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# Coal Ash Handling Rules: Changes Generators Face

By Lindsay Morris, Associate Editor

Coal-fired plant operators may have several questions when evaluating the U.S. Environmental Protection Agency's (EPA's) proposed rules for coal ash handling. How will the rules affect individual coal-fired plants? What plant modifications will be necessary? How much will these modifications cost? Will the regulations have an effect on byproduct markets?

The potential coal combustion residuals (CCR) rulemaking covers fly ash, bottom ash, coal slag and flue gas desulfurization (FGD) or gypsum residue. EPA will rule coal ash as either hazardous under the Resource Conservation and Recovery Act (RCRA) Subtitle C, or non-hazardous under RCRA Subtitle D.

Larry Almaleh, an environmental power generation services engineer with Black & Veatch, said operators should take into account the following impacts on existing operations when preparing for the rulemaking: waste collection modifications, transport (switching from slurry to dry system) and water management (handling contact water and leachate). Operators also need time to identify and acquire a disposal site if needed, conduct site studies to support the new design, submit the permit and wait for EPA's review and response, as well as the construction of necessary facilities.

## Regulations scenarios

If EPA rules coal ash as hazardous under the RCRA Subtitle C, the expected effective date of regulations is 12 to 24 months after EPA issues the rule. Within six months of the effective date of rule, Almaleh said affected operators would need to obtain an interim status or permit and submit Part A of the permit application. Within 12 months of the effective date, operators would need to submit Part B of the permit application, start making surface impoundment plans, initiate groundwater monitoring as well as run-on and runoff control. Within five years of the effective date, operators would need to effectively eliminate the surface impoundment and begin constructing new landfills. Existing CCR landfills and surface impoundments not meeting the EPA requirements would need to close within five years of the new rules.

If the EPA rules coal ash as non-hazardous under RCRA Subtitle D, the expected effective date of regulations is six months after EPA issues the rule. Within 12 months of the effective date, Almaleh said operators would need to make surface impoundment plans, conduct groundwater monitoring, run-on and runoff control and impoundment inspections and install fugitive dust controls. Twelve months after the

effective date of ruling would also see the closure of facilities not accepting wastes. Within five years of the ruling, the retrofit of existing surface impoundments, construction of new landfills, and closure of existing CCR landfills and surface impoundments not in compliance with requirements would occur.

Kevin McDonough, director of sales, Americas for United Conveyor Corp., said the issue in creating these regulations focuses on wastewater, not ash. According to the EPA, all new unit construction must utilize dry ash conveying technologies. For existing facilities, wet-to-dry conversions are a means to remove or minimize coal combustion residuals from the overall plant wastewater management plan. Many of the utilities currently operating with wet ash systems are weighing the options of whether to continue operating their system or retire the plants, particularly in the cases of older, less-efficient units that are subject to the collective effect of multiple environmental upgrades.

McDonough said that industry estimates indicate that approximately one-third of coal-fired power plants utilize wet fly ash conveying systems, and over 80 percent utilize wet bottom ash conveying systems. "Some of those plants are targeted for closure," McDonough said.

While the majority of plants will face retrofits rather than retirement, McDonough said the changes necessary are more than just wet to dry conversions. "The pending regulations appear to target a comprehensive surface and wastewater management program for the plants. Rather than just considering individual issues, the intent is more of a holistic approach."

## Plant modifications

McDonough said plant modifications will primarily fall into three different categories: modifications for fly ash, bottom ash and gypsum. He said the handling of mill rejects will also be an important consideration, as these are typically conveyed along with bottom ash.

The primary plant modifications will be either the elimination of water as a conveying medium, or the installation of dewatering equipment in certain applications, McDonough said. For example, bottom ash conversions can readily be implemented using dewatering technologies and closed loop recirculation systems, with about 5 to 10 percent of the U.S. fleet currently utilizing that approach.

A standard retrofit for fly ash would involve installing dry fly ash silos, dry ash separating equipment and dry ash prime movers. McDonough estimates that technology conversion for fly ash retrofits—depending on the proximity of equipment, plant requirements and control system upgrades—will range from \$20 to \$80 million.

For bottom ash, the scope of retrofits would include significant modifications underneath the boiler or closed loop dewatering systems. McDonough estimates that bottom ash retrofits will range from \$10 to \$40 million. For gypsum, modifications would include a combination of dewatering systems, fixation systems and wastewater treatment systems. McDonough estimates that gypsum retrofits will range from \$20 to 50 million, although gypsum retrofits could be higher, depending on the level of wastewater treatment.

Since the 1980s, plants have ceased designing ponds for new projects, said Gary Mooney, sales engineer for Delta Ducon. Instead, most companies prefer continuous removal systems like a submerged scraper conveyor.

"If you just look at getting rid of a pond for a unit that has easy access outside of the boiler wall itself, you really only need to spend \$2.5 to \$3 million for a submerged scraper conveyor." With installation

and construction included, he said the project would likely remain stay under \$10 million.

Maria Calia, field evaluation engineer for Allen-Sherman-Hoff, said that every plant is different, which makes predicting modifications a challenge.

“We are seeing major generators looking for similar fleet wide solutions,” she said. “The only problem with this approach is that site conditions vary and every rule has its exception.”

Calia said one particular fleet was investigating Allen-Sherman-Hoff’s Hydrobin Dewatering Bins as a solution. However, one of the fleet’s sites is lakeside, making groundwater contamination an issue. Therefore, a dry solution instead of a system using water was used.

If coal ash is ruled hazardous, Calia said completely dry end modifications will be necessary. If coal ash is ruled non-hazardous, then a wider spectrum of options is available for bottom ash, such as a submerged drag conveyer, or using a dewatering bin approach in which ash is sent into bins to separate the ash, and the ash is sent to trucks. For fly ash, Calia said the option will be to convey the ash to a storage silo.

## Byproduct markets

Dry bottom ash handling techniques typically produce a low carbon content bottom ash product that can be refined and mixed with fly ash for use in asphalt, concrete and road construction. Therefore, EPA’s ruling of “hazardous” or “non-hazardous” could affect not only coal-fired power plants, but also byproduct markets.

Since coal ash is commonly used for various applications such as cement, EPA’s ruling of “hazardous” or “non-hazardous” is sure to have an effect on byproduct markets.

“If they rule that ash is hazardous, that could shut down coal plants,” Mooney said. “In trying to deal with every part of the ash, the cost of treating all the ash as hazardous. Fewer power plants will go to all the cost.”

McDonough said the stigma associated with a hazardous ruling “could potentially greatly diminish the activity in the byproduct markets.”

A hazardous ruling would lead to two detriments regarding byproducts, McDonough said. First, byproducts that have come from coal ash would have to originate from other sources. Secondly, the removal of coal ash minerals as a byproduct would “increase the carbon footprint for the markets rather than recycling a waste, thus adding to landfills.”

Mooney said he expects that EPA will rule coal ash as non-hazardous. He said a non-hazardous ruling could give some innovators a reason to develop new ways to use fly ash and bottom ash.

“If the ponds go away, it will stimulate reasons for people to come up with ways to use the ash.”

The potential affect on byproduct markets is speculation for now, and plant modifications are pending on whether the EPA rules ash as hazardous or non-hazardous.

For the time being, plant operators can begin planning how to implement solutions for either possibility.

With a number of solutions available to fit a number of ash handling scenarios, a retrofit is possible for most plants. Some plants, however, will face retirement. For now, a familiarity with the regulation possibilities and a plan for moving forward once regulations have been enforced will serve plant operators well.

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