STATE OF FAILURE

HOW STATES FAIL TO PROTECT OUR HEALTH AND DRINKING WATER FROM TOXIC COAL ASH

THIRTY-SEVEN COAL ASH REGULATORY PROGRAMS THAT PLACE OUR AIR, WATER AND HEALTH IN DANGER

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EARTHJUSTICE

Appalachian Center FOR THE ECONOMY & THE ENVIRONMENT

Principal Authors:
Lisa Evans
Senior Administrative Counsel
Earthjustice

Michael Becher
Attorney
Appalachian Center for the Economy and the Environment

Additional Contributor:
John Dawes
Environmental Integrity Project

Cover photo: Coal ash spill in Forward Township, PA, January 2005

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Introduction: An Unhealthy Union

Coal ash is the second largest industrial waste stream in the United States. More than 140 million tons of coal ash, comprised of fly ash, bottom ash, boiler slag and flue gas desulfurization (FGD) sludge, is generated annually by the nation's coal-fired power plants. Coal ash contains a long list of carcinogenic and neurotoxic chemicals such as arsenic, lead, hexavalent chromium, cadmium and mercury. The toxic brew is stored in more than a thousand unstable ponds and landfills, which are located in nearly every state in the nation. **Yet most states don't have regulations in place to keep these toxic chemicals safely entombed and out of our air and drinking water.**

Earthjustice and Appalachian Center for the Economy and the Environment (ACEE) uncovered the details of this state of failure in an exhaustive review of state regulations in 37 states, which together comprise over 98 percent of all the coal ash generated nationally. Our analysis debunks the oft-repeated myth that state programs are doing a good job of safeguarding our air and water and protecting communities from catastrophic dam failure.

Our review reveals that most states do not require coal ash landfills and ponds to employ the most basic safeguards required at household trash landfills, such as composite liners, groundwater monitoring, leachate collection systems, dust controls and financial assurance; nor do states require that coal ash ponds be operated to avoid catastrophic collapse. In addition, most states allow the placement of toxic coal ash *in* water tables and the siting of ponds and landfills in wetlands, unstable areas and floodplains. When measured against basic safeguards that the U.S. Environmental Protection Agency (EPA) identified as essential to protect health and the environment,[1] state regulatory programs fail miserably to guarantee safety from contamination and catastrophe.

Although no rational person would question the necessity of lining and monitoring coal ash dumps to prevent the escape of toxic chemicals or the need to inspect the nation's aging fleet of nearly 700 coal ash dams, we found in the 37 states examined:

- Only 3 states require composite liners for all new coal ash ponds:
- Only 5 states require composite liners for all new coal ash landfills;
- Only 2 states require groundwater monitoring of all coal ash ponds;
- Only 4 states require groundwater monitoring of all coal ash landfills;
- Only 6 states prohibit siting of coal ash ponds into the water table; and

- Only 17 states require regulatory inspections of the structural integrity of coal ash ponds.

In view of the widespread absence of critical protections in most states, it is absolutely essential that the EPA establish a national coal ash rule under subtitle C of the Resource Conservation and Recovery Act (RCRA). Currently, the EPA is at the threshold of a decision—it can continue to leave the regulation of this toxic waste entirely to states under subtitle D of RCRA, or it can establish national minimum standards under subtitle C of RCRA. Our analysis shows that it is far too dangerous to continue to allow states sole discretion over coal ash dumping. Nothing short of federally enforceable standards will protect our most vulnerable communities from continuing harm.

Amazingly, even the EPA readily admits that a state-controlled subtitle D scheme will continue to leave most communities without protections against precarious ponds and cancer-causing chemicals in their air and water. In fact, the EPA concludes that, based on the entrenched, decades-long state resistance to regulating coal ash, it expects **less than half** of the total ash generated in the U.S. to be governed by adequate state regulations, unless these regulations are made mandatory under a RCRA subtitle C rule.[2]

Part I of this report provides a brief overview of the threats posed by the widespread lack of state requirements for coal ash disposal. Part II explains how most state programs do not adequately protect public health and the environment from these threats by specifically identifying the regulatory gaps in 37 states. Part III identifies the 10 worst states that fail to protect communities located near coal ash disposal sites. Criteria for determining the most dangerous states include gross lack of basic regulatory safeguards, widespread dangerous disposal practices, and huge amounts of coal ash generated annually. By this measurement, the 10 worst states for coal ash disposal are (in alphabetical order): Alabama, Georgia, Illinois, Indiana, Kentucky, Missouri, North Carolina, Ohio, Tennessee, and Virginia.

PART I. WHAT'S AT STAKE: MAJOR DAM FAILURES, UNHEALTHY AIR AND POISONED WATER

Dangerous Dams: Another Accident Waiting to Happen

In Harriman, Tennessee on December 22, 2008, a coal ash dam at the Tennessee Valley Authority (TVA) Kingston Fossil Plant broke, releasing **1.1 billion** gallons of coal ash into the Emory and Clinch Rivers, destroying three homes and damaging a dozen others. By volume, this spill is the largest environmental disaster in U.S. history—100 times greater than the Exxon Valdez oil spill and 5 times larger than the BP Deepwater Horizon spill of 2010. While the cataclysmic disaster in Kingston is well known, few realize that **at least every three years since 2002, major breaks in coal ash ponds have**

occurred, causing the release of millions of pounds of toxic sludge to waterways and drinking water sources. For example:

- In Euharlee, Georgia on July 28, 2002, a four-acre sinkhole fractured a coal ash pond at Georgia Power's Plant Bowen and caused the release of more than **2 million pounds** of arsenic-laden coal ash to the Etowah River, a drinking water source for Rome, Georgia,[3] a city with a population of nearly 35,000 residents. The discharge contained arsenic at concentrations more than 100 times the federal safe drinking water standard.

- In Martins Creek, Pennsylvania on August 23, 2005, a coal ash dam broke at PPL Generation's Martin's Creek Power Plant, releasing over **100 million gallons** of ash into the Delaware River.[4] The spill could not be contained for four days.

- In Martinsville, Indiana on February 14, 2007, internal and external levees breached at the Indianapolis Power and Light's Eagle Valley Generating Station, resulting in a discharge of **30 million gallons** of coal ash sluice liquid to the White River.[5]

- In Martinsville, Indiana on January 30, 2008, a second breach occurred at the 52-year-old earthen dam resulting in another **30 million gallon** discharge of coal ash sludge to the White River.[6] None of the released ash was recovered.

And these were not the only major breaks. About a week after the 2008 spill in Kingston, a gypsum pond at TVA's Widow's Creek Fossil Plant in Alabama released 10,000 gallons of coal ash to the Tennessee River.[7] And just last fall, approximately 10 tons of coal ash flowed from an 8-foot by 22-foot breach in the ash pond at Progress Energy's Sutton Electric Plant near Wilmington, North Carolina.[8]

It has been almost three years since the last massive coal ash disaster—which means the clock is ticking on the next multi-million-gallon spill. Unfortunately, not nearly enough has been done to avert the next disaster. In the years following the Kingston spill, neither the EPA nor any state legislature has overhauled coal ash pond regulations. Hundreds of dangerous ponds remain virtually unregulated, and basic requirements for safe dam and pond management, such as routine inspections and emergency action plans are still not required at ash ponds across the U.S.

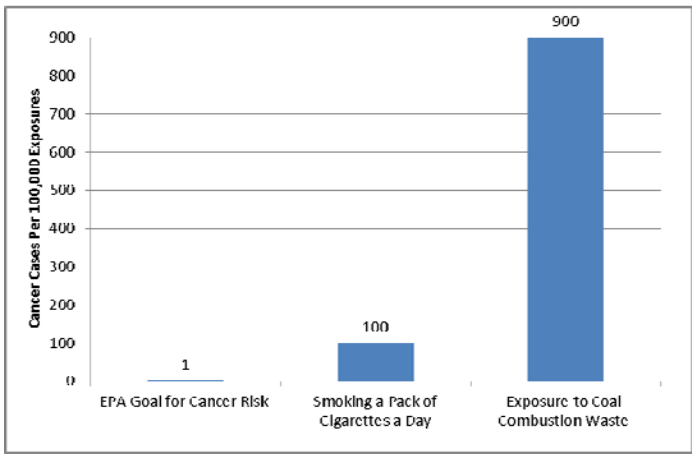
Poisoned Water and Air

While dramatic events like the coal ash spills garner national media attention, dangerous pollutants are quietly seeping from hundreds of improperly lined and unmonitored coal ash dumps into drinking water supplies and streams across the nation, exposing people and wildlife to toxic and cancer-causing substances. The vast majority

of states do not require adequate monitoring or liners to stop or even detect the migration of pollution.

Coal ash contains numerous hazardous chemicals, including arsenic, cadmium, hexavalent chromium, lead, mercury and selenium.[9] The contaminants can cause cancer and damage the nervous system or other organs, especially in children. When coal ash comes into contact with water, these hazardous chemicals leach out of the ash and contaminate drinking water. [10] Over 137 cases of water contamination from coal ash have been documented. This is only the tip of the iceberg, since most dumps are not monitored.[11]

In 2010, the EPA published a risk assessment that found extremely high risks to human health and the environment from the disposal of coal ash in waste ponds and landfills.[12] The chart below compares the EPA's findings on the cancer risk from arsenic in coal ash disposed in some unlined waste ponds to several other cancer risks, along with the highest level of cancer risk that the EPA finds acceptable under current regulatory goals.[13] The risk from coal ash is **2,000 times greater** than that regulatory goal.



Despite the high threat, as this report explains, most states fail to require basic measures to prevent the release of toxic chemicals from coal ash into our air, water supplies, lakes and streams. In fact, most states do not even require coal ash dumps to take measures to detect such releases.

PART II. EXPOSING STATE SECRETS: GROSSLY INADEQUATE STATE PROGRAMS

Missing Safeguards at Coal Ash Ponds and Landfills

Below is a damning indictment of the entire nation's state regulatory programs, revealing a widespread absence of basic safeguards across the U.S. Table 1 indicates

how few states impose specific basic safety requirements that should be mandated in all states for all coal ash ponds and landfills.

Table 1. Failure of State Programs to Impose Basic Safeguards at Coal Ash Dumps

REGULATORY SAFEGUARD	STATES THAT FAIL TO REQUIRE SAFEGUARD AT ALL (NEW & EXISTING) PONDS	STATES THAT FAIL TO REQUIRE SAFEGUARD AT ALL (NEW & EXISTING) LANDFILLS	STATES THAT FAIL TO REQUIRE SAFEGUARD AT NEW PONDS	STATES THAT FAIL TO REQUIRE SAFEGUARD AT NEW LANDFILLS
Groundwater Monitoring *during operation*	35 of 37 states 86% total coal ash*	33 of 37 states 95% total coal ash	35 of 37 states 86% total coal ash	29 of 37 states 83% total coal ash
Composite Liner	*No states have retroactive liner requirements*	*No states have retroactive liner requirements*	34 of 37 states 80% total coal ash	32 of 37 states 90% total coal ash
Leachate Collection System	*No states have retroactive leachate requirements*	*No states have retroactive leachate requirements*	31 states of 37 76% total coal ash	25 of 37 states 67% total coal ash
Daily Cover	*Not applicable*	30 of 37 states 72% total coal ash	*Not applicable*	30 of 37 states 72% total coal ash
Dust Controls	36 of 37 states 87% total coal ash	24 of 37 states 59% total coal ash	36 of 37 states 87% total coal ash	24 of 37 states 59% total coal ash
Run-off Controls	34 of 37 states 84% total coal ash	20 of 37 states 55% total coal ash	34 of 37 states 84% total coal ash	20 of 37 states 55% total coal ash
Separation from Water Table	*No states have retroactive siting requirements*	*No states have retroactive siting requirements*	31 of 37 states 74% total coal ash	22 of 37 states 64% total coal ash
Financial Assurance	25 of 37 states 64% total coal ash	19 of 37 states 50% total coal ash	25 of 37 states 64% total coal ash	18 of 37 states 48% total coal ash
Groundwater Monitoring (30 years after closure)	36 of 37 states 97% total ash	32 of 37 states 73% total coal ash	36 of 37 states 97% total coal ash	31 of 37 states 71% total coal ash
Inspection of Pond by State Regulators	24 of 37 states 57% total coal ash	*Not applicable*	24 of 37 states 57% total coal ash	*Not applicable*
Regular Reporting by Pond Operators	28 of 37 states 61% total coal ash	*Not applicable*	24 of 37 states 55% total coal ash	*Not applicable*
Emergency Action Plan for Coal Ash Ponds	19 of 37 states 44% total coal ash	*Not applicable*	18 of 37 states 43% total coal ash	*Not applicable*

*Percentage of total coal ash generated in the U.S. in 2005. Percentage indicates the portion of total coal ash that is not covered by the specific safeguard.

How does your state stack up? Table 2, below, lists the 37 states (comprising 98 percent of the ash generated in the U.S.) and the safeguards required by each state. The requirements in this table address both coal ash landfills and ponds. Appendix 1 of this report provides citations to all state regulatory requirements.

Table 2. State-by-State Failure to Impose Basic Safeguards at Coal Ash Dumps

State	Require groundwater monitoring at all new and existing ponds	Require groundwater monitoring at all new and existing landfills	Require composite liners for all new ponds	Require composite liners for all new landfills	Prohibit ash ponds from being constructed in the water table	Prohibit coal ash landfills from being constructed in the water table	Require financial assurance for coal ash ponds	Require financial assurance for coal ash landfills
Alabama	No	No	No	Yes	No	Yes	No	Yes
Alaska								
Arizona	No	No	No	No	No	No	No	No
Arkansas								
California								
Colorado	No	No	No	No	Yes	Yes	Yes	Yes
Connecticut								
Delaware								
Florida	No	No	No	No	No	No	No	No
Georgia	No	No	No	No	No	No	Yes	Yes
Hawaii								
Idaho								
Illinois	No	Yes	No	No	No	Yes	Yes	Yes
Indiana	No	No	No	No	No	No	No	Yes
Iowa	No	No	No	No	No	Yes	No	Yes
Kansas	No	No	No	No	No	No	No	No
Kentucky	No	No	No	No	No	No	No	No
Louisiana	Yes	No	Yes	Yes	No	No	Yes	Yes
Maine								
Maryland	No	No	No	No	No	Yes	No	No
Massachusetts								
Michigan	No	No	No	No	No	Yes	Yes	Yes
Minnesota	No	No	No	No	No	Yes	No	No
Mississippi	No	No	No	No	No	No	No	No
Missouri	No	No	No	No	No	No	Yes	Yes
Montana	No	No	No	No	No	No	No	No
Nebraska								
Nevada	No	Yes	No	Yes	No	Yes	No	Yes
New Hampshire	No	Yes	No	No	No	Yes	Yes	Yes
New Jersey	No	Yes	No	No	No	Yes	No	Yes
New Mexico	No	No	No	No	No	No	No	No
New York	No	No	No	No	No	No	No	No
North Carolina	No	No	No	Yes	Yes	Yes	No	Yes
North Dakota	No	No	No	No	No	No	No	No
Ohio	No	No	No	No	No	No	No	No
Oklahoma	No	No	No	No	Yes	Yes	Yes	Yes
Oregon								
Pennsylvania	Yes	No	Yes	No	Yes	Yes	Yes	Yes
Rhode Island								
South Carolina	No	No	No	No	No	No	No	Yes
South Dakota	No	No	No	No	No	No	No	No
Tennessee	No	No	No	No	No	No	No	No
Texas	No	No	No	No	No	No	No	No
Utah	No	No	No	No	No	No	No	No
Vermont								
Virginia	No	No	No	No	No	No	No	No
Washington	No	No	No	No	No	No	No	No
West Virginia	No	No	Yes	No	Yes	Yes	Yes	Yes
Wisconsin	No	No	No	Yes	Yes	Yes	Yes	Yes
Wyoming	No	No	No	No	No	No	Yes	Yes

Gray indicates data not available

Missing Coal Ash Pond Safeguards

Because disposal of coal ash in ponds presents the additional threat of catastrophic failure, which can be deadly to nearby communities and cause significant economic and environmental destruction, basic requirements related to structural stability are presented separately. Table 3, below, presents the components of an adequate pond and dam safety program and indicates how many states fall short. Appendix 2 of this report provides the corresponding state regulatory citations.

Table 3. Essential Coal Ash Pond Safeguards Missing in State Regulatory Programs

State	Requires Dam Design/Super-vision by an Engineer	Size Threshold for Regulation	Requires Frequent Visual Inspection By Operator	Geotechnical/ Engineering Inspections by Operator	Requires Regular Reporting (*construction period only)	Requires Inspection by Regulators	Requires Emergency Action Plan	Requires Inundation Mapping	Requires Certification of Construction	Requires Meeting Design Standards and Specifications	Bond	No. of Dams	No. of Dams Rated Significant or High Hazard	No. of Dams over 25 ft or 500 acre-feet	Percentage of Dams with Hazard Ratings	Number of Dams rated "Poor"	Percentage of Dams Inspected by Regulators in Last 5 years
Alabama	No	None	No	None	No	None	No	No	No	No	No	15	5	13	47%	3	0%
Alaska																	
Arizona	Yes	Large	Yes	1–5 yrs	Frequent*	None	Yes	Yes	Inspection‡	Yes	Yes	15	10	8	66%	0	66%
Arkansas																	
California																	
Colorado	Yes	Medium	Yes	Infrequent	Infrequent	None	Yes	Yes	Yes	Yes	Yes	40	0	1	15%	0	5%
Connecticut																	
Delaware																	
Florida	No	Large	No	None	None	None	No	No	No	No	No	9	0	1	89%	0	100%
Georgia	Yes	Very Large	Yes	For Permit	Only if Problem	None	No	No	No	Yes	No	29	9	19	34%	1	7%
Hawaii																	
Idaho																	
Illinois	Yes	Medium	Operation Plan†	For Permit	Frequent	None	Partial	No	Yes	Yes	Yes	38¶	2	16	24%	0	0%
Indiana	No	Very Large	No	None	None	1–5 yrs	No	No	No	Yes	No	71	4	26	6%	25	8%
Iowa	Yes	Medium	Annual	As Follow Up	Frequent	1–5 yrs	No	No	Inspection	Yes	Yes	43	0	3	0%	0	0%
Kansas	Yes	Large	No	3–5 yrs	Frequent*	None	Yes	Yes	Yes	Yes	No	13	1	5	8%	0	15%
Kentucky	Yes	Large	No	None	Infrequent	1–5 yrs	No	No	Yes	Yes	No	43	12	21	54%	0	28%
Louisiana	Yes	Large	Operation Plan	None	Only if Problem	None	Yes	Yes	No	Yes	No	11	0	8	0%	3	0%
Maine																	
Maryland	Yes	Small	No	None	Failure Only	None	Partial	No	Yes	Yes	No	0	0	0	100%	0	N/A
Massachusetts																	
Michigan	Yes	Small	No	3–5 yrs	Infrequent	None	Yes	Yes	Inspection	Yes	Yes	10	0	6	10%	0	90%
Minnesota	Yes	Large	Operation Plan	None	Infrequent	1–8 yrs	Partial	No	Yes	No	No	21	3	10	19%	2	19%
Mississippi	Yes	Medium	Yes	For Permit	Frequent	None	Yes	No	Yes	Yes	No	1	0	1	0%	0	100%
Missouri	No, if Permit	Very Large	Operation Plan	For Permit	Infrequent	None	Yes	No	Yes	Yes	No	32	0	15	0%	0	0%
Montana	Yes	Large	Operation Plan	5 yrs	Infrequent	None	Partial	Yes	Yes	Yes	Yes	9	3	2	100%	0	0%
Nebraska																	
Nevada	No	Medium	No	None	None	None	No	No	No	No	No	8	8	0	100%	0	0%
New Hampshire	Yes	Small	Operation Plan	None	Infrequent	1–5 yrs	Yes	Yes	Yes	Yes	No	0	0	0	100%	0	N/A
New Jersey	Yes	Small	No	1–10 yrs	Frequent*	None	Yes	Yes	Yes	Yes	No	0	0	0	100%	0	N/A
New Mexico	Yes	Large	Operation Plan	5 yrs	Infrequent	None	Yes	Yes	Yes	Yes	No	8	3	2	50%	0	0%
New York	No	None	No	None	No	None	No	No	No	No	No	6	0	0	0%	0	100%
North Carolina	Yes	Medium	Operation Plan	None	Infrequent	1–5 yrs	No	No	Yes	Yes	No	26	18	26	100%	6	19%
North Dakota	Most	Large	Operation Plan	None	Frequent	None	No	No	Yes	No	Yes	16	0	4	31%	0	6%
Ohio	Yes	Medium	Operation Plan	5 yrs	Frequent	5 yrs, at least	Yes	Yes	Yes	Yes	Yes	29	17	22	72%	10	66%
Oklahoma	Yes	Large	No	1–5 yrs	Infrequent	1–5 yrs	Yes	Yes	Yes	Yes	No	5	0	3	0%	0	100%
Oregon																	
Pennsylvania	Yes	Large	Yes	Annual	Frequent	None	Yes	No	Yes	No	Yes	31	5	7	39%	1	61%
Rhode Island																	
South Carolina	Yes	Large	Operation Plan	None	Frequent*	None	Yes	Yes	Yes	Yes	No	22	0	13	4%	0	0%
South Dakota	Yes	Large	No	None	None	1–5 yrs	Partial	No	Yes	Yes	No	0	0	0	100%	0	N/A
Tennessee	No	None	No	None	No	No	No	No	No	No	No	18	14	16	83%	8	0%
Texas	Yes	Large	Operation Plan	Annual	Frequent	5 yrs for some	Yes	No	Yes	Yes	No	31	0	6	0%	3	26%
Utah	Yes	Medium	Operation Plan	None	Frequent	5 yrs for some	Yes	Yes	Inspection	Yes	No	6	0	4	83%	0	0%
Vermont																	
Virginia	Yes	Large	Operation Plan	Annual	Infrequent	None	Yes	Yes	Yes	Yes	No	11	2	9	73%	1	36%
Washington	Yes	Medium	Operation Plan	Annual	Frequent	1–5 yrs	Yes	Yes	Yes	Yes	No	0	0	0	100%	0	N/A
West Virginia	Yes	Large	Yes	1–7 yrs	Infrequent	None	Yes	Yes	Yes	Yes	No	12	10	9	83%	0	83%
Wisconsin	No	None	No	None	No	None	No	No	No	No	No	18	0	0	0%	0	6%
Wyoming	Yes	Small	No	None	Infrequent	Every 5+ yrs	No	No	No	No	No	17	3	9	41%	0	18%

† Requires aapproved operation and monitoring plan but regs do not specify a schedule

‡ Requires a post-construction inspection

¶ 38 dams reflects US EPA survey; according to Illinois EPA, there are 83 coal ash ponds in Illinois

Colors	Good	Needs Improvement	Poor	Bad or Absent	Data Unavailable

PART III. THE 10 MOST DANGEROUS STATES

The 10 states described below make up almost 40 percent of the yearly generation of coal ash—in total, 55.3 million tons of coal ash each year are generated in these states.[14] Together the 10 states host at least 184 coal-fired power plants.[15] All of these states dispose of a substantial amount of their waste in over 300 coal ash ponds, the most dangerous type of coal ash disposal.[16] **In general, the weakest state programs are found in the states that produce the largest quantities of toxic waste and employ wet disposal, the most dangerous method of disposal.**

Below are brief descriptions of the 10 most dangerous states. Unless otherwise noted, the source for information regarding the number, age and size of coal ash ponds is EPA's "Database of Survey Responses" from the Agency's 2009–2011 "Information Request Responses from Electric Utilities."[17] The source for information concerning the condition of coal ash dams and ponds is EPA's "Coal Combustion Residuals Impoundment Assessment Reports," including the contractor reports assessing the structural integrity of numerous coal ash impoundments.[18]

National Inventory of Dams criteria: "High," "Significant," and "Low"[19]

The hazard potential ratings refer to the potential for loss of life or damage if there is a dam failure.

- **High Hazard Potential:** Dams assigned the high hazard potential classification are those where failure or mis-operation will probably cause loss of human life.
- **Significant Hazard Potential:** Dams assigned the significant hazard potential classification are those dams where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environment damage, disruption of lifeline facilities, or impact other concerns.
- **Low Hazard Potential:** Dams assigned the low hazard potential classification are those where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses.

1. Alabama

Alabama represents the worst of the worst when it comes to coal-ash disposal. First, Alabama has **no** laws or regulations on the books to specifically ensure the safety of the state's coal ash dams. It is the only state in the country without such laws. Because there are no federal laws to ensure dam safety, this essentially means that

Alabama dams are **completely unregulated**. Until 2011, Alabama also completely exempted coal ash disposal in landfills. Consequently, coal ash from Alabama's ten coal-fired plants has been dumped mostly in unlined, unregulated, and unmonitored ponds and landfills. Given the historical absence of controls on coal ash disposal, it is outrageous that more than 5 million tons of ash from the Kingston TVA spill was shipped to Alabama for disposal.[20]

State oversight of Alabama's dangerous dams is also totally missing. None of the state's 16 coal ash dams have been subject to state regulatory inspections in the past five years. After inspections by the EPA and TVA contractors in 2009–2010, five of the dams were given poor ratings and two had to make immediate repairs to improve stability. Alabama dams are, on average, the tallest and largest coal ash dams in the 10 most dangerous states. The average height is nearly 7 stories tall (over 66 feet), and the average surface area is greater than 192 acres (about 151 football fields)—more than twice the average of coal ash ponds in the other nine states. These large ponds pose high threats—two of Alabama's dams are high hazard, and 11 are significant hazard dams. Lastly, these ponds are **old**—the average age of an Alabama coal ash pond is 40 years. According to the EPA, that's the estimated lifespan, but Alabama utilities have announced no retirement plans.[21]

Alabama's coal ash ponds disproportionately impact low-income communities and communities of color. The EPA statistics show that more than 40 percent of the citizens living near coal ash ponds in Alabama are non-white. Also, about 25 percent of nearby residents are below the poverty line, which is more than twice the national average poverty rate of 11.9 percent.

2. Georgia

Georgia is the eighth largest coal ash-producing state, and, in gross disregard to the safety of its citizens, it has a hands-off approach to coal ash at its 29 coal ash ponds. Georgia's role in ensuring the safety of coal ash impoundments basically stops at dam construction. There is nothing in Georgia law to specify how often inspections must occur, and in practice, regulatory inspections of Georgia's numerous aging ponds are exceedingly rare—only 7 percent of Georgia's dams have been inspected by the state in the past five years, yet 13 of the state's 29 ponds are at least 40 years old. Georgia requires no emergency action plans, no inundation maps to determine what areas would be impacted in the event of a breach, and no bonds to cover closure or cleanup.

The threat from coal ash in Georgia is substantial. The state ranks second among the 10 most dangerous states in total surface area covered by impoundments (2,218 acres—almost three times the size of Central Park). Yet the state does not require liners or monitoring wells at coal ash ponds—despite the fact that many of the ponds are built on unstable, karst terrain.[22] The state does not even prohibit the siting of landfills and ponds directly in the water table. Of Georgia's 29 coal ash ponds, two are rated high

hazard and 11 are rated significant hazard. So far, Georgia has one dam rated poor by EPA inspectors—the 25-year-old, 54-acre ash pond at Georgia Pacific's Plant Hammond in Coosa, GA, where the percent of citizens living below the poverty line exceeds the county average.

3. Illinois

State regulatory control of Illinois' many large coal ash ponds is sorely missing, and the threat to Illinois citizens is substantial. The state has 68 operating coal ash dams and 15 ponds that no longer accept waste, but which still pose a danger to adjacent communities.[23] In fact, counting these retired ponds, Illinois ranks first in the nation in the number of coal ash ponds with 83. Even without including the 15 retired ponds, Illinois ranks second among the 10 most dangerous states in total surface area for its coal ash impoundments (over 3.3 square miles of ponded ash, which is more than 86 times the size of Chicago's famed Millennium Park). A recent inventory by the Illinois Environmental Protection Agency (IEPA) revealed that only about a third of Illinois ponds are lined or monitored.[24] This is no surprise because Illinois regulations do not require composite liners or groundwater monitoring at every coal ash pond and landfill. According to a 2010 assessment by the IEPA, 10 Illinois power plants with active ponds were characterized as having "high" to "very high" potential to contaminate a drinking water source. According to the U.S. EPA[25] and the IEPA,[26] coal ash has already contaminated water at 15 power plant sites in the state.

Disturbingly, the structural integrity of Illinois coal ash ponds remains unknown. Because there is no regular inspection requirement of ponds by state regulators, few of the state's 68 operating dams have been inspected by the state in the past five years. The EPA has inspected only four of the state's dams. In addition, only 10 of Illinois' ponds have been assigned hazard ratings, yet at least seven of the unrated ponds are taller than 25 feet.[27] Compounding Illinois' problem is the lack of a requirement for area inundation maps—a key component of proper emergency planning because an inundation map indicates the area of probable flooding in the event of a dam failure. This is an environmental justice issue in Illinois, where approximately one-fifth of residents living near coal ash ponds are below the poverty line.

4. Indiana

Indiana citizens have good reason to worry about coal ash. Indiana is sixth in the nation in coal ash generation, and it has more operating coal ash ponds (71) than any other state in the U.S.[28] The state also has an alarmingly poor record of dam safety and water contamination and exceedingly lax regulations, even when compared to the other nine most dangerous states. For example, in Indiana:

- A staggering 25 of the 41 coal ash dams inspected by the EPA to date were given a "poor" rating for structural integrity;

- There have already been two major 30 million gallon spills from coal ash ponds at the Eagle Valley Generating Station in Indianapolis and two spills at the R.M. Shafer Power Station;
- Contaminated groundwater has been documented at eight sites, including in the Town of Pines, which has been designated a Superfund site;[29]
- Only 11 percent of the state's ponds have had state regulatory inspections in the past five years; and
- Less than half of the state's coal ash dams have hazard ratings.

State regulations could hardly be worse. First, there are shockingly few requirements for ensuring dam safety in Indiana, including no requirement that the dam be designed by a professional engineer, no requirement to inspect dams, no reporting requirements, no inundation mapping, no emergency plans required, and no bond requirements. Similarly, state law fails to protect drinking water and surface water. Indiana regulations do not require groundwater monitoring or composite liners at all ponds and landfills nor do the regulations prohibit dumping directly into the water table. The eight contaminated sites in Indiana and the numerous pond spills are the direct result of the state's lax oversight.

5. Kentucky

Kentucky is on the most dangerous list because the threat from coal ash is enormous in this leading coal-burning state, yet state regulations require exceedingly little from owners and operators of coal ash ponds and landfills. Kentucky is fifth in the nation in coal ash generation, and it has 43 operating coal ash ponds—21 of which exceed a height of 25 feet or impound more than 500 acre-feet of ash. In fact, Kentucky has the third largest coal ash storage capacity (more than 64,000 acre-feet) in the nation. This is equivalent to covering the Churchill Downs Racetrack, home to the Kentucky Derby, is held each year, under 800 feet of toxic sludge. Kentucky ties Ohio for the most high hazard dams (eight). It should concern Kentucky residents that professional engineers did not design 20 of the state's 43 dams nor did they construct 27 of them. Only 15 of Kentucky's dams have been inspected by the EPA to date, and, by admission of the power plant owners, engineers do not presently monitor 30 of the 43 dams.

State oversight of the coal ash dams is also minimal. There are no regular reporting requirements after construction, except for certificate renewal every five years. Operators are not given an inspection frequency and are not required to post a bond to ensure safe operation and maintenance or even completion of dam construction. Finally, Kentucky does not require emergency action planning or inundation mapping, which is astounding given the presence of eight high hazard dams that are likely to take human lives if they break and six significant hazard dams that would cause substantial economic and/or environmental damage in the event of failure.

Groundwater contamination from coal ash dumping has been documented at four sites in Kentucky. Many more sites are likely contaminated but not detected, because the state does not require composite liners at all ponds and landfills nor does the state prohibit dumping directly into the water table. Yet because Kentucky regulations do not require groundwater monitoring at all coal ash dump sites, the extent of the contamination is largely unknown. We do know, however, that by the EPA's calculation, **100 percent** of the toxic chemical releases to land of arsenic, chromium and mercury in Kentucky come from disposal of coal ash in landfills and ponds.[30]

6. Missouri

In Missouri, only the largest, most dangerous of the state's 32 coal ash ponds are regulated. Amazingly, Missouri allows ponds impounding more than 170 million gallons of coal ash to escape safety regulations. This amount is roughly equivalent to 35,000 bathtubs full of coal ash or an area the size of Washington's National Mall covered in sludge about two feet deep. Furthermore, Missouri has not assigned a hazard rating to a single coal ash impoundment in the state. The EPA has inspected only two of Missouri's 32 dams and rated those dams as high hazard and significant hazard. Undoubtedly, many of Missouri's other ponds are also potentially dangerous because 14 ponds are over 25 feet high or impound more than 500 acre-feet. Yet state regulators have inspected only one dam in the past five years, despite the fact that about half the dams were not constructed by professional engineers and less than half are currently monitored by one.

Other key safety regulations to protect the public are also missing in Missouri. State regulations do not require regular inspections by dam safety officials. Missouri regulations also do not require groundwater monitoring or composite liners at all ponds and landfills, nor do the regulations prohibit dumping directly into the water table or require bonds to ensure cleanup at coal ash landfills.

7. North Carolina

Every single one of the North Carolina's 26 coal ash dams is enormous. The average dam height in North Carolina is more than six stories tall (62 feet), and the total storage capacity is nearly 65,000 acre-feet—enough toxic waste to flood an area nine times the size of Central Park one foot deep. This means that it is essential that North Carolina have strict regulations for dam safety. Unfortunately, the state does not require operators to submit regular reports to regulators, have emergency action plans, generate inundation maps, or post bonds in the case of dam failure.

Only 42 percent of North Carolina's ponds have been inspected by a state regulator in the past five years. Over the last two years, however, the EPA inspected 22 of North Carolina's dams and gave six of the ponds a poor rating. One of these high hazard poor-rated dams, at Progress Energy's Asheville Electric Plant, is located in a

densely populated area with nearly 1,800 residents within a one-mile radius. The population near the plant also exceeds state averages for low income and minority residents.

North Carolina also does not require groundwater monitoring nor composite liners at all its ash ponds. North Carolina's lax regulation of coal ash ponds and landfills has resulted in 10 dump sites where local communities are threatened because groundwater or surface water has been contaminated with toxic pollutants such as arsenic, selenium and boron.[31]

8. Ohio

Despite the fact that Ohio is the third largest producer of coal ash in the U.S., Ohio has one of the most lax regulatory programs in the nation. Ohio excludes all coal ash from regulation by classifying it as "nontoxic."[32] Due to lax state regulations, which fail to require composite liners at all coal ash ponds and landfills, water contamination has occurred at seven coal ash dump sites across the state. Many other sites in Ohio may also be poisoned but remain undetected, because the state does not require groundwater monitoring at all sites.

We do know, however, that something has gone terribly wrong at Ohio's huge coal ash ponds. The EPA gave a poor rating to 10 Ohio dams, greater than a third of Ohio's 29 coal ash dams. Three poorly-rated dams at Dayton Power and Light's J.M. Stuart Station in Aberdeen are located in the most densely populated area of any of the 55 dams in the U.S. found by the EPA to be in poor condition. The J. M. Stuart dams have 2,265 residents within a 1-mile radius. The population near the Stuart Station also exceeds state averages for low income and minority populations.

Ohio citizens have great reason to be concerned. The average dam height in Ohio is more than five stories tall (52.6 feet), and the total storage capacity is the third largest of the 10 worst states (over 73,000 acre-feet)—enough to flood 114 square miles in sludge a foot deep. Sixteen (over half) of Ohio's ponds have dams that are rated either high or significant hazard. Ohio likely has more high and significant hazard dams, since five not-yet-rated dams are over 25-feet high (with four over 40-feet high). Nine of Ohio's 29 dams were not designed by a professional engineer, and 10 of the state's dams were not constructed by one. The state also has some of the oldest dams of the 10 states. The average age of Ohio coal ash dams is 39 years.

9. Tennessee

In 2008, the cataclysmic TVA disaster graphically demonstrated just how dangerous it is to live next to a coal ash pond. The collapse of a dam at TVA's Kingston Fossil Plant destroyed a riverside community, and the decade-long cleanup is estimated to cost more than $1 billion. The disaster in Harriman, Tennessee spurred TVA to

evaluate its other large coal ash dams (24 in total) in TVA's three-state region. At TVA's seven Tennessee plants, inspectors found that half the ponds (eight) failed to meet federal stability standards established by the U.S. Army Corps of Engineers.[33] Remedial action was required at all eight dams to increase stability.

The collapse of the Kingston dam was a direct result of the absence of state oversight and maintenance at Tennessee's coal ash dams. There is **no set of rules that apply to the structural stability and safety of Tennessee's coal ash dams.** While the state does have a comprehensive set of dam safety laws and regulations, **it specifically exempts coal-ash dams from its scope.** While this would be shocking in any state, it is abhorrent in Tennessee, which suffered the worst coal-ash disaster, and arguably one of the worst environmental disasters in history. Given the absence of state regulations, it is not surprising that prior to the dam failure, none of the dams in Tennessee had been subject to an official regulatory inspection within the previous five years.

Similarly, Tennessee regulations fail to prevent contamination of water via the slow escape of chemicals from landfills and impoundments. Eight sites in the state have been documented with contamination of surface and/or groundwater from coal ash. One of the most polluted is the Superfund site at the Oak Ridge Y-12 Plant where arsenic and selenium releases led to fish deformities and a widespread extirpation of aquatic life.[34]

10. Virginia

Coal ash from Virginia's 16 coal-fired power plants has created a substantial toxic legacy in the Commonwealth. Coal ash contamination has generated at least two federal Superfund sites in Virginia,[35] including one on the National Priority List of the nation's most contaminated Superfund sites,[36] as well as two other sites where coal ash contaminated groundwater[37] or caused extensive ecological damage.[38] Despite the history of coal ash contamination, Virginia regulations do not require composite liners, groundwater monitoring and daily cover at every coal ash pond and landfill.

The legacy of mismanagement extends to oversight of the structural integrity of Virginia's large coal ash ponds, as well. Virginia's coal ash dams are some of the oldest, having an average age of 40 years. Virginia has 11 ash ponds, including five significant hazard coal ash dams, with an average height of more than five stories. The EPA gave one of Virginia's significant hazard dams a poor rating and asked the owner, Dominion Virginia Power, to take immediate remedial action at the Chesapeake Energy Center to address the "urgent action items" that "require immediate attention to ensure the structural integrity of the impoundment in the near term."[39] Serious problems like these may well escape detection in Virginia because the Commonwealth does not require inspection of dams by state regulators and requires only infrequent reporting by owners. Virginia also does not require a bond to ensure safe operation and maintenance or even completion of dam construction.

But Virginia's lack of regulatory control over coal ash is playing with fire. One hundred percent of the releases to land of arsenic, chromium and selenium, and over 92 percent of the releases to land of mercury, come from coal ash alone.[40]

[dis]Honorable Mention
The Wild West: Arizona, Montana, New Mexico, Texas and Utah

Not only is the situation dismal in the 10 worst states, but some of the largest coal ash-generating states in the country have no or nearly no coal ash regulatory programs—and many are found in the arid west, where water is scarce. Two states—New Mexico and Utah[41]—exempt coal ash completely from regulation as a solid waste, leaving the disposal of coal ash virtually unregulated. Montana and Arizona are not much better. Texas excludes from regulation all coal ash that is disposed of on-site (defined as anywhere within 50 miles of the power plant) or destined for "beneficial" reuse (which includes dangerous minefilling).[42] In these five states, which together generate approximately 24.8 million tons of coal ash each year (about 18 percent of the total coal ash generated in the U.S.), very few safeguards are required.

CONCLUSION

Clearly, federal coal ash regulations are needed to protect communities from leaking and unstable landfills and ponds. The states have had decades to get this right—but most states still have huge and dangerous gaps in their programs. The 37 state programs we examined, which cover 98 percent of all ash generated in the nation, largely fail to protect their citizens' drinking water, air and environment from some of the most toxic chemicals known to man. The lack of adequate state regulatory programs is a major rationale for a strong federal rule under subtitle C. Not only would a subtitle C rule set mandatory minimum national standards for all states to enforce, it would also provide the EPA with authority to enforce such regulations if states are unable or unwilling to do so. Poisoned water, foul air and falling dams are not the inevitable consequences of coal ash disposal. These are threats that can and must be minimized by regulatory standards that require reasonable safeguards be followed. The states have failed miserably at this straightforward task and have placed the nation's most vulnerable communities at great risk. There is a solution, and the EPA proposed it over a year ago—regulation of coal ash as a hazardous waste under subtitle C of RCRA.

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[1] 75 Fed. Reg. 35,128, 35,157 (June 21,2010).
[2] U.S. Environmental Protection Agency, Regulatory Impact Analysis For EPA's Proposed RCRA Regulation of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry, April 30, 2010 at page 124.
[3] 75 Fed. Reg. at 35,237.
[4] 75 Fed. Reg. at 35,238.

[5] IPL, Response to US EPA 104(e) Information Request to Indianapolis Power and Light Company- Eagle Valley Generating Station (May 13, 2009), available at http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.
[6] *Id.*
[7] http://www.timesfreepress.com/news/2009/jan/13/tennessee-widows-creek-ash-may-be-more-toxic-kings/.
[8] http://www.starnewsonline.com/article/20100928/ARTICLES/100929663/1177?Title=Deluge-takes-toll-on-roads-ash-pond-sewers.
[9] US EPA, Human and Ecological Risk Assessment of Coal Combustion Wastes (April 2010) (draft).
[10] *Id.*
[11] Physicians for Social Responsibility, Coal Ash the Toxic Threat to Our Health and Environment (August 2010), http://www.psr.org/resources/coal-ash-the-toxic-threat-to-our-health-and-environment.html.
[12] *Id*.
[13] *Supra* at note iii. Date for cigarettes comes from Center for Disease Control, Cigarette Smoking-Attributable Morbidity-U.S. 2000, MMWR Weekly, September 5, 2003 / 52(35); 842–44.
[14] Based on 2005 coal ash generation volumes. *See* U.S. Environmental Protection Agency, Regulatory Impact Analysis For EPA's Proposed RCRA Regulation of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry, 32 (April 30, 2010).
[15] *Id.*
[16] *Id.*
[17] http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.
[18] *See* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm.
[19] http://www.epa.gov/osw/nonhaz/industrial/special/fossil/coalash-faqs.htm#13.
[20] US EPA, Database of Survey Responses, Information Requests from Electric Utilities, http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/survey5-16-11.pdf.
[21] 75 Fed. Reg. 35,153. EPA stated in the preamble to its proposed coal ash rule, "Surface impoundments are generally designed to last the typical operating life of coal-fired boilers, on the order of 40 years. However, many impoundments are aging: 56 units are older than 50 years, 96 are older than 40 years, and 340 are between 26 and 40 years old. In recent years, problems have continued to arise from these units, which appear to be related to the aging infrastructure, and the fact that many units may be nearing the end of their useful lives."
[22] According to EPA, Karst terraces are areas that are underlain by soluble bedrock, generally limestone or dolomite, and may contain extensive subterranean drainage systems and relatively large subsurface voids whose presence can lead to the rapid development of sinkholes. The Agency recognizes that rapid sinkhole formation that occurs in some karst terraces can pose a serious threat to human health and the environment by damaging the structural integrity of dams, liners, caps, run-on/run-off control systems, and other engineered structures. 75 Fed. Reg. 35,201.
[23] Illinois Environmental Protection Agency, Illinois EPA's Ash Impoundment Strategy Progress Report (October 2010), available at http://www.epa.state.il.us/water/ash-impoundment/documents/ash-impoundment-progress-102010.pdf.
[24] *Id.*
[25] US EPA, Coal Combustion Waste Damage Case Assessments (July 2007).
[26] *Supra* at note xxvi.
[27] US EPA, Database of Survey Responses, Information Requests from Electric Utilities, http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/survey5-16-11.pdf.
[28] *Id.*
[29] See Pines Ground Water Plume Site at http://www.epa.gov/region05/cleanup/pines/.
[30] See US EPA, Toxic Release Industry dataset update for 2009 released in February 2010, available at http://www.epa.gov/triexplorer/.
[31] See Environmental Integrity Project and Earthjustice, *Out of Control: Mounting Damages from Coal Ash Waste Sites*, February 2010, available at http://earthjustice.org/sites/default/files/library/reports/ej-

eipreportout-of-control-final.pdf and Environmental Integrity Project, Earthjustice and Sierra Club, In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment, August 2010, available at http://earthjustice.org/sites/default/files/files/report-in-harms-way.pdf.

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

[33] Stantec, Coal Combustion Facility Assessment Report (October 20, 2010), available at http://www.tva.gov/power/stantec2/Oct%202010%20presentation.pdf.

[34] US EPA, Coal Combustion Waste Damage Case Assessments, 20 (July 2007).

[35] Battlefield Golf Club Site, Chesapeake, VA, http://www.epa.gov/reg3hwmd/CurrentIssues/finalr-battlefield_golf_club_site/index.html.

[36] The Chisman Creek Superfund Site contaminated residential wells with vanadium and selenium from coal ash generated by the Yorktown Power Station. *See* http://www.epa.gov/reg3hwmd/super/sites/VAD980712913/index.htm.

[37] Possum Point Power Station is listed as a "proven damage case" in EPA's 2007 *Coal Combustion Waste Damage Case Assessments* due to cadmium and nickel contamination of groundwater.

[38] Coal ash from the Clinch River Plant caused ecological damage to fish, snails, mussels, and aquatic macroinvertebrates in the Clinch River. In 1967 a dike from a coal ash pond at Clinch River Plant collapsed releasing a caustic ash slurry into the Clinch River. Some 217,000 fish were killed for up to 90 miles downriver and benthic macroinvertebrates, snails and mussels were also wiped out or very negatively affected. Forty years after the spill, aquatic ecosystems downstream remain degraded. High concentrations of copper and aluminum from power plant effluent also contribute to biotic impairment.

[39] http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/dom-chesa-power-request.pdf.

[40] See US EPA, Toxic Release Industry dataset update for 2009 released in February 2010, available at http://www.epa.gov/triexplorer/.

[41] N.M. Code § 20.9.2.7(S)(9) (2010); Utah Code § 19-6-102(18)(b)(iii) (2010).

[42] 30 Tex. Admin. Code §§ 335.2(d); 335.1(138)(H) (2010).