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**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

August 7, 2017

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

Steve Smith  
USACE  
CESWF-PER-DD  
819 Taylor Street, Room 3B06  
Fort Worth, TX 76102

**RE: DISAPPROVAL  
GROUNDWATER PERIODIC MONITORING REPORT  
JANUARY THROUGH JUNE 2016  
FORT WINGATE DEPOT ACTIVITY  
MCKINLEY COUNTY, NEW MEXICO  
EPA ID# NM6213820974  
HWB-FWDA-16-013**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the Fort Wingate Depot Activity's (Permittee) *Final Groundwater Periodic Monitoring Report January through June 2016* (2016 Report), dated October, 2016. NMED has reviewed the Report and hereby issues this Disapproval. The Permittee must address the following comments.

**GENERAL COMMENTS**

1. The 2016 Report was written and submitted before receipt of NMED's comments regarding the *Final Groundwater Periodic Monitoring Report January through June 2015* (2015 Report). The Permittee must revise the 2016 Report to address NMED's comments regarding the 2015 Report dated May 19, 2017 as many of the comments from the 2015 Report carry over to the 2016 Report. Revise the Report to address NMED's previous comments. Also, ensure that all future reports incorporate the changes made to address the

comments concerning both the 2015 Report and the 2016 Report.

## 2. Inaccuracies/Discrepancies

**NMED Comment:** The 2016 Report contains multiple inaccuracies/discrepancies.

Examples are listed below:

- a. **Figure 5-1, Spring 2016 Northern Area Nitrate and Nitrite Concentrations in Alluvial Groundwater:** The nitrite concentration in well TMW29 is recorded as not detected (ND) in Figure 5-1, while the value is shown as 0.069 J mg/L in Table 5-2.
- b. **Figure 5-2, Spring 2016 Northern Area Nitrate and Nitrite Concentrations in Bedrock Groundwater:** The nitrite concentration in well TMW30 is recorded as ND in Figure 5-2, while the value is shown as 0.070 J mg/L in Table 5-2.
- c. **Figure 5-2, Spring 2016 Northern Area Nitrate and Nitrite Concentrations in Bedrock Groundwater:** The nitrite concentration in well TMW48 is recorded as ND in Figure 5-2, while the value is shown as 0.053 J mg/L in Table 5-2.
- d. **Figure 5-3, Spring 2016 Northern Area Explosives and Perchlorate Concentrations in Alluvial Groundwater:** The RDX concentration in TMW40S is recorded as 980 J ug/L in Figure 5-3, while the value is shown as 980 ug/L in Table 5-3.
- e. **Section 5.1.4, Perchlorate, lines 23-24, page 5-3:** The Permittee states, “[p]erchlorate was detected in groundwater samples from 23 alluvial monitoring wells in the Northern Area, with concentrations ranging from 0.015 J to 640 µg/L.” The lowest perchlorate concentration is recorded as 0.010 J ug/L in alluvial well TMW22 according to Table 5-4.
- f. **Figure 5-5, Spring 2016 Northern Area VOC, SVOC and TPH Concentrations in Alluvial Groundwater:** The methyl tert-butyl ether concentration in well MW01 is not shown in Figure 5-5, while the value is shown as 0.29 J ug/L in Table 5-5.
- g. **Section 5.1.6, Other Organic Compounds, lines 21-23, page 5-5:** The Permittee states, “[t]he pesticide compound, delta-hexachlorocyclohexane (delta-bhc) was detected at a concentration below the reporting limit at 0.018 J µg/L from alluvial monitoring well TMW40S.” The reporting limit for the pesticide compound is not established according to Table 5-7.
- h. **Section 5.1.6, Other Organic Compounds, lines 35-36, page 5-4:** The Permittee states, “[d]iethyl phthalate (0.46 J µg/L at bedrock monitoring well TMW35); detected in samples from one alluvial and one bedrock monitoring wells.” TMW35 is an alluvial monitoring well.
- i. **Section 5.1.6, Other Organic Compounds, lines 39-40, page 5-4:** The Permittee states, “[p]henanthrene (0.57 J µg/L at alluvial monitoring well TMW35); detected in samples

from two alluvial and no bedrock monitoring wells.” There is a typographical error in the statement (phenanthrene; not phenathrene).

- j. Section 5.1.6, Other Organic Compounds, lines 17-18, page 5-5:** The Permittee states, “[f]ourteen SVOCs were detected from TMW35, which were not detected from any other sample during this monitoring event.” 21 SVOCs were detected in the samples obtained from well TMW35, and eighteen of those were not detected from any other sample during this monitoring event according to Table 5-6.
- k. Section 5.1.6, Other Organic Compounds, lines 19-20, page 5-5:** The Permittee states, “[t]he TWM35 results are not fully described above, but are presented in Table 3-6.” Table 3-6 is not found in the Report.
- l. Figure 5-5, Spring 2016 Northern Area VOC, SVOC and TPH Concentrations in Alluvial Groundwater:** There are typographical errors on the detected compound (bis(2-ethylhexyl) phthalate) for wells MW20, MW22S, and TMW41.
- m. Figure 5-5, Spring 2016 Northern Area VOC, SVOC and TPH Concentrations in Alluvial Groundwater:** The 2,4-dinitophenol concentration in well TMW40S is recorded as 19 J ug/L in Figure 5-5, while the value is reported as 16 J ug/L in Table 5-6.
- n. Figure 5-5, Spring 2016 Northern Area VOC, SVOC and TPH Concentrations in Alluvial Groundwater:** The bis(2-ethylhexyl) phthalate concentration in well TMW46 is not shown in Figure 5-5, while the value is reported as 0.84 J ug/L in Table 5-6.
- o. Figure 5-6, Spring 2016 Northern Area VOC, SVOC and TPH Concentrations in Bedrock Groundwater:** Although the groundwater samples from bedrock wells TMW32, TMW39D, TMW40D, TMW48 and TMW49 were not collected for Method 8270 analysis, “not detected (ND)” was indicated instead of “not sampled (NS)”.
- p. Figure 5-5, Spring 2016 Northern Area VOC, SVOC and TPH Concentrations in Alluvial Groundwater:** The Permittee states, “[o]rganochlorine pesticides (by Method SW8081A) were not detected in any monitoring well” in the footnotes. Delta-hexachlorocyclohexane (delta-bhc) was detected at 0.018 J ug/L from the sample collected from alluvial well TMW40S during the spring 2016 sampling event according to Table 5-7.
- q. Table 5-8, Summary of Dissolved Metals Analytical Detections (page 4 of 7):** Although the arsenic concentration in well TMW27 was detected above the regulatory limit, the value was not indicated to show the exceedance with bold font.
- r. Table 5-9, Summary of Total Metals Analytical Detections (page 4 of 7):** Although the iron concentration in well TMW26 was detected above the regulatory limit, the value was not indicated to show the exceedance with bold font.

- s. **Table 5-9, Summary of Total Metals Analytical Detections (page 1 of 7):** Although the manganese concentration in well BGMW03 was detected above the regulatory limit, the value was not indicated to show the exceedance with bold font.

Ensure that all statements provided in the 2016 Report, as well as in all future plans and reports, are accurate. Revise the 2016 Report to resolve these issues.

### **SPECIFIC COMMENTS**

#### **3. Section 2.2, Groundwater Sampling, lines 40-42, page 2-1**

**Permittee Statement:** “Monitoring well purging and sampling was performed using a variety of sampling techniques: dedicated low-flow pneumatic pumps from BESST Products, dedicated pneumatic Bennett Sample Pumps, a non-dedicated Grundfos Redi-Flo2 submersible pump, and disposable bailers.”

**NMED Comment:** It appears that some wells were equipped with dedicated pumps and others were sampled by non-dedicated submersible pump or disposable bailers. Explain the rationale for the variance in sampling technique and equipment for each well in the revised 2016 Report. Also, provide a table that describes the sampling technique and equipment (e.g., pumps, disposable or dedicated tubing) used for each well in the revised 2016 Report.

#### **4. Section 4.1.1, Northern Area Alluvial Groundwater System, lines 31-33, page 4-1**

**Permittee Statement:** “However, the groundwater mound is still observed in the water level data for monitoring well MW02 and may be the result of leakage from the installation water supply well or borehole.”

**NMED Comment:** Even if there is no apparent hydraulic connection between the shallow and deep aquifers, pollutants could migrate into the deep aquifer through faulty construction of the water supply well (Water Supply Well 69) because the well is located near the former fueling facility. Provide all available construction details for the water supply well (e.g., total depth, screen interval).

#### **5. Section 4.1.2, Northern Area Bedrock Groundwater System, lines 3-8, page 4-2**

**Permittee Statement:** “Steep horizontal gradients from east to west (in particular, between monitoring wells TMW38 and TMW40D and between monitoring wells TMW17 and TWM37) indicate that a geologic structural feature impedes groundwater flow. Vertical offset of the sandstone layers in the bedrock aquifer by a fault or fracture zones may be present in this area and impede groundwater flow. Contaminant transport of perchlorate to the north (instead of to the west) also provides evidence supporting the

conceptual model of a structural impediment to westerly groundwater flow in bedrock beneath the Workshop Area.”

**NMED Comment:** Although it is true that steep horizontal groundwater gradient from east to west is detected between wells TMW38 and TMW40D and wells TMW17 and TMW37, the bedrock surface elevations (elevations where bedrock is encountered) do not change significantly between these wells to indicate the presence of vertical offset. The top of bedrock elevation changes between wells TMW38 to TMW40D and wells TMW17 and TMW37 are recorded as -0.3 and +4.6 feet, respectively, according to the boring logs in the *Monitoring Well Installation and Abandonment Work Plan*, dated April 12, 2011. However, notable elevation differences in the top of the bedrock elevations are detected between wells TMW16 to TMW17(-41 feet) and wells TMW18 to TMW19 (+35 feet). The changes may indicate that a subsurface feature dips to the east between these wells. The higher bedrock elevation west of the Workshop Area may be the cause of slower contaminant transport to the west creating a preferential pathway to the north. Since the theory of a geologic structural feature is unconfirmed, the Permittee must revise the statement to include the fact that the groundwater flow direction has not been fully characterized in the bedrock aquifer beneath the Workshop Area. The groundwater elevation contours in Figure 4-3 and Figure 4-4 must be removed from the revised 2016 Report.

According to *TNT Leaching Bed Soil Boring Test Results and Development of Site-Specific Dilution Attenuation Factors*, a Geoprobe™ investigation was conducted from March 24 through April 5, 2014 and thirty-four borings were advanced to approximately 35 feet below ground surface (bgs). During the investigation, drilling refusal was encountered within 20 feet bgs while advancing borings SB04, SB09, SB14 and SB18. The location of these soil borings appears to be aligned with the apparent geologic structural feature in Figure 4-3 and Figure 4-4. During excavation of the TNT Leaching Beds, the Permittee must visually inspect the cause of the refusal in the vicinity of borings SB04, SB09, SB14, and SB18 and report all findings in the Interim Measures Report.

**6. Section 5.1.1, Water Quality Parameters, line 27, page 5-1 and Section 5.1.5, Volatile Organic Compound, lines 10-11, page 5-4**

**Permittee Statements:** “Low median values indicate that anaerobic conditions (<1 mg/L) are likely present in some areas of FWDA.”

and

“The only VOC detected in groundwater samples at concentrations above regulatory levels was the gasoline additive and chlorinated solvent 1,2-dichloroethane.”

**NMED Comment:** Chlorinated solvents are known to undergo dechlorination under anaerobic conditions. However, the presence of other compounds such as nitrate interferes

with the process. The incomplete biodegradation of 1,2-dichloroethane produces vinyl chloride. The accumulation of vinyl chloride may be occurring at the site. Include all previously acquired data for vinyl chloride in the revised 2016 Report, and evaluate whether vinyl chloride is accumulating at the site.

**7. Section 5.1.1, Water Quality Parameters, lines 37-40, page 5-1**

**Permittee Statement:** “Values of Eh below approximately 400 mV in neutral pH waters indicate that perchlorate is susceptible to chemical degradation (Takeno, 2005). Values of Eh below approximately 300 mV in neutral pH waters indicate that nitrate and some nitrogen-based explosive compounds are susceptible to chemical degradation (Takeno, 2005).”

**NMED Comment:** The reference (Takeno, 2005) does not fully support the Permittee’s statement defining degradability of nitrate and perchlorate. Eh-pH diagrams in the reference merely show dominant species by boundary. Either provide additional reference(s) to support the statement or remove the statement from the revised 2016 Report.

**8. Section 5.1.6, Other Volatile Organic Compounds, lines 4-5, page 5-5**

**Permittee Statement:** “No screening levels were identified for petroleum hydrocarbons.”

**NMED Comment:** NMED’s 2015 Risk Assessment Guidance for Investigations and Remediation removed the TPH groundwater standards; however, the updated 2017 Guidance includes TPH standards in Table 6-4. Revise the 2016 Report to include a discussion of the 2017 standards.

**9. Section 5.1.6, Other Volatile Organic Compounds, lines 10-12, page 5-5**

**Permittee Statement:** “The common plastic additive bis(2-ethylhexyl) phthalate may be present in a variety of laboratory and sampling equipment (including sample tubing, pump, bailer, and laboratory equipment) and was detected in samples from four monitoring wells.”

**NMED Comment:** Concentrations of bis(2-ethylhexyl) phthalate in the sample collected from well TMW18 have been consistently present since 2014. The Permittee’s statement is insufficient to justify the presence of the contaminant. Examine each step of the sampling procedure to verify if any variance exists. See Comment 3. In addition, bis(2-ethylhexyl) phthalate was detected from eleven monitoring wells (not four monitoring wells). Revise the 2016 Report to address these issues.

**10. Section 6.1, Summary, lines 12-15, page 6-1**

**Permittee Statement:** “Groundwater in the bedrock appears to flow radially to a potentiometric low south of monitoring well TMW32 in the eastern portion of the Workshop Area and to the west in the western portion of the Workshop Area, with an interpreted geologic feature impeding flow between the two areas.”

**NMED Comment:** The groundwater flow direction may be interpreted differently based on the current groundwater water elevations in bedrock monitoring wells, and the contour maps may be drawn without an interpreted geologic feature. The absence of the contaminants in the western portion of the Workshop Area may also be explained by different assumptions and interpretations. See Comment 5. There are not enough bedrock monitoring wells to adequately define the groundwater flow direction in the bedrock aquifer beneath the Workshop Area. Propose installation of additional bedrock monitoring wells to define the groundwater flow direction in the revised *Supplemental RFI Work Plan* for the northern area groundwater.

**11. Section 6.1, Summary, lines 30-31, page 6-1 and Section 6.2, Recommendations, lines 7-8, page 6-3**

**Permittee Statements:** “The extent of the alluvial nitrate plume is not defined west of the Administration Area.”

and

“Perform additional investigation of the alluvial aquifer nitrate plume to define the western boundary of the plume. The nitrate plume boundaries will be investigated as part of the revised Supplemental RFI.”

**NMED Comment:** The nitrate concentration in the groundwater sample collected from alluvial monitoring well TMW46 was 82 mg/L during the spring 2016 sampling event. No alluvial monitoring well is present within approximately 1,500 feet to the north of TMW46; therefore, the northern extent of alluvial nitrate plume is also not defined. Propose to investigate all undefined nitrate plume boundaries in the revised *Supplemental RFI Work Plan* for the northern area groundwater.

**12. Section 6.1, Summary, lines 12-15 & 31-32, page 6-1**

**Permittee Statements:** “Groundwater in the bedrock appears to flow radially to a potentiometric low south of monitoring well TMW32 in the eastern portion of the Workshop Area and to the west in the western portion of the Workshop Area, with an interpreted geologic feature impeding flow between the two areas.”

and

“The bedrock nitrate plume is also present at the TNT Leaching Beds (SWMU 1) but extends upgradient to the south.”

**NMED Comment:** The groundwater flow direction contradicts in the Permittee’s statements. Revise the 2016 Report to correct the discrepancy.

**13. Section 6.1, Summary, line 38-39, page 6-1 and Section 6.2, Recommendations, lines 9-10, page 6-3**

**Permittee Statements:** “The highest perchlorate concentrations were detected in groundwater samples from the bedrock groundwater unit in the Workshop Area. The northern boundary of the bedrock perchlorate plume has not been defined.”

and

“Perform additional investigation of the bedrock aquifer perchlorate plume to define the northern boundary of the plume.”

**NMED Comment:** The plume boundaries must be investigated by installing additional bedrock monitoring wells. The proposed monitoring wells must be located to define the groundwater flow direction north of well TMW02. See Comment 10. Propose installation of additional bedrock monitoring wells to define the perchlorate plume boundary and groundwater flow direction in the revised *Supplemental RFI Work Plan* for the northern area groundwater.

**14. Section 6.2, Recommendations, line 28, page 6-2**

**Permittee Statement:** “Re-survey the elevations of all bedrock monitoring wells. Wells were surveyed during multiple events, which is believed to have introduced errors into the measured groundwater elevation data and associated groundwater potentiometric surface maps. The mapped groundwater flow directions in the bedrock aquifer conflict with the observed contaminant distributions.”

**NMED Comment:** NMED provided the comment to re-survey all alluvial and bedrock monitoring wells. In the Permittee’s correspondence titled as *Approval with Modifications: Final Groundwater Periodic Monitoring Report, July through December 2015*, dated in November 9, 2016, the Permittee states, “[t]he Army has plans on resurveying all wells during the Northern Area RCRA Facility Investigation field efforts, anticipated to begin in June 2017.” Revise the 2016 Report to include the new survey data for all monitoring wells. In addition, provide an example where the mapped groundwater flow directions in the bedrock aquifer conflict with the observed contaminant distributions in the revised 2016 Report.

The Permittee must submit a revised 2016 Report that addresses all comments contained in this Disapproval. In addition, the Permittee must include a response letter that cross-references

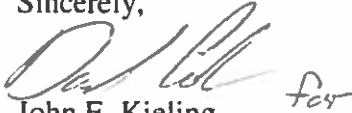


Messrs. Patterson and Smith  
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where NMED's numbered comments were addressed. The Permittee must also submit an electronic redline-strikeout version of the revised 2016 Report showing all changes that have been made to the Report. The revised 2016 Report must be submitted no later than **December 1, 2017**.

Should you have any questions, please contact Ben Wear of my staff at (505) 476-6041.

Sincerely,

  
John E. Kieling *for*  
Chief  
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB  
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File: FWDA 2017 and Reading, Groundwater, FWDA-16-013

