

From: [Burrows, Ronald](#)
To: [Richard Blubaugh](#)
Cc: ["Richard Clement"](#); ["John Mays"](#); ["Jack Fritz"](#); ["Mark Hollenbeck"](#); escheinost@powertechuranium.com; [Kurian, Varughese](#)
Subject: RE: NRC review of Powertech's additional statistical analysis of radium-226 soil sampling data and gamma measurements
Date: Monday, September 09, 2013 6:29:52 PM

Dear Mr. Blubaugh,

This e-mail is in response to your August 19, 2013 letter (ML13238A185) requesting NRC review of Powertech's additional statistical analysis of radium-226 soil sampling data and gamma measurements for the Dewey-Burdock Project (the submittal).

After reviewing your August 19, 2013 submittal, NRC staff requires additional information on the following aspects of Powertech's additional statistical analysis:

1) Page 2 of the submittal references minor data entry errors and their corrections.

Please provide NRC staff with the specifics of all errors, including how they were identified as errors and how they were corrected.

2) In response to RAI-2.9-35 (ML11208B714), and as reiterated in the submittal (e.g., page 6), neither the radium-226 soil sampling data nor the gamma measurements can be described by a normal distribution function. The proposed methodology for predicting radium-226 concentrations in soil for the Dewey-Burdock Project is linear regression using gamma measurements as the independent variable. However, linear regression, and statistical tests associated with it, assume normally distributed data (see, for example, NUREG-1475, Applying Statistics). This includes the proposed use of the outlier test provided in EPA's ProUCL 4.1.00 referenced in this submittal (see, for example, page 6).

Please provide NRC staff with a technical justification for utilizing linear regression, and associated tests such as for outliers, for these data sets that are not normally distributed. Your justification should include a discussion of errors associated with utilizing linear regression in this case where the underlying assumptions are not met as well as relevant statistical tests to demonstrate that any positive correlation is not occurring by chance. In your response, please provide authoritative references used for this justification.

3) Pages 15 and 16 of the submittal discuss the disposition of outliers. Further, as discussed in the submittal, no sample collection errors, data transcription errors, or field equipment malfunctions were identified (see page 7 of the submittal). For example, data point RFA-B21A was excluded from the proposed statistical modeling data set because it "...falls outside the expected range..." It is not clear to NRC staff how the expected range was exactly determined. Also, as part of the outlier analysis, linear regression was run on data sets without these outliers present (see, for example, page 17 and Appendix D of the submittal) and the correlation coefficient and residuals were compared. However, as discussed in (2) above, these tests are for normally distributed data sets, which are not present here.

Please provide additional technical justification for excluding the identified outliers from the proposed statistical modeling data set, taking into account the analyses utilized

methodologies with an underlying assumption of normally distributed data. Please also provide a discussion on how the expected value of data point RFA-B21A was established.

4) Portions of Appendix A (pages A-6 through A-8), Field Notes, are illegible.

Please provide NRC staff with a legible version of Appendix A.

In anticipation of the need for a discussion of issues associated with your submittal, I will establish a public meeting. I will contact you with the information when that meeting has been established.

Thank you.

Ronald A. Burrows

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From: Richard Blubaugh [mailto:rblubaugh@powertechuranium.com]
Sent: Monday, August 19, 2013 6:05 PM
To: Burrows, Ronald
Cc: 'Richard Clement'; 'John Mays'; 'Jack Fritz'; 'Mark Hollenbeck'; escheinost@powertechuranium.com
Subject: FW: Additional Statistical Analysis

Ron,

The attachment is the report we prepared to address draft license condition 12.11 concerning the gamma and radium in soils correlation. As we discussed during our PM to PM meeting, we request that NRC determine if the additional statistical analysis is sufficient or if additional soil sampling in the field will be necessary. We are submitting this report now in order to have sufficient time to collect samples this season, if necessary.

We look forward to hearing from you at your earliest convenience in this regard.

Sincerely,

Richard Blubaugh
VP-HS&E Resources

Powertech (USA) Inc.
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From: Lisa Scheinost [<mailto:escheinost@mail.powertechuranium.com>]
Sent: Monday, August 19, 2013 3:40 PM
To: Richard Blubaugh
Subject: Additional Statistical Analysis