DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER

17 November 2016

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Subject: Former Williams Air Force Base, ST012 Liquid Fuels Storage Area Path Forward (Your Letter, 29 September 2016)

As significant progress has been achieved since your 29 September 2016 letter, I am providing an update on Air Force (AF) actions addressing post-steam characterization and containment at former Williams Air Force Base (AFB) site ST012. Thank you for your acknowledgement of the AF's concerted and extensive efforts to address your concerns. It is the AF's responsibility, and mutual interest with the US Environmental Protection Agency (EPA) and Arizona Department of Environmental Quality (ADEQ), to provide effective remediation for the protection of human health and the environment. As you know, the Phase 1 investigation results were reported in the 24 August BRAC Cleanup Team (BCT) meeting. At that meeting, the AF identified post-steam characterization and containment as ST012 priorities and indicated Phase 2 investigation and interim containment construction could start immediately.

The AF is proceeding with actions to address the request included in your 29 September 2016 letter, "*to see the interim containment system expedited with highest priority, and we wish to have the containment monitoring plan proposed during the August 24 BCT meeting implemented immediately*." Mobilization and commencement of field activities for the Phase 2 investigations and interim containment system construction started on 24 October 2016. The AF's containment monitoring plan presented at the August BCT meeting has been implemented. A summary of events since EPA and ADEQ invoked informal dispute in your letter dated 28 June 2016 is provided in Attachment 1.

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The most immediate concern specified in your 29 September 2016 letter, "*is to prevent the loss of containment and expansion of the LNAPL and dissolved phase plume as the water table returns to equilibrium*"…"*especially in the highly transmissive Cobble Zone.*" The AF has been providing weekly reports to EPA and ADEQ with water level, temperature, light non-aqueous phase liquid (LNAPL), and dissolved phase monitoring results. As documented in the weekly reports, presented in the August BCT meeting, and discussed during the June, September, and October BCT conference calls, mobile LNAPL has diminished in all zones and was minimal in the Cobble Zone (total of 5 gallons removed post-steam, none since May). As reported in the August BCT meeting, there were no indications of LNAPL in the Cobble Zone in the 16 boring locations completed during the Phase 1 post-steam investigation. Six months of post-steam monitoring results have not indicated contaminant migration in any zone. Additional borings and wells are planned during Phase 2 to address data gaps identified in coordination with BCT members.

Over the next couple of months, there will be an important decision to make regarding startup of the groundwater extraction and treatment system. The interim containment system will be ready for startup in January. The complete set of Phase 2 results will be available by February 2017, at which time the BCT will evaluate the comprehensive post-steam monitoring and characterization data. To date, containment migration has not been indicated by site characterization and monitoring data. The AF is concerned extended operation of the extraction system will degrade the conditions currently favorable to EBR implementation.

Post-steam elevated temperatures are highly favorable for EBR implementation. Successful EBR implementation at ST012 is partially dependent on taking advantage of the increased solubility and dissolution of contaminants of concern (COCs) from LNAPL occurring at elevated temperatures. In addition, increased anaerobic degradation at the higher temperatures is currently establishing microbial populations that can be further enhanced for bioremediation of COCs. If extended extraction is used for hydraulic containment instead of establishing EBR reagent distribution, deterioration of conditions favorable to the anaerobic EBR approach will occur due to introducing cooler groundwater and higher dissolved oxygen levels.

Continued groundwater remediation is needed at ST012. Once post-steam characterization can be sufficiently demonstrated, continued progress towards remedial objectives is warranted. Phase 1 and 2 monitoring wells and LNAPL characterization borings will greatly increase confidence in site characterization and significantly enhance the containment monitoring network by adding over 30 wells. Post-steam site characterization data available to date does not indicate contaminant migration and does not contradict implementation of EBR. Favorable conditions currently exist at ST012 for EBR implementation. As long as contaminant migration is not indicated by characterization and containment monitoring results, the AF recommends the startup of active extraction be placed on hold while Phase 2 data is evaluated. The groundwater extraction system will be available and capable of providing active containment if the results from ongoing monitoring indicate contaminant migration.

EBR can significantly reduce if not eliminate our concerns of migration through active remediation. Pump and treat has already been established as an ineffective technology for ST012. While the EPA and ADEQ concerns regarding the transition from steam enhanced extraction identified in your 28 June 2016 letter are not fully resolved, there is an opportunity to maximize cleanup progress based on current site conditions and information. The AF recommends continuing our progress towards establishing sufficient characterization and

monitoring, while also taking advantage of the opportunity to significantly advance site remediation at ST012 with EBR. Towards this end, the AF recommends proceeding with resolution of EPA and ADEQ comments on the Addendum #2 Work Plan so EBR implementation, if mutually agreed to be the appropriate course of action, is not further delayed.

I look forward to continuing the significant remedial progress that has occurred at ST012 over the last couple of years. I will contact each of you to set up a conference call for discussion of the path forward at site ST012. Please contact me at (916) 643-1250, ext. 100 or philip.mook@us.af.mil if you have any questions regarding this letter.

Sincerely,

PHILIP H. MOOK, JR., P.E.
Chief, Western Execution Branch

cc:
AFCEC/CIBW – Catherine Jerrard
Administrative Record File

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Attachment 1
Former Williams Air Force Base, Site ST012
Informal Dispute Chronology

- **22 June 2016** – ST012 BRAC Cleanup (BCT) Team Conference Call
- **28 June 2016** – EPA/ADEQ joint letter requesting halt to all activities related to decommissioning the SEE system and procuring for and constructing the EBR system
- **1 July 2016** – AF letter acknowledging voluntary suspension of SEE decommissioning and EBR construction
- **11 and 20 July 2016** – Two meetings between AF, EPA, ADEQ managers (Mook, Herrera, LePage)
- **28 July 2016** – EPA/ADEQ Invokes Informal Dispute
- **17 August 2016** – ADEQ comments on ST012 OMM Reports received
- **22 August 2016** – AF issues Responses to EPA and ADEQ comments on the Draft Final Enhanced Bioremediation Work Plan Addendum #2
- **24 August 2016** – ST012 BCT Meeting, Phase 1 results and Phase 2 plan presented
- **15 September 2016** – ST012 BCT Conference Call, Responses to Comments and Revised Phase 2 plan presented. EPA requests Work Plans.
- **29 September 2016** – EPA/ADEQ letter stating 'we wish to see the interim containment system with the highest priority and we wish to have the containment monitoring plan proposed during the August 24 BCT meeting implemented immediately.' EPA/ADEQ identifies elements requested for Phase 2 characterization and containment Work Plans (some elements provided by email in advance).
- **29 September 2016** – ST012 Field Variance Memorandum #4 (Phase 2 Characterization Work Plan addendum)
- **30 September 2016** – ST012 Field Variance Memorandum #5, Proposed Active Containment
- **14 October 2016** – EPA comments on FVM #5
- **17 October 2016** –EPA comments on FVM #4
- **20 October 2016** – ST012 BCT Conference Call, in the interest of 'implementing immediately', the AF will accommodate EPA comments on FVMs or evaluate them on the basis of the Phase 2 investigation results
- **24 October 2016** – Phase 2 characterization and active containment construction activities start
- **26 October 2016** – AF Responses to EPA comments on FVMs #4 and #5
- **7 November 2016** – EPA Reply to AF Responses to Comments (75 days after Phase 2 plan presented)
- **7 November 2016** – ST012 BCT Conference Call (FVMs), in the interest of 'implementing immediately', the AF will accommodate EPA comments on FVMs or evaluate them on the basis of the Phase 2 investigation results
- **17 November 2016** (scheduled) – ST012 BCT Conference Call
- Responses to Comments and Final FVMs in preparation
- Weekly field updates issued to EPA/ADEQ (two week lag); boring logs and data distributed and uploaded as available

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