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LETTER REGARDING U S EPA REGION IV REVIEW AND COMMENTS ON EVALUATION OF ARSENIC IN GROUNDWATER REVISION 1 NAS PENSACOLA FL
08/28/2014
U S EPA REGION IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

August 28, 2014

Official Correspondence – This electronic message is being sent in lieu of regular mail

4SF/FFB

Ms. **Patty Marajh-Whittemore,** Remedial Project Manager,
ITP Gulf Coast
Dept of the Navy; Naval Facilities Southeast
Attn: AJAX Street, Building 135N
P.O. Box 30A
Jacksonville, FL 32212-0030

Re: Evaluation of Arsenic in Groundwater, Rev 1

Dear Ms Whittemore:

The U.S. Environmental Protection Agency (EPA) has received and reviewed the above mentioned document and has the following comments.

Based on the analysis presented in the document, the Navy recommends a background threshold value (BTV) of 56.9 ppb for arsenic in groundwater. EPA performed a desktop analysis to determine whether EPA calculations would arrive at approximately the same answer. EPA used the approach detailed in Dr. Anita Singh's issue paper entitled *Extracting a Site-Specific Background Data Set from a Mixture Data Set & Estimating Background Level Constituent Concentrations* (Singh, 2014). Our calculations arrived at a Background Threshold Value of 19.8 ppb.

EPA also compared the Navy's analysis with the approach detailed in Dr. Singh's issue paper. Comments on the Navy's document are presented below.

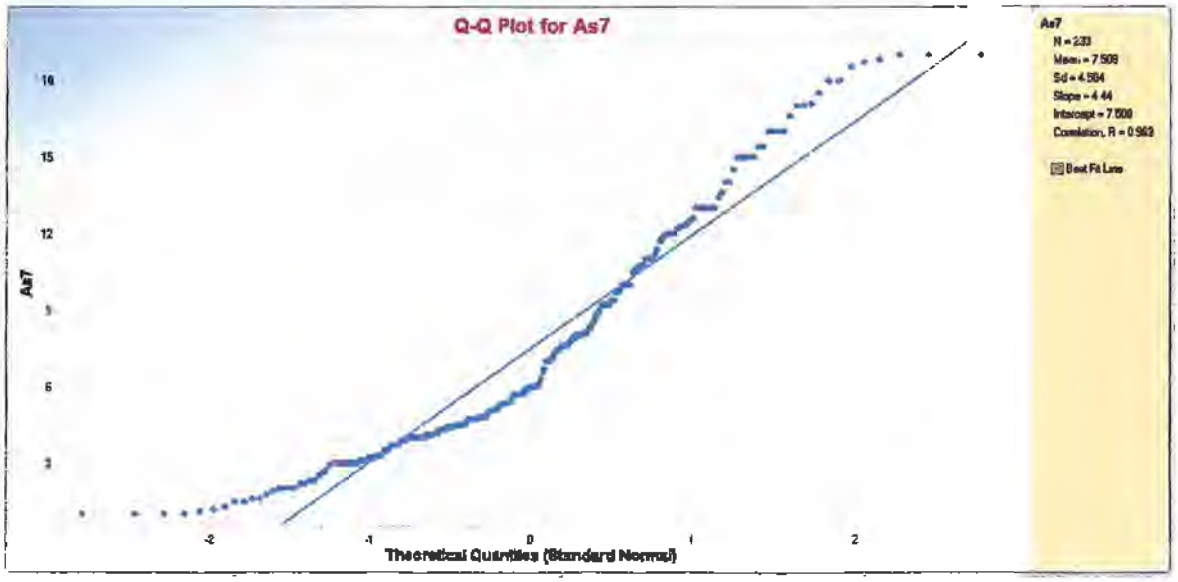
1. Section 3.2, Page 6. The text underneath Figure 3 indicates that a normal distribution had been assumed up until that point in the process but other distributions were evaluated. However, Figure 3 indicates that a lognormal plot was used prior to that statement. The justification for suddenly using a lognormal plot of the data in mid-evaluation is not discussed in any detail. Singh's issue paper specifically states that a lognormal plot should be avoided:

   > The existing literature (e.g., Fleischhauer and Korte, 1990; and Singh, Singh, and Flatman, 1994) suggest the use of normal (and not lognormal) distribution based methods to delineate multiple populations potentially present in a pooled dataset.

The use of a lognormal model tends to accommodate outliers (polluted locations) and multiple populations (onsite, background) present in a dataset (Singh, Singh, and Engelhardt, EPA 1997); this accommodation often leads to the incorrect conclusion that the pooled dataset represents a single environmental (e.g., background) population. The log-transformed dataset may represent a single statistical population in the log-scale but not a single population (e.g., background) in the original scale. It is highly likely (almost certain) that noticeable breaks and jumps of significant magnitude (from a risk point of view) observed in a normal Q-Q plot may not appear to be significant in a lognormal Q-Q plot.

The objective is to identify the background population in the original scale consisting of uncontaminated locations as cleanup and remediation decisions are made based upon concentrations and decision statistics computed in the original raw scale. In the context of using a Q-Q plot (or probability plot) based population partitioning method to extract a background dataset, the use of a lognormal distribution may actually include contaminated onsite concentrations in the extracted background dataset (Example 2) and yield inflated estimates of BTVs which may not be protective of human health and the environment. Therefore, the use of lognormal distribution based Q-Q plots should be avoided. An example illustrating these issues is discussed as follows.

Lognormal plots should not be used in this evaluation. The Navy's use of a lognormal plot may be the cause of the differences between the Navy's BTV and EPA's estimate. For discussion purposes, the final of seven iterations based upon normal Q-Q plots is presented below:



2. Section 3.3, Page 11. The unnumbered table that shows the various BTV estimates has been truncated on the right. Please revise this table so that all values are shown.

3. Figures: Please explain why the right hand column summaries (whether for the Normal (Figure 1 and 2) or Log Normal (3-6) figures) indicate that the data is not normal (or log-normal) despite the titles suggesting that this is the assumption. What is the significance

of an assumption that the data is normal and yet the plot descriptors indicate that the data is contrary to the assumption?

4. The Navy should prepare an evaluation of the sampling points that were above the background threshold levels to ensure that there are action being taken that will ensure protectiveness.

Thank you for the opportunity to review this document. Should any further clarification be required, please contact me at 404-562-8510 or woolheater.tim@epa.gov.

Sincerely,

Timothy R Woolheater

Digitally signed by Timothy R Woolheater
DN: cn=Timothy R Woolheater, o=USEPA, ou=4SF-FFB, email=woolheater.tim@epa.gov, c=US
Date: 2014.08.28 11:24:21 -04'00'

Timothy R. Woolheater
Senior Remedial Project Manager
Federal Facilities Branch

CC: David Grabka, FDEP