

# **U.S. EPA Public Hearing on the Proposed Amendments to the Federal 2015 Coal Ash Rule**

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## **1. Background:**

The U.S. EPA is proposing amendments to the 2015 federal Coal Ash Rule. Attached below are my comments for these proposed amendments. My motivation for involvement in this evaluation is related to my scientific research on the environmental implications from coal ash disposal and storage. Together with my students and colleagues at Duke University, I have been conducting research on the subject of coal ash and its environmental effects for about ten years. These research projects have included the investigation of the environmental effects of the Tennessee Valley Authority (TVA) coal ash spill in Kingston, TN (Ruhl et al., 2009; 2010), sources of mercury in river sediments from TVA spill sites (Bartov et al., 2013; Deonarine et al., 2013), selenium speciation of coal ash from the TVA spill (Liu et al., 2013), discharge of effluents from coal ash impoundments to waterways in North Carolina (Ruhl et al., 2012), developing new isotope methods to detect coal ash contaminants in the environment (Ruhl et al., 2014), leaking of coal ash ponds in the southeastern U.S. (Harkness et al., 2016), radioactivity of coal ash (Lauer et al., 2015), possible links between hexavalent chromium and coal ash ponds in North Carolina (Vengosh et al., 2016), methylmercury and coal ash (Schwartz et al., 2016), and leaching of arsenic and selenium from coal ash (Schwartz et al., 2016; 2018). Overall, I have published 13 scientific articles on different aspects of the environmental effects of coal ash (see reference list below).

Based on my review of the U.S. EPA proposal for amendments of the federal coal ash regulations, and on my knowledge and experience, it is my opinion that the proposed amendments would considerably weaken the existing federal regulations. The reduction of the environmental protection and safeguards that were established as part of the federal 2015 Coal Ash Rule would severely exacerbate the already identified environmental effects associated with coal ash storage and disposal. Below I outline the major issues that could result from the proposed U.S. EPA amendments.

## **2. Monitoring groundwater quality near coal ash storage sites is essential and must continue**

An important component of the 2015 Coal Ash Rule is the requirement for conducting a comprehensive water quality monitoring of groundwater located in the vicinity of coal ash impoundments. An evaluation of seeps and surface water from seven sites and shallow groundwater from 15 sites in five states (Tennessee, Kentucky, Georgia, Virginia, and North Carolina) found that they were contaminated above background levels (Harkness et al., 2016). Contamination levels above drinking water and ecological standards were observed in 10 out of 24 samples of impacted surface water. Out of 165 monitoring wells, 65 were contaminated. Distinct isotope fingerprints, combined with elevated levels of contaminants known to be enriched in coal ash, provided strong evidence for the leaking of all investigated coal ash ponds to adjacent surface water and shallow groundwater (Harkness et al., 2016).

The results of this study are consistent with recent data that were published on the EPA website. A recent water quality dataset of groundwater from sites adjacent coal ash facilities that was published by owners and operators of coal combustion residuals (CCR) units, as required by

the EPA's 2015 final CCR Rule, revealed large-scale water contamination from coal ash impoundments and other storage and disposal facilities in numerous sites throughout the country. In particular, elevated levels of toxic and carcinogenic arsenic, chromium, molybdenum, lead, selenium, thallium, radium (radium-226 and radium-228), boron, fluoride, and sulfate were discovered in numerous groundwater wells near coal ash disposal sites (impoundments, landfills). These results clearly indicate large-scale contamination of groundwater in the vicinity of coal ash ponds. In numerous cases the concentrations of these contaminants exceed the U.S. EPA Maximum Contaminant Level (MCL) upper limit for drinking water and groundwater standards. In most cases the highly carcinogenic and toxic contaminants listed above were associated with elevated levels of boron, an element known to be enriched and highly mobilized from coal ash and which has been used as a reliable fingerprint for coal ash contamination (Ruhl et al., 2014). The co-existing of high boron and contaminants like arsenic and radium nuclides confirm that these contaminants were derived directly from the nearby coal ash storage facilities. These results indicate that groundwater resources underlying and near coal ash storage facilities in the U.S. are already impacted by coal ash contaminants. Therefore, continuation of monitoring the quality of groundwater near coal ash storage facilities is critical given the actual evidence for presence of contaminants in aquifers. Modification of the required monitoring program, as suggested by the proposed U.S. EPA amendments, would increase the risks for the further spread of contaminants in groundwater and impact of thousands of drinking water wells located downstream from these disposal sites.

### **3. Groundwater quality standards should not be modified**

As part of the recent water quality dataset of groundwater from sites adjacent CCR facilities that was published by owners and operators of CCR units, numerous wells showed high levels of lithium, cobalt, lead and molybdenum, in some cases exceeding the MCL and groundwater standards. Modification of the 2015 Coal Ash Rule, as suggested by the proposed U.S. EPA amendments, will allow states to set different standards for these and other contaminants. Given that these contaminants are known to have direct human health effects, the changing of the standards could induce high human health upon exposure to these contaminants. Since we already see the occurrence of these contaminants in impacted groundwater, the public should be protected and thus reducing the protection threshold through weaken the standards would have negative effects on human health.

### **4. Groundwater quality monitoring and post-closure care must be long term**

The 2015 Coal Ash Rule requires owners and operators of CCR units to conduct groundwater quality monitoring and other post-closure care activities (i.e., maintenance of the cover and leachate collection systems) for a period of 30 years after the closure of coal ash operating sites. Yet the proposed U.S. EPA amendments suggest a significant reduction of the period required for post-closure care activities and groundwater quality monitoring. Given that we have clear evidence that coal ash contaminants have already arrived in shallow groundwater underlying and downstream from coal ash storage facilities, the reduction of the monitoring period would increase the risks for inability to detect further migration of the contaminated groundwater towards drinking water wells near coal ash impoundments and landfills. Groundwater flow in aquifers is a long-term process and the migration of contaminated

groundwater from the CCR storage sites to pumping areas in aquifers could take decades. Thus, a long-term monitoring and protection measures are critical for public protection.

#### **5. Groundwater quality and air quality data must be transparent**

The 2015 Coal Ash Rule requires that groundwater quality and air quality data must be posted on publicly available websites. The recent water quality dataset of groundwater from sites adjacent CCR facilities that was published by owners and operators of CCR units clearly demonstrates the importance of data transparency and the ability of communities living near coal ash ponds to monitor groundwater quality near their drinking water wells. The proposed U.S. EPA amendments suggest the elimination of the internet posting requirements. This elimination will prevent local communities from monitoring and evaluating the status of nearby groundwater and would further increase the public concerns of the possible contamination of drinking water wells near coal ash impoundments and landfills.

#### **6. Contaminated sites must be closed**

The 2015 Coal Ash Rule requires that unlined coal ash ponds in areas where underlying groundwater was contaminated should install liners or be closed at a certain date. The proposed U.S. EPA amendments would backtrack from this rule and allow state agencies or utilities themselves to decide on closure or installation of liners. Pursuant to this modification, owners could avoid actual closure or installation of liners which would further exacerbate the water quality situation in shallow groundwater underlying and downstream from CCR storage sites. As shown above, in many sites the groundwater underlying the CCR storage sites is already contaminated and further infiltration of coal ash contaminated effluents could increase the

magnitude of contamination and migration of the contaminated groundwater towards drinking water wells near the CCR storage sites. This amendment to the 2015 Coal Ash Rule is extremely critical since its implementation would weaken the key safeguard of groundwater protection that was established in the federal 2015 Coal Ash Rule.

## **7. Contaminated groundwater must be cleaned**

The U.S. EPA proposes an amendment to the 2015 Coal Ash Rule in which the requirement for cleanup of contaminated groundwater (i.e., exceeding of groundwater protection standards) will be discretionary. That means that states or owners and operators of CCR units will make the decision whether to cleanup in cases where there are groundwater contamination violations. Given the economic cost of such cleanup operations, many of the utilities' owners would be reluctant to conduct large-scale cleanup operations, which would result in continued contamination of the impacted aquifers and further migration of contaminated groundwater towards drinking water wells.

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