



EARTHJUSTICE

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By Email

May 21, 2013

The Honorable John Shimkus
Chairman
Subcommittee on Environment and the Economy
Committee on Energy and Commerce
c/o Nick Abraham, Legislative Clerk
2125 Rayburn House Office Building
Washington, DC 20515

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Re: Responses to questions submitted by the Honorable Henry A. Waxman

Dear Mr. Shimkus:

Thank you for the opportunity to provide answers to questions submitted as a follow-up to my testimony before the Subcommittee on Energy and Environment on April 11. This letter provides my responses to questions submitted by the Honorable Henry A Waxman concerning the discussion draft entitled “The Coal Ash Recycling and Oversight Act of 2013.” For your convenience, I have repeated Representative Waxman’s question (in bold), followed by my answer.

Recent reports by the Congressional Research Service (CRS) analyzing legislative proposals to address coal ash disposal have raised serious concerns about the efficacy of recent bills.

- 1. Do you concur with conclusions reached in the CRS reports about weaknesses in H.R. 2273 and S. 3512?**

Yes, I concur with the conclusions reached in both Congressional Research Service (CRS) reports about the weaknesses in H.R. 2273 and S. 3512.

2. Please describe what the most significant weaknesses with those bills are, in your view.

CRS described numerous critical problems in H.R. 2273 and S. 3512. The unequivocal conclusion of the CRS was that the bills lacked a clear purpose¹ and would not ensure state adoption and implementation of minimum standards “necessary to protect human health and the

¹ Congressional Research Service, *H.R. 2273 and S. 3512: Analysis of Proposals to Create a Coal Combustion Residuals Permit Program Under RCRA*, (Dec. 5, 2012) (hereinafter “2012 CRS Report”), Summary.

environment.”² CRS found that S.3512’s approach to regulation of coal ash was “unprecedented” in environmental law.³ The bills depart from benchmark environmental statutes in important ways that significantly harm their effectiveness as vehicles to protect health and the environment nationwide. Among the most significant weaknesses identified by CRS are the following:

1. Failure to Establish a Protective Standard

The 2013 CRS Report identified the failure of the coal ash bills to establish a national protective standard, stating “[t]here is no provision in Section 4011 that explicitly requires regulations promulgated by the state and implemented by a CCR Permit Program to achieve a certain level of protection.”⁴ The reports could not be any clearer in pointing out that the unprecedented approach of the bills, whereby “[e]ach state arguably could apply its own standard of protection.”⁵

The practical impact of no protective standard is that the EPA would have no authority to assert the failure of a state to protect human health or the environment as a “program deficiency.” CRS explains, “The absence of an explicit statement in the bills has implications for how EPA might exercise its authority in the event of absent or deficient state action.”⁶ CRS observes that, unlike the federal municipal solid waste permit program, the bill would curtail EPA oversight to an exceptionally narrow range of issues. CRS writes, “EPA would not be authorized to identify as a deficiency the program’s adequacy to enforce federal statutory standards or to assess the level of protection the program may provide.”⁷

2. Failure to Establish Minimum Federal Standards

The bills fail to establish minimum federal standards for the management and disposal of coal ash under state permit programs. The 2013 CRS Report concluded that the bills would “allow individual states to define key terms.... Hence program applicability could vary from state to state, depending on how each state defines those terms.”⁸ The Report explained:

Permit programs were created previously under RCRA when Congress wanted to ensure that certain solid waste disposal facilities would be subject to regulatory criteria that achieved a minimum national standard of protection and that a permit program would be implemented to assure facility compliance with that standard. *The proposed statutory criteria included among the Permit Program Specifications are not comparable, in scope or in detail, to those identified by EPA as those necessary to protect human health from risks specific to CCR disposal and use* (in the June 2010 EPA proposal). Absent directives that regulations promulgated and applied to CCR structures achieve a federal standard

² 2012 CRS Report, Summary.

³ 2012 CRS Report at 2.

⁴ 2013 CRS Report at 38. *See also*, 2012 CRS Report at 30.

⁵ 2013 CRS Report, Summary at page 3.

⁶ *Id.*

⁷ 2012 CRS Report at 25.

⁸ 2013 CRS Report, Summary at page 2.

of protection, *states might promulgate and implement regulations according to a state-established standard of protection, which might vary from state to state.*⁹

CRS specifically pointed out that this failure to establish minimum federal standards could result in programs that are far less protective than state requirements pertaining to municipal solid waste landfills. CRS concluded “given the flexibility that states would have to define several key program elements, it cannot be predicted whether state programs to regulate CCRs, developed and implemented pursuant to provisions in Section 4011, would result in the management of CCRs comparable to the existing programs to regulate MSW landfills.”¹⁰

According to CRS, key directives critical to program implementation are either missing from or ambiguously defined in S. 3512 (the discussion draft). Ambiguous directives would be subject to a state’s interpretation of those requirements (e.g., a definition of entities subject to the permit program and deadlines for existing facilities to obtain permits). CRS explained, “Due to the questions regarding how states may implement it, a CCR permit program would be similar to the program to regulate Municipal Solid Waste (MSW) landfill criteria, *only in states that choose to implement it as such*. That level of uncertainty *defeats the purpose of a permit program* and would not be consistent with other permit programs created under RCRA.”¹¹

3. Absence of Federal Backstop Authority

The CRS reports are unequivocal about the failure of S. 3512 to provide EPA with “backstop authority.” The 2013 CRS Report stated that the bill “would not provide EPA with authority to backstop state programs to regulate CCR facilities.”¹² Similarly, the 2012 CRS Report was crystal clear, stating,

The proposed amendments to RCRA include no directive to EPA to determine whether state CCR permit programs are adequate to enforce the statutory standards or to assess whether the programs would result in necessary protections. Instead, EPA would be required to notify states of deficiencies in a narrow range of program requirements. Given other limits to EPA’s role in state implementation of a CCR permit program, EPA would have no federal backstop authority to implement federal standards comparable to its authorities established under other environmental law, including RCRA. Regardless of whether a state chose to adopt a CCR permit program, *EPA would have no authority to compel states to adopt and implement the program according to provisions in the proposed amendments to RCRA.*¹³

⁹ 2013 CRS Report at 16. Emphasis added.

¹⁰ 2013 CRS Report at 37.

¹¹ 2012 CRS Report at 21-22. Emphasis added.

¹² 2013 CRS Report at 9.

¹³ 2012 CRS Report at 2. Emphasis added.

4. Inadequate Requirements for Wet Impoundments

Both CRS reports concluded that the requirements concerning structural stability of coal ash impoundments in S.3512¹⁴ are not equivalent “in detail or scope” to the safeguards proposed by the EPA to ensure the structural stability of dangerous coal ash dams.¹⁵ According to CRS, the EPA modeled its proposed coal ash impoundment standards on the Mine Safety and Health Administration (MSHA) regulations for “water, sediment, or slurry impoundments and impounding structures” set forth at 30 C.F.R. §77.216.¹⁶ According to CRS, the EPA’s decision to draw from the MSHA safety standards was based on its belief that records compiled by MSHA for its rulemaking and the agency’s 40 years of experience in implementing those requirements “provided evidence that similar requirements, applied to CCR surface impoundments, will prevent a catastrophic release of CCRs from surface impoundments, as occurred at TVA’s facility in Kingston, TN, and will generally meet RCRA’s mandate to ensure the protection of human health and the environment.”¹⁷

CRS pointed out that S. 3512 lacked standards equivalent to the EPA’s proposed criteria, which “included more detailed requirements comparable to the MSHA standards.”¹⁸ In fact, the structural integrity section of the bill is riddled with gaps that render it wholly insufficient to prevent future potentially deadly dam failures. S. 3512 (the discussion draft) does not require owner/operators of coal ash dams to submit inspection reports to their state regulatory agencies, even when serious deficiencies are found. The bill also does not require public disclosure of inspections. Nor does the bill require an owner/operator to remedy deficiencies in a timely manner or require the state to order them to do so—no matter what was uncovered in an annual inspection.¹⁹ Lastly, there is no requirement that these annual inspections begin one year, five years, or even decades after enactment of the bill. Their timing is wholly dependent on when a state begins to implement its permit program, which is entirely discretionary to the state.

However, even if the bill required annual inspections to begin immediately, the usefulness of these inspections is extremely suspect. The bill simply requires that an engineer, hired by the utility, certify that the design of the structure is “in accordance with recognized and generally accepted good engineering practices.”²⁰ The bill does not require engineers to employ federal standards in this certification, submit such certification to the state or EPA, or make such certification public. If the engineer cannot certify that the “construction and maintenance of the structure will ensure dam stability,”²¹ *the bill requires no further action* by the utility or the state. Lastly, the bill does not require *the state or EPA* to ever inspect dams, even if such impoundments are found to be unstable or in urgent need of repair, regardless of the size, age, condition or hazard potential of the dam.

¹⁴ See §§ 4011(c)(1)(B) and 4011(c)(1)(A).

¹⁵ 2012 CRS Report at 24. See also, 2013 CRS Report at 39.

¹⁶ See proposed 40 C.F.R. Section 257.71, “Design criteria for existing CCR surface impoundments.” U.S. Env’tl. Prot. Agency, “Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities,” 75 Federal Register 35128, June 21, 2010.

¹⁷ 2013 CRS Report at 27. See 75 Federal Register 35128, at 35243, June 2010.

¹⁸ 2013 CRS Report at 30.

¹⁹ See Section 4011(c)(1)(B).

²⁰ See § 4011(c)(1)(B)(i)(I).

²¹ *Id.* § 4011(c)(1)(B)(i)(II).

5. Failure to Set Deadlines for Permit Issuance

The CRS reports observed that the bills would “establish no explicit deadlines for the issuance of permits or for facility compliance with applicable regulations.”²² Since S.3512 establishes *no* deadlines for permit issuance, states have no deadlines for imposing the requirements set forth in the “revised criteria.” The absence of a deadline renders the bill nearly meaningless. Since almost all the requirements applicable to coal ash dumps are effective only through state permits, compliance with needed safeguards can be delayed indefinitely. S. 3512 contains very few self-implementing requirements. Further, without a deadline for states to issue permits, EPA oversight is an empty promise, and in the absence of permit issuance, citizen enforcement of standards is legally impossible.

6. Failure to Require Adequate Fugitive Dust Controls

Neither H.R. 2273 nor S. 3512 require the control or prevention of airborne coal ash sufficient to protect the health of communities residing near coal ash impoundments and landfills. According to CRS, the EPA found risks and actual evidence of human exposure from “fugitive dust emissions, when fine particulates in the dried ash become airborne as at landfills or large-scale fill operations.”²³ Yet the bills simply direct a state agency to “address” wind dispersal of coal ash, but fail to provide a standard for air quality analogous to the EPA’s proposed health-based federal requirement that fugitive dust not exceed 35 ug/m³.²⁴ The bills also fail to include the federal minimum “cover material requirements” mandated at municipal solid waste landfills.

3. Are those weaknesses addressed in the discussion draft that was the subject of the April 11th hearing?

No. Although the two CRS reports were crystal clear in their identification of numerous significant deficiencies in H.R. 2273 and S. 3512, none of the weaknesses was addressed in the discussion draft. The discussion draft that was the subject of the April 11, 2013 hearing is identical to S. 3512. The failure to amend the discussion draft to close any of the substantial gaps and problems identified in the two reports by the nonpartisan Congressional Research Service is quite remarkable.

According to CRS, the term “federal backstop enforcement authority” is widely understood to mean explicit authority provided to the Environmental Protection Agency (EPA) to enforce standards at individual facilities in a state authorized by EPA to implement and enforce federal standards.

²² 2013 CRS Report, at Summary.

²³ 2012 CRS Report at 14. *See also*, 2013 CRS Report at 25.

²⁴ *See* § 4011(c)(1)(D).

4. Do you concur with CRS's definition of that term?

Yes, I concur with CRS' definition of "federal backstop enforcement authority." It is my understanding that this is the common meaning of the term.

As we heard at a hearing in the Environment and the Economy Subcommittee in February, under the proven model of environmental delegation to the states, EPA retains backstop enforcement authority, as defined by CRS, to ensure that every citizen in the United States is receiving a minimum level of protection from environmental risks. This backstop authority allows EPA to step in and enforce requirements at a noncompliant facility, when a state is incapable, unable, or unwilling to do so. This authority is especially important when environmental harms are disproportionately borne by traditionally disenfranchised groups, like low-income communities.

5. Can you describe whether contamination associated with coal ash disposal disproportionately harms vulnerable communities, and, if so, how?

Contamination of water and air associated with unsafe disposal of coal ash, as well as the adverse impacts of dam failures, disproportionately harms low income communities. These vulnerable communities are more heavily impacted because coal ash landfills and impoundments are more often located in impoverished neighborhoods. The location of coal ash dumps in such communities raises issues of environmental justice, because low income neighborhoods tend to rely more on groundwater as their sole source of drinking water, are less likely to have access to medical care and insurance, and are much less likely to have resources to legally assert their right to uncontaminated water and air.

The following table lists the 15 largest coal ash-generating states, based on 2004 data²⁵ and indicates the percentage of coal ash impoundments in low income communities. On average for the 15 states, nearly 70 percent of the impoundments are located in zip codes where the communities are impoverished according to U.S. Census Bureau statistics.

²⁵ 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.

State	State Rank by CCR Generation	Number of Impoundments in Poverty Areas	Total Number of Impoundments	Percentage of Impoundments in Poverty Areas
PA	1	44	94	46.8%
TX	2	60	104	57.7%
OH	3	61	73	83.6%
WV	4	20	49	40.8%
KY	5	34	58	58.6%
IN	6	60	96	62.5%
FL	7	25	52	48.1%
GA	8	41	48	85.4%
NC	9	28	40	70.0%
NM	10	31	31	100.0%*
IL	11	55	94	58.5%
AZ	12	52	62	83.9%
TN	13	16	16	100.0%
AL	14	26	31	83.9%
MO	16	24	50	48.0%
Average				68.5%

According to the 2007 Economic Census, families living on less than \$20,000 annually are impoverished. Poverty analyzed by Zip Code Tabulation Area (ZCTA), based on the U.S. Census Bureau's 2007-2011 American Community Survey 5-Year Estimates for ZCTAs.

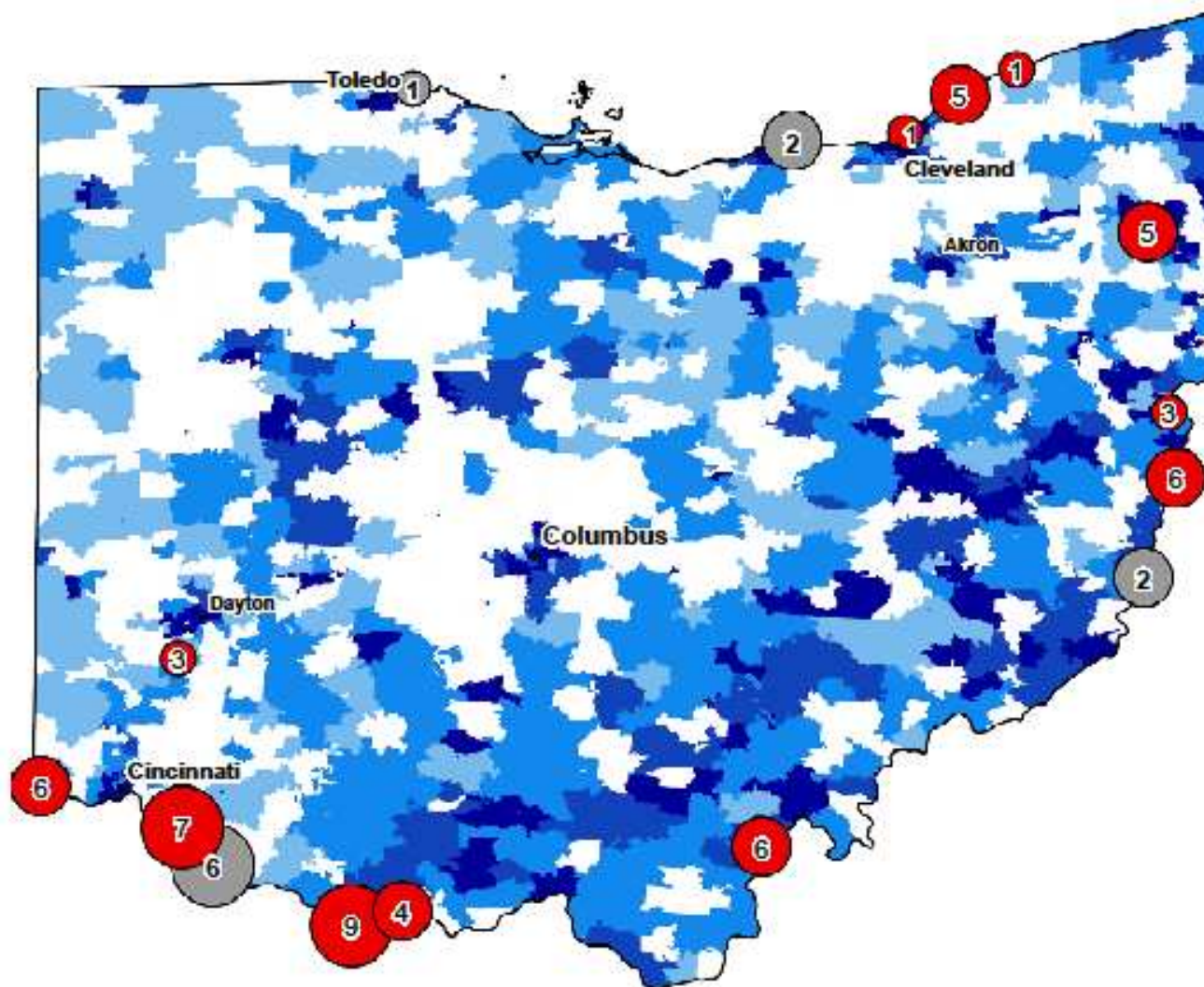
"Poverty Area" defined as a ZCTA with a poverty level above the state average.

* NM data based on 2000 census data due to incomplete 2007-2011 census data.

To illustrate further, the following are maps of landfills and impoundments in Ohio, Georgia and Tennessee, in which, respectively, 83.6 percent, 85.4 percent and 100.0 percent of the state's coal ash impoundments are located in low income communities.

Coal Ash and Environmental Injustice

Poverty and the Location of Coal Ash Impoundments and Landfills in Ohio



Eighty-four percent (84%) of impoundments and landfills are located in areas with poverty levels above the state average.

Coal Ash Impoundments and Landfills**

- Above Average Poverty
- Not Above State Poverty Average*

Percent of Individuals Below Poverty Line

- 0 - 14.80%*
- 14.81 - 20%
- 20.01 - 30%
- 30.01 - 40%
- 40.01 - 100%

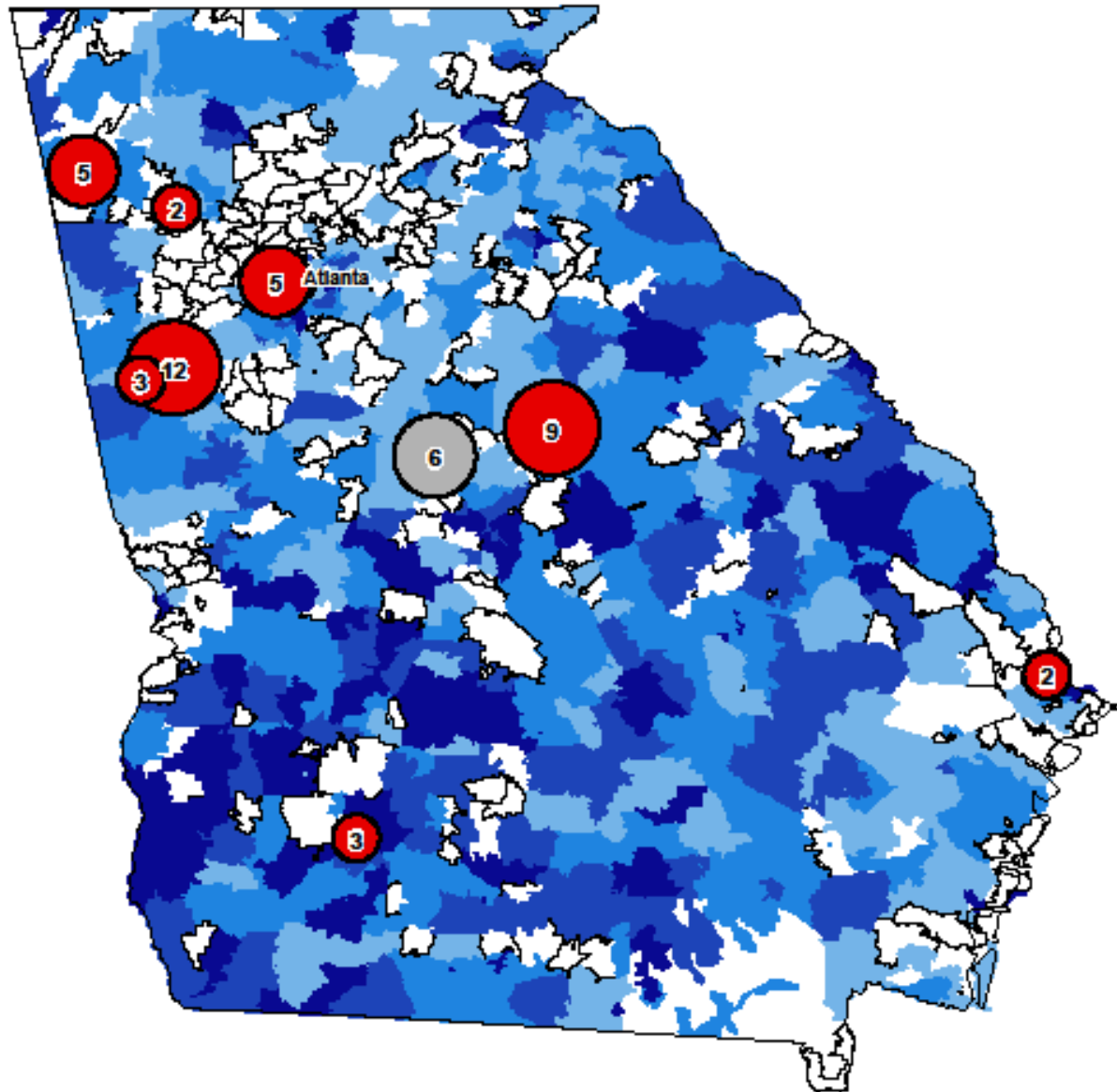
*Ohio's state-wide individual poverty level is 14.8%. According to the 2007 Economic Census, families living on less than \$20,000 annually are impoverished. Poverty displayed by Zip Code Tabulation Area, based on the U.S. Census Bureau's 2007-2011 American Community Survey 5-Year Estimates for Zip Code Tabulation Areas.

**Coal ash impoundments and landfills located by longitude and latitude. Data provided by US EPA. CGT.



Coal Ash and Environmental Injustice

Poverty and the Location of Coal Ash Impoundments and Landfills in Georgia



Eighty-five percent (85%) of impoundments and landfills are located in areas with poverty levels above the state average.

Coal Ash Impoundments and Landfills**

- Above Average Poverty
- Not Above State Poverty Average*

Percent of Individuals Below Poverty Line

- 0 - 16.50%*
- 16.51 - 25%
- 25.01 - 35%
- 35.01 - 45%
- 45.01 - 100%

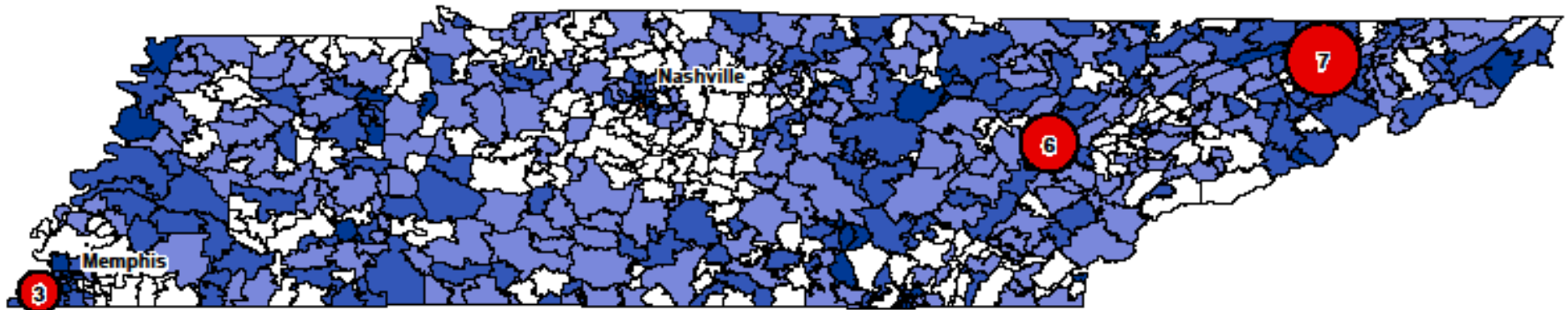
*Georgia's state-wide individual poverty level is 16.5%. According to the 2007 Economic Census, families living on less than \$20,000 annually are impoverished. Poverty displayed by Zip Code Tabulation Area (ZCTA), based on the U.S. Census Bureau's 2007-2011 American Community Survey 5-Year Estimates for ZCTAs.

**Coal ash locational data provided by US EPA.



Coal Ash and Environmental Injustice

Poverty and the Location of Coal Ash Impoundments and Landfills in Tennessee



One hundred percent (100%) of impoundments and landfills are located in areas with poverty levels above the state average.

Coal Ash Impoundments and Landfills**

- Above Average Poverty
- Not Above State Poverty Average*

Percent of Individuals Below Poverty Line

- 0 - 16.90%*
- 16.91 - 30%
- 30.01 - 50%
- 50.01 - 100%

*Tennessee's state-wide individual poverty level is 16.9%. According to the 2007 Economic Census, families living on less than \$20,000 annually are impoverished. Poverty displayed by Zip Code Tabulation Area, based on the U.S. Census Bureau's 2007-2011 American Community Survey 5-Year Estimates for Zip Code Tabulation Areas.

**Coal ash locations provided by US EPA.



This disparity in the siting of coal ash landfills and impoundments in low income communities has far reaching consequences. Not only are impoverished communities more likely to have their health, property and environment harmed by coal ash contamination, but there is likely to be less recourse to adequate and enforceable safeguards in the states posing the greatest potential for harm. In many of the states that generate the largest volumes of coal ash and have the greatest disproportionate impact, state regulatory programs are the weakest. For example, until 2011, Alabama had no regulations pertaining to coal ash, and despite statutory changes in 2011, the state still does not regulate coal ash impoundments.²⁶ Ohio excludes virtually all coal ash from regulation by classifying it as “nontoxic” and, therefore, exempt.²⁷ Georgia regulations fail to require liners, groundwater monitoring, or even inspections at their many coal ash impoundments, and the state permits the siting of dumps directly in the water table. New Mexico exempts coal ash entirely from regulation as a solid waste.²⁸ 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 coal ash) from regulation.²⁹ Indiana regulations do not require groundwater monitoring at all of the state’s impoundments and landfills, and the state has few requirements for ensuring dam safety, including no requirement that dams be designed by a professional engineer, inspected or bonded. With few exceptions, state programs in the largest coal ash-producing states are grossly deficient and lack many basic requirements for ensuring safe coal ash disposal. To make matters even more urgent, the number of coal ash impoundments in these top 15 coal ash-generating states comprises over 78 percent of the total number of impoundments in the United States.

6. Is federal backstop enforcement authority necessary to address that disparate impact?

Yes, federal backstop enforcement authority is necessary to ensure that disproportionate harm does not occur to the nation’s most vulnerable communities. It is especially critical that federally enforceable minimum standards exist in states where utilities generate large amounts of coal ash, where there is disparate impact to low income communities, and where there is a history of state failure to establish baseline safeguards to protect such communities.

By way of example, one can look to the harm that occurred to the low income and predominantly black community of Uniontown, Alabama, which is discussed in more detail at the end of this document. Approximately 4 million tons of coal from the 2008 TVA disaster in Harriman, Tennessee was shipped to the Arrowhead Landfill in Uniontown for disposal in 2009. Despite complaints and legal actions by the affected residents near the landfill, the Alabama Department of Environmental Management did not intervene to address severe air and water pollution problems. The EPA was unable to address the problems at the landfill because there was no right of enforcement of state municipal solid waste regulations.

²⁶ Ala. Admin. Code r. 335-13-1-.03(12) (2010).

²⁷ Ohio Admin. Code 3745:27-01(S)(23) (2010).

²⁸ N.M. Code § 20.9.2.7(S)(9) (2010).

²⁹ 30 Tex. Admin. Code §§ 335.2(d), 335.1(138)(H) (2010).

The Congressional Research Service has found that S. 3512, which is identical to the discussion draft examined at the April 11th hearing, does not include federal enforcement backstop authority.

7. Do you agree with that conclusion?

Yes, the discussion draft does not include federal backstop authority.

Much attention has been given to the conclusions reached by EPA in the 2000 determination on coal combustion residuals, but very little has been paid to the study underlying it. That study was based on congressionally mandated criteria that went beyond risk and included criteria unrelated to health effects, such as the impact of regulation on the competitiveness of coal as a fuel source.

8. In your view, would a scientific study of the health and environmental risks of coal ash, uninfluenced by congressional policy preferences favoring fossil fuels, demonstrate that subtitle C regulation of these wastes is merited?

Yes, a scientific study that specifically evaluates the health and environmental risks of coal ash would conclude that subtitle C regulation is indeed warranted. The two reports to Congress completed pursuant to Sections 3001(b)(3)(C) and 8002(n) of RCRA in 1988³⁰ and 1999³¹, considered many factors in addition to the health and environmental risks of coal ash. Specifically, Section 8002(n) mandated that the Reports to Congress consider cost, recycling, and the “impact of [disposal] alternatives on the use of coal.”

However, if one evaluates the health and environmental impacts of coal ash, particularly in light of the changing toxicity of the waste due to increased Clean Air Act pollution control requirements, its increasing volume, the lowering of the arsenic standard for drinking water, and the newly-developed leach test that more accurately determines the behavior of coal ash, it would be clear that subtitle C regulation is merited.

In many important ways, the Reports to Congress in 1988 and 1999 are very seriously outdated. First, little was known about the actual universe of coal ash landfills and impoundments when the two reports were written. The 1999 report estimated that there were approximately 561 to 618 coal ash landfills and impoundments in total in the United States.³² The EPA discovered in 2012, however, that there are actually 1,070 impoundments and approximately 335 landfills, an increase of about 2.5 times the number of disposal units.³³ Second, little was known about the condition of the waste units, including the employment of

³⁰ U.S. EPA, Report to Congress on Wastes from the Combustion of Coal by Electric Utility Power Plants (EPA530-SW-88-002), February 1988

³¹ 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>.

³² U.S. EPA, Report to Congress on Wastes from the Combustion of Fossils Fuels (EPA530-R-99-010), March 1999 at 3-21.

³³ The utility industry self-reported information on coal ash disposal units in response to a 2010 Information Collection Request sent to all steam electric power generating plants by the EPA’s Office of Water. *See* <http://water.epa.gov/scitech/wastetech/guide/steam-electric/index.cfm>

safeguards such as liners and monitoring. The absence of these safeguards increases considerably the risk and magnitude of harm, and EPA now has data revealing greater numbers of unlined and unmonitored dumps. Third, the issue of structural stability of coal ash dams was never mentioned in either Report to Congress, despite the fact that failures pose grave threats to health and the environment. The Reports to Congress also did not consider the widespread use of coal ash as “structural fill” in gravel pits, quarries and landfills, although the EPA now recognizes these practices as forms of potentially dangerous waste disposal. Lastly, the issue of environmental justice is never addressed in the 1988 report, and the 1999 report mentions environmental justice in a single paragraph, raising only the potential impact on subsistence farmers and their children.³⁴

The outdated Reports to Congress also did not benefit from the considerable advance in research concerning coal ash. In the 25 and 14 years, respectively, since EPA’s 1988 and 1999 Reports to Congress were published, EPA studies and other scientific research have produced a growing body of evidence that overwhelmingly support a subtitle C regulation. Evidence in four areas in particular demonstrates heightened risk from coal ash to human health and the environment: (1) the increasing toxicity of coal ash due to greater capture of metals and improvement in the accuracy of leach tests; (2) an EPA risk assessment that describes extremely high human and ecological risks; (3) dramatically elevated health risks from arsenic exposure; and (4) the increasing number of documented cases of coal ash contamination. The first category is discussed in response to Question 9, below. The other three areas of concern are summarized below.

1. EPA’s Human and Ecological Risk Assessment of Coal Combustion Wastes

Neither the Reports to Congress in 1988 and 1999 nor the regulatory determination in 2000 were based on risk assessments for coal ash. In fact, the EPA completed its first risk assessment for coal combustion waste in 2007 and updated this assessment in 2010. The EPA’s Human and Ecological Risk Assessment of Coal Combustion Wastes (draft) (April 2010) provides confirmation of the high risks presented by the mismanagement of coal ash disposed in landfills and surface impoundments.³⁵ The risks described in this assessment are, in fact, *extremely high* when compared with the EPA’s target level of protection of human health and the environment.

The results of this risk assessment should have great bearing on the classification of coal ash as a subtitle C waste. For EPA’s subtitle C listing determinations, the Agency defines 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.³⁶ The 2010 coal ash risk assessment found that at the 90th percentile, the management of coal ash in unlined or clay-lined landfills and impoundments results in risks greater than the listing criteria

³⁴ U.S. EPA, Report to Congress on Wastes from the Combustion of Fossils Fuels (EPA530-R-99-010), March 1999 at 2-5.

³⁵ 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].

³⁶ *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>

“generally used in EPA’s listing determination procedure.”³⁷

Specifically, the EPA found:

- 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);³⁸
- 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.³⁹

Additional risks above the EPA’s benchmark for both 90th and 50th percentile estimates for lined and unlined landfills and surface impoundments are summarized in the preamble to the 2010 proposed rule 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 toxic metals mentioned above.

Clearly the human health and ecological risks found by the EPA far exceed target levels for listing. However, in numerous ways, the EPA’s risk assessment actually *underestimates* risks significantly. Despite the high risks acknowledged by the EPA, the risk assessment nevertheless failed in several critical ways to assess fully and accurately the scope and scale of the risks posed by coal ash. Deficiencies of the 2010 assessment include the failure to consider multiple pathways of exposure, underestimation of synergistic risks of toxic chemicals (cumulative impacts and concurrent exposure), failure to evaluate risk from ingestion of hexavalent chromium, underestimation of lead exposure risks, underestimation of risks from fugitive dust⁴⁰, failure to assess risk to fish and wildlife posed by the “attractive nuisance” of impoundments and contaminated wetlands, and failure to evaluate accurately the risk of cancer from arsenic exposure (discussed in more detail, below).

2. Risk of Arsenic Exposure from Coal Ash

Arsenic is one of the most potent carcinogens known to man, causing multiple types of cancer in humans. Arsenic exceeding federal drinking water standards (maximum contaminant levels (MCLs)) or water quality standards has been found at a significant number of coal ash contaminated sites, often at very high levels.⁴¹ For example, recent monitoring data from an unlined South Carolina impoundment at the Santee Cooper Grainger Generating Station identified arsenic at 3000 parts per billion in the groundwater, a concentration 300 times the allowable level in drinking water.⁴² Arsenic released to groundwater from coal ash dumps can flow to public well fields or private wells and poison drinking water. Further, the release of coal

³⁷ *Id.*

³⁸ 75 Fed. Reg. at 35,145.

³⁹ *Id.*

⁴⁰ See 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).

⁴¹ <http://earthjustice.org/features/campaigns/in-harm-s-way-coal-ash-contaminated-sites>

⁴² <http://www.myrtlebeachonline.com/2013/05/06/3473365/environmentalists-to-hold-public.html>

ash contaminants to surface water often results in the contamination of sediment at the bottom of rivers and reservoirs.⁴³ Over years, such deposits of arsenic can be substantial and result in periodic “eruptions” of the toxic metal into the water column causing violation of water quality criteria.⁴⁴ Because arsenic is a potent carcinogen, it is essential to minimize its presence in our aquifers, reservoirs, lakes and streams.

The EPA, however, significantly underestimated the cancer risks to human health from arsenic by relying on an outdated cancer slope factor in its 2010 risk assessment. The cancer risks associated with arsenic ingestion were a principal factor in the risk assessment’s conclusion that there are potentially significant risks to human health from coal ash disposal.⁴⁵ The two key exposure pathways considered in the human risk assessment were (1) ingestion of groundwater contaminated by migration of a hazardous coal ash 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 [waste management units] managing certain types of CCR may present lifetime cancer risks above EPA’s range of concern to highly exposed groundwater users.”⁴⁶ Similarly, the risk assessment concluded that lifetime cancer risks exceeding the EPA’s range of concern were associated with ingestion of fish impacted by arsenic arising from surface impoundments.

The risk assessment, however, reached its conclusions regarding these arsenic-associated risks by relying on a cancer slope factor for arsenic ingestion of $1.5 \text{ (mg/kg-d)}^{-1}$ obtained from EPA’s IRIS database. That slope factor, which was first published in IRIS in 1988, is based on a study solely 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 a gross underestimate of the actual cancer risk posed by inorganic arsenic ingestion. This is because inorganic arsenic, in addition to causing skin cancer, also causes cancer of the lung and bladder in humans. For example, in 2000-2001, the EPA’s Office of Water used independent estimates of arsenic-induced lung and bladder cancer, rather than estimates derived from the IRIS cancer slope factor, as a basis for lowering the maximum contaminant level for arsenic in drinking water from $50 \text{ }\mu\text{g/L}$ to $10 \text{ }\mu\text{g/L}$.⁴⁷

Although the 2010 risk assessment included a nonspecific acknowledgement that “some benchmarks in IRIS are quite dated,”⁴⁸ the narrative contained no explicit indication that use of the IRIS cancer slope factor 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 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

⁴³ Ruhl, L, Vengosh, A, Dwyer, GS, Hsu-Kim, H, Schwartz. The impact of coal combustion residue effluent on water resources: a North Carolina example, *Environ Sci Technol*. 2012 Nov 6;46(21):12226-33. doi: 10.1021/es303263x. Epub 2012 Oct 15, available at

<http://sites.nicholas.duke.edu/avnervengosh/files/2011/08/es303263x1.pdf>

⁴⁴ Id.

⁴⁵ 2010 Risk Assessment, at 4-40.

⁴⁶ 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)).

⁴⁷ Arsenic in Drinking Water: Final Rule, EPA-815-Z-01, 66 Fed. Reg. 6976 (Jan. 22, 2001).

⁴⁸ 2010 Risk Assessment, at 4-56.

arsenic.”⁴⁹ 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 cancer slope factor for lung and bladder cancer of $26 \text{ (mg/kg-d)}^{-1}$ —a factor 17.3 times the IRIS cancer slope factor.⁵⁰ Further support for use of a upwardly revised cancer slope factor 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).”⁵¹ Although still under review by the EPA Science Advisory Board, this externally peer-reviewed final draft derived an identical new oral cancer slope factor of $25.7 \text{ (mg/kg-d)}^{-1}$.

Medical toxicologist Dr. Michael Kosnett⁵² and three scientists, Allan H. Smith, MD, PhD,⁵³ Kenneth P. Cantor,⁵⁴ and Marie Vahter,⁵⁵ 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 National Academy of Sciences reports) drew the following conclusion from EPA’s use of the outdated cancer slope factor of $1.5 \text{ (mg/kg-d)}^{-1}$:

Because estimates of lifetime cancer risk increase linearly with the CSF [cancer slope factor], a direct consequence of the draft CCR risk assessment’s utilization of a CSF of $1.5 \text{ (mg/kg-d)}^{-1}$ instead of $26 \text{ (mg/kg-d)}^{-1}$ is an underestimation of the cancer risk associated with each CCR disposal scenario by a factor of 17.3 (i.e. $26 \div 1.5$). 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.

3. Increasing Number of Documented Cases of Coal Ash Contamination

One measurement of the increased risk to human health and the environment is the significant increase in the number of contaminated coal ash sites. In 1999, only seven contaminated sites (“damage cases”) were documented in the Report to Congress.⁵⁶ Today, using the same criteria to define a documented “damage case,” that number has risen to 203 coal ash-contaminated sites in 37 states – a 29-fold increase.⁵⁷ At these sites, coal ash has poisoned drinking water, destroyed entire fish populations, killed scores of livestock, created myriad superfund sites, sickened families and destroyed livelihoods.⁵⁸ These sites include leaks, major

⁴⁹ 2010 RIA, at 256, & Appendix K4.

⁵⁰ See 2010 RIA, at 120, & Appendix K4, at 263–66.

⁵¹ 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).

⁵² See <http://yosemite.epa.gov/sab/SABPEOPLE.NSF/WebPeople/KosnettMichael?OpenDocument>.

⁵³ Professor of Epidemiology, School of Public Health, University of California, Berkeley.

⁵⁴ Epidemiologist, Division of Cancer Epidemiology and Genetics, National Cancer Institute, Bethesda, MD.

⁵⁵ Professor, Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden.

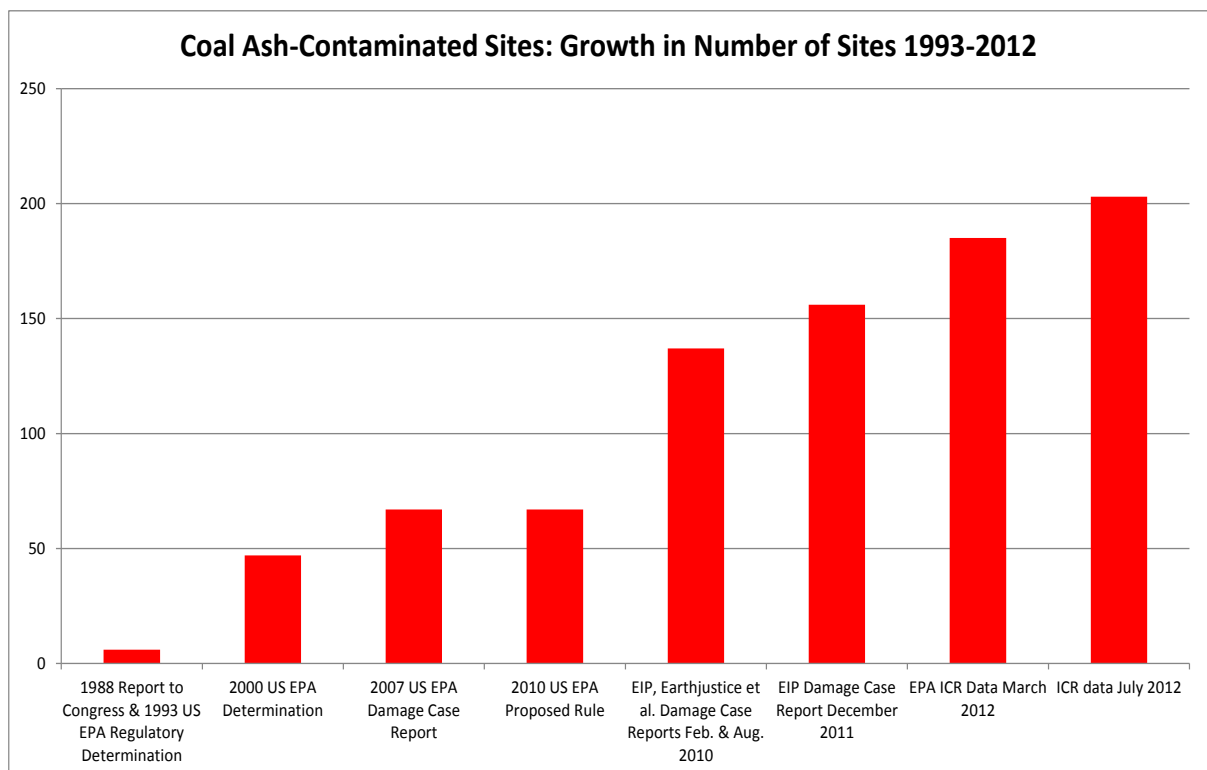
⁵⁶ 65 Federal Register at 32224 (May 22, 2000).

⁵⁷ See <http://earthjustice.org/features/campaigns/in-harm-s-way-coal-ash-contaminated-sites>.

⁵⁸ See EPA, Proposed Rule, Coal Combustion Residuals from Electric Utilities, 75 Fed. Reg. 35,128 (proposed

spills, and the pervasive contamination of underground drinking water sources. The contamination includes toxic metals at concentrations hundreds of times safe drinking water standards and involves chemicals hazardous to humans or aquatic life in small doses, 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 historic practices. Furthermore, these 203 contaminated sites do not even include those communities that have been inundated with airborne coal ash dust, of which there are dozens located throughout the U.S. Lastly, these cases of documented water contamination are likely to be only a small percentage of the coal-ash contaminated sites in the U.S., because most coal ash impoundments and many coal ash landfills do not conduct groundwater monitoring, so water contamination largely goes undetected.

The graph below depicts the steep rise in the documentation of coal ash contaminated sites since the 1988 Report to Congress:



1988 Report to Congress & 1993 US EPA Regulatory Determination: U.S. EPA. Nov. 1988. *Wastes from the Combustion of Coal by Electric Utility Power Plants—Report to Congress*. EPA-530-SW-88-002. U.S. EPA Office of Solid Waste and Emergency Response. Washington, DC; Final Regulatory Determination on Four

June 21, 2010); Environmental Integrity Project (EIP), Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment* (Aug. 26, 2010), available at http://environmentalintegrity.org/news_reports/documents/INHARMSWAY_FINAL3.pdf; EIP and Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* (Feb. 24, 2011), available at <http://earthjustice.org/sites/default/files/library/reports/ej-eipreportout-of-control-final.pdf>; Office of Solid Waste, EPA, *Coal Combustion Waste Damage Case Assessments* (July 9, 2007).

Large-Volume Wastes From the Combustion of Coal by Electric Utility Power Plants, 58 Fed. Reg. 42,466 (Aug. 9, 1993)

2000 US EPA Determination: Regulatory Determination on Wastes from the Combustion of Fossil Fuels; Final Rule, 65 Fed. Reg. 32,213 (May 22, 2000)

2007 US EPA Damage Case Report: U.S. EPA. *Coal Combustion Waste Damage Case Assessments* (July 9, 2007)

2010 US EPA Proposed Rule: Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities, 75 Fed. Reg. 35,128 (June 21, 2010)

EIP, Earthjustice et al. Damage Case Reports Feb. & Aug. 2010: Environmental Integrity Project and Earthjustice. *Out of Control: Mounting Damages From Coal Ash Waste Sites* (Feb. 2010); Environmental Integrity Project, Earthjustice and Sierra Club. *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment* (Aug. 2010)

EIP Damage Case Report December 2011: Environmental Integrity Project, *Risky Business: Coal Ash Threatens America's Groundwater Resources at 19 More Sites* (Dec. 2011)

EPA ICR Data March 2012: U.S. EPA ICR Data 3/2012 (Response to FOIA Request to EPA)

EPA ICR Data June 2012: U.S. EPA ICR Data 7/2012 (Response to FOIA Request to EPA)

Lastly, if one employed the existing RCRA regulatory criteria for evaluating whether a solid waste should be listed as a hazardous waste, there is clear support for a listing under subtitle C. The EPA's hazardous waste listing criteria is set forth at 40 C.F.R. § 261.11(a). Particularly relevant is Section 261.11(a)(3)(i)-(xi), which establishes that the Administrator shall list a solid waste as a hazardous waste upon determining that the solid waste:

contains any of the toxic constituents listed in appendix VIII [which includes arsenic, lead, cadmium, selenium] 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:

- (i) The nature of the toxicity presented by the constituent.
- (ii) The concentration of the constituent in the waste.
- (iii) 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.
- (iv) The persistence of the constituent or any toxic degradation product of the constituent.
- (v) The potential for the constituent or any toxic degradation product of the constituent to degrade into non-harmful constituents and the rate of degradation.
- (vi) The degree to which the constituent or any degradation product of the constituent bioaccumulates in ecosystems.
- (vii) The plausible types of improper management to which the waste could be subjected.
- (viii) The quantities of the waste generated at individual generation sites or on a regional or national basis.
- (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 constituent.
- (x) Action taken by other governmental agencies or regulatory programs based on

the health or environmental hazard posed by the waste or waste constituent.
(xi) Such other factors as may be appropriate.

Public interest groups, in their comments on the 2010 proposed coal ash rule, evaluated coal ash in detail using the above criteria and concluded that there is ample and sound justification for a subtitle C listing.⁵⁹

In the 2000 determination, EPA determined that coal ash contains more than 40 toxic constituents, and that those constituents can degrade and migrate into groundwater.

9. My understanding is that the leaching test used by EPA to complete the 2000 determination has been criticized by EPA’s Science Advisory Board and the National Academy of Sciences. Can you explain these criticisms and their significance?

It is essential to note that the EPA’s 2000 determination relied upon a leaching procedure, the Toxicity Characteristic Leaching Procedure (TCLP) test, which has since been demonstrated to be inaccurate and irrelevant for determining the toxicity of coal ash. Since 2000, a more accurate testing method, the Leaching Environmental Assessment Framework (LEAF), has confirmed the toxicity of coal combustion wastes. Beginning in 2006, the EPA’s Office of Research and Development (ORD) published a series of three reports that examined the fate of mercury and other heavy metals in coal ash 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.⁶⁰ The EPA describes the results of the ORD studies at some length in section I.E.2. of the preamble to the 2010 Proposed Rule.⁶¹

Central to these ORD studies is the rejection of the older leach test, the TCLP. Historically, estimating metal release from coal ash 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.⁶² For nearly two decades, however, the EPA Science Advisory

⁵⁹ See, Earthjustice *et al.*, Comments on Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric Utilities; Proposed Rule, Docket ID No. EPA-HQ-RCRA-2009-0640 (Nov.19, 2010), available at

http://earthjustice.org/sites/default/files/us_epa_proposal_disposal_coal_comb_residue.pdf

⁶⁰ 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, *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>.

⁶¹ 75 Fed. Reg. at 35,139–42.

⁶² 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> [hereinafter Thorneloe, *Evaluating the Fate of Metals*] (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., *Control 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.)).

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."⁶³ 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.**"⁶⁴ 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.⁶⁵

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 coal ash is exposed to during disposal and reuse.⁶⁶ For example, coal ash is frequently placed in contact with acid mine drainage and co-disposed with acidic coal refuse (pyrites). Both of these common disposal scenarios expose coal ash 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, the 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).⁶⁷

The EPA relies on LEAF for the latest testing of a wide range of coal ash generated by plants employing air pollution controls. This is not the first time, however, that the 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.⁶⁸ Using the LEAF test, the EPA tested 73 different types of coal ash from 31 coal-fired boilers.⁶⁹ The results of the tests were dramatically different from the TCLP tests of similar types of coal ash. While TCLP test results rarely exceeded the toxicity characteristic for metals (the level at which a waste is deemed a "hazardous" waste⁷⁰), the LEAF test confirmed that coal ash can leach metals, such as arsenic, barium, chromium and selenium, at levels that far exceed federal thresholds established for hazardous waste.

⁶³ 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), *available at* [www.yosemite.epa.gov/sab/sabproduct.nsf/.../\\$File/eecm9902.pdf](http://www.yosemite.epa.gov/sab/sabproduct.nsf/.../$File/eecm9902.pdf).

⁶⁴ *Id.* (emphasis in original)

⁶⁵ Nat'l Research Council, Nat'l Academies, *Managing Coal Combustion Residues in Mines* 123–29 (2006), *available at* http://books.nap.edu/catalog.php?record_id=11592#toc.

⁶⁶ 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>.

⁶⁷ Thorneloe, *Evaluating the Fate of Metals*, at 7351.

⁶⁸ See 75 Fed. Reg. at 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 EPA/600/R–02/019 (Sept. 2001), *Stabilization and Testing of Mercury Containing Wastes: Borden Catalyst*.

⁶⁹ 75 Fed. Reg. at 35,139.

⁷⁰ See 40 C.F.R. § 261.11.

EPA LEAF Test Results⁷¹

Table ES-2. Leach results for $5.4 \leq \text{pH} \leq 12.4$ and at “own pH” from evaluation of thirty-four fly ashes.

	Hg	Sb	As	Ba	B	Cd	Cr	Co	Pb	Mo	Se	TI
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	0.7 2 - 13
Leach results ($\mu\text{g/L}$)	<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 ($\mu\text{g/L}$)	200		5,000	100,000		1,000	5,000		5,000		1,000	
MCL ($\mu\text{g/L}$)	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.

Table ES-3. Leach results for $5.4 \leq \text{pH} \leq 12.4$ and at “own pH” from evaluation of twenty FGD gypsums.

	Hg	Sb	As	Ba	B	Cd	Cr	Co	Pb	Mo	Se	TI
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 ($\mu\text{g/L}$)	<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 ($\mu\text{g/L}$)	200	-	5,000	100,000	-	1,000	5,000	-	5,000	-	1,000	-
MCL ($\mu\text{g/L}$)	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.

Specifically, the EPA found, at the highest leach level for particular coal ash types:

- 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);⁷²
- Antimony, which damages the heart, lung and stomach, also leached from fly ash at a

⁷¹ 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), available at <http://www.epa.gov/nrmrl/pubs/600r09151/600r09151.html> (the highlighted numbers are identical to those highlighted in the EPA Report).

⁷² 75 Fed. Reg. at 35,141–42.

concentration 1,800 times the federal safe drinking water standard and over 900 times the level of previous TCLP tests;⁷³

- 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;⁷⁴
- 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;⁷⁵ and
- Selenium also leached from FGD gypsum at 320 times the federal drinking water standard and 16 times the threshold for hazardous waste.⁷⁶

Previous leach data in the EPA's 1999 Report to Congress⁷⁷ and test data produced by the utility industry⁷⁸ have never revealed such high concentrations of pollutants because they used single point leach tests that could not mimic the conditions under which coal ash is actually disposed.⁷⁹ It is important to note that the above data and the additional data found in the 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, 2010.⁸⁰

Furthermore, the 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. The EPA admits there is a potential underestimation by the LEAF test because actual field conditions for coal ash disposal can exhibit a pH below the lowest bound of the test's pH range.⁸¹

In the 2000 determination, EPA found that there was sufficient evidence that adequate controls were not in place at coal ash disposal sites. This was the case, in part, because the states that did require liners for wet impoundments did not apply that requirement to impoundments that were already in use.

10. Under the discussion draft considered at the April 11 hearing, would liner requirements apply to impoundments that are already in use?

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ 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>.

⁷⁸ 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/.

⁷⁹ For a more detailed discussion of the EPA's LEAF test results and comparison to data from TCLP testing, see Attachment 7, Lisa Evans, *Failing the Test: The Unintended Consequences of Controlling Hazardous Air Pollutants from Coal-Fired Power Plants* (May 2010).

⁸⁰ Thorneloe, *Evaluating the Fate of Metals*, at 7,351.

⁸¹ 75 Fed. Reg. 35140.

No, the liner requirements set forth in Section 4011(c)(1)(A)(i) apply only to “new structures, and lateral expansions of existing structures, that first receive coal combustion residuals after the date of enactment of this section.” Since coal ash impoundments are most often expanded via vertical, not lateral expansion, the liner requirement would apply to very few existing coal ash impoundments. Consequently, existing unlined impoundments would continue to operate without liners. The discussion draft contains no retrofit requirement.

In addition, since under the discussion draft, states are free to define “structures” in any manner they see fit, it is possible that some states will choose to omit some types of coal ash impoundments from the definition of “structure.” For example, states may exempt units of a particular size or height, or units that contain certain types of coal ash such as bottom ash, flue gas desulfurization sludge or other wastewater impoundments. Because the discussion draft does not define “structure,” one cannot be sure how the requirement in Section 4011(c)(1)(A)(i) will be applied. Lastly, there is nothing in the discussion draft to prevent a state from exempting all coal ash surface impoundments from the definition of structure. If states choose to do so, the EPA would have no recourse under the discussion draft.

11. Does leaving these impoundments unlined pose risks to human health and the environment?

Yes, leaving impoundments unlined poses serious risks to human health and the environment. In 2010, the EPA released a national-scale risk assessment entitled *Human and Ecological Risk Assessment of Coal Combustion Wastes*⁸² that analyzed different coal ash disposal methods and the risks they pose to human health by releasing pollutants like arsenic to groundwater. The EPA concluded that “[t]he assessment does confirm that there are methods to manage CCRs safely, although it calls into question the reliability of clay liners, especially in surface impoundments, and *it points to very high potential risks from unlined surface impoundments.*”⁸³ The EPA found that the highest risk was posed by arsenic leaching from unlined surface impoundments where coal ash and coal refuse were co-disposed—a cancer risk of 1 in 50.⁸⁴ This risk is 2,000 times higher than EPA’s target protection level for human health of a cancer risk no greater than 1 in 100,000.⁸⁵

In addition to arsenic, the 2010 Risk Assessment found that disposal of coal ash in unlined surface impoundments, particularly when coal ash is co-disposed with coal refuse, also results in risk to human health well above the EPA’s benchmarks for numerous toxic constituents, including cadmium, lead, and selenium. Boron, cobalt, molybdenum, and nitrate/nitrite also showed elevated risk to human health.⁸⁶

⁸² Office of Solid Waste & Emergency Response, U.S. Env’tl. Prot. Agency (“EPA”), *Human and Ecological Risk Assessment of Coal Combustion Wastes* (draft) (Apr. 2010) [hereinafter 2010 Risk Assessment].

⁸³ 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. 35,128, 35,144 (proposed June 21, 2010) (to be codified at 40 CFR Parts 257, 261, 264 et al.) (emphasis added) [hereinafter 2010 Proposed Rule].

⁸⁴ *Id.* at ES-7.

⁸⁵ *Id.* at 1-3; *see also* 2010 Proposed Rule, at 35,144.

⁸⁶ *See generally* 2010 Risk Assessment. For additional detail, *see* Environmental Integrity Project and Earthjustice, *Coming Clean: What the EPA Knows about the Dangers of Coal Ash* (May 2009), *available at*

Unlined surface impoundments also pose devastating risks to ecological receptors. The EPA's 2010 Risk Assessment also reviewed impacts to individual organisms, and disposal scenarios where there was a risk of impacts to individual organisms were given a hazard quotient ("HQ") greater than 1.⁸⁷ Unlined surface impoundments were estimated to have HQs well above 1 for several pollutants, indicating high risks to aquatic organisms—2,375 for boron, 22 for lead, 13 for arsenic V, 12 for selenium VI, 6 for cobalt, and 3 for barium.⁸⁸

Furthermore, most of the more than 200 coal ash damage cases involve the migration of toxic constituents to groundwater.⁸⁹ Comments submitted by Earthjustice in response to EPA's 2010 Proposed Rule included Appendix F, which describes the scope of this migration at damage cases involving groundwater contamination.⁹⁰ In many instances, the levels 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 constituents have also migrated from unlined landfills.

12. Please describe some of the new evidence of risk from coal ash since the 2000 determination?

Since the 2000 determination, a plethora of new information has arisen detailing risks to human health and the environment from coal ash disposal practices nationwide, including additional damage cases, an EPA risk assessment detailing the risks of various exposure pathways, ratings showing many dams given "poor" structural stability scores, additional evidence of harm from fugitive dust, and many notice of intent to sue letters and lawsuits alleging harm to human health and the environment.

1. Over 200 Coal Ash Damage Cases in 37 States

Whereas the May 2000 determination had identified only 11 proven coal ash damage

<http://www.earthjustice.org/sites/default/files/library/reports/final-coming-clean-ejeip-report-20090507.pdf>.

⁸⁷ 2010 Risk Assessment, at ES-3.

⁸⁸ 2010 Risk Assessment, at 4-29, Tbl. 4-21; *see also* 2010 Proposed Rule, 75 Fed. Reg. at 35,146; U.S. EPA, "What Are the Environmental and Health Effects Associated with Disposing of CCRs in Landfills and Surface Impoundments?" (undated), <http://rfflibrary.files.wordpress.com/2010/05/epa-hq-rcra-2009-0640-0004.pdf> (cited in 2010 Proposed Rule, 75 Fed. Reg. at 35,146).

⁸⁹ *See* Environmental Integrity Project (EIP), *Risky Business: Coal Ash Threatens America's Groundwater Resources at 19 More Sites* (Dec. 12, 2011); U.S. EPA, Proposed Rule, *Coal Combustion Residuals from Electric Utilities*, 75 Fed. Reg. 35,128 (proposed June 21, 2010); Environmental Integrity Project (EIP), Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment* (Aug. 26, 2010), available at http://environmentalintegrity.org/news_reports/documents/INHARMSWAY_FINAL3.pdf; EIP and Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* (Feb. 24, 2011), available at <http://earthjustice.org/sites/default/files/library/reports/ej-eipreportout-of-control-final.pdf>; Office of Solid Waste, EPA, *Coal Combustion Waste Damage Case Assessments* (July 9, 2007).

⁹⁰ Comments of Earthjustice, et al., 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. 35,128, 35,144 (proposed June 21, 2010) (to be codified at 40 CFR Parts 257, 261, 264 et al.) (Docket ID No. EPA-HQ-RCRA-2009-0640), at Appendix F: J. Russell Boulding, "Analysis of EPA and EIP/Earthjustice Damage Cases: The Extent of Damage from CCR Disposal is Significant, Pervasive and Growing."

cases and 25 potential damage cases,⁹¹ additional assessments using EPA data and documentation submitted to EPA from public interest groups have brought the current list of coal ash damage cases to over 200.⁹²

2. Risk Assessment Shows Exposure to Cancer-Causing Chemicals and Other Toxic Pollutants through Groundwater and Surface Water Pathways

The EPA released a draft risk assessment of coal combustion wastes in 2010 assessing exposure pathways to humans and the environment. Among the findings in this report was the conclusion that the cancer risk to humans from exposure to arsenic in groundwater from an unlined coal ash impoundment that also disposes of coal refuse can be as high as 1 in 50, compared to EPA's target threshold of no greater risk than 1 in 100,000.⁹³ The EPA noted in the preamble to the 2010 Proposed Rule that the Agency's Human 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."⁹⁴ The 2010 risk assessment was discussed at length, above, in response to Question 8.

3. Many Dams Given "Poor" Ratings for Risk of Structural Breach

In the aftermath of the TVA Kingston coal ash disaster, EPA has been assessing dams at coal ash impoundments, and an alarming number of dams that are likely to cause "high" or "significant" damage to lives and property have also been given "poor" ratings for structural integrity. Following an Information Collection Request from EPA, most coal ash impoundments have been given hazard ratings (less than low, low, significant, or high) to represent potential risks to the community if they were to breach: a "significant" hazard rating represents a possibility of property, infrastructure and environmental damage; and a "high" hazard rating represents a probable loss of human life should the impoundment fail.⁹⁵ EPA then had experts in dam stability visually assess the high and significant hazard dams (as well as some less than low or low hazard dams) and rate the structural integrity of each as either "satisfactory," "fair,"

⁹¹ Office of Solid Waste, U.S. EPA, Coal Combustion Waste Damage Case Assessments 2–3 (July 2007), http://graphics8.nytimes.com/packages/pdf/national/07sludge_EPA.pdf.

⁹² See Environmental Integrity Project (EIP), *Risky Business: Coal Ash Threatens America's Groundwater Resources at 19 More Sites* (Dec. 12, 2011); U.S. EPA, Proposed Rule, Coal Combustion Residuals from Electric Utilities, 75 Fed. Reg. 35,128 (proposed June 21, 2010); Environmental Integrity Project (EIP), Earthjustice, & Sierra Club, *In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and their Environment* (Aug. 26, 2010), available at http://environmentalintegrity.org/news_reports/documents/INHARMSWAY_FINAL3.pdf; EIP and Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites* (Feb. 24, 2011), available at <http://earthjustice.org/sites/default/files/library/reports/ej-eipreportout-of-control-final.pdf>; Office of Solid Waste, EPA, Coal Combustion Waste Damage Case Assessments (July 9, 2007). See generally Earthjustice, *In Harm's Way: Coal Ash Contaminated Sites*, <http://earthjustice.org/features/campaigns/in-harm-s-way-coal-ash-contaminated-sites>. See also U.S. EPA, Information Request Responses from Electric Utilities (Jan. 13, 2012), <http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/> (follow link to Database Results (Excel)).

⁹³ Office of Solid Waste & Emergency Response, U.S. Env'tl. Prot. Agency ("EPA"), Human and Ecological Risk Assessment of Coal Combustion Wastes (draft), at ES-7 (Apr. 2010).

⁹⁴ 75 Fed. Reg. at 35,144.

⁹⁵ 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. 35,128, 35,130 (Jun. 21, 2010).

“poor,” or “unsatisfactory.”⁹⁶

Although assessments are still ongoing, EPA has assessed 492 coal ash impoundments.⁹⁷ Of those 492, more than one third – 144 dams – have been given a “poor” rating for structural integrity.⁹⁸ Of these 144 poor-rated dams, 11 are high hazard and 69 are significant hazard dams.⁹⁹ At least one utility was asked to make “urgent” repairs relating to structural stability after inspection of the dam at Dominion’s Chesapeake Energy Center in Chesapeake, VA.¹⁰⁰ In addition, a high hazard dam that had previously breached was again found in poor condition at the Indianapolis Power and Light Company’s Eagle Valley Generating Station in Martinsville, Indiana.¹⁰¹

4. Risks to Human Health and the Environment from Fugitive Dust

In 2009, the EPA completed a screening assessment of the inhalation risks posed by disposal of coal ash in landfills to determine whether the National Ambient Air Quality Standards (NAAQS) for particulate matter could be violated at such landfills. Entitled, “Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills,” EPA’s assessment found that daily cover was necessary to prevent violations of NAAQS at coal ash disposal sites.¹⁰² The report found that daily dust controls, which EPA regulations do not currently require, are necessary to control the “excess levels of particulates” resulting from coal ash landfill operations.¹⁰³

Particle pollution, especially fine particles, contains microscopic solids or liquid droplets that can lodge deep into the lungs and cause serious health problems.¹⁰⁴ Numerous scientific studies have linked particle pollution exposure to a variety of problems, including decreased lung function, asthma, bronchitis, irregular heartbeat, and premature death in people with heart or lung disease.¹⁰⁵

5. Additional Evidence of Risk Detailed in Citizen Lawsuits and Notice of Intent to Sue Letters

Several lawsuits and notice of intent to sue letters filed by citizens throughout the country are alleging harms caused by pollution from coal ash disposal sites and have also introduced new

⁹⁶ U.S. EPA, Coal Combustion Residuals Impoundment Assessment Reports (last updated Apr. 10, 2013), <http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm>.

⁹⁷ *Id.* (Click on “Summary Table for Impoundment Reports (XLS)”).

⁹⁸ *Id.*

⁹⁹ *Id.*

¹⁰⁰ Dam Safety Assessment available at <http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm>.

¹⁰¹ Dam Safety Assessment available at <http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm>.

¹⁰² U.S. EPA, Inhalation of Fugitive Dust: A Screening Assessment of the Risks Posed by Coal Combustion Waste Landfills (draft), 11 (Sept. 2009) (ORCR Docket ID No. EPA-HQ-RCRA-2009-0640-0142 (filed May 13, 2010)).

¹⁰³ *Id.*

¹⁰⁴ U.S. EPA, Fine Particle (PM_{2.5}) Designations, www.epa.gov/pmdesignations/basicinfo.htm (last visited May 20, 2013).

¹⁰⁵ *Id.*

evidence of the risks posed by coal ash disposal.

For example, the Environmental Integrity Project (EIP) and the University of Maryland Environmental Law Clinic sent a notice of intent to sue letter to GenOn on behalf of Defenders of Wildlife, Chesapeake Climate Action Network, Patuxent River Keeper, and Sierra Club for Clean Water Act violations at the Brandywine Coal Ash Landfill. Following the notice letter, the Maryland Department of the Environment (MDE) filed suit itself against GenOn.¹⁰⁶ In January 2013, MDE and GenOn filed a consent decree in federal court requiring GenOn to clean up pollution at three coal ash disposal sites – the Faulkner Landfill, the Brandywine Landfill, and the Westland Landfill.¹⁰⁷ The agreement requires GenOn MidAtlantic to pay a civil penalty of \$1.9 million to MDE and requires cleanup of groundwater and surface water, use of the best technology available to clean up discharges, evaluation of drinking well impacts and, if impacted, clean up of well water, and submission of a fugitive dust plan.¹⁰⁸

In addition, after the Southern Environmental Law Center filed suit against South Carolina Electric & Gas on behalf of the Catawba Riverkeeper for violations of environmental laws at the Wateree Station, the parties reached a settlement that requires SCE&G to remove its coal ash from coal ash ponds and transport it to lined and properly engineered landfills.¹⁰⁹

Residents of Juliette, Georgia have also filed a mass tort case in January 2013 against Georgia Power Co., alleging that coal ash from two coal ash impoundments at the Robert W. Scherer coal plant has made them sick and constituted negligence, nuisance, and trespass by “invas[ing]” their homes and exposing them to “extremely toxic and hazardous substances released to the air, soil, and groundwater.”¹¹⁰

Also, in May 2011 the EIP and Public Justice sent FirstEnergy Generation Corp. a notice of intent to sue on behalf of the Little Blue Regional Action Group (LBRAG) for groundwater and surface water pollution caused by the largest coal ash impoundment in the nation, the Bruce Mansfield Plant’s Little Blue Run Impoundment.¹¹¹ LBRAG alleged harms that included violations of the Resource Conservation and Recovery Act, and Pennsylvania Clean Streams

¹⁰⁶ Press Release, Env’tl. Integrity Project, et al., Groups Support MDE Settlement Clean Up GenOn’s Toxic Coal Ash Pollution in Charles, Montgomery, and PG Counties (Jan. 14, 2013), http://www.environmentalintegrity.org/news_reports/documents/011413_GenOn_FINALCoalAshsettlementjointnewsrelease.pdf.

¹⁰⁷ Consent Decree, State of Md. Dep’t of the Env’t. v. GenOn MD Ash Mgmt., LLC, Civil Action Nos. 8:11-CV-01209-PJM, 8:10-CV-00826-PJM, 8:12-CV-[] (Jan. 2, 2013), http://www.environmentalintegrity.org/news_reports/documents/2013_01_02_71-1_ConsentDecree.pdf.

¹⁰⁸ *Id.*

¹⁰⁹ Catawba Riverkeeper, SCE&G and Catawba Riverkeeper Reach Settlement on Coal Ash Storage, <http://www.catawbariverkeeper.org/issues/coal-ash-1/sce-g-and-catawba-riverkeeper-reach-settlement-on-coal-ash-storage> (Aug. 20, 2012).

¹¹⁰ Kristen Lombardi, Ctr. for Public Integrity, “As EPA Delays New Coal Ash Rules, Residents Turn to the Courts for Relief,” <http://www.publicintegrity.org/2013/02/22/12223/epa-delays-new-coal-ash-rules-residents-turn-courts-relief>.

¹¹¹ Letter from Lisa Widawsky Hallowell, Attorney, Env’tl. Integrity Project, to Anthony Alexander, President, FirstEnergy Corp., Re: Notice of Violations and Notice of Intent to Sue for Violations at the Little Blue Run Coal Ash Impoundment (May 30, 2011)

Law, and the federal Clean Water Act.¹¹² In July, just before the end of the 60-day notice period under the Clean Water Act and Clean Streams Law, the Pennsylvania Department of Environmental Protection (DEP) filed suit in federal court against FirstEnergy and simultaneously proposed a consent decree.¹¹³ In the lawsuit, DEP recounted extensive evidence of the release of pollutants from the impoundment, concluding that:

Constituents contained in the solid waste disposed of in the Impoundment may present a potential that human health and environmental receptors would be exposed to a risk of harm, in the near term and the future, if remedial action is not taken. These conditions ‘may present an imminent and substantial endangerment to health or the environment,’ as that term is used in Section 7002(a)(1)(B) of RCRA, 42 U.S.C. § 6972(a)(1)(B).¹¹⁴

The settlement requires closure of the impoundment, imposes an \$800,000 penalty and includes stipulated penalties for failure to comply with various surface water, groundwater, and air monitoring requirements contained in the consent decree.¹¹⁵

Additional examples of additional citizen lawsuits and notice letters of intent to sue (NOIs) include a lawsuit filed by the Southern Environmental Law Center on behalf of the Cape Fear River Watch, Sierra Club, Waterkeeper Alliance, and Western North Carolina Alliance to require cleanup of groundwater contamination from 14 unlined North Carolina coal ash ponds,¹¹⁶ a lawsuit filed by the Waccamaw Riverkeeper against Santee Cooper for arsenic seeping into groundwater from coal ash ponds at the Grainger coal plant,¹¹⁷ and an NOI filed by the Catawba Riverkeeper against Duke Energy for illegally discharging arsenic, cobalt, boron, barium, strontium, manganese, zinc, and iron into Mountain Island Lake from the Riverbend Plant’s unlined coal ash lagoons.¹¹⁸

13. Given this evidence, in your view, are enforceable federal requirements necessary to protect human health and the environment from this waste?

Yes.

14. Should those requirements meet a legal standard of protection, such as the current standard for municipal solid waste – protection of human health and the environment?

¹¹² *Id.*

¹¹³ Consent Decree, Commonwealth of Pa. Dep’t Env’tl. Prot. v. FirstEnergy, Civil Action No. 2:12-cv-01061-NBF, at 5 (Dec. 14, 2012).

¹¹⁴ Commonwealth of Pa. Dep’t Env’tl. Prot. v. FirstEnergy, Civil Action No. 2:12-cv-01061-NBF (July 27, 2012).

¹¹⁵ Consent Decree, Commonwealth of Pa. Dep’t Env’tl. Prot. v. FirstEnergy, Civil Action No. 2:12-cv-01061-NBF (Dec. 14, 2012).

¹¹⁶ Press Release, Groups in Court to Stop Groundwater Contamination from Toxic Coal Ash Waste (Jan. 8, 2013), http://www.southernenvironment.org/newsroom/press_releases/groups_in_court_to_stop_groundwater_contamination_from_toxic_coal_ash_waste.

¹¹⁷ Sammy Fretwell, “Santee Cooper Plant Discharges Spark Federal Lawsuit,” *The State* (Apr. 29, 2013) available at <http://www.thestate.com/2013/04/29/2748309/santee-cooper-coal-plant-discharges.html>.

¹¹⁸ Nick Needham, “Riverkeeper: Duke Energy Allowing Toxic Leaks into Catawba River,” wbtv.com, (Mar. 26, 2013), <http://www.wbtv.com/story/21797969/lawsuit-duke-energy-allowing-toxic-leaks-into-catawba-river>.

Yes, any bill addressing coal ash should contain a standard of protection that is at least as stringent as the federal protective standard governing municipal solid waste landfills, which requires the protection of human health and the environment. Without a federal protective standard, Congress cannot guarantee that every community in every state is provided with the same protection from toxic releases. Absent a protective standard, states may implement permit programs that fail to protect the health and environment of American communities. The intent of RCRA is to ensure the safety of all citizens from unsafe disposal of solid and hazardous waste. Whether under subtitle C or subtitle D, the intent is to create a baseline of federal requirements that will protect the nation's health and environment. The discussion draft radically amends RCRA to abandon this critical goal of national consistency and baseline protection, and it would allow states to implement permit programs without meeting any federal standard. As stated earlier in this response, many states have chosen not to regulate coal ash or to regulate its disposal very inadequately. The discussion draft would not change the status quo.

15. Would the discussion draft considered at the hearing hold state coal ash permit programs to such a legal standard of protection?

No, the discussion draft would not hold state coal ash permit programs to any legal standard of protection. As the CRS Report (twice) explained, the absence of a standard of protection is “unique among all federal environmental law.”¹¹⁹ The CRS report explained:

Federal standards promulgated under RCRA include directive from Congress to EPA that the regulatory criteria meet a particular standard of protection. When those standards are required to be implemented using a permit program, that directive is that the standards be those necessary to protect human health and the environment. There is no explicit directive in Section 4011 that Permit Program Specifications, assumed to be the equivalent of federal standards, achieve a certain level of protection. The absence of any directive or indication that the program has some objective to achieve a standard of protection is unique among all federal environmental law.¹²⁰

When the Tennessee Valley Authority coal ash impoundment in Kingston, Tennessee, failed, it released 5.4 million cubic yards of toxic sludge, blanketing the Emory River and 300 acres of surrounding land, and creating a Superfund site that could cost up to \$1.2 billion to remediate. The sludge from that spill was removed and disposed of in a municipal solid waste landfill in Perry County, Alabama, over the protests of local residents. There are reports that residents became sick from foul smells and off-gassing from the waste.

16. What are some of the issues residents around the Perry County, Alabama landfill have experienced?

Beginning in 2009, approximately 4 million tons of coal ash were excavated from the

¹¹⁹ 2012 CRS Report at 23.

¹²⁰ *Id.*

spill site in Harriman, Tennessee and deposited in the Arrowhead Landfill in Uniontown, Alabama. Because of poor dust and odor suppression during the dumping of the TVA ash, residents living near the Arrowhead Landfill suffered serious health problems, including respiratory illness (including irritation of the upper respiratory tract), headaches, dizziness, nausea and vomiting from the fugitive dust and emission of unhealthy levels of hydrogen sulfide.

Several homes are within 100 feet of the landfill where the dumping occurred. Residents complained that fugitive dust from the facility contaminated their homes, porches, vehicles, laundry and plantings. In addition, runoff from the landfill into roadside ditches running through residential and agricultural areas were found to contain arsenic at more than 80 times the health standard. Despite many hundreds of acres of available landfill space distant from residential properties, the coal ash was stacked very close to homes in a large mound 60 feet high.¹²¹

Uniontown is located in Perry County, Alabama's poorest county, where over 35 percent of the population fall below the poverty line. In Uniontown, 88 percent of residents are African-American and almost half (45.2 percent) live in poverty. The median income in Uniontown is \$17,473, and the unemployment rate is 17 percent. The population in the census blocks surrounding the landfill range from 87 to 100 percent African-American. In January 2012, 54 poor black residents of Perry County filed a civil rights complaint against the Alabama Department of Environmental Management pursuant to Title VI of the 1964 Civil Rights Act. The complaint alleged that Alabama environmental regulators violated the civil rights of predominantly poor and black residents by renewing the permit issued to operators of the landfill.

In addition, since 2009, numerous lawsuits were filed on behalf of residents alleging violations of federal environmental laws, including the Clean Air Act, Clean Water Act and the Resource Conservation and Recovery Act. Most of the actions were unsuccessful due to the bankruptcy of the landfill's owners. In 2010, Uniontown residents filed a lawsuit, *Abrahams et al. v. Phill-Con Services, LLC et al.*, in U.S. District Court for the Southern District of Alabama, against the landfill's operator, asserting claims including negligence, nuisance and trespass resulting from construction and operation of the landfill.

17. My understanding is that Alabama regulators allow the use of coal ash as daily cover at the landfill. Did the decision to allow the use of coal ash as daily cover exacerbate or mitigate issues of concern for the residents of Perry County?

In 2009, nothing in the permit for coal ash disposal in the Arrowhead Landfill required the owner or operator of the landfill to take any specific precautions to eliminate the threat of airborne ash. While the permit did require placement of "daily cover," the permit specifically allowed the use of *coal ash* as an "alternative daily cover material" to cover the TVA ash.¹²² Consequently, it would have been permissible for coal ash to be placed on the TVA ash as "cover." Clearly, if this occurred, it would not have been effective in controlling fugitive and

¹²¹ Photographs of the residences and landfill can be viewed at the website of photographer, Carlan Tapp: <http://www.carlantapp.com/livinginash/index.html>

¹²² See Section III.H.2. of the Permit Modification for the Arrowhead Landfill, dated July 20, 2009, <http://www.arrowheadlandfill.com/Solid%20Waste%20Permit.pdf>.

toxic dust blowing from the landfill. However, it is not known if the landfill owners actually used coal ash as cover. It is known, nevertheless, that residents of Uniontown complained for years of dust and odors coming from the landfill into their homes.

Furthermore, there were several additional significant permit deficiencies that diminished the level of protection of residents from coal ash disposed in the Arrowhead Landfill. These included:

1. The Operating Permit's Groundwater Monitoring Parameters Were Inadequate to Protect Health and the Environment in Perry County

Groundwater monitoring parameters for the Arrowhead Landfill do not include several contaminants found commonly in leachate generated by coal ash disposal. According to Table IV.3 of the Permit Modification for the Arrowhead Landfill, the parameters to be monitored on a semi-annual basis are those parameters listed in Appendix I of Chapter 335-13-4 of the Alabama Administrative Code. These parameters do *not* include boron, manganese, molybdenum or sulfate, four very common coal ash pollutants. It is critical to monitor for these common coal ash contaminants, because these chemicals are often the first to leach from ash, thereby constituting an early warning that a landfill is leaking. Addressing releases immediately can prevent more dangerous contaminants, like arsenic, from migrating off-site.

2. The Operating Permit's Post-Closure Requirements Fail to Require At Least 30 Years of Post-Closure Monitoring

According to Section VIII of the Permit Modification for the Arrowhead Landfill, the length of the period of post-closure groundwater and surface water monitoring is left to the discretion of the Alabama Department of Environmental Management (ADEM). It is essential, however, for the protection of the community that at least 30 years of post-closure groundwater and surface water monitoring be required at the Arrowhead Landfill. According to the EPA's Human Health and Ecological Risk Assessment for Coal Combustion Wastes, the risk of leachate migration and contamination of underlying groundwater increases with time. Therefore monitoring must continue for a substantial period after disposal ends to make sure that pollutants do not migrate from the landfill and contaminate the underlying groundwater or surface water. According to the operating permit and Alabama regulations, the ADEM has authority to further decrease the length of the post-closure care period. *See* ADEM Rule 335-13-4-.20(3)b.

18. Have those residents been able to address these issues to protect their air and water?

No, the residents to date have not been able to adequately address these issues. Residents have contacted the EPA and ADEM about the problems they faced to no avail, according to their attorney, David Ludder. The EPA did not sufficiently address complaints regarding fugitive dust, odors, potential exposure to radiation, contaminated runoff, and the need for increased groundwater monitoring.

19. Have they been able to recover damages for the impairment of their air and water?

Limited damages covering the period of coal ash disposal operations are expected to be paid shortly due to a settlement of a case filed in 2010.

20. Does the experience of residents around the Perry County landfill suggest that municipal solid waste landfills, operating under state programs in accordance with the MSW disposal criteria under RCRA, can safely accept coal ash?

No. The damage that occurred to the health and well-being of residents living near the Arrowhead Landfill in Perry County illustrates the great risk of relying on state municipal waste regulations to protect citizens near coal ash dumps. The Alabama municipal solid waste landfill regulations were ill equipped to deal with the fugitive dust and hydrogen sulfide emissions from the landfill. Furthermore, while the immediate air hazards have abated because the coal ash dumping has stopped, long term threats posed by the disposal of the 4 million tons of ash remain. Alabama's municipal solid waste groundwater monitoring parameters still do not include the most common coal ash contaminants, and post-closure groundwater monitoring can be terminated at the discretion of state regulators. Thus, contamination of the underlying aquifer could occur without detection and future problems may escape detection because of the early termination of monitoring.

The Arrowhead Landfill is a subtitle D solid waste landfill permitted by the Alabama Department of Environmental Management and governed by Alabama law. In 2009, Alabama did not have any laws specific to coal ash disposal. When things went wrong, and the health of residents was being harmed, the State did not take appropriate action, and the EPA claimed it had no authority. There is reason to believe that future coal ash disposal in the landfill – or in other municipal solid waste landfills – will encounter similar problems.

Thank you for this opportunity to provide additional information on this important issue.

Respectfully submitted by:

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