

## DeweyBurdPubEm Resource

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**From:** Richard Blubaugh [rblubaugh@powertechuranium.com]  
**Sent:** Wednesday, June 27, 2012 4:18 PM  
**To:** Burrows, Ronald; Cohen, Stephen  
**Cc:** 'John Mays'; 'Richard Clement'; 'Jack Fritz'  
**Subject:** PM-to-PM Clarification Re TR RAI 5.7.8-3(b)  
**Attachments:** TR RAI 5 7 8-3b revised response\_120627.pdf

Ron and Steve;

This email is in response to the PM-to-PM clarification requested by you in our telephone discussion on June 22, 2012. You had two concerns related to the June 2011 response to TR RAI 5.7.8-3(b). The first being, "What is meant by "hydrogeological units"?" and the second being, "Will we confirm that we are staying with the commitment to "arithmetic average"?"

We have evaluated the context and intended meaning of the term "hydrogeological units" and have determined that the phrase was used in error. Revised language is included in the attached revised response to TR RAI 5.7.8-3(b). Also, after further evaluation regarding the use of "arithmetic average," we have decided that there are other methods available today that should be included, with the actual method used dependent upon the baseline data collected. Consequently, we have also revised the language regarding this concern. Please see the attached revised response to TR RAI 5.7.8-3(b), which is ADAMS compliant should you need to post it.

If, after review of this revised response, you have additional questions or need further clarification, please contact us at your convenience. We appreciate the level of review and the progress being made toward the final SER.

Sincerely,

Richard Blubaugh  
VP-EH&S Resources  
Powertech (USA) Inc.  
303-790-7528

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**From:** Richard Blubaugh

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**TR RAI 5.7.8-3**

*Table 2.7.3-1 in NUREG-1569 provides a list of acceptable constituents for monitoring at in situ recovery facilities. Alternatively, applicants may propose a list of constituents that is tailored to a particular location. In such cases, sufficient technical bases must be provided to demonstrate the acceptability of the selected constituent list." With respect to the list of RAIs, the staff requests the following information.*

**TR RAI 5.7.8-3(b)**

- b. Consistent with Section 5.8.7.3 of NUREG-1569, the applicant did not include information on the statistical methods that would be employed to establish baseline or background levels. For example, the applicant did not define whether or not the baseline levels for the production zone will be based on a well field average or well-by-well basis, methods to identify and exclude outliers, or other methods that may be appropriate for establishing background levels in all aquifers. The staff cannot determine if the applicant will be able to appropriately define baseline levels for a well field without this information. Please provide the above-referenced information.*

**TR RAI 5.7.8-3(b) Response**

The following discussion will be incorporated into the revised TR.

Within each well field a subset of wells that will later serve as production wells will be identified for baseline water quality sampling. These subsets of wells will include at least one (1) well per four (4) acres of well field pattern area, or six (6) wells, whichever is greater. These wells will be sampled four times for baseline characterization, with a minimum of fourteen (14) days between sample events. The samples will be analyzed for all parameters identified in revised Table 6.1-1, which is included with the response to TR RAI 6.1-3.

Prior to calculating baseline water quality statistics, the analytical results will be examined for differences within the production zone. Methods used to determine whether differences exist include visual screening such as the use of trilinear diagrams, and statistical analysis such as the Student's t-test or other accepted methods such as those described in "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance" (EPA, 2009). If heterogeneity exists, then baseline water quality will not be established for entire production zone but will be separated into subzones. If no statistically significant differences in water quality are present, then baseline water quality will be established for the entire production zone of the well field.

Outliers, which are anomalously high or low values relative to the other values, will be removed by quality control checks including visual screening and statistical analysis. Typically, an outlier will be defined as a value outside of the mean value, plus or minus three (3) standard deviations, of all values of that parameter within the production zone or subzone, if applicable. The mean value and standard deviation used to identify outliers will be calculated for the entire data set within the production or

subzone minus the suspected outlier. Other accepted methods may be used to identify outliers including methods described within EPA (2009). Outliers will be examined for potential data transcription or other identifiable errors and corrected if possible. If they cannot be corrected, outliers will be removed from the data set prior to calculating baseline water quality.

For the production zone monitor wells, the baseline water quality will be established as the average on a parameter-by-parameter basis for the entire production zone, for each subzone, or on a well-by-well basis. Alternately, Powertech may propose the use of a statistical analysis tool such as EPA's ProUCL 4.0, which was described by NRC staff in the January 2011 NRC Uranium Recovery Workshop in Denver, Colorado, to establish baseline water quality based on the distribution of sample results on a parameter-by-parameter basis. The target restoration goals (TRGs) will be established as a function of the average baseline water quality and the variability in each parameter according to statistical methods approved by NRC. The methods used to establish baseline water quality, identify outliers, evaluate variability, and calculate TRGs will be described within the well field hydrogeologic data package for each well field.