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Cc: []
From: CN=Gary Nurkin/OU=R2/O=USEPA/C=US
Sent: Mon 5/14/2012 4:32:15 PM
Subject: AES

I am raising this question to you because George Meyer told me that AES has hired Sylvia Lowrance as their expert and I believe test methodology and the appropriateness of the LEAF test will be critical issues that we will need to address in order to prove that the TCLP test, which itself is an accredited leaching test, is an inappropriate test to use with respect to the AES aggregate. For this reason, I am sending you this email and seeking your assistance.

I have reviewed many of the documents that Greg Helms sent and have a question regarding LEAF.

In 1991, the Scientific Advisory Board (SAB) in its publication on Leachability Phenomena, raised some concerns about the TCLP test. Two of the many concerns that the SAB report addressed were:

"the need for a consistent, replicable and easily applied, physical, hydrological, and geochemical representation for the waste management scenario of concerns and,

leach test conditions appropriate to situations being evaluated should be used for assessing long-term contaminant release potential."

Essentially, the SAB in part, concluded . . . a leaching protocol should be both accurate and reasonably related to the conditions governing leachability under actual waste disposal conditions. Id at 15. (Emphasis added) See also, D.S. Kosson et. al., An Integrated Framework for Evaluating Leaching in Waste Management and Utilization of Secondary Materials, 19 Environmental Engineering Science at 160.

The general theory behind the LEAF test is that it should "provide information about potential contaminant releases from a waste in the context of the anticipated disposal or utilization conditions. Thus, testing should reflect the range of conditions that will be present in the waste and in the interface with its surroundings during long term which may be significantly different than the properties of the material immediately following the production." 19 Environmental Engineering Science at 162. (Emphasis added)

As I understand the LEAF test, as it relates to Method 1313, and this may be an over simplification or over generalization of that test, a sample of material is taken and in the laboratory that sample is broken or pulverized into smaller pieces than would be used for the TCLP test. A pH range that is greater than the range used for TCLP and includes liquids that are both more acidic and more basic than the acid/base used for the TCLP test is poured over this sample and a measurement is taken of the constituents that leach out. Through using the new enhanced LEAF test it is more likely that constituents would leach out in greater concentrations than with the TCLP test both because of the strength of the acid and bases used and because of the greater surface area that is exposed to this acid/base. If I have misstated how the test will be performed, please advise me

As I understand the properties of the aggregate that AES produces, when that aggregate is dry it is very friable and easily dispersible. On the other hand, when the aggregate is wetted, the aggregate becomes somewhat impervious and water does not easily run through it. Please let me know if my understanding is correct.

In terms of leachability, this aggregate is exposed to rainwater and rainwater is generally neutral or just

slightly acidic or basic (although given the location of AES and the surrounding industries the rainwater may be slightly more acidic or basic than the rainwater that falls in a non industrialized area of PR). Within this context, what documentation or evidence do we have that the LEAF test, as it relates to leachability, “reflect the range of conditions that will be present in the waste [aggregate] and in the interface with its surroundings during long term." In addition, given that the surface area of the aggregate exposed to leaching under the LEAF test is greater than the surface area exposed to leaching under the TCLP test, how do we know that the LEAF test adequately reflects the surroundings in which the aggregate is placed?
Based on the Boxerman letter and the hiring of Sylvia Lowrance, I believe that we will need to document why the LEAF test is a more nuanced test to use and better reflects what is happening as the AES aggregate is exposed to rainwater and I am seeking your help in obtaining such information.
As a corollary to this question, EPA in its 2009 study of Characterizations of Coal Combustion Residues from Electric Utilities-Leaching and Characterization Data, stated:

"Distinctive patterns in leaching behavior have been identified over a range of pH values that would plausibly be encountered for CCR management.

Total constituent content is not a good indicator of leaching which has been found to be a function of the characteristics of the material (pH) and field conditions in which the material is managed.

The maximum eluate concentration from leaching test results varies over a wide range in pH and is different for different CCR types and elements. This indicates that there is not a single pH for which testing is likely to provide confidence in release estimates over a wide range of disposal and beneficial use options, emphasizing the benefit of multi-pH testing. Furthermore, for CCRs, the rate of constituent release to the environment is affected by leaching conditions (in some cases dramatically so), and that leaching evaluation under a single set of conditions will, in many cases, lead to inaccurate conclusions about expected leaching in the field."

Given these findings, can we prove that using LEAF Method 1313 adequately reflects the environmental conditions that will be found where AES places it aggregate and the LEAF test, at least through Method 1313, more adequately reflects how the aggregate will behave than the TCLP test?

In other words, what specific documentation do we have that the LEAF test is a better indicator of the contaminants that will leach out from the AES aggregate in PR as opposed to the TCLP test.
I ask this question because none of the information that I have seen from Greg documents that at the AES site, the LEAF test more accurately mimics how the constituents will leach out than the TCLP test. Has Greg sent all of the information or have I misunderstood the LEAF test or the information that Greg sent?
At best, from my readings, it appears that the LEAF, in laboratory settings, will lead to enhanced leaching over the TCLP test but does this enhanced leaching adequately reflects or mimics the environment in which the AES aggregate is taken from?
Again, as I mentioned earlier, given the Boxerman letter and the hiring of Sylvia Lowrance I believe we will need to address these issues and I am seeking your help in obtaining the documentation that will enable us to argue that the LEAF is the preferred test to use in this situation because it better mimics what is happening with the AES aggregate than the TCLP test.

Thanks