**From:** Paul Bertetti
**Sent:** Thursday, January 25, 2007 4:47 PM
**To:** James A Davis
**Subject:** RE: Hello

Jim,

Good to hear from you. I hope you are doing well. I have been out of pocket for a few days, so I apologize for the delay in responding to your e-mail.

We have produced a couple of internal reports on the alluvium sorption work, but they are not publicly available; moreover, I don't think they would have anything you would need to cite. We have not done work with uranium for some time. The current sorption work has been progressing slowly as we have had some staff transitions and a number of programmatic efforts to deal with over the past year. The results we have on hand show that (for Np and the alluvium samples we have) we measure about double the maximum sorption relative to what we would predict using the simple model (represented as a montmorillonite surface) we have incorporated into TPA. The problem may be due to underestimates of alluvium effective surface area or the more complex surface species one would expect for a "natural" system (I expect both). Slight changes in sorption peak location (pH of peak sorption) indicate that we need to interpret results with a different set of surface species. Our chemical analyses are going very slow, so we'll have to wait for more information before we can do some modeling. In the interim we are conducting several experiments to generate sorption data.

I think I did exchange some e-mail with Patsy Buckley late last year. I was supposed to provide her with some data from our Np-quartz work, but I had some trouble locating the right files and then I forgot all about it! ( I guess I will have to track that down) By now she's probably done the work for which she wanted the data -- pretty typical of me to lose track of that.

Arend Meijer has pushed the idea of locally reducing zones for some time. He has measured negative redox values in a couple (some hits in exactly two wells, I think) of holes near Yucca Mountain, but these data were limited (I think the probe was dropped downhole under static conditions rather than sampling pumped outflow). We have not ever (nor Nye County, nor USGS) observed reducing conditions within the alluvium in any of our sampling efforts, and the vast majority of all other redox measurements at YM are indicative of oxidizing to slightly suboxic conditions. The current DOE line is to cite the occurrence of minor pyrite in some drill hole samples as further evidence of potentially reducing conditions. It is my opinion, based on our observations, that the occurrence of pyrite is quite limited and the more extensive occurrences are very deep (in pre-Miocene sediments that are not part of the volcanic/tuff aquifer system). So, there may be some limited localized reducing zones, but these have not been observed from the EWDP sampling, nor are they observed in a majority of the wells at YM.

I look forward to seeing some of your results.

Talk to you soon,

Paul

-----Original Message-----
**From:** James A Davis [mailto:jadavis@usgs.gov]
**Sent:** Tuesday, January 16, 2007 3:21 PM
**To:** paul.bertetti@swri.org
**Subject:** Hello

Paul,

Long time, no talk.

Just thought I would let you know that I am beginning to write a NUREG on our U(VI) adsorption data and modeling for the 40-mile Wash composite we prepared from the drilling some time ago. Do you have any reports on your work that we should be citing? How goes the mineralogy versus Np adsorption study?

We are writing up some work we have done on Np adsorption. A paper was submitted to ES&T on EXAFS of hematite samples with adsorbed Np(V). We concluded that the adsorbed species was primarily neptunyl-carbonato surface complexes. And Patsy Buckley, a graduate student of Bruce Honeyman's, is finishing up her thesis on Np(V) adsorption by the composite sediment sample from Naturita, Colorado, which I have been involved with.

I heard recently that there is groundwater with reducing conditions in the aquifer beneath Yucca Mountain. I thought the system was oxic or at least suboxic. What have you seen/heard on this subject?

Thanks,
Jim

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**Hearing Identifier:** HLW_YuccaMountain_Hold_EX
**Email Number:** 1075

**Mail Envelope Properties** (pbertetti@cnwra.swri.edu20070125164700)

**Subject:** RE: Hello
**Sent Date:** 1/25/2007 4:47:16 PM
**Received Date:** 1/25/2007 4:47:00 PM
**From:** Paul Bertetti

**Created By:** pbertetti@cnwra.swri.edu

**Recipients:**
"James A Davis" <jadavis@usgs.gov>
Tracking Status: None

**Post Office:**

| **Files** | **Size** | **Date & Time** |
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