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

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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 all 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 12 worst states; where regulations fail most completely to protect communities located near coal ash disposal sites, particularly coal ash ponds. Criteria for determining the most dangerous states include gross lack of basic regulatory safeguards, widespread dangerous disposal practices (especially wet disposal), and huge amounts of coal ash generated annually. By this measurement, the 12 worst states for coal ash disposal are (in alphabetical order): Alabama, Georgia, Illinois, Indiana, Kentucky, Missouri, North Carolina, Ohio, South Carolina, Tennessee, Texas, 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.

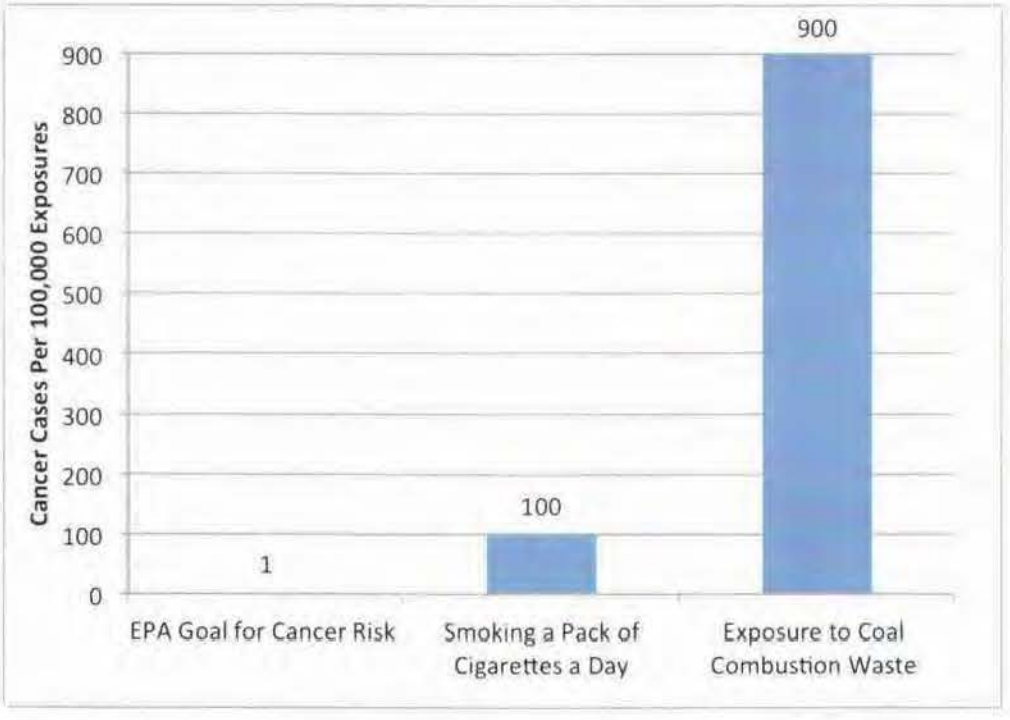
Poisoned Water and Air

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] [Appendix 1 contains a list of the 137 contaminated sites in 35 states.]

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 2 of this report provides citations to all state regulatory requirements.

Table 2. State-by-State Failure to Impose Basic Safeguards at Coal Ash Dumps[14]

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

States that exempt on-site storage or allow for variance of safeguards per regulator discretion are classified as lacking the requirement.

*With respect to dry landfills, Tennessee law provides for groundwater monitoring, financial assurances, landfill siting and composite liners merely as a default. Tenn. Comp. R & Regs. 1200-01-07-.01 et. seq. The same law also contains a very broad provision to allow the Commissioner of the Tennessee Department of Environment and Conservation to waive any of these provisions at his discretion. Tenn. Comp. R & Regs. 1200-01-07-.01(5).

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 3 of this report provides the corresponding state regulatory citations.

Table 3. Essential Coal Ash Pond Safeguards Missing in State Regulatory Programs[15]

State	Requires Dam Design/Supervision 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 a approved 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

Inconsistency Breeds Endangerment

State regulations governing coal ash are often wildly inconsistent with each other as well as internally inconsistent. These inconsistencies lead to the unequal protection of American communities from toxic waste. Fairness requires that federal waste regulations establish a floor of mandatory safeguards to ensure that all citizens, no matter where they live, are protected from coal ash.

Inconsistent state regulations lead to **cross-border dumping**. For example, lack of regulations in Alabama has made that state a coal-ash dumping ground. In fact, the Arrowhead landfill in Perry County, Alabama, which has received about 5 million tons of coal ash from Tennessee since 2009, is licensed to receive ash from no less that 33 states.[16] Inconsistent state regulations also result in **environmental injustice**-- the states with the most lax coal ash regulations are the states where coal ash dumps are most likely to disproportionately impact low-income communities and communities of color.

Internally, states also leave their citizens unprotected. For example, Wisconsin's regulation of wet ash disposal lacks many of the protections afforded to dry disposal in the state. Despite the existence of 18 coal-ash impoundments in Wisconsin, these dams are not included within the scope of the state's dam safety program.[17] This means that there are no structural safety or dam integrity regulations applying to coal-ash dams in the state. Likewise state regulators do not monitor the construction or operation of Wisconsin coal-ash dams. As a result, state regulators have inspected only one of the state's 18 dams within the last five years.

In the case of Florida, your protection from dangerous coal ash ponds depends on where you live within the state. Florida is a complex patchwork of local rules promulgated by five individual water management districts.[18] While three of these districts require a professional engineer to design or certify plans for a new dam, two have no such requirement.[19] Only one district requires regular inspections by regulators, and none of the districts require emergency action plans to protect human life during a disaster.[20] While the state of Florida does require permits for dams constructed within the state, the terms of those permits are left up to the individual water management districts.[21] The result of all of this—you should feel much safer living next to a dam in Florida Northwest than along the Suwanee River.

The only way to cure these inconsistencies is for EPA to establish mandatory federal regulations under RCRA that apply equally in all states. This is a national problem that demands a national solution.

PART III. THE 12 MOST DANGEROUS STATES

The 12 states described below make up about 50 percent of the yearly generation of coal ash—in total, 70.6 million tons of coal ash each year are generated in these states.[22] Together the 12 states host at least 217 coal-fired power plants.[23] All of these states dispose of a substantial amount of their waste in over 350 coal ash ponds, the most dangerous type of coal ash disposal.[24] **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 12 most dangerous states.[25] Unless otherwise noted, the source for information for 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."[26] The source for information for 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.[27]

National Inventory of Dams criteria: "High," "Significant," and "Low"[28]

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**
   Coal ash Generation: 3,210,337 tons annually[29]
   Rank for Coal Ash Generation in US: 14th
   Number of Ash Ponds: 15
   Number of Documented Sites Contaminated by Coal Ash: 2

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.[30]

State oversight of Alabama's dangerous dams is also totally missing. None of the state's 15 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 12 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.[31]

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**
   Coal ash Generation: 6,077,700 tons annually
   Rank for Coal Ash Generation in US: 8th
   Number of Ash Ponds: 29
   Number of Documented Sites Contaminated by Coal Ash: 1

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 12 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.[32] 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**
   Coal ash Generation: 3,856,748 tons annually
   Rank for Coal Ash Generation in US: 11th
   Number of Ash Ponds: 83
   Number of Documented Sites Contaminated by Coal Ash: 12

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.[33] 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 12 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.[34] 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[35] and the IEPA,[36] 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.[37] 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

Coal ash Generation: 8,798,844 tons annually
Rank for Coal Ash Generation in US: 6th
Number of Ash Ponds: 71
Number of Documented Sites Contaminated by Coal Ash: 9

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.[38] The state also has an alarmingly poor record of dam safety and water contamination and exceedingly lax regulations, even when compared to the other eleven 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;[39]
- 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 from the leaching of toxic chemicals from ash. 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. In fact, state regulators are clear in their opposition to such common-sense protections. In 2010, the Commissioner of the Indiana Department of Environmental Management denied that coal ash shares the "harmful characteristics" of other types of hazardous waste, and he urged EPA to

weaken its proposed subtitle D standards to allow coal ash to be placed below the water table.[40] The eight contaminated sites in Indiana, including the poisoning of an entire town's drinking water aquifer, the large ash pond spills, and the 25 ponds with "poor" ratings are the direct result of the state's lax oversight.

5. **Kentucky**
   Coal ash Generation: 9,197,567 tons annually
   Rank for Coal Ash Generation in US: 5th
   Number of Ash Ponds: 43
   Number of Documented Sites Contaminated by Coal Ash: 4

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.[41]

6. **Missouri**
   Coal ash Generation: 2,679,742 tons annually
   Rank for Coal Ash Generation in US: 16th
   Number of Ash Ponds: 32
   Number of Documented Sites Contaminated by Coal Ash: 4

In Missouri, only the largest, most dangerous of the state's 32 coal ash ponds are regulated for dam safety. 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 fewer 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.

These deficiencies are threatening Missouri's environment. The Missouri Department of Natural Resources (DNR) has known since 1992 that a 154-acre, unlined ash pond at Ameren's Labadie plant – the largest coal plant in the state and the 14th largest coal plant in the nation – has been leaking some 50,000 gallons per day. DNR has not required groundwater monitoring or cleanup, despite the threat to the local population that relies on groundwater for drinking water and agricultural use. DNR has also allowed the plant to continue operating under a 1994 NPDES permit, which technically expired in 1999, without issuing an updated renewal permit to require groundwater monitoring and cleanup. Missouri citizens deserve better.

7. **North Carolina**
   Coal ash Generation: 5,504,531 tons annually
   Rank for Coal Ash Generation in US: 9th
   Number of Ash Ponds: 26
   Number of Documented Sites Contaminated by Coal Ash: 10

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 19 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.[42]

8. Ohio

Coal ash Generation: 10,429.446 tons annually
Rank for Coal Ash Generation in US: 3rd
Number of Ash Ponds: 29
Number of Documented Sites Contaminated by Coal Ash: 7

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."[43] 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 12 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 12 states. The average age of Ohio coal ash dams is 39 years.

9. South Carolina

Coal ash Generation: 2, 178, 359 tons annually
Rank for Coal Ash Generation in US: 21st
Number of Ash Ponds: 22
Number of Documented Sites Contaminated by Coal Ash: 4

A striking proportion of the 22 ash dams in South Carolina – over 50% -- are large capacity impoundments or have dam heights above 25 feet. While the breach of any of these dams would undoubtedly inundate a large area (six are significant hazard rated dams), the state does not require hazard ratings and eight of the dams remain unrated. Compounding this problem, the state does not require **any** state regulatory inspections and **none** of the dams in South Carolina have been subject to a regulatory inspection within the past five years. While South Carolina has a fair set of regulations for the design and construction of new dams, its laws are deficient when it comes to inspection and oversight of existing dams. Annual geotechnical inspections should be required of the operators, and experienced regulators need to take a more active oversight role. With so many large dams in the state, it is imperative that regulators beef up both the contents and application of dam safety regulations – it is the only way to minimize the threat to the environment and people of South Carolina.

To date, there is evidence that at least five coal ash dump sites in South Carolina have contaminated groundwater or surface water with arsenic and other dangerous chemicals. In fact, one of the polluted and most thoroughly studied cases of coal ash contamination is in the Savannah River in South Carolina. A power plant discharged coal ash into ponds that overflowed into the Savannah River floodplain for more than a decade. Scientists found severe ecological damage, especially to amphibians, which have experienced mutations and die-offs.[44] Concentrations of arsenic, selenium, and strontium in some amphibians were as much as 11-35 times higher than in the same species collected from unpolluted wetlands. Arsenic was also found leaking from ponds at the SCE &C Wateree Station, SCE&G Urquhart Station and the SC Public Service Authority's Grainger Station.[45] At the Grainger Station, arsenic was found up to 91 times the drinking water standard in groundwater near the Waccamaw River. These releases are not surprising since South Carolina regulations do not require composite liners for their ponds and landfills.

10. Tennessee

Coal ash Generation: 3,240,120 tons annually
Rank for Coal Ash Generation in US: 13th
Number of Ash Ponds: 18
Number of Documented Sites Contaminated by Coal Ash: 7

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.[46] 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. With respect to dry landfills, Tennessee law provides for groundwater monitoring, financial assurances, landfill siting and composite liners merely as a default.[47] The same law also contains a very broad provision to allow the Commissioner of the Tennessee Department of Environment and Conservation to waive any of these provisions at his discretion.[48] 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.[49]

11. Texas

Coal ash Generation: 13,165,728 tons annually
Rank for Coal Ash Generation in US: Second
Number of Ash Ponds: 31
Number of Documented Sites Contaminated by Coal Ash: 5

Texas is the second largest generator of coal ash in the U.S., but the laws in Texas governing the disposal of ash are among the worst. Texas excludes from

regulation all coal ash that is disposed of "on-site," which is defined in Texas as anywhere within 50 miles of the power plant![50] Texas also excludes from regulation all coal ash that is destined for "beneficial" reuse.[51] This is a big problem because in Texas "beneficial" reuse includes minefilling—the dumping of industrial waste in active and abandoned coal mines. This type of dumping often occurs directly into aquifers and has resulted in significant contamination in several states.[52]

The harmful release of pollutants to water and air from landfills is highly likely, because at least seven Texas coal plants employ *no* liners or dust controls at their landfills.[53] In fact, dangerous contamination of drinking water is occurring at the Lower Colorado River Authority, Fayette Power Project in La Grange, where coal ash is polluting groundwater with arsenic, molybdenum and selenium exceeding state standards-- which has required the Texas Commission on Environmental Quality to warn neighboring landowners.[54]

There is also abundant evidence of dangerous chemical releases from coal ash ponds in Texas. Texas coal ash ponds are not especially large or high, but they are numerous (31). Discharges from coal ash ponds caused the contamination of at least three reservoirs with selenium- the Brandy Branch Reservoir in northeastern Texas along the Louisiana border, the Welsh Reservoir northeast of Dallas, and the Martin Lake Reservoir southeast of Dallas. Coal ash discharges poisoned the water, caused major fish kills, and contaminated fish with high levels of selenium that lasted for over a decade. And the harm was not limited to fish. The contaminated fish threatened the health of those who fished and consumed them. In response, the Texas Department of Health issued fish consumption advisories, in one case warning people to eat no more than eight ounces of fish from the reservoir per week. Another advisory urged children under six and women who were pregnant or might become pregnant not to consume any fish from the reservoir whatsoever. That advisory remained in effect for 12 years.[55] In addition, there is evidence that the toxin entered the food chain resulting in elevated selenium concentrations in birds nesting near the lakes. Even now, decades after the releases occurred, selenium concentrations in fish remain as high as 1.8 to 27 times the national average in two of the three reservoirs, according to 2009 Health Consultation by the Agency for Toxic Substances and Disease Registry.[56]

Lastly, the legacy of poor regulatory authority in Texas was evident in the determination in March 2011 by U.S. EPA that three coal ash ponds were in "poor" condition.[57] Among the problems observed were erosion, seeps and the absence of engineering studies that indicate the structural stability of the ponds. EPA also noted that the absence of documented inspections and emergency action plans.

12. Virginia

Coal ash Generation: 2,388, 527 tons annually
Rank for Coal Ash Generation in US: 18th
Number of Ash Ponds: 11
Number of Documented Sites Contaminated by Coal Ash: 4

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,[58] including one on the National Priority List of the nation's most contaminated Superfund sites,[59] as well as two other sites where coal ash contaminated groundwater[60] or caused extensive ecological damage.[61] 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."[62] 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.[63]

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

Not only is the situation dismal in the 12 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[64]—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. In these four arid states, with scarce and valuable underground sources of drinking water, very few safeguards are required.

CONCLUSION

The Myth is Busted: States are not doing a "good job"

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] An appendix to Table 2 can be found at http://earthjustice.org/documents/report/pdf/state-groundwater-monitoring-requirements-coal-combustion-waste-landfills.

[15] An appendix to Table 3 can be found at: http://earthjustice.org/documents/report/pdf/appendix-of-dam-safety-laws-across-the-states

[16] http://adem.alabama.gov/newsEvents/notices/jun11/6perry.htm. The Arrowhead landfills is permitted to accept waste from Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa,

Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, West Virginia, and Wisconsin. See also, http://perryherald.blogspot.com/2009/06/three-million-tons-of-coal-ash-headed.html.

[17] *See* Wisconsin Admin. Code NR § 333.03. This regulation defines a "dam" as "any artificial barrier in or across a water-course which has the primary purpose of impounding or diverting water." Because coal-ash impoundments do not fit within this regulatory definition of a "dam" they are not regulated by the Wisconsin dam safety program.

[18] http://www.dep.state.fl.us/water/mines/damsafe.htm. The Florida Dam Safety Program homepage describes the relationship between the Florida Department of Environmental Protection, the five regional water management districts and the U.S. Army Corps of Engineers.

[19] The districts of Northwest Florida, Florida Southwest, and South Florida all have such a design requirement. *See* Fla. Admin. Code §§ 40A-4.101 (Northwest Florida), 4OD-4.381(m) (Florida Southwest); *see also* Rules of the South Florida Water Management District Appx. 6 Rule 1.3 *available at* http://www.dep.state.fl.us/water/mines/docs/BOR_08_00.pdf. The St. John's River and Suwanee River districts do not.

[20] The Northwest Florida Water Management district has an annual inspection requirement. *See* Fla. Admin Code § 40A-4.461. The state code contains only a vague "periodic inspection" requirement, which is not elaborated upon in any other district. Fla. Stat. § 373.423.

[21] A copy of each district's regulations are available at: http://www.dep.state.fl.us/water/mines/damsafe.htm.

[22] 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).

[23] *Id.*

[24] *Id.*

[25] Fact sheets on all listed states can be found at http://earthjustice.org/features/campaigns/state-fact-sheets-on-coal-ash.

[26] http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys/index.htm.

[27] *See* http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm.

[28] http://www.epa.gov/osw/nonhaz/industrial/special/fossil/coalash-faqs.htm#13.

[29] Information regarding amount of coal ash generated is EPA's Regulatory Impact Analysis for EPA's Proposed RCRA Regulation of Coal Combustion Residues (CCR) Generated by the Electric Utility Industry, specifically the 2007 US Department of Energy, Energy Information Agency (EIA) database for electricity power plants from the Form EIA-860 "Annual Electric Generator Report."

[30] 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.

[31] 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."

[32] 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.

[33] 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.
[34] *Id.*
[35] US EPA, Coal Combustion Waste Damage Case Assessments (July 2007).
[36] *Supra* at note xxvi.
[37] 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.
[38] *Id.*
[39] See Pines Ground Water Plume Site at http://www.epa.gov/region05/cleanup/pines/.
[40] See Thomas W. Easterly, Commissioner IDEM, State of Indiana Comments on Hazardous Waste Management System (Oct. 22, 2010), available at http://www.uswag.org/pdf/2010/CCR%20Comments/IDEM10222010.pdf.
[41] See US EPA, Toxic Release Industry dataset update for 2009 released in February 2010, available at http://www.epa.gov/triexplorer/.
[42] 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.
[43] Ohio Admin. Code 3745:27-01(S)(23) (2010).
[44] National Academy of Sciences, National Research Council. Managing Coal Combustion Residuals in Mines, March 2006 at 78. Available at www.nap.edu.
[45] 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.
[46] Stantec, Coal Combustion Facility Assessment Report (October 20, 2010), available at http://www.tva.gov/power/stantec2/Oct%202010%20presentation.pdf.
[47] Tenn. Comp. R & Regs. 1200-01-07-.01 et. seq.
[48] Tenn. Comp. R & Regs. 1200-01-07-.01(5). For further information see Southern Alliance for Clean Energy, "The State of Coal Ash Regulation In Tennessee", October 2010, available at http://www.cleanenergy.org/images/files/TN Regulatory and Damage Report1.pdf.
[49] US EPA, Coal Combustion Waste Damage Case Assessments, 20 (July 2007).
[50] 30 Tex. Admin. Code §§ 335.2(d): 335.1(138)(H)(2010).
[51] *Id.*
[52] *See* Clean Air Task Force, *Impacts on Water Quality from Placement of Coal Combustion Waste in Pennsylvania Coal Mines* (July 2006), available at www.catf.us.
[53] *Id.*
[54] Environmental Integrity Project, Earthjustice and Sierra Club, In Harm's Way: Lack of Federal Coal Ash Regulations Endangers Americans and Their Environment, August 2010, at pp. 243-247, available at http://earthjustice.org/sites/default/files/files/report-in-harms-way.pdf.
[55] U.S. Environmental Protection Agency, Office of Solid Waste. Coal Combustion Waste Damage Case Assessments. July 9, 2007. Downloaded from http://www.publicintegrity.org/assets/pdf/CoalAsh-Doc1.pdf.
[56] See Agency for Toxic Substances and Disease Registry, Health Consultation, Welsh Reservoir, Mount Pleasant, Titus County, TX, October 2009, available at http://www.atsdr.cdc.gov/hac/pha/pha.asp?docid=145&pg=1, and Health Consultation, Martin Creek Lake, Henderson, Rusk and Panola Counties, Texas, October 2009, available at http://www.atsdr.cdc.gov/HAC/pha/pha.asp?docid=117&pg=1.
[57] The three poor-rated impoundments are located at the Coleto Crek Power Station in Fannin, TX (two ponds) and the Lower Colorado River Authority in La Grange, TX (one pond). *See* U.S. Environmental Protection Agency, Coal Combustion Residuals Impoundment Assessment Reports available at http://www.epa.gov/osw/nonhaz/industrial/special/fossil/surveys2/index.htm#F.

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

[59] 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.

[60] 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.

[61] 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.

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

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

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

Coal Ash Damage Cases Documented as of August 2010

	State	Site	Owner	Location	Documentation*
1	Alabama	Colbert Power Plant	TVA	Tuscumbia	EPA 2007 (P)
2		Widows Creek Power Plant	TVA	Stevenson	EPA 2007 (P)
3	Arizona	Cholla Plant	APS/Pinnacle West	Holbrook	EPA 2007 (P)
4	Arkansas	Flint Creek Plant	SWEPCO/AEP/Arkansas Electric	Gentry	EIP 8/2010
5		Independence Station	Entergy	Newark	EIP 8/2010
6	Connecticut	Montville Station	NRG Energy	Montville	EIP 8/2010
7	Delaware	Indian River Plant	NRG Energy	Millsboro	EIP 2/2010
8	Florida	Big Bend Station	Tampa Electric	Apollo Beach	EIP 2/2010
9		C.D. McIntosh Plant	City of Lakeland	Lakeland	EIP 8/2010
10		Curtis Stanton Center	Orlando Utilities	Orlando	EIP 2/2010
11		Lansing Smith Plant	Southern Co.	Sneeds	EPA 2007 (P)
12		P.L. Bartow Plant	Progress Energy	St. Petersburg	EPA 2007 (P)
13		Port Everglades Plant	FPL	Fort Lauderdale	EPA 2007 (P)
14		Riviera Plant	FPL	Riviera Beach	EPA 2007 (P)
15		Seminole Station	Seminole Electric Cooperative	Palatka	EIP 2/2010
16	Georgia	Plant Bowen	Southern Company	Cartersville	EPA 2007
17	Illinois	Coffeen/White & Brewer Trucking Fly Ash Landfill	White & Brewer Trucking	Montgomery County	EPA 2007 (P)
18		Duck Creek Station	AES	Canton	EPA 2007 (P)
19		Havana Power Plant	Dynegy	Havana	EPA 2007 (P)
20		Hennepin Power Station	Dynegy	Hennepin	EPA 2007 (P)
21		Hutsonville Power Station	Ameren Energy	Hutsonville	EPA 2007 (P)
22		Joliet 9 Generating Station	Edison International	Joliet	EIP 8/2010
23		Marion Plant	Southern Illinois Power Cooperative	Marion	EIP 8/2010
24		Powerton Plant - Mahoney Landfill	Edison International	Pekin	EPA 2007 (P)
25		Rocky Acres Disposal Site		Oakwood	EIP 2/2010
26		Venice Power Station	Ameren Energy	Venice	EIP 8/2010
27		Vermilion Power Station	Dynegy	Oakwood	EPA 2007 (P)
28		Wood River Power Station	Dynegy	Alton	EPA 2007 (P)
29	Indiana	A.B. Brown Station	Vectron	Mount Vernon	EPA 2007 (P)
30		Bailly Station	NiSource	Chesteron	EPA 2007 (P)
31		Clifty Creek Station Landfill	Ohio Valley Electric	Madison	EIP 2/2010
32		Gibson Plant	Duke Energy	Princeton	EIP 2/2010
33		Merom Station CCW Landfill	Hoosier Energy	Merom	EPA 2007 (P)

34		Michigan City Site	NIPSCO	Michigan City	EPA 2007 (P)
35		Petersburg Station	AES	Petersburg	EPA 2007 (P)
36		R.M. Schahfer Station	NiSource	Wheatfield	EPA 2007 (P)
37		Yard 520/Brown's Landfill	NIPSCO	Township of Pines	EPA 2007
38	Iowa	George Neal Station North	Berkshire Hathaway	Sergeant Bluff	EIP 8/2010
39		George Neal Station South	Berkshire Hathaway	Salix	EIP 8/2010
40		Lansing Power Station	Alliant Energy	Lansing	EIP 8/2010
41		Muscatine County Landfill		Muscatine County	EPA 2007 (P)
42	Kentucky	East Bend Scrubber Sludge Landfill	Duke Energy		EPA 2007 (P)
43		Mill Creek Station	E.ON	Louisville	EIP 8/2010
44		Shawnee Fossil Plant	TVA	West Paducah	EIP 8/2010
45		Spurlock Power Station	Easts Kentucky Power Cooperative	Maysville	EIP 8/2010
46	Louisiana	Big Cajun 2 Plant	NRG Energy	New Roads	EIP 8/2010
47		Dolet Hills Station	Cleco Power	Mansfield	EIP 8/2010
48		Rodemacher Station	Cleco Power	Lena	EIP 8/2010
49	Maryland	Brandywine Coal Ash Landfill	Mirant	Brandywine	EIP 2/2010
50		Morgantown Station, Faulkner Off-site Disposal Facility	Mirant	Faulkner	EPA 2007
51	Massachusetts	City of Beverly/Vitale Bros. Fly Ash Pit	Vitale Bros.	Beverly	EPA 2007
52		K.R. Rezendes S. Main St. Ash Landfill		Freetown	EPA 2007 (P)
53		Brayton Point Station	Dominion	Somerset	EPA 2007 (P)
54		Salem Acres		Salem	EPA 2007
55	Michigan	JR Whiting	CMS Energy	Erie	EIP 8/2010
56		Karn/Weadock	CMS Energy	Essexville	EIP 2/2010
57		North Lansing Landfill	Lansing Board of Water & Light	North Lansing	EPA 2007
58	Minnesota	Sherburne County Plant	Xcel	Becker	EPA 2007 (P)
59	Montana	Colstrip Plant	PPL	Colstrip	EIP 2/2010
60	Nebraska	Sheldon Station	Nebraska Public Power	Hallam	EIP 8/2010
61	Nevada	Reid Gardner	NV Energy	Moapa	EIP 2/2010
62	New Mexico	Four Corners Plant	Pinnacle West Capital	Fruitland	EIP 2/2010
63	New York	Cayuga	AES	Lansing	EIP 8/2010
65		Danskammer Waste Management Facility	Dynegy	Newburgh	EPA 2007 (P)
66		Don Frame Trucking			EPA 2007
64		Huntley Station Flyash Landfill	NRG	Tonawanda	EPA 2007 (P)

67		Weber Ash Disposal Site	AES		EPA 2007 (P)
68	North Carolina	Allen Plant	Duke Energy		EPA 2007 (P)
69		Asheville Plant	Progress Energy	Arden	EIP 2/2010
70		Belews Creek Station	Duke Energy	Belews Creek	EIP 2/2010
71		Belews Lake	Duke Energy		EPA 2007
72		Cape Fear Plant	Progress Energy	Moncure	EIP 2/2010
73		Dan River	Duke Energy	Eden	EIP 8/2010
74		Hyco Lake	Progress Energy	Semora	EPA 2007
75		Lee Plant	Progress Energy	Goldsboro	EIP 2/2010
76		Sutton Plant	Progress Energy	Wilmington	EIP 2/2010
77		Swift Creek Structural Fill	ReUse/Full Circle Solutions	Rocky Mount	EIP 2/2010
78	North Dakota	Antelope Valley	Basic Electric Power Cooperative	Beulah	EIP 8/2010
79		Coal Creek Station Surface Impoundments	Great River Energy	Underwood	EPA 2007
80		Leland Olds	Basic Electric Power Cooperative	Stanton	EIP 8/2010
81		R.M. Heskett Station	MDU Resources	Mandan	EPA 2007 (P)
82		W.J. Neal Station Surface Impoundment	Basic Electric Power Cooperative	Velva	EPA 2007
83	Ohio	Cardinal	AEP	Brillant	EIP 8/2010
84		Conesville Fixed FGD Sludge Landfill	AEP	Conesville	EPA 2007 (P)
85		Gavin Power Plant	AEP	Cheshire	EIP 8/2010
86		Industrial Excess Landfill Superfund Site	Hyman Budoff/Merle & Charles Kittinger	Uniontown	EIP 8/2010
87		Miamiview Landfill	Duke Energy	Hamilton County	EPA 2007 (P)
88		Muskingum River Plant	AEP	Beverly	EIP 8/2010
89		W.C. Beckjord Station	Duke Energy	New Richmond	EPA 2007 (P)
90	Oklahoma	Northeastern	AEP	Oologah	EIP 8/2010
91	Oregon	Boardman	PGE	Boardman	EIP 8/2010
92	Pennsylvania	Bruce Mansfield Station	FirstEnergy	Shippingport	EIP 8/2010
93		Elrama Power Plant	Reliant	Elrama	EPA 2007 (P)
94		Fern Valley Landfill	Reliant	Elrama	EIP 2/2010
95		Hatfields Ferry Station	Allegheny Energy	Masontown	EIP 8/2010
96		Hunlock Power Station	UGI Development	Hunlock Creek	EIP 2/2010
97		Mitchell Power Station	Allegheny Energy	Courtney	EIP 2/2010
98		Phillips Power Station Landfill	Duquesne Light	Crescent Township	EIP 2/2010
99		Portland Station's Bangor Ash Disposal Site	RRI Energy	Bangor	EIP 2/2010
100		Seward	RRI Energy	New Florence	EIP 2/2010
101	South Carolina	Canadys Plant	SCANA		EPA 2007
102		Grainger Station	Santee Cooper	Conway	EIP 2/2010
103		Savannah River Project	Department of Energy		EPA 2007
104		Urquhart Station	SCANA	Beech Island	EIP 2/2010

105		Wateree Station	SCANA	Eastover	EIP 2/2010
106	South Dakota	Big Stone	Otter Tail Power	Big Stone	EIP 8/2010
107	Tennessee	Bull Run	TVA	Oak Ridge	EPA 2007 (P)
108		Cumberland	TVA	Cumberland City	EIP 8/2010
109		Gallatin	TVA	Gallatin	EIP 8/2010
110		John Sevier	TVA	Rogersville	EIP 2/2010
111		Johnsonville	TVA	New Johnsonville	EIP 8/2010
112		Oak Ridge Y-12 Plant Chestnut Ridge Operable Unit 2	Department of Energy		EPA 2007
113		Trans-Ash Coal Combustion Waste Landfill	Trans-Ash	Camden	EIP 2/2010
114	Texas	Brandy Branch Reservoir	AEP	Hallsville	EPA 2007
115		Fayette Power Project	Lower Colorado River Authority	La Grange	EIP 8/2010
116		Martin Lake Reservoir	TXU	Tatum	EPA 2007
117		Welsh Reservoir	AEP	Mt Pleasant	EPA 2007
118	Virginia	Clinch River	AEP	Cleveland	EIP 8/2010
119		Glen Lyn	AEP	Glen Lyn	EIP 8/2010
120		Possum Point	Dominion	Dumfries	EPA 2007
121		Yorktown Station Chisman Creek Disposal Site	Dominion	Yorktown	EPA 2007
122	West Virginia	John Amos Plant	AEP	Winfield	EIP 2/2010
123		Mitchell Plant	AEP	Moundsville	EIP 2/2010
124	Wisconsin	Alma Station Off-site Fly Ash Landfill	Dairyland Power		EPA 2007 (P)
125		Alma Station On-site Fly Ash Landfill	Dairyland Power	Alma	EPA 2007 (P)
126		Cedar-Sauk Landfill	WEPCO		EPA 2007
127		Columbia Energy Center	Alliant	Pardeeville	EIP 8/2010
128		Edgewater 1-4 Ash Disposal Site	Alliant		EPA 2007 (P)
129		EJ Stoneman Station Ash Disposal Pond	Dairyland Power Cooperative		EPA 2007
130		Highway 59 Landfill	WEPCO		EPA 2007
131		Lemberger Landfill			EPA 2007 (P)
132		Nelson Dewey Ash Disposal Facility	Alliant		EPA 2007
133		Oak Creek	Wisconsin Energy	Oak Creek	EIP 8/2010
134		Port Washington Facility	WEPCO		EPA 2007
135		Pulliam Ash Disposal Site	WPSC		EPA 2007 (P)
136		Rock River Station	Alliant	Beloit	EPA 2007 (P)
137	Wyoming	Dave Johnston Power Plant	Berkshire Hathaway	Glenrock	EPA 2007 (P)

* EIP 2/2010 is "Out of Control," Environmental Integrity Project and Earthjustice, Feb. 24, 2010.
EIP 8/2010 is "In Harm's Way," Environmental Integrity Project, Earthjustice and Sierra Club, Aug. 26, 2010;
EPA 2007 is "Coal Combustion Waste Damage Case Assessments," U.S. EPA, July 9, 2007; sites it lists as possible damage cases designated with (P).

(Chart prepared by the Institute for Southern Studies/Facing South, online at www.southernstudies.org.)

Table 1: State Groundwater Monitoring Requirements: Coal Combustion Waste Landfills

State	Regulation date	Monitoring required at landfills	Grandfathering of old landfills	Monitoring location	Minimum number of wells	Sampling parameters	Monitoring frequency	Post-closure monitoring period	Monofill exemption	Onsite exemption	Exemption based on TCLP results
Alabama	5-5-11. 2011 AL H B. 50 (NS)-Alabama Code §22-27-3(h). Coal ash regulated as solid waste.	**Yes**. AL ADC 335-13-4-.27.	**Yes**. Alabama Code §22-27-3(h).	Within 150 meters of waste management unit boundary. AL ADC 335-13-4-.27.	**One background** upgradient and **two downgradient**. AL ADC 335-13-4-.14; AL ADC 335-13-4-.27.	Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. AL ADC 335-13 App. I.	**Semi-annual**. AL ADC 335-13-4-.27.	**30 years**. AL ADC 335-13-4-.20.	No.	No.	No.
Arizona	No regs.	No.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Colorado	10/9/1991	**Yes**. 6 CO ADC 1007-2:1-2.2. / **on-site exempt**.	**No**. 6 CO ADC 1007-2:1-2.2.	Within **150 meters** of waste management unit boundary. 6 CO ADC 1007-2:1 Appx. B B2(A)(2).	Class III: at least **one background** upgradient and **one downgradient** well. 5C ADC 61-107.19 Pct. V.E.256.51(a), (d).	Indicators: magnesium, sodium, potassium, calcium, carbonate, bicarbonate, chloride, sulfate, nitrate, nitrate, pH, specific conductivity, temp, TDC. 6 CO ADC 1007-2:1 Appx. IA. / **Waiver available**.	**Semi-annual**. 6 CO ADC 1007-2:1 Appx. B B4(B).	**30 years**. 6 CO ADC 1007-2:1-2.6.	No.	**Yes**. 6 CO ADC 1007-2:1-1.4.	No.
Florida	Adopted 1-8-1993. Amended 1-6-2010.	**Yes**. 62 FL ADC 62-701.510. CCW classified as Class I waste. 62 FL ADC 62-701.200(12). / **on-site exempt**.	**Yes**. Applies to all permit applicants. 62 FL ADC 62-701.510.	Within zone of discharge, within **50 feet** of edge of solid waste disposal unit. 62 FL ADC 62-701.510(3)(a). Wells to be no more than **500 feet apart**. (3)(d)(3).	At least **one background** and **two downgradient** well. 62 FL ADC 62-701.510(3)(a).	Ammonia, chlorides, iron, mercury, nitrate, sodium, TDS, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. 62 FL ADC 62-701.510(6)(a) (40 CFR 258 Appx. I).	**Semi-annual**. 62 FL ADC 62-701.510(6)(c).	**30 years**. 62 FL ADC 62-701.620(1).	No.	**Yes**.	No.
Georgia	Adopted 1989. Amended 6-27-1993.	**Possibly**. Required at MSWLFs (which may receive industrial waste). GA ADC 391-3-4-.14(1). / **Variance** available.	**No**. GA ADC 391-3-4-.14(1).	Within **150 meters** of waste management unit boundary. GA ADC 391-3-4-.14(8).	At least **one background/upgradient** and **one downgradient** well. GA ADC 391-3-4-.14(8).	Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel selenium, silver, thallium, vanadium, zinc, and various organics. GA ADC 391-3-4-.14(21) ; Appx. I. / **Waiver available**.	**Semi-annual**. GA ADC 391-3-4-.14(22).	**30 years**. GA ADC 391-3-4-.12(2).	**Discretionary variance available**. GA ADC 391-3-4-.07(4)(a).	No.	No.
Illinois	Section 811 adopted in 1990; section 816 adopted in 1996. Subsections 811.318; 811.319; 811.320 amended in 2007.	**Yes**. GW monitoring for putrescible and chemical waste landfills. 35 IL ADC 811.318; 811.319; 812.317.	**No**. 35 IL ADC 811.301.	**Property boundary or 100 ft** from edge of waste unit, whichever is closer. 35 IL 811.320, 35 IL ADC 811.318.	**At least one** well; multiple implied; network of monitoring points "at sufficient locations downgradient." No upgradient wells required. 35 IL ADC 811.318.	**Per agency discretion** sample for ammonia-N, arsenic, boron, cadmium, chloride, chromium, cyanide, lead, magnesium, mercury, nitrate, sulfate, TDS, zinc, if they that appear/expected to appear in leachate; additional indicator parameters based upon leachate characteristic and waste content. 35 IL ADC 811.319(a)(2).	**Quarterly** for first 5 years, then semi-annual; then annual, then no monitoring. 35 IL ADC 811.319; 811.320.	**5 years** for on-site units, **15 years** for other landfills. 35 IL ADC 811.319(C). May be reduced.	No.	**Yes**: 5 years post-closure monitoring. 35 IL ADC 811.319. *No permit required. / annual monitoring.*	No.
Indiana	Adopted 1996. Amended 1998, 2004. Readopted 2001, 2007.	**Possibly**. Required for Type I and II Restricted Waste Sites, but not for Type III or IV. 329 IAC 10-29-1. CCW may be disposed of at restricted waste site Type I without testing or at Type II, III, or IV after waste characterization. 329 IAC 10-9-4(d).	**No**. 329 IAC 10-29-1.	Within **50 feet** of solid waste boundary or property line. 329 IAC 10-29-1(g).	At least one **upgradient** and **three downgradient** wells. 329 IAC 10-29-1(b).	Phase I parameters: pH, specific conductance, chloride, boron ammonia, sodium, COD, phenolics, methylene chloride, 1,1-dichloroethane, toluene, benzene, 1,2-dichloroethene, ethyl benzene, 2-butanone, methyl ethyl ketone. 329 IAC 10-29-6(b). (Type I and II landfills only; no GW mtg required at Type III)	**Quarterly** for first year to establish background. 329 IAC 10-29-4(a)(4). **Semi-annual**. 329 IAC 10-29-2(f).	**30 years**. 329 IAC 10-29-3. 329 10-31-2(b).	Exemption based on volume. Site receiving less than 100 cubic yards of CCW per year from generators who produce less than 100 cubic yards a year. 329 IAC 10-3-1(10).	No.	**Yes**. CCW classified as Type IV waste exempt from landfill regs. 329 IAC 10-3-4. Type III sites exempt from groundwater monitoring regs.
Iowa	Adopted 1971. Amended 2007. Regulated on permit-by permi basis. KS ADC 28-29-8.	**Possibly**. IA ADC 567-103.1. / **Variances** available. **Discretionary**. KS ADC 28-29-19.	**No**. IA ADC 567-103.1. Not specified.	Within **50 feet** of waste boundary. IA ADC 567-103.1(4)(C). **Discretionary**. KS ADC 28-29-19.	**Three background** locations. IA ADC 567-103.1(2)(f). At least **one downgradient** well. IA ADC 567-103.1(4)(c). **Discretionary**. KS ADC 28-29-19.	Arsenic, barium, beryllium, cobalt, copper, iron, lead, magnesium, manganese, selenium, zinc, chlorides, and sulfate. IA ADC 567-103.1(2)(f). **Discretionary**. KS ADC 28-29-19.	**Quarterly** for first year to establish baseline. Then **annually**. IA ADC 567-103.1(4)(d). **Discretionary**. KS ADC 28-29-18.	**Ten years**. 567-103.1(5)(e),(f). **Discretionary**. KS ADC 28-29-18.	No. N/A.	No. N/A.	No. N/A.
Kentucky	6/24/1992	**Possibly**. 401 KAR 45:160. / CCW regulated as special waste. / **Variances** available.	**Yes**. 401 KAR 45:020(sec.4)(1).	Located to provide **early detection** of GW contamination. 401 KAR 45:160(sec.2).	At least **one upgradient** and **two downgradient** wells. 401 KAR 45:160(sec.2)(1),(2).	For monofills: chloride, chemical oxygen demand, total dissolved solids, total organic carbon, specific conductance, pH, copper (additional parameters may be required based on significant increases from baseline). 401 KAR 45:160(sec.8)(2).	**Semi-annual** monitoring for monofills. 401 KAR 45:160(sec.8)(2). **Quarterly** monitoring for other landfills. 401 KAR 45:160(sec.8)(3).	**5 years**. 401 KAR 45:110(sec.5)(5).	Specific sampling parameters and monitoring frequency requirements for monofills. 401 KAR 45:160(sec.8)(2).	No.	No.

Table 1: State Groundwater Monitoring Requirements: Coal Combustion Waste Landfills

State	Regulation date	Monitoring required at landfills	Grandfathering of old landfills	Monitoring location	Minimum number of wells	Sampling parameters	Monitoring frequency	Post-closure monitoring period	Monofill exemption	Onsite exemption	Exemption based on TCLP results
Louisiana	Adopted Feb. 1993. Amended Apr. 2008.	**Yes.** LAC 33:VII.805.A. **Discretionary.** COMAR 26.04.07.20(D)(2).	**Yes.** LAC 33:VII.403. **Discretionary.** COMAR 26.04.10.04.	Within **150 meters** downgradient of unit.; no more than 800 feet apart. LAC 33:VII.805.A.1.b. **Discretionary.** COMAR 26.04.07.20(D)(2)(a).	At least **one upgradient** and **two downgradient** wells per zone. LAC 33:VII.805.A.2. **Discretionary.** COMAR 26.04.07.20(D)(2)(a).	Permit-specific. Type I landfill sample for 10 indicators (may be reduced per agency discretion); Type II landfills sample for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. LAC 33:VII.805.C.7. **Discretionary.** COMAR 26.04.07.20(D)(2)(d).	**Quarterly** in first year; then **semi-annual**. LAC 33:VII.805.C. **Discretionary.** COMAR 26.04.07.20(D)(2)(b).	**30 years**, if operating after 10/9/93; **3 years** if stopped receiving waste before 10/9/93. LAC 33:VII.711.F.2. **5 years**. COMAR 26.04.07.22(A).	No. No.	No. No.	No. No.
Maryland	1987.										
Michigan	1982, 1993, Amended 2005.	**Possibly.** Required for Type II/MSWLFs (which may accept industrial waste). MI ADC R.229.4439. Not required for Type III/industrial waste landfills. MI ADC R.299.4306.	**No.** MI ADC R.299.4302; 299.4318. Regs do not include grandfathering provision; but State's report on landfills indicates that 14% of existing facilities were grandfathered.	No requirement.	At least **one background/upgradient** and **one downgradient** well. MI ADC R.299.4318.8.	Primary inorganic indicators: chlorides, iron, sulfates, total inorganic nitrogen, TDS; magnesium, manganese, potassium, sodium, bicarbonate alkalinity, carbonate alkalinity, conductivity, phenolics, cyanide, TOC, COD, boron. Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc. MI ADC R.299.4318.5.	**Quarterly**, during operation. **Biannually** post-closure. (Type III.) MI ADC R.299.4315(15).	**30 years.** MI ADC R.299.4318(4).	No.	No.	No.
Minnesota	Adopted 1988.	**Yes.** MN ADC 7035.1700(S); 7035.2815.3. / **Variances** available.	Within **200 feet** from waste unit boundary. MN ADC 7035.2815.4.c.2.	At least **one upgradient** and **one downgradient** well. MN ADC 7035.2815.10.C.1.	**Discretionary.** MN ADC 7035.2565.2; 7035.1700(S).	**Discretionary.** MN ADC 7035.2565.2; 7035.1700(S).	**20 years.** MN ADC 7035.2655.1.A.	No.	No.	No.
Mississippi	Effective 10/1/1993. Amended 4/3/1996.	**Yes.** MS ADC 11-2-4.IV.D. / **on-site exempt**.	**No.** MS ADC 11-2-4.IV.D.1.	Within **150 meters** from unit boundary. MS ADC 11-2-4.IV.C.3.	"Sufficient number" **at least two**, including background/upgradient and downgradient wells. MS ADC 11-2-4.IV.D.2.	Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, parameters may be excluded/indicators added per department discretion. MS ADC 11-2-4.IV.D.4.a. (Does **NOT** include: aluminium, boron, chloride, fluoride, iron, manganese, mercury, molybdenum, pH, sulfate, sulfide, or TDS.) / **agnecy may waive required parameters**.	**Semi-annual. Annual** per department discretion. MS ADC 11-2-4.IV.D.4.b.	**30 years**, may be adjusted per department discretion. MS ADC 11-2-4.IV.E.3.a.	No.	**Yes**, if wastes do not pose endangerment. MS ADC 11-2-4.IV.B.7.	No.
Missouri	7/30/1997.	**Yes.** 10 CSR 80-11.010(11)(A). / CCW classified as "utility waste".	**Discretionary.** 10 CSR 80-11.010(11)(B)(2).	**Discretionary.** 10 CSR 80-11.010(11)(C)(1)(A).	At least **one upgradient** and **three downgradient** wells. 10 CSR 80-11.010 (11)(B)(4)(A). (B).	COD, chlorides, iron, pH, specific conductance, TDS, chemicals in Appendix I (arsenic, aluminum, antimony, banum, beryllium, boron, cadmium, calcium, COD, chloride, chromium, cobalt, copper, fluoride, hardness, iron, lead, magnesium, manganese, mercury, nickel, pH, selenium, silver, sodium, specific conductance, sulfate, thallium, TDS, TOC, TOX). 10 CSR 80-11.010 (11)(C)(4). / **Variances/waiver available**.	**Semi-annual.** 10 CSR 80-11.010 (11)(C)(4)(A).	**30 years.** 10 CSR 80-2.030(4)(A)(2)(B).	No.	No.	No.
Montana	Adopted 1991. Amended 1997.	**Yes.** MT ADC 17.50.701. GW monitoring required for Class II sites. / Coal ash classified as Group 2 waste MT ADC 17.50.503(1)(a)(ii). / **on-site exempt**.	**No.** MT ADC 17.50.701.	Within **150 meters** of waste management unit boundary. MT ADC 17.50.710(1)(f).	At least **one background/upgradient** and **two downgradient** wells. MT ADC17.50.706.	Antimony, arsenic, banum, beryllium, cadmium, chloride, chromium, cobalt, copper, cyanide, iron, lead, mercury, nitrate, nickel, selenium, silver, sulfate, thallium, vanadium, zinc, COD, pH, specific conductance, and certain VOCs. MT ADC 17.50.708(8); Table 1 / Variance **available**.	**Semi-annual.** MT ADC 17.50.708(4)(a).	**30 years.** MT ADC 17.50.721(b).	No.	No.	No.
Nevada	11/8/1993.	**Yes.** NAC 444.683; 444.741; 444.7483. / Class III sites accept only industrial solid waste. NAC 444.5715.	**No.** NAC 444.6835; 444.7482; 444.7483.	As close as possible to **waste boundary unit**. NAC 444.7438(1).	At least **one background/upgradient** and **one downgradient** well. NAC 444.7438(1), (5).	Antimony, arsenic, banum, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. NAC 444.7487 [40 CFR Part 258, Appx. I]. / **Variance avaiable**.	**Semi-annual.** NAC 444.7488(1).	**30 years.** NAC 444.6894.	No.	No.	No.

Table 1: State Groundwater Monitoring Requirements: Coal Combustion Waste Landfills

State	Regulation date	Monitoring required at landfills	Grandfathering of old landfills	Monitoring location	Minimum number of wells	Sampling parameters	Monitoring frequency	Post-closure monitoring period	Monofill exemption	Onsite exemption	Exemption based on TCLP results
New Hampshire	Adopted 7-1-1991. Amended 10-28-2005	**Very limited.** Only if required under NH Groundwater Protection Act. NH ADC ENV-SW 806.04 (NH Rev. Stat. 485-C). **Possibly.** For all sanitary landfills, NJ ADC 7:26-2A.4(h), (p); NJ ADC 7:14A-9.2. Ash may be disposed of in Class I or II sanitary landfill. NJ ADC 7:26-1.4. /	N/A	Not specified.	*If required:* At least **one upgradient** and **three downgradient** wells. NH ADC ENV-SW 805.08(a).	Not specified. Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. NJ ADC 7:14A-9, Appx. A.	Not specified.	Not specified.	No.	No.	No.
New Jersey	1998	**Waiver** available.	**No.** NJ ADC 7:26-2A.4(h), (p); NJ ADC 7:14A-9.2.	Within **150 meters** of disposal area, on land owned by landfill owner. NJ ADC 7:14A-9.3(a).	At least **one background/upgradient** and **three downgradient** well. NJ ADC 7:14A-9.3(e).		**Semi-annual**. NJ ADC 7:14A-9.7(b).	**30 years**. NJ ADC 7:26-2A.9(c)(5).	No.	No.	No.
New Mexico	No regs. CCW excluded from definition of solid waste. NM ADC 20.9.3.7(S)(9)	No.	N/A.	N/A.	N/A.	N/A.	N/A.	N/A.	No.	No.	No.
New York	Adopted 1988. Amended 2006.	**Possibly.** 6 NY ADC 360-2.11. / **Variances** available.	**No.** 6 NY ADC 360-2.1.	Within **50 feet** downgradient of waste boundary; no more than 500 feet apart. 6 NY ADC 360-2.11(c)(1)(i)(e).	At least **one upgradient** and **three downgradient** wells. 6 NY ADC 360-2.11(c)(1)(i)(d).	Routine parameters (indicators): kjeldahl nitrogen, ammonia, nitrate, COD, BOD, TOC, TDS, sulfate, alkalinity, phenols, chloride, bromide, hardness, cadmium, calcium, iron, lead, magnesium, manganese, potassium, sodium. Baseline parameters: (routine plus:) color, boron, aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, cyanide, lead, selenium, thallium, vanadium, zinc, various organics. Expanded parameters: (routine, baseline, plus:) mercury, nickel, silver, sulfide, tin. (Does **NOT** include fluoride or molybdenum.). NY ADC 360-2.11(d)(6). Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. 15A NCAC 13B.1633(a).	**Quarterly.** First year: sample for expanded parameters once; for baseline parameters thrice. 6 NY ADC 360-2.11(c)(5)(i)(b). Ongoing monitoring: **annual** sample for baseline parameters once a year; for routine parameters thrice. 6 NY ADC 360-2.11(c)(5)(ii).	**30 years.** 6 NY ADC 360-2.15(k)(4).	**Discretionary:** DEC may impose additional or less stringent requirements for monofills. 6 NY ADC 360-2.14(a).	No.	No.
North Carolina	10/9/1993	**Discretionary.** 15A NC ADC 13B.	**Yes.** 15A NCAC 13B.0503(2)(d).	Within **250 feet** from waste boundary.	At least **one background/upgradient** and **one downgradient** well. 15A NCAC 13B.1631(a).		**Semi-annual**. 15A NCAC 13B.1633(p).	**30 years.** 15A NCAC 13B.1627(d)(1).	No.	**Yes.** N.C.G.S.A. § 130A-295.4.	No.
North Dakota	12/1/1992	**Possibly.** ND ADC 33-20-13-02. / **Variances** available. **Possibly.** Sanitary industrial, and residual LFs all require GW monitoring. OH ADC 3745-30-08. / monitors with excluded from DSW. OH ADC 3745-27-01(S)(20).	**No.** ND ADC 33-20-13-02(1).	Within **500 feet** from unit. ND ADC 33-20-13-02; 33-20-13-03. **Site-specific** as close as possible to limits of solid waste placement. OH ADC 3745-30-08(B)(4).	**One upgradient** and at least **two downgradient** wells. ND ADC 33-20-13-02(2)(a). At least **one background/upgradient** and **one downgradient** well. OH ADC 3745-30-08(B)(3).	Permit-specific. "Include indicators." ND ADC 33-20-13-03, Table 1: Calcium, chloride, potassium, sodium, sulfate, arsenic, barium, cadmium, chromium, iron, lead, magnesium, manganese, selenium, TDS. OH ADC 3745-30-08(D)(5); Appx III.	**Semi-annual**. ND ADC 33-20-13-02. **Annual**, **semi-annual** for indicators. OH ADC 3745-30-08 Appx III.	**30 years.** ND ADC 33-20-04.1-09(5)(b). **30 years** (industrial). OH ADC 3745-29-14. **30 years** (class I), **20 years** (class II); **15 years** (class III). OH ADC 3745-30-10(A).	**Yes.** ND ADC 33-20-05.1-02.	No.	No.
Ohio	Adopted 6-1-1994. Amended 2008.		**No.** OH ADC 3745-30-08(C).	Within **150 meters** from unit boundary. OH ADC 252: 515-9-4(a).	At least **one upgradient** and **three downgradient** wells., one upgradient. But "additional monitoring wells may be required to adequately monitor groundwater in areas of complex hydrogeology." Can use alternative to an upgradient well under certain conditions. 252: 515-9-5(b)(1).	pH, chemical oxygen demand, specific conductivity, chloride, sulfate, calcium, magnesium, nitrates, sodium, carbonates, potassium, and "other parameters specified in the permit, based on the types of wastes to be disposed." OK ADC 252: 515-9-31(d).	**Semi-annual**. OK ADC 252: 515-9-73(a). **Annual** on case-by-case determination. OK ADC 252: 515-9-73(b). **Quarterly** sampling for background water quality. OK ADC 252: 515-9-31.	**5 years** for new/existing on-site NHW landfills. OK ADC 252: 515-25-51.	**Partial.** Less stringent requirements for NHW landfills.	**Yes.** reduced post-closure monitoring period for on-site NHW landfills. OK ADC 252: 515-25-51(a).	**Yes.** No.
Oklahoma	6/1/2003	**Variances** available.	**Yes.** OK ADC 252: 515-9-1.								
Pennsylvania	Mar. 2001	**Yes.** 25 PA ADC § 288.251. / **Monofills exempt**	**No.** 25 PA ADC § 288.251.	Within **200 feet** of disposal area. 25 PA ADC § 288.252(b)(3).	At least **one upgradient** and **three downgradient** wells. 25 PA ADC § 288.252(a),(b).	Ammonia-nitrogen, bicarbonate, calcium, chloride, fluoride, chemical oxygen demand, nitrate-nitrogen, pH, specific conductance, sulfate, total alkalinity, total organic carbon, total dissolved solids, turbidity, iron, manganese, magnesium, potassium, and sodium (quarterly); arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, zinc, and VOCs (annually); and parameters detected in leachate collection, other constituents in the waste. 25 PA ADC § 288.254.	**Quarterly or annually**, based on sampling parameters. 25 PA ADC § 288.254(1)–(4).	Not specified. 25 PA ADC § 288.182.	**Yes.** Regs allow modification of groundwater monitoring sampling parameters and frequencies. 25 PA ADC § 288.254(5)(b).	No.	No.

Table 1: State Groundwater Monitoring Requirements: Coal Combustion Waste Landfills

State	Regulation date	Monitoring required at landfills	Grandfathering of old landfills	Monitoring location	Minimum number of wells	Sampling parameters	Monitoring frequency	Post-closure monitoring period	Monofill exemption	Onsite exemption	Exemption based on TCLP results
South Carolina	5/23/2006	**Possibly.** SC ADC 61-107.19 Part V.E.258.50. / **Waiver** available	**No.** SC ADC 61-107.19 Part V.E.258.50(a), (c)	Within **150 meters** of waste management unit boundary. SC ADC 61-107.19 Part V.E.258.51(a)(2)	At least **one background/upgradient** and **one downgradient** well. SC ADC 61-107.19 Pt V.E.258.51(a), (d)	pH, specific conductance, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and certain organics. **SC ADC 61-107.19 Appx IV.**	**Quarterly** for first year to establish baseline. SC ADC 61-107.19 Part V.E.258.53(e); **semi-annual**. SC ADC 61-107.19 Part V.E.258.54(b).	**30 years.** SC ADC 61-107.19 Part V.F.258.61(a).	No.	No.	TCLP determines if waste goes to a Class II or Class III facility. SC ADC 61-107.19 Part I.C
South Dakota	Adopted 7-26-1990. Amended 10-4-1993.	**Possibly.** SD ADC 74:27:19. / **Variances** available	**No.** SD ADC 74:27:19:02	Within **150 meters** of waste management unit boundary. 40 CFR 258.51(a)(2).	At least **one upgradient** and **three downgradient** wells. SD ADC 74:27:19:03	Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. SD ADC 74:27:19:04 (40 CFR Part 258 Appx. I).	**Semi-annual**. SD ADC 74:27:19:05.	**30 years.** SD ADC 74:27:19:08.	No.	No.	No.
Tennessee	TN ADC 1200-01-07-.01--.04 adopted in 1974; amended in 2008. / CCR usually Class II	**Possibly.** Class I and II. TN ADC 1200-01-07-.04(7). / **Variances/waiver** available.	**No.** TN ADC 1200-01-07-.04(1)(b)	Within **150 meters** of waste management unit boundary. TN ADC 1200-01-07-.04(7)(a)(2).	At least **one upgradient** and **two downgradient** wells. TN ADC 1200-01-07-.04(7)(a)(3).	Regs require sampling for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, fluoride, lead, mercury, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. TN ADC 1200-01-07-.04 Appendix I.	**Semi-annual or annual**, per discretion of Commissioner. TN ADC 1200-01-07-.04(7)(b)(3).	**30 years** unless alternative is approved in post-closure care plan. TN ADC 1200-01-07-.04(8)(d).	No.	No.	No.
Texas	2004 (Chap 335); 2006 (Chap 330); 2009 amendments. CCW excluded from definition of solid waste. UCA 1953 §19-6-102(18)	**Yes.** 30 TX ADC 335.592. / **on-site exempt**	**Yes.** 30 TX ADC 330.401.	Within **500 ft** downgradient of waste unit boundary; no more than 600 feet apart. 30 TX ADC 330.403(a)(2).	**At least one**. "sufficient number." 30 TX ADC 330.403(a)(1).	Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and various organics. 30 TX ADC 330.419.	**Semi-annual.** 30 TX ADC 335.590(24)(D); 330.407.	**30 years.** 30 TX ADC 330.463.	No.	**Yes.**	No.
Utah		No.	N/A	N/A	N/A	N/A	N/A	N/A	**Yes.** Excluded from definition of solid waste.	N/A	N/A
Virginia	9/24/2003	**Possibly.** Monitoring required for "all landfills". 9 VA ADC 20-80-300; 20-80-250(C)(16); 20-80-270(12). / **Waiver** available.	**No.** 9 VA ADC 20-80-240; 20-80-60(C)(5).	Waste management unit boundary. 9 VA ADC 20-80-300(A)(3)(a)(2).	At least **one upgradient** and **three downgradient** wells. 9 VA ADC 20-80-300(A)(3)(f)(2).	Phase I: Indicators (specific conductance, pH, TOC, TOX); Phase II – Table 5.5 parameters. 9 VA ADC 20-80-300(C)(3): (4).	**Semi-annual**. 9 VA ADC 20-80-300(C)(3).	**10 years**. 9 VA ADC 20-80-270(F)(1).	No.	No.	No.
Washington	9/8/2000	**Possibly.** WAC 173-304-490(1). / **Variances** available.	**No.** WAC 173-304-400(3)(a).	Locations/depths from uppermost and all hydraulically connected aquifers. WAC 173-304-490(2)(a).	At least **one upgradient** and **three downgradient** wells. WAC 173-304-490(2)(a).	Temperature, conductivity, pH, chloride, nitrate, nitrite, ammonia as nitrogen, sulfate, dissolved iron, dissolved zinc and manganese, COD, TOC, and total coliform. WAC 173-304-490(2)(d)(i)(A)-(K).	**Quarterly.** WAC 173-304-490(2)(g).	**20 years.** WAC 173-304-407(7)(a).	No.	No.	No.
West Virginia	1-Jun-06	**Yes.** WV ADC s 33-1-3.8.d.	**Yes.** WV ADC s 33-1-1(1.1.a.2).	Within **150 meters** of waste unit boundary. WV ADC s 33-1-4(4.5.d.1.G).	At least **one upgradient** and **three downgradient** wells. WV ADC s 33-1-3(3.8.d)	Alkalinity, arsenic, barium, bicarbonate, hardness, boron, cadmium, calcium, chloride, total and hexavalent chromium, iron, lead, manganese, magnesium, sulfate, TDSs, TOC, specific conductance, zinc. WV ADC s 33-1-5(5.5.b.3.A).	**Semi-annual.** WV ADC s 33-1-5(5.5.b.3.A).	**30 years.** WV ADC s 33-1-6(6.3).	No.	No.	No.
Wisconsin	Jul-96	**Discretionary.** WI ADC s NR 507.04.	**Discretionary.** WI ADC s NR 507.04.	**Discretionary.** WI ADC s NR 141.065(1); s NR 507.06.	**Discretionary.** WI ADC s NR 507.19(1).	Alkalinity, boron, COD, conductivity, pH, temp, GW elevation, hardness, sulfate. WI ADC s NR 507 Appx 1, Table 2. BOD5, conductivity, pH, alkalinity, boron, cadmium, chloride, COD, hardness, iron, lead, manganese, mercury, selenium, sulfate, TSS. Table 4.	**Semi-annual.** WI ADC s NR 507.19(3); Appx 1, Table 2.	Not specified. WI ADC s NR 514.06(11).	**Yes**, exempt from GW monitorig of VOCs. WI ADC s NR 507.18(3)(a).	No.	No.
Wyoming	Effective Date: November 28, 1990 AMENDED: May 26, 1995 October 15, 1998	**Possibly.** WY ADC ENV SW Ch. 3 s. 6. / **Waiver** available.	**No.** WY ADC ENV SW Ch. 3 s. 6(b)(i)(A)(VI).	Within **150 meters** of facility waste boundary. WY ADC ENV SW Ch. 3 s. 6(b)(i)(B)(I).	**At least one**. "sufficient number." WY ADC ENV SW Ch. 3 s. 6(b)(i)(B)(I).	Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, zinc, and numerous VOCs. WY ADC ENV SW Ch. 3 s. 6(b)(i)(D)(I); Appx A.	**Semi-annual.** WY ADC ENV SW Ch. 3 s. 6(b)(i)(D)(I).	**30 years.** WY ADC ENV SW Ch. 3 s. 7(q)(i).	No.	No.	No.

Table 2: State Groundwater Monitoring Requirements: Coal Combustion Waste Surface Impoundments

State	Regulation Date	Monitoring required at impoundments	Grandfathering of old impoundments	Monitoring location	Minimum number of wells	Sampling parameters	Monitoring frequency	Post-closure monitoring period	Monofill exemption	Onsite exemption	Exemption based on TCLP results
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Arizona	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Colorado	Limited impoundment regs. 6 CO ADC 1007-2 Part 1, Section 9. Regs appply to leachate collector impoundments only. 62 FL ADC	**Yes.** 6 CO ADC 1007-2-1.9.5.8 / **on-site exempt**	**Site-specific.** 6 CO ADC 1007-2-1.9.1.4.	Not specified.	At least **one upgradient** and **one downgradient** well. 6 CO ADC 1007-2-1.9.5.8.	Indicator parameters determined a	*Class I and II Impoundment*: **quarterly**. *Class III Impoundments*: **annually** (if required). 6 CO ADC 1007-2-1.9.8.6	**30 years.** 6 CO ADC 1007-2-1.3.6.3.	No.	**Yes.** 6 CO ADC 1007-2-1.1.4.	No.
Florida	62-701.400(6).	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Georgia	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Illinois	Sections 606, 615 and 616 adopted in 1992.	**Limited,** ONLY where on-site impoundments within "setback zone" or "regulated recharge area." 35 IL ADC 616.441; 616.443	**Yes,** though some requirements and forced closures of existing plants in minimal setback zones were enacted at59 IL ADC 615.441.	Not specified.	Not specified.	Specific conductance, pH, total organic carbon, total organic halogen, other per discretion 35 IL ADC 616.207(a)(1)	**Quarterly**. 35 IL ADC 615.207(a); 616.207(a). May step down to **semi-annual** monitoring if 2 years compliance. 35 IL ADC 615.207(b); 616.207(b)	**5 years** if closed in place. 35 IL ADC 615.202(b); 616.202(b). If removed, not specified. 35 IL ADC 616.447(a).	No.	No.	No.
Indiana	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iowa	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kansas	CCW facilities regulated on permit-by-permit basis. KS ADC 28-29-6	**Discretionary.** KA ADC 28-29-19.	Not specified.	**Discretionary.** KA ADC 28-29-19.	**Discretionary.** KA ADC 28-29-19.	**Discretionary.** KA ADC 28-29-19.	**Discretionary.** KA ADC 28-29-19.	No regs.	N/A	N/A	N/A
Kentucky	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Louisiana	Adopted Feb. 1993. Amended Apr. 2008.	**Yes.** LAC 33:VII.805.A.	**No.** LAC 33:VII.803.	Within **150 meters** downgradient of unit , no more than 600 feet apart. LAC 33:VII.805.A.1.b.	At least **one upgradient** and **two downgradient** wells per zone. LAC 33:VII.805.A.2.	Permit-specific. Include indicators: LAC 33:VII.805.C.D; 33:VII.3005 Appx. C	**Quarterly** in first year; then **semi-annual**. LAC 33:VII.805.C.	**30 years.** If operating after 10/9/93; **3 years** if stopped receiving waste before 10/9/93. LAC 33:VII.711.F.2.	No.	No.	No.
Maryland	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Michigan	Industrial waste SIs closed as landfills. MI ADC R.299.4309.	**Limited.** Post-closure monitoring MI ADC R.299.4309.2.	Not specified.	No requirement.	At least **one background/upgradient** and **one downgradient** well. MI ADC R.299.4318.6.	Primary inorganic indicators. MI ADC R.299.4318.5.	**Quarterly**, during operation. **Biannually** post-closure. MI ADC R.299.4315(15).	**30 years.** MI ADC R.299.4318(4).	No.	No.	No.
Minnesota	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mississippi	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Missouri	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Montana	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nevada	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Hampshire	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Jersey	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New Mexico	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New York	Adopted 1988. Amended 2006.	**Yes.** 6 NY ADC 360-6.5(d). / **Variances** available.	**No.** 6 NY ADC 360-6.1.	Within **50 feet** downgradient of waste boundary, no more than 500 feet apart. 6 NY ADC 360-2.11(c)(1)(i)(ii).	At least **one upgradient** and **two downgradient** wells. 6 NY ADC 360-6.5(d).	Routine parameters (indicators): kjeldahl nitrogen, ammonia, nitrate, COD, BOD, TOC, TDS, sulfate, alkalinity, phenols, chloride, bromide, hardness, cadmium, calcium, iron, lead, magnesium, manganese, potassium, sodium. Baseline parameters: (routine plus:) color, boron, aluminum, antimony, arsenic, barium, beryllium, chromium, cobalt, copper, cyanide, lead, selenium, thallium, vanadium, zinc, various organics. Expanded parameters: (routine, baseline, plus:) mercury, nickel, silver, sulfide, tin. (Does **NOT** include flouride or molybdenum.)	**Quarterly**. First year: sample for expanded parameters once, for baseline parameters thrice. 6 NY ADC 360-2.11(c)(5)(i)(b). Ongoing monitoring: sample for baseline parameters once a year, for routine parameters thrice. 6 NY ADC 360-2.11(c)(5)(ii).	N/A	No	No	No
North Carolina	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North Dakota	12/1/1992	**Yes.** ND ADC 33-20-13-02. / **Variances** available.	**No.** ND ADC 33-20-13-02(1).	Within **500 feet** from unit. ND ADC 33-20-13-02; 33-20-13-03.	**One upgradient** and at least **two downgradient** wells. ND ADC 33-20-13-02(2)(a).	Permit-specific. Include indicators. ND ADC 33-20-13-03, Table 1.	**Semi-annual.** ND ADC 33-20-13-02.	**30 years.** ND ADC 33-20-04.1-09(5)(b).	**Yes.** ND ADC 33-20-05.1-02.	No.	No.
Ohio	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Oklahoma	8/12/2000	**Discretionary**. OK ADC 252: 616-5-4.	**No.** OK ADC 252: 616-3-1.	No.	At least **one upgradient** and **two downgradient** wells. OK ADC 252: 616-5-4(2).	Not specified. OK ADC 252: 616-5-4(3)(C).	Not specified. OK ADC 252: 616-5-4(3)(C).	Not specified. OK ADC 252: 616-13-5(3).	No.	No.	No.

Table 2: State Groundwater Monitoring Requirements: Coal Combustion Waste Surface Impoundments										
State	**Regulation Date**	**Monitoring required at impoundments**	**Grandfathering of old impoundments**	**Monitoring location**	**Minimum number of wells**	**Sampling parameters**	**Monitoring frequency**	**Post-closure monitoring period**	**Monofill exemption**	**Onsite exemption**	**Exemption based on TCLP results**
Pennsylvania	Jan. 13, 2001	**Yes**. 25 PA ADC 289.261	**No.** 25 PA ADC 289.261	Within **200 feet** of disposal area. 25 PA ADC 289.262(b)(3).	At least **one upgradient** well. 25 PA ADC 289.262(a)(1). At least **three downgradient** wells. 25 PA ADC 289.262(a)(2).	Ammonia-nitrogen, bicarbonate, calcium, chloride, fluoride, chemical oxygen demand, nitrate-nitrogen, pH, specific conductance, sulfate, total alkalinity, total organic carbon, total dissolved solids, turbidity, iron, manganese, magnesium, potassium, and sodium (quarterly); barium, cadmium, chromium, copper, lead, mercury, selenium, silver, zinc, and VOCs (annually) and parameters detected in leachate collection, other constituents in the waste. 25 PA ADC 289.264.	**Quarterly/annually**, based on sampling parameters. 25 PA ADC 289.264(a)(1)–(4).	Not specified. Closure plan must include schedule for water quality monitoring. 25 PA ADC 289.172.	No	No	No
South Carolina	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
South Dakota	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tennessee	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Texas	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Utah	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Virginia	Regs apply if closed in place as lar	**Limited.** Post-closure monitoring. 9 VA ADC 20-80-380(B).	N/A	Waste management unit boundary. 9 VA ADC 20-80-300(A)(3)(a)(2)	At least **one upgradient** and **three downgradient** wells. 9 VA ADC 20-80-300(A)(3)(f)(2).	Not specified.	Not specified.	Not specified.	No	No	No
Washington	9/8/2000	**Possibly.** Must have either GW monitoring **OR** leachate detection/ collection/ treatment. WAC 173-304-430(2)(f)	**No.** WAC 173-304-400(3)(a).	Locations/depths from uppermost and all hydraulically connected aquifers. WAC 173-304-490(2)(a).	**At least one upgradient** and **three downgradient** wells. WAC 173-304-490(2)(a).	Temperature, conductivity, pH, chloride, nitrate, nitrite, ammonia as nitrogen, sulfate, dissolved iron, dissolved zinc and manganese, COD, TOC, and total coliform. WAC 173-304-490(2)(d)(i)(A)-(K).	**Quarterly.** WAC 173-304-490(2)(g).	**20 years.** WAC 173-304-407(7)(a).	No	No	No
West Virginia	1-May-90	**Discretionary.** WV ADC s 33-1-4(4.8.c.3.D)	**No.** Regs require retrofitting of old Sts. WV ADC s 33-1-4(4.8.c.3.B)	Within **150 meters** of waste unit boundary. WV ADC s 33-1-4(4.5.d.1.G).	At least **one upgradient** and **three downgradient** wells (per DEP **discretion**). WV ADC s 33-1-4(3.8.c.3.D).	Alkalinity, arsenic, barium, bicarbonate, hardness, boron, cadmium, calcium, chloride, total and hexavalent chromium, iron, lead, manganese, magnesium, sulfate, TDSs, TOC, specific conductance, zinc. WV ADC s 33-1-5(5.5.b.3.A).	**Semi-annual.** WV ADC s 33-1-5(5.5.b.3.A).	N/A	No	No	No
Wisconsin	Discretionary regulation of industrial lagoons not licensed under other solid waste provisions. WI ADC s NR 213.02.	**Discretionary.** WI ADC s NR 213.08(3)(a).	N/A	**Discretionary**. WI ADC s NR 141.065(1); s NR 507.06.	**Discretionary**. WI ADC s NR 507.19(1).	**Discretionary**. WI ADC s NR 213.08(3)(b).	**Discretionary**. WI ADC s NR 213.08(3)(b).	**Discretionary**. WI ADC s NR 213.07.	N/A	N/A	N/A
Wyoming	No regs.	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 3: State Environmental Control Requirements for Coal Ash Landfills

State	Regulations date	Grandfathering of old landfills	Liner type	Leachate collection system	Cap	Financial assurance	Daily Cover	Dust controls	Run-on, run-off controls	Monofill exemption	Onsite exemption	Exemption based on TCLP results
Alabama	5-5-11: 2011 AL H.B. 50 (N5)/Alabama Code §22-27-3(h). Coal ash regulated as solid waste.	**Yes**. Alabama Code §22-27-3(h).	**Composite** liner or department-approved alternate design. AL ADC 335-13-4-.18.	**Yes**. AL ADC 335-13-4-.18.	18-inch infiltration layer and/or synthetic layer, 6-inch soil erosion layer; vegetative cover. AL ADC 335-13-4-.20.	**Yes**, closure and post-closure. AL ADC 335-13-4-.08.	**Discretionary**. AL ADC 335-13-4-.15.	No.	No.	No.	No.	No.
Arizona	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Colorado	10/9/1993	**Yes**. 6 CO ADC 1007-2:1.1.3.2.	**Composite** (30-mil FML upper; 2 ft 3.2.3(D). Class I: **Composite** (60-mil HDPE geomembrane upper; 6-inch lifts for lower) or **double** (60-mil HDPE geomembrane upper and lower; 6-inch subbase or geosynthetic clay liner). 6 CO ADC 1007-2:1-3.2.3(D).	**Yes**. 6 CO ADC 1007-2:1-3.2.3(D).	**Composite** (30-mil geomembrane	**Yes**, closure, post-closure, and corrective action. 6 CO ADC 1007-2:1-1.6.	**Yes**. 6 inches of earth. 6 CO ADC 1007-2:1-3.3.4.	**Yes**. 6 CO ADC 1007-2:1-2.1.3.	**Yes**. 6 CO ADC 1007-2:1-2.1.6.	No.	**Yes**. 6 CO ADC 1007-2:1-1.4.	No.
Florida	Adopted 1-8-1993. Amended 1-8-2010.	**Yes**. Design requirements apply to new construction and lateral expansion. 62 FL ADC 62-701.400.	**Composite** (30-mil FML upper; 2-foot compacted soil lower). 62 FL ADC 62-701.400(3).	**Yes**. 62 FL ADC 62-701.400(3).	**Soil**, geomembrane, or composite. 62 FL ADC 62-701.600(g).	**Yes**, for closure, post-closure, and corrective action. 62 FL ADC 62-701.630.	*Class I*: **Yes**, daily. 62 FL ADC 62-701.500(7)(a)(1).	**Yes**. 62 FL ADC 62-701.300(15).	**Yes**. 62 FL ADC 62-701.400(5).	No.	No.	No.
Georgia	Adopted 1972. Amended 8-20-1997.	**Yes**. GA ADC 391-3-4-.07(1). Design requirements apply to new construction and lateral expansion.	**Composite** (30-mil FML upper; 2-foot compacted soil lower) required in areas with certain pollution susceptibility. GA ADC 391-3-4-.07(1)(d)(1).	**Yes**. GA ADC 391-3-4-.07(1)(d).	**Soil**. GA ADC 391-3-4-.07(1). (i)	**Yes**, for closure, post-closure, and corrective action. GA ADC 391-3-4-.13.	**Yes**. 6 inches. GA ADC 391-3-4-.07(3)(e).	No.	**Yes**. GA ADC 391-3-4-.07(3)(c).	**Yes -- discretionary variance available**. GA ADC 391-3-4-.07(4)(a).	No.	No.
Illinois	Adopted 1973, 1980, 1996. Amended 2005, 2006, 2007.	**Yes, partial**. Existing landfills exempt from rqmts for: (1) location; (2) foundation/mass stability; (3) final cover; (4) liner and leachate collection; and (5) hydrogeo site investigation. 35 IL ADC 814.302; 814.402; 814.502.	**Soil** (5-foot compacted earth). 3-to-5-foot thick liner permitted if overlain by 60-mil geomembrane. **Alternative** per discretion. 35 IL ADC 811.308.	**Yes**. 8 IL ADC 811.307, 35 IL ADC 811.308.	**Soil** (3-foot compact earth Low Permeability Layer; Final Protective Layer). / More protective **alternative**. 35 IL ADC 811.314.	**Yes**, for closure. 35 IL ADC 807.600–.666; 811.700–.720.	**Yes**. Six inches soil or alternative. 35 IL ADC 811.106. 1 foot compacted clean soil as intermediate cover. 35 IL ADC 811.313.	**Yes**, but unspecified. 35 IL ADC 811.107(g).	No.	**Yes**, for CCW/FGD monofills using "Poz-O-Tec" technology where waste processed via patented stabilizing technology. 35 IL ADC 816.529. Poz-O-Tec CCW monofills are exempt from the requirements of: 811.307 (leachate drainage), 811.308 (leachate collection), 811.309 (leachate treatment, and disposal) if 12 criteria are met.	No.	No.
Indiana	Adopted 1998.	**Yes**. Landfills closed prior to 4-14-1998 grandfathered. 329 IAC 10-6-1(a). Liner design requirements apply to new sites. 329 IAC 10-28-1.	Low permeability **soil**. 10 to 15 feet thick for Type I sites. 5 to 10 feet for Type II sites. 329 IAC 10-26-1(2). At least 3 feet for Type III sites. 329 IAC 10-34-1. Type IV **exempt**.	Required only if **karst** terrain. 329 IAC 10-3-4(b)(4). Surface leachate collection required for Type I and II. 329 IAC 10-28-15.	*Type III*: Soil (2 feet), 6 inches topsoil; vegetative cover. 329 IAC 10-36-11(a).	**Yes**, for closure and post-closure. 329 IAC 10-39-1.	Type I: **Yes** (6 inches). Type II: monthly; Type III: annually. 329 IAC 10-28-12.	**Yes**. 329 IAC 10-3-4(a)(11); 10-28-5(3); 10-28-4(h); 10-32-4(3); 10-38-4(b).	**Yes**. 329 IAC 10-28-10; 10-28-11(a); 10-36-10; 10-36-15(a).	**Exemption based on volume**. Site receiving less than 100 cubic yards of CCW per year from generators who produce less than 100 cubic yards a year. 329 IAC 10-3-1(10).	No.	**Yes**. TCLP used to determine disposal of Type I, II, III, or IV facility. Type IV exempt.
Iowa	Adopted 1971. Amended 2007.	**No**. IA ADC 567-103.1.	Not specified.	Not specified.	Compacted **soil** (2 feet); 1 foot topsoil for vegetation. IA ADC 567-103.1(5).	**Yes**, for closure, post-closure, and corrective action for sites accepting waste after 10-31-2007. IA ADC 567-103.3.	**Discretionary** (if dust or issue). IA ADC 567-103.1(4)(b).	**Yes**. IA ADC 567-103.1(3)(b)(4)(b).	**Yes**. IA ADC 567-103.1(3)(c).	No.	No.	No.
Kansas	Regulated on permit-by-permit basis. KS ADC 28-29-6.	Not specified.	Not specified.	Not specified.	Not specified.	Not specified.	Not specified.	Not specified.	Not specified.	N/A	N/A	N/A
Kentucky	6/24/1992.	N/A	**Discretionary**. 401 KAR 45:110 (sec 1)(1),(8).	**Discretionary**. 401 KAR 45:110 (sec 1)(7).	Not specified. 401 KAR 45:110 (sec 5)(2).	**Yes**, for closure and post-closure care. 401 KAR 45:080 (sec 5) and (sec 6).	No.	No.	**Discretionary**. 401 KAR 45:110(sec 1)(7).	No.	No.	No.
Louisiana	Adopted Feb. 1993. Amended Sept. 2008.	**No**. LAC 33:VII:403.	**Composite** (30-mil geomembrane; 3-foot clay) or alternative. LAC 33:VII.711.B.5.c.	**Yes**. LAC 33:VII.711.B.5.c.	**Clay** (24 inches) **and geomembrane**; 6-inch topsoil; or alternative. LAC 33:VII.711.E.3.a.	**Yes**, for closure and post-closure. LAC 33:VII.1303.	**Yes**. 8 inches **clay** or approved alternative. LAC 33:VII.711.B.2.b.	No.	**Yes**. LAC 33:VII.711.A.6.	No.	No.	No.
Maryland	12/1/2008.	**Yes**. Facilities authorized before 12-1-08 may continue to operate, but MDE may modify existing authorization. COMAR 26.04.10.04(E).	**Clay** (at least 1 foot) or **synthetic** (30 mil single reinforced membrane or 50 mil unreinforced). COMAR 26.04.07.07(C)(12)(a)(ii).	**Yes**. COMAR 26.04.07.07(C)(12)(c).	**Clay** (1 foot) or **synthetic** (20 mil; 1.0 x 10-10 cm/sec permeability); 6-inch drainage layer; 2-foot earthen cover; perennial vegetative cover. COMAR 26.04.07.21(H).	No.	**Discretionary**. COMAR 26.04.07.19(E)(3).	**Yes**. Fencing or other barriers required. COMAR 26.04.07.19(E)(4)(2). CCW facilities to be designed to contain CCW and prevent air pollution. COMAR 26.04.10.09(D)(1).	**Yes**. Permit app to include runoff/run-on controls. COMAR 26.04.07.20(A)(11). CCW facilities to be designed to prevent contact with waters of the US. COMAR 26.04.10.05(C), (D)(2).	No.	No.	No.
Michigan	1982; 1993.	**Yes**. Existing (as of 1993) low hazard industrial waste piles exempt. MI ADC R 299.4125.	**Composite** or **synthetic** (30-mil) OR **natural soil barrier**. MI ADC R 299.4307.2. Alternatives per application for low-hazard industrial waste landfills.	**Yes**. MI ADC R 299.4308.	Erosion layer (6 inches **earthen** material for vegetation); infiltration layer ≥2 feet compacted **soil OR flexible membrane liner**). 2 feet of additional soil, or alternative. MI ADC R 299.4304.6. Low hazard industrial waste landfills on natural soil sites may install cover not designed to minimize infiltration. MI ADC R 299.4304.7.	**Yes**, closure and post-closure. MI ADC R 299.4922.4.	No.	**Yes**. MI ADC R 299.4315.5.	**Yes**. MI ADC R 299.4315.13.	No.	No.	**Yes**. MI ADC R 299.4311.
Minnesota	Adopted 1988. But industrial landfills regulated on permit-by-permit basis.	Not specified.	**Soil** (4 feet) or **composite** (2-foot soil and 60-mil unreinforced membrane or 30 mil reinforced membranes). 12-inch soil drainage layer. MN ADC 7035.2815.7.D.E.	**Yes**. MN ADC 7035.1700.T. 7035.2815.9.	**Soil** (24 inches) or **synthetic** (30-mil). 12-inch layer, of which 8 inches topsoil, vegetative cover. MN ADC 7035.2815.6. 7035.1700.Y.	**Yes**, for closure, post-closure, and corrective action. MN ADC 7035.2695.	**Yes**. 6 inches. MN ADC 7035.1700.D.	**Yes**. MN ADC 7035.1700.I.	**Yes**. MN ADC 7035.1700.D.Y.	No.	No.	No.
Mississippi	Effective 10/1/1993. Amended 4/3/1996.	**Yes**. Landfills that stopped receiving waste before 9-23-93 are exempt. MS ADC 11-2-4.IV.A.1.2. **Yes**. Design and operation requirements apply to new construction/permits issued after rule. 10 CSR 80-11.010(1).	**Composite** or department-approved **alternative**. MS ADC 11-2-4.IV.C.1.	**Yes** / **Alternative** per department discretion. MS ADC 11-2-4.IV.C.1.	**Soil**: 18-inch earthen infiltration layer; 6-inch erosion layer for vegetation. / **Alternative** per department discretion. MS ADC 11-2-4.IV.E.2.	**Yes**, for closure, post-closure care, and corrective action (if required). MS ADC 11-2-4.IV.F.1.3. Federal/state owners exempt. MS ADC 11-2-4.IV.A.6.	*Ash Monofills*: **Not daily**. MS ADC 11-2-4.IV.B.2.	No.	**Yes**. MS ADC 11-2-4.IV.B.1.	**Yes**. Exempt from daily cover requirements. MS ADC 11-2-4.IV.B.2.	No.	No.
Missouri	7/30/1997.	**Yes**. 10 CSR 80-11.010(1).	**Clay** (at least 2 feet) or **composite** (2-foot lower soil layer). 10 CSR 80-11.010(10)(B).	**Yes**. 10 CSR 80-11.010(9)(A).	**Clay** (1 foot). 1 foot not for vegetation. 10 CSR 80-11.010(10)(C)(2).	**Yes**, for closure, post-closure, and corrective action. 10 CSR 80-2.030(4)(B), (C).	**Not daily**. Composition/frequency not specified. 10 CSR 80-11.010(13), (14).	**Yes**. 10 CSR 80-11.010(12)(B); 10 CSR 80-11.010(18)(C)(4).	**Yes**. 10 CSR 80-11.010(8)(B)(1)(F).	No.	No.	No.

Table 3: State Environmental Control Requirements for Coal Ash Landfills

State	Regulations date	Grandfathering of old landfills	Liner type	Leachate collection system	Cap	Financial assurance	Daily Cover	Dust controls	Run-on, run-off controls	Monofill exemption	Onsite exemption	Exemption based on TCLP results
Montana	Adopted 1991. Amended 1997.	**Yes.** MT ADC 17.50.501(4). Design requirements apply to new construction and lateral expansion. MT ADC 17.50.506.	*Class II Landfills*: **Composite** (30-mil FML, upper; 2-foot low permeability soil lower). MT ADC 17.50.506(1)(b)(i).	**Yes.** MT ADC 17.50.506(1)(b)(ii).	**Soil**: *Class II and IV Landfills*: 18-inch earthen infiltration layer; 6-inch earthen erosion layer; vegetation. MT ADC 17.50.530(1)(3).	**Yes**, for closure, post-closure, and corrective action. MT ADC 17.50.540; 17.50.542	**Yes**, for Class II Landfills, 6 inches of earth. MT ADC 17.50.511(1).	No.	**Yes.** MT ADC 17.50.511(1)(j)	No.	No.	No.
Nevada	11/5/1993	**Yes.** Liner design requirements apply to new construction and lateral expansion. NAC 444.681.	**Composite** (30-mil flexible membrane upper; 2 feet low permeability soil). NAC 444.6811(1)(b).	**Yes.** NAC 444.681(1)(b).	**Soil**. Low permeability: 18-inch earthen infiltration layer; 6-inch earthen erosion layer. NAC 444.6811(1).	**Yes**, for closure, post-closure, and corrective action. NAC 444.685.	**Yes.** 6 inches compacted earthen material. NAC 444.688.	**Yes.** NAC 444.696.	**Yes.** NAC 444.6865.	No.	No.	No.
New Hampshire	Adopted 7-1-91. Amended 10-28-05.	**Yes.** NH ADC ENV-SW 805.01(a)(1).	*Coal Ash Monofill*: Single liner (**soil**, synthetic, or composite) NH ADC ENV-SW 805.14.	**Yes**, at all lined landfills. NH ADC ENV-SW 805.06.	**Impermeable composite cap**: 12-inch soil base; 12 inches of sand; impermeable barrier of 40-mil geomembrane or soil; 18 inches sand or geonet and 12 inches sand; 4 inches topsoil/vegetation. **Low permeable soil cap**: 12-inch soil base; 18-inch soil infiltration layer; 4 inches topsoil/vegetation. NH ADC ENV-SW 805.10. **Soil**: 18-inch infiltration layer; 6-inch erosion layer. If synthetic bottom liner, synthetic membrane in final cover. NJ ADC 7:26-2A.7(c).	**Yes**, for closure. NH ADC 1403.01	No.	No.	**Yes.** NH ADC ENV-SW 806.06.	**Yes**. May be designed as single-lined facilities. NH ADC ENV-SW 902.04(b)(3).	No.	No.
New Jersey	1996	**Yes.** NJ ADC 7:26-2A.1; 7:26-2A.9(a).	**Clay, synthetic,** or **composite** NJ ADC 7:26-2A.7(c).	**Yes.** NJ ADC 7:26-2A.4(a); NJ ADC 7:26-2A.7(a)(1).		**Yes.** NJ ADC 7:26-2B.6(c)(12); 7:26-2A.9(f).	**Yes.** 6 inches daily. NJ ADC 7:26-2A.8(b)(7).	**Yes.** NJ ADC 7:26-2A.8(b)(29).	**Yes.** NJ ADC 7:26-2A.8(b)(12).	No.	No.	No.
New Mexico	No regs. CCW excluded from definition of solid waste.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
New York	Adopted 1988. Amended 2006.	**Yes.** 6 NY ADC 360-1.7(a)(3)(i); 360-2.13.	**Double composite liner** (upper composite, 80-mil geomembrane, 18-inch soil layer – lower composite: 60-mil geomembrane, 24-inch soil layer). 6 NY ADC 360-2.13(f).	**Yes.** 6 NY ADC 360-2.13(g).	*For unlined LFs*: gas venting, bottom layer: low permeability **soil** OR geomembrane; barrier protection layer; topsoil. *For lined LFs*: gas venting bottom layer: **composite** (soil AND geomembrane); barrier protection layer; topsoil; vegetation. / **Alternative**. 6 NY ADC 360-2.15(d).	**Yes,** for closure, post-closure, and corrective action (if required). 6 NY ADC 360-2.19(a)-(e). **Third-party** liability coverage. 6 NY ADC 360-1.12(b).	**Yes.** 6 inches compacted material. 6 NY ADC 360-2.17(c).	**Yes.** 6 NY ADC 360-1.11(k).	**Yes.** 6 NY ADC 360-2.7.	**Discretionary**: DEC may impose additional or less stringent requirements for monofills. 6 NY ADC 360-2.14(a).	No.	No.
North Carolina	Adopted 10-9-1993. Amended 4-1-1994.	**Yes.** 15A NCAC 13B.1601.	**Composite** (geomembrane + 24-inch compacted clay liner, OR geomembrane + geosynthetic clay liner + 18-inch compacted clay liner, OR 2 geomembrane liners with leachate drainage systems + 12-inch compacted clay liner, OR approved alternative). 15A NCAC 13B.1624(b).	**Yes.** 15A NCAC 13B.1624(b)(2).	**Soil**: 18-inch earthen infiltration layer; 6 inch earthen erosion layer. 15A NCAC 13B.1627(c)(1).	**Yes**, for closure, post-closure, and corrective action for non-government-owned MSWLFs. 15A NC ADC 13B.1628.	**Yes.** 6 inches. 15A NC ADC 13B.1628(2).	**Yes.** 15A NCAC 15B.1626(6)(d).	**Yes**. 15A NC ADC 13B.1626(7),(8).	No.	**Yes.** N.C.G.S.A. § 130A-295.4.	No.
North Dakota	12/1/1992	**Yes.** ND ADC 33-20-01.1-02; 33-20-03.1-04.	**Composite** (3-foot clay, 60 mil FML) liner for landfills receiving wastes which may contain leachable organic constituents; ND ADC 33-20-07.1-01(4)(a). Soil (8 feet) for landfills that receive wastes containing water soluble constituents. ND ADC 33-20-07.1-01(4)(d).	**Yes.** ND ADC 33-20-04.1-09(3)(e); 33-20-07.1-01(4).	**Clay/soil**: 18 inches soil; 12 inches clay-rich soil; 6 inches plant growth material. / **Alternative** per agency discretion. ND ADC 33-20-07.1-02.	**Yes**, for closure and third-party liability; for corrective action at agency's discretion. ND ADC 33-20-14-01.	**Not daily**. ND ADC 33-20-07.1-01(1). Compaction required. ND ADC 33-20-07.1-01(3).	**Yes.** ND ADC 33-20-04.1-02; 33-20-07.1-01(1).	**Yes.** ND ADC 3-20-04.1-09(3)(a).	No.	No.	No.
Ohio	Adopted 6-1-1994. Amended 2000.	**Yes.** OH ADC 3745-27-02(D)(8).	**Soil** or composite, depending on Class (TCLP). OH ADC 3745-30-07. **Composite** (2-foot clay, 30 mil flexible membrane liner). OK ADC 252: 515-11-2(b); 252: 515-11-31. 252: 515-11-51. / **Alternative** per DEQ discretion. OK ADC 252: 515-11-2.	**Yes.** OH ADC 3745-27-08(B)(1)(d).	**Composite** (soil barrier layer; flexible membrane liner; drainage layer; cap protection layer). OH ADC 3745-27-08(B)(1)(f).	**Yes**, for closure, post-closure, and corrective action of sanitary landfills. OH ADC 3745-27-15, 16, 18.	**Yes.** OH ADC 3745-27-19(F).	**Yes.** OH ADC 3745-27-19(B)(3).	**Yes.** OH ADC 3745-27-19(J).	**Yes.** Exempt from daily cover requirements. OH ADC 3745-30-14(F).	No.	**Yes.**
Oklahoma	6/1/2000	**Yes.** OK ADC 252: 515-1-8.		**Yes.** OK ADC 252: 515-13-1.	**Soil** (24-inch barrier layer; 1-foot erosion layer for vegetation). OK ADC 252: 515-19-53(a).	**Yes**, for closure, post-closure, and corrective action. OK ADC 252:515-27-3.	**Not daily.** 6 inches earthen material, but no daily requirement. OK ADC 252: 515-19-51(a),(c)(2).	**Yes,** but unspecified. OK ADC 252: 515-19-36(c).	**Yes.** OK ADC 252: 515-17-2.	No.	No.	No.
Pennsylvania	Jul. 4, 1992; amended Jan. 12, 2001	**Yes.** But DEP may require closure. 25 PA ADC 287.111.	*Class I Landfills*: - 6-inch subbase; **clay or composite** secondary liner; 12-inch leachate detection zone; **composite** primary liner; 18-inch earthen protective cover including leachate collection system. 25 PA ADC 288.431–440. *Class II Landfills*: - 6-inch subbase; 12-inch leachate detection zone; **composite** liner (geosynthetic upper and earthern composite); 18-inch earthen protective cover including leachate collection system. 25 PA ADC 288.531–539. *Class III Landfills*: - Attenuating **soil** (sand, loam, clay, silt). 25 PA ADC 288.624.	**Yes.** 25 PA ADC 288.413; 288.451–457; 25 PA ADC 288.512; 288.551–557; 25 PA ADC 288.623(a)(7).	**Clay or geosynthetic** (1.0 x 10-7 cm/sec permeability). Drainage layer over cap. 2-foot soil for vegetation. 25 PA ADC 288.234 Appx. A.	Bond for **closure**. 25 PA ADC 287.342. Insurance for **third-party** claims. 25 PA ADC 287.371.	**Yes.** Composition not specified. 25 PA ADC 288.232.	**Yes,** but unspecified. 25 PA ADC 288.217(a)(1).	**Yes.** Final cover drainage and slope requirements. 25 PA ADC 288.234(a),(g). Runoff prevention included in leachate provisions. 25 PA ADC 288.513(c)(3); 288.454(a)(4); 288.413(c)(3). Surface drainage through sediment ponds. 25 PA ADC 288.243(g).	**Yes.** Coal ash monofill characterized as a Class III Landfill. 25 PA ADC 288.621(b). Exempt from leachate system and liner requirements that apply to Class I and II landfills.	No.	No.

Table 3: State Environmental Control Requirements for Coal Ash Landfills

State	Regulations date	Grandfathering of old landfills	Liner type	Leachate collection system	Cap	Financial assurance	Daily Cover	Dust controls	Run-on, run-off controls	MonoFill exemption	Onsite exemption	Exemption based on TCLP results
South Carolina	5/23/2008	No. SC ADC 61-107.19 I.A.6.f.	*Class I:* **no** liner right; *Class II:* **clay** liner; *Class III:* **Composite** (30-mil FML, upper; 2-foot compacted soil lower). SC ADC 61-107.19 Part V.D.258.40(a)(2).	*Class III:* **Yes.** SC ADC 61-107.19 Part V.D.258.40(a)(2).	**Soil**. *Class III:* 18-inch earthen infiltration layer; 1-foot earthen erosion layer. SC ADC 61-107.19 Part V.F.258.60(a).	**Yes**, for closure, post-closure, and corrective action for non-government-owned Class I, II, and III landfills. SC ADC 61-107.19 Part I.E.	*Class III:* **Yes.** 6 inches daily. SC ADC 61-107.19 Part V.D.258.21(a)	**Yes.** SC ADC 61-107.19 Part V.H.4.a.11; Part V.C.258.31(a)	**Yes.** SC ADC 61-107.19 Part V.D.2; Part V.C.258.26.	**Yes.** Liners in monofills exempt from composite liner requirement; only require 2-foot clay liner. SC ADC 61-107.19 Part V.D.258.40(3)	No.	TCLP determines if waste goes to a Class II or Class III facility. SC ADC 61-107.19 Part I.C.
South Dakota	Adopted 7-26-1990. Amended 6-10-1993. Sections 1200-01-07-.01--.64 adopted in 1974; amended in 2001, 2003, 2006, 2008. NOTE: coal ash waste could be either a Class I or Class II waste; if termed a special waste, landfills would need permission before accepting it.	**Yes.** SD ADC 74:27:12:01	**Composite**. 12-inch drainage layer; 60-mil flexible membrane liner). SD ADC 74:27:12:17.	**Yes.** SD ADC 74:27:12:18.	**Soil**. 15 inches compacted soil; 6 inches topsoil, vegetation. SD ADC 74:27:12:21.	**Yes**, for closure. TN ADC 1200-01-07-.03. No requirement for state or federally operated facilities or facilities with pre-3/18/90 permits.	**Yes.** 6 inches daily. SD ADC 74:27:13:09.	**Yes.** SD ADC 74:27:13:12.	**Yes.** SD ADC 74:27:12:18.	No.	No.	No.
Tennessee	2004 (Chap 335); 2006 (Chap 330); 2009 amendments. Coal ash excluded from definition of solid waste. U.C.A. 1953 § 19-6-102(18)(b)(iii) / (per phone convo w Ralph Bonn)	**Yes, partial.** Pre-1990 facilities exempt from certain requirements. TN ADC 1200-01-11-.07-.04(13)(b)(7).(3)	**Composite**. At least 50-mil FML upper component; 2-foot compacted soil lower component (for Class I and II facilities, unless Class II obtain a **waiver**). TN ADC 1200-01-07-.04(4)(a)(1)	**Yes.** TN ADC 1200-01-07-.04(4)(a)(5), (7), (8).	**Soil** (3 feet: top 12 inches topsoil (vegetative cover). TN ADC 1200-01-07-.04(4)(a)(6); -.04(8). **Composite** (4 feet of "clay-rich soil material"); 18 inches topsoil, flexible synthetic membrane over aerial fill. 30 TX ADC 335.590(24)(E); 30 TX ADC 330.457	**Yes**, for closure, post-closure, and corrective action. TN ADC 1200-01-07-.04(6)(a)(3). *Class II:* **No**, not necessarily daily; depth and frequency of soil cover individualized by permit. TN ADC 1200-01-07-.04(6)(e).	**Yes.** TN ADC 1200-01-07-.04(2)(c).	**Yes.** TN ADC 1200-01-07-.04(2)(c). (4)	No.	No.	No.
Texas	2004 (Chap 335); 2006 (Chap 330); 2009 amendments. Coal ash excluded from definition of solid waste. U.C.A. 1953 § 19-6-102(18)(b)(iii) / (per phone convo w Ralph Bonn)	**Yes.** 30 TX ADC 335.580	**Composite** (30 mil flexible membrane upper; 3-foot soil). 30 TX ADC 335.590(24)(A). / **Alternative** design per CEQ discretion. 30 TX ADC 330.335.	**Yes.** 30 TX ADC 335.590(24)(B). 30 TX ADC 330.333.	**Composite** (4 feet of "clay-rich soil material"); 18 inches topsoil, flexible synthetic membrane over aerial fill. 30 TX ADC 335.590(24)(E); 30 TX ADC 330.457	**Yes**, for closure, post-closure, corrective action, and third-party liability. 30 TX ADC 37.8031. 37.8031	*Type I:* **Yes** (6-inch earth). *Type IV:* **Weekly** cover. / **Waiver** per CEQ discretion. 30 TX ADC 330.165.	**Yes**, but unpelletized. 30 TX ADC 335.590(23).	**Yes.** 30 TX ADC 335.590(24).	No.	No.	No.
Utah		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Virginia	Adopted 3-15-1990. Amended 11-1-2008.	**Yes.** 9 VA ADC 20-80-60(B).	**Soil** (1-foot compacted soil; 1-foot drainage layer) or synthetic (30-mil FML, 12-inch drainage layer). 9 VA ADC 20-80-270(B)(14). **Clay** or other material (four feet). WAC 173-304-460(3)(c)(i)	**Yes.** 9 VA ADC 20-80-250(B)(11)	**Soil** (18-inch infiltration layer; 6-inch erosion layer). 9 VA ADC 20-80-270(E)(1); 20-80-250(E)(1)	**Yes**, for closure, post-closure, and corrective action for non-government-owned solid waste facilities. 9 VA ADC 20-70-90.	**Discretionary**. 9 VA ADC 20-80-270(C)(12)(c).	**Yes**. 9 VA ADC 20-80-270(C)(12)(c).	**Yes.** 9 VA ADC 20-80-250(B)(6).	No.	**Yes.** Expansion of pre-10-9-93 on-site landfills exempt from certain requirements. 9 VA ADC 20-80-60(C)(4).	No.
Washington	9/6/2000	**No.** Design standards apply to new construction and expansions. WAC 173-304-460.	Alternative design: two liners (50 mils synthetic upper; 2-foot clay or other material liner). WAC 173-304-460(3)(c)(ii)	**Yes.** WAC 173-304-460(3)(iii).	Low permeability **soil** (2 feet); 6-inch topsoil final cover vegetation. WAC 173-304-460(3)(c)(i)-(iii).	**Yes**, for closure and post-closure of new, expanded, and existing as of 11-27-89 facilities. WAC 173-304-467.	**No.** Compaction required. WAC 173-304-460(4)(b)(ii).	**Yes.** WAC 173-304-410(2)(j).	**Yes.** WAC 173-304-460(3)(a)(ii). (vi)	No.	No.	No.
West Virginia	1-May-90	**Yes.** Liner system requirements apply to landfills placed in operation after 5-1-90. WV ADC s 33-1-5(5.5.b.1).	**Clay** (18 inches) and synthetic liner (60 mil. / or 2-foot clay liner. WV ADC s 33-1-5(5.5.b.1.A/B).	**Yes.** WV ADC s 33-1-4(4.8); s.33-1-5(5.5.b.1.A).	**Clay** (1 foot). WV ADC s.33-1-6(6.1.e.1.A.2)	**Yes**, closure, post-closure care, and corrective action. WV ADC s 33-1-3(3.13). Non-commercial facilities exempt.	**Yes.** Composition not specified. WV ADC s.33-1-4(4.8.g.1.H)	**Yes.** WV ADC s.33-1-4(4.5.g.1).	**Yes.** WV ADC s.33-1-4(4.5.g.5); s.33-1-6(6.1.e.1.E).	No.	No.	No.
Wisconsin	7/1/1996	**Yes.** Regs apply to new construction and expansion of old facilities. WI ADC s NR 504.05.	**Composite**. liner (60 mil geomembrane upper; 4 foot clay lower). WI ADC s NR 504.06(1)(a).	**Yes.** WI ADC s NR 504.06(5).	**Clay** (2 feet) or geosynthetic clay liner (GCL) over 2 feet of soil. WI ADC s NR 504.07(4).	**Yes**, for closure, long-term care, and remedial action. WI ADC s NR 520.05.	**Not daily**. WI ADC s NR 506.09(2).	**Yes.** WI ADC s NR 506.07(1)(c).	**Yes.** WI ADC s NR 504.07(2).	No.	No.	No.
Wyoming	Effective Date: November 28, 1990; AMENDED: May 25, 1995, October 15, 1998	**No.** WY ADC ENV SW Ch. 3 s. 2(vii).	**Clay** (at least 2 feet). WY ADC ENV SW Ch. 3 s. 4(a)(i).	**Yes.** WY ADC ENV SW Ch. 3 s. 3(j).	**Subsoil** (2 feet); topsoil (6 inches). WY ADC ENV SW Ch. 3 s. 7(d).	**Yes**, for closure, post-closure, and corrective action. WY ADC ENV SW Ch. 7 s. 3.	**Not daily**. Every 31 days. Composition not specified. WY ADC ENV SW Ch. 3 s. 5(o). (One-acre and larger CCW facilities may cover coal ash less frequently. WY ADC ENV SW Ch. 3 s. 3(q)(i).	**Yes.** WY ADC ENV SW Ch. 3 s. 5(n).	**Yes.** WY ADC ENV SW Ch. 3 s. 4(i); s. 5(o). (vi)	**Yes.** Exempt from liner requirements. WY ADC ENV SW Ch. 3 s. 4(i)(iv). Less stringent other requirements. WY ADC ENV SW Ch. 3 s 5(q)(i).	No.	No.

Table 4: State Environmental Requirements for Coal ash Surface Impoundments

State	Regulation date	Grandfathering of old impoundments	Liner type	Leachate collection system	Cap	Financial assurance	Run-on, run-off controls	Monofill exemption	Onsite exemption	Exemption based on TCLP results	
Alabama	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Arizona	No regs.	N/A	N/A **Discretionary.** *Class I impoundments*: double liners with high permeability collection layer between; *Class II impoundments*: single liner. 6 CO ADC 1007-2:1-9.3; 9.4.	N/A No collection system. Monitoring system required. 6 CO ADC 1007-2:1-9.3	N/A N/A	N/A **Yes.** closure, post-closure, and corrective action. 6 CO ADC 1007-2:1-1.8.	N/A N/A	N/A N/A	N/A **Yes.** 6 CO ADC 1007-2:1-1.4.	N/A N/A	
Colorado	Limited impoundment regs. 6 CO ADC 1007-2 Part 1, Section 9 Regs apply to leachate collection impoundments only. 62 FL ADC	**Site-specific.** 6 CO ADC 1007-2:1-9.1.4.									
Florida	62-701.400(6).	N/A	N/A	N/A	N/A	N/A. **Yes.** for closure, post-closure, and corrective action. GA ADC 391-3-4-.13	N/A	N/A	N/A	N/A	
Georgia	No regs.	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	
Illinois	Limited impoundments regs: if located in "setback zone" or "regulated recharge area" (water supply areas). 35 IL ADC 616.441	**Yes.** Some requirements and forced closures of existing plants. 35 IL ADC 615.441.	Two or more liners with leachate collection between. Lower liner may be composed of 5-foot thick layer of **clay** or "other natural material" with specified permeability. 35 IL ADC 616.444.	**Yes.** Between liners. 35 IL ADC 616.444.	**Yes.** but material unspecified. Must have same or lower permeability than lower liner. 35 IL ADC 616.447(b)(3).	**Yes.** for closure. 35 IL ADC 807.605–656; 811.700–720.	No.	No.	No.	No.	
Indiana	No regs.	N/A	N/A	N/A	N/A	No. 329 IAC 10-3-1 Sec. 1 (8), (9).	N/A	N/A	N/A	N/A	
Iowa	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Kansas	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Kentucky	No regs.	N/A	N/A	N/A	N/A	Yes, for closure and post-closure care. 401 KAR 45:080 (sec.5) and (sec.6)	N/A	N/A	N/A	N/A	
Louisiana	Adopted Feb. 1993. Amended Oct. 2007.	**Yes.** Existing impoundments exempt from liner standards. LAC 33:VII.713.A.3.a.	**Composite** (30-mil geomembrane; 3 feet clay) or alternative. LAC 33:VII.713.A.3.d.	Not	**Clay** (24 inches) **and geomembrane** or alternative; 6 inches topsoil. LAC 33:VII.713.E.3.c.	**Yes.** for closure and post-closure. LAC 33:VII.1303.	**Yes.** LAC 33:VII.713.A	No.	No.	No.	
Maryland	No regs. Storage of CCW in unlined surface impoundments prohibited without MDE authorization. COMAR 26.04.10.05(B).	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Michigan	Regs apply to industrial waste Sis closed as landfills. MI ADC R.299.4309.	Not specified.	N/A	N/A	Erosion layer (6 inches **earthen** material for vegetation), infiltration layer (2 feet compacted **soil OR flexible membrane liner**), 2 feet of additional soil, or alternative. MI ADC R.299.4304.6. Low-hazard industrial waste landfills on natural soil sites may install cover not designed to minimize infiltration.	**Yes.** closure and post-closure. MI ADC R.299.4922.4.	**Yes.** MI ADC R.299.4315.13.	N/A	No	**Yes.** MI ADC R.299.4311.	
Minnesota	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No.	
Mississippi	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Missouri	No regs. Solid Waste Disposal Area permits required if no NPDES permit. 10 CSR 80-2.020.	N/A	N/A	N/A	N/A	**Yes.** for closure, post-closure, and corrective action. 10 CSR 80-2.030(4)(B), (C).	N/A	N/A	N/A	N/A	
Montana	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Nevada	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
New Hampshire	No regs. Regs apply to leachate collection impoundments only. NJ ADC 7:26-	N/A	N/A	N/A	N/A	**Yes** for closure. NH ADC Part ENV-SW 1403	N/A	N/A	N/A	N/A	
New Jersey	2A.7(e)12).	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
New Mexico	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
New York	Adopted 1988. Amended 1993. Regs apply to leachate collection impoundments only. 15A NCAC	**Yes.** 6 NY ADC 360-6.1.	Two liners: upper 60-mil **geosynthetic** lower **composite** (60mil geosynthetic; 2 feet compacted soil). 6 NY ADC 360-6.5(b).	**Yes.** between two liners. 6 NY ADC 360-6.5(b)(2).	Removal upon closure. 6 NY ADC 360-6.8.	**Discretionary.** 6 NY ADC 360-1.12(a), (b).	No	No.	No.	No.	
North Carolina	13B.1600(e).	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
North Dakota	12/1/1992	**Yes.** ND ADC 33-20-01.1-02; 33-20-03.1-04	**Soil** (4 feet) or **synthetic.** ND ADC 33-20-08.1-01(2)(b)	**Yes.** ND ADC 33-20-04.1-09(3)(e); 33-20-07.1-01(4)	Removal/reclamation **OR** treatment/cap, not specified. ND ADC 33-20-08.1-02; 33-20-04.1-09	**Yes,** for closure and third-party liability; for corrective action at agency's discretion. ND ADC 33-20-14-01	**Yes.** ND ADC 33-20-04.1-09(3)(a)	No.	No.	No.	Corrective action requirement. ND ADC 33-20-08.1-01(4).
Ohio	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Oklahoma	6/12/2000	**No.** OK ADC 252: 616-3-1.	Dependent on waste classification. **Clay, composite, flexible membrane liner, or concrete.** OK ADC 252: 616-7-2.	No.	**Clay or FML.** OK ADC 252: 616-13-3(d)(6)(B).	**Yes,** for closure, post-closure, and corrective action. OK ADC 252:515-27-3.	**Yes.** OK ADC 252: 616-7-1(1)	No.	No.	No.	

Table 4: State Environmental Requirements for Coal ash Surface Impoundments

State	Regulation date	Grandfathering of old impoundments	Liner type	Leachate collection system	Cap	Financial assurance	Run-on, run-off controls	Monofill exemption	Onsite exemption	Exemption based on TCLP results
Pennsylvania	Jan. 13, 2001	**Yes.** But DEP may require closure. 25 PA ADC 287.111.	*Class I impoundments:* • 6-inch soil/earthen subbase; **clay or composite** secondary liner; 12-inch leachate detection zone; **composite** primary liner; 18-inch protective cover including leachate collection system. 25 PA ADC 289.431–439. *Class II impoundments:* • 6-inch soil/earthen subbase; 12-inch leachate detection zone; **composite** liner (geosynthetic upper and earthern composite); 18-inch protective cover including leachate collection system. 25 PA ADC 289.451–457; 25 PA ADC 289.531–538.	**Yes.** 25 PA ADC 289.413, 289.513, 289.551–557.	**Clay or geosynthetic** (1.0 x 10-7 cm/sec permeability); drainage layer; 2-foot vegetative soil. 25 PA ADC 289.242; Appx. A	Bond for **closure**. 25 PA ADC 287.342. Insurance for **third-party** claims. 25 PA ADC 287.371.	**Yes.** 25 PA ADC 289.271(a)(6); 25 PA ADC 289.413 (c)(3); 289.454(a)(4); 289.513(c)(3); 289.554(a)(4)	No.	No.	No.
South Carolina	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
South Dakota	No regs.	N/A	N/A	N/A	N/A	**Discretionary**: for closure, post-closure, and corrective action. May be required for envtn. remediation. SD ADC 74.27.16.	N/A	N/A	N/A	N/A
Tennessee	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Texas	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Utah	No regs.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Virginia	Regs apply if closed in place as lar	N/A	N/A	N/A	Material not specified. 9 VA ADC 20-80-360(B)(2)(d).	N/A	N/A	N/A	**Yes.** VA ADC 20-80-60(E)(8).	N/A
Washington	9/8/2000	**Yes.** Design standards apply to new construction and expansions. WAC 173-304-460.	**Soil** (2 feet) or synthetic (30 mil). WAC 173-304-430(2)(b). Two liners and leak detection system. WV ADC s 33-1-4(4.8.c.3.B). 60 mil **synthetic** top liner, **composite** lower (2-foot clay-60mil synthetic); protective cover over top liner.	Must have either GW monitoring **OR** leachate detection/ collection/ treatment. WAC 173-304-430(2)(b). **Yes.** WV ADC s 33-1-4(4.8); s 33-1-5(5.5.b.1.A).	Removal **OR** soil cap (2 feet); 6-inch topsoil final cover; vegetation WAC 173-304-460(3)(a)(i)-(iii).	No.	**Yes.** WAC 173-304-460(3)(a)(iii) (vi).	No.	No.	No.
West Virginia	1-May-90	**Yes.** Liner system requirements apply to SIs placed in operation after 5-1-90. WV ADC s 33-1-5(5.5.b.1).			No.	**Yes.** closure, post-closure care, and corrective action. WV ADC s 33-1-3(3.13).	N/A	No.	No.	No.
Wisconsin	Discretionary regulation of industrial lagoons not licensed under other solid waste provisions. WI ADC s NR 213.02.	**Yes.** WI ADC s NR 213.03(1).	**Soil or synthetic.** WI ADC s NR 213.10(1)(a)(1).	**Yes.** WI ADC s NR 213.14(7).	No capping requirement. Abandonment plan to be submitted to DNR. WI ADC s NR 213.07.	**Yes.** for closure, long-term care, and remedial action. WI ADC s NR 520.05.	No.	No.	No.	No.
Wyoming	No regs.	N/A	N/A	N/A	N/A	**Yes.** for closure, post-closure, and corrective action. WY ADC ENV SW Ch. 7 s. 3.	N/A	N/A	N/A	N/A

Appendix: State by State Comparison of Dam Safety Laws

State	Regulatory Citation	Date of Enactment of Regulations	Designed by Engineer	Review of Plans by Regulators	Size Classification	Hazard Classification	Inspections by Operator	Reporting	Inspection by Regulators	Emergency Action Plans	Inundation Maps	Certification of Construction	Technical Standards for Construcion	Bond Requirement
Alabama	No State Regulations*	None	No	No	No	No	No	No	No	No	No	No	No	No
Arizona	Ariz. Rev. Stat. § 45-1201 et seq. Ariz. Admin Code § 12-15-1201 et seq.	11/27/1979	Ariz. Admin Code § 12-15-1212(B): Owner's engineer to supervise construction Ariz. Admin Code § 12-15-1215: Engineer must be responsible for design and safety of dam	Ariz. Admin Code § 12-15-1207: written approval required before constructing or altering dam Ariz. Admin Code § 12-15-1214: License requirement for operating dam	Ariz. Admin Code § 12-15-1203: jurisdictional threshold – under 6 ft; under 25 ft and 50 acre-ft; under 15 acre-ft Ariz. Admin Code § 12-15-1206(A): Size classification	Ariz. Admin Code § 12-15-1206(B): Hazard Classification based on threat to life and property	Ariz. Admin Code § 12-15-1205: Regular visual inspection by operator as specified in Emergency Action Plan	Ariz. Admin Code § 12-15-1212: regular inspections during construction Ariz. Admin Code § 12-15-1219: Inspections every year for significant and high hazard dams, every 5 years for others	Ariz. Admin Code § 12-15-1212(G): Final Construction Inspection Ariz. Rev. Stat. § 45-1213: Inspection based upon complaint No Frequency of Inspection	Ariz. Admin Code § 12-15-1221: Emergency Action Plan for Significant and High Hazard Dams	Ariz. Admin Code § 12-15-1221(A)(7): Inundation map required as part of Emergency Action Plan	Ariz. Admin Code § 12-15-1212(G): Final construction inspection by department Ariz. Admin Code § 12-15-1213: Completion Documents for a Significant or High Hazard Potential Dam	Ariz. Admin Code § 12-15-1216: Design Requirements	Ariz. Admin Code § 12-15-1208: Performance bond may be required for large and/or high hazard dams to ensure costs of construction
Colorado	Colorado Rev. Stat. § 37-87-101 Rules contained in Guidance Document by State Engineer (enforceable)	1/1/2007	Rule 5.2: Designs by Professional Engineer. Rule 5.3: Construction Specifications by Professional Engineer. Rule 9.1: Construction Observation by Professional Engineer.	Rule 5: Construction Permit requirement.	Rule 4.5.2: Jurisdictional: 100 acre feet/20 acre surface area/ or 10 ft height; Minor, Small, Large	Rule 4.2.14: Hazard Classifications I through IV based on threat to property and human life Rule 5.4: Hazard Classification Report	Rule 15.2: Observations (when impoundment is at least half full): Twice a month for high or significant hazard dams; Once every three months for low hazard dams	Rule 14: Qualified Engineer may inspect and report in lieu of state	Colorado Rev. Stat. § 37-87-107: As often as deemed appropriate by the State Engineer Rule 14: Qualified engineer may report in lieu of state inspection No Frequency of Inspection for all dams	Rule 16: Emergency Action Plan required for high and significant hazard dams	Rule 18.1.5: Requires inundation mapping	Rule 10: Certification of construction by department	Appear Extensively Throughout Rules	Colorado Rev. Stat. §37-87-104: Owner exemption from liability with proper insurance/bond
Florida	Fla. Stat. § 373.403 - 4596 Regulations by individual water management district	1972	40A-4.101: Northwest Florida – Plans and specifications must be prepared or approved by engineer 40A-4.461: Northwest Florida: periodic inspections during construction, annual constructions thereafter South Florida Rule 3.3: dams certified by experts in engineering, soils, etc. 40D-4.381(m): Florida Southwest construction certification by prof. engineer St. John's River area – None Suwanee River area - None	40A-4.041: Northwest Florida permit requirement (general or individual permit depending upon size) 40A-4.091: Northwest Florida permit application must be reviewed by engineer appointed by commission South Florida Rule 1.4.1: review of plans by regulators South Florida Rule 3.0: Certification requirement 40D-4.041: Southwest Florida permit requirement St. John's River area Rule 3.2: Permit Requirement 40B-1.702: Suwanee River permit requirement	40A-4.051: Northwest Florida jurisdictional req: less than 10 ft and 50 acre-ft South Florida - None Southwest Florida- None St. John River area Rule 3.3.1: jurisdictional threshold 40 acre-feet or over 40 acres surface area St. John's River area Rule 10.5.6: Hazard classification based mostly on size Suwanee River area - None	Northwest Florida- None South Florida Rule 1.1: "Major" or "Minor" depending on threat to life and property Southwest Florida- None St. John's River area Rule 10.5.6: Hazard classification based mostly on size Suwanee River area - None	Northwest Florida - None South Florida Rule 4: Responsibilities in accordance with operation and maintenance Southwest Florida - None St. John's River Area- None Suwanee River area - None	40A-4.301: Northwest Florida – Board may require reports of operation and maintenance South Florida Rule 4.1: Regular reporting requirement Southwest Florida - None St. John's River area – None St. John's River area- None Suwanee River area - None	373.423: Periodic inspections during construction 373.423: Periodic inspections after construction 40A-4.461: Northwest Florida – periodic inspection during construction at least annually thereafter South Florida - None 40D-4.381(w): Southwest Florida right of inspection St. John's River area – None Suwanee River area – None	Northwest Florida - None South Florida - Emergency Response Plan Southwest Florida - None St. John's River area – None Suwanee River area - None	Northwest Florida - None South Florida - None Southwest Florida - None St. John's River area - None Suwanee River area - None	40A-4.411: Northwest Florida Completion report with as-built plans South Florida Rule 3.0: Construction certifications 40D-4.381(m): Florida Southwest construction certification by prof. engineer St. John's River area - None Suwanee River area - None	Northwest Florida - None (left to engineer) South Florida Rule 2.0: Design Criteria Southwest Florida - None St. John's River area: Rule 10. Additional requirements for permits contains design standards. Suwanee River area - None	Northwest Florida - None South Florida - None Southwest Florida - None St. John's River area: Rule 7.1.1: financial assurance for operation and maintenance 40B-1.704: Suwanee River are bond requirement
Georgia	GA Code § 12-5-370 GA. Comp. R. & Regs. § 391-3-8-	9/20/1990	GA Code § 12-5-376(e): Application must be accompanied by certification from professional engineer	GA. Comp. R. & Regs. § 391-3-8-.05. Permitting Requirement GA. Comp. R. & Regs. § 391-3-8-.09: Standards for Design and Evaluation of Dams	GA. Comp. R. & Regs. § 391-3-8-.02(h)(iii)(1): jurisdictional limit 25 ft high or 100 acre-feet GA. Comp. R. & Regs. § 391-3-8-.02(h)(ii)(2): small, medium, large, very large	GA. Comp. R. & Regs. § 391-3-8-.02(e) (f): Category I: probable loss of human life. Category II: No probable loss of human life	GA. Comp. R. & Regs. § 391-3-8-.10: Regular inspection and maintenance as necessary No Schedule in law	GA. Comp. R. & Regs: § 391-3-8-.10(f): Notification only if indication of failure	GA. Code § 12-5-379: Right of entry for inspection No Frequency of Inspection	None	None	None	GA. Comp. R. & Regs. § 391-3-8-.09(1): All dams built to acceptable guidelines (NRCS, USACE, FERC, OCE Bureau of Reclamation) GA. Comp. R. & Regs. § 391-3-8-.09: Standards for Design and Evaluation of Dams	None
Illinois	Il. Stat. 615 § 5/23a Il. Admin Code 17 § 3702.10	3/2/1988	Il. Admin Code 17 § 3702.40: Plans and reports by professional engineer	Il. Admin Code 17 § 3702.30(b)-(c): Permit Req. (By its terms applies only to structures in floodway)	Il. Admin Code 17 § 3702.30(b)-(c): jurisdictional limit greater than 25 ft and 15 acre-ft or 6 ft and 50 acre-ft Il. Admin Code 17 § 3702.30: small, intermediate or large	Il. Admin Code 17 § 3702.30: Hazard Categories based on threats to life and property	Il. Admin Code 17 § 3702.40(5): Maintenance and inspection requirements based on dam class every one to five years	Il. Admin Code 17 § 3702.40(5): engineer report – Class I dams annually; Class II dams every 3 years; Class 3 dams every 5 years.	Il. Admin Code 17 § 3702.30(C): Current inventory and inspection of existing dams Il. Admin Code 17 § 3702.40(7): Right of access for inspection No Frequency of Inspection	Il. Admin Code 17 § 3702.40(4): Operating plan must contain emergency warning and evacuation plan	None	Il. Admin Code 17 § 3702.60(k): Submission of as-built plans	Il. Admin Code 17 § 3702.40(1)	Il. Admin Code 17 § 3702.40: Performance bond may be required

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State	Regulatory Citation	Date of Enactment of Regulations	Designed by Engineer	Review of Plans by Regulators	Size Classification	Hazard Classification	Inspections by Operator	Reporting	Inspection by Regulators	Emergency Action Plans	Inundation Maps	Certification of Construction	Technical Standards for Construction	Bond Requirement
Indiana	IND. Code § 14-27-7-1 312 IND. Admin. Code § 10-5-1 1 et seq. (Extensive guidelines lacking the force of law)	1/26/2007	None	IND. Code § 14-28-1-22: Construction permit for structures in floodway	None	312 IND. Admin. Code § 10-5-3-1: Hazard classifications based on threats to human life and property	None	None	IND. Code § 14-27-7-4: Inspections at least once every 3 years	None	None	None	See Guidelines	None
Iowa	Iowa Code § 567-52.1 et seq. Iowa Admin. Code § 567-73.1 Enforceable Guidelines "Design Criteria and Guidelines for Iowa Dams"	11/24/1975	Iowa Admin. Code § 567-72.3: Requires compliance with engineering criteria Design Criteria and Guidelines for Iowa Dams: requires inspection during construction and submission of as-built plans by engineer for major dams	Iowa Admin. Code § 567-72.3(455B): Permit for construction, operation and maintenance, or alteration only when dam complies with "Design Criteria and Guidelines for Iowa Dams"	Iowa Admin. Code § 567-71.3(455B): jurisdictional size class dependant upon proximity to population	Iowa Admin. Code § 567-72.3(2): Hazard class based on threat to life and property	Iowa Admin. Code § 567-73.21(1): Annual inspection	Iowa Admin. Code § 567-73.21(1): Regular written reports by operator	Iowa Admin. Code § 567-73.21: Inspection schedule during and after construction Iowa Admin. Code § 567-23.21(1): Post-construction inspection every two to five years depending upon hazard class	None	None	Iowa Admin. Code § 567-73.21: Requires dam completion inspection	Iowa Admin. Code § 567-72.3(455B): Permit for construction, operation and maintenance, or alteration only when dam complies with "Design Criteria and Guidelines for Iowa Dams"	Iowa Code § 455B.275: Bond required at discretion of Commission Iowa Admin. Code § 567-72.3: Permit may require performance bond
Kansas	Kan. Stat. § 82a-301 et seq. Kan. Admin Regs. § 5-40-1 et seq.	5/1/1983	Kan. Admin Regs. § 5-40-26: Designs must be submitted by professional engineer	Kan. Stat. § 82a-307: Permit or consent of state engineer required	Kan. Stat. § 82a-301: jurisdiction threshold: 25 ft or capacity to impound 50 acre-feet or more Kan. Admin Regs. § 5-40-21: Class sizes of dams	Kan. Admin Regs. § 5-40-20: Hazard Classifications based on threat to life and property	Kan. Admin Regs. § 5-40-73: Inspection during dam construction, repair, and modification Kan. Admin Regs. § 5-40-93: Schedule for inspection of dams (by hazard class)	Kan. Admin Regs. § 5-40-72: Construction inspection reports Kan. Admin Regs. § 5-40-90.3(requirements for a dam safety inspection report	Kan. Stat. § 82a-303b: Power of inspection No Frequency of Inspection	Kan. Admin Regs. § 5-40-73: Emergency Action Plan	Kan. Admin Regs. § 5-40-73(a)(3): requirement for inundation map	Kan. Admin Regs. § 5-40-12: Certification of as-built drawings	Kan. Admin Regs. § 5-40-22: Design requirements for construction of a dam	None
Kentucky	Kentucky Rev. St. § 151 401 KY Admin. Regs. § 4:030 Enforceable Guidance: "Division of Water Engineering Memorandum No. 5 (1-1-75)"	1966	401 KY Admin. Regs. § 4:030 Section 9: signature of engineer on plans and specifications	Ky Rev St. § 151.250: Permit Req (By its terms applies only to structures in floodways)	Kentucky Rev. St. § 151.100: jurisdictional threshold – dam 25 ft high or holds 50 acr feet or more	Guidance Section B: Hazard classifications based on threats to life and property	None	None except certificate renewal	Kentucky Rev. St. § 151.125: Right of entry for inspection Kentucky Rev. St. § 151.293: Certificates of inspection not to exceed five years	Kentucky Rev. St. § 151.293(3)(g): calls for promulgation of regulations calling for emergency action plans; no regs found	None	Section 8 of Guidance: Requires approval of as-built plans	401 KY Admin. Regs. § 4:030: Design Criteria for Dams and Associated Structures See also guidance	None
Louisiana	La. Rev. Stat. R.S. § 38:24 La. Admin. Code 70 §2101 et seq.	Dec-85	La. Admin. Code 70 §2101(F)(1): Required certification by professional engineer	La. Admin. Code 70 §2103(1): Permit requirement La. Admin. Code 70 §2101(F)(1): Submission and review of plans	La. Admin. Code 70 §2101(J): jurisdictional size threshold 25 ft high and 15 acre-ft or 6 ft high and 50 acre-ft	La. Admin. Code 70 §3101 (Table 1): "Impact category" based on potential loss of life	La. Admin. Code 70 §2101(I): Designer must submit operations and maintenance manual	No regular reporting (only if problem with operation/ maintenance)	La. Admin. Code 70 §2101(J): "Periodic" inspections by Regulators No frequency of inspection	La. Admin. Code 70 §2101(I): Requirement of Emergency Action Plan	La. Admin. Code 70 §2101(I): Requires Emergency Action Plan including inundation map	None	La. Admin. Code 70 §2101(G): Design Criteria	None
Maryland	MD. Code Regs. 26.17.04.01 et seq.	1973	MD. Code Regs. 26.17.04.05: Requirement of design by Professional Engineer	MD. Code Regs. 26.17.04.03: Permit Req	MD. Code Regs. 26.17.04.05(B): Class by Size and Hazard combination No jurisdictional limit evident	MD. Code Regs. 26.17.04.05(B): Class by Size and Hazard combination	MD. Code Regs. 26.17.04.05(E): Owner given responsibility for monitoring but few specific requirements No frequency established	None except to notify of problems	MD. Code Regs. 26.17.04.05(E): General right of inspection No frequency of inspection	MD. Code Regs. 26.17.04.09A(3)(b)(iv): "Warning Plan" for high hazard dams, no specific requirement for emergency action plans	None	MD. Code Regs. 26.17.04.05(G): Submission of as-built plans	MD. Code Regs. 26.17.04.05(C)-(H): Design and Construction Requirements	None
Michigan	Mich. Comp. Laws § 324.31501 Mich. Admin. Code. r. 281.1301	1994	Mich. Comp. Laws § 324.31501-324.31508: Requires plans by licensed engineers (with exceptions)	Mich. Comp. Laws § 324.31509: Permit req Mich. Comp. Laws § 324.31515: Plan approval before construction	Mich. Comp. Laws § 324.31502: Jurisdictional threshold - 6 ft or 5 surface acres Mich. Comp. Laws § 324.31516: Classification by combo of size and hazard potential	Mich. Comp. Laws § 324.31516: Classification by combo of size and hazard potential	Mich. Comp. Laws § 324.31518: Inspection by operator's engineer every 3-5 based on hazard class	Mich. Comp. Laws § 324.31528: Report after inspection	Mich. Comp. Laws § 324.31527: Right of Entry for State inspection No frequency of inspection	Mich. Comp. Laws § 324.31523: Requirement for Emergency Action Plan	Mich. Admin. Code. r. 281.1331: Requires Inundation map	Mich. Comp. Laws § 324.31517: Final Construction Inspection by Department	Mich. Admin. Code. r. 281.1305: Engineering plans and specifications	Mich. Admin. Code. r. 281.1307: Performance bonds
Minnesota	Minn. Stat. § 103G.001 Minn. R. 6115.0300	1978	Minn. R. 6115.0410(5): Requirement to retain engineer	Minn. R. 6115.0410: Criteria for permit approval	Minn. R. 6115.0320(5): Jurisdictional threshold - 8 ft or 15 acre-ft; or 25 ft and 50 acre-ft if no threat to human life	Minn. R. 6115.034: Hazard classes based on threat to life and property	Minn. R. 6115.0380: Owner must keep records of Operation and Maintenance and Report Problems	Minn. R. 6115.0380: Owner must keep records of operation and maintenance and report problems	Minn. R. 6115.0360: Inspections every year to eight years depending upon hazard class	Minn. R. 6115.0490: "Warning Procedures" required of owners of high hazard dams	None	Minn. R. 6115.0410(10): Submission of as-built construction plans for approval	Left largely to engineer	None

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State	Regulatory Citation	Date of Enactment of Regulations	Designed by Engineer	Review of Plans by Regulators	Size Classification	Hazard Classification	Inspections by Operator	Reporting	Inspection by Regulators	Emergency Action Plans	Inundation Maps	Certification of Construction	Technical Standards for Construction	Bond Requirement
Mississippi	Miss. Code § 51-3-1 11-6-4 Miss. Code R. § I	1984	11-6-4 Miss. Code R. § III(B)(1): Drawings and specifications by professional engineer 11-6-4 Miss. Code R. § VI(B) Inspection of existing dams by engineer	11-6-4 Miss. Code R. § II: Permit requirement	11-6-4 Miss. Code R. § II(B): Jurisdictional Threshold – above 8 ft. or 25 acre ft impoundment	11-6-4 Miss. Code R. § I: High, Low and Significant hazard dams described in definitions section	11-6-4 Miss. Code R. § VI(A): Visual inspection every 60 days 11-6-4 Miss. Code R. § VI(B): In addition to above, high hazard dams must be inspected by engineer at frequency designated in permit	11-6-4 Miss. Code R. § VI(B): Report of engineer inspection of high hazard dam required	11-6-4 Miss. Code R. § VI(C) Right of inspection by regulator No frequency of inspection	11-6-4 Miss. Code R. § IV(H): Emergency Action Plan required	None	11-6-4 Miss. Code R. § IV(D): As-built plans must be submitted along with engineer's seal	11-6-4 Miss. Code R. § IV. Design and Safety Requirements.	None
Missouri	Mo Rev. Stat. § 236.400 Mo Code Regs. § 10Z-22-1.010	1979	Mo Code Regs. § 10Z-22-1.010: Dams designed by engineer do not need construction permit, but do need registration or safety permit	Mo Code Regs. § 10Z-22-2.010: Permit Requirement	Mo Code Regs. § 10Z-2-2.010: Jurisdictional Limit of 35 ft height or 15 acre- surface area	Mo Code Regs. § 10Z-22-2.040 Classes of Downstream Environment based on number of structures and/or occupied dwellings	Mo Code Regs. § 10Z-22-3.030: If dam was built before law was enacted then engineer inspection required every five years Mo Code Regs. § 10Z-22-3.050: If dam subject to building requirements, then permit renewal without inspection report if certification of no changes.	Mo Code Regs. § 10Z-22-3.030 -3.050: Permit Renewal (including reporting) every 5 years	Mo Code Regs. § 10Z-22-3.030 -3.050: Right of inspection No frequency of inspection	Mo Code Regs. § 10Z-22-3.030 -3.050: Require Emergency Action Plan	Mo Code Regs. § 10Z-22-2.040 (Development of inundation maps to determine hazard class	Mo Code Regs. § 10Z-22-3.050: Certification of new dams after construction	Mo Code Regs. § 10Z-22-3.030	None
Montana	Mont. Code § 85-15-101 Mont. Admin. R. § 36.14.101 et seq.	11/14/1988	Mont. Admin. R. § 36.14.303(6): Construction plans prepared by or under direction of engineer	Mont. Admin. R. § 36.14.201: Operator of dam over 50 acre-ft must submit app. for hazard determination Mont. Admin. R. § 36.14.301: Permit required for construction, repair, alteration of high hazard dam	Mont. Admin. R. § 36.14.102: Jurisdictional limit of 50 acre-ft or more	Mont. Admin. R. § 36.14.206: High hazard dam if over 50 acre ft and loss of human life probable in breach	Mont. Admin. R. § 36.14.601: Inspections by owner's engineer at least once every five years	Mont. Admin. R. § 36.14.603: Report after every owner inspection	Mont. Admin. R. § 36.14.302: Inspection during construction No frequency of inspection post-construction	Mont. Admin. R. § 36.14.406: Emergency Procedures and Warning Plans	Mont. Admin. R. § 36.14.205: Inundation area must be calculated for hazard classification Mont. Admin. R. § 36.14.406: Emergency Procedures must include evacuation area	Mont. Admin. R. § 36.14.310: Owner's engineer must give notice of final construction inspection	Mont. Admin. R. § 36.14.501: Design Criteria for high hazard dams	Mont. Admin. R. § 36.14.309 Performance bond for completion of construction
Nevada	48 Nev. Rev. St. § 535.005 et seq. No regulations promulgated	Mar-55	None	48 Nev. Rev. St. § 535.01: Permit requirement	48 Nev. Rev. St. § 535.010: Jurisdictional limit 20 ft high and 20 acre-ft of water	None	None	None	48 Nev. Rev. St. § 535.030: State engineer inspection "from time to time" No frequency of inspection	None	None	None	None	None
New Hampshire	N.H. Rev. Stat. Chapter 482 N.H. Env.-Wr. Parts 100-700	1980	N.H. Env.-Wr. 405.03 Construction Engineer required to ensure dam is built to specifications and to perform inspections (for high and significant hazard dams)	N.H. Env.-Wr. 304.01: Permit requirement for existing dams N.H. Env.-Wr.: Permits for new dams	N.H. Rev. St. 482:2 Jurisdictional threshold – 4 ft; or 2 acre-ft	N.H. Env. Wr. 101.09: Class AA, A, B, C based on threat to life and property	N.H. Env.-Wr. 303.05: Inspect and maintain according to operation and maintenance plan N.H. Env.-Wr. 803.04 Dam monitoring	N.H. Env.-Wr. 302: Report after inspection	N.H. Env.-Wr. 302.02 Inspections every 2, 4 or 6 years depending upon hazard class	N.H. Env.-Wr. 303.06 Emergency Action Plan Required N.H. Env.-Wr. 505: Specifications for EAP	N.H. Env.-Wr. 503.01: Requirement for inundation maps	N.H. Env.-Wr. 405.08 Final inspection report due within 30 days of completion of construction N.H. Env.-Wr. 405.09 Affidavit of compliance with approved plans N.H. Env.-Wr. 405.10: submission of as-built plans	N.H. Env.-Wr. 405: Design requirements	None
New Jersey	N.J. Stat. Chapter 58:4 N.J. Admin. Code § 7:20	1985	N.J. Admin. Code § 7:20-1.5: Engineer must approve designs and specifications and oversee construction	N.J. Stat. Ann. 58:4-2: Approval of plans by Commissioner before construction N.J. Admin. Code § 7:20-1.4: Permit Requirement	N.J. Admin. Code § 7:20-1.1: Jurisdictional threshold- dam which raises water level 5 ft	N.J. Admin. Code § 7:20-1.8: Hazard Class I-IV based on threat to life and property	N.J. St. An. 58:4-8.2: Annual inspection by engineer of all dams greater than 10 ft or 10,000 acre-ft N.J. Admin. Code § 7:20-1.11: class I dams every 6 years; class II dams every 10 years	N.J. Admin. Code § 7:20-1.10(d): Regular progress reports during construction N.J. Admin. Code § 7:20-1.11(g): Report after inspection	N.J. Admin. Code § 7:20-1.13: Authority to inspect No frequency of inspection	N.J. Admin. Code § 7:20-1.7(f): All applicants for Class I and II dams must submit Emergency Action Plan with permit application	N.J. Admin. Code §7:20-1.7(f): Emergency Action Plan must include inundation map	N.J. Admin. Code § 7:20-1.10(6)(7)- As-built plans and certification by engineer that dam has been built in accordance with permit plans.	N.J. Admin. Code § 7:20-1.7(b)(3): Designs according to USACE, DOI Bureau of Reclamation or NRCS N.J. Admin. Code § 7:20-1.9: Specific design criteria	None

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New Mexico	NM Stat. § 72-5-1 NM Code R. § 19.25.12.1	1933	NM Code R. 19.25.12.11: Design report must be prepared or supervised by professional engineer NM Code R. 19.25.12.13(A): Professional Engineer to supervise construction	NM Code R. 19.25.12.11: Permit requirement	NM Code R. 19.25.12.7(D)(1)(a): 25 ft high with 15 acre ft or 6 ft high with 50 acre ft NM Code R. 19.25.12.9: Small, Intermediate, Large	NM Code R. 19.25.12.10: Hazard class based on threat to life and property	NM Code R. 19.25.12.21(C):Dams inspected at least once every 5 years by professional engineer	NM Code R. 19.25.12.21(C): Report required after every inspection	NM Code R. 19.25.12.21: Right of inspection NM Code R. 19.25.12.15: Inspection for final certification No frequency of inspection after construction	NM Code R. 19.25.12.18: Emergency Action Plan for high or significant hazard dams	NM Code R. 19.25.12.18(F): Inundation Maps	NM Code R. 19.25.12.15: State Engineer certifies completed dams	NM Code R. 19.25.12.11: Design Requirements	None
New York	NY Envtl. Conserv. Stat. § 15-0503 6 NY Comp. Codes R. & Regs. § 673.1 **Waste storage and Treatment Structures Specifically Exempted from the Definition of a Dam 6 NY Comp. Codes R. & Regs. § 673.2(f).**	12/10/1985	6 NY Comp. Codes R. & Regs. § 673.7(d)-(e): engineer required to design emergency action plans	6 NY Comp. Codes R. & Regs. § 673.4: Permit requirements for dams NY Envtl. Conserv. Stat. 15-0503: Height under 15 ft and impounding less than 3,000,000 gallons or less than 6 ft	6 NY Comp. Codes R. & Regs. § 673.5: Hazard classification based partially on size or impounding capacity	6 NY Comp. Codes R. & Regs. § 673.9: Hazard classifications based on size and threat to life and property	6 NY Comp. Codes R. & Regs. § 673.6: Inspection and maintenance plan requirement 6 NY Comp. Codes R. & Regs. § 673.12: Safety inspections No frequency specified	6 NY Comp. Codes R. & Regs. § 673.7(c): annual or bi-annual reporting of emergency action plans 6 NY Comp. Codes R. & Regs. § 673.8: Annual certification of significant and high hazard (class B and C) dams 6 NY Comp. Codes R. & Regs. § 673.12: Report of safety inspections 6 NY Comp. Codes R. & Regs. § 673.13: Engineering assessments submitted based on hazard class	6 NY Comp. Codes R. & Regs. § 673.14: Right of inspection No frequency of inspection	6 NY Comp. Codes R. & Regs. § 673.7: Emergency Action Plan required for significant and high hazard (class B and C) dams	6 NY Comp. Codes R. & Regs. § 673.5: Inundation maps required for hazard classification	None	See 6 NY Comp. Codes R. & Regs. Part 608	6 NY Comp. Codes R. & Regs. § 673.16: regulator may required "enhanced safety procedures" including posting of financial insurance based on assessment of dam condition
North Carolina	NC Gen. Stat. § 143-215.23 15A NC Admin. Code § 2K.0101 et seq.	1967	15A NC Admin. Code § 2K.0101: plans, design, and supervision must be completed by engineer	15A NC Admin. Code § 2K.0101: approval required to construct, alter or remove a dam 15A NC Admin. Code § 2K.0101: Certificate of approval required before construction, alteration or removal of a dam	NC Gen. Stat. § 143-215.25A(6): Jurisdictional threshold - 15 ft high or 10 acre ft unless it threatens human life	15A NC Admin. Code § 2K.0105: Hazard classifications based on threat to life and property	15A NC Admin. Code § 2K.0201(d): requires approved operation and maintenance plan	15A NC Admin. Code § 2K.0204: report for final approval	15A NC Admin. Code § 2K.0211: authority to inspect during construction 15A NC Admin. Code § 2K.0301: inspection by department every 2 to 5 years	none	none	15A NC Admin. Code § 2K.0215: As-built plans 15A NC Admin. Code § 2K.0216: Construction certification required by owners engineer 15A NC Admin. Code § 2K.0220: Grant of final approval by regulator	15A NC Admin. Code § 2K.0219: Design standard to U.S. Soil Conservation Service, USACE, DOI Bureau of Reclamation	None
North Dakota	N.D. Cent. Code § 61-03 N.D. Admin. Code. § 89-08-01	Jun-85	N.D. Admin. Code. § 89-08-03-01: Engineer in charge of inspection during construction of high and medium hazard dams and low hazard dams over 10 feet	N.D. Cent. Code § 61-16.1-38: Permit required if dam could impound more than 50 acre-feet (25 feet for medium or high hazard dams)	N.D. Cent. Code § 61-16.1-38: jurisdictional threshold - 50 acre ft (25 for medium or high hazard dams)	N.D. Admin. Code. § 89-08-01-03: provides definition of high, medium, and low hazard dams based on potential for loss of life and property damage	None specifically (although operation plan is required)	N.D. Admin. Code. § 89-08-04-03: annual submission of operating plan	N.D. Admin. Code. § 89-08-03-04: Inspection as the result of a complaint N.D. Admin. Code. § 89-08-03-05: Regulatory inspections as often as necessary to ensure safety N.D. Admin. Code. § 89-08-03-02: right to inspect during construction No frequency of inspection	None	None	N.D. Admin. Code. § 89-08-03-06: As-built plans must be submitted after construction is complete	None	None

Appendix: State by State Comparison of Dam Safety Laws

State	Regulatory Citation	Date of Enactment of Regulations	Designed by Engineer	Review of Plans by Regulators	Size Classification	Hazard Classification	Inspections by Operator	Reporting	Inspection by Regulators	Emergency Action Plans	Inundation Maps	Certification of Construction	Technical Standards for Construction	Bond Requirement
Ohio	Ohio Rev. Code § 1521.06 et seq. Ohio Admin. Code § 1501:21-13-01	4/15/1972	Ohio Rev. Code 1521.06 Plans and specification by professional engineer. Ohio Admin. Code § 1501:21-15-01: Engineer must be in charge of construction	Oh. Rev. Code § 1521.06: Permit requirement	Oh. Rev. Code 1521.06: jurisdiction requirement less than 10 ft or 50 acre ft Ohio Admin. Code § 1501:21-13-01: dam placed in lowest hazard class if 25 ft or less, impounds less than 50 acre-ft and would not cause probable loss of human life	Ohio Admin. Code § 1501:21-13-01 Classification of dams based primarily on threat to life and property	Ohio Admin. Code § 1501:21-15-06: Operation and maintenance plan requires regular inspection plan Ohio Admin. Code § 1501:21-15-07: professional engineer must perform inspections	Ohio Admin. Code § 1501:21-21-01: owners engineer may make inspection and prepare report in lieu of regulator Ohio Admin. Code § 1501:21-21-04: Owner required to update Emergency Action Plan annually	Ohio Rev. Code § 1521.062: Inspections at least once every 5 years Ohio Admin. Code § 1501:21-21-01: "Periodic" inspections Ohio Admin. Code § 1501:21-17-03: Final construction inspection	Ohio Admin. Code § 1501:21-15-07: Emergency Action Plan	Ohio Admin. Code § 1501:21-15-07: Requires inundation map	Ohio Admin. Code § 1501:21-15-04: As-built plans Ohio Admin. Code § 1501:21-15-05: Final construction certification Ohio Admin. Code § 1501:21-17-03: Approval of construction by the chief	Ohio Admin. Code § 1501:21-13-02 through 08	Ohio Rev. Code § 1521.061 Bond to insure completion of structure
Oklahoma	Okla. Stat. 82 § 110.1 Okla. Admin. Code § 785:25-2-1	1933	Okla. Admin. Code § 785:25-5-2: Plans to be prepared by registered professional engineer	Okla. Admin. Code § 785:25-5-1 to 8: Submission and approval of application for construction, alteration or repair Okla. Admin. Code § 785:25-7-5: Changes of plans after approval must be submitted to regulators	Okla. Admin. Code § 785:25-3-1: Jurisdictional threshold: 25 feet high or impounds 50 acre-ft or more Okla. Admin. Code § 785:25-3-3(a): Size classification	Okla. Admin. Code § 785:25-3-3(b): Hazard classification based on threat to life and property	Okla. Admin. Code § 785:25-7-7: Inspection by qualified person every one to five years depending upon hazard class Okla. Admin. Code § 785:25-7-1: Inspection required during construction	Okla. Admin. Code § 785:25-9-2: Records and reports of owner	Okla. Admin. Code § 785:25-7-1: Right of inspection during construction Okla. Admin. Code § 785:25-9-1: Periodic inspections as needed after construction No frequency of inspection	Okla. Admin. Code § 785:25-7-7: Emergency Action Plans	Okla. Admin. Code § 785:25-7-7: Emergency Action Plans must conform to FEMA guidance, which include inundation maps	Okla. Stat. § 110.8. Notice of completion of construction - certification Okla. Admin. Code § 785:25-7-8: Certificate of completion	Okla. Admin. Code § 785:25-3-5: Design standards based on USACE, USACE, or NRCS	None
Pennsylvania	32 Pa. Stat. § 693.3 25 Pa. Code § 105.1	9/16/1980	25 Pa. Code § 105.102: Work must be directed and overseen by engineer approved by the regulator	25 Pa. Code § 105.11: Permit requirement	32 Pa. Stat. § 693.4: 15 ft. or 50 acre ft. 25 Pa. Code § 105.91: Class A, B, and C by size	25 Pa. Code § 105.91: Class 1, 2, 3 by hazard potential	25 Pa. Code § 105.53: Inspections by owner: every 3 months	25 Pa. Code § 105.53: Inspection reports by owners of Category 1 and 2 dams due annually	25 Pa. Code § 105.45: Right of inspection during construction 25 Pa. Code § 105.62: general right of inspection No frequency of inspection	§ 105.134: Emergency Action Plan	No explicit provision to calculate inundation area, although emergency action plan must be posted in towns within inundation area	25 Pa. Code § 105.107: Certificate of completion and the submission of as-built plans	Left largely to the engineer	32 Pa. Stat. § 693.11: Proof of financial responsibility
South Carolina	S.C. Code § 49-11-10 S.C. Code Reg. § 72-1 through 72-9	1997	S.C. Code Reg. § 72-3(C)(1)(b)	S.C. Code Reg. § 72-3(1): Permit Requirement	S.C. Code Reg. § 72-3(B): Very small: small, intermediate, large S.C. Code Reg. § 72-5(D): Jurisdictional threshold - 25ft or 50 acre ft	S.C. Code Reg. § 72-3(C): Hazard class based on threat to life and property	S.C. Code Reg. § 72-4: Inspections (preliminary inspections to be performed by the department, follow up as needed with detailed inspections by owner's engineer)	S.C. Code Reg. § 72-3(E): Regular construction reports	S.C. Code Reg. § 72-4: Inspections (preliminary inspections by regulator; detailed inspections may be performed by owners engineer)	S.C. Code Reg. § 72-3(D)(2)(c): Emergency Action Plan requirement	S.C. Code Reg. § 72-3(D)(2)(c): Inundation maps required with Emergency Action Plans	S.C. Code Reg. § 72-3(F): Certificate of completion, and requirement to submit as-built plans	S.C. Code Reg. § 72-3(D)(1)(c): Standard must conform to those of USACE, NRCS, or DOI Water and Power Resources	None
South Dakota	S.D. Code § 46-5 S.D. Admin. R. 74:02:08 et seq.	10/27/1986	S.D. Admin. R. 74:02:08:04: Engineer must prepare plans and specifications, perform inspections during construction and periodically thereafter	S.D. Code § 46-5-9: Permit Requirement	S.D. Admin. R. 74:02:08:01(7): 25 ft or 50 acre ft S.D. Admin. R. 74:02:08:06: small, intermediate, and large dams based on impounding capacity	S.D. Admin. R. 74:02:08:05: Category 1, 2 and 3 dams similar to NRCS High, Significant and Low ratings	No inspection Frequency	none, except application	S.D. Admin. R. 74:02:08:11: High hazard dams to be inspected at least once every 5 years	S.D. Admin. R. 74:02:08:10: Emergency preparedness plans required for all category 1 dams	Not specifically required in emergency preparedness plan	S.D. Code § 46-5-30	S.D. Admin. R. 74:02:08:07 - 09	None
Tennessee	Tenn. Code § 69-11-101 Tenn. Comp. R. & Regs. § 1200-5-7-.01 et seq. **Definition of dam does not include "wastewater treatment impoundment" and thus excludes coal ash dams: Tenn. Code § 69-11-102(3);Tenn. Comp. R. & Regs. § 1200-5-7-.02**	Feb-01	Tenn. Comp. R. & Regs. § 1200-5-7-.04(1)(c): Professional engineer must be retained to design dam and supervise construction	Tenn. Comp. R. & Regs. § 1200-5-7-.08: Certificate of Approval required for construction	Tenn. Comp. R. & Regs. § 1200-5-7-.02(10): Jurisdictional threshold - 20 ft or 30 acre ft Tenn. Comp. R. & Regs. § 1200-5-7-.05(1): Size classification: small, intermediate, large	Tenn. Comp. R. & Regs. § 1200-5-7-.05(2): Hazard Classification based on threat to life and property	Tenn. Comp. R. & Regs. § 1200-5-7-.04(6)(a): Operating certificate sets conditions for inspection, operation and maintenance	Tenn. Comp. R. & Regs. § 1200-5-7-.04: operating Certificate sets conditions for operations and reporting	Tenn. Comp. R. & Regs. § 1200-5-7-.04(3)(d): Right of inspection during construction Tenn. Code: § 69-11-104: General right of inspection Tenn. Code § 69-11-115: Calls for regular inspection based on hazard rating No inspection frequency but certificate good for 5 years.	Tenn. Comp. R. & Regs. § 1200-5-7-.08(1)(e): Requirement for Emergency Action Plan	Tenn. Comp. R. & Regs. § 1200-5-7-.08(1)(f): Emergency Action Plan must include inundation maps	Tenn. Comp. R. & Regs. § 1200-5-7-.04(2)	Tenn. Comp. R. & Regs. § 1200-5-7-.06 - .07: Specific design criteria Tenn. Comp. R. & Regs. § 1200-5-7-.08: Engineering requirements of USACE, NRCS, or Bureau of Reclmation	None

Appendix: State by State Comparison of Dam Safety Laws

State	Regulatory Citation	Date of Enactment of Regulations	Designed by Engineer	Review of Plans by Regulators	Size Classification	Hazard Classification	Inspections by Operator	Reporting	Inspection by Regulators	Emergency Action Plans	Inundation Maps	Certification of Construction	Technical Standards for Construction	Bond Requirement
Texas	Texas Water Code § 12.052 31 Texas Admin Code § 1.299	1/1/2009	31 Texas Admin Code § 1-299.4: Required to prepare plans and specifications, perform required analyses and oversee construction	31 Texas Admin Code § 1-299.22: Review and approval of construction plans and specifications	31 Texas Admin Code § 1-299.13: Jurisdictional limit – height of 25 ft with 15 acre-ft or height of 6 ft with 50 acre-ft 31 Texas Admin Code § 1-299.13: Size classification (small, intermediate, large)	31 Texas Admin Code § 1-299.14: Hazard classification based on threat to life and property	31 Texas Admin Code § 1-299.42(b): Inspection by owner as specified in operation and maintenance plan, at least once a year	31 Texas Admin Code § 1-299.24: Construction tests must be reported once per month during construction for high and significant hazard dams 31 Texas Admin Code § 1-299.42(b): requires report after inspection	31 Texas Admin Code § 1-299.25: Right of inspection during construction 31 Texas Admin Code § 1-299.42(a): inspections every 5 years for large, high hazard, and significant hazard dams	31 Texas Admin Code § 1-299.61: Emergency Action Plans required for high and significant hazard dams	Not specifically required in emergency action plan	31 Texas Admin Code § 1-299.29: Engineer must certify that dam was built according to approved plans	31 Texas Admin Code § 1-299.15-.16	None
Utah	Utah Code § 73-5a-103 Utah Admin. Code § 655-10 et seq.	1990	Utah Admin. Code § 655-10-5B: Plan drawings must be signed by professional engineer	Utah Admin. Code § 655-10-6: Requirement of approval by State Engineer	Utah Code § 73-5a-202: Jurisdictional threshold of 20 acre-ft	Utah Admin. Code § 655-10-6: Hazard classification based on threat to life and property	Utah Admin. Code § 655-12-4: All dams must have operation plans including frequency of inspection	Utah Admin. Code § 655-11-12C: Construction reporting requirements Utah Admin. Code § 655-11-4C: Instrumentation and monitoring reports	Utah Admin. Code § 655-11-12: Construction inspection Utah Code § 73-5a-501 requires inspection at least once every 5 years	Utah Admin. Code § 655-12-6: Emergency Action Plan required	Utah Admin. Code § 655-12-6: contains requirement for inundation map	Utah Admin. Code § 655-11-12E: Final inspection by State Engineer required before dam is put into operation	Utah Admin. Code § 655-11	None
Virginia	VA Code § 10.1-604 4 VA Admin. Code § 50-20-10 et seq.	2/1/1989	4 VA Admin. Code § 50-20-20: All engineering analyses including plans must be signed by professional engineer	4 VA Admin. Code § 50-20-60: Permit Requirement	4 VA Admin. Code § 50-20-50: Jurisdictional threshold: 25 ft high with 15 acre-ft; or 6 ft high and 50 acre-ft 4 VA Admin. Code § 50-20-55: Size classes based on height and impounding capability	4 VA Admin. Code § 50-20-40: Hazard classifications based on threat to life and property	4 VA Admin. Code § 50-20-105: Six year operation and maintenance certificates 4 VA Admin. Code § 50-20-105(F): annual inspections, submission of reports every two to six years	4 VA Admin. Code § 50-20-105(E): Inspection reports every two to six years	4 VA Admin. Code § 50-20-180: Right of inspection No Frequency established	4 VA Admin. Code § 50-20-175: Requires Emergency Action Plan	4 VA Admin. Code § 50-20-58: Required inundation zone mapping	4 VA Admin. Code § 50-20-105: Requires certificate of construction by engineer	4 VA Admin. Code § 50-20-240: Design Requirements 4 VA Admin. Code § 50-20-310: Plans and specifications requirements	None
Washington	Wash Rev. Code §§ 43.21A.064, 43.21A.068, 86.16.035, 90.03.350, 90.03.410 Wash Admin Code § 173-175-010	6/3/1992	Wash Admin Code § 173-175-140: Plans and specifications signed by project engineer	Wash Admin Code § 173-175-100: Permit Requirement - department engineer must approve plans.	Wash Admin Code § 173-175-020: Jurisdictional threshold – 10 acre-ft Wash Admin Code § 173-175-130: Dam Classification: Small - less than 35 ft Medium - between 35ft and 50ft Large- over 50ft	Wash Admin Code § 173-175-130: Hazard classification based on threat to life and property	Wash Admin Code § 173-175-510: annual inspection by owner's engineer	Wash Admin Code § 173-175-520: report after inspection	Wash Admin Code § 173-175-700: Periodic inspections based on hazard class High Hazard - 5 years Medium - 5-10 years Low - No regulatory inspections Wash Admin Code § 173-175-730: Inspection at citizen request	Wash Admin Code § 173-175-520: Emergency Action Plans required when there might be a threat to human life	Wash Admin Code § 173-175-130: Inundation maps if threat to human life	Wash Admin Code § 173-175-110: Required declaration by construction engineer that dam was built to specifications	Wash Admin Code § 173-175-130 Wash Admin Code § 163-175-140:	None
West Virginia	W.Va. Code § 22-14-1 47 W.Va. Code R. § 34-1	1982	47 W.Va. Code R. § 34-6: Plans must be signed and sealed by engineer 47 W.Va. Code R. § 34-8.2.a.1: Engineer must supervise construction	47 W.Va. Code R. § 34-4: Certificate of approval	47 W.Va. Code R. § 34-2.12: Jurisdictional threshold – 25 feet high or impounding 15 acre-ft; or 6ft high and 50 acre-ft	47 W.Va. Code R. § 34-9.5(b): Hazard classifications based on threat to life and property	47 W.Va. Code R. § 34-15.4.c: once per year for first three years then once every 7.5.3; or 2 years depending upon hazard class	47 W.Va. Code R. § 34-15.5: Reporting within 30 days of each inspection	47 W.Va. Code R. § 34-15.4.b: Inspections allowed any time deemed necessary by secretary No Frequency of Inspection	47 W.Va. Code R. § 34-15.1: Requires Emergency Action Plan	47 W.Va. Code R. § 34-15.7.b: Requires inundation map	47 W.Va. Code R. § 34-8.4.b; Final construction certification by engineer 47 W.Va. Code R. § 34-8.3.c.: Acceptance of construction by regulator	47 W.Va. Code R. § 34-7	None
Wisconsin	Wisc. Stat. Ch. 31 Wisconsin Admin. Code NR § 333 for "large dams" **Definition of Dam only includes those that cross a water course. Wisconsin Admin. Code NR § 333.03**	Jun-85	Wisconsin Admin. Code NR § 333.05: Large dams must be designed by professional engineer Wisconsin Admin. Code NR § 333.08: Large dams constructed under supervision of engineer	Wis. Code § 31.05: Permit Req. Wisconsin Admin. Code NR § 333.05: Plan approval before construction of large dam	Wisconsin Admin. Code NR § 333.02: Large Dam Threshold: 6ft high with 50 acre-feet or more, or, 25 ft high with 15 acre-ft or more; or, any dam which might endanger human health or property. (Code applies to all dams)	Wisconsin Admin. Code NR § 333.04: Parallels NRCS classification Wisc. Code § 31.19: Parallels NRCS classification	Wisconsin Admin. Code NR § 333.07: Owner shall have adequate inspection and maintenance plan Wisc. Code § 31.19: High Hazard - Inspection by engineer 4 times every ten years; Significant Hazard- Twice every ten years. Low Hazard- Once Every 10 years	Wisc. Code § 31.19: Report after each inspection	Wisc. Code § 31.19: Inspection of high hazard dams once per ten years or upon citizen request	Wisconsin Admin. Code NR § 333.07: Requires Emergency Action Plan	Wisconsin Admin. Code NR § 333.07: Requires Inundation Maps	Wisconsin Admin. Code NR § 333.08: As built plans must be submitted to agency upon completion	Wisconsin Admin. Code NR § 333.05: Hydraulic, hydrologic, and stability analyses performed to accepted engineering practices Wisconsin Admin. Code NR § 333.07: Minimal design standards to specify hydraulic capacity	Wisconsin Admin. Code NR § 333.09: Financial assurance

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State	Regulatory Citation	Date of Enactment of Regulations	Designed by Engineer	Review of Plans by Regulators	Size Classification	Hazard Classification	Inspections by Operator	Reporting	Inspection by Regulators	Emergency Action Plans	Inundation Maps	Certification of Construction	Technical Standards for Construction	Bond Requirement
Wyoming	Wyo. Stat. § 41-3-301 Wyo. Code R. § Chapter 5 Section 1	1913	Wyo. Stat. § 41-3-308: Plans and specifications prepared by or under direction of engineer Wyo. Stat. § 41-3-309: Engineer in charge of construction, enlargement, repair	Wyo. Stat. § 41-3-301: Permit Requirement Wyo. Stat. § 41-3-308: Approval of Plans by State Engineer's Office	Wyo. Stat. § 41-3-307(a)(iii): Jurisdictional Limit greater than 6 ft or impounding more than 15 acre feet	None	Wyo. Stat. § 41-3-309: Inspections by engineer at such intervals as necessary to insure compliance with design and specifications No Frequency of Inspection	Wyo. Stat. § 41-3-309: report after inspection	Wyo. Stat. § 41-3-310: Inspection by state if owner's engineer inspections are deemed inadequate Wyo. Stat. § 41-3-311: Inspections at least every 10 years Wyo. Stat. § 42-3-312: Inspection by state upon citizen request	None	None	None	None (left to discretion of engineer)	None

* HB 454: Alabama Dam Classification and Inventory Act introduced in 2008. Not Passed.