

## HLWYM HEmails

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**From:** Paul Bertetti  
**Sent:** Monday, October 17, 2005 11:19 AM  
**To:** James Winterle  
**Subject:** Response to Stirewalt  
**Attachments:** Stirewalt\_response.doc

Jim,

I have attached a file that conatins mt response to Gerry. Please comment and modify as needed. I intend to send this as an e-mail in the form provided.

Thanks.

Paul

**Hearing Identifier:** HLW\_YuccaMountain\_Hold\_EX  
**Email Number:** 1091

**Mail Envelope Properties** (pbertetti@cnwra.swri.edu20051017111900)

**Subject:** Response to Stirewalt  
**Sent Date:** 10/17/2005 11:19:13 AM  
**Received Date:** 10/17/2005 11:19:00 AM  
**From:** Paul Bertetti

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

**Recipients:**  
"James Winterle" <jwinterle@cnwra.swri.edu>  
Tracking Status: None

**Post Office:**

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	181	10/17/2005 11:19:00 AM
Stirewalt_response.doc	48633	

**Options**  
**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

Gerry,

Within the body of your e-mail (noted by the \*\*\*\* identifiers), I have provided a brief bit of information for the topics you have listed. This is meant as a follow-up to our conversation of last week. The information provided is as you have mentioned for your personal notes and has not been reviewed. Please note that the information is predecisional and in draft form.

Paul

Hi Paul ... Approaching you with this request - per approval of John Bradbury - since you were the individual who traveled with the Public Outreach team in June 2003 (I think that was the time frame) for discussions with Inyo County folks .....

If at all possible, would you please prepare a set of Qs&As (based on your knowledge of current "hydro-facts" about potential surface water/groundwater issues for Inyo County, including Death Valley National Park, and/or info from your previous meetings in Inyo County during June 2003) for use during the Public Outreach sessions which Miriam will be attending the last of this month? The Qs&As should address at least the following points, but please include ANYTHING you may deem pertinent:

[1] Potential groundwater issues for Northern and Southern Inyo County, including DVNP, related to possible radionuclide contamination of the regional carbonate aquifer underlying YM and extending across the Amargosa Valley beneath alluvium into DVNP. This aquifer is reputed to be the source for fresh water springs in DV, as you are aware.

Note - There is a reported upward gradient from the carbonate aquifer to the overlying volcanic tuffs at YM based on data from borehole UE-25p1, as you know.

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Groundwater issues of concern to Inyo County are outlined in the recent summary report produced by the Inyo County Yucca Mountain Repository Assessment Office and in previous reports distributed by the Inyo County YMRAO and its contractors (which include the Hydrodynamic Group and USGS). The most recent report provides information related to Inyo County's studies of the Paleozoic carbonate rocks of the southern Funeral Mountains, drilling activities, and groundwater modeling of the regional Paleozoic aquifer system from the Amargosa Desert to Death Valley and alluvial aquifer system in Death Valley. The report provides additional information in support of the hypothesis put forward previously by the Hydrodynamics Group that groundwater can flow through the southern Funeral Mountains within the Paleozoic carbonate rocks (mostly fractured dolomites in this area according to the report). With respect to Yucca Mountain, the report acknowledges that current data indicate no direct communication between the deep Paleozoic aquifer system and the shallower tuff and alluvial aquifer systems near Yucca Mountain. The Inyo County report implies that future changes potentiometric surface of the Paleozoic aquifer system near Yucca Mountain could produce changes in the hydraulic gradient between the Paleozoic aquifer and the overlying volcanic tuff aquifer. Based on my reading of the report, there is no analysis presented to support this implication. In short, the report suggests that a flow connection may exist between the springs in Death Valley (especially Nevares, Travertine, and Texas Springs) and Paleozoic aquifer

groundwater in Amargosa Farms region. Furthermore, the report hypothesizes that the Paleozoic aquifer is continuous enough to provide a path from Yucca Mountain to the Amargosa Farms/ Franklin Lake Playa area to the Death Valley Springs (through the southern Funerals). Finally, the report concludes that if contaminants could enter the Paleozoic aquifer near Yucca Mountain they might eventually be transported to Death Valley via the Paleozoic aquifer pathway.

Some important facts:

1. The data available to describe the Paleozoic groundwater system in the Funeral Mountains are quite limited. Thus, there is no direct evidence to support the Funeral Mountain flow path hypothesis. However, The Inyo report provides numerous suggestions for work that may provide such evidence. I would suspect that Inyo County will continue to work with their contractors to increase their understanding of the groundwater flow in the area. The report also references additional USGS mapping of the southern Funerals that may be of interest to geologists trying to understand the regional structure and tectonics.
2. Not only is there a separation of the Paleozoic aquifer and volcanic tuff aquifer near Yucca Mountain due to hydraulic gradient, but, based on drilling and geochemical evidence, there appears to be a physical isolation between the two aquifers as well.
3. Based on my review of AMRs and previous TSPA efforts, the Paleozoic aquifer system is included in the current hydrologic models used by DOE.

Finally, it should be noted that current regulations stipulate that DOE demonstrate compliance at the boundary of the controlled area (approximately 18 km from YM in the direction of groundwater flow), which is some distance from Inyo County. If compliance is demonstrated at that boundary, then it follows that potential contamination beyond the 18-km point would be below regulatory limits. Although the recent focus of efforts has been on assessment of performance of the Tertiary volcanic/alluvial aquifer system because that has been identified by DOE as containing the most likely groundwater flow path, the Paleozoic aquifer is considered (and must be if it is a potential pathway for release) in the assessment of YM.

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[2] Interactions between alluvial materials and the underlying carbonate aquifer in the Amargosa Valley that may be a source of uncertainty for understanding groundwater flow and transport from YM into Inyo County, including DVNP.

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I am not sure what can be added or discussed on this point. In general the Paleozoic aquifer is overlain by various sediments or volcanic layers in the region. As I noted previously, it appears that there is a substantial thickness of material with low transmissivity between the Paleozoic aquifer and the shallower volcanic and alluvial aquifers in the YM area. That may change in the Amargosa Desert / Franklin Lake Playa area. The Inyo report refers to this issue to identify differences between discharge from the alluvium in Death Valley that may have originally come from the Paleozoic aquifer and discharge that originated as recharge to the alluvium from other

**sources. It is important to note that the alluvium in Death Valley and alluvium near YM are not connected.**

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[3] Possible detrimental effects of flooding on surface water or groundwater environments.

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**People in the region can observe directly damage caused to roads and other structures as a result of flooding. Flooding is not thought to have any significant impact on groundwater (with the exception of recharge, of course). Impacts of flooding on surface operating facilities associated with the potential repository are considered in the assessment of performance. One should take care to note that the flash floods and intermittent flow of water into Death Valley observed over the past few months are not only expected, but are typical of the region. The geological evidence over the past several thousand years has recorded this pattern of flooding. The resulting geomorphology and the impacts on groundwater flow are considered in the assessment.**

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[4] Potential issues related to climate changes, increased infiltration if "cooler and wetter" climate is to be the case, and possibility that such climate changes may detrimentally affect groundwater flow and/or groundwater contamination and result in consequent contaminant transport from YM into Inyo County, including into springs in DVNP, through the regional carbonate aquifer.

Note - With the increased time of compliance to 1MY, it is considered very likely that cooler and wetter climatic cycles will occur - again as you are doubtless aware.

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**Cooler and wetter climates, and the potential increased flow and infiltration resulting from those potential climate states, are included in the assessment of performance of the potential repository. To date, modeling indicates that groundwater flow paths are not significantly altered by the increases in infiltration and flow that may be associated with cooler and wetter climates. Again, the repository performance must be assessed at the location identified by regulation, and if compliant at that location, the repository will be compliant for Inyo County.**

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[5] Status of Inyo County drilling program, to be funded by DOE for assessing groundwater conditions and/or possible monitoring(?) wells.

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**The status is summarized by the recent Inyo county report.**

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[6] Possible concerns about the proposed Charleston View development, a "draft" residential area for Southern Inyo County that will supposedly have 50,000 to 65,000 new homes if built (translating to 100,000 to 150,000 people), which will draw on groundwater resources that are already over-taxed in the area of Pahrump, NV.

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**Yes, it is likely that additional withdrawal of groundwater in the Pahrump area may be of concern to Inyo County, whose struggles with water resources in the Owens Valley region are well documented. The Pahrump valley groundwater system is not thought to be connected to any YM groundwater system.**

**\*\*\*\*\***

The above points are all I can think of for now regarding focus, realizing you may have info on other potential issues as well. Sorry for short notice, but I would hope to have draft Qs&As back by COB on Monday, 17 October for use at the 18 October dress rehearsal dry run. Visit to Inyo County itself will occur the following week, so turnaround time is abbreviated! (This short turnaround time frame means it is not meant to be a gigantic effort on your part. Please keep them as concise as possible to assist you with preparing them quickly.)

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**With respect to other issues, I would just mention that Nye County and other affected units of local government, such as Inyo County, continue to work to provide data and information relevant to Yucca Mountain. The recent Nye County compilation of data and information from Phase IV of their Early Warning Drilling Program and the Inyo County report are examples. NRC continues to review and monitor this information. You should explicitly note to folks that we are interested in obtaining useful information, and if they are aware of other sources of relevant materials, to please let us know, so that we may review them in a timely fashion.**

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Please contact me if you have any questions about this request, about which I have spoken to John (of course!) prior to contacting you as I stated above. Linda Lehman may be present at the public meetings in Tecopa, by the way, so John also suggested I copy this note to you, Jim Winterle, in case you may "want" to add some pertinent Qs&As as well.