



SUSANA MARTINEZ  
Governor

JOHN A. SANCHEZ  
Lieutenant Governor

State of New Mexico  **ENTERED**  
**ENVIRONMENT DEPARTMENT**

**Hazardous Waste Bureau**

2905 Rodeo Park Drive East, Building 1  
Santa Fe, New Mexico 87505-6313  
Phone (505) 476-6000 Fax (505) 476-6030  
[www.env.nm.gov](http://www.env.nm.gov)



BUTCH TONGATE  
Cabinet Secretary

J. C. BORREGO  
Deputy Secretary

**CERTIFIED MAIL - RETURN RECEIPT REQUESTED**

February 9, 2018

Mr. Adam Kusmak  
Chief, Installation Management Flight  
49<sup>th</sup> CES/CEI  
550 Tabosa Avenue  
Holloman AFB, NM 88330-8458

**RE: DISAPPROVAL  
FINAL SS-039 – MISSILE FUEL SPILL AREA (SWMUs 165, 177, 179 & 181),  
RESOURCE CONSERVATION AND RECOVERY ACT FACILITY  
INVESTIGATION REPORT, OCTOBER 2017  
HOLLOMAN AIR FORCE BASE, EPA ID# NM6572124422  
HWB-HAFB-17-019**

Dear Mr. Kusmak:

The New Mexico Environment Department (NMED) has reviewed the above referenced Resource Conservation and Recovery Act Facility Investigation Report (RFI Report) submitted by Holloman Air Force Base (Permittee) and received on October 13, 2017. The NMED hereby issues this disapproval for the subject report with the following comments.

1. **Section 2.1, Groundwater Impacts, page 2-3.** The last paragraph of Section 2.1 states "Nitrate/nitrite (as N) was detected in all of the wells with maximum concentrations in August 2015 of 514 µg/L (MW39-06D) and 227 µg/L (MW39-05) in January 2016. All concentrations exceeded the USEPA MCL of 10 mg/L." Correct the analytical results' units in this text to read "mg/L" for the reported concentrations.
2. **Section 2.1, Groundwater Impacts and Figures 6 and 7.** These figures depict the trichloroethene (TCE) and perchlorate groundwater contaminant contour maps for site SS039. Neither figure adequately defines the southerly extent of the plumes, which extend well into the adjacent Lost River Basin. A previous report submitted by the Permittee, the *Supplemental*

*RCRA Facility Investigation Report, DP-30/SD-33, SS-39 and SD-27*, dated July 2007, provided analytical results for five temporary monitoring wells, MW39-08, 09, 10, 11 and 12, that were installed up to approximately 250 feet south (into the river basin) of the monitoring wells used for the risk evaluation. Revise Section 2.1 to provide a discussion of the analytical results for these temporary wells. Also provide a discussion on the possible source(s) of the elevated levels of perchlorate in the groundwater and revise Figures 6 and 7 as required.

3. **Section 7.0, Risk-Based Human Health Evaluation, pages 7-1 through 7-3.** This Section does not include an estimate of the total residual risk (soil risk or hazard [arsenic above background] plus vapor intrusion [VI] risk or hazard) to the receptor populations addressed in the risk-based human health evaluation. A screening level estimate of total risk and hazard to industrial workers, construction workers, and residents is required by NMED's *Risk Assessment Guidance for Investigations and Remediation, Volume I, March 2017 (RAGIR)* to account for cumulative impacts on receptor populations. Revise Section 7.0 to include a screening-level estimate of total risk (additive risk from all exposure pathways, soil risk plus VI risk) for each receptor population evaluated in the human health assessment. While the amount of risk attributable to soil contamination may be low, the RFI Report must still address it.
4. **Section 7.3.2, Soils, page 7-1.** This Section indicates that impacted soil has been addressed at SS039 and that soil concentrations are below NMED residential screening levels. While a reference is provided to the *Accelerated Corrective Measures Completion Report for SS-039*, dated September 2012 (ACM Report), a summary of the activities and results documented in this report is not included in the RFI Report. It is noted that Table 3-5 of the ACM Report showed post removal levels of arsenic above the soil screening level (SSL) in the Oxidizer Discharge Spill Pipe Excavation Area. This information is needed to provide technical justification for the assertions, claims, and conclusions stated in the RFI Report regarding potential risk to receptor populations. Revise Section 7.3.2 to include a summary of actions taken (e.g., removal of contaminated soil; confirmatory sampling; estimation of residual risk and hazard) at SS039 regarding soils contamination and the results (e.g., comparison of confirmatory sampling results to residential SSLs) of those actions with regard to risk to potential receptors.
5. **Section 7.3.3, Groundwater, page 7-2.** The third paragraph describes a 100-meter buffer area for protection of the White Sands Pupfish that exists on both sides of the Lost River Basin. This Section states "No construction activities are expected to be performed within this buffer area." Section 8.3, Vapor Intrusion Evaluation, implies that construction activities are prohibited by the *Cooperative Agreement for Protection and Maintenance of White Sands Pupfish* (May 2006). Thus, it is unclear whether construction is specifically prohibited by the Agreement or if the Permittee has implemented other controls and/or procedures. Revise Section 7.3.3 to provide a discussion on the prohibition of construction in the 100-meter buffer area for the Lost River Basin. The revised discussion should identify the agreements, controls, and/or procedures in place that specifically prohibit construction in the buffer area.

6. **Section 7.3.4, Vapor Intrusion, page 7-3.** The top of page 7-3 presents a bulleted list of four items that must be satisfied before a qualitative assessment of the vapor intrusion (VI) pathway can be performed in lieu of a more detailed quantitative assessment. The list is taken directly from Section 2.5.2.2 of the RAGIR, Potentially Complete Pathway; Qualitative Discussion. As stated in the RAGIR and on page 7-3 of the RFI Report, all four of the listed criteria must be met before a site from which the source and associated contaminated soil have been removed can be assessed qualitatively. Only the criterion related to site concentrations and VI screening levels (VISLs) has been addressed in the RFI Report. In addition, the current version of the RFI Report does not contain the level of detail required to demonstrate that the source and associated contaminated soil has been removed from the site. Before a qualitative assessment of the VI pathway can be performed for Building 1176 and any building constructed in the future, the RFI Report shall be revised to include:
- A summary of the activities performed in removing the source and associated contaminated soil from the site as currently documented in the ACM Report.
  - The results of confirmatory sampling performed after removal of the source and associated soil contamination.
  - A demonstration that minimal volatile and toxic compounds remain in the soil, soil gas, and groundwater at locations where the VI pathway is potentially complete. This can be demonstrated through comparison of confirmatory sampling results to applicable risk-based screening levels (e.g., NMED SSLs) combined with the comparisons of March 2017 soil gas results to soil-gas VISLs and April 2017 groundwater results to groundwater VISLs.
  - A brief but technically sound and defensible discussion of the potential for dense/sinking vapors at locations where the VI pathway is potentially complete.
  - A discussion and associated graphics (tables and/or diagrams) demonstrating that soil and soil-gas concentrations are decreasing with depth at locations where the VI pathway is potentially complete.
7. **Section 7.3.4, Vapor Intrusion, page 7-3 and Table 14.** The last paragraph of Section 7.3.4 refers to Table 14 for a comparison of soil vapor concentrations to NMED residential and industrial soil gas VISLs. Examination of the table indicates that risk and hazard have not been calculated for the listed analytes. In addition, the total risk and total hazard over all chemicals is not included. Revise Table 14 to include 1,4-dioxane (see Comment #11 below) and to add columns displaying the risk or hazard for each chemical listed in the table. The total risk and total hazard over all chemicals should also be displayed. This information should be furnished for industrial workers and residential receptors.
8. **Section 7.3.4, Vapor Intrusion, page 7-3.** The last paragraph of Section 7.3.4 states "...a qualitative evaluation for the indoor air exposure pathway is adequate for SS039. The information above, in addition to the removal of the SWMU 177 soils (the source of TCE that affected groundwater), and documented decrease in TCE concentrations in groundwater since 2008 suggests that the vapor intrusion pathway is sufficiently addressed and no further quantitative evaluation of the pathway is warranted." The RFI Report contains no information

on the soil removal activities and/or the comparison of confirmatory sampling results to NMED SSLs and the resulting levels of residual soil risk. In addition, decreases in TCE concentrations are not discussed in Sections 7.3.3, Groundwater, or 7.3.4, Vapor Intrusion. Thus, the information contained in Section 7.3.4 does not constitute a qualitative evaluation of the VI pathway. Revise Section 7.3.4 to include information on the removal of contaminated soil from the site and the impact(s) of the removal on risks and hazards via the VI pathway. Also, include a discussion on decreases in TCE concentrations. Additional qualitative lines of evidence such as information on vapor migration and attenuation at the site and the characteristics of Building 1176 that affect vapor intrusion should be added to strengthen the qualitative evaluation. Additional information is available in Section 2.5, Vapor Intrusion Screening Levels, of the RAGIR, EPA's Subsurface Vapor Intrusion Guidance dated 2002, and Sections 2.0 and 5.0 through 7.0 of EPA's more recent *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* dated 2015.

9. **Section 7.4, Ecological Evaluation, page 7-3.** This Section states "No complete exposure pathways for potential ecological receptors exist due to the lack of source of soil contamination at depth intervals considered for evaluation of ecological species (0-10 feet bgs)." The discussion refers to the ACM Report for information related to the removal of contaminated soil at the site. However, Section 7.4 does not provide adequate technical support for the assertion that no complete exposure pathways exist at the site (e.g., source removal was to depths outside of ecological exposure intervals). The text does not identify potential ecological habitats or potential ecological receptors at the site, although Section 7.3.3 of the RFI Report indicates that a 100-meter buffer area was created as part of the *Cooperative Agreement for Protection and Maintenance of White Sands Pupfish* (Agreement). In addition, the RFI Report contains no figures that illustrate or delineate areas of the site capable of providing ecological habitat. As previously noted, no details regarding the removal of contaminated soil at the site are included in the RFI Report; thus, it is not known if an ecological evaluation of the site was performed as part of the soil removal. NMED's *Risk Assessment Guidance for Investigations and Remediation, Volume II, Soil Screening Guidance for Ecological Risk Assessments*, March 2017 (ECO RAGIR) outlines the information required in a scoping assessment to determine if a screening level ecological risk assessment should be performed at a site. Expand Section 7.4 to include information from the ACM Report related to potential ecological risk at the site as well as the information required for a scoping assessment presented in Section 2.0, Scoping Assessment, of the ECO RAGIR. All information collected and analyzed as part of the scoping assessment should be presented in the expanded discussion. In addition, the information should be synthesized into a preliminary conceptual site model for ecological risk and all possible exposure pathways discussed. A line of evidence approach should be applied in developing the rationale/justification for eliminating any pathways from further consideration.

According to Figure 9 of the RFI Report, the locations of the excavation of Sump #2 (Building 1176 Drainage Sump), nine of the site's fourteen monitoring wells, and the undefined southerly extent of the TCE and perchlorate groundwater contamination plumes extending from the site are located within the 100-meter buffer area. The river basin itself and the 100-meter upland

buffer area that extends into site SS039 are defined as “Essential Habitat” for the Pupfish in the Agreement, entered into between the Permittee, the U.S. Fish and Wildlife Service (USF&WS) and the N.M. Department of Game and Fish (NMDG&F), among others. The Agreement states that “Essential Habitat must be protected from adverse anthropogenic disturbances” and that “all non-emergency activities shall be restricted”. The Agreement also defines lands adjacent to the Essential Habitat as “Limited Use Areas” where activities must be managed to prevent habitat degradation. Revise Section 7.4 to provide a discussion addressing the possibilities of habitat degradation caused by the investigation and remediation activities conducted at the site, and addressing the possible effects of the presence of the groundwater contamination plume extending into the Essential Habitat at shallow depths (7 feet below ground surface).

The Agreement also states that the Permittee agrees to “Coordinate all unclassified activities proposed for implementation within Essential Habitat and Limited Use Areas with the signatory agencies [USF&WS and NMDG&F] to prevent negative impacts to White Sands Pupfish or its habitat”. The RFI Report does not indicate that any such coordination was conducted regarding the activities conducted at the site nor regarding the existence of TCE and Perchlorate groundwater contaminant plumes extending from the site well into the Essential Habitat. Revise Section 7.4 to include a discussion on agency coordination activities.

10. **Section 8.0, Conclusions, pages 8-1 through 8-3.** The discussion of risk in subsections 8.3, 8.4, and 8.5 of Section 8.0 will likely require review and revision once the issues raised in these comments are addressed. Ensure that revision of the RFI Report includes review and revision of the risk-based conclusions presented in subsections 8.3, 8.4, and 8.5 of the text.
11. **Section 8.2, Nature and Extent of Groundwater Contamination, page 8-1.** The first paragraph states “The chemical 1,4-dioxane does not meet the definition of a VOC to be considered in the indoor VI pathway.” The statement is referenced to the RAGIR. Examination of the RAGIR indicates that while the value of the Henry’s Law Constant for 1,4-dioxane ( $4.8 \times 10^{-6}$  atm·m<sup>3</sup>/mole) is less than the target of  $1 \times 10^{-5}$  atm·m<sup>3</sup>/mole, its molecular weight is 88.1 g/mole, less than the target of 200 g/mole. In addition, Table A-3 of the RAGIR lists VISLs for residential exposures and industrial exposures to 1,4-dioxane. VISLs are available for soil gas and groundwater. As such, 1,4-dioxane should be included in the evaluation of the VI pathway for SS039. A cursory and preliminary comparison of the 1,4-dioxane groundwater sampling results for the April 2017 sampling event to the NMED groundwater VISLs indicates no exceedances. The residential VISL for groundwater is over two orders of magnitude greater than the maximum 1,4-dioxane concentration and the industrial VISL is over 3 orders of magnitude greater. There are no soil gas results for 1,4-dioxane; thus, a comparison to the soil gas VISLs could not be performed. Based on this cursory comparison, it appears that it can be demonstrated that exposure to 1,4-dioxane via the VI pathway is not of concern without collecting additional soil gas samples. Revise Section 8.2 to indicate that 1,4-dioxane is included in the evaluation of the VI pathway. In addition, revise Section 4.1.2 to include a discussion of 1,4-dioxane detections and the VI evaluation in Section 7.3.4 to include 1,4-dioxane. Groundwater concentrations should be compared to the

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groundwater residential and industrial VISLs for 1,4-dioxane ( $2.85 \times 10^{-4}$   $\mu\text{g/L}$  and  $1.4 \times 10^{-5}$   $\mu\text{g/L}$ , respectively).

The Permittee must submit a revised RFI 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 RFI Report showing where all changes have been made to the Report. The revised RFI Report must be submitted no later than **August 1, 2018**.

If you have any questions regarding this letter, please contact Mr. Brian Salem of my staff at (505) 222-9576 or at the address indicated in the letterhead of this letter.

Sincerely,



John E. Kieling  
Chief  
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB  
B. Salem, NMED HWB  
C. Amindyas, NMED HWB  
D. Strasser, NMED HWB  
J. Ward, NMDF&G  
C. Schick, HAFB  
S. Dorton, HAFB  
C. Hendrickson, EPA Region 6 (6MM-RC)  
L. King, EPA Region 6 (6MM-RC)  
S. Jacks, USF&WS  
A. Arnold, USF&WS

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