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CERTIFIED MAIL - RETURN RECEIPT REQUESTED

April 8, 2015

Mark Patterson
FWDA-BRAC Coordinator
P.O. Box 93
Ravenna, OH 44266

Steve Smith
USACE FWDA Program Manager
CESWF-PEC-EF
819 Taylor Street, Room 3A12
Fort Worth, TX 76102

RE: DISAPPROVAL
GROUNDWATER BACKGROUND EVALUATION FOR
FORT WINGATE DEPOT ACTIVITY, NEW MEXICO
EPA ID# NM6213820974
FWDA-14-007

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) received the Department of the Army's (Permittee) *Final Version 1, Technical Memorandum, Groundwater Background Evaluation for Fort Wingate Depot Activity* (Memorandum); dated September 2014 and submitted pursuant to Section VII.L of the Fort Wingate Hazardous Waste Facility Permit. NMED has reviewed the Memorandum and hereby issues this Disapproval. The Permittee must address the following comments.

Comment(s):

1. Permittee Statement: Section 1.0 Introduction, page 2, lines 6-9. "[t]he background wells used in the analysis were selected by CH2M Hill and approved for use in the evaluation by the U.S. Army Corps of Engineers, Fort Worth District. The approved background wells are alluvial aquifer wells BGMW01, BGMW02, BGMW03, FW31, TMW25, TMW26, TMW27, and TMW28, (Figure 1) and bedrock wells TMW17 and TMW19 (Figure 2)."

NMED Comment:
In reviewing the *Groundwater Periodic Monitoring Report,* January through June 2014, it appears that monitoring wells BGW01, BGW02 and BGW03, TMW17 and TMW19 have already been impacted by site activities and must not be used in background evaluations, unless demonstrated otherwise. Also, TMW27 appears to be the only monitoring well with detections of arsenic higher than the EPA maximum contaminant level (MCL) of 10, which may be indicative of site impacts. The Permittee must demonstrate these well are representative of groundwater not impacted by site activities prior to using them in determining background groundwater concentrations. In addition, demonstrate that at least one of these monitoring wells is a true up-gradient well that has not been impacted by site activities or that the contamination is from an alternative up-gradient source. The Permittee might reconsider the need to calculate background concentrations for the entire suite of metals as arsenic, manganese, selenium, aluminum, and iron appear to be the only metals with detections above the EPA MCLs. The background evaluation must be put delayed until the Permittee demonstrates the appropriateness of the selected background wells is demonstrated. Provide the well logs, well construction diagrams, geotechnical data for these wells and a potentiometric surface map that represents the northern groundwater flow for the aquifers beneath FWDA.

2. Permittee Statement: Section 1.0 Introduction, page 2, lines 9 -12, Section 4.0, Calculation of Background Threshold Values, page 5, lines 1-2 and Section 6.0 References, page 5 , lines 38-39. "[t]he methodology utilized in this evaluation is primarily from the framework provided in the ProUCL Technical Guide (U.S. Environmental Protection Agency [USEPA], 2010)."

NMED Comment:
Section 1.0 indicates the data set subjected to statistical analysis (alluvial plus bedrock aquifer) in the Technical Memorandum Groundwater Background Evaluation for Fort Wingate Depot Activity Final Version 1, dated September 2014 (Groundwater Background Evaluation) covers the period from 2007 through 2013. Thus, it is unclear why ProUCL version 5.0.00 dated September 2013 was not used in the Groundwater Background Evaluation. Use the version of EPA's ProUCL available at the time that statistical analysis of the data set under evaluation is performed in determining trends, distributions, and other statistical properties. Revise the Groundwater Background Evaluation to use and also as reference ProUCL version 5.0.00 for determining the statistical properties of the groundwater background data set. (See Comment 10).

3. Permittee Statement: Section 2.0 Trend Evaluation, page 2-3, line(s) 40-42; 1-5 and 6. "The Mann-Kendall trend evaluation is one of the commonly used trend analysis methods for environmental data largely because it is a nonparametric method, so there are no distributional assumptions, missing data values (non-detects) are easily handled through assignment of a common value less than detected values, and irregularly spaced sampling intervals are permitted (Gilbert, 1987; Gibbons, 1994, USEPA, 2006).[..]"

"[t]he results of this trend evaluation for groundwater data from the FWDA are presented in Table 2."

NMED Comment:
The text does not indicate if the trend analysis was performed using ProUCL or by other means. If the evaluation was performed using ProUCL, electronic copies of the input and output files should be included as an appendix to the Groundwater Background Evaluation. If the trend evaluation was performed by other means, revise the text to include a concise but comprehensive summary outlining how the evaluation was performed. For clarity, provide examples of the calculations performed. (See Comment 10).

4. Permittee Statement: Section 3.1 Identification of Mathematical Outliers, page 3, lines 26-27. "For 25 or fewer results for a specific constituent, Dixon's test was applied to the data; for larger numbers of results, Rosner's test was applied to the data (USEPA, 2006)."

NMEDs Comment:
The text does not indicate if the tests were performed using ProUCL or by other means. If the evaluation was performed using ProUCL, electronic copies of the input and output files should be included as an appendix to the Groundwater Background Evaluation. If Dixon's test and Rosner's test were performed by other means, revise the text to include a concise but comprehensive summary outlining how the tests were performed and include calculation examples for clarity. (See Comment 10)

5. Permittee Statement: Section 3.1 Identification of Mathematical Outliers, page 3 and 4, lines 42-43 and 1-5 and 6. "In the subsequent evaluation, the data were transformed using each of three transformations: square root transformation, cubic root transformation, and natural logarithmic transformation. The logarithmic transformation is a standard transformation in environmental applications, while the square root and cubic root offer options appropriate for intermediate levels of skewness in a data set. The Shapiro-Wilk test for normality was applied to the untransformed data and three sets of transformed data to determine which provided the best adherence to normality with the remaining concentrations (Gilbert, 1987; USEPA, 2006)."

"The outcomes of these outlier tests are presented in Table 3."

NMED Comment:
The results of the Shapiro-Wilk test are not provided in the Groundwater Background Evaluation. According to the last paragraph of Section 3.1, the results of the outlier tests are presented in Table 3. The text does not indicate if the second outlier analysis was performed using software or by other means. If the evaluation was performed using software, electronic copies of the input and output files should be included as an appendix to the Groundwater Background Evaluation. If the second analysis of outliers was performed by other means, revise the text to include a concise but comprehensive summary outlining how the analysis was performed and ensure all input information (e.g., transformed data), as well as the results, are

provided in an appendix to the Groundwater Background Evaluation. For clarity, include examples of the calculations performed.

6. Permittee Statement: Section 3.2 Visual Inspection of Outliers, page 4, lines 22-24. "Other mathematical outliers were evaluated using a combined inspection of Table 3 and probability plots presented for each detected constituent. Figures 3 and 4 present normal probability plots for the data from the alluvial and bedrock wells, respectively."

NMED Comment:
Normal probability plots were also used in the identification of potential outliers. While the plots for the alluvial aquifer background wells and the bedrock background wells are presented in Figures 3 and 4, respectively, the text does not describe how the plots were generated. Revise Section 3.2 to indicate if the normal probability plots were generated using software or by other means. If the evaluation was performed using software, electronic copies of the input and output files should be included as an appendix to the Groundwater Background Evaluation. If the plots were generated by other means, revise the Groundwater Background Evaluation to include a concise but comprehensive summary outlining the methodology used.

7. Permittee Statement: Section 4.0 Calculation of Background Threshold Values, page 4 and 5, line(s) 41 and 1-2. "The distribution possibilities included those computed by the USEPA's ProUCL software: the normal, lognormal, and gamma distributions (USEPA, 2010)."

NMED Comment:
Section 4.0 includes references to the ProUCL Technical Guide implying that BTVs were calculated using ProUCL. However, the ProUCL input and output files covering these calculations are not included in the Groundwater Background Evaluation. Revise the Groundwater Background Evaluation to include electronic copies of all the ProUCL input and output files that cover the calculation of the groundwater BTVs. (See Comment 10).

8. Section 4.0 Calculation of Background Threshold Values, page 5, lines 19 -20. "UTLs were calculated whenever at least four detected values were available. When fewer than four detections were available, the BTV was assigned the maximum detected value."

NMED Comment:
The text states that "UTLs were calculated whenever at least four detected values were available." As previously noted (Comment 2), FWDA has based the Groundwater Background Evaluation on ProUCL version 4.1 which indicates "At the minimum, a background sample should have at least 8 to 10 detected observations to estimate BTVs." Thus, the evaluation as presented is inconsistent with the version of ProUCL applied. An examination of Table 4 shows that at least 10 observations are available for all cases where less than four detections were obtained. December 2014 NMED Soil Screening Guidance, available at http://www.nmenv.state.nm.us/HWB/guidance.html, allows for statistical analyses when at least 10 observations are available for all cases where less than four detections were obtained. NMED has revised its recommendations based partly on information presented in US EPA's Technical

Guide for ProUCL version 5.0.00 dated September 2013. Revise the Groundwater Background Evaluation to use ProUCL version 5.0.00 as the framework for groundwater BTVs at FWDA. (See Comment 10)

9. Permittee Statement: Table 3, Footnotes, page 21. "c = result appears unusually distant from the main population."

NMED Comment:
Justification for exclusion of the outliers listed in Table 3 is provided by footnotes a, b, and c of the table. Sections 3.2 and 3.3 of the text provide an expanded explanation of these footnotes. However, some additional explanation should be provided for footnote c. It is unclear whether "distant" refers to the reported numerical value or the actual location relative to the main population. Revise footnote c for clarity.

10. Permittee Statement: Section 5.0 Conclusions, page 5, lines 26-30.
"Groundwater analytical results were statistically evaluated to determine background concentrations following USEPA methodologies. The BTVs were calculated for dissolved metals, total metals, perchlorate, nitrate, nitrite, and polynuclear aromatic hydrocarbons. The BTVs can be used to compare groundwater analytical results from FWDA monitoring wells to determine if anthropogenic contamination is present in the groundwater.

NMED Comment:
Based on the information furnished in the Groundwater Background Evaluation, this conclusion is premature. FWDA has used an obsolete EPA document Technical Guide for ProUCL Version 4.1 dated 2010, as the framework for some, and perhaps all, of the analyses performed in determining groundwater BTVs for the facility. This document was replaced by Technical Guide for ProUCL Version 5.0.00 in September 2013. In addition, the Groundwater Background Evaluation does not provide the level of detail needed to verify the reported results for the analyses performed in determining the BTVs. Furthermore, the Permittee must provide justification for calculating background for constituents other than metals.

The Permittee must submit a revised Memorandum to address all comments contained in this Disapproval. In addition, the Permittee must include a response letter that details where each comment was addressed, cross-referencing NMED's numbered comments. The Permittee must also submit an electronic redline-strikeout version of the revised Memorandum. The revised Memorandum must be submitted on or before **June 30, 2015**.

If you have any questions regarding this letter, please contact Vicky Baca at (505) 476-6059.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: Kristen VanHorn, NMED HWB
Neelam Dhawan, NMED HWB
Dave Cobrain, NMED HWB
Christy Esler, USACE
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Barbara Davis, BIA

File: FWDA 2015 & Reading File
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