Responses to EPA Comments Dated October 17, 2016
Former Williams Air Force Base ST012 Remedial Action Field Variance Memorandum #4
Additional Site Characterization, September 29, 2016

The U.S. Environmental Protection Agency (EPA) provided comments on the ST012 Remedial Action Field Variance Memorandum (FVM) #4, Former Williams Air Force Base, Mesa, Arizona in a letter dated October 17, 2016. The letter text and comments are presented below and are followed by Air Force (AF) responses in bold.

EPA has reviewed the subject Field Variance Memorandums for the former Williams Air Force Base. The comments provided below also incorporate comments received from ADEQ.

The regulatory agencies have requested full delineation of the LNAPL and dissolved phase contamination distribution at ST012 in order to determine the most appropriate next steps to meet the remedial action objectives specified in the 2013 Amended Record of Decision (RODA). The drilling plan in the Field Variance Memorandum #4 proposes the borings and wells that the Air Force discussed with EPA and Arizona Department of Environmental Quality during the August 24, 2016 BCT meeting. After reviewing the data from the recently completed soil borings and the results from LNAPL Monitoring and Removal that are contained in the Health, Safety, Environmental and Remediation Weekly Reports provided by Amec Foster Wheeler, we have identified additional data gaps and request to change the location or depth of some of the planned borings, and for additional wells where soil borings (but not wells) are proposed. In addition, we are requesting additional borings/wells in data gap areas that have not been previously discussed. These are discussed in the comments below.

Response: The information presented in the FVM was discussed with EPA and Arizona Department of Environmental Quality (ADEQ) during the August 24, 2016 BCT meeting and EPA/ADEQ comments from the meeting were addressed in the 15 September 2016 BCT conference call. Some of the additional new wells requested below are in areas likely to contain dissolved phase contamination. The additional characterization as presented in prior BCT discussions and the FVM is focused on defining the extent of dissolved phase contamination above MCLs rather than the magnitude of contamination within the plume. Responses to general and specific comments are provided below.

General Comments

1. The Field Variance should define the criteria to be used for determining when stepping out with additional borings and wells is necessary to characterize the full extent of contamination. Attachment 4, Locations and Drilling Plan table, states, "Step out in future if LNAPL indications or high PID readings", and "Potentially step out in future if > MCLs". It can be assumed that LNAPL indications refers to positive dye test results on soil samples from the soil borings. However, it is not clear what constitutes a 'high' PID reading that would necessitate stepping out to complete the LNAPL and dissolved phase characterization, or why concentrations greater than MCLs would only 'potentially' lead to stepping out. This issue should be discussed by all the stakeholders as the data from these borings becomes available.

Response: There is a note "(g)" that goes with the "high PID readings" and provides the requested criteria. Note "(h)" clarifies that the step out will be discussed with the regulators. The word 'potentially' is used because of the discussion with regulators referred to in note (h) regarding whether step out is necessary for wells that are only slightly above MCLs. In any case, all step out well locations, whether automatic based on criteria or subject to discussion, will be presented and discussed with the BCT.

2. Footnote f of Attachment 4, Locations and Drilling Plan table states that PID results > 250 ppmv will be tested using the dye test kits. It is not clear what the threshold PID reading of >250 ppmv is based on. If lower PID readings have not been tested, then it is not clear that lower PID readings cannot be associated with LNAPL presence.

Response: The threshold is based on the relationship between PID readings and dye test kit results in previous borings at ST012. While there are a few exceptions, dye test kit results were typically negative when PID readings were below this threshold. As indicated in Note 2, the 250 ppmv is the threshold above which a dye test will be required. Below 250 ppmv, a dye test kit may still be run at the geologist's discretion based on other factors (e.g., staining or odor) which will be incorporated as a text revision into the final FVM.

3. Footnote g of Attachment 4, Locations and Drilling Plan table states that PID results > 15 ppmv may not bound dissolved phase contamination. It is not clear why > 15 ppmv is used as the threshold for dissolved phase concentrations. Observation of the drilling logs from UWBZ36 and LSZ44 show that PID reading of 1 ppmv or less were recorded in zones with benzene concentrations above the MCL. At LSZ44, the PID readings were all below 15 ppmv, and the dissolved benzene concentration was found to be 320 μg/l. At UWBZ36, the PID readings were all approximately 1 ppmv, and the benzene concentration was 15 μg/l.

Response: A PID result greater than 15 ppmv was used as a threshold above which it is unlikely that the location will be suitable for bounding dissolved phase contamination. Below 15 ppmv, the location may or may not bound dissolved phase contamination below MCLs and it is considered worthwhile to install the well and sample the groundwater. While there are examples such as the ones cited in the comment, there are also examples of PID readings between 1 and 15 where subsequent groundwater samples were below MCLs.

4. The statement on Page 3 indicates PVC casings will be used for installation of these wells that are on the perimeter, however the purpose of this characterization effort is to define the perimeter of exiting (sic) contamination, which currently is unknown. Until we have a more refined estimate of remaining LNAPL mass, the capability of EBR to meet the RAOs specified in the RODA under current site conditions has not been established. PVC casings are incompatible with additional thermal treatment and will likely result in additional costs for abandonment and redrilling. Wells that are being installed within known areas of LNAPL should be functional as SEE wells to cover every contingency going forward to be able to meet the MNA window of 17 years from now.

Response: The AF agrees the purpose of the characterization effort is to sufficiently define contaminant extent. Covering 'every contingency going forward' is not an objective of the characterization effort. The wells will remain PVC consistent with their purpose as monitoring wells.

<u>Specific Comments</u>

1. The second paragraph of Section 3.0 lists ranges of depths to which UWBZ or LSZ wells could be drilled. UWBZ and LSZ borings and wells should all be drilled to the total depth of that zone, which is 195 feet for the UWBZ and 245 feet for the LSZ. If contamination is encountered in the bottom of the boring, the boring must be continued until the total depth of the contamination has been determined.

Response: As indicated in Table 1 UWBZ wells have depths extending to 195 ft bgs. The 185 ft will be removed from the second paragraph. For the LSZ there is no evidence of LNAPL extending deeper than 230 ft bgs around the perimeter of the site where these investigations are located. Therefore the design depth of the borings is 230 ft bgs. However, if contamination is encountered at the bottom, the boring will be extended. A text revision will be incorporated in the final FVM to include this information

2. Section 6.0. Please specify the well locations that may require night drilling to minimize impacts to businesses.

Response: This will be clarified in the table. In general, this applies to the locations east of Sossaman including SB17, SB18, and CZ24/UWBZ38/LSZ55.

3. Table 1 and the Locations and Drilling Plan table (Attachment 4) state that proposed soil boring ST012-SB16 is to only extend through the UWBZ. This boring should extend through the LSZ if no LNAPL indications are encountered at LSZ53. This would provide a better understanding of the extent of LNAPL in the LSZ in this area.

Response: There were no indications of LNAPL at ST012-LSZ43 or ST012-LSZ51. These locations provide adequate characterization of LNAPL extent in this area. Unless there are LNAPL indications at the bottom of the UWBZ, boring ST012-SB16 will not be extended to the LSZ. ST012-LSZ53 is proposed for dissolved phase characterization in the LSZ.

4. The location for ST012-SB17 should be moved to the north and west of where it is shown in Figure 1. Its current location is close to the CZ24/UWBZ38/LSZ55 cluster, and leaves a large data gap to the north. If indications of contamination are encountered in this boring, it should be completed as monitoring well(s).

Response: ST012-SB17 is correctly positioned downgradient of ST012-UWBZ21 and ST012-LSZ14, both known locations of LNAPL. Additionally, utility and safety logistics do not allow drilling the location in Sossaman Road or the median. The boring at ST012-LSZ44 provides data further north and west of ST012-SB17. The ST012-CZ24/UWBZ38/LSZ55 cluster is positioned for dissolved phase characterization and fills a gap between existing wells northeast and southwest of the cluster.

5. Table 1 and the Locations and Drilling Plan table (Attachment 4) show the purpose soil boring ST012SB18 as determining the LNAPL extent in the UWBZ and LSZ. Due to the high dissolved phase concentrations in upgradient CZ21 and UWBZ30, and the lack of a LSZ well in this area, this boring should be completed as a monitoring well in each of the three zones.

Response: The well cluster ST012-CZ24/UWBZ38/LSZ55 provides downgradient dissolved phase characterization in this area.

6. Soil boring SB-19 should be made into a LSZ well to characterize the dissolved phase plume in this area to the west of LSZ50, as LSZ50 has a benzene concentration of 1300 μg/l.

Response: The location is intended to characterize LNAPL contamination and may not be ideally placed for bounding dissolved phase contamination. If there are LNAPL indications, a step out location to the west may be needed in the future to bound the dissolved phase plume. If there are no indications that the location has contamination (< PID readings throughout), installation of a well will be considered for dissolved phase characterization.

7. Well CZ23 should be moved to the south to be closer to the known contaminated cobble zone. With the data in hand from the Weekly reports, showing that there is LNAPL sheen in the cobble zone wells closet (sic) to this proposed well, it can be determined now that this well will be needed to characterize the dissolved phase contamination in the cobble zone.

Response: Moving ST012-CZ23 south would move it closer to be in line with ST012-C02 in the direction of groundwater flow. It would also move it more downgradient of ST012-CZ09 than ST012-CZ07 and ST012-CZ08. ST012-CZ07 and ST012-CZ08 had an order of magnitude higher dissolved phase concentration than ST012-CZ09 in recent samples. The proposed location of ST012-CZ23 provides better spacing of the perimeter monitoring network and is a better downgradient monitoring location to address the reported detections at ST012-CZ07 and ST012-CZ08. Based on sample results from ST012-CZ07, ST012-CZ08, and ST012-CZ09 presented in the 20 October 2016 BRAC Cleanup Team conference call, the ST012-CZ23 well will be installed.

8. An additional well is needed to the south of LSZ46. The boring log for this well shows that there was a positive dye test in the LSZ, and the dissolved phase benzene concentration was 3900 μg/l. The Weekly Reports from Amec show that this well now contains LNAPL. It is likely that the LNAPL extends further to the south.

Response: The amount of LNAPL observed in this well has been limited (0.01 feet on 2 Sept 2016 and not observed on repeat measurement on 7 Oct 2016). ST012-LSZ52 provides characterization in the downgradient direction to the east. The need for additional characterization in the LSZ south of ST012-LSZ46 will be further evaluated based on the combined Phase 1 and Phase 2 data.

9. Additional borings/wells are needed to the north and east of UWBZ21, which has accumulated a significant quantity (more than 40 gallons) of LNAPL, to determine the extent of LNAPL in this area.

Response: The area to the north of ST012-UWBZ21 was characterized when SEE wells were installed in late 2013/early 2014. There were no indications of LNAPL in the UWBZ at locations ST012-LSZ18, ST012-LSZ22, ST012-LSZ29, and ST012-LSZ32 all located to the north of ST012-UWBZ21 (see Figure 3-2 of the Final RD/RAWP Addendum 1). Proposed location ST012-SB17 provides LNAPL characterization to the east of ST012-UWBZ21. Existing well ST012-U02 and proposed well ST012-UWBZ38 provide downgradient characterization northeast and east of ST012-UWBZ21.

10. CZ07 on northern perimeter of TTZ also had NAPL, needs to be bounded by a well to the north; it's not clear if this is covered in the current sampling program.

Response: ST012-SB16 and the ST012-UWBZ37/ST012-LSZ53 location provide LNAPL characterization north of ST012-CZ07 and ST012-CZ08. ST012-CZ23 provides dissolved phase characterization downgradient of ST012-CZ07.

11. A cobble zone monitoring well is needed at the UWBZ40/LSZ59 location. The boring log for well cluster UWBZ28/LSZ51 has PID readings in the range of 20 to 42 ppmv in the cobble zone, indicating the likely presence of dissolved phase contamination in the cobble zone in this area.

Response: The UWBZ40/LSZ59 area is up- and cross-gradient of the UWBZ28/LSZ51 area. ST012-CZ23 is downgradient and north of UWBZ28/LSZ51 thereby providing a downgradient monitoring location for potential dissolved phase contamination in the CZ. The need for

additional characterization in the CZ north of Ulysses Ave will be further evaluated based on the combined Phase 1 and Phase 2 data.

12. An additional Cobble Zone (CZ) location to the north of CZ-18 should be proposed to define the extent of LNAPL. Currently, only Upper Water Bearing Zone (UWBZ) and lower saturated zone (LSZ) wells (ST012-UWBZ40/ST012-LSZ59) are proposed for the area north of CZ-18, these are too far away for defining the extent of LNAPL in the CZ. Please revise FVM #4 to propose an additional location north of CZ-18 and south of ST012-UWBZ40/ST012-LSZ59.

Response: This area was characterized when SEE wells were installed in late 2013/early 2014. There were no indications of LNAPL in the CZ at locations ST012-LSZ08, ST012-LSZ09, ST012-LSZ19, and ST012-LSZ27 all located to the north of ST012-CZ18 (see Figure 3-1 of the Final RD/RAWP Addendum 1). FVM#4 will not be revised at this time to include an additional location north of CZ-18. The need for additional characterization in the CZ will be further evaluated based on the combined Phase 1 and Phase 2 data.

13. UWBZ location should be proposed to the northeast of UWBZ18, where 20 gallons of LNAPL were removed. Location UWBZ09 is located northeast of UWMB18 (sic), but also had LNAPL present, so the extent to the northeast remains undefined. Please revise FVM #4 to propose an additional location northeast of UWBZ18.

Response: There were no UWBZ LNAPL indications in ST012-LSZ43 and ST012-LSZ44 located northwest and northeast of UWBZ18, respectively. As noted in the Locations and Drilling Plan (see note "(e)"), ST012-CZ23 will be drilled through the UWBZ. ST012-CZ23 is located northeast of both ST012-UWBZ18 and ST012-UWBZ09. FVM#4 will not be revised at this time to include an additional location northeast of UWBZ-18. The need for additional characterization in the UWBZ will be further evaluated based on the combined Phase 1 and Phase 2 data.