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THE MEMPHIS DEPOT
TENNESSEE

ADMINISTRATIVE RECORD
COVER SHEET

AR File Number 870

DEFENSE LOGISTICS AGENCY
DEFENSE DISTRIBUTION CENTER
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M.D. 541-460-0009

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IN REPLY
REFER TO

DDC-DES-EE

28 November 2006

Mr. Turpin Ballard
Environmental Protection Agency, Region 4
Office of Solid Waste
Federal Facilities Branch
61 Forsyth Street, SW
Atlanta, GA 30303

Mr. Evan Spann
Tennessee Department of Environment and Conservation
Division of Remediation
2510 Mt. Moriah Road, Suite E645
Memphis, Tennessee 38115-1520

Subject: Request for Extension in Dunn Field Off-Depot Remedial Design

Dear Sirs:

As provided in Section XXII of the Defense Depot Memphis Tennessee (DDMT) Federal Facilities Agreement (FFA), the Defense Logistics Agency (DLA) hereby requests an extension to the schedule for the Pre-Final and Final Off-Depot Groundwater Remedial Design (RD) documents. An extension of 221 days is requested for each document, which will change the Pre-Final RD submittal date of 11 December 2006 to 20 July 2007 and the Final RD submittal date of 10 April to 16 November 2007.

DLA believes good cause, as defined in Section XXII.B. of the FFA, exists because additional information on hydrogeology and contaminant extent obtained since completion of the Dunn Field Record of Decision (ROD) has created a need to re-consider the selection of a "permeable reactive barrier to remediate CVOCs within the off site areas of the groundwater plume" Initial discussions on the impact of this information to the Off Depot RD were discussed at the BRAC Cleanup Team (BCT) meeting on 19 October 2006.

Additional monitoring wells installed in the Off-Depot area since completion of the ROD provided new information on groundwater flow gradient, saturated thickness, and contaminant concentrations around the ROD-proposed location of the zero-valent iron (ZVI) permeable reactive barrier (PRB). The relatively low groundwater gradient in that area would make it difficult to ensure consistent flow through a ZVI PRB, while the thicker saturated zone would increase the construction cost. In addition, concentrations of chlorinated volatile organic compounds (CVOCs) downgradient of the ROD-proposed ZVI PRB location exceed 5,000 parts per billion (ppb), which is an order-of-magnitude higher than those presented in the ROD. These concentrations are higher than considered appropriate for monitored natural attenuation (MNA) and would require active treatment downgradient of the ZVI PRB.

To comply with the ROD and account for the new hydrogeologic information, a new ZVI PRB alignment near the midpoint of the off-Depot plume was proposed during development of the Intermediate (60%) Off-Depot RD. This location was selected because of a thinner saturated zone and a narrowing of the CVOC plume. As part of the ZVI PRB design effort, a pilot-scale ZVI PRB was installed using the jet grouting or "jetting" technique to evaluate its implementability and cost-effectiveness. Key findings that could adversely impact the expected effectiveness and cost of a full-scale ZVI PRB include the following:

- **Highly variable clay surface.** The top of the clay surface is highly variable, which could result in iron/sand columns that are either above or below the top of clay. Consequences include the potential for the CVOC plume to pass over or under the full-scale ZVI PRB or that iron installed below the top of clay is essentially wasted.

- **High groundwater velocities.** Aquifer testing conducted as part of the study indicated much higher groundwater velocities than previously understood (5 to 6 feet per day [ft/d] versus approximately 1 ft/d before). These new groundwater velocities would require a 5 to 6 foot thick ZVI PRB.

- **Construction challenges.** The jetting technique used for the pilot-scale ZVI PRB requires modification to address incomplete removal of formation material during the jetting process and impacts of sidewall sloughing and variable column diameter on overall system effectiveness.

- **Supplemental technologies would be required.** Multiple injection wells for enhanced bioremediation were proposed in the 60% Off-Depot RD to address elevated CVOC concentrations downgradient of the full-scale ZVI PRB location.

Therefore, based on the hydrogeologic and CVOC data collected since the ROD was signed and the challenges associated with the installation of a cost-effective, full-scale ZVI PRB, enhanced bioremediation through injection of a carbon donor substrate is considered a more appropriate remedy for the Off-Depot CVOC plume. Enhanced bioremediation is presently being implemented on the Main Installation and the facilities and equipment could readily be used for the Off-Depot RA. Enhanced bioremediation offers implementation flexibility in that the treatment area can be adjusted to address changes in plume geometry. Finally, the use of multiple rows or transects of injection wells along the CVOC plume and perpendicular to groundwater flow would be a more aggressive approach than a single ZVI PRB for meeting Dunn Field remediation action objectives (RAOs).

The length of the extension is based on the time required to modify the Off-Depot RD for the change in remedy from the ZVI PRB to enhanced bioremediation and to perform a study to determine the most effective approach for enhanced bioremediation. Though there is compelling evidence that the primary off-Depot contaminants, 1,1,2,2-tetrachloroethane and trichloroethylene, are biodegradable in natural systems, a microcosm study will be conducted before the RD can be completed to assess compound-specific biodegradation kinetics, substrate preference, and necessity and effectiveness of bioaugmentation. The microcosm study is anticipated to include use of three potential substrates for biostimulation (lactate, edible oil substrate [EOS®], and ChitoRem™) with and without bioaugmentation (using a proprietary consortium of bacteria [WBC-2]). A control test will also be performed without biostimulation or bioaugmentation. Fluvial aquifer soils and groundwater will have to be collected for the study, and the findings and other relevant site data will have to be incorporated into the Pre-Final Off-

Depot RD. The preliminary schedule for completing the elements of the Pre-Final Off-Depot RD is as follows:

Task	Duration	Start	Finish
Collect fluvial aquifer soil and groundwater	5 days	18 December 2006	22 December 2006
Microcosm study conducted by SiREM in Guelph, Ontario.	120 days	15 January 2007	15 May 2007
Data analysis and reporting	30 days	1 May 2007	1 June 2007
Completion and submittal of Pre-Final Off-Depot RD	60 days	15 May 2007	20 July 2007

The extension for the RD will result in delays for the Off-Depot Remedial Action Work Plan (RAWP), Notice of Remedial Action Implementation, and associated remedial activities and reports. The change to the selected remedy will also require revision of the Dunn Field Proposed Remedial Action Plan and an Amendment to the Dunn Field ROD.

The Master Schedule for DDMT is currently being revised for the BRAC Cleanup Plan (BCP), Version 10, which serves as the Site Management Plan required by FFA Section XXI. The BCP is to be submitted to the BRAC Cleanup Team on 1 December 2006. The revised dates for the Off-Depot activities and documents are as follows:

Task	BCP V9	BCP V10
Submit Pre-Final Off Depot Groundwater RD	11 December 2006	20 July 2007
Submit Final Off Depot Groundwater RD, Rev. 0	10 April 2007	16 November 2007
Submit Off Depot Groundwater RAWP, Rev.0	9 June 2007	17 December 2007
Submit Revised Proposed Plan Rev. 0	-	21 May 2007
Public Comment/Meeting Period Close	-	31 December 2007
ROD Amendment Rev 0 Submitted	-	20 July 2007
Final ROD Amendment Signed	-	29 April 2008
Notice of Off Depot GW RA Implementation	12 February 2008	21 August 2008
Submit Off Depot GW Interim RACR, Rev. 0	4 December 2009	23 January 2010
Off Depot GW RA Complete/Remedy In Place	23 June 2010	11 October 2010

Should you have any questions regarding this request, please don't hesitate in contacting me at (717) 770-6950 or the e^{2}M Project Manager, Tom Holmes, as (404) 237-3982.

MICHAEL A. DOBBS
Chief, Environmental Safety and Occupational Health

cc: CH2M HILL (Nelson)
e^{2}M (Holmes)
Mitretek (Miller)

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