Review of the 2015 April Basewide Groundwater Sampling Event Memorandum, Former George Air Force Base, Victorville, California
March 2015

The March 16, 2015 Memorandum entitled Former George AFB Fall [April] 2015 Basewide Groundwater Sampling Event (tech memo) proposes groundwater monitoring wells and extraction wells to be gauged for groundwater elevations and selects wells for groundwater analysis. In support of this effort the following questions/comments are provided.

1. The tech memo proposes to collect groundwater data for the 2015 Basewide Annual Monitoring and Operations Report for CERCLA and Non-CERCLA sites (2015 BAMOR). As such, it should include sampling from all Former George Air Force Base CERCLA and non-CERCLA groundwater sites. The CERCLA sites should include CG70, FT019a, FT019c, OTO69, FT082, ZZ051, DP003, DP004, LF12, LF14, LF044 and SEDA. It appears that the proposed April 2015 Basewide Groundwater Sampling Event (April 2015 Event) does not include monitoring locations from Sites FT019a, FT019c or FT082. Please provide an explanation or include these sites in the April 2015 Event.

2. It is unclear why the tech memo proposes to monitor only one Site CG70 monitoring well during the April 2015 Sampling Event. One of the objectives for the groundwater monitoring program at Site CG70 is to collect data to support the Air Force proposed Monitored Natural Attenuation (MNA) remedy; develop an Operable Unit (OU1) long term monitoring plan; and to verify assumptions made in the Final Focused Feasibility Study OU TCE Ground Water Plume, October 2011 (FFS). To this end it would be helpful to continue to build upon the trichloroethylene (TCE) concentration trends data presented in the FFS in support of MNA. For example, the trends identified in the FFS are summarized below:

Upper Aquifer

Stable or Declining TCE Concentration Trends:
Wells below maximum contaminant limits (MCLs): NZ-17, NZ-18, NZ-49, NZ-52, NZ-81, MW-102, FT-01, FT-02, MW-104, MW-103, and NZ-97.

Declining Trends since the year noted:
1998: NZ-11, NZ-59
2000: NZ-07, NZ-23, NZ-34
2001: NZ-27, NZ-28a, NZ-32, NZ-40, NZ-67, NZ-101, NZ-102, NZ-103
2003: NZ-2003, NZ-39, NZ-55, NZ-56, NZ-94, NZ-11, NZ-116

Stable Trends since the year noted:
1997: NZ-52
1998: NZ-25, NZ-36, NZ-75, NZ-97, MW-105, MW-106
2003: MW-102, NZ-20, NZ-31, NZ-42, NZ-95, NZ-96, NZ-99
2004: NZ-24
2005: NZ-10, NZ-12, NZ-21, NZ-22, NZ-51, NZ-68
2006: FT-02, FT-03, FT-04, NZ-06

Lateral and Vertical Stability
No specific monitoring wells were identified to determine lateral plume stability in the upper aquifer. Vertical stability was determined by NZ-49, NZ-99, NZ-32, NZ-31, NZ-27, MW-105 and MW-106.

Lower Aquifer
Stable or Declining TCE Concentration Trends Lower Aquifer:
Wells Below MCL: EW-15, EW-17, MW-37, MW-107, LW-1, LW-2, LW-3, LW-4, NW-3, NZ-02, NZ-03, NZ-13, NZ-29, NZ-41, NZ-44, NZ-48, NZ-57, NZ-58, NZ-60, NZ-61, NZ-62, NZ-62, NZ-69, NZ-70, NZ-71, NZ-72, NZ-73, NZ-74, NZ-76, NZ-77, NZ-78, NZ-79, NZ-85, NZ-86, NZ-98, NZ-100, NZ-104, NZ-106, NZ-108, NZ-112, NZ-113, NZ-114, NZ-127b/c, NZ-128b/c, NZ-129b/c, NZ-130b/c, NZ-131a/b/c, NZ-132b/c, NZ-133b/c, NZ134b/c, NZ-135b/c, OW-1, OW-6, TZ-1a/b/c, H1a/b

Declining Trend since the year noted:
2005: NZ-37

Stable Trend since the year noted:
2009: NZ-50, EW-6

Lateral and Vertical Stability
No specific monitoring wells were identified to determine lateral plume stability in the lower aquifer. Vertical stability was determined by EW-6, EW-17, NZ-50, NZ-127b, NZ-127c, NZ-128b, NBZ-128c, NZ-129b, NZ-129c, NZ-131b, NZ131c, NZ-134b, NZ134c, NZ-135b and NZ-135c.

Additionally, the Draft Uniform Federal Policy Quality Assurance Project Plan – Volume 1 dated August 2012 (UFP QAAP) identifies Site CG70 Lower Aquifer perimeter or compliance wells in the groundwater monitoring program. These wells include LW-1, LW-2, LW-3, LW-4, M-107, NW-3, NZ-41, NZ-72, NZ-73, NZ-76, NZ-77, NZ-78, and OW-6.

Please provide an explanation as to why the tech memo proposes only one well to be sampled at the Site CG70 during the April 2015 Event and include the FFS wells and UFP QAAP perimeter/compliance wells listed above in the proposed Basewide Monitoring Program.

3. The tech memo and associated tables do not adequately explain the rationale for the selection of monitoring well locations proposed for the April 2015 Event at the OT069 sites. The tech memo states that the "[long term monitoring plan] LTMP for OT069 entails annual sampling to monitor the chlorinated solvent plume. Note that a small number of OT069 5-year review wells were missed during the October 2014 Basewide sampling event. As such, all 5-year review wells will be resampled." While it is appreciated that the error is being corrected and that the 5-year review wells are being re-sampled, it is unclear how the 27 monitoring wells proposed for sampling during the April 2015 Event were selected given that the LTMP included in Appendix I of the 2012 BAMOR (LTMP) states that 10 monitoring wells will be sampled annually and 10 monitoring wells will be sampled every five years in order to monitor:

   - contaminant of concern (COC) concentrations along migration pathways and at the distal end of the plumes
   - Wells with COC concentrations that exceed maximum contaminant limits (MCLs)
   - To optimize the number of monitoring wells sampled.

   Also, the April 2015 Event proposes many more wells for sampling at OT069 than discussed in the LTMP, the 2012 BAMOR, and the 2013 BAMOR. For example, the LTMP states that MW-28, MW-35, MW-36 and MW-44 are sampled every five years and MW-31 and MW-48 are sampled annually. Additionally, the 2012 BAMOR proposes that MW-30, MW-45, MW-58, MW-71, MW-74, MW-88 and MW-91 be sampled annually because all seven of these monitoring well sampling results had COCs exceeding the MCLs. MW-16 was proposed for monitoring every 5 years because of tetrachloroethylene (PCE) concentration fluctuations. Finally, it is unclear why MW-48 is not included in the list of wells to be monitored during the April 2015 Event. The TCE concentration reported at MW-48 in the 2013 BAMOR was reported as 95 ug/L exceeding the MCL of 5 ug/L. Please provide the criteria under which the monitoring wells were selected or not selected for the April 2015 Event. Also, please include MW-48 in the April 2015 Event or October 2015 Event.

4. The tech memo does not include rationale for the proposal to remove Sites FT19a and FT19c monitoring wells FT01 and FT02 from the basewide groundwater monitoring program. At the August 26 and 27 Workshop (the August 2014 Workshop) the Air Force and the Regulatory Agencies evaluated monitoring wells with regard to redundancy and

sampling frequency, however minutes summarizing the meeting have not been provided. It is expected that these minutes would reflect the technical discussion and consensus reached.

Groundwater beneath OU3 Sites FT019a and FT019c is monitored as part of Site CG070 and groundwater monitoring downgradient from Sites FT019a and FT019c is intended to monitor the effectiveness of vadose zone remediation at reducing VOC concentrations reaching groundwater. Monitoring wells FT-04 and FT-05, both located downgradient of FT019a and FT019c, are proposed for the April 2015 Event. However, the status of the remaining three monitoring wells FT-01, FT-02, and FT-03 is unknown because they are not listed in Table 1- Monitoring Well Summary, April 2015 Basewide Groundwater Monitoring Event. Please provide rationale for the removal of FT-01 and FT-02 and include the remaining three FT019a and FT019c monitoring wells (FT-03, FT-04, and FT-05) in the April 2015 Event.

5. The tech memo states that four wells will be sampled during the April 2015 Event at LF014. However, only three groundwater monitoring wells are proposed for LF014, compliance wells NZ-13 and NZ-58 and another well, NZ-03. It is unclear why NZ-03 was selected instead of compliance well NZ-57. Please provide an explanation for this omission and include compliance well NZ-57 in the April 2015 Event.

6. The tech memo's description of the objectives for the April 2015 Event appear to differ from the objectives included in the 2013 BAMOR. The reviewer has referenced the 2013 BAMOR because the 2014 BAMOR is not yet available. The tech memo lists four objectives for the upcoming April 2015 Event groundwater monitoring. Two of these objectives are consistent with the objectives in the 2013 BAMOR however; three of the objectives are missing from the tech memo. Specifically, the tech memo does not include the following objectives:

   - Verify compliance with the RODs or other regulatory considerations
   - Monitor effectiveness of remedies that are in place
   - Monitor post-closure performance of remedial actions implemented at landfill sites.

   Please include a discussion in the upcoming 2015 BAMOR that explains how all of these objectives were met in the April 2015 Event.

7. Table 1 - Wells Proposed for Sampling - October 2014, highlights in green groundwater monitoring wells proposed for removal from the basewide groundwater monitoring program based on discussions at the August 2014 Workshop. However, several wells proposed for removal do not appear correct. Specifically, upper aquifer monitoring wells MW-35, NZ-40, NZ-46 and NZ-96 proposed for removal are incorrect. Similarly, the following lower aquifer monitoring wells proposed for removal, MW107, NW-2, NW-3,

NZ-108, NZ-114, NZ-131a, NZ-29, NZ-70, NZ-71, NZ-73, NZ-74, and NZ-78, are incorrect. Please revise the proposed sampling program to include these monitoring wells in the annual basewide groundwater sampling program.

8. The tech memo does not discuss sampling background wells for the various sites in the upper and lower aquifers. Please provide information on the frequency of background well sampling.

9. Table 1 - Monitoring Well Summary, April 2015 Basewide Groundwater Monitoring Event includes MW-136; however the rationale provided in this table states that this monitoring well is located at the downgradient edge of the dieldrin plume. This explanation differs from that of the 2013 BAMOR which describes MW-136 as located west of the Westwinds Golf Course between Sites ST067b and OT071. Also, PCE was detected at a concentration of 4.4 ug/L in October 2013 rather than dieldrin. Please update the rationale section in Table 1 to be consistent with the 2013 BAMOR or provide more explanation with regard to the contaminant history for this monitoring well.