

2808

RECEIVED

DEC 23 REC'D

From: Payne, Bryce [bryce.payne@wilkes.edu]
Sent: Tuesday, December 22, 2009 10:01 AM
To: EP, RegComments
Subject: PROPOSED RULEMAKING ENVIRONMENTAL QUALITY BOARD [?25 PA.?CODE CHS. 287 AND 290?] Beneficial Use of Coal Ash [39 Pa.B. 6429] [Saturday, November 7, 2009]
Attachments: Chap 290 comments.docx

INDEPENDENT REGULATORY
REVIEW COMMISSION

Please find attached a file containing my comments regarding the proposed regulatory changes regarding coal ash utilization.

Sincerely,
Bryce Payne, PhD
Dept. of Environmental Engineering and Earth Sciences
Wilkes University
Wilkes-Barre, PA
570 408-4612

DEC 23 REC'D

Chap 290 comments

INDEPENDENT REVIEW BOARD
REVIEW COMMISSION

To introduce myself, I am currently a Visiting Professor in the Department of Environmental Engineering and Earth Sciences at Wilkes University. I have been a consulting soil/environmental scientist working mostly on beneficial use of coal ash since 1993. For most of that time I was a cautiously enthusiastic proponent of broad beneficial use of coal ash. Over the last three years I have had occasion to reconsider my previous position.

Until three years ago I had accepted without serious consideration that existing coal ash regulations, including especially chemical characterization and site monitoring practices, were sufficiently protective of the environment and human health. During the last three years I have had opportunities to work on and review ground water quality and other impacts of recent ash spills and older, buried or closed ash disposal facilities. My investigative efforts in those cases compelled re-examination of the methods used to chemically characterize coal ash, the hazard ratings based on those characterization methods, and the water quality monitoring measures employed at disposal facilities and related ash affected sites.

I am now convinced that currently accepted characterization methods (SPLP, TCLP, and "totals" methods based on digestions that do not accomplish complete destruction siliceous matrices) are inadequate and do not provide reliable estimates of the amounts of toxic elements, especially those that are typically present as oxyanions, e.g. selenium, present in and likely to be mobilized from coal fly ash. I am similarly convinced that currently accepted water quality and site monitoring approaches are inadequate and not sufficiently protective, especially with regard to site-specifically appropriate numbers and locations of monitoring wells at ash utilization or disposal sites, including mine fill sites. I have also had occasion to develop some concern about the potential radioactivity and associated hazards that coal ash may bear. Finally, I have for a longer time been concerned about the inadequacy of regulatory provisions with regard to assuring sufficient strength and duration of financial responsibility for corrective measures should an ash utilization or disposal project eventually cause environmental impacts. My conclusions in these areas parallel the findings reported in *Managing Coal Combustion Residues in Mines* (NRC, 2006)", though mine were independent of the NRC investigations and based on different source cases.

I was, therefore, disappointed upon reading the proposed Chapter 290 regulations for beneficial use of coal ash in Pennsylvania. Though the Proposed Rulemaking specifically states that the proposed Chapter 290 adopts recommendations from the 2006 NRC report, it is difficult to identify where those adoptions involve more than administrative provisions. My impression of the proposed Chapter 290 is that it is functionally equivalent to the existing regulations. Time and space do not permit specific detailing of all the points that I would like to address, but let me mention just a few.

My own findings, the NRC report and others have concluded chemical characterization methods required by current regulations were developed for other residuals and wastes and are simply chemically inappropriate for characterization of coal ash and related materials. This is, in fact, stipulated in the EPA manual (SW-846) where the currently most often used methods (TCLP and 3050) are documented. The SPLP accepted in Pennsylvania regulations is even less adequate. Given this situation, the expansion of the number of analytes to be determined in the proposed regulations rings hollow. Having more data for more analytes establishes nothing if the methods are analytically inadequate.

The Proposed Rulemaking states, "For over 20 years, the Department has seen no significant pollution events that would require abatement related to coal ash beneficial use and has documented many successfully reclaimed sites." This again is a foreseeable outcome if monitoring wells were not appropriately placed. Given the complexities of hydraulic flow patterns in Pennsylvania coal mine areas, monitoring wells that are not placed in close proximity to the preferred flow paths on such sites will not identify pollution events that would require abatement. My experience has indicated that monitoring well locations are currently determined by relatively cursory examination of local hydrology and practical convenience for well contractors or the ash facility owners, not identification of the preferred flow paths for ash contacting waters. Again, a similar indication was made in the NRC report, but the proposed Chapter 290 does not appear to effectively address this issue.

The utilization of alkaline coal fly ash to amend and mitigate coal refuse has foreseeable benefits with regard to water quality. However, there are few such sites that have a sufficiently long history to determine whether, in practice, the available alkalinity in the added ash is sufficient to maintain elevated pH over the long term. There are methods for estimating the long-term acid/base balance for such sites, and presumably those methods have been applied in some reclamation cases. However, again, various methods used have been criticized as likely to underestimate the amount of alkalinity needed over the long term. If the amount of alkalinity is insufficient, then it follows that eventually the site will resume release of the toxic elements originally associated with coal refuse but now will also have the substantial additional amounts added in the ash amended to the refuse. If such utilization of coal ash is to be allowed, then there should be appropriate provisions in the regulations to assure alkalinity sufficient to neutralize all potential acidity in the refuse, generated by mineral weathering of the ash itself, acid rainfall and all other foreseeable acid inputs to the site. Finally, deliberations should also consider that the solubility of some elements, e.g. selenium, actually increase with increasing pH. Hence, it is risky to presume that reductions in levels of other toxic elements due to increased pH will necessarily be sustained through the long term, or that all toxic element releases are mitigated by increased pH. As previously mentioned, selenium is an insidious toxic element; its solubility increases with increasing pH; it is difficult to detect and effectively impossible to mitigate once it has found its way into aquatic ecosystems. Again, my impression is that neither the current nor the proposed regulations speak effectively to these issues.

It follows logically from the preceding and my observations and findings, again along with those of the NRC (2006) and others, that there simply has not been a long enough time frame for evaluation of the environmental impacts of high volume applications of coal ash. When and if coal ash will eventually release toxic elements, which ones, in what order, etc. are all simply unknowns at this time. The proposed regulations seem to be betting that because the Agency has not seen any substantive impacts from beneficial use of coal ash in the short historical time frame for which data is available, that it necessarily follows that such will continue into the unforeseeable future. This, again, appears to be an inherently risky approach. There are available data sources showing that land-filled ash does release unacceptable levels of toxic elements. Additionally, data recently reported by the EPA corroborate previous data that indicate the soluble levels of toxic elements in "dry stored" must be considerable and greater than those in "wet stored" (slurried) ash. [Regretably, the lower levels in wet stored ash are due to the release of those toxic elements to local waters during ash sluicing and lagooning, another poorly regulated aspect of coal ash management.] Given what I have seen, I believe responsibility for ash disposal and utilization sites and any environmental impacts they may cause should be the permanent obligation of the site owners/operators.

My reading of the proposed regulations is that they contain no requirement that will effectively assure ash cannot contact local ground waters, again a situation that my work and the NRC report indicates should be avoided if local waters are to be protected. The NRC and others recommend isolation measures. Though isolation measures certainly seem better than open contact designs, my experience suggests that most isolation measures are prone to eventual failure, and when such failure eventually occurs the isolated ash may present more intensive contamination problems than the originally disposed ash. Nevertheless, the isolation measures seem to be the only present option, are clearly an improvement on current unlined approaches, but are not required or mentioned in the proposed beneficial use regulations.

If the proposed regulations eventually do stand without addressing the preceding issues, then the proposed regulations should at least require fully developed emergency response and environmental corrective action plans to address possible future impacts.

Finally, a curiosity that caught my attention in the proposed regulations.

For active and abandoned mine reclamation activities

"Subsection (b) establishes the elements required to submit a request for a proposal to use coal ash at an abandoned coal surface mine site. This includes a requirement to publish a notice in local newspapers of the proposed use of coal ash at a... mine site involving use of more than 10,000 tons of coal ash per acre or more than 100,000 tons in total at any project."

While for beneficial use as a soil amendment,

" (4) Coal ash shall be incorporated into the soil within 48 hours of application, unless

otherwise approved by the Department. The coal ash shall be incorporated into the top 1-foot layer of surface soil. If 1 foot of surface soil is not present, coal ash may be combined with the surface soil that is present until the layer of combined surface soil and coal ash is 1 foot. The coal ash required for the beneficial use is limited to the amount necessary to enhance soil properties or plant growth.

(5) Coal ash shall be applied at a rate per acre that will protect public health, public safety and the environment.”

It would seem to follow logically, therefore, that the Department considers anything greater than a 1 foot thick layer of ash unlikely to “protect health, public safety and the environment”, but for mine applications the Department places no depth limit and does not see the need for public announcements or other requirements until the amount of ash to be applied exceeds the equivalent of a layer roughly 5 feet thick. It would seem that on mine sites layers of pure ash tens or even hundreds of feet thick are somehow less problematic than a foot or less blended with soil materials somewhere else which seems to, at least, return one to the issues pointed out in the preceding paragraphs.

I hope these comments prove useful in your upcoming deliberations on the proposed Chapter 290.

Sincerely,
Dr. Bryce F. Payne Jr.
Visiting Professor
Department of Environmental Engineering and Earth Sciences
Wilkes University
Wilkes-Barre, PA