single spillway configured as specified in paragraph (a)(9)(i) of this section, designed and constructed to safely pass the applicable design precipitation event specified in paragraph (a)(9)(ii) of this section, except as set forth in paragraph (c)(2) of this section.
(i) The regulatory authority may approve a single open-channel spillway that is:
(A) Of nonerodible construction and designed to carry sustained flows; or
(B) Earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.
(ii) Except as specified in paragraph (c)(2) of this section, the required design precipitation event for an impoundment meeting the spillway requirements of paragraph (a)(9) of this section is:
(A) For an impoundment meeting the Class B or C criteria for dams in TR–60, the emergency spillway hydrograph criteria in the "Minimum Emergency Spillway Hydrologic Criteria" table in TR–60, or greater event as specified by the regulatory authority.
(B) For an impoundment meeting or exceeding the size or other criteria of §77.216(a) of this title, a 100-year 6-hour event, or greater event as specified by the regulatory authority.
(C) For an impoundment not included in paragraph (a)(9)(ii) (A) and (B) of this section, a 25-year 6-hour or greater event as specified by the regulatory authority.

(10) The vertical portion of any remaining highwall shall be located far enough below the low-water line along the full extent of highwall to provide adequate safety and access for the proposed water users.
(11) *Inspections.* Except as provided in paragraph (a)(11)(iv) of this section, a qualified registered professional engineer or other qualified professional specialist under the direction of a professional engineer, shall inspect each impoundment as provided in paragraph (a)(11)(i) of this section. The professional engineer or specialist shall be experienced in the construction of impoundments.
(i) Inspections shall be made regularly during construction, upon completion of construction, and at least yearly until removal of the structure or release of the performance bond.
(ii) The qualified registered professional engineer, or qualified registered professional land surveyor as specified in paragraph (a)(11)(iv) of this section, shall promptly after each inspection required in paragraph (a)(11)(i) of this section provide to the regulatory authority a certified report that the impoundment has been constructed and/or maintained as designed and in accordance with the approved plan and this chapter. The report shall include discussion of any appearance of instability, structural weakness or other hazardous condition, depth and elevation of any impounded waters, existing storage capacity, any existing or required monitoring procedures and instrumentation, and any other aspects of the structure affecting stability.
(iii) A copy of the report shall be retained at or near the minesite.
(iv) In any State which authorizes land surveyors to prepare and certify plans in accordance with §780.25(a) of this chapter, a qualified registered professional land surveyor may inspect any temporary or permanent impoundment that does not meet the SCS Class B or C criteria for dams in TR–60, or the size or other criteria of §77.216(a) of this title and certify and submit the report required by paragraph (a)(11)(ii) of this section, except that all coal mine waste impounding structures covered by §816.84 of this chapter shall be certified by a qualified registered professional engineer. The professional land surveyor shall be experienced in the construction of impoundments.
(12) Impoundments meeting the SCS Class B or C criteria for dams in TR–60, or the size or other criteria of §77.216 of this title must be examined in accordance with §77.216–3 of this title. Impoundments not meeting the SCS Class B or C criteria for dams in TR–60, or subject to §77.216 of this title, shall be examined at least quarterly. A qualified person designated by the operator shall examine impoundments for the appearance of structural weakness and other hazardous conditions.
(13) *Emergency procedures.* If any examination or inspection discloses that a potential hazard exists, the person who examined the impoundment shall promptly inform the regulatory authority of the finding and of the emergency procedures formulated for public protection and remedial action. If adequate procedures cannot be formulated or implemented, the regulatory authority shall be notified immediately. The regulatory authority shall then notify the appropriate agencies that other emergency procedures are required to protect the public.

(b) *Permanent impoundments.* A permanent impoundment of water may be created, if authorized by the regulatory authority in the approved permit based upon the following demonstration:
(1) The size and configuration of such impoundment will be adequate for its intended purposes.
(2) The quality of impounded water will be suitable on a permanent basis for its intended use and, after reclamation, will meet applicable State and Federal water quality standards, and discharges from the impoundment will meet applicable effluent limitations and will not degrade the quality of receiving water below applicable State and Federal water quality standards.
(3) The water level will be sufficiently stable and be capable of supporting the intended use.
(4) Final grading will provide for adequate safety and access for proposed water users.
(5) The impoundment will not result in the diminution of the quality and quantity of water utilized by adjacent or surrounding landowners for agricultural, industrial, recreational, or domestic uses.
(6) The impoundment will be suitable for the approved postmining land use.
(c) *Temporary impoundments.* (1) The regulatory authority may authorize the construction of temporary impoundments as part of a surface coal mining operation.
(2) In lieu of meeting the requirements in paragraph (a)(9)(i) of this section, the regulatory authority may approve an impoundment that relies primarily on storage to control the runoff from the design precipitation event when it is demonstrated by the operator and certified by a qualified registered professional engineer or qualified registered professional land surveyor in accordance with §780.25(a) of this chapter that the impoundment will safely control the design precipitation event, the water from which shall be safely removed in accordance with current, prudent, engineering practices. Such an impoundment shall be located where failure would not be expected to cause loss of life or serious property damage, except where:
(i) Impoundments meeting the SCS Class B or C criteria for dams in TR–60, or the size or other criteria of §77.216(a) of this title shall be designed to control the precipitation of the probable maximum precipitation of a 6-hour event, or greater event specified by the regulatory authority.
(ii) Impoundments not included in paragraph (c)(2)(i) of this section shall be designed to control the precipitation of the 100-year 6-hour event, or greater event specified by the regulatory authority.[749]

Commenters assert that the OSM impoundment regulations, which incorporate but which also build upon the MSHA regulations and better protect the public from loss of life and serious property damage from smaller impoundments, are necessary to **fully** protect public safety and the environment and to address the problems created by the MSHA thresholds.

[749] 48 Fed. Reg. 44,004 (Sept. 26, 1983), as amended at 50 Fed. Reg. 16,200 (Apr. 24, 1985); 53 Fed. Reg. 43,605 (Oct. 27, 1988); 59 Fed. Reg. 53,029, 53030 (Oct. 20, 1994); 66 Fed. Reg. 14,317 (Mar. 12, 2001).

Commenters additionally support the proposal to adopt additional design restrictions on impoundments located in seismic impact zones, other unstable areas, and within certain distances from faults; however those standards should be applied in the interim to require owners of the impoundments to demonstrate that existing impoundments are designed to compensate for those risks, and that no new impoundments should be constructed after the effective date of the rule and all existing impoundments closed under subtitle C.

Commenters also support imposition of a requirement that all existing impoundments develop and file Emergency Action Plans, and recommend that EPA specify in the final rules that those plans must conform both in content and in implementation and exercising **of** the plans, to the requirements established by the Federal Emergency Management Agency in "Emergency Action Planning Guidelines for Dams." The requirement should be extended to include all impoundments that are rated as significant or high hazard

Commenters recommend these additions to the proposed impoundment regulations:

(A) The requirements proposed at 40 CFR 264 and 265.1307, must be retained. These requirements are consistent with Congress' concern under SMCRA that "discharges from the impoundment will not degrade the water quality below water quality standards established pursuant to applicable Federal and State law in the receiving stream,"[750]and that "such water impoundments will not result in the diminution of the quality or quantity of water utilized by adjacent or surrounding landowners for agricultural, industrial recreational, or domestic uses."[751]

(B) Impoundments must be regularly inspected by qualified individuals (as is required also as part of the development of an Emergency Action Plan), and as well by the federal or state regulatory agency. A minimum frequency for such inspections should be developed for each facility based on the structural status of the impoundment and the hazard classification. Under SMCRA, monthly partial and quarterly complete inspections are conducted of mining operations.

(C) EPA must require annual inspections by state or federal regulators of all CCR impoundments and quarterly inspection of all high and significant hazard impoundments, and those that have been given a less than satisfactory safety rating.[752]

(D) Regular Reporting Requirements: SMCRA requires operators to submit monthly reports to regulators.[753]Under the current EPA proposal inspection results must recorded by the owner or operator of the impoundment and made available for public or regulatory inspection. Reports on the status of the impoundment, however,

[750] 30 U.S.C. § 1265(b)(8)(C).
[751] 30 U.S.C. § 1265(b)(8)(F).
[752] EPA's assessment of existing, known, "Significant" and "High" hazard dams reveals that potential stability issues exist in many of the nation's CCR impoundments and must be addressed. Only 68 of 120 impoundments in the assessment were given a "Satisfactory" safety rating. Several had issues with seepage, which presents water quality problems in addition to stability issues.
[753] 30 U.S.C. § 1267 (b).

must be submitted to regulators only on an annual basis. Because detailed reports are not required (except at five-year intervals) if a certification of no significant change is made by a professional engineer, it is possible that regulators could go five full years without receiving functional data regarding the status of an impoundment. (This problem is exacerbated by the lack of oversight inspection by regulators described above). This is too long to adequately ensure impoundment stability. It is suggested that reports of inspections be submitted at quarterly for significant, and monthly for high-hazard impoundments.

(E) Every impoundment must be designed by an engineer or other relevant licensed professional. Pursuant to 30 C.F.R. § 780.25(a) and 816.49(a)(3) must be designed and certified by a professional engineer or land surveyor and meet the standards of current prudent engineering practice. Impoundments meeting the size criteria for MSHA jurisdiction or with a hazard potential rating of "Significant" or "High" must meet more specific design standards.[754]The owners of all existing CCR impoundments must also be required to provide the design and construction details on the impoundments under their controls and an engineering certification that the structure, as built, meets safety and other performance standards with respect to stability, static safety factor, freeboard, spillway, and other criteria comparable to those required in the OSM rules and regardless of the size of the impoundment.

(F) Large impoundments and those with a significant or high hazard rating must be subject to additional design standards. In addition to requiring that all dams be certified to current prudent engineering standards, SMCRA regulations require that large dams and those with a "Significant" or "High" hazard rating be subject to precise design standards.[755]For example, these dams must have a static safety factor of 1.5 and a seismic stability factor of 1.2.[756]"Significant" and "High" hazard classification impoundments must be built to withstand the 6-hour Probable Maximum Precipitation.[757] (All impoundments must be built to withstand the 100-

[754] The SMCRA regulations still refer to a 1985 version of TR-60, a set of guidelines for earth dams and reservoirs developed by the Conservation Engineering Division of the Natural Resource Conservation Service. This 1985 document classified dams on a letter based ranking system. The letter indicated the potential for harm if the dam failed. Class A dams were those "located in rural or agricultural areas where failure may damage farm buildings, agricultural land, or township or county roads." Class B dams were those "located in predominately rural or agricultural areas where failure may damage isolated homes, main highways or minor railroads, or cause interruption of use or service or relatively important public utilities." Finally, Class C dams were those "where failure may cause loss of life, serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads." The 1985 TR-60 was superseded by a revised version in 2005. The 2005 TR-60 retains the same definitions for dam classification from the 1985 version but uses nomenclature of "Low Hazard Class" (formerly A); "Significant Hazard Class" (formerly B); and "High Hazard Class" (Formerly C).

[755] 30 C.F.R. § 816.49.

[756] 30 C.F.R. § 816.49(a)(4).

[757] Probable Maximum Precipitation (PMP) is defined by the National Oceanic and Atmospheric Administration to be "the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular geographical location at a certain time of the year." The 6-hour PMP would therefore be the greatest amount of rain that could theoretically fall in a six-hour period. A similar definition appears in the EPA proposed regulations, however, this rain event is not incorporated into any of the proposed, enforceable, regulations. Instead, EPA has proposed run-off controls to prevent flow into the active CCR impoundment during the 24-hour 25-year

year, 6-hour rain event). These impoundments are also subject to laboratory testing of foundation material. EPA should incorporate similar requirements as Interim Standards pending the phasing out of all existing CCR impoundments.

(G) The design standards of the Natural Resource Conservation Service's (NRCS) TR-60 should be incorporated into the final rule. SMCRA regulations contain numerous cross-references to the design standards of TR-60 for "Significant" and "High" hazard dams. The NRCS has developed these standards based on decades of experience operating and maintaining earthwork dams. EPA should incorporate these standards where appropriate – particularly in situations where they are adopted under SMCRA.

In summary, commenters support the phasing out of all wet handling and disposal systems, and elimination of the use of impoundments for the management and disposal of CCR. *If* EPA instead finalizes a rule allowing the continued disposal of wet CCR in impoundments, commenters assert that the rules governing siting, design, construction, operation, monitoring, maintenance and closure of the impoundments must reflect the most stringent requirements developed by OSMRE, the NRCS and FEMA applicable to such impoundments.

B. EPA Must Complete Its Inventory of Significant and High Hazard CCR Impoundments and Ensure That All Existing Impoundments are Designated with a Hazard Criteria

Even the best-designed regulations will be ineffective if they are not being enforced. EPA must ensure that it has a complete understanding of existing CCR impoundments and their status so that the proposed regulations will be useful and truly enforceable. (This is particularly critical if EPA does not adopt regulations requiring periodic inspections by state or federal regulators). EPA has begun this effort by soliciting assessments of known "Significant" and "High" hazard rated impoundments. So far, EPA has received 120 responses. Engineers determined that 68 of these were in "Satisfactory" condition, 36 were in "Fair" condition, and 16 were in "Poor" condition. In its final report to each facility EPA recommended necessary action to improve impoundment safety. While this effort demonstrates EPA's commitment to impoundment safety, much more work needs to be done. By the Agency's own data, 429 of 629 surface impoundments in the U.S. do not have hazard ratings. One hundredeighty-six impoundments were not designed by a professional engineer. EPA should prioritize for closure all non-engineered high or significant hazard structures and continue this work until all impoundments are adequately identified and assessed. Penalties and imminent harm orders should be issued to facilities that do not cooperate.

The agency's assessments must include a report of any individual characteristics of a site that might threaten impoundment stability. For example, in EPA's inspection of American Electric and Power's Philip Sporn Generating Plant in New Haven, West Virginia, frequent

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storm event. Commenters assert that stability design requirements to ensure capacity for the 6-hour PMP, or 100-year 6-hour PMP, is necessary in addition to the run-off control regulation.

vibrations from a nearby rail line are mentioned as a threat to stability. Such individual site characteristics should be documented and addressed as needed.

C. EPA Should Undertake Further Study to Justify Its Regulatory Threshold for Wet-handled Versus Dry CCRs

EPA proposes to adopt a different regulatory definition for CCR wastewaters than currently exists under RCRA. Under the existing RCRA subtitle C rules, a wastewater is defined as one that contains less than 1% by weight total organic carbon and less than 1% by weight total suspended solids. EPA proposes an improvement, necessary to ensure that largely liquid wastes are safely regulated, by changing the definition so that CCRs would be classified as wastewaters if they exceed 50% water (moisture) content. While commenters commend EPA for this positive step, we suggest that further study is necessary to justify the 50% regulatory cutoff or develop a better standard.

It does not appear that much, if any, scientific study has been devoted to the potential for CCR to flow at various states (its "flowability") or the potential for static liquefaction in disposal units. Some work on similar studies, most notably coal refuse slurry has been undertaken by the very agencies (MSHA and OSM) whose regulations form the basis for EPA's proposed rules for impoundment stability. EPA not only should take heed of this work but also undertake further investigation to determine its applicability to CCRs.

In a 2005 white paper, OSM researchers concluded that the flow potential of impounded fine refuse was dependent upon the strength characteristics of the impounded material, the size of the impoundment (and thus the shear stress on the material if a breach would occur), and the nature of any breach.[758] (The OSM researches were looking at a specific type of breach, where a breakthrough into underground mine workings occurred.) These factors themselves are influenced by a large number of variables, which together make flow modeling extremely difficult. (In fact, in the paper, OSM was unable to pinpoint a comparable flow-model although they did find a promising candidate.) Though moisture content is an important part of any equation predicting flowability, it alone is insufficient to determine even the strength characteristics of any impounded material.[759] Additionally, it is not yet possible to determine a "safe" moisture content for coal-refuse slurry, for which studies have been undertaken, much less CCR for which no known study has been conducted. Because of this, additional analysis on the flowabiltiy and potential for liquefaction of CCR is essential.

Another important consideration in determining potential flowability in an impoundment is the behavior of a material in an impoundment. Moisture content may change during a rain

[758] Michael, Murguia, and Kosareo, U.S. Office of Surface Mining Reclamation and Enforcement, The Flowability of Impounded Coal Refuse (August, 2005)

[759] A team of reviewers of the OSM white paper noted, "flow properties are controlled by a highly variable and undocumented combination of factors including mineralogy, grain size and shape, and the presence or absence of processing chemicals. " Comments on the OSM Draft Report Entitled "The Flowability of Impounded Coal Refuse" by P. Michael, R. Murguia, and L. Kosareo , Comments prepared by The Geotechnical and Structures Laboratory (GSL), U.S. Army Engineer R&D Center (ERDC).

even and changes as little as 1% in this variable may affect material properties.[760] "Unless relatively dry, the undrained shear strength of even partially saturated fine coal refuse is very sensitive to moisture contents. A change in moisture content of only one percent may cause a large change in un-drained strength."[761] Consequently, poorly drained "dry" disposal landfills could possibly take on liquid characteristics in a significant rain event; particularly if the regulatory distinction between wet and dry handled wastes is not carefully determined to prevent such a scenario.[762]

D. Specific Questions Posed by EPA

In the proposed rule preamble, EPA has posed several questions and solicited public comment. Commenters respond to each in turn.

EPA states: "*The Agency has documented through proven damage cases and risk analyses, that the wet handling of CCRs in surface impoundments poses higher risks to human health and the environment than the dry handling of CCRs in landfills. EPA seeks comments on the standards proposed in this notice to protect human health and the environment from the wet handling of CCRs. For example, in light of the TVA Kingston, Tennessee, and the Martins Creek, Pennsylvania CCR impoundment failures, should the Agency require that owners or operators of existing and surface impoundments submit emergency response plans to the regulatory authority if wet handing of CCRs is practiced?"*

The TVA Kingston and Martins Creek impoundment failures illustrate that the potential for catastrophic failure of coal waste impoundments still exists. Although these failures did not result in loss of human life, similar coal waste disasters have had tragic effects in the past – most notably with the failure of the Buffalo Creek, coal-slurry impoundment in West Virginia. The 1972 failure at the Buffalo Creek impoundment resulted in 125 deaths, and left 4,000 people homeless. While regulations were developed by MSHA to prevent future tragedies, large-scale releases still occur – despite implementation of these regulations.

Mentioned nowhere in the EPA regulatory proposal, moreover, is the October 11, 2000 release of 300 millions of coal-slurry from a coal-slurry impoundment near Inez, Kentucky. This impoundment was under MSHA's jurisdiction and subject to the MSHA regulations upon which EPA's proposed stability regulations are based. It has become clear that the foundational investigation into the suitability of the valley in which Martin County impoundment was located was insufficient to identify the existence and lack of sufficient competent barrier between prior mining in the Coalburg coal seam and the valley wall. While adoption of stringent regulations

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[760] Huang, Yang H., Junli Li, and Gamini Weeratunga, Strength and Consolidation Characteristics of Fine Coal Refuse, University of Kentucky Contract Report J5140126 prepared for USDI Office of Surface Mining Reclamation and Enforcement, Lexington, KY, (1987).

[761] *Id.*

[762] Although the proposed change in regulatory definition would presumably have altered the classification, it must be remembered that the large-scale release from the TVA Kingston dam was the result of a "landfill" failure and not an "impoundment" failure.

will reduce the likelihood of catastrophic failure from impoundments, a risk still exists. The development of emergency response plans is necessary to limit the effects if a failure to the extent possible. These plans should encompass Emergency Action Plans, as recommended by FEMA, as well emergency response to address the environmental hazards presented by a catastrophic impoundment failure.

EPA asks "*whether the Agency should provide for a variance process allowing some surface impoundments that manage wet-handled CCRs to remain in operation because they present minimal risk to groundwater (e.g. because they have a composite liner) and minimal risk of a catastrophic release (e.g. as indicated by a low or less than low hazard rating under the Federal Guidelines for Dam Safety established by the Federal Emergency Management agency).*"

Other sections of these comments address the risks to groundwater presented by impoundments with or without a composite liner. As mentioned above, however, the risk of impoundment failure can never be eliminated unless impoundments themselves are phased out. In just the past 10 years, there have been at least 43 spills due to existing impoundment failure or other unpermitted discharges from coal-slurry impoundments subject to the same MSHA regulations upon which EPA proposes to base its impoundment regulations.[763] Furthermore, it isimportant to realize that a low or less than low hazard rating under the FEMA guidelines says little about the potential risk of environmental damage such as ground or surface water contamination from an impoundment failure. The FEMA guidelines are not designed to impart that information, but in state were developed to define only risks to property and human life. By grandfathering in existing impoundments based on criteria with little relevance to environmental harm, the EPA would invite future spills and leak events. Older impoundments are less likely to have been designed by a professional engineer, are larger, higher and more likely to have leaks or defects than new impoundments. Despite this, the majority of existing dams (including a majority of those commissioned more than 25 years ago) have not even been assigned a hazard classification.

EPA asks: *"Whether to address all CCR impoundments for stability, regardless of height and storage volume; whether to use the cut-offs in the MSHA regulations, approaches or size cut-offs should be used. If commentators believe that other regulations or different size cut-offs should be adopted, we request that commenters provide the basis and technical support for their position."*

EPA's jurisdiction to regulate the stability of impoundments must be based upon the degree of risk an impoundment poses to public safety and the environment, not simply on standards enacted by MSHA to protect the safety of coal miners at mine sites. Commenters understand that operators have already begun to use smaller impoundments, referred to as cells, in order to avoid regulatory jurisdiction. Due to space restrictions, new cells may be built on older, capped, cells. This increases the potential for instability despite the limited impoundment

[763] This data come from the Coal Impoundment Location & Information System (LIS) based out of Wheeling Jesuit University in Wheeling, West Virginia. The site is accessible at: http://www.coalimpoundment.org.

volume in the individual cell. Groups of cells, particularly, may pose a significant threat to safety and the environment and should not be excluded from regulation.[764]

EPA asks: *"Whether surface impoundment integrity should be addressed under EPA's NPDES permit program, rather than the development of regulations under RCRA, whether it be RCRA subtitles C or D."*

Commenters assert that regulation of the integrity of existing surface impoundments must be undertaken through RCRA subtitle C, in order to assure uniformly sufficient and comprehensive regulation among the states. While the CWA could be employed to address impoundment integrity, RCRA provides a broader jurisdictional basis to address impoundment integrity, and impacts on surface and groundwater.

E. FEMA Guidelines on Emergency Action Plans Should Be Incorporated into Regulations for "Significant" and "High" Hazard Impoundments.

The Federal Emergency Management Agency has developed guidance for the development and maintenance of Emergency Action Plans (EAPs).[765] *See* These guidelines must be incorporated into the final regulations and made a requirement of all "Significant" and "High" hazard impoundments. Recent failures of coal-slurry and CCR impoundments – most notably in Inez, Kentucky in 2000 and Kingston, Tennessee in 2008, illustrate that the potential for large-scale impoundment failure exists. As described previously the Kingston impoundment failure resulted in the release of 5.4 million gallons of CCRs. The tidal wave of ash resulting from this release destroyed several homes and ruptured a major gas line. The release of coal-slurry waste near Inez, Kentucky in 2000 was even larger – estimated to be 300 million gallons. The effects of that spill are still being felt by area residents, who were fortunate to all escape alive.[766]

Though each of these releases had a significant environmental and social impact, fortunately neither resulted in the loss of human life. The potential for such a tragedy exists, however, particularly when impoundments are rated with a "Significant" of "High" hazard regardless of the acre-feet of material contained or the dam height, as was made tragically evident in the Ages tragedy.. Properly developed EAPs are essential to reducing this risk to the minimum.

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[764] *See* Michael et. al. Potential of Breakthrough of Impounded Coal Refuse Slurry into Underground Mines, 16 GeoScienceWorld, 299.

[765] *See* Interagency Committee on Dam Safety, Federal Guidelines for Dam Safety: Emergency Action Planning for Dam Owners (April 2004)

[766] *See* "The Day Black Lava Flowed," Charleston Gazette, October 13, 2010, *available online at* http://www.wvgazette.com/News/201010100572

F. EPA Must Not Allow Wet-Handling Facilities to Continue Operating Merely Because They are Perceived to Be a Limited Threat to Groundwater and Have a Low or Less than Low Hazard Rating

Despite the presence of regulation, spills will continue to occur. Coal-slurry impoundments – regulated under the same MSHA standards proposed by EPA to regulate CCR impoundments – have resulted in 43 failures in the last ten years, including the one near Inez, Kentucky described above. These spills resulted in releases ranging from the relatively minor, to an estimated 1,000,000 gallons at Elkhorn Creek in Kentucky in 2001, to 10,000,000 gallons in the Tug Fork watershed in West Virginia in 2002, to the over 300,000,000-gallon release near Inez, Kentucky in 2000. Though regulations have had an effect on limiting the size of releases and incidents of embankment failure, clearly the only way to sufficiently reduce the environmental hazards posed by wet-refuse impoundments is to phase them out.

It should be emphasized that the hazard rating under the Federal Dam Safety Guidelines of "low" or "less than low" has no bearing with regards to an impoundment's likelihood to fail. These ratings primarily evaluate the risk to human life and property **if** such a failure would occur. Consequently, they also have little bearing on environmental risk should a failure occur. FEMA defines "hazard" as "[p]otential loss of life or property damage downstream of a dam from floodwaters released at the dam or waters released by partial or complete failure of the dam, and upstream of the dam from effects of rim slides."[767] The definition continues "a hazard is considered significant if there is a potential to cause loss of human life or major damage to permanent structures, utilities, or transportation facilities."[768] While some versions of the FEMA classification system, including the one adopted by EPA in its regulatory proposal, nominally mention environmental damage, this is not the basis for the classification system.[769] It should, therefore, not be the basis for exempting current wet-handling CCR impoundments from any proposed set of regulations as it will not ensure adequate protection of ground and surface waters.

Finally, and most importantly, grandfathering in old impoundments would result in exemption for some of the dams with the greatest likelihood of failure and some of the greatest magnitude of catastrophe. EPA's survey results of existing impoundments revealed that older dams tend to have a greater capacity, higher embankments, and be less likely to be designed and

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[767] Interagency Committee on Dam Safety, Federal Guidelines for Dam Safety, 5 (2004).

[768] *Id.*

[769] It is apparent that the basis of FEMA's rating system is in the more descriptive system developed by the U.S. Army Corps of Engineers and the U.S. Department of Agriculture and defined in the National Engineering Manual. There a "low" hazard dam is one that is "located in rural or agricultural areas where failure may damage farm buildings, agricultural land, or township and country roads." *See* Natural Resource Conservation Service, Earth Dams and Reservoirs TR-60 1-1 (2005). . A "significant" hazard dam is one which is "located in predominantly rural or agricultural areas where failure may damage isolated homes, main highways or minor railroads, or cause interruption of use or service of relatively important public utilities." *Id*. Finally a high hazard dam is one "where failure may cause loss of life, serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads." *Id*. Though FEMA and EPA may have modified the ratings to nominally incorporate environmental damage, such considerations are not in the original classification system, which allows for precise and specific characterization as opposed to the newer and more vague standards of "economic loss" and "environmental damage."

constructed under the guidance of a professional engineer than those built more recently. *See* Tables 2 through 4 and Charts 1 through 3 below. They are also more likely to have problems with leaks and more likely to have serious deficiencies. Exempting these dams based on criteria that have little to no bearing on potential for failure and only nominal (at best) relationship to the potential for environmental harm in the event of a disaster would invite future catastrophe.

The vast majority of CCR impoundments (approximately 490 of 629 dams in the survey results)[770] were commissioned prior to 1985. Of those commissioned more recently nearly 90% were designed by a professional engineer. Older dams are far more likely to have been designed by someone without such certification. Only around 66% of dams built before 1985 were designed by a P.E.; as were only 55% of the 242 dams built prior to 1975, and only 30% of the 90 dams built before 1965. *See* Table 2 and Chart 1 below. Older dams are also likely to be larger. Only 40 of 629 impoundments surveyed have more than a 5000 acre-foot capacity. All but 5 of these (88%) were commissioned prior to 1985. Of 22 dams with a greater than 10,000 acre foot capacity, all but three (86%) were commissioned prior to 1985. *See* Table 3 and Chart 2 below. Unsurprisingly then, older dams are also more likely to be built with higher embankments. One hundred-sixty-four of 213 dams (77%) with embankment heights above 25 feet were built prior to 1985; as were 65 of the 80 dams (81%) with an embankment height over 50 feet, and 22 of 28 dams (79%) with an embankment height over 100 ft. *See* Table 4 and Chart 3 below. Finally, older dams are substantially more likely to have problems. Only 11 dams in the survey were identified as having significant deficiencies – all but one of these was built in 1985 or before. Of 40 dams with a history of leakage, 33 (83%) were commissioned prior to 1985, and over half (22) were commissioned prior to 1975.

Table 39

Impoundments Designed by Professional Engineers by Commission Date				
	Post 1985	Pre 1985	Pre 1975	Pre 1965
Not PE Designed	14	167	110	63
PE Designed	118	323	132	27

[770] "Approximately" because precise data were not available for all of the impoundments in EPA's survey.

Comparison of Impoundments Designed by Professional Engineers by Commission Date

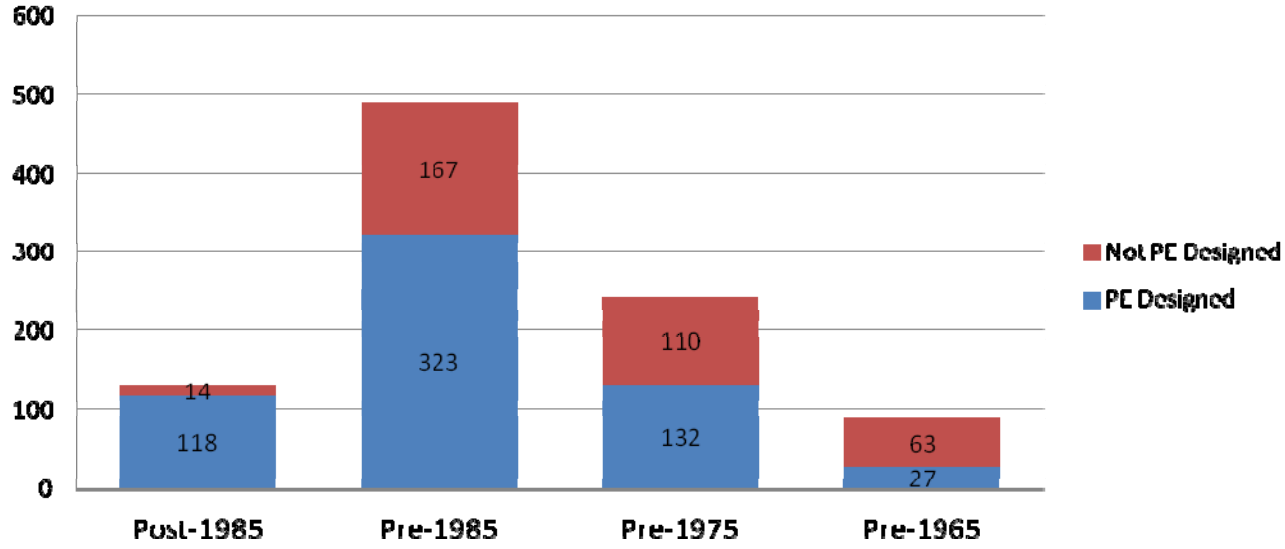


Table 40

Large Impoundments by Commission Date		
	>5,000 acre-feet	>10,000 acre-feet
Post 1985	5	3
Pre 1985	35	19

Comparison of Large Impoundments by Commission Date

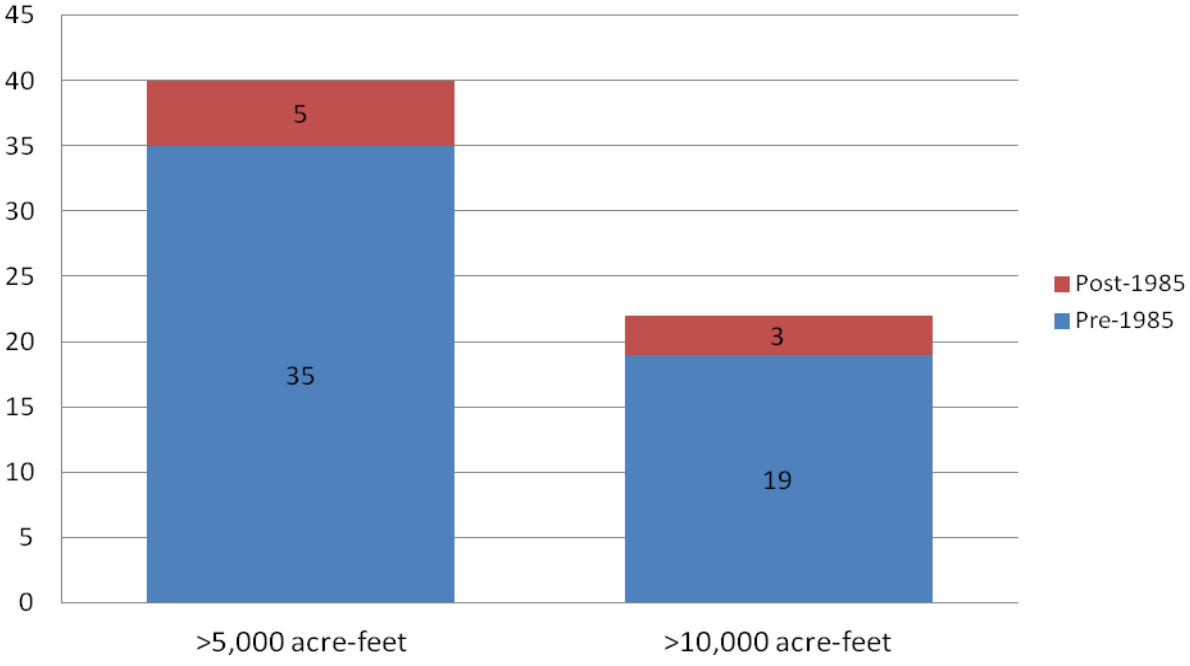
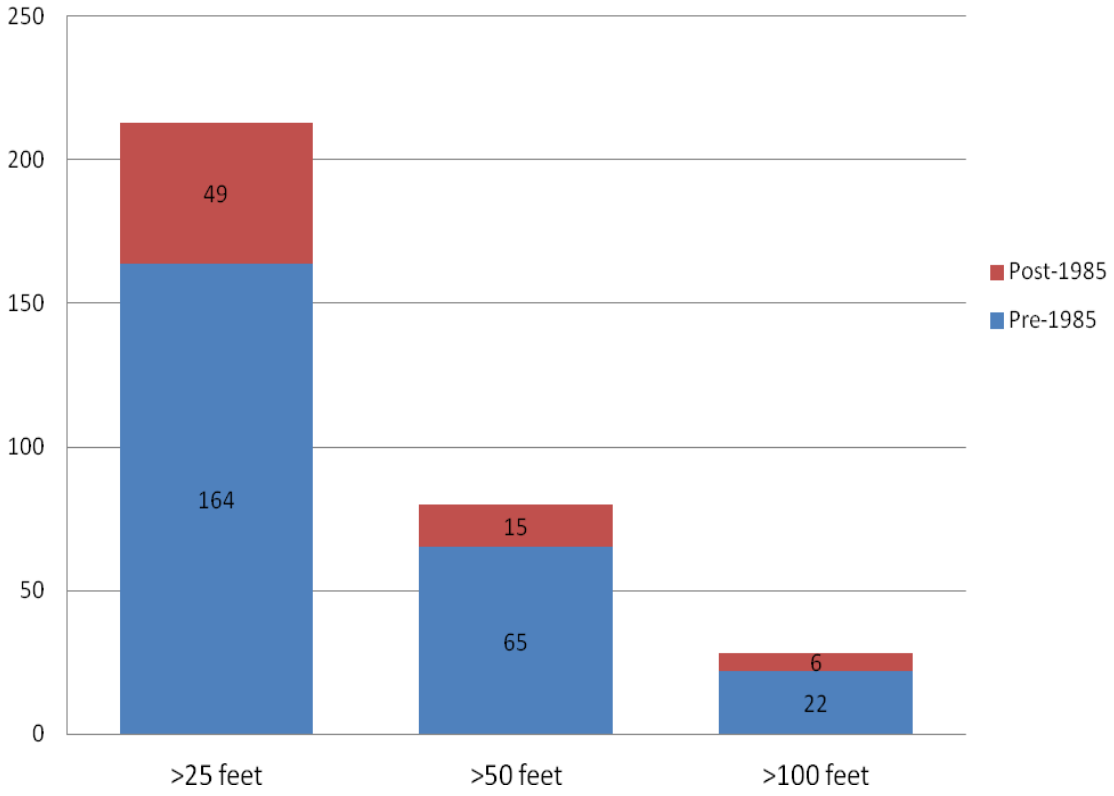


Table 41

High Embankments by Impoundment Commission Date			
	>25 Feet	>50 Feet	>100 Feet
Post 1985	49	15	6
Pre 1985	164	65	22

Comparison of High Embankments by Impoundment Commission Date



As described above, and based on EPA's own data, older dams are likely to be larger, hold more material, and have leakage history or significant deficiencies. They are also less likely to have been designed by a professional engineer. It is nearly impossible to conduct any analysis of impoundments based on their hazard classification because so few of the existing impoundments have been assigned such a classification. (Only 200 of 629 impoundments have been assigned a hazard rating at all, and only 150 of 490 impoundments built prior to 1985.) It should not be assumed however that large impoundments or those that leak will necessarily be assigned a high or significant rating. Nineteen of 40 dams holding greater than 5000 acre-feet have a "low" hazard classification or none at all. Nine of the 22 dams impounding 10,000 acre feet or more have a "low" hazard classification or none at all. Similarly of 40 impoundments with a leak history, 24 are classified as a "low" hazard, "less than low" hazard or have been given no hazard classification.

In summary, leaks are bound to happen even with the regulatory improvements proposed by EPA. (We know this because frequent leaks still occur in coal-slurry impoundments regulated under the same rules upon which EPA's CCR impoundment regulations are based.) There is little relevance to hazard classifications and the potential for environmental harm. (The classification system was not intended to assess environmental consequences and only nominally incorporates environmental harm as a factor). Therefore exempting CCR impoundments based on hazard rating will not be protective of ground and surface waters. In fact, it likely will promote the continued use (and possibly the expansion) of old impoundments which are larger, impound more material, are less likely to be designed by a professional engineer, and are more likely to have deficiencies or a history of leakage. Old impoundments are the most important to phase-out and therefore, they should not be exempt from stringent regulations. For these same reasons they should not be grandfathered under a subtitle D, D', or other hybrid regulatory structure, but instead should be phased out and closed under subtitle C, with no new impoundments authorized.

G. EPA Should Not Restrict Impoundment Regulation by the MSHA Size Thresholds

As explained in more detail above, the MSHA regulations were enacted for the specific purpose of protecting miners at the minesite. Considering such a limited focus the size thresholds for MSHA jurisdiction over dam stability may make sense – if an impoundment is too small to pose a significant risk to human life then at a mine it need not be regulated. SMCRA, on the other hand has a broader mission in the protection of the environment and society at large, and public protection on and off the mine site, and as such all impoundments are subject to stability regulation and those with significant safety risks are subject to more stringent rules. This should be the approach taken by EPA in regulating CCRs.

Particularly troubling under the proposed size-threshold regulations is the development of so called waste disposal "cells." These cells consist of numerous small impounding structures typically separated by dikes of compacted waste materials. They appear to be built primarily to avoid the more stringent regulations placed on larger impoundments. Cumulatively, however, they may pose a risk similar to that of larger impoundments. Because of space restrictions they are built close together and frequently on top of one another. As such multiple cells may together reach significant heights and volumes. Internal pressures within the stack may still lead to breaches – particularly if they are not subject to enforceable design standards.[771] EPA should regulate CCR waste impoundments regardless of size, so that it does not inadvertently encourage the development and use of these "cell" stacks.

[771] *See* Michael et. al. Potential of Breakthrough of Impounded Coal Refuse Slurry into Underground Mines, 16 GeoScienceWorld, 299.

VII. PROPOSED SUBTITLE C REGULATIONS MUST BE STRENGTHENED

A. EPA's Proposed Extenuated Phase-out Of Surface Impoundments Under Subtitle C Is In Violation Of RCRA §3004(x)

RCRA 3004(x) provides that modification of 3005(j) standards must "assure the protection of human health and the environment."[772] The Agency's proposal to utilize 3004(x) authority to modify the four-year grace period for compliance with minimum technology requirements does not adequately protect human health and the environment. This extension is therefore in violation of RCRA and EPA should thus maintain the current four-year period.

Promulgation of a rule under the authority of subtitle C will lead to the eventual phase-out of surface impoundments.[773] This phase-out is based on application of minimum technology requirements of RCRA 3005(j), which operators will be either incapable of meeting or, for financial reasons, will chose not to meet.[774] The Agency predicts that operators will consequently close existing surface impoundments.[775]

When a surface impoundment becomes newly subject to Subtitle C regulations, provisions of RCRA 3005(j) grant impoundment operators a four-year grace period in which to close or upgrade an impoundment.[776] The grace period begins with the effective date of the new rule, six months after promulgation.

EPA's proposal considers extending the traditional four-year exemption.[777] Under the proposal the Agency would permit impoundments to continue receiving coal ash for five years and would provide an additional two years before final closure.[778] This creates a seven-year grace period from the time that states are authorized to implement the pertinent provisions of RCRA.[779]

EPA recognizes that states can take from two to eight years to adopt the laws and regulations necessary to gain the necessary RCRA authorization.[780] This range, in combination with the proposed seven-year exemption, creates a 9 to 15 year period in which surface impoundments will continue to pose substantial human health and environmental risks. If EPA were to maintain the current four year period, operators would still be granted six to 12 years to phase-out their impoundments. Given the extremely long timeframe provided under the default rules, this additional extension is not justifiable.

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[772] 42 U.S.C. § 6924(x).
[773] U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35177 (Jun. 21, 2010).
[774] 75 Fed. Reg. 35177.
[775] 75 Fed. Reg. 35177.
[776] 42 U.S.C § 6925(j)(6); 40 CFR § 268.14.
[777] 75 Fed. Reg. 35178.
[778] 75 Fed. Reg. 35178.
[779] 75 Fed. Reg. 35179.
[780] 75 Fed. Reg. 35179.

The Agency has considered several factors that it presents as justifications for extending the default period. For instance, EPA states that it will be necessary for utilities to convert form wet to dry ash handling, "which cannot necessarily be accomplished within four years."[781] EPA expresses further concern about the need for facilities to seek permits to govern replacement impoundments for currently co-mingled non-hazardous wastewaters.[782]

These factors do not support a modification for several reasons. First, a four-year period for dry conversion is an absolute minimum and is practically very unlikely. Accounting for the state authorization process, utilities will have closer to six years, the low-end estimate, for conversion. Taking a more moderate estimate, accounting for the date of promulgation, the grace period, and state authorization, operators may not have to complete a dry conversion or new impoundment permitting until 2021, hardly a pressing timeline for utilities or state permitting agencies.

Even if EPA is persuaded that the conversion and permitting pressures may pose impediments in certain instances, the extended timeline is not appropriate because narrower methods are available and more protective of human health and the environment. The Agency solicits comment on the option of further extending the timeline on a case-by-case basis where nine to 15 years is insufficient. In order to comply with the 3004(x) and "assure the protection of human health and the environment", EPA must maintain the default, four-year grace period and should adopt provisions for case-by-case analysis of extensions where problems with permitting or technical difficulty make compliance impossible within the six to 12 window.

The Agency has explicitly recognized the risk of old, poorly designed and poorly maintained ash surface impoundments. The Agency identifies the human health and environmental dangers posed by their continued operation. Yet, the Agency is proposing to permit their continued operation through the end of the next decade. Rather than establishing a long and risky exemption based on untested possibilities, EPA must maintain the current period and permit extensions only when operators have demonstrated in inability to comply with the minimum technology requirements of 3005(j). Any other option creates an unacceptably long grace period that does not protect human health and the environment as required by 3004(x).

B. The Exemption for Ongoing State Or Federal Cleanups Is Overly Broad

EPA proposes to exempt from subtitle C listing "coal combustion residuals that are . . . generated from clean-up activities that are conducted as part of a state or federally required clean-up that commenced prior to the effective date of this rule."[783] The basis of this exemption is sound, but without refinement, the exemption is far too broad because it does not properly distinguish between the unique nature of the cleanup process itself and ash that is merely the byproduct of the cleanup process.

[781] 75 Fed. Reg. 35178.
[782] 75 Fed. Reg. 35178.
[783] 75 Fed. Reg. § 35254.

This exemption is based on EPA's understanding that ongoing cleanups involve administrative agreements that dictate specific remedies, goals and timelines that consider human health and the environment "based on conditions *at the site*."[784] Any established goals and site-specific plans might be upset by application of hazardous waste regulations.[785] This rational is appropriate for onsite cleanup actives, but it does not establish a sound basis for exempting all ash that is generated as part of the cleanup. That is, EPA must distinguish between onsite cleanup "activities" and final disposal of ash generated by those activities.

As stated, the proposed language exempts waste generated from ongoing cleanup activities. This language should be modified to exempt ash that is handled, treated, transported or stored *as part of an ongoing cleanup activity*. However, ash that is *generated from* cleanup activities (i.e., ash that is dredged from waterways or otherwise collected during cleanup) and is destined for final disposal must be covered by the provisions of subtitle C. EPA has not distinguished waste that is generated by the cleanup process from ash generated directly by coal combustion. Likewise, the ash that is generated from cleanup activities and is destined for final disposal is not burdened with the same site-specific characteristics as the cleanup activities themselves. In other words, while cleanup may be unique to the location, the waste that is collected as part of that cleanup is simply ash destined for final disposal and that final disposal is not unique to the ongoing and site-specific cleanup.

Given this crucial differentiation between cleanup activities and the waste generated from those activities, EPA should narrow the proposed exemption such that disposal and offsite transportation of ash from cleanup projects are covered by the special waste provisions of subtitle C. This would provide for coverage of both onsite and offsite disposal because that disposal is distinct from the cleanup activities. It would, however, still exempt all onsite handling other than final disposal and would, therefore, largely impact only disposal but not the unique remedies, goals and timelines of ongoing cleanup projects.

VIII. EPA SHOULD USE RCRA §7003 TO ADDRESS THE IMMINENT AND SUBSTANTIAL HAZARD POSED BY OLD AND INADEQUATELY DESIGNED SURFACE IMPOUNDMENTS

The nationwide inventory of currently operating surface impoundments includes a considerable number of decades-old impoundments that pose serious risks of collapse and groundwater contamination because they were not properly designed and are not properly maintained. The best-case scenario under EPA's current proposal would allow these precarious impoundments to continue operating for seven years after promulgation.[786] Because even Subtitle C does not provide for rapid closure and remediation of the most dangerous

[784] 75 Fed. Reg. § 35183 (emphasis added).
[785] *Id.*
[786] U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35178 (Jun. 21, 2010).

impoundments, EPA should utilize its authority under RCRA §7003 to effect the closure or clean-up of the most perilous surface impoundments.[787]

Section 7003 of RCRA provides broad authority for EPA to issue administrative orders or commence judicial actions where handling of a solid waste creates "an imminent and substantial endangerment to health or the environment…"[788] This clause has been broadly interpreted to grant enforcement authority when there is an actual, threatened or potential harm,[789] when present conditions indicate a future risk, even if the harm may not manifest for some time,[790] and when there is a reasonable concern that health of the environment may be seriously harmed.[791]

After the devastating collapse of the Kingston impoundment in 2008, and the growing evidence of groundwater contamination at impoundments across the country,[792] EPA should recognize that unregulated impoundments pose an imminent harm to human health and the environment. EPA should further act pursuant to section 7003 to safeguard communities from further groundwater contamination from unlined ponds and from another collapse at a poorly designed and maintained impoundment.

A. Surface Impoundment Ratings Indicate A Probability Of "Substantial Endangerment"

To commence action under section 7003 EPA must find a substantial endangerment. Substantial endangerment arises when there is a reasonable cause for concern that human health or the environment may be seriously harmed.[793] EPA has compiled hazard ratings for 200 of the 629 known surface impoundments throughout the country.[794] While these hazard ratings do not address potential for harm, the ratings do directly account for the substantiality of the harm. A high hazard rating represents a probable loss of human life should the impoundment fail.[795] A significant hazard rating represents a possibility of environmental damage.[796] Thus, all

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[787] 42 U.S.C § 6973.
[788] *Id*,.
[789] United States v. Velentine, 856 F. Supp. 621, 266 (D. Wyo. 1994).
[790] United States v. Velentine, 856 F. Supp. 621, 266 (D. Wyo. 1994).
[791] United States v. Conservation Chemical, 619 F. Supp 162 (W.D. Mo. 1985); Leister v. Black & Decker, Inc., 117 F.3d 1414 (4th Cir. 1997).
[792] *See, e.g.*, Environmental Integrity Project and Earthjustice, "Out of Control: Mounting Damages from Coal Ash Waste Sites", Feb. 24, 2010; Environmental Integrity Project, Earthjustice and Sierra Club, "In Harm's Way: Lack Of Federal Coal Ash Regulations Endangers Americans And Their Environment", Aug. 26, 2010.
[793] United States v. Conservation Chemical, 619 F. Supp 162 (W.D. Mo. 1985); Leister v. Black & Decker, Inc., 117 F.3d 1414 (4th Cir. 1997).
[794] EPA, Information Request Responses from Electric Utilities, *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.
[795] U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35130 (Jun. 21, 2010).
[796] U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35130 (Jun. 21, 2010).

impoundments with high and significant hazard potential should be considered as posing a substantial degree of endangerment for purposes of action under §7003.

Of the 200 reporting impoundments, 121 rate as high or significant hazards.[797] EPA should begin with these 121 impoundments, review the imminence of the hazards posed and where the hazard is, in fact, imminent, EPA should utilize section 7003 to remedy the endangerment or close the impoundment.

B. Surface Impoundment Design And Monitoring Failures Indicate An "Imminent Endangerment"

EPA must also base a section 7003 action on the imminence of endangerment. Danger is imminent if present conditions indicate a future risk, even if the harm may not be realized for years.[798] In other words, there need not be an emergency to find imminent endangerment.[799]

There is no objective rating system, such as the hazard potential ratings, to easily identify those impoundments that are most likely to endanger health and the environment through structural failure or groundwater contamination. However, several known factors can help assess the potential for impoundment failure or contamination and therefore the imminence of endangerment. First, one can look to the design, constriction, monitoring, age and height of an impoundment to help determine whether the impoundment has a risk of failure. Second, the presence of a liner is a simple indicator of the imminence of groundwater contamination.[800]

[797] EPA, Information Request Responses from Electric Utilities, *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.
[798] United States v. Velentine, 856 F. Supp. 621, 266 (D. Wyo. 1994).
[799] United States v. Conservation Chemical, 619 F. Supp 162 (W.D. Mo. 1985)
[800] *See* U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35144 (Jun. 21, 2010) (Repeating that there are high potential risks associated with unlined and even clay lines surface impoundments.)

High and significant hazard ponds without professional engineer design, constriction or monitoring

Company	Facility	Unit	State	Age	Storage Capacity (acre ft)	Unit Height (ft)
Kentucky Utilities Co	E. W. Brown Power Station	Ash Pond	KY	1957		126
Duke Energy Corp	Riverbend Power Station	Primary Pond	NC	1957	1640	80
Louisville Gas & Electric Co	Mill Creek Power Station	Ash Pond	KY	1972		77
Duke Energy Corp	G. G. Allen Power Station	Active Ash Pond	NC	1973	5915	75
Duke Energy Corp	Buck Power Station	New Primary Pond	NC	1982	2645	72
Duke Energy Corp	Buck Power Station	Primary Pond	NC	1957	1610	70
Duke Energy Corp	Buck Power Station	Secondary Pond	NC	1957	510	70
Duke Energy Corp	Riverbend Power Station	Secondary Pond	NC	1986	980	70
Allegheny Energy Supply Co LLC	R Paul Smith Power Station	Lagoon Dam #3	WV	early 1960's	81	50
Ohio Valley Electric Corp	Kyger Creek Power Station	Boiler Slag Pond	OH	1955	1435	41
Ohio Valley Electric Corp	Kyger Creek Power Station	South Fly Ash Pond	OH	1955	2500	40
Duke Energy Corp	Walter C. Beckjord Power Station	Ash Pond C extension	OH	1985	1300	40
Allegheny Energy Supply Co LLC	R Paul Smith Power Station	Lagoon Dam #4	WV	early 1960's	161	40
Western Kentucky Energy Corp	Reid/Green/HMP&L Station Two	Ash Pond	KY	1971		39
Louisville Gas & Electric Co	Cane Run Power Station	Ash Pond	KY	1972	868	12

Of the 121 identified ponds with high or significant hazard potential, 24 were not designed by a professional engineer and 15 of these 24 ponds were likewise not constructed and are not now monitored by a professional engineer.[801] This means that at a minimum there are 15 ponds, listed in Table X, that pose a threat to human life or the environment but their structural stability is not monitored by a professional engineer to assure that they do not manifest their hazard potential. Moreover, these 15 hazard ponds were neither designed nor constructed with the expertise, oversight or input of a professional engineer. These ponds that present the most substantial endangerment may not be properly designed and constructed and they are not regularly monitored by an expert in structural engineering. A number of these ponds are more than a half-century-old, and the very newest is a quarter century old.[802] These impoundments are built as high as 126 feet above the ground, they cover a total of more than 756 acres and contain almost 20,000 acre-feet of toxic slurry.[803]

This combination of factors presents a very clear, imminent and substantial endangerment to surrounding communities at risk from structural failure with a resulting flood possibly more substantial than Kingston in terms of human lives and the environment, and this says nothing of the health and environmental dangers posed by the subtler, but equally important threat posed by groundwater contamination.

C. Groundwater Contamination Presents A Substantial And Ongoing Danger

EPA has demonstrated that exposure to coal ash constituents through groundwater pathways presents a serious human health endangerment.[804] When a surface impoundment operates with a clay liner—EPA has questioned the efficacy of clay liners—or with no liner at all, the potential human harm is much more imminent and substantial.[805] As EPA has already stated, "unlined or clay lined waste management units [] result in risks greater than the risk criteria of [1 in 5,000] for excess cancer risk to humans or a [hazard quotient] greater than 1 for noncancer effects to both humans and ecological receptors…"[806]

For most of the 629 surface impoundments, EPA does not know whether a liner is present. However, for about 150 ponds, information on liner status is available from the 1995 EPRI Comanagement Study. Presently, EPA estimates that approximately 74 percent of the

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[801] EPA, Information Request Responses from Electric Utilities, *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.
[802] EPA, Information Request Responses from Electric Utilities, *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.
[803] EPA, Information Request Responses from Electric Utilities, *available at* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.
[804] *See* U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35144 (Jun. 21, 2010).
[805] *See* U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35144 (Jun. 21, 2010).
[806] *See* U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, Proposed Rule, 75 Fed. Reg. 35128, 35144 (Jun. 21, 2010).

nation's surface impoundments are unlined.[807]EPA's health review demonstrates that each and every one of these ponds poses a real endangerment. The known damage cases and proven likelihood of groundwater contamination from unlined or clay-lined impoundments demonstrates imminent harm and certainly, the heightened risk of cancer from these impoundments raises a reasonable concern for human health, amounting to a substantial endangerment.

These human health and environmental risks from unlined or insufficiently lined impoundments, combined with the 137 known groundwater damage cases compiled by EPA and by Environmental Integrity Project, Earthjustice and Sierra Club, present EPA with another imminent and substantial hazard that EPA should address under the immediate authority of section 7003 rather than the delayed closure date presented in the proposed rule.

Should EPA ultimately promulgate rules under the authority of RCRA subtitle C, the risks from unstable and unlined impoundments will eventually be diffused. However, given the long lead-time for full applicability of subtitle C to coal ash impoundments, it is important that EPA use all available authority to address the threat of another impoundment failure or growing groundwater contamination.

RCRA §7003 provides a strong basis for closure—or, at the very least, remediation—of the most perilous ponds. Section 7003 authorizes EPA to take action against any solid waste handling that presents "an imminent and substantial endangerment to health or the environment."[808] Courts have broadly interpreted this language to grant authority whenever there is reasonable cause for concern that present site conditions may harm human health or the environment, either immediately or in the future.[809] There can be no doubt that, at a minimum, there are 21 identified ash impoundments without proper design, construction or monitoring and 137 cases of groundwater contamination that EPA must consider for section 7003 action.

IX. EPA MUST REGULATE MINEFILLS AT LEAST AS STRINGENTLY AS OTHER CCR DISPOSAL SITES

As discussed above, CCR's toxic contaminants, including arsenic, cadmium, chromium, lead, selenium, and thallium, can readily pollute streams and drinking water. These chemicals can result in a number of health effects in humans, including neurological damage, cancer, and reproductive failure, as well as widespread ecosystem damage. The risks are even greater when CCR is disposed of in mines, a practice which is already widespread and growing. Yet there are no federal regulations controlling this practice, and EPA has postponed consideration of the minefilling issue. Indeed, minefills are expressly excluded from the scope of EPA's proposal for regulation of CCR under RCRA.

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[807] U.S. EPA, *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities*, *Regulatory Impact Analysis*, Appendix K1.
[808] 42 U.S.C. 6973.
[809] United States v. Velentine, 856 F. Supp. 621, 266 (D. Wyo. 1994); United States v. Conservation Chemical, 619 F. Supp 162 (W.D. Mo. 1985); Leister v. Black & Decker, Inc., 117 F.3d 1414 (4th Cir. 1997).

Federal regulations are needed to ensure that essential safeguards are in place before any more CCR is disposed of in coal mines. These safeguards must ensure that companies reveal the toxicity of the waste they are dumping, identify sources of groundwater and surface water that are susceptible to contamination from the dumping, and prohibit the disposal of waste directly into groundwater. Federal regulations must also require long-term, comprehensive monitoring for pollution from the dumping, and ensure that mine owners are held financially responsible for cleanup. Because state regulations uniformly fail to require these safeguards, EPA must start regulating CCR in minefills without delay, and it must promulgate standards at least as protective as those it adopts for other disposal sites. EPA must ensure full protection of human health and the environment under Subtitle C of RCRA for all communities affected by the disposal of CCR.

A. Enormous Quantities of CCR Are Already Being Dumped in Mines.

In 2006, the American Coal Ash Association claimed that 43 percent of nearly 125 million tons of CCR was "recycled",[810] leaving about 71 million tons of coal ash to be disposed of, much of which ended up in unlined and unmonitored waste ponds, landfills and mines. While industry estimates that the amount of CCR being disposed in active or abandoned mines is only about 1.5 million tons, this is a gross underestimate.[811] A conservative estimate is that at least 4 times that amount, about 6 million tons, is dumped every year in Pennsylvania mines alone.[812] Based on mine disposal rates in Pennsylvania, West Virginia, Indiana, Ohio, Illinois, Texas, North Dakota, South Dakota and New Mexico, plus conservative estimates of mine disposal in eight other coal basin states, approximately 24 to 25 million tons of CCR, or 20 percent of generation, are minefilled each year.

It is difficult to convey the sheer scale of these minefills. The Springdale Pit in Tamaqua, Pennsylvania is a good example. The pit is 700 feet deep, 3,000 feet long, and 1,500 feet wide, large enough to fit nearly 80 football fields. Before an environmental group appealed the permit for this site, Pennsylvania regulators had issued a permit that would have allowed up to 59 million tons of CCR and sludge to be dumped into this one giant pit.

The scale of the Springdale Pit is not an anomaly. In northern New Mexico, for instance, two power plants together have disposed of about 100 million tons of coal ash in two surface coal mines about 10 miles apart on either side of the San Juan River.[813]Similarly, in western Pennsylvania, the owners of the Champion Coal Refuse Disposal Site are seeking to mine waste

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[810] American Coal Ash Association (2007). Coal Production Products Production and Use Survey, 2006. http://www. acaa-usa.org/associations/8003/files/2006_CCP_Survey_(Final-8-24-07).pdf.

[811] *Id.*

[812] Clean Air Task Force, Impacts of Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines, September 2007. www.catf.us.

[813] Public Service New Mexico's San Juan Generating Station and Arizona Public Service's Four Corners Power Plant, both located near Farmington, NM, dispose of approximately a million tons of coal combustion waste annually in the San Juan Mine and Navajo Mine, respectively. Both mines are active coal mines located near the power plants. This estimate is based on testimony of Public Service New Mexico, Arizona Public Service, and BHP Minerals at hearings of the National Research Council's Committee on Mine Placement of Coal Combustion Wastes, December 6 and 7, 2004. Farmington, New Mexico.

coal for a new waste coal-burning power plant.[814] Their permit would authorize the dumping of up to 87 million tons of CCR on a site that is surrounded by people relying on private drinking water wells.[815]

B. Minefilling Increases The Risk Of Harm From CCR.

The unique geologic characteristics of mines maximize the risk of contamination from coal ash dumping. Mining breaks up solid rock layers into small pieces, called spoil. Compared to the flow through undisturbed rock, water easily and quickly infiltrates spoil that has been dumped back into the mined-out pits. Fractures from blasting become underground channels that allow groundwater to flow rapidly offsite. Because mines usually excavate underground aquifers, the spoil fills up with groundwater. Unlike engineered landfills – which are lined with impervious clay or synthetic membranes and are required by law to be situated above water tables – coal ash dumped into mine pits continually leaches its toxic metals and other contaminants directly into the groundwater that flows through and eventually leaves the site.

Furthermore, as a practical matter, dumping large quantities of CCR directly into water tables in highly fractured sites under massive quantities of mine overburden makes the prospect of cleaning up resulting contamination far more daunting than halting leakages from conventional landfills and ash ponds.

Promoters of minefilling argue that dumping alkaline CCR into coal mines will neutralize the acidic runoff that results from mining. But the facts show that minefilling is not a solution to acid mine drainage. Under pressure from electric utilities, many states have wrongly defined the dumping of CCR in coal mines as a "beneficial use" or "recycling" of an industrial waste and exempted the practice from all solid waste regulations.[816] Yet minefilling is far from beneficial use or recycling.

In a multi-year study of fifteen coal ash minefills in Pennsylvania, researchers found that CCR made the water quality *worse* at ten of the sites, and acidity actually *increased* over time.[817] At the remaining five sites, there was not enough monitoring data to determine whether adverse impacts were caused by the coal combustion waste. A review of the permits revealed that:

- Levels of contaminants, including aluminum, arsenic, cadmium, chloride, chromium, lead, manganese, nickel, selenium, and sulfate, increased in groundwater and/or surface water after coal ash was dumped in the mines.

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[814] Board of Supervisors of Robinson Township, Washington County, Pennsylvania. In re: Conditional Use Application And Major Land Development Application Of Champion Processing, Inc. ("Champion Processing" And Robinson Power Company, LLC ("Robinson Power") Decision, Findings Of Fact And Conclusions Of Law, September 11, 2006.

[815] *Id.*

[816] U.S. EPA (2002). Mine Placement of Coal Combustion Waste, State Program Elements, Final Draft, December 2002.

[817] Clean Air Task Force, Impacts of Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines, September 2007. Executive Summary. www.catf.us.

- Contaminants increased from background concentrations (measured after mining) to levels hundreds to thousands of times above federal drinking water standards.

- Pollution was found downstream from coal ash disposal areas and sometimes well outside the boundary of the mines.

Promoters of minefilling fail to recognize that chemical conditions at these sites change over time, and that coal combustion waste contains high levels of many different heavy metals and other toxic trace elements, each of which can leach into water under different chemical conditions, particularly when the water has a changing pH. Under alkaline conditions, some metals do not dissolve in water, but others do. Under acidic conditions, the situation reverses; metals that were previously immobile when the site was alkaline now dissolve into the water. Minefill permits routinely ignore the tendency of some metals in ash to leach into water under neutral to higher pH and thus completely overlook the potential of CCR to contaminate groundwater. Examples of metals that leach into water as pH increases from acid into neutral ranges include arsenic, selenium, antimony, hexavalent chromium, vanadium, molybdenum and boron.[818] Multiple researchers have documented that a greater number of toxic trace elements leach in greater amounts in the changing pH of mine waters that varies from acidic to alkaline.[819] These findings have also been confirmed by monitoring data from ash minefills.[820]

Furthermore, at most eastern mines, there is much more acidity than can be buffered by the alkalinity of the ash. Eventually the ash loses all of its alkalinity and is acidified. As the pH of the ash falls and the water flowing through the ash becomes more acidic, metals such as cadmium, copper, lead, manganese, nickel, and zinc will leach into the water.[821] Ashes from a "fluidized bed combustor" (FBC), a type of power plant boiler that can burn practically any type of fuel, will become acidic in acid mine drainage without continual addition of alkaline material, with the result that the concentration of metals increases beyond the amounts originally contained in the acidic drainage.

Other chemical reactions involving major constituents in mine water and ash such as iron and sulfate further complicate the picture, making it hard to predict when metals will leach based purely on the pH of the initial CCR. Thus, rather than cleaning up the water, CCR disposal is increasing the total amounts of toxic metals in mines and generating more contamination from those metals than ever occurred from the acid mine drainage alone.

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[818] Pennsylvania Department of Environmental Protection, Coal Ash Beneficial Use in Mine Reclamation and Mine Drainage Remediation in Pennsylvania, December 2004. Chapter 9, Figure 9.37, page 284.

[819] Stewart, B.R., 1996. The influence of fly ash additions on acid mine drainage production from coarse coal refuse. PhD. Dissertation. Virginia Polytechnic Institute and State University, Blacksburg, VA. pages 195-198; Skousen, Jeff & Bhumbla, D.K. , Metal Release From Fly Ash Upon Leaching with Sulfuric Acid or Acid Mine Drainage, National Meeting of the American Society for Surface Mining and Reclamation, St. Louis, MO, May 16-21, 1998; McDonald, Louis M. and Simmons, Jennifer. Effects of Large-Scale CCB Applications on Groundwater: Case Studies, Final Report, April 15, 2004, CBRCE-37, page 6. The complete report can be viewed at the Combustion Byproducts Recycling Consortium Web site at http://wvwri.nrcce.wvu.edu/cbrc.

[820] Clean Air Task Force, Impacts of Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines, September 2007. Chapter 3. www.catf.us.

[821] *Id.*

The following few examples illustrate the severity of the problems associated with disposing of coal ash at mine sites:

At the McDermott Mine in Cambria County, Pennsylvania, waste coal ash contaminated surface and groundwater with toxic levels of cadmium, selenium, sulfate, manganese and other pollutants. Billed as "alkaline addition" to clean up "preexisting pollution" from acid mine drainage, the Pennsylvania Department of Environmental Protection permitted the dumping of approximately 316,000 tons of CCR at the 73-acre surface mine from 1996-2004. The coal ash failed, however, to stop the acid mine drainage. Instead, pollution rose precipitously, rendering offsite water unfit for human consumption and forcing the abandonment of a spring used as a drinking water source. After CCR disposal, cadmium and selenium appeared in the groundwater and surface water at levels toxic to humans and aquatic life. Neither of these contaminants had been detected before ash disposal. Cadmium jumped to nearly 14 times the drinking water standard in groundwater and increased in surface water to nearly 4 times the drinking water standard and 76 times the water quality standard. Selenium, a pollutant that is extremely toxic to aquatic life, was measured at a seep at the property boundary at nearly 4 times the drinking water standard and more than 36 times the water quality standard. At a deep mine discharge 800 feet beyond the property boundary, selenium increased to levels exceeding water quality standards, with the highest measurement 14 times the standard. In addition to threatening human health, these toxic levels of cadmium and selenium are discharging in volumes of water exceeding 100 gallons per minute into a small stream that has limited ability to absorb this pollution.

Equally extreme consequences have resulted from the disposal of CCR at western mine sites as well. Near the San Juan Mine in Farmington, New Mexico, the Shumway Arroyo has long served as a source of drinking water for area residents and their livestock. Since the late 1980s, however, forty million tons of coal combustion waste from the San Juan Generating Station have been dumped in the San Juan Mine. As a result, the shallow groundwater and surface water in the Shumway Arroyo have been poisoned and can no longer be used as drinking water. Concentrations of lead, selenium, arsenic, cadmium, and boron have risen above drinking water standards in the shallow gravel aquifer underneath the arroyo. Sulfates in the aquifer have reached 55,000 milligrams per liter (mg/L) at the boundary of the mine, 220 times the secondary drinking water standard. The level of total dissolved solids in the groundwater, an indicator of all pollution dissolved in water, now exceeds 80,000 mg/L, 160 times the federal standard. The polluted water from the Shumway Arroyo eventually flows to the San Juan River, a source of drinking water for thousands.

This is not the first time water has been severely contaminated by coal ash dumped by the San Juan Generating Station. In the 1970s, high levels of sulfate, pH, metals, and other pollutants caused serious damage to neighboring ranchers. As a result, the power plant owners paid millions of dollars to settle claims for cattle and sheep killed and families made sick by drinking the Shumway's contaminated water. In 1984, an EPA enforcement action forced the owners to line the plant's ash disposal sites. Ironically, even though the ponds were lined, the dumping of coal combustion waste in unlined sites accelerated when the plant owners subsequently required their primary coal supplier, the neighboring San Juan Mine, to backhaul more of their coal ash to the mine's pits. Since 1987, the San Juan Mine has been filling more than 20 pits with CCR, each ranging from a few acres to hundreds of acres in size. Large unlined

pits, nearly 200 feet deep and 300 feet wide, are now filled with concentrated, battleship-sized tonnages of caustic fly ash and scrubber sludge. Because the pits are located above the arroyo, CCR continues to poison the groundwater.

C. Recent Trends Are Making The Problem Worse.

Some states have actually encouraged industry practices that increase the risk of exposure to CCR disposed in mines. "Remining" at abandoned mine lands is booming in eastern coalfields. At remining sites, operators excavate waste coal piles and coal left from the previous mining operation. These materials are burned in a fluidized bed combustion ("FBC") power plant. State regulators, particularly in Pennsylvania, actively encourage remining of waste coal on abandoned mine lands, which has led to the proliferation of FBC waste coal burning plants at mine sites.

The problem is that FBC plants produce huge amounts of waste – about 4 times more CCR per megawatt of electricity than conventional coal burning plants.[822] This is because the ash
content of waste coals is two to three times higher than the parent coals, and because limestone is injected into the combustion process to capture emissions of sulfur dioxide. In Pennsylvania, FBC power plants produce only 8 percent of the electricity generated in the state, but ash from FBC plants makes up over 60 percent of the CCR produced by all of the state's power plants.[823] In addition, FBC coal combustion waste is highly concentrated with mercury. Accordingto an industry survey of different coal types, waste bituminous coal contains 4 times more mercury than ordinary bituminous coal.[824]

CCR is also becoming more toxic as an indirect result of increasingly stringent air pollution control regulations. As better air pollution controls are implemented, more particulates and metals are captured in the ash instead of being emitted through the smokestack. In a 2006 report, EPA found that, when activated carbon injection was added to a coal-fired boiler to capture mercury emissions, the resulting waste leached selenium and arsenic at levels sufficient to classify the waste as "hazardous" under RCRA.[825] Specifically, EPA found that arsenic leaches as high as 100 times its maximum contaminant level (MCL) for drinking water and selenium leaches at levels up to 200 times its MCL. EPA concluded that the tendency of coal ash from these types of boilers to leach toxic arsenic and selenium should require site-specific evaluation of CCR disposal sites.[826]

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[822] Pennsylvania Department of Environmental Protection, Coal Ash Beneficial Use in Mine Reclamation and Mine Drainage Remediation in Pennsylvania, December 2004. Chapter 1.

[823] U.S. Department of Energy, 2002. Energy Information Administration. These values were predicted using the actual tonnage of coal burned by an FBC boiler and a PC boiler in Pennsylvania during 2006. http://www.eia.doe.gov/cneaf/electricity/page/eia906_920.html.

[824] 40 Waste coal contains, on average 0.4 ppm of mercury compared to 0.1 ppm of mercury, on average, in bituminous coal. Electric Power Research Institute. *An Assessment of Mercury Emissions from U.S. Coal-fired Power Plants*. EPRI, Palo Alto, CA: 2000. 1000608.

[825] U.S. EPA (2006). Characterization of Mercury-Enriched Coal Combustion Residues from Electric Utilities Using Enhanced Sorbents for Mercury Control. EPA/600/R-06/008. (January).

[826] *Id.*

In a follow-up study in 2007, EPA tested the leaching characteristics of solid waste from a boiler with a wet scrubber for sulfur dioxide and mercury control. EPA found that the CCR from this boiler similarly leached metals at levels significantly higher than their MCLs.[827] It also leached large amounts of boron and barium far above RCRA's hazardous waste threshold (100 times the MCL). Levels of concern for molybdenum, cadmium, and lead were also found.

D. EPA Has Extensively Studied The CCR Problem, But Taken Little Action.

EPA's own analyses of how CCR behaves in unlined disposal sites predict that some metals will migrate and contaminate nearby groundwater to levels extremely dangerous to people. In 2007, EPA published a draft risk assessment that found extremely high risks to human health from the disposal of coal ash in waste ponds and landfills.[828] According to EPA, the excess cancer risk for children drinking groundwater contaminated with arsenic from CCR disposal in unlined ash ponds is estimated to be as high as 9 in 1,000— 900 times higher than EPA's own goal of reducing cancer risks to less than 1 in 100,000.[829] In fact, in calculating this risk estimate for ash ponds, EPA assumed that the ash pond would be above the local water table. Because CCR in mines is in direct contact with the groundwater, residents living near minefilling sites could be at even higher risk.

CCR also threatens human health through airborne pathways. Coal ash and scrubber sludge that dries out in uncovered mine pits becomes airborne on windy days. The high pH of the ash, the extremely small size of the particles, and the toxic metals contained in the ash all present health hazards to nearby communities.[830]

In addition to health risks, scientists have also been documenting environmental degradation near CCR disposal sites for decades. Impacts include the leaching of toxic substances into soil, drinking water, lakes and streams; damage to plant and animal communities; and accumulation of toxins in the food chain.[831]

Disposal of CCR has contaminated water supplies and damaged life and the environment at more than 70 sites across the nation. Most CCR disposal sites are not even monitored, and EPA

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[827] U.S. EPA, Office of Research and Development. "Evaluating the Fate of Metals from Management of Coal Combustion Residues from Implementation of Multi-pollutant Controls at Coal-fired Electric Utilities," Presentation for 32nd Annual EPA-A&WMA Information Exchange. December 4, 2007.

[828] *2010 Risk Assessment*.

[829] *Id.*

[830] Aranyi, C. et al. (1979). Cytotoxicity to alveolar macrophages of trace metals adsorbed on fly ash. Envr. Res. 20, 14-23; Chauhan et al. (1989). Induction of pulmonary and hepatic cytochrome p-450 species by coal fly ash inhalation in rats. Toxicology, 56, 95-105; Smith et al. (1999). Interleukin-8 levels in human lung epithelial cells are increased in response to coal fly ash and vary with the bioavailability of iron, as a function of particle size and source of coal. American Chemical Society, October 1999; Srivastava et al. (1984). Distribution of metals of inhaled fly ash in various organs of rats at various periods after exposure. Environmental Science Health, A19(6), 663-677.

[831] Adriano, D.C., Page, A.L., Elseewi, A.A., Chang, A.C., Straughan, I.R. (1980). Utilization and disposal of fly ash and other coal residues in terrestrial ecosystems. Journal of Environmental Quality, 9: 333; Carlson, C.L., Adriano, D.C. (1993). Environmental impacts of coal combustion residues. Journal of Environmental Quality, 22: 227-247; U.S. Environmental Protection Agency, "Damage Case Assessment under RCRA for Fossil Fuel Combustion Wastes," dated August 2006. This assessment recognizes 24 proven damage cases and 39 "potential" damage cases. Damage cases are CCR disposal sites that show evidence of groundwater and/or surface contamination.

readily admits that damage and threats to human health from this waste are likely to be far more widespread than currently documented.[832] Although EPA has acknowledged the need for protections,[833] it has not yet issued any regulations for controlling the disposal of CCR at minefills.

E. CCR Is Not Being Adequately Regulated.

Despite the well-established toxicity of CCR, there are no adequate federal regulations in place to protect human health and the environment. In 2000, EPA concluded that federal safeguards were needed for minefilling, particularly because of the potential for groundwater contamination.[834] Yet EPA has failed to fulfill its promise to develop these regulations.

Although EPA has jurisdiction over all waste disposal under RCRA, EPA decided to cede regulation of coal combustion waste disposal in active mines to the Office of Surface Mining. In 2006, a panel of scientists appointed by the National Academies of Sciences (NAS), directed EPA to exercise its expertise and collaborate with the U.S. Department of Interior's Office of Surface Mining (OSM) to develop national minefill regulations.[835] Despite this directive, EPA refused to become actively involved and deferred entirely to OSM, an agency lacking institutional experience in waste management.

OSM has allowed dumping of coal ash in active mines to grow unchecked in state after state without any federal intervention, and OSM also does not intend to change the status quo, despite the explicit recommendation of the National Academies of Sciences.[836] Indeed, in March 2007, OSM announced in an Advance Notice of Proposed Rulemaking that it merely intends to rely on the existing authority of the Surface Mining Control and Reclamation Act (SMCRA), even though SMCRA clearly does not require the necessary safeguards.[837] Lastly, even if OSM were to regulate the dumping of coal ash in active coal mines, the disposal of ash in abandoned mines would still not be subject to such regulations, because SMCRA does not govern abandoned mines.

Since there are currently no federal standards, responsibility for protecting the public from exposure to CCR falls to the states, but their efforts to date have been grossly inadequate. As detailed above, many state regulatory agencies actually encourage industry practices that increase human exposure to coal combustion waste. For example, West Virginia promotes the burning of waste coal and allow mine dumping to be classified as a "beneficial" use with few

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[832] U.S. EPA (2007) Human and Ecological Risk Assessment of Coal Combustion Wastes, August, 6, 2007 (draft).

[833] Clean Air Task Force, Impacts of Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines (September 2007). Chapter 3 at 33, 214. www.catf.us.

[834] *Id.*

[835] National Academies Press. Managing Coal Combustion Residues in Mines. Committee on Mine Placement of Coal Combustion Wastes, National Research Council. Available at http://www.nap.edu/catalog/11592.html.

[836] Office of Surface Mining, Western Region. Guidance on Disposal of Coal Combustion Byproducts in the Western United States when OSM Western Region is the Regulatory Authority. Approved February 6, 2001. http://www.wrcc.osmre.gov/CCBguidance.html.

[837] Office of Surface Mining Reclamation and Enforcement, "Advanced Notice of Proposed Rulemaking on Placement of Coal Combustion Byproducts in Active and Abandoned Coal Mines," 72 Fed Reg, 12026, March 14, 2007.

restrictions. No state, with the exception of Kentucky and recently, Pennsylvania, provides the safeguards recommended by the National Academies of Sciences for coal combustion waste minefilling. All other states fail to protect coalfield communities by neglecting to follow the most basic tenets of safe waste management, including requiring strict separation of waste from water, long term groundwater monitoring, and bonds to ensure sufficient funds to clean up contamination if it occurs. While all coal-producing states prohibit the unregulated disposal of soda cans and banana peels (i.e., household trash) in mines, none, save Kentucky, impose similar safeguards when toxic ash is dumped in a mine.

Unlike the financial assurance posted by landfills, mine bonds typically do not include funds for remediating groundwater contamination. These bonds are released to the mine operators as soon as they have re-vegetated the mine surfaces, long before contamination from CCR is discovered. When contamination does occur, there is no money left to pay for cleanup. As a result, the true cost is shifted from power plants and mine operators to host communities and taxpayers who must pay for cleaning up wastes that will remain chemically active for decades and will threaten water resources in perpetuity.

According to federal law, municipal waste landfills are subject to requirements for engineered liners and covers, extensive monitoring, corrective action standards, and financial assurance. Most CCR minefills are subject to *none* of these requirements. Consequently, enormous quantities of toxic industrial waste are being dumped directly into groundwater without any site-specific evaluation, monitoring, or cleanup requirements.

EPA's lack of action to control the hazards posed by minefilling is egregious. Uncontrolled dumping of CCR into groundwater in coal mines violates the basic prohibitions in RCRA against open dumping. EPA's failure to regulate CCR has resulted in weak or nonexistent state standards. Some 23 states even have a provision in their law that prohibits the state from having stricter waste standards than federal law, meaning that without federal regulation, there will be no regulation of CCR beyond the inadequate and unenforceable provisions there are now.[838]

F. EPA Has The Tools And The Duty To Minimize The Risk From Coal Combustion Waste at Mine Sites.

In 2006, at the request of Congress, the National Academies of Sciences conducted a study of the health, safety, and environmental risks associated with using coal combustion waste for reclamation in active and abandoned coal mines. The National Academies of Sciences concluded that disposing of CCR in mines can cause unacceptable harm if it is not carriedout under minimum federal safeguards set forth in enforceable regulations.[839] For coal ash that is placed in mines, the National Academies of Sciences stated that new regulations should address both active and abandoned mines and that federal regulations must ensure that:

[838] U.S. EPA (2002). Mine Placement of Coal Combustion Waste, State Program Elements, Final Draft, December 2002.
[839] *Id.*

- Coal combustion waste is fully tested (or "characterized") to determine its hazardous characteristics and its potential to leach toxic chemicals;

- Disposal sites are fully characterized (i.e. investigated to determine the quality and location of groundwater, groundwater flow paths, the potential for coal ash to react with minerals or groundwater, etc.);

- Coal ash contact with water must be minimized;

- Site-specific management plans are implemented at all disposal sites;

- Monitoring is designed to detect movement of coal combustion waste contaminants;

- Site-specific performance and clean up standards are established;

- Deeds record and fully disclose that coal combustion waste was disposed at the mine site;

- Bonds or other mechanisms address clean up of groundwater from coal combustion waste disposal.[840]

Lastly, the National Academies of Sciences report stated that the public should be actively involved in developing these regulations, commenting on proposed permits, and enforcing them at mine sites.

Federal regulations are needed to ensure that common sense safeguards such as placement above water tables, adequate monitoring, and clean up standards are employed in every state. EPA is the federal regulatory agency charged with protecting human health and the environment from the mismanagement of industrial wastes. The evidence of harm caused by minefilling is compelling and warrants immediate action by EPA to establish protective and enforceable national standards that follow the recommendations of the National Academies of Sciences.

The true cost of minefilling lies in the heavy toll it takes on the health and environment of the communities near coalfields. Many of these communities are populated by low-income residents whose health is already compromised by the effects of coal mining.[841] These communities should not now be dumping grounds for toxic coal combustion waste. The residents who live downhill, downstream, and downwind of our nation's coal mines deserve better. Justice, fairness and common sense dictate that citizens living near a coalfield deserve the same protections as people living elsewhere.

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[840] National Academies Press. Managing Coal Combustion Residues in Mines. Committee on Mine Placement of Coal Combustion Wastes, National Research Council. Available at http://www.nap.edu/catalog/11592.html.

[841] 58 Hendryx, M. and M.M.Ahern (2008). Relations between health indicators and residential proximity to coal mining in West Virginia. Amer. J. Pub. Health, Vol. 98, No. 4, 669-671.

X. REGULATION OF CCR UNDER SECTION 4010(C) OF RCRA IS NOT A LEGITIMATE REGULATORY OPTION.

The utility industry has repeatedly urged EPA to rely on Section 4010(c) of RCRA as the foundation of its regulatory program for coal ash.[842] Industry representatives contend that regulations promulgated under this framework would be "equally protective" as compared to regulations promulgated under Subtitle C, and that such regulations would be "federally enforceable."[843] Neither assertion is correct, as discussed further below. Even more importantly, however, the utility industry's proposal overlooks the fact that states would be able to opt out of the entire program simply by prohibiting facilities within their borders from accepting hazardous waste from small quantity generators. By doing so, states would eliminate the facilities' potential for handling exempt hazardous waste and thereby make the program inapplicable.

This result exposes the fundamental absurdity of industry's argument that EPA should address the serious hazards posed by CCR by regulating it only indirectly through a regulatory framework that is dependent upon the incidental presence or absence of an entirely different waste stream. The absurdity is compounded by industry's suggestion that EPA should disingenuously treat CCR – the main target of the regulation – as non-hazardous even though there is ample evidence that CCR is hazardous in and of itself.

In light of these glaring flaws in industry's proposal concerning Section 4010(c), EPA should not give this option any serious consideration.

A. Purpose and Historical Context of Section 4010(c)

When Congress enacted RCRA in 1976, its "overriding concern" was to address the "clear danger to the health and safety of the population and to the quality of the environment" posed by hazardous waste.[844] Congress acknowledged that it was entering an area that had "traditionally been considered the sphere of local responsibility."[845] Nevertheless, Congress moved ahead because, in the absence of a federal regulatory framework, hazardous wastes were being "disposed of in ponds or lagoons or on the ground in a manner that result[ed] in substantial and sometimes irreversible pollution of the environment" and often presented "serious danger to human life."[846]

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[842] *See, e.g.,* Dan Riedinger, USWAG, "Comments of the Utilities Solid Waste Activities Group," at 2-3 (submitted to EPA during public meeting in Louisville, KY, Sept. 28, 2010); Jim Roewer, USWAG, "Comments of the Utilities Solid Waste Activities Group," at 2-3 (submitted to EPA during public meeting in Denver, CO, Sept. 2, 2010); Meeting Material Provided to OMB During Meeting on April 2, 2010, at 4 (author unspecified; appears to have been written by one or more industry representative in attendance at meeting, namely Meg Hunt for Edison Electric Institute, Jim Roewer for Utility Solid Waste Activity Group (USWAG), Richard Meiers for Duke Energy, and Douglas Green for Venable LLP/USWAG), *available at* http://www.whitehouse.gov/omb/2050_meeting_04022010/.

[843] *See, e.g.,* Roewer, USWAG Comments, Sept. 2, 2010, at 3.

[844] *See* H.R. Rep. No. 94-1491(I), 1976 USCCAN 6238, 6241 (Sept. 9, 1976).

[845] *Id*. at 6240.

[846] *Id*. at 6241.

By 1980, EPA had achieved progress in controlling hazardous waste through its Subtitle C regulations, but Congress remained concerned about the estimated 40 million tons per year that were still "escaping control through various loopholes."[847] One important loophole was the exemption for "small quantity generators."[848] An estimated 4 million tons of hazardous waste was "escaping effective control through this exemption," and it was being disposed of into sanitary landfills and sewers, even though "[n]either of these types of facilities [was] suited to the disposal or treatment of toxic organics or metals."[849] Since regulatory controls for such facilities were "either nonexistent or far less restrictive than those governing hazardous waste disposal facilities, environmental and health problems caused by Subtitle D facilities [were] becoming increasingly serious and widespread."[850]

In response to this problem, Congress added Section 4010(c) to the RCRA statute as part of the 1984 amendments.[851] This provision required EPA to revise its criteria for states to use in determining whether solid waste management practices were lawful (sanitary landfills) or unlawful (open dumps).[852] More specifically, the provision required EPA to revise its criteria for facilities that "may receive hazardous household wastes or hazardous wastes from small quantity generators," i.e., "facilities potentially receiving such wastes.[853] According to the statute, "[a]t a minimum," the new criteria "should require ground water monitoring as necessary to detect contamination, establish criteria for the acceptable location of new or existing facilities, and provide for corrective action, as appropriate."[854] In sum, the basic purpose of 4010(c) was to provide at least some minimum protection against health and safety risks resulting from the disposal of hazardous waste that is exempt from Subtitle C wherever there is a possibility that such disposal might occur.

As a first step, EPA revised its criteria for municipal solid waste landfills in 1991 to incorporate the protections specified in 4010(c).[855] EPA delayed promulgating similar regulations for other types of solid waste landfills, but eventually, in response to litigation, EPA promulgated criteria for non-municipal solid waste landfills in 1996.[856] Despite the statute's

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[847] H.R. Rep. No. 98-198(I), 1984 USCCAN 5576, 5578 (June 9, 1983).

[848] *See id.*

[849] *Id*.

[850] H.R. Conf. Rep. No. 98-1133, 1984 USCCAN 5649, 5688 (Oct. 3, 1984).

[851] *See* Pub.L. 98-616, 98 Stat. 3267, Title III § 302(a)(1) (Nov. 8, 1984).

[852] *See* 42 U.S.C. § 6949a(c) (citing 42 U.S.C. §§ 6907(a)(3) and 6944(a)).

[853] 42 U.S.C. § 6949a(c)(1).

[854] *Id.*

[855] *See generally* 40 C.F.R. Part 258, 56 Fed. Reg. 50978 (Oct. 9, 1991) (specifying location restrictions, facility design and operating criteria, ground-water monitoring requirements, corrective action requirements, financial assurance requirements, and closure and post-closure care requirements for municipal solid waste landfills).

[856] *See generally* 40 C.F.R., Part 257, 61 Fed. Reg. 34252 (July 1, 1996); *Sierra Club v. EPA*, 992 F.2d 337 (D.C. Cir. 1993); EPA, Office of Envtl. Policy and Assistance, RCRA/CERCLA Div. (EH-413), *Environmental Guidance Regulatory Bulletin: Standards for Non-Municipal, Non-Hazardous Waste Disposal Units Receiving Hazardous Wastes from Conditionally Exempt Small Quantity Generators (CESQGs)* (eff. Jan. 1, 1998).

reference to facilities "potentially receiving" exempt hazardous waste, EPA's current regulations are only applicable to facilities that actually "receive" small-quantity generator waste.[857]

B. Section 4010(c) Is Not a Legitimate Regulatory Option for CCR Because States Can Opt Out of the Entire Program.

The utility industry is asking EPA to regulate CCR by expanding the universe of facilities regulated under 4010(c) beyond those actually receiving hazardous waste from small quantity generators to encompass those with the potential to receive such waste as well.[858] The underlying premise is that CCR disposal facilities are now, and will remain, "solid waste management units that ... *may receive* CESQG hazardous wastes."[859] A closer inspection reveals that this premise is fundamentally flawed and that many CCR facilities could escape regulation if EPA adopts a program based on 4010(c).

Since 4010(c) does not apply where there is no "potential" for disposal of hazardous waste from small quantity generators, a regulatory program adopted under 4010(c) would not apply where facilities are legally forbidden from accepting such waste under state laws or regulations more stringent than federal requirements. States wishing to protect utilities from regulatory burdens could simply establish prohibitions on the ability of CCR facilities to accept this waste and thereby opt out of the entire program either on a state-wide basis (through laws or regulations) or on a facility-by-facility basis (through permitting).

This is much more than a theoretical concern. States routinely engage in this type of action in the air pollution context. In order to protect facilities from the regulatory burdens associated with the new source review program (such as the requirement to apply "best available control technology") or the burdens associated with the hazardous air pollutant program (such as the requirement to apply "maximum achievable control technology"), states frequently issue "synthetic minor" permits.[860] Such permits impose legal restrictions designed to ensure that a facility's emissions will remain below the threshold levels that would trigger the regulatory requirements.[861] Courts have upheld this practice as lawful even where the restrictions are enforceable only by states and not by EPA.[862]

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[857] *See* 40 C.F.R. §§ 257.1(a), 257.5(a)(1). *See also* 40 C.F.R. § 258.2 (defining a municipal solid waste landfill unit as a facility that actually "receives household waste" and defining "household waste" to mean "any solid waste ... derived from households" regardless of whether such waste demonstrates hazardous characteristics).

[858] *See* Material Provided to OMB During April 2, 2010 Meeting, at 4; Roewer, USWAG Comments, Sept. 2, 2010, at 2.

[859] Material Provided to OMB During April 2, 2010 Meeting, at 4 (emphasis added).

[860] *See, e.g.,* Clean Air Council, The Small Business Guide to Key Federal and State Air Regulations, at 12, available at http://www.cleanair.org/Air/SmallBusinessGuide.pdf; U.S. Air Force, Title V / Synthetic Minor Permit Guide, *available at* http://www.afcee.brooks.af.mil/products/air/flowcharts/TitleVSyntheticMinorPermits/docs/Title%20V_Synthetic%20Minor%20Permits.pdf.

[861] *See id.*

[862] *See,e.g., National Mining Ass'n v. EPA*, 59 F.3d 1351 (D.C. Cir. 1995), reh'g denied (Sept. 21, 1995) (hazardous air pollutant program); *Clean Air Implementation Project v. EPA*, 1996 WL 393118 (D.C. Cir. 1996) (Title V program, unreported); *Weiler v. Chatham Forest Products, Inc.*, 392 F.3d 532 (2d Cir. 2004) (new source review/preconstruction permitting program).

This approach has some intuitive appeal in the air pollution context, but it leads to perverse consequences in the waste context. First, when states and facilities work together to establish legal restrictions that will avoid regulatory burdens, these efforts are generally consistent with the overall goal of the applicable law because they cap the very type of pollution that is of concern at a de minimis level. By contrast, state efforts to help CCR facilities avoid 4010(c) requirements would eviscerate the very purpose of the program. State rules would prohibit CCR facilities from accepting hazardous waste from small-quantity generators, and this would leave enormous quantities of CCR, the waste stream of concern, completely unregulated.

Second, EPA has established the relevant air pollutant thresholds based on findings that each threshold represents a de minimis quantity of pollution. In the waste context, however, it is the RCRA statute that establishes the applicability of the 4010(c) program based on a facility's "potential" to receive small-quantity generator waste. As a result, instead of exercising control through the setting of upper limits, EPA would have no ability to prevent states from opting out of the 4010(c) program after they take steps to eliminate this "potential."

Another reason the threat is real is that states home to powerful coal interests have already expressed strong opposition to the kinds of regulatory measures for CCR that would be necessary to fully protect human health and the environment. For instance, the Indiana Department of Environmental Management has denied that CCR shares the "harmful characteristics" of other types of hazardous waste, and it has urged EPA to weaken its proposed Subtitle D standards to allow CCR to be placed below the water table.[863]

C. Even Where States Do Not Opt Out, A Program Based On 4010(c) Would Not Ensure Adequate Protection.

Industry further contends that EPA regulations under 4010(c) would be adequately stringent. Unfortunately, there can be no assurance that this will be true. On the contrary, since any regulatory program based on 4010(c) would depend on the presence of hazardous waste from small-quantity generators, the applicability of controls for individual facilities as well as the adequacy of the state program as a whole would have to be judged primarily by reference to whether they are sufficient to address the threats posed by the small-quantity generators' waste.

1. CCR Hazard Irrelevant to Applicability of 4010(c) to Individual Facilities

The *Environmental Defense Fund v. City of Chicago* case is instructive concerning the applicability of waste management obligations.[864] The case involved the City's operation of a modern waste-to-energy incinerator facility, and the central question was whether the ash residue resulting from the burning of household and non-hazardous commercial waste should be regulated as non-hazardous solid waste under Subtitle D or as hazardous waste under Subtitle C.

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[863] *See* Thomas W. Easterly, Commissioner IDEM, *State of Indiana Comments on Hazardous Waste Management System* (Oct. 22, 2010), *available at* http://www.uswag.org/pdf/2010/CCR%20Comments/IDEM10222010.pdf.

[864] *EDF v. City of Chicago*, 77 F. Supp. 419 (N.D. Ill. 1989).

In the face of conflicting interpretations from EPA, the court concluded that the ash residue was legally exempt from regulation under Subtitle C. Accordingly, despite toxicity testing in which 29 of 32 samples of the ash residue exceeded hazardous waste toxicity thresholds for lead and cadmium, the court held that the facility would not be subject to Subtitle C regulation as long as it could demonstrate compliance with the other prerequisites for the household waste exclusion.[865] In order to qualify for the statutory exemption, the City would have to show only that the facility (i) in fact receives and burns only household and non-hazardous commercial or industrial waste, (ii) does not accept any listed hazardous wastes, and (iii) follows appropriate procedures to ensure that hazardous wastes are not received or burned at the facility.[866]

Similarly, judgments about whether a particular CCR disposal facility is governed by a state's ordinary solid waste management program (under 40 C.F.R. Part 256 guidelines or state law only) or the enhanced criteria under 4010(c) for facilities accepting hazardous waste from small-quantity generators (40 C.F.R. Parts 257 and 258) would turn on whether the facility has the potential to accept any household or small-quantity generator waste. In addition to the possibility of state restrictions eliminating this potential, as discussed above, 4010(c) would not apply where practical impediments make it impossible for a facility to accept hazardous waste, e.g., the facility has already been capped, or the facility is in a remote area far from any source of hazardous waste. Just as the toxicity of the ash residue was irrelevant in the *EDF v. City of Chicago* case, factual information relating to CCR, such as the toxicity of the CCR waste, the quantity of such waste, and the sufficiency of protective measures would have no bearing on this determination, no matter how compelling the situation.

2. CCR Hazards Irrelevant to EPA Determinations Regarding Adequacy of State Programs

At a broader level, if EPA adopts the 4010(c) approach, EPA would be forced to judge the "adequacy" of state solid waste management plans in a similarly strained fashion.[867] EPA's final rule would have to classify CCR as non-hazardous waste, yet it would be founded on EPA's anticipation and assumption that such waste would be regulated more stringently than ordinary solid waste by virtue of being co-disposed at facilities with the potential to accept hazardous waste from small-quantity generators. If, however, states were to later preclude such co-disposal and regulate each waste stream separately (i.e., regulate CCR as ordinary solid waste), this would be consistent with EPA's findings and classification of CCR, and EPA would not be in a position to object.

3. Legal Framework Does Not Ensure Sufficient Stringency of 4010(c) Regulations

Even assuming states could not opt out of 4010(c) regulations for CCR, it is unlikely that a regulatory program under this authority would be sufficiently stringent or protective. If EPA wanted to pursue the 4010(c) approach, this "would likely require a supplemental proposal"

[865] *See id.* at 424-25.
[866] *See* 42 U.S.C. § 6921(i).
[867] 42 U.S.C. § 6945(c)(1)(C).

since neither alternative in EPA's pending proposal is based on 4010(c).[868] In crafting a new proposal, the legal framework would make it difficult for EPA to promulgate a robust and stringent rule.

One important factor is that states do not have to adopt regulations as stringent as the federal guidelines. While Subtitle C requires state hazardous waste programs to be "equivalent to the Federal program,"[869] the 4010(c) program only requires state programs to be "adequate."[870] Furthermore, 4010(c) significantly weakens the standard for classifying a facility as a sanitary landfill rather than an open dump. Under the general standard, a facility can avoid open dump status "only if there is no reasonable probability of adverse effects on health or the environment from disposal of solid waste at such facility."[871] The need to show "no reasonable probability of adverse effects" is a very protective standard. It reinforces the presumption against open dumping, places the burden on the facility to demonstrate the lack of adverse effects, and focuses entirely on health and the environment. In contrast, under 4010(c), the criteria for avoiding open dump status are "those necessary to protect human health and the environment."[872] The "necessary to protect" language creates a presumption favoring non-regulation with the burden on EPA to demonstrate the necessity of its criteria, and it suggests a far less ambitious goal of avoiding significant or substantial harm, which is a far cry from a mandate to avoid *any* reasonable probability of *any* adverse effects.

Moreover, under 4010(c), EPA "may take into account the practicable capability of such facilities."[873] There is no provision for cost or practicability considerations under Subtitle C, and this is for good reason.[874] Although it is unlikely EPA could promulgate a rule that completely failed to provide for groundwater monitoring, siting restrictions, and corrective action since these are specifically mentioned in the statute,[875] EPA would still be under tremendous pressure to weaken its standards in light of practicability considerations.[876] Indeed, EPA's regulations for non-municipal solid waste disposal facilities reflect the impact of such pressure and illustrate the limited scope, caveats, escape hatches, and other provisions favorable to industry that are the end result of 4010(c)'s relatively weak standards and concern for practicability and cost. The following are just a few examples:

- Location Restrictions – The 4010(c) regulations governing the siting of non-municipal solid waste facilities only require consideration of issues relating to wetlands and

[868] Roewer, USWAG Comments, Sept. 2, 2010, at 3.
[869] 42 U.S.C. § 6926(b).
[870] *Id*. § 6945(c)(1)(C).
[871] 42 U.S.C. § 6944(a).
[872] 42 U.S.C. § 6949a(c)(1).
[873] *Id*.
[874] *See* 42 U.S.C. § 6926.
[875] *Cf. Sierra Club v. EPA*, 992 F.2d 337 (D.C. Cir. 1993) (concluding EPA did not have authority to exempt small landfills from the groundwater monitoring requirements of 4010(c)).
[876] *Cf. Whitman v. American Trucking Ass'ns, Inc.*, 531 U.S. 457, 469 (2001) (explaining that, for purposes of setting national ambient air quality standards (NAAQS), consideration of costs was "full of potential for canceling the conclusions drawn from direct health effects," and this was an important factor in the Court's decision prohibiting EPA from considering costs).

floodplains.[877] EPA has not required consideration of seismic/fault issues, nor has it prohibited siting of facilities in salt dome formations, salt bed formations, underground mines or caves, all of which would be important in siting decisions for hazardous waste facilities under Subtitle C.[878]

- Groundwater Monitoring – Under 4010(c), EPA has given states broad discretion to decrease the presumptive 30-year groundwater monitoring period whenever the "owner/operator demonstrates that a shorter period of time is adequate to protect human health and the environment and the Director approves the demonstration."[879] The Subtitle C groundwater protection provisions are much more extensive and protective in that they must include a sufficient number of wells placed in locations and depths that satisfy detailed criteria, adequate casings, comprehensive sampling and analysis procedures, and meet numerous other requirements.[880]

- Corrective Action – EPA has authorized states to allow a facility to forego remediation if the owner/operator demonstrates that remediation is "not necessary" based on risk and practicability considerations.[881] Here again, the corrective action program under Subtitle C is more comprehensive and protective as seen, for instance, in the duty of owners/operators to "prevent hazardous constituents from exceeding their respective concentration limits at [a specified] compliance point by removing the hazardous waste constituents or treating them in place."[882]

- Detection Monitoring – EPA has also given states broad leeway to relax federal detection monitoring procedures, such as by providing that a State (1) "*may delete* any of the appendix I ... monitoring parameters for a unit if it can be shown that the removed constituents are *not reasonably expected* to be contained in or derived from the waste contained in the unit;" (2) "*may establish an alternative list* of indicator parameters for a unit, *in lieu of some or all of the constituents in appendix I* ... if the alternative parameters provide a reliable indication of releases from the unit to the ground water ...;" and (3) *may relax* the minimum number of sampling events from twice to once a year.[883] The detection monitoring program under Subtitle C is more comprehensive and protective, including, for example, an obligation to "monitor for indicator parameters ..., waste constituents, or reaction products" as specified by the Regional Administrator and in accordance with detailed procedures and statistical analysis methods.[884]

- Recordkeeping – For purposes of 4010(c), EPA only requires recordkeeping for information "as it becomes available" including "any" documentation generated under

[877] *See* 40 C.F.R. § 257.8(a).
[878] *See id*. § 264.18.
[879] *Id*. § 257.21(e).
[880] *See id*. § 264.97, .99.
[881] *Id*. § 257.27(e).
[882] *Id*. § 264.100(b). *See generally id.* at .100, .101.
[883] *Id*. § 257.24(a), (b) (emphasis added).
[884] *Id*. § 264.98.

various provisions of the 4010(c) regulations.[885] EPA has also authorized States to "*set alternative schedules* for recordkeeping and notification requirements," except for records relating to notifications of neighbors regarding off-site migration of contaminants.[886] Under Subtitle C, however, most records must be kept for a minimum of five years, and certifications must be retained until facility closure.[887]

Aside from these areas, many other aspects of the Subtitle C program create a far more comprehensive and protective regime for managing hazardous waste than EPA's current 4010(c) regulations for non-municipal solid waste management facilities, including: land disposal restrictions;[888] facility design/construction requirements,[889] including liners for surface impoundments and landfills;[890] manifest system/cradle-to-grave responsibility for hazardous wastes;[891] closure and post-closure requirements;[892] financial assurances;[893] export/import restrictions;[894] the "derived-from" rule/mechanism for managing leachate;[895] stricter controls on reuse/recycling;[896] emergency preparedness, prevention, and response;[897] and personnel training.[898]

D. Regulation of CCR Facilities Under 4010(c) Would Not Be Enforceable By EPA.

The inadequacy of the 4010(c) standards would be compounded by the lack of federal enforceability. Industry representatives have frequently suggested that 4010(c) regulations would be "federally enforceable,"[899] but these assertions are simply not accurate.

Most federal environmental statutes provide for concurrent authority of EPA and states to enforce applicable requirements on a day-to-day basis, including obligations set forth in regulations, permits, compliance orders, and the like.[900] EPA can typically initiate judicial proceedings for civil penalties, criminal sanctions, and injunctive relief based on violations of

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[885] *See id*. § 264.30(a).
[886] *See id*. § 264.30(c).
[887] *See id.* § 264.73.
[888] *See* 42 U.S.C. § 6924(d) *et seq.*
[889] *See id.* § 264.19 and 264.31.
[890] *See id.* § 264.221, .301.
[891] *See id.* §§ 263.20-.44, 263.10-.22, 264.70-.77.
[892] *See id.* § 264.110-.120.
[893] *See id.* § 264.140.
[894] *See id.* § 262.50-.60, .80-.89.
[895] *See id.* § 261.3(c)(2)(i).
[896] *See id.* §§ 261.3(c)(2)(i), 261.4.
[897] *See id.* § 264.30-.56.
[898] *See id.* § 264.16.
[899] *See, e.g.,* Roewer, USWAG Comments, Sept. 2, 2010, at 2; Reidinger, USWAG Comments, Sept. 28, 2010, at 2-3.
[900] *See, e.g.,* Clean Air Act, 42 U.S.C. §§ 7413, 7414, 7416, 7477; Clean Water Act, 33 U.S.C. §§ 1318, 1319, 1369, 1370.

these provisions, and EPA generally possesses broad authority to issue administrative compliance orders, conduct inspections, compel document and data disclosure, and require monitoring.[901] The hazardous waste program of RCRA grants EPA a similar array of authorities.[902]

The 4010(c) context, however, represents a sharp departure from this typical enforcement scheme. In a state with an "adequate program," EPA has *no authority* to inspect facilities, issue compliance orders, initiate judicial proceedings for civil or criminal penalties, or otherwise enforce violations of permits, regulations, orders, or other applicable requirements.[903] These fundamental enforcement tools only become available to EPA after it makes an affirmative finding that the state "has not adopted an adequate program."[904] This is an enormous obstacle to federal enforcement. It requires, not only a lengthy public process, but also resources and willingness on the part of EPA to take responsibility for implementing and enforcing an entire state's waste management program, or potentially the programs of multiple states. Because of these hurdles and resource constraints, it is virtually unheard of for EPA to withdraw its approval or delegation of any state regulatory program under any of the federal environmental laws. EPA's ability to step in and enforce waste management requirements only after the total failure of a state program is essentially meaningless in terms of day-to-day enforcement activities. EPA has no mechanism for investigating potential violations at a particular facility, compelling any particular facility to comply with its regulatory and permitting obligations, or penalizing such a facility for its noncompliance.

E. "Imminent and Substantial Endangerment" Actions Are Not An Adequate Substitute for EPA Enforcement Authority.

RCRA does grant both citizens and EPA authority to sue for "imminent and substantial endangerment" (ISE) caused by solid or hazardous waste.[905] Industry groups have suggested that these provisions provide sufficient authority to address the threats posed by CCR and that, as a result, it is not necessary for EPA to designate and regulate CCR as a hazardous waste. These arguments are entirely without merit. RCRA is a preventative statute, and these reactive provisions were never intended to serve as the backbone of a management program for a dangerous waste. Nor, as a practical matter, could citizens and EPA feasibly employ these provisions to prevent coal ash from harming the public and the environment. The hazards of coal ash cannot reasonably be addressed through reactive litigation approaches. What is needed is a comprehensive regulatory program for coal ash under EPA's existing Subtitle C authority.

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[901] *See generally id.*

[902] *See* 42 U.S.C. §§ 6927 (inspections), 6928 (compliance orders, civil penalties, criminal penalties). *See also* § 6929 (retention of state authority).

[903] *See* 42 U.S.C. § 6945(c(2)(A).

[904] *Id*.

[905] *See* 42 U.S.C. §§ 6972, 6973. RCRA § 7002(a)(1)(B) authorizes citizen suits against parties contributing to "the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an *imminent and substantial endangerment* to health or the environment" 42 U.S.C. § 6972(a)(1)(B) (emphasis added).[905] RCRA § 7003(a) authorizes the EPA Administrator, "upon receipt of evidence" of such imminent and substantial endangerment, to file suit and issue "orders . . . necessary to protect public health and the environment." 42 U.S.C. § 6973(a).

Furthermore, RCRA is a proactive statute designed primarily to address risks from wastes *before* they become a problem through comprehensive regulation.[906] Courts have repeatedly explained that "RCRA is *preventative* in nature – 'it attempts to deal with hazardous waste *before* it becomes a problem by establishing minimum federal standards . . . and the permitting of facilities . . . .'"[907]The ISE provision is RCRA's "only tool" for addressing unsound past disposal practices,[908] and the statute as a whole is intended to deal with disposal practices and sites *before* problems emerge.

The legislative history of RCRA clearly demonstrates that the ISE provisions are *supplemental* to a comprehensive, proactive federal regulatory system for hazardous wastes. Both provisions were included in the Senate bill that ultimately became RCRA from its first introduction,[909] along with regulatory authority over hazardous wastes.[910] Thus, from the outset, Congress envisioned *both* an EPA-administered federal regulatory system *and* supplementary authority for EPA to take emergency action and for citizens to enforce RCRA should EPA fail to do so.[911]

While legislative history discussing these provisions during the initial passage of RCRA is sparse, it is clear that the ISE provision was understood as an "emergency authority."[912] The imminent hazard provision in RCRA was modeled on a similar provision in the Clean Air Act and Clean Water Act, both statutes with comprehensive regulatory systems.[913]

The legislative history of 1984 amendments is more explicit about the supplementary status of these provisions. While the amendments substantially expanded these provisions — authorizing citizen suits to enjoin ISE situations under section 7002, and broadening the scope of

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[906] RCRA stands in sharp contrast to remedial statutes such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601 *et seq.*

[907] *S.C. Dep't of Health & Envtl. Control v. Commerce & Indus. Ins. Co.*, 372 F.3d 245, 256 (4th Cir. 2004) (quoting *Envtl. Tech. Council v. Sierra Club*, 98 F.3d 774, 779 (4th Cir. 1996) (emphasis added). *See B.F. Goodrich Co. v. Murtha*, 958 F.2d 1192, 1202 (2d Cir. 1992) (explaining that "RCRA is preventative; CERCLA is curative."); *U.S. v. E.I. du Pont de Nemours & Co., Inc.*, 341 F. Supp. 2d 215, 237 (W.D.N.Y. 2004) (noting "RCRA was designed to address present and prospective threats"). Congress has also noted that "RCRA is basically a prospective statute." Report on Hazardous Waste Disposal, Subcomm. on Oversight & Investigations, Comm. on Interstate & Foreign Commerce, 96th Cong, 1st Sess., H.R. COMM. PRINT 96 IFC-31, at 31 (Sept. 1979).

[908] *S.C. Dep't of Health & Envtl. Control*, 37 F.3d at 256.

[909] However, as discussed below, the original version of RCRA did not authorize citizen suits on ISE grounds, but only for violations of RCRA requirements. ISE citizen suits were subsequently authorized by HSWA.

[910] *See* S. 2150, 94th Cong., 1st Sess. (July 21, 1975); Pub. L. No. 94-580, § 7002–7003, 90 Stat. 2795, 2825–26 (Oct. 21, 1976).

[911] Legislative history predating S. 2150, the bill that became RCRA, reinforces that these supplemental provisions were intertwined with comprehensive hazardous waste regulation. S. 2150's imminent hazard provision (in a somewhat different form) originated in a bill from the 93rd Congress that did not pass prior to adjournment. *See* S. 1086, 93rd Cong., 1st Sess. (Mar. 6, 1973), at 18, 23. Like S. 2150, S. 1086 proposed a comprehensive federal regulatory system. In contrast, competing bills from opponents who favored federal assistance or research, rather than federal regulation, did not contain ISE provisions. Such provisions have never been *alternatives* to comprehensive regulation but rather companions to it.

[912] *See* S. REP. NO. 94-988, 94th Cong., at 16 (June 25, 1976).

[913] *See id.* at 16, 18.

section 7003[914] — the legislative history of these amendments is explicit that both provisions are "an *alternative and supplement* to other remedies."[915] The sponsor of the expanded citizen-suit provision, Senator George Mitchell, was equally explicit: "I reiterate: These amendments are a supplement to, and not a substitute for Government action."[916] In one citizen suit under section 7002, the Supreme Court similarly observed that "[c]hief responsibility for the implementation and enforcement of RCRA rests with the [EPA] Administrator," reinforcing the limited role of citizen suits in only "some circumstances." *Meghrig v. KFC Western, Inc.*, 516 U.S. 479, 483 (1996).

These straightforward statements clarify that sections 7002 and 7003 serve to buttress, not replace, proactive EPA regulation under Subtitle C. *Nothing* in the legislative history supports industry's contention that citizen suits and ISE actions alone can adequately address the risks of hazardous substances such as coal ash. None of Congress' proposed bills ever severed these provisions from comprehensive regulatory schemes, nor did any member of Congress ever speak out against this dual system as redundant or unnecessary. The drafters of RCRA and HSWA clearly did not view these provisions, standing alone, as adequate to protect public health and the environment.

The history of ISE suits in the courts makes clear that the financial and evidentiary burdens placed on plaintiffs will generally be beyond the means of citizen groups. And, even EPA, with its greater resources, cannot reasonably be expected to prosecute every potential ISE case, or even obtain evidence sufficient to prove imminent and substantial endangerment without the monitoring and data collection requirements that only a full *regulatory* program can provide.

Citizen suits under section 7002 are a singularly inadequate method for protecting the public and the environment from the threat of substances like coal ash. The first limitation on the effectiveness of such suits is the significant cost — in time, money, and effort — to any citizen in bringing suit. These costs are substantial not only for the advocacy organizations perhaps best equipped to bear them, but especially for individuals who may be most directly affected by dangerous conditions. Second, citizen plaintiffs are subject to certain limitations that are not imposed on EPA.[917] Third, plaintiffs may not be able to establish the requisite causal

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[914] *See* Pub. L. No. 98-616, §§ 401–402, 98 Stat. 3221, 3268 (1984).

[915] *See* Report of the Comm. on Env't and Public Works, S. REP. NO. 98-284, 98th Cong., at 57, 59 (Oct. 28, 1983, Calendar No. 500) (emphasis added).

[916] 130 CONG. REC. 20,815 (1984). *See also id.* at 30,696 (statement of Sen. George Mitchell) (referring to the provision as "an important and necessary *supplement* to EPA's efforts" (emphasis added)); H.R. REP. NO. 98-198, at 53 ("[T]his expansion of the citizens suit provision will *complement*, rather than conflict with, the Administrator's efforts to eliminate threats . . . .") (emphasis added). The House Committee on Interstate and Foreign Commerce reflected a similar understanding of citizen suits as a "stop-gap" measure by quoting with approval the following in a discussion of federal facility regulation: "[A] citizen suit provision . . . provides a "second line" of enforcement by non-Federal officials or interested citizens. These citizen suit provisions are valuable for plugging holes that develop in a Federal enforcement program. However, they should not be relied upon as a primary source of surveillance and enforcement . . . ." H.R. REP. NO. 94-1491, 94th Cong., 2d Sess., at 50 (quoting report accompanying Administrative Conference of the United States, Recommendation 75-4, *reprinted with modifications at* William R. Shaw, The Procedures to Establish Compliance by Federal Facilities with Environmental Quality Standards, 5 Envtl. L. Rep. (Envtl. Law Inst.) 50,224 (1975)).

[917] *See* 42 U.S.C. § 6972(b); *see also* H.R. CONF. REP. NO. 98-1133, at 117–118 (Oct. 3, 1984) (describing how citizen suit provision was continually narrowed during legislative process through increasing limitations on its use).

links to obtain a preliminary injunction in these lawsuits, allowing producers of harmful wastes to continue their conduct for the duration of the trial.[918]

Lastly, despite arguably quite imminent risks from coal ash impoundments discovered through inspections conducted of all "high" and "significant" hazard dams in 2009, EPA has failed to issue enforceable administrative orders and instead has had to rely on purely voluntary "action plans" for utilities that fail to protect the public and the environment. Despite evidence of significant problems resulting in "poor" ratings at six high hazard dams, EPA did not proceed under the ISE provision..

Clearly, sections 7002 and 7003 cannot, on their own, provide sufficient authority to respond to the risks posed by coal ash — nor were these provisions ever intended to serve such a purpose. Instead, these provisions are merely supplementary to the comprehensive, and proactive, regulatory scheme established by Subtitle C of RCRA. While citizen suits and emergency response authorities do have a supplementary role to play in the regulation of hazardous wastes such as coal ash, they are merely reactive and cannot adequately protect public health and the environment. Industry's contentions to the contrary are without merit.

XI. SECTION 6971(E) OF RCRA HAS NO APPLICATION TO EPA'S RULEMAKING

In its comments to EPA's June proposal, the U.S. Chamber of Commerce takes issue with the EPA's supposed failure to comply with certain employee protection provisions of RCRA.[919] At the outset, we note that the Chamber of Commerce's comments cite the wrong section of RCRA, but assume that the Chamber of Commerce intended to invoke section 6971(e).[920] Regardless of technical citation issues, reliance on section 6971(e) is misplaced. The Chamber of Commerce argues that EPA has not evaluated "the potential loss or shifts in employment that may result from administration or enforcement of the proposed rules."[921] However, this complaint rings hollow when the provision is read alongside the pertinent statutory language. Section 6971(e) calls for "continuing evaluations of the potential loss of shifts of employment which may result *from the administration or enforcement of [RCRA]*";[922] it does not require evaluations of potential effects of proposed rules. The statute's command that "*continuing* evaluations" be conducted underscores the fact that this provision applies to the ongoing administration and enforcement of RCRA, not to an isolated rulemaking event. The Chamber of Commerce provides no support for its claim that EPA's current rulemaking triggers this section. Instead, it offers only conclusory statements—*e.g.*, "the statutory command is clear

[918] *See, e.g.*, *Att'y General of Okla. v. Tyson Foods, Inc.*, 565 F.3d 769, 777 (10th Cir. 2009) (upholding district court's denial of preliminary injunction because plaintiff "fail[ed] to establish a causal link" between defendant's actions and bacterial contamination).

[919] Letter from William L. Kovacs, Senior Vice President, U.S. Chamber of Commerce, to U.S. EPA, 2-4 (Nov. 19, 2010) (*available at* www.regulations.gov (Document ID No. EPA-HQ-RCRA-2009-0640-****)).

[920] 42. U.S.C. § 6871(e).

[921] *Id*. at 4.

[922] 42 U.S.C. § 6971(e) (emphasis added).

and direct"[923]—in support of its argument. Because section 6971(e) has no bearing on these rulemaking proceedings, this section of the Chamber of Commerce's comments have no validity.

XII. CONCLUSION

For all of the reasons set forth above, we respectfully request that EPA regulate CCRs under subtitle C of RCRA. We thank you for your consideration of these comments.

[923] Letter from William L. Kovacs, Senior Vice President, U.S. Chamber of Commerce, to U.S. EPA, 4 (Nov. 19, 2010) (*available at* www.regulations.gov (Document ID No. EPA-HQ-RCRA-2009-0640-****)).