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**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

February 6, 2019

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Fort Wingate Depot Activity  
13497 Elton Road  
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Steve Smith  
USACE  
CESWF-PER-DD  
819 Taylor Street, Room 3B06  
Fort Worth, TX 76102

**RE: DISAPPROVAL  
FINAL PERMITTEE-INITIATED INTERIM MEASURES REPORT  
PARCEL 21  
FORT WINGATE DEPOT ACTIVITY  
MCKINLEY COUNTY, NEW MEXICO  
EPA ID# NM6213820974  
HWB-FWDA-18-008**

Dear Messrs. Patterson and Smith:

The New Mexico Environment Department (NMED) is in receipt of the U.S. Army Fort Wingate Depot Activity (Permittee) *Final Permittee-Initiated Interim Measures Report Parcel 21* (Report), dated September 12, 2018. NMED has reviewed the Report and hereby issues this Disapproval. The Permittee must address the following comments.

**GENERAL COMMENTS**

**1. Electronic Database**

**NMED Comment:** The Permittee failed to include an electronic database that includes all historical data for Parcel 21 in the Report. For all documents that include analytical data, the Permittee must include a searchable electronic file that includes all historical data in a format acceptable to the NMED. Provide the searchable electronic data in the revised Report.

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## 2. Analytical Result Reports

**NMED Comment:** The Report includes Level IV reports from the analytical laboratories. These reports are rarely needed. Provide only Level II analytical laboratory reports with all future submittals. Remove Level IV reports from the revised Report. The Permittee provided large quantities of data with no cross-references between specific samples and their corresponding analytical laboratory reports. For this document alone, the Permittee provided over 14,000 pages of analytical laboratory reports with no reference to where a particular sample can be located. For every document that includes analytical data, provide a cross-reference for each specific sample to a specific lab report filename (if multiple files are provided) or to a page number in the appendix where the specific lab report can be found (if multiple lab reports are combined into one large file). In this Report, the lab reports are combined into several large files; therefore, the Permittee must provide page numbers for the beginning of the laboratory report that contains the sample. This information can be provided in a new table or in the analytical data electronic database.

## 3. ProUCL Output Data Files

**NMED Comment:** The Permittee provided hard copies of ProUCL output data files in Appendices E, H, and M. Hard copies of these files are unnecessary. ProUCL output files must be submitted in electronic format only. Remove all hard copy ProUCL output files from the revised Report and replace them with an electronic version.

## 4. Analytical Table Organization

**NMED Comment:** All detected analytes are presented in one large table format. This practice of presenting the data is a departure from the standard presentation of data in tables based on the analytical group (e.g., individual Tables for VOCs, SVOCs, metals, etc.). Presenting data for all analytes in one table increases review time for a document based on the difficulty of finding a specific analyte for a specific sample. Revise the Report to present data in tables specific to analyte groups as has been performed in the past. This applies to all tables where data are presented in this and all future documents.

## SPECIFIC COMMENTS

### 5. Executive Summary, SWMU 2 – Former Building 515, Acid Holding Pond and Paint Debris Disposal Area, lines 7-8, page ES-2

**Permittee Statement:** “An area where paint was disposed of is also present south of Former Building 515.”

**NMED Comment:** Figure 1-3, *Site Location Map – SWMU 2, SWMU 19, AOC 63, AOC 68, AOC 75, and AOC 60*, does not identify the area where the paint was disposed. Revise this and all relevant figures to depict the Paint Debris Disposal Area.

**6. Executive Summary, SWMU 2 – Former Building 515, Acid Holding Pond and Paint Debris Disposal Area, lines 29-30, page ES-2, lines 17-18, page ES-3**

**Permittee Statements:** “Approximately 811 cubic yards of soil were removed from an excavation measuring approximately 60 feet long by 60 feet by 10 feet deep.”  
and,

“Approximately 8 cubic yards of soil were removed from an excavation measuring 10 feet wide by 10 feet long by 1 foot deep.”

**NMED Comment:** The calculated volume from the measurements (60 feet long by 60 feet by 10 feet deep) is approximately 1,333 cubic yards for Area A. Similarly, the calculated volume from the measurements (10 feet wide by 10 feet long by 1 foot deep) is approximately 3.7 cubic yards for Area B. The estimated volumes indicated in the statements above were calculated from the pre- and post-excavation surveys; however, the volumes from the excavation measurements are notably different. Provide an explanation for the differences between the volumes in the revised Report.

**7. Section 2.2.2, Evaluation of Human Health Risk, lines 3-4, page 2-3**

**Permittee Statement:** “Note that a cumulative risk evaluation is not required for AOCs or SWMUs where only one analyte is identified as a COPC, or where no analytes are detected.”

**NMED Comment:** The statement is not complete. Regardless of the number of contaminants of potential concern (COPCs), it is acceptable to screen out site concentrations as being within background levels. If the site metals concentrations were within background levels, eliminating all COPCs, no risk assessment would be required. Revise the Report accordingly.

**8. Section 2.2.2.2, Selection of Screening Levels, lines 23-26, page 2-3**

**Permittee Statement:** “Direct contact pathway – SSLs for each of the three receptors were considered in the human health risk evaluation, with the exception of arsenic, where NMED is allowing use of the FWDA site-specific background level of 5.6 milligrams per kilogram (mg/kg) (NMED, 2013) in lieu of the NMED SSL for the risk screening step.”

**NMED Comment:** The initial screening step consists of a comparison of the confirmation sample results to remediation goals, in order to assess the need for additional soil removal. According to the previous agreements in 2013, the levels of arsenic were compared to the site-specific background level in lieu of the health-based screening level. The impetus for use of the background level was due to an arsenic screening level being significantly below existing background levels. Since this agreement, changes in the screening level for arsenic have occurred, and the current screening level for arsenic (7.07 milligrams per kilogram, mg/kg) is above the site-specific background (5.6 mg/kg). Use of the background level for the initial screening step is conservative and acceptable. However, for future reports, use of

the health-based screening level may be more appropriate if comparison to background results in an overly conservative retention of arsenic as a COPC.

**9. Section 4.2.1, Supplemental Investigation – Acid Holding Pond, lines 19-20, page 4-3**

**Permittee Statement:** “Groundwater at the Acid Holding Pond will be addressed as part of the site wide groundwater monitoring program.”

**NMED Comment:** In order for NMED to examine and evaluate the site conditions, the Permittee must include all available groundwater analytical results pertinent to the Acid Holding Pond and provide a discussion in the revised Report. In addition, Comment 4 in the May 26, 2015 *Disapproval* states, “groundwater in the vicinity of SWMU 2 has not been evaluated. Propose to sample these existing wells [FW07 and FW08], if groundwater is encountered... If wells FW07 and FW08 remain dry, then the Permittee must propose to drill at least two more monitoring wells in order to investigate groundwater impacts at SWMU-2.” Well TMW57 was proposed to be installed northwest of Building 515 in the *Final Groundwater Supplemental RCRA Facility Investigation Work Plan, Revision 4*, dated March 23, 2018. The installation of Well TMW57 partially satisfies the above comment. Ensure that well TMW57 is installed within or directly adjacent to the northwest boundary of the pond. The referenced work plan above requires only one soil sample to be collected immediately above saturated zone for total chromium analysis; however, soil samples must be collected at five-foot intervals from the excavation floor to the water table. The soil samples must be analyzed for total and hexavalent chromium. If well TMW57 is installed directly adjacent to the northwest boundary of the pond, a separate soil boring must be installed within the pond to collect soil samples at the intervals specified above. Although the Permittee is required to install at least two groundwater monitoring wells, the requirement may be reevaluated after investigating groundwater conditions in well TMW57. If the groundwater in the vicinity of the Acid Holding Pond is found to be affected, the Permittee may be required to submit a work plan to install additional wells. In this case, the additional wells must be installed to delineate the extent of groundwater contamination as a result of historical site operations at the Acid Holding Pond. If the groundwater is not affected, installation of additional wells may not be required.

**10. Section 4.2.3, Removal Activities, lines 30-32, page 4-4**

**Permittee Statement:** “The excavation area is a rectangular-shaped polygon and measured 90 feet by between 135 and 155 feet long, by 1.5 foot deep.”

**NMED Comment:** In the Executive Summary, *SWMU 2 – Former Building 515, Acid Holding Pond and Paint Debris Disposal Area*, the Permittee states, “[a]pproximately 723 cubic yards of soil were removed from an excavation measuring approximately 87 to 91 feet wide by 134 to 159 feet long by 1.5 feet deep.” The statements describing the size of the excavation are slightly different. Revise the statements for consistency or provide a clarification for the difference.

**11. Section 4.2.3, Removal Activities, pages 4-4**

**NMED Comment:** Comment 4 in the May 26, 2015 *Disapproval* states, “information regarding the removal of the drainage pipes must be included. If they have not been removed, then provisions for removal must be incorporated into this Plan.” The Report does not include any discussion regarding the removal of the drainage pipes. Include the discussion in the revised Report.

**12. Section 4.3, Confirmation Sampling, lines, 13-16, page 4-5**

**Permittee Statement:** “The samples were analyzed for VOCs using USEPA Method 8260C, SVOCs using USEPA Method 8270D, PAHs using USEPA Method 8720 SIM, TAL metals using USEPA Method 6010C (7471B for mercury) and hexavalent chromium using USEPA Method 7199.”

**NMED Comment:** the analytical method for hexavalent chromium is cited incorrectly. EPA Method for hexavalent chromium analysis should be referenced as 7196A. Revise all references to the method in the Report, as necessary.

**13. Section 4.5.2.1, Data Used in the Evaluation, lines 11-13, page 4-9**

**Permittee Statement:** “The samples collected at approximately 2.5 and 5-foot bgs from the June 2017 borings represent soil that was removed during the soil removal action, so the results from these samples are excluded from the cumulative risk evaluation.”

**NMED Comment:** The risk evaluation included data from 10, 15 and 20 feet below ground surface (ft bgs) samples collected in June 2017; however, data from 2.5 and 5 ft bgs were excluded. For the risk exposure intervals, the residential and construction worker are only assumed to be exposed to soil up to a depth of 10 ft bgs. Therefore, the data from 15 and 20 ft bgs should not have been included in the risk evaluation. While the data from 10 ft bgs is questionable as to whether these pre-removal data are still representative of post excavation conditions and this depth interval is likely best represented by the confirmation data, the inclusion of the June 2017 data from 10 ft bgs may be retained. Further, an additional sample collected at 25 ft bgs in December 2017 was also included in the risk assessment. Again, this represents soil outside the soil exposure intervals for receptors and should not have been retained in the risk evaluation. Revise the human health risk assessment for Area A of SWMU 2 to exclude all data outside the risk exposure intervals in the revised Report. It should be noted that all data regardless of depth should be retained for the soil-to-groundwater pathway analysis and evaluation of vapor intrusion. The data sets for these evaluations do not appear to require any modification.

**14. Section 4.5.2.3, Conceptual Site Model & Exposure Assumptions, lines 20-24, page 4-10**

**Permittee Statement:** “Previous investigations conducted in 1992, 2014, and 2017 explored to depths as great as 20 feet bgs and determined that soil impacts were present to the

maximum depth explored. Excavation at Area A was conducted to 10 feet bgs to remove soil from the deepest exposure interval for the direct contact pathway for human receptors.”

**NMED Comment:** While exposure risks to contaminants for human receptors are eliminated by excavation of soils to the depth of 10 feet bgs, risk of contaminants migrating from soil to groundwater remains since soil impacts are still present below 20 feet bgs. The vertical extent of soil impacts has not been defined. It is essential to investigate whether groundwater is affected by the soil impacts below 20 feet bgs (see Comment 9).

**15. Section 4.5.2.4, Data Quality Objectives, lines 14-16 and 17-20, page 4-11**

**Permittee Statements:** “Table 4-7A, the quantitation limits were greater than the direct contact screening levels for 10 analytes, none of which were detected and are addressed further in the uncertainty discussion.”

and,

“As illustrated in Table 4-7B, the quantitation limits were greater than the groundwater protection screening levels for 39 analytes, including four metals, 26 SVOCs (excluding PAHs and VOCs having LOQs less than the groundwater protection screening levels from analysis using USEPA Method 8260), and 9 VOCs.”

**NMED Comment:** Quantitation limits that exceed screening levels (SLs) make it impossible for the Permittee to demonstrate, or for NMED to defend, that contamination is not present at unacceptable concentrations at the facility. The Permittee must identify and use analytical laboratories that can achieve appropriate quantitation limits below the SLs. A cursory review of the Department of Defense Environmental Laboratory Accreditation Program (DOD-ELAP) website indicates that there are over 85 DOD-ELAP certified analytical laboratories. The Permittee must solicit limit of quantitation (LOQ) values from additional laboratories for all analytes where their current lab LOQ values exceed the screening levels.

**16. Section 4.5.2.6, Metals Background Evaluation, lines 14-16, page 4-12**

**Permittee Statement:** “The metals background evaluation considered the results for metals that were detected [sic] soil remaining after excavation activities were completed. These results are the June 2017 boring samples from 10 feet and greater, and the August and December 2017 confirmation samples.”

**NMED Comment:** Since data collected from greater than 10 ft bgs are outside the soil exposure intervals for the human health risk assessment, the site attribution analysis must not include data collected from greater than 10 ft bgs (see Comment 13). The comparison of data to background levels is used as a refining tool for determining constituents of potential concern for evaluation in the risk assessment. Inclusion of extraneous data could result in overly conservative retention of metals in the risk assessment. Revise the background comparisons to only include post excavation data up to 10 ft bgs. Revise the Report accordingly.

**17. Section 4.5.2.6, Metals Background Evaluation, lines 34-35, page 4-12**

**Permittee Statement:** “The range of concentrations in the sample data set for the remaining 10 metals was compared to the range of concentrations in the FWDA site-specific background data set.”

**NMED Comment:** Metals that had maximum detections above the background reference values were compared to the range of background concentrations. Section 2.8.3.2 of the *NMED Risk Assessment Guidance for Investigations and Remediation Volume I (Guidance)* states, “[a] simple comparison to the range of background is not acceptable. Background can vary across a site (especially larger sites) and not allow for soil type to be taken into consideration. Further, a range can mask low level contamination.” If the site maximum is greater than the background reference value, additional analysis may be conducted through statistical analyses comparing the distributions of the data sets. Revise the risk assessment to either 1) retain all COPCs that had maximum concentrations that exceeded the background reference value or 2) conduct the appropriate statistical tests in accordance with Step 2 of Section 2.8.3.2 of the Guidance. Revise the Report accordingly.

**18. Section 4.5.2.7, Initial Cumulative Risk Evaluation, lines 31-34, page 4-13**

**Permittee Statement:** “As presented in Table 4-9C, the estimated total cancer risk of  $1 \times 10^{-4}$  is greater than the NMED target risk threshold of  $1 \times 10^{-5}$ . The carcinogenic analytes contributing the majority of the unacceptable risk are hexavalent chromium and benzene. These analytes were carried forward to the refined cumulative risk evaluation.”

**NMED Comment:** For the soil-to-groundwater screening analyses, risks were calculated using constituent-specific concentrations in the subsurface and the soil screening level (SSL) values for a dilution attenuation factor (DAF) of 20 taken from the 2017 Guidance. The SSLs address the potential leaching of contaminants from the vadose zone to groundwater and incorporate chemical and physical properties of the constituents. The soil-to-groundwater SSLs are not truly risk-based numbers; therefore, estimations of risk must not be conducted and must not be included in cumulative risk/hazard estimates. Rather than estimating risk, soil contaminant concentrations must be compared directly to the soil-to-groundwater screening levels to determine if the subsurface soil contamination has the potential to act as a source of contamination for groundwater. If the site concentration is greater than the appropriate SSL, additional investigation is necessary to evaluate potential leaching and migration to groundwater in excess of NMED groundwater protection criteria. Refinements of the soil-to-groundwater pathway do not include evaluation on a target organ-specific basis; again, the soil-to-groundwater SSLs are not evaluated as risk-based numbers and comparison of risk by target organ is inappropriate. Section 4.3 of the 2017 Guidance allows the use of the least conservative SSL for the initial SSL evaluation (this may be based on a water quality parameter, a contaminant limit or drinking water standard). Revise all text and associated tables in the revised Report, removing all estimates of risk/hazard for the soil-to-groundwater pathway. In addition, revise the discussion of the soil-to-groundwater screening in terms of point comparisons and the identification of constituents that exceed the corresponding SSLs. Where SSLs are exceeded, additional evaluation following Section 4.3

of the 2017 Guidance is required. This comment also applies to Sections 4.7.2.7, 5.7.2.6, 5.7.2.7.1, 7.7.2.6, and 7.7.2.7.1.

**19. Section 4.5.2.8.2, Refinement 2 – Lines-of-Evidence Discussion (Lead), page 4-16**

**Permittee Statement:** “The range of lead concentrations in the sample set were within the range of lead concentrations in the FWDA site-specific background data set (16.9 mg/kg) in 20 of 34 samples.”

**NMED Comment:** This section was included as the result of the soil-to-groundwater assessment indicating that a revised exposure point concentration was greater than the screening level. As noted in Comment 18, estimations of exposure risk based on the soil-to-groundwater screening analysis must not be conducted. In addition, comparison to the range of background is not an acceptable approach to demonstrate that a contaminant is reflective of natural levels, as noted in Comment 17. Rather, a statistical comparison of site lead levels to background should have been conducted. In lieu of comparison to the range of background, other lines of evidence must be presented to show that the low levels of lead in soil do not present a risk for migration to groundwater (similar to those presented for hexavalent chromium). Revise the Report to include additional lines of evidence to support lead not being a threat to groundwater via vertical migration. This comment also applies to Section 4.7.2.8.2.

**20. Section 4.5.2.8.3, Refinement 3 – Lines-of-Evidence Discussion (Hexavalent Chromium), lines 6-8, page 4-16**

**Permittee Statement:** “Area A is in a desert setting which has low average precipitation and high evaporation rates that limit the influence of infiltrated rainwater as a possible water source that could mobilize and transport hexavalent chromium.”

**NMED Comment:** Although total annual rainfall is low, rainfall often comes intensely in a short period of time in New Mexico (e.g., monsoon season). As a result, water on the surface may not evaporate immediately and the runoff may pool or follow the least resistant pathways and infiltrate into the subsurface. The intense rainfall may accelerate migration of contaminants from soils to groundwater. Contaminants have migrated from surface/shallow soils to the water table at various sites within FWDA. Reevaluate the risk and correct the statement in the revised Report.

**21. Section 4.5.2.8.3, Refinement 3 – Lines-of-Evidence Discussion (Hexavalent Chromium), lines 13-16, page 4-16**

**Permittee Statement:** “Groundwater is relatively deep, occurring between 50 to 70 feet bgs. This is a large separation distance between the shallow soil horizon that contained the historical source of hexavalent chromium, and the medium through which exposure could potentially occur.”



**NMED Statement:** Groundwater monitoring wells are not present in the vicinity of the acid Holding Pond at this time; therefore, the accuracy of the statement must be verified when well TMW57 is installed. An existing well TMW37 screened in the bedrock is located nearby east of building 515. The historical groundwater depths of well TMW37 have been slightly less than 50 feet bgs. Revise the Report accordingly.

**22. Section 4.5.2.8.3, Refinement 3 – Lines-of-Evidence Discussion (Hexavalent Chromium), lines 36-39, page 4-16**

**Permittee Statement:** “The results show that hexavalent chromium concentrations decrease with increasing depth (Table 4-10C) and demonstrate that soil conditions are not contributing to changes in hexavalent chromium mobility or preferential distribution in the subsurface.”

**NMED Comment:** The statement is not accurate. According to Table 4-10C, *SWMU 2 – Former Building 515 – Area A Vertical Trends in Chromium Concentrations*, the hexavalent chromium concentration in soil sample 2102B515SB04-15D-SO collected at a depth of 15 feet bgs is recorded as 0.418 mg/kg while the concentration in soil sample 2102B515SB04-20D-SO collected at a depth of 20 feet bgs is recorded as 1.02 mg/kg. These samples were collected from the same boring and the hexavalent chromium concentration in soil sample at the depth of 20 feet bgs was higher than the concentrations detected in shallower soils. Revise the Report for accuracy.

**23. Section 4.5.2.8.3, Refinement 3 – Lines-of-Evidence Discussion (Hexavalent Chromium), lines 9-11, page 4-17**

**Permittee Statement:** “The results of the SPLP testing are presented in Table 4-3 and indicate that hexavalent chromium was not detected in leachate generated from the five bottom samples.”

**NMED Comment:** Table 4-3, *SWMU 2 – Former Building 515 – Area A Additional Bottom Confirmation Sample Results – Detections Only (December 2017)*, only presents detected analytes and their concentrations. All hexavalent chromium concentrations presented in Table 4-3 exceeded the soil-to-groundwater screening level. The Permittee states that the hexavalent chromium concentrations were not detected in the Synthetic Precipitation Leaching Procedure (SPLP) testing. However, since Table 4-3 only presents detected analytes, analytes that were not detected cannot be presented. Accordingly, the results of the SPLP testing is not presented in Table 4-3. Revise the statement and include a separate table that summarizes the results of the SPLP testing and reference all laboratory reports presenting the results of the SPLP testing in the revised Report.

**24. Section 4.5.2.8.3, Refinement 3 – Lines-of-Evidence Discussion (Hexavalent Chromium), lines 18-25, page 4-17**

**Permittee Statement:** “The results of a grain size study performed on samples collected from the base of the excavation in December of 2017 indicated that soils at the base of the

excavation at Area A are comprised of greater than 97% silt and clay, and soils at 25 feet bgs are comprised of approximately 38% fine sand and approximately 60% silt and clay (Table 4-4). These grain size results are indicative of a soil that behaves like an aquitard (i.e. having a low permeability likely in the range of  $10^{-4}$  to  $10^{-10}$  centimeters/second) and would minimize vertical migration toward the water table (Fetter, 1994, Table 2.2)."

**NMED Comment:** The deeper soils at a depth of 25 feet bgs consist of coarser grains. Once contaminants reach depths where coarser sediments are present, the rate of vertical migration is likely to be higher. Revise the statement for accuracy.

**25. Section 4.5.2.10, Uncertainty Discussion, lines 1-4, page 4-22**

**Permittee Statement:** "As discussed in Section 4.5.2.4 and shown on Table 4-7B, 37 analytes that were not detected and had LOQs greater than the groundwater protection screening levels, after eliminating PAHs and VOCs analyzed by multiple methods and for which the LOQs were less than the screening level for one of the two methods. These 37 analytes were not retained as COPCs."

**NMED Comment:** The discussion to eliminate the analytes may only be allowed in Uncertainty Discussion unless the issue is resolved by the actions required by Comment 15. Revise the Report accordingly.

**26. Section 4.5.3.1, Data Used in the Evaluation, lines 1-3, page 4-25, and Section 4.5.3.5, Tier 1 Ecological Risk Evaluation, lines 23-24, page 4-26**

**Permittee Statements:** "Bottom confirmation samples were not used because they were collected below 10-foot bgs. Likewise, boring sample results also were not used because those samples from soil remaining in place also were collected below 10 feet bgs."  
and,  
"Bottom samples are not included because they were collected below 10 feet bgs and are outside of the exposure interval of 0-10 feet for deep-rooted plants."

**NMED Comment:** Confirmation data from the bottom of the excavation area were not used, as it is stated the data are from a depth of greater than 10 ft bgs. This statement is inconsistent with the evaluation of data and depths of bottom excavation area confirmation data discussed for the human health risk assessment. According to the human health risk assessment and Sections 4.2.3 and 4.3 of the Report, the confirmation data collected at 10 ft bgs were deemed appropriate for use in the human health risk assessment. Therefore, the bottom confirmation data should have been retained for the ecological risk assessment. Revise the ecological risk assessment accordingly.

**27. Section 4.6.2.3, Conceptual Site Model & Exposure Assumptions, lines 26-28, page 4-33**

**Permittee Statements:** "Previous investigations conducted in 2010 explored to a depth of

1.5 foot bgs and determined that soil impacts were present to a depth of 1 foot bgs.”

**NMED Comment:** Figure 4-1 depicts previous sampling locations within the footprint of building 515 (SB03, SB04 and SB05). The results of the previous sampling events are not included in the Report. Include an electronic database that contains all historical data in the revised Report. Refer to Comment 1.

**28. Section 4.7.1, Preliminary Exposure Pathway Analysis – Human and Ecological Receptors, lines 35-37, page 4-36**

**Permittee Statement:** “The beef ingestion pathway is not complete for SWMU 2, Area C because the acreage for Area C excavation is 0.081 acres, which is insufficient acreage to support beef cattle.”

**NMED Comment:** While the beef ingestion pathway was evaluated, the area of SWMU 2 was divided into Areas A, B, and C. Although each area in SWMU 2 is not contiguous, cattle may freely cross the boundaries of each area. Therefore, Areas A, B, and C in SWMU 2 must be evaluated altogether for the beef ingestion pathway. Revise the Report accordingly.

**29. Section 4.7.2.1, Data Used in the Evaluation, lines 34-38, page 4-37**

**Permittee Statement:** “The risk evaluation for SWMU 2, Area C used the results of confirmation soil samples collected on August 22, 2017 (29 samples and two duplicates) and October 4, 2017 (19 samples and two duplicates). Re-sampling for VOCs was conducted on November 8, 2017 at the same locations sampled on October 4. Twelve samples and one duplicate were collected at depths greater than 1 foot bgs and 34 samples and three duplicates were collected at less than 1 foot bgs.”

**NMED Comment:** The numbers of sidewall and bottom excavation confirmation samples collected from Area C are described as 31 and 15, respectively, in Section 4.3. The number of the samples does not appear to match the numbers provided above. Correct or provide an explanation for the discrepancy. In addition, the above statement requires clarification. The Permittee states, “[t]welve samples and one duplicate were collected at depths greater than 1 foot bgs and 34 samples and three duplicates were collected at less than 1 foot bgs.” It is not clear whether the statement references the November 8, 2017 sampling activity or all sampling activities conducted in 2017. Furthermore, the purpose of the November 8, 2017 sampling for VOC analysis at the same locations where samples were collected on October 4, 2017 is unclear. Provide an explanation for the purpose of the November 8, 2017 VOC sampling in the revised Report.

**30. Section 4.7.2.3, Conceptual Site Model & Exposure Assumptions, lines 27-30, page 4-38**

**Permittee Statement:** “The source of COPCs at Area C is from surficial disposal of paint debris from painting operations that occurred at Former Building 515. Previous investigations conducted in 2010 explored to depths of 1-foot bgs and determined that soil

impacts were present to a depth of 1 foot, particularly below an area of dried paint.”

**NMED Comment:** The disposed paint debris may have contained lead-based paint liquids and sludges. The contaminants may have penetrated the subsurface to depths greater than one foot bgs. Photograph No. 4-15 depicts a buried paint container in Area C, suggesting potential impacts at a depth greater than the maximum depth of excavation at five feet bgs. If soils to depths of 20 feet bgs were previously investigated at the site, provide the results (see Comments 1 and 27). Otherwise, propose to submit a work plan to install soil borings to the depths of 20 feet bgs at the site to delineate vertical extent of contamination in the revised Report.

**31. Section 4.7.2.3, Conceptual Site Model & Exposure Assumptions, lines 5-7, page 4-39**

**Permittee Statement:** “The results from sample 2102B515CEC15-0.0-0.5D-SO were excluded from the risk evaluation because this sample was removed during over-excavation to address screening level exceedances.”

**NMED Comment:** Sample 2102B515CEC14-0.0-0.5D-SO was collected from the same area shown on Figure 4-3. Explain whether sample 2102B515CEC14-0.0-0.5D-SO was included or excluded in the risk evaluation. The sample appeared to be collected from the same over-excavated area where the results from sample 2102B515CEC15-0.0-0.5D-SO were excluded. In comparison to the figures showing progression of multiple excavations for SWMU 19 and AOC 68, the figures depicting soil removal areas for SWMU 2 (e.g., Figure 4-3) lack clarity and organization. The figures did not indicate 1) which areas were over-excavated and 2) to what extent of the depths the soils were excavated. Provide additional figures for clarity in the revised Report. Refer to Comment 55. In addition, it is not clear which confirmation sample locations were over-excavated or whether confirmation samples were collected from the final excavation. The Permittee must indicate which confirmation sampling data represent initial and secondary excavation activities.

**32. Section 4.7.2.6, Metals Background Evaluation, lines 32-35, page 4-40**

**Permittee Statement:** “Four of the eight metals had a range of concentrations that fell within the range of concentrations from the FWDA site-specific background data set: 1) arsenic, 2) barium, 3) cobalt, and 4) total chromium. These four metals were not retained as COPCs and were not evaluated further.”

**NMED Comment:** Metals that had maximum detections above the background reference values were compared to the range of background concentrations. Four metals were eliminated as COPCs based on this analysis. As stated in Section 2.8.3.2 of the Guidance, “[a] simple comparison to the range of background is not acceptable. Background can vary across a site (especially larger sites) and not allow for soil type to be taken into consideration. Further, a range can mask low level contamination.” If the site maximum is greater than the background reference value, additional analysis may be conducted through statistical analyses comparing the distributions of the data sets. Revise the risk assessment to either 1)

retain all COPCs that had maximum concentrations that exceeded the background reference value or 2) conduct the appropriate statistical tests per Step 2 of Section 2.8.3.2 of the Guidance. Refer to Comment 17.

**33. Section 4.7.2.6, Metals Background Evaluation, lines 36-37, page 4-40, and lines 1-5, page 4-41**

**Permittee Statement:** “Lines of evidence are presented below for each of the four metals retained for further evaluation. The lines of evidence indicate how many samples had concentrations greater than the FWDA site-specific background level (i.e. the 95% upper tolerance limit), and how many samples had concentrations greater than the range of concentrations in the FWDA site-specific background data set by comparison to the maximum concentration in the FWDA site-specific background data set. The frequency of exceedance and magnitude of exceedance form the basis for determining if the metal was retained as a COPC.”

**NMED Comment:** Metals that had maximum concentrations greater than background and fell outside the range of background were further evaluated using frequency and magnitude of exceedance of background to determine if it should be retained as a COPC. As stated in previous comments, the Guidance must be followed in conducting site attribution analysis. If the maximum detected concentration is greater than the background reference value, statistical comparisons must be conducted. As none of the four metals assessed using the frequency and magnitude analysis were eliminated and retained as COPCs, no changes are needed to this Report. However, for future documents, this line of evidence would not be considered as an adequate substitute for the required statistical comparisons.

**34. Section 5.1, Previous Investigation, lines 25-26, page 5-1**

**Permittee Statement:** “Aroclor 1260 was detected in soil from both ISM sampling areas concentrations below the 2009 NMED SSL and no other PCB Aroclors were detected.”

**NMED Comment:** NMED’s Comment 10 in the February 6, 2018 *Disapproval for Final RCRA Facility Investigation Work Plan, Parcel 2, Revision 1*, states, “[t]he reported constituent concentrations for incremental samples must be multiplied by the number of subsamples in each decision unit to evaluate for the presence of hot spots.” Since 28 discrete soil samples were collected from the same incremental soil sampling areas during the Phase 2 investigation, it is not necessary to reevaluate the incremental sampling method (ISM) data. However, site concentrations in ISM samples must be multiplied by the number of subsamples for initial comparison to SSLs as directed in the future.

**35. Section 5.4, Waste Profile Sampling and Disposal, lines 26-27, page 5-2**

**Permittee Statement:** “Samples were submitted for analysis for PCBs, PAHs, SVOCs, RCRA 8 Metals, VOCs, and TPH DRO/ORO.”

**NMED Comment:** The analytical results for PCBs and TPH DRO/ORO were included in Appendix F. However, the analytical results for PAHs, SVOCs, metals, and VOCs were not included. If copies of these waste profile laboratory reports are included in the Report, provide a reference to the applicable appendices; otherwise, provide all missing waste profile laboratory reports in the revised Report.

**36. Section 5.7.2.7.2, Refinement 2 – Lines of Evidence Discussion, lines 5-7 and 22-24, page 5-11**

**Permittee Statements:** “This [PCB exceedances in soil samples 2119B501CEC06-0.0-0.5D-SO and 2119B501CEC-21D-SO] is an isolated exceedance and given the magnitude of soil removal conducted at SWMU 19 is not considered representative of the SWMU as a whole.”

**NMED Comment:** The PCB exceedances were observed throughout SWMU 19 at the same depth of two feet bgs. Although the Permittee states that the exceedances are isolated, the exceedances appear to be consistent with other sampling results at the site. Remove the statement from the revised Report.

**37. Section 5.7.2.7.2, Refinement 2 – Lines of Evidence Discussion, lines 35-38, page 5-11**

**Permittee Statement:** “The results of the second refinement to the cumulative risk evaluation indicate that additional soil removal is warranted to address the estimated unacceptable cancer risks through the direct contact and soil-to-groundwater pathways associated with a concentration of Aroclor 1260 of 38 mg/kg at sample location 2119B501CEC06-0.0-0.5D-SO.”

**NMED Comment:** NMED concurs that additional soil removal is warranted from the vicinity of sample location 2119B501CEC06-0.0-0.5D-SO. However, Photograph 5-12 shows that the area appears to be completely backfilled. Clarify whether the area still remains as an open excavation in the revised Report. If the area has been already backfilled, the fill material must be removed at the time of excavation. In addition, the Aroclor 1260 concentration in sample 2119B501CEC-21D-SO remains above the soil-to-groundwater screening level. Provide a justification for leaving the exceedance at the site; otherwise, the Permittee must also propose to remove surrounding soils in the vicinity of sample 2119B501CEC-21D-SO and collect step-out and deeper confirmation samples. Furthermore, although the Permittee asserts that the risk of PCB leaching potential from soil to groundwater is minimal, the risk must be evaluated because various contaminants have migrated from soil to groundwater at other sites despite the same lines of evidence provided in this section. Alluvial well TMW13 is located downgradient of SWMU 19. Propose to collect a groundwater sample from well TMW13 for PCB analysis in the Facility-Wide Groundwater Monitoring Plan. If PCBs are not detected in two consecutive future sampling events, PCB analysis may be discontinued.

**38. Section 5.7.4, Risk Evaluation Summary, lines 28-30, page 5-16**

**Permittee Statement:** "Evaluation of potential cancer risks assuming the area of soil around sample 2119B501CEC06-0.0-0.5D-SO is removed as part of a future soil removal action effectively demonstrates a risk reduction to acceptable levels below the NMED target risk threshold for each pathway."

**NMED Comment:** Even if the soils are removed in the future, unacceptable risks may still remain because the extent of contamination is not delineated. Evaluate the risks once all soil removal is complete at the area around sample location 2119B501CEC06-0.0-0.5D-SO. At this time, the removal action is not implemented; therefore, it is premature to state that the future soil removal demonstrates a risk evaluation to acceptable levels. Revise the Report accordingly.

**39. Section 5.7.4, Risk Evaluation Summary, lines 33-34, page 5-16**

**Permittee Statement:** "No volatile COPCs were detected in soil, and as such no further evaluation of the vapor intrusion pathway is warranted."

**NMED Comment:** The statement is misleading. VOC analysis was not conducted on soil samples collected from SWMU 19. The only analytes tested for were PCBs. Revise the Report for clarification.

**40. Section 6.1, Previous Investigations, lines 15-20, page 6-1**

**Permittee Statement:** "The 2011 RFI Report (TPMC, 2011) noted that an explosive constituent, 2,4-DNT, was present in concentrations of 230 and 16.7 mg/kg in two soil samples (B509SO001 and 2163B50964B510SS07-1.0D-SO) exceeding the 2009 NMED SSLs. One PCB, Aroclor 1254, was also present at a concentration of 2.3 mg/kg in sample B509SS001 above the 2009 NMED SSL. Sample B509SS001 was collected west of former Building 509 and sample 2163B50964B510SS07-1.0D-SO was collected southwest of former Building 509."

**NMED Comment:** There are multiple discrepancies in the statement. First, soil sample 2163B50964B510 SS07-1.0D-SO is identified as 216350964B510SS07-1.0D-SO in Figure 6-2, *AOC 63 – Exceedance Area Map*. The same sample also appears to be identified as 510SS07 in Figure 6-1, *AOC 63 – Previous and Phase 2 Sample Location Map (September 2014)*. Resolve the discrepancies in the revised Report. Second, the 2,4-dinitrotoluene concentration in soil sample 216350964B510SS07-1.0D-SO is recorded as 16.0 mg/kg in Figure 6-2, rather than 16.7 mg/kg. Correct the discrepancy in the revised Report. Third, sample B509SO001 is identified as B509SSO001 and B509S0001 in Figures 6-2 and 6-1, respectively. Correct the discrepancies in the revised Report. Similarly, sample B509SS001 is identified as B509SSO001 and B509S0001 in Figures 6-2 and 6-1, respectively. Revolve the discrepancies in the revised Report. Finally, there is another sample location identified as 509SS01 in Figure 6-1. The sample location 509SS01 is depicted at a location north of

building 510 in Figure 6-1. Clarify whether the PCB exceedance was detected from the same sample location labeled as B509S0001 in Figure 6-1, where the 2,4-dinitrotoluene concentration was recorded as 230 mg/kg, or from the sample location 509SS01 depicted at the location north of building 510 in Figure 6-1. Provide clarification in the revised Report. If the latter case represents actual field investigation, the Permittee must propose to submit a work plan to investigate the extent of PCB contamination in the vicinity of sample location 509SS01 in the revised Report.

**41. Section 6.2, RCRA Facility Investigation Phase 2, lines 30-33 and 37-38, page 6-1 and line 1, page 6-2**

**Permittee Statements:** “The Army established three additional soil sample locations, 10 feet horizontally to the north, west, and south from sample B509SO001. The soil samples were collected from the 0 to 0.5-foot and 1 to 1.5-foot depth intervals at each location and analyzed for explosives using USEPA Method 8330B.”

and,

“The soil samples were collected from the 0 to 0.5-foot, 1 to 1.5-foot, and 2 to 2.5-foot bgs depth intervals and analyzed for explosives using USEPA Method 8330B.”

**NMED Comment:** Method 8330B was used for explosive compound analysis. This method is appropriate for ISM samples. However, these soil samples were discrete samples. Method 8330A is more appropriate for explosive compound analysis in discrete soil samples. Justify why Method 8330B is acceptable for explosive compound analysis for discrete samples. If the data collected using Method 8330B are found to be unacceptable for discrete samples, propose to recollect discrete confirmation samples for explosive compound analysis using Method 8330A. This comment is also applicable to Sections 6.5, 7.2, and 7.5.

**42. Section 6.5, Confirmation Sampling, lines 8-10, page 6-3**

**Permittee Statement:** “The analytical results indicated that contaminant concentrations exceeded the human health screening levels for the soil to groundwater pathway in three samples from Area A (2163B509AEC-0.0-0.5D-SO, 2163B509AEC-03D-SO and 2163B509AEC-04D-SO).”

**NMED Comment:** Clarify whether the contaminant concentrations exceeded the human health screening levels or soil-to-groundwater screening levels. As noted in Comment 18, the soil-to-groundwater SSLs are not truly risk-based numbers; therefore, estimations of risk must not be conducted and must not be included in cumulative risk/hazard estimates. Revise the Report accordingly.

**43. Section 6.7.2.1, Data Used in the Evaluation, page 6-6, and Table 6-1, AOC 63 Confirmation Samples Results – Detections Only (August and December 2017)**

**NMED Comment:** It is unclear what data were used in the risk assessment. The text indicates that seven primary samples were collected in August 2017 and an additional nine



samples were collected in December 2017 with three of these samples being excluded due to additional soil removal. This equates to 13 soil results for risk analysis. The text discusses 16 samples (minus two for rejections) for explosives and seven samples for PCBs. However, Table 6-1 includes detections. While three results are highlighted as being above screening levels, these data were not evaluated as they were removed. Samples 2163B509AEC-03D-SO, 2163B509AEC-04D-SO, 2163B509AEC-04D-SO-DUP, and 2163B509AEC-0.0-0.5D-SO were removed, but they appear to be listed as confirmation data. Resolve the discrepancy and revise the text to clarify what data are used as confirmation data. Additionally, revise Table 6-1 for clarity.

**44. Section 7.2, RCRA Facility Investigation Phase 2, lines 22-23, page 7-1**

**Permittee Statement:** “Six additional soil samples were collected 10 feet horizontally and to the north, east, and south directions from the B514SO001 location.”

**NMED Comment:** No soil samples were collected from the location west of B514SO001 during previous investigations; however, the Permittee did not collect any soil samples from west of B514SO001 during the Phase 2 investigation. Provide justification for not collecting soil samples west of B514SO001 during the Phase 2 investigation in the revised Report.

**45. Section 7.3, Removal Activities, lines 36-37, page 7-1, line 1, page 7-1**

**Permittee Statement:** “Approximately 120 cubic yards of soil surrounding sample location B514SO001 was removed on August 16, 2017, December 15, 2017 and January 18, 2018 shown in Photographs 7-1 through 7-3 and on Figure 7-3.”

**NMED Comment:** Figure 7-3 only shows the area excavated in August 2017 while Figures 7-4 and 7-5 show the areas excavated in December 2017 and January 2018, respectively. Revise the Report for accuracy.

**46. Section 7.5, Confirmation Sampling, lines 29-31, page 7-2**

**Permittee Statement:** “The analytical results from the 17 secondary removal confirmation samples indicated that contaminant concentrations exceeded screening levels in one confirmation sample from the secondary removal area (2168S514EC-15D-SO).”

**NMED Comment:** Revise the statement for clarity. The referenced sample is likely 2168B514EC-15D-SO rather than 2168S514EC-15D-SO. Correct the typographical error in the revised Report. In addition, according to Table 7-1, *AOC 68 Confirmation Samples Results – Detections Only (August and December 2017, January 2018)*, the RDX concentrations exceeded the soil-to-groundwater screening level in 15 secondary removal confirmation samples. Indicate the types of screening levels exceeded in soil sample 2168B514EC-15D-SO. Provide a clarification in the revised Report.

**47. Section 7.5, Confirmation Sampling, lines 1-2, page 7-3**

**Permittee Statement:** “A total of six bottom confirmation samples characterize the base of the excavated area (approximately 1 sample per 195 square feet).”

**NMED Comment:** According to Table 7-1, seven bottom confirmation samples, 2168B514EC02-0.0-0.5D-SO, 2168B514EC03-0.0-0.5D-SO, 2168B514EC04-0.0-0.5D-SO, 2168B514EC05-0.0-0.5D-SO, 2168B514EC06-0.0-0.5D-SO, 2168B514EC-1.0-1.5D-SO, and 2168B514EC-0.0-0.5D-SO, excluding duplicates, appear to be used for the characterization of the excavated area. Revise the Report for accuracy, if necessary.

**48. Section 7.5, Confirmation Sampling, lines 3-7, page 7-3**

**Permittee Statement:** “The number of confirmation sidewall samples deviates from the work plan in that there is one sidewall sample missing on the northern most portion of the secondary removal area. What would have been sample 2168B514EC-06D-SO was broken during transport to the laboratory. This deviation was inadvertently not identified until preparation of this report.”

**NMED Comment:** The contamination associated with explosive compounds may remain at the location where the collected confirmation sample was not analyzed. In the revised Report, propose to include collection of one sidewall confirmation sample from the northern-most portion of the secondary removal area in a future work plan. Ensure that native soil is collected rather than backfill at the time of sample collection.

**49. Section 7.7.2.7.2, Refinement 2 – Lines-of-Evidence Discussion, lines 32-34, page 7-9**

**Permittee Statement:** “This second refinement provides multiple lines of evidence to demonstrate that vertical migration of RDX and nitroglycerin in soil at concentrations of concern is unlikely to occur.”

**NMED Comment:** The explosive compound concentrations have not been detected in groundwater samples collected from alluvial well TMW15 located within AOC 68. However, the Permittee must continue to monitor explosive compounds in well TMW15 because explosive compound concentrations that exceed the soil to groundwater SLs still remain in shallow soils. Propose continued monitoring in the revised Report.

**50. Section 8.0, Summary and Conclusions, AOC 68 - Former Structure 514, lines 13-16, page 8-3**

**Permittee Statement:** “There is the potential for unacceptable cancer risks and unacceptable noncancer hazards through the soil to groundwater pathway if explosive compounds (RDX and nitroglycerin) were to migrate from soil to groundwater, with groundwater then used as a source of potable water supply.”

**NMED Comment:** According to Table 7-1, the concentrations of HMX in sample 2168B514EC-15D-SO and 1,3-dinitrobenzene in sample 2168S514EC-03D-SO also exceeded the soil-to-groundwater screening levels. Clarify whether the risk associated with the exceedances of HMX and 1,3-dinitrobenzene have been eliminated by excavation. Provide clarification in the revised Report. If the risk still remains, revise the Report to address the exceedances of HMX and 1,3-dinitrobenzene as well.

**51. Section 8.0, Summary and Conclusions, lines 30-31, page 8-3**

**Permittee Statement:** “The Army is recommending no further investigation or corrective action for the soils at SWMU 2, AOC 63 or AOC 68.”

**NMED Comment:** Additional investigations are warranted at SWMU 2 as directed by Comments 9 and 30, AOC 63 as directed by Comment 40, and AOC 68 as directed by Comment 48 and 49. Revise the Report accordingly.

**52. Table 4-1, SWMU 2 – Former Building 515 – Area A Boring Sample Results (June**

**NMED Comment:** Some analytes detected in the samples were not reported on the table (e.g., acetone). Explain why some analytes are not listed on the table or include all detected analytes in the table. Revise the Report accordingly. This comment also applies to other sections of the tables where analytical data is presented.

**53. Table 4-6, SWMU 2 – Former Building 515 – Area C, Confirmation Sample Results – Detections Only (August, October, November 2017)**

**NMED Comment:** Some sample identification (ID) nomenclature in Table 4-6 have a designation of “RE” (e.g., 2102B515CEC-31D-SO-RE). The designation “RE” is not defined in the table. Provide the definition for “RE” in the revised Table 4-6.

**54. Table 4-10C, SWMU 2 – Former Building 515 – Area A Vertical Trends I Chromium Concentrations**

**NMED Comment:** The sample ID nomenclature for all boring samples at 2.5- and five-foot depth intervals present incorrect sampling depths indicating 15 feet bgs (e.g., 2102B515SB01-15D-SO) in Table 4-10C. The sample ID must be corrected to present appropriate sampling depths. For example, the sample ID for boring 2102B515SB01 at a depth of 2.5 feet bgs must be identified as 2101B515SB01-2.5D-SO rather than 2102B515SB01-15D-SO. Correct the table in the revised Report.

**55. Figure 4-3, SWMU 2 – Soil Boring, Soil Removal Area and Excavation Confirmation Sample Location Map**

**NMED Comment:** The figure depicts sampling locations without a clear indication of sampling depths within Area C. Three areas where buried paint containers were discovered

were excavated to depths between one and five feet bgs; however, actual depths were not indicated. For example, the sampling location 2102B515CEC15-0.0-0.5D-SO was over-excavated to address screening level exceedances. However, the extent and depth of the over-excavated area are not clearly depicted. Separate figures similar to Figures 5-3 through 5-7 must be prepared to demonstrate the progression of excavation and confirmation sampling. Revise the Report accordingly. Refer to Comment 31.

**56. Figure 5-6, SWMU 19 – Final Excavation Areas and Confirmation Sample Location Map (January 2018)**

**NMED Comment:** The contaminated soils were removed to the depth of two feet bgs from the final removal area defined by sidewall excavation confirmation samples 02, 11, 16 and 17 in Area C. However, bottom excavation confirmation samples were not collected from the area according to the figure. Provide justification for why samples were not collected from the base of the excavation; otherwise, propose to submit a work plan to collect samples from the base of excavation in the revised Report.

**57. Figure 6-2, AOC 63 – Exceedance Area Map**

**NMED Comment:** There is a typographical error in Figure 6-2. Aroclor was spelled incorrectly (Arclor). Correct the typographical error in the revised Report.

**58. Appendix B, SWMU 2 – Former Building 515 Laboratory Report Summaries, pages 6 and 7 of 1,396**

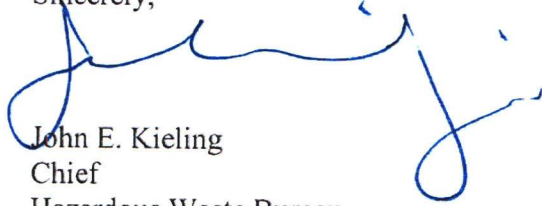
**NMED Comment:** Three aqueous samples (2101-EB01-D, 2101-EB02-D, and 2101-EB03-D) are listed in the chain of custody form. The Report does not provide any discussion or explanation regarding the aqueous samples. Provide a discussion and explanation for the aqueous samples in the revised Report.

The Permittee must submit a revised Report that addresses all comments contained in this Disapproval. In addition, the Permittee must include a response letter that cross-references where NMED's numbered comments were addressed. The Permittee must also submit an electronic redline-strikeout version of the revised Report showing all changes that have been made. The revised Report must be submitted no later than **June 30, 2019**.

Messrs. Patterson and Smith  
February 6, 2019  
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Should you have any questions, please contact Michiya Suzuki of my staff at (505) 476-6059.

Sincerely,

A handwritten signature in blue ink, appearing to read "John E. Kieling". The signature is fluid and cursive, with a large loop at the end.

John E. Kieling  
Chief  
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB  
B. Wear, NMED HWB  
M. Suzuki, NMED HWB  
C. Hendrickson, U.S. EPA Region 6  
L. Rodgers, Navajo Nation  
S. Begay-Platero, Navajo Nation  
M. Harrington, Pueblo of Zuni  
C. Seoutewa, Southwest Region BIA  
G. Padilla, Navajo BIA  
J. Wilson, BIA  
B. Howerton, BIA  
R. White, BIA  
C. Esler, Sundance Consulting, Inc.

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