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**Draft Final
Remedial Action Completion Report**

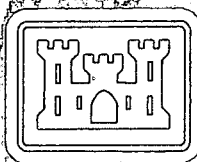
**Former Fire Training Area
(Operable Unit 004)**

at

**Marshall Army Airfield
Fort Riley, Kansas**

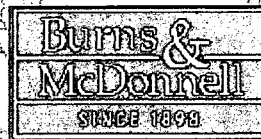
August 12, 2010

Prepared for



U.S. Army Corps of Engineers
Kansas City District

Prepared by



Contract Number: W912DQ-08-D-0017
Project Number: 55426



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List of Acronyms and Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below Ground Surface
BLRA	Baseline Risk Assessment
BmCD	Burns & McDonnell Engineering Company, Inc.
CENWK	United States Army Corps of Engineers, Kansas City District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
<i>cis</i> -1,2-DCE	<i>cis</i> -1,2-dichloroethene
COC	Chemical of Concern
COPC	Chemical of Potential Concern
DA	Department of the Army
DERA	Defense Environmental Restoration Account
DoD	Department of Defense
DSR	Data Summary Report
EAB	Enhanced Anaerobic Bioremediation
EAEST	EA Engineering, Science, and Technology, Inc.
EDG	Environmental Data Groupings
EE/CA	Engineering Evaluation/Cost Analysis
EUC	Environmental Use Control
FFA	Federal Facility Agreement
FFTA	Former Fire Training Area
FS	Feasibility Study
ft	Foot/feet
HRS	Hazard Ranking System
IC	Institutional Controls
IRP	Installation Restoration Program
IWSA	Installation-Wide Site Assessment
KDHE	Kansas Department of Health and Environment
LBA	Louis Berger & Associates
MAAF	Marshall Army Airfield
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
MP	Malcolm Pirnie
MPEO	Master Plan Environmental Overlay

List of Acronyms and Abbreviations

NA	Natural Attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethene (or Perchloroethene)
PP	Proposed Plan
PRG	Preliminary Remediation Goal
PWE	Directorate of Public Works – Environmental Division
RACR	Remedial Action Completion Report
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPMP	Fort Riley Real Property Master Plan
SI	Site Investigation
SOP	Standard Operating Procedure
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TCL	Target Compound List
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
µg/L	Micrograms per Liter

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Remedial Action Completion Report (RACR) for the Former Fire Training Area (FFTA) at Marshall Army Airfield (MAAF) (FFTA-MAAF Site) (Operable Unit [OU] 004) at Fort Riley, Kansas is to document the completion of the remedial actions necessary to restore the site to a non-restricted use. The remedy was implemented in accordance with the Record of Decision (ROD) and the Remedial Design/Remedial Action Plan (RD/RAP) for the FFTA-MAAF Site (OU 004) (Burns & McDonnell Engineering Company, Inc. [BMcD], 2005a and Malcolm Pirnie [MP]/BMcD, 2006).

This document has the following sections:

- Section 1.0 Introduction
- Section 2.0 Record of Decision
- Section 3.0 Demonstration of "Site Completion"
- Section 4.0 Ongoing Activities
- Section 5.0 Community Involvement
- Section 6.0 Summary and Conclusions
- Section 7.0 Certification Statement
- Section 8.0 References

This RACR has been prepared in accordance with guidance promulgated by the Department of Defense (DoD) and the United States Environmental Protection Agency (USEPA) on the streamlined site closeout process. A copy of this guidance is provided with this RACR in Addendum A.

1.2 SUMMARY OF THE FFTA-MAAF (OU 004) SITE CHARACTERISTICS

The FFTA-MAAF Site (OU 004) is located at the north end of the MAAF in the southern region of the Fort Riley Military Installation and extends to the Kansas River. MAAF is in the southern region of Fort Riley, south of the Kansas River (Figure 1-1). The term Site is used in this report to refer to the general area extending from the FFTA north to the Kansas River. Information on the other four operable units at Fort Riley is provided in Addendum B to this report.

Introduction

Fort Riley is identified by the USEPA as Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) site KS6214020756. This document is issued by the Department of the Army (DA), the lead agency for the activities at Fort Riley, with consultation with the USEPA and the Kansas Department of Health and Environment (KDHE), the support agencies. Cleanup work at the FFTA-MAAF Site (OU 004) has been funded by the DA, Fort Riley through the Installation Restoration Program (IRP).

The FFTA was operated from the mid-1960s through 1984 to conduct fire-training exercises. During these exercises, flammable liquids were poured into the FFTA, ignited, and then extinguished. The predominant fuels used for the fire training exercises were JP-4 (jet fuel), diesel, and MOGAS (a generic term for leaded motor gasoline). In August 1982, reportedly 55 gallons of tetrachloroethene (PCE) were inadvertently poured into a pit at the FFTA. The next day it was pumped out of the pit and into 55-gallon drums. Fire fighting training has not been conducted at the FFTA since 1984. Contaminants at the FFTA-MAAF Site (OU 004) are believed to have entered the environment through the FFTA and moved downward through the soil to the groundwater. Some of these contaminants migrated in the groundwater northward from the FFTA off the post and under private property (BMcD, 2001).

Hazard Ranking System (HRS) scoring was performed by the USEPA in 1988, which resulted in Fort Riley being proposed for inclusion on the National Priorities List (NPL) in 1989 pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The USEPA formally listed Fort Riley on the NPL in 1990 (BMcD, 2001). In 1991, the DA entered into a Federal Facility Agreement (FFA) with the KDHE and USEPA Region VII to address environmental pollution subject to the Resource Conservation and Recovery Act (RCRA) and/or CERCLA (USEPA, 1991). This agreement is also referred to as the Interagency Agreement. Fort Riley subsequently conducted an Installation-Wide Site Assessment (IWSA) in 1992 (Louis Berger & Associates [LBA], 1992) to identify sites having the potential to release hazardous substances to the environment. The FFTA was identified in the IWSA as a site where releases of hazardous substances to the environment either occurred or were likely to have occurred. In 1994, a site investigation (SI) was conducted for the FFTA-MAAF. The SI results indicated that organic compounds had been released to groundwater and were present at concentrations exceeding federal and state drinking water standards. Also, similar contaminants were found in off-site private wells at levels above drinking water standards (LBA, 1994). These results indicated that additional investigation and study at the FFTA-MAAF Site (OU 004) were necessary.

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A source removal pilot study using soil vapor extraction (SVE) and bioventing technologies was performed at the FFTA from November 1994 through May 1995. This remediation effort was successful in removing from the soil an estimated 1,900 pounds of contaminants (primarily petroleum hydrocarbon compounds) from one area and an estimated 470 pounds of contaminants (primarily PCE) from a second area (BMcD, 2004a). Soil samples were collected following the pilot study to confirm source removal. A comparison between pre-pilot study analytical results and post-pilot study analytical results revealed an overall reduction in the number and levels of chemicals detected in soils near the treatment area. Post-pilot study results are described in both the Remedial Investigation (RI) report (BMcD, 2001) and in the *Data Summary Report for Post-Pilot Study Expanded Soil Sampling for the Expanded Site Investigation, Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas, and Nearby Off-Post Properties* (LBA, 1996).

Monitoring wells associated with the FFTA-MAAF Site (OU 004) have been sampled by LBA (1994 through 1996), BMcD (1997 through 2005), and EA Engineering, Science, and Technology, Inc. (EAEST) (2006 through 2009) as part of the groundwater monitoring program at Fort Riley. Details on the monitoring program can be found in the RD/RAP (MP/BMcD, 2006). The results of these sampling events are provided in the Data Summary Reports (DSRs) for each event, which are available as part of the administrative record for the FFTA-MAAF Site (OU 004).

In 1996, Fort Riley began a RI/feasibility study (FS), including a baseline risk assessment (BLRA) (human health and ecological evaluation), to identify the types, quantities, locations, and risk of the contaminants at the FFTA-MAAF Site (OU 004) and to develop a plan to address the contamination problem. The resulting *Exposure Control Action Engineering Evaluation/Cost Analysis for the Former Fire Training Area, Marshall Army Airfield, Fort Riley, Kansas and Nearby Off-Post Properties* (LBA, 1997) recommended the installation of two new supply wells within the aquifer in areas that have not been influenced by the groundwater plume. Two alternate water supply wells were installed in August 2002 after a lawsuit settlement to replace private wells impacted by the contaminant plume at the FFTA-MAAF Site (OU 004). The impacted private wells and two additional unimpacted wells were then abandoned. With the removal of these wells, there were no longer any private wells impacted by the contaminant plume at the FFTA-MAAF Site (OU 004) (BMcD, 2004a).

Another engineering evaluation/cost analysis (EE/CA) was performed in 1997 to describe current conditions and to propose a groundwater removal action for remediating threats to human health and the

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environment associated with the FFTA-MAAF Site (OU 004). The results of the EE/CA are presented in the *Draft Groundwater Engineering Evaluation/Cost Analysis for the Former Fire Training Area at Marshall Army Airfield, Fort Riley, Kansas* (BMcD, 1998). This EE/CA was never finalized because the plume characterization activities defined a larger plume than anticipated and addressing hot-spot contamination was no longer applicable. It was agreed by Fort Riley, the United States Army Corps of Engineers, Kansas City District (CENWK), and regulators to suspend the report, and proceed with the RI and the FS reports.

In 1996, the Army began an RI/FS to identify the types, quantities, and locations of the contaminants at the FFTA-MAAF Site (OU 004) and to develop a plan to address the contamination problem. The RI report provided the basis for the FS report which presented the alternatives available to address potential risk identified in the RI report. The USEPA and KDHE approved the RI and FS reports in 2001 and 2003, respectively (BMcD, 2004a). In August 2004, two monitoring wells were installed on the north bank of the Kansas River, adjacent to the Southwest Funston Landfill, to provide additional monitoring points at KDHE's request as part of the 2001 approval of the RI report.

The Proposed Plan (BMcD, 2004a) was issued to inform the public of Fort Riley's, USEPA's, and KDHE's preferred remedy based on information included in the Administrative Record and to solicit public comments pertaining to the remedial alternatives evaluated, including the preferred alternative. The Proposed Plan described the remedial alternatives considered for the FFTA-MAAF Site (OU 004) and identified the preferred remedial alternative with the rationale for this preference. Submitted in May 2004, the Draft Final Proposed Plan was approved by the KDHE and USEPA with no comments. The ROD (BMcD, 2005a) was prepared and was signed in August 2005. The Remedial Design/Remedial Action Plan (MP/BMcD, 2006) was subsequently prepared to document specific guidance for the implementation of the remedial alternative.

MAAF is located in the southern region of Fort Riley, south of the Kansas River. The FFTA is located at the north end of the MAAF, approximately 300 feet (ft) southwest of the Fort Riley reservation boundary (Figure 1-1). The source of contamination in soil, which was located in the former drum storage area and former burn pit area, was reduced to concentrations below the levels determined by KDHE to prevent further leaching of contaminants to groundwater (LBA, 1999 and BMcD, 2001). The groundwater plume originated from the fire training pit area at the FFTA, but migrated from the FFTA in a northeasterly direction toward the Kansas River.

Introduction

The FFTA-MAAF Site (OU 004) is located on the alluvial floodplain of the Kansas River. The material beneath the FFTA-MAAF Site (OU 004) consists primarily of unconsolidated alluvial sand and gravel deposits (with minor discontinuous lenses of silt and clay) that tend to coarsen downward to the bedrock surface. The top of bedrock is at a depth of approximately 60 to 70 ft below ground surface (bgs), and is composed of limestone and shale units that dip gently to the west-northwest. A more detailed description of the geology of the FFTA-MAAF Site (OU 004) is presented in the RI report (BMcD, 2001).

The FFTA-MAAF is covered with soil and has a well-established grass cover; its previous location is no longer discernible in the field. After use of the FFTA-MAAF was discontinued in 1984, a new road and associated drainage ditch were constructed along the northern edge of the airfield. The new road runs south of the boundary of the former FFTA-MAAF burn pit and the new grass-lined drainage ditch transects the former burn pit. Surface soil was excavated from portions of the FFTA-MAAF during road construction to complete the project and improve surface drainage. As needed, soil was spread in nearby areas consistent with the natural topography. With the exception of the drainage ditch and a low area east of the former burn pit, the surrounding area is relatively flat with a gentle grade to the south.

The FFTA-MAAF Site (OU 004) is underlain by the alluvial aquifer of the Kansas River valley. This aquifer is unconfined and connected hydraulically to the Kansas River. Underlying the alluvial sediments is bedrock composed of limestone and shale units that are considered to be relatively impermeable, compared to the much more permeable alluvial sediments.

Depth to the water table at the FFTA-MAAF Site (OU 004) generally has ranged between 20 to 25 ft bgs. Groundwater flow within the alluvium is generally toward the north-northeast and parallel to the alluvial valley. For any one sampling event, the horizontal component of the hydraulic gradient has typically been in the range of 0.0006 to 0.0009 ft/ft. Horizontal hydraulic conductivity ranges from 600 to 900 ft/day and increases with depth. Effective porosity ranges from 0.31 to 0.40, with a mean of 0.35. More detailed information on the hydrogeology of the FFTA-MAAF Site (OU 004) is presented in the RI report (BMcD, 2001).

Drinking water for MAAF is supplied from the Fort Riley well field, which is located approximately four miles upgradient (west) of the FFTA-MAAF Site (OU 004) near Camp Forsyth. A well for emergency fire supply is located at the south end of MAAF, approximately one mile upgradient of the FFTA-MAAF Site (OU 004). Several water supply wells are present in the area north of the FFTA-MAAF Site (OU 004) and

south of the Kansas River. These wells are outside the area where groundwater was impacted by contamination.

1.3 MAJOR FINDINGS AND RESULTS OF THE RI/FS

1.3.1 Nature and Extent of Contamination

The known or suspected sources, types, and location (nature and extent) of contamination were presented in the RI report (BMcD, 2001). The locations of additional information in the RI Report on the vertical and lateral extent of contamination are provided in Addendum B to this report. Major findings of the RI are presented in the following bullets:

- Soil contamination was detected over a 120-ft by 240-ft area to a depth of 15 ft in the FFTA. The levels of the soil contaminants, including chlorinated solvents and petroleum hydrocarbons, were reduced at the FFTA through a source removal pilot study in 1995 (BMcD, 2001). Soil data following treatment in 1995 confirmed that there was no source material remaining that would cause the soil to be classified as a principle threat waste. The concentrations of volatile organic compounds (VOCs) remaining in the soil do not contribute to or drive risk at the FFTA-MAAF Site (OU 004) (BMcD, 2001).
- As an alternative water supply/interim removal action, two private water supply wells were installed and five existing wells were abandoned in 2002. The two new wells are located outside of the contaminated groundwater plume, further reducing the potential human health risk.
- The two contaminants of concern (COCs) (trichloroethene [TCE] and *cis*-1,2-dichloroethene [*cis*-1,2-DCE]) present in the dissolved phase in groundwater drove the need for remedial action at the FFTA-MAAF Site (OU 004). Data did not indicate that there was source material (e.g., liquids, areas of contamination with high concentrations of toxic compounds, highly mobile materials, or dense non-aqueous phase liquids) in the soil or groundwater at the FFTA-MAAF Site (OU 004).
- Groundwater was a medium of concern at the FFTA-MAAF Site (OU 004). The COCs (TCE and *cis*-1,2-DCE) were detected in groundwater at concentrations exceeding Maximum Contaminant Levels (MCLs). TCE and *cis*-1,2-DCE were the degradation products of the PCE spilled at the FFTA-MAAF Site (OU 004).

- The groundwater water contamination at the FFTA-MAAF Site (OU 004) extended from the FFTA to the Kansas River and generally increased in depth with distance from the FFTA. Analytical samples from the Kansas River were nondetect for the COCs.
- Natural attenuation of contaminants was the dominant mechanism for the decrease in contaminant levels in groundwater at the FFTA-MAAF Site (OU 004). Natural attenuation was determined to be occurring at the FFTA-MAAF Site (OU 004) based on the presence of degradation products of PCE and favorable natural attenuation parameters (temperature, pH, methane, alkalinity, nitrate as nitrogen, sulfate, chloride, total organic carbon, dissolved oxygen, oxidation-reduction potential, and ferrous iron).

1.3.2 Characterization of Risk

The BLRA (human health and ecological) that was completed for the FFTA-MAAF Site (OU 004) in 2001 found that the estimated risks to human health and the environment were within or below the USEPA acceptable levels. However, Fort Riley's remedy decision was based primarily on the presence of site-related contaminants off the site in the alluvial aquifer at levels exceeding drinking water standards (MCLs), identified as an applicable or relevant and appropriate requirement (ARAR). The off-site contamination affected nearby wells at the racetrack and adjacent farms along the Kansas River. The installation of alternate water supply wells addressed the risk due to off-site contamination and there is currently no human use of groundwater at the FFTA-MAAF Site (OU 004). The source of contamination in soil was reduced to concentrations below the KDHE soil to groundwater protection pathway level that would prevent further leaching of contaminants to groundwater. The source reduction occurred through a source removal pilot study (using SVE and bioventing technologies) and was completed in May of 1995. The levels of VOCs remaining in the soil did not contribute to or drive the risk at the FFTA-MAAF Site (OU 004). Natural attenuation, combined with the source removal, was responsible for the continuing decrease of contaminant levels in groundwater. However, future use of the groundwater at the FFTA-MAAF Site (OU 004) and off the site would be affected if current concentrations of contamination did not decrease to below the MCLs and development allows for use of the groundwater for drinking water. For this reason, despite the absence of human health or ecological risks, the exceedance of MCLs provided the basis for remedial action at the FFTA-MAAF Site (OU 004).

1.3.3 Feasibility Study

A feasibility study report was prepared to evaluate remedial alternatives for the FFTA-MAAF Site (OU 004) (BMCD, 2003a). Nine alternatives were evaluated, including no action, monitored natural attenuation (MNA), chemox treatment, enhanced anaerobic bioremediation (EAB), zero-valent iron permeable reactive barrier, in-situ redox manipulation, bimetallic nanoscale particles, air sparge/soil vapor extraction, and groundwater extraction and ex-situ treatment. The locations of tables in which the nine alternatives are evaluated in previous primary documents are provided in Addendum B to this report. Institutional controls (ICs) and monitoring were also components of all alternatives, with the exception of no action.

MNA with ICs was selected as the remedy for the FFTA-MAAF Site (OU 004). ICs were used to ensure that receptors are not exposed to contaminated groundwater. MNA relies on natural degradation processes already demonstrated to be occurring at the FFTA-MAAF Site (OU 004) and off the site (downgradient) to further reduce contaminant concentrations to or below MCLs. Monitoring was conducted to follow the effectiveness and progress of natural attenuation.

2.0 RECORD OF DECISION

2.1 ROD FINDINGS

MNA with ICs was selected as the remedy for the FFTA-MAAF Site (OU 004). ICs are used in this alternative to prevent exposure of receptors to contaminated groundwater. MNA relies on natural degradation processes demonstrated to be occurring at the FFTA-MAAF Site (OU 004) and off the site (downgradient) to further reduce contaminant concentrations to or below MCLs. Monitoring was conducted to evaluate the effectiveness and progress of natural attenuation. ICs included land use controls which prohibited the installation of water supply wells within the impacted area. The ICs are described in more detail in Section 3.1 of this RACR.

The DA, USEPA, and KDHE determined that MNA with ICs met the requirements of CERCLA and, to the extent practical, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This remedy was chosen over the other alternatives because it provided risk reduction through degradation of contaminants in the groundwater and provided measures to prevent future exposure to contaminated groundwater. Based on information available at the time the ROD was finalized, the DA, USEPA, and KDHE believed the selected remedy would be protective of human health and the environment, would comply with ARARs, would be cost-effective, and would utilize permanent solutions to the maximum extent practicable (BMcD, 2005a). Although MNA with ICs did not involve engineered treatment, it did rely on natural degradation processes which were already occurring at the FFTA-MAAF Site (OU 004) to further reduce contaminant concentrations to levels below the MCLs. Evidence of natural degradation processes at the Site, as discussed in the USEPA MNA guidance document (USEPA, 1999) included 1) decreasing contaminant concentration trends and 2) supporting geochemical data measurements. In addition, based on available data, natural attenuation/degradation of the VOCs plume(s) was effectively reducing the contamination. The selection of MNA as the selected remedy was based on current (at the time) and reasonably projected land use and exposures. However, hazardous substances, pollutants, or contaminants might remain at the FFTA-MAAF Site (OU 004) above levels that would allow for unlimited use and unrestricted exposure. The rationale for choosing this remedy was based on the fact that no source materials (such as liquids, areas contaminated with high concentrations of toxic compounds, or highly mobile materials) constituted principal threat wastes that required further treatment likely existed at the FFTA-MAAF Site (OU 004).

This section will provide additional discussion on the remedial action objectives and remediation goals for the FFTA-MAAF Site (OU 004), as presented in the ROD (BMcD, 2005a).

2.2 REMEDIAL ACTION OBJECTIVES AND REMEDIATION GOALS

As identified in the USEPA guidance (USEPA, 1997), a remedial action is generally warranted if one or more of the following conditions apply:

- Cumulative excess carcinogenic risk to an individual exceeds one in ten thousand (or 1×10^{-4}),
- Non-carcinogenic hazard index is greater than one,
- Site contaminants cause adverse environmental impacts, and/or
- Chemical-specific standards (i.e., ARARs) or other measures that define acceptable levels are exceeded and exposure to contaminants above these levels is predicted for the reasonable maximum exposure identified in the risk assessment.

At the time of the completion of the FS for the FFTA-MAAF Site (OU 004), only the last listed item above applied, in that chemical-specific ARARs were being exceeded. The drinking water standards (i.e., MCLs) were exceeded in the groundwater, which could potentially be used as a future drinking water source.

The Remedial Action Objectives (RAOs) for the FFTA-MAAF Site (OU 004) were identified as:

- Prevent use of groundwater with contaminant levels exceeding the MCLs as a drinking water source; and
- Reduce contaminant levels, to the extent practicable and appropriate, through natural attenuation processes.

The ultimate goal was for the groundwater to meet unrestricted use requirements. The Preliminary Remediation Goals (PRGs) for groundwater at the FFTA-MAAF Site (OU 004) were levels determined safe for drinking water (MCLs). The MCLs for COCs that drive the risk at the FFTA-MAAF Site (OU 004) were as follows:

- TCE: 5 micrograms per liter ($\mu\text{g/L}$)
- *cis*-1,2-DCE: 70 $\mu\text{g/L}$

PCE and vinyl chloride were not included as COCs because both were detected at levels below their respective MCLs. There were only low level, sporadic detections of vinyl chloride across the site, indicating that there was no accumulation of the degradation byproduct in the groundwater (BMcD, 2005a).

There were no reasonably anticipated changes in the future water uses at the FFTA-MAAF Site (OU 004).

2.3 REMEDIAL ACTION TAKEN TO ACCOMPLISH RAOs AND MEET REMEDATION GOALS

Fort Riley, as lead agency under the FFA, established a course of action to accomplish each of the components of the selected remedy for the FFTA-MAAF Site (OU 004). The locations of additional information about the specific remedial actions that were undertaken to reach the RAOs are provided in Addendum B to this report. The following are the key elements of the selected remedial action which was implemented:

- Removed the SVE shed and concrete slab;
- Plugged and abandoned all holes and removal of all piping at the SVE shed area;
- Decommissioned selected piezometers;
- Decommissioned selected monitoring wells determined to be unnecessary for future sampling events;
- Sampled selected groundwater monitoring wells;
- Sampled two private groundwater supply wells (M02-02 and R02-02);
- Conducted annual inspections and periodic maintenance and repair of the monitoring wells.
- Restricted site access and the installation and use of groundwater supply wells at and downgradient of the FFTA-MAAF Site (OU 004);
- Provide sampling results to the affected off-site landowners until groundwater quality has been restored; and
- Conduct a review in accordance with Section 121(c) of CERCLA at least every five years after initiation.

The key factors which influenced Fort Riley in the selection of MNA with ICs included the following:

- Soil contamination was reduced through a source removal pilot study (using SVE and bioventing technologies) to below levels determined by KDHE to prevent further leaching to groundwater.
- As an alternative water supply/interim removal action, two private water supply wells were installed and five existing wells were abandoned in 2002. The two new wells were located outside of the contaminated groundwater plume. This reduced the potential exposure of human health receptors to contaminated groundwater and thus the potential for risk; further supporting MNA.
- Monitoring data indicated no evidence of principal threat waste.
- Natural attenuation combined with source removal had resulted in a continuing decrease in contaminant concentrations in groundwater.
- The selected remedy was expected to continue to provide risk reduction through degradation of contaminants in groundwater.
- The selected remedy provided measures to prevent future exposure to contaminated groundwater.
- DA, USEPA, KDHE, and the public believed that the selected remedy would be protective of human health and the environment, would comply with ARARs, would be cost-effective, and would use permanent solutions and alternative treatment technologies to the maximum extent practicable.

3.0 DEMONSTRATION OF "SITE COMPLETION"

3.1 Institutional Controls

The inclusion of ICs as a component of the remedial remedy at the FFTA-MAAF Site (OU 004) reduced the potential for human ingestion, inhalation, or dermal contact with contaminated groundwater. Because the contamination impacted both private and federal property, there were significant differences in the way ICs were applied on and off the post. The ICs applied included both land use and site access control.

The primary control for the off-post portion of the FFTA-MAAF Site (OU 004) was the implementation of ICs for property with environmental contamination above unrestricted land-use standards. The ICs restricted future use to agricultural, industrial, or commercial use and prohibited the installation of drinking water wells within the impacted areas. These restrictions limited the exposure at the FFTA-MAAF Site (OU 004) by:

- Provided access for DA to continue monitoring;
- Provided access for the USEPA and KDHE to conduct site inspections to confirm land and water use;
- Prohibited installation of groundwater wells within the impacted area; and
- Ensured that future owners and tenants were aware of contamination at the FFTA-MAAF Site (OU 004).

These ICs were in the form of proprietary controls to limit land and water use. The USEPA guidance on ICs suggested that controls should be "layered" to enhance the effectiveness and protectiveness of the remedy (USEPA, 2000). Layering refers to using different types of ICs together or in series to enhance their effectiveness on other ICs. Layering of ICs at the FFTA-MAAF Site (OU 004) included the following:

- The KDHE Environmental Use Control (EUC) Program restricted future use to agricultural, industrial, or commercial use and prohibited installation of drinking water wells within the areas of the site that had contaminant concentrations above MCLs. The EUC program required the impacted landowners to make application to the KDHE for approval of an EUC program for their property. The KDHE then provided oversight to ensure that the conditions imposed were followed. The Proposed Plan addressed the implementation of the KDHE EUC Program;

however, it was not implemented because groundwater concentrations reached and maintained levels below MCLs.

- Deed notices were filed for impacted adjacent properties, with the consent of the landowner. Deed notices are not enforceable, but they provided an informational provision that alerted anyone performing a title search that the property was located within an area impacted by a CERCLA site.
- Zoning for the FFTA-MAAF Site (OU 004) remained agricultural, which allows for the construction of residential dwellings. However, the FFTA-MAAF Site (OU 004) is located in the floodplain of the Kansas River, where new construction is limited by a zoning ordinance. This restriction limited the chance of a new drinking water well being installed within the area.

Other controls implemented off-post included the installation of alternate water supply wells, community awareness, and groundwater monitoring.

The primary IC for the on-post portion of the FFTA-MAAF Site (OU 004) was to restrict land use through the environmental overlay of the Fort Riley Real Property Master Plan (RPMP). The long-range component of the RPMP consists of narratives and supporting graphics that include a Master Plan Environmental Overlay (MPEO) which reflects operational and environmental constraints. These constraints were reflected in the MPEO and in the land-use analysis narrative. The purpose of the environmental overlay is to graphically depict the environmental data groupings (EDGs), which included:

- Surface/aerial limiting factors; for example, noise and flood plains;
- Underground hazards/limiters; for example, groundwater and Defense Environmental Restoration Account (DERA) issues; and
- Surface hazardous and toxic materials / waste issues.

The MPEO illustrated FFTA-MAAF Site (OU 004) site features including site boundaries, monitoring well locations, and the location of gates and signage.

The FFTA-MAAF Site (OU 004) was designated as restricted land use in the RPMP. Restrictions limited exposure to contaminants at the FFTA-MAAF Site (OU 004) by:

- Limiting land use to non-residential;
- Controlling public access;

- Prohibited installation of drinking water wells and other uses of groundwater in the area; and
- Involving the Fort Riley Directorate of Public Works – Environmental Division (PWE) personnel in planning for future activities at the FFTA-MAAF Site (OU 004).

Additionally, land use at the FFTA-MAAF Site (OU 004) was restricted because of its proximity to the floodplain of the Kansas River.

3.2 SOURCE REMOVAL

Soil contamination was detected over a 120-ft by 240-ft area to a depth of 15 ft in the FFTA. The levels of the soil contaminants, including chlorinated solvents and petroleum hydrocarbons, were reduced at the FFTA through a source removal pilot study (using SVE and bioventing) in 1995. The source of contamination in soil was reduced to concentrations below the KDHE soil to groundwater protection pathway that would prevent further leaching of contaminants to groundwater. Soil data following treatment confirmed that there was no source material remaining that would make the soil classified as a principal threat waste. The concentrations of VOCs remaining in the soil do not contribute to or drive the risk at the FFTA-MAAF Site (OU 004) (BMcD, 2001; LBA, 1996; and LBA, 1999).

3.3 MONITORED NATURAL ATTENUATION PROGRAM

The objectives of the MNA program were to:

- Monitor groundwater contaminant concentrations and reduce contaminant levels, to the extent practicable and appropriate, through natural attenuation processes; and
- Monitor geochemical parameters to determine if conditions favorable to MNA were present.

As part of the BLRA, chemicals of potential concern (COPCs) were identified. However, the BLRA indicated that the estimated risks to human health and the environment were within or below the USEPA acceptable levels. Two site-related contaminants present off the site in the alluvial aquifer at levels exceeding drinking water standards (MCLs, identified as an ARAR) were selected as the COCs at the FFTA-MAAF Site (OU 004). These two contaminants, TCE and *cis*-1,2-DCE, were identified in the FS (BMcD, 2003a). The MCLs for these compounds are 5 µg/L and 70 µg/L, respectively.

The groundwater monitoring program adopted in the RD/RAP considered more than 10 years of groundwater sampling, data evaluation, and trend analysis. Based on this, the following monitoring wells were selected for inclusion in the MNA program:

- Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-94-09 were used to monitor the VOC concentrations in the shallow zone.
- Monitoring Wells FP-96-26b, FP-98-27b, FP-98-28b, FP-98-29b, FP-98-31b, and FP-99-32b were used to monitor the VOC concentrations in the intermediate zone.
- Monitoring Wells FP-98-29c, FP-98-30c, FP-99-32c, and FP-04-33c were used to monitor the VOC concentrations in the deep zone.
- Private Wells M02-02 and R02-02 were used to monitor the VOC concentrations in the private wells.

The locations of additional information in the RI Report on the depth ranges for the terms "shallow zone," "intermediate zone," and "deep zone," information on these intervals for the private wells (M02-02 and R02-02), and well construction diagrams are provided in Addendum B to this report.

Sampling was conducted in accordance with the standard operating procedures (SOPs) in the *Installation-Wide Sampling and Analysis Plan for Environmental Investigations at Fort Riley, Kansas, Volume I - Field Sampling Plan* (MP-BMcD, 2004). Monitoring wells were sampled for Target Compound List (TCL) VOCs, naphthalene, natural attenuation (NA) parameters (methane, ethane, ethene, alkalinity, total organic carbon, nitrate, nitrite, sulfide, sulfate, dissolved oxygen, oxidation-reduction potential, and ferrous iron), and general water quality parameters (temperature, pH, turbidity, and specific conductivity). Water levels were measured and recorded for all monitoring wells during a 24-hour period immediately prior to the commencement of sampling operations. Annual inspections of the monitoring wells were conducted in conjunction with groundwater sampling events. Maintenance and repair of monitoring wells was not required.

Groundwater sampling results for monitoring wells included in the remedial action are presented in the Data Summary Reports prepared for sampling events conducted between 2003 and 2009 (BMcD, 2003b, 2004b, 2004c, 2005b, and 2005c; EAEST, 2007a, 2007b, 2008, and 2009). Results for PCE, TCE, and *cis*-1,2-DCE are presented in Tables 3-1, 3-2, and 3-3 for those monitoring wells retained in the sampling program. Significant results are discussed in the following bullets:

- Table 3-1 presents PCE historical detections for 2003 through 2009. PCE was detected only in Monitoring Well FP-93-02 at concentrations ranging from 4.8 to 1.4 µg/L. All of these results are below the MCL for PCE of 5.0 µg/L. The concentration trend over this seven year period was generally decreasing; however, the results for the February 2009 sampling event were elevated over the previous year's result.
- Table 3-2 presents TCE historical detections for 2003 through 2009. TCE was detected in multiple monitoring wells retained for sampling under the remedial response. At all monitoring wells where TCE was detected, TCE concentrations showed decreasing trends. TCE has not been detected in any of these monitoring wells at concentrations above the MCL of 5 µg/L since the March 2003 sampling event, when TCE was detected in Monitoring Wells FP-98-29b and FP-98-31b at concentrations of 6.4 and 7.0 µg/L, respectively.
- Table 3-3 presents *cis*-1,2-DCE historical detections for 2003 through 2009. *cis*-1,2-DCE was detected in multiple monitoring wells retained for sampling under the remedial response, with all monitoring wells showing generally decreasing concentration trends. *cis*-1,2-DCE has not been detected at any of these monitoring wells at concentrations above the MCL of 70 µg/L since the October 2004 sampling event, when *cis*-1,2-DCE was detected in Monitoring Well FP-96-26b at 70.9 µg/L. There was an increase in *cis*-1,2-DCE concentration at Monitoring Well FP-96-26b reflected in the results for the February 2009 sampling event. The concentration was 63.0 µg/L, an increase from 10.4 µg/L detected in February 2008. However, two subsequent sampling events were conducted at this monitoring well in June and September 2009. The *cis*-1,2-DCE concentrations were 5.4 and 4.5 µg/L, respectively. The trend at Monitoring Well FP-96-26b for the last seven years has been decreasing *cis*-1,2-DCE concentrations.

Based on the RAOs which were established for the FFTA-MAAF Site (OU 004) and the results for groundwater monitoring as discussed above, the remedial actions are complete and monitoring can be terminated. As discussed in Section 1.2 of this RACR, the RAOs established included the following:

- Prevent the use of groundwater with contaminant levels exceeding the MCLs as a drinking water source.
- Reduce contaminant levels, to the extent practicable and appropriate, through natural attenuation processes.

Each of these will be addressed in turn, providing the rationale for completion based on the monitoring results.

The remedial action has successfully prevented the use of groundwater with contaminant levels exceeding the MCLs as a drinking water source through the use of both ICs and the installation of alternate supply wells. ICs have been successfully implemented at the FFTA-MAAF Site (OU 004), both on- and off-post. The off-post component included the installation of two alternate supply wells. Also implemented were provisions for continued property access for monitoring, regulator access for site inspections to confirm land and water use, and ensuring that future owners and tenants were aware of groundwater contamination issues at the FFTA-MAAF Site (OU 004). On the post, ICs were implemented through the use of the Fort Riley RPMP.

The second RAO stated that contamination levels would be reduced to below MCLs through use of natural attenuation processes. As discussed previously, there have been no detections of either PCE, TCE, or *cis*-1,2-DCE at concentrations above the MCLs in samples collected from the FFTA-MAAF Site (OU 004) monitoring wells since the October 2004 sampling event (note that PCE is not a COC at the site). There have been three consecutive years with sampling results for COCs below the MCLs. Therefore, the requirements of the second RAO have been satisfied.

3.4 COMPARISON OF COSTS IN RECORD OF DECISION WITH ACTUAL COSTS

Operations and maintenance (O&M) costs include groundwater sample collection, sample analysis, and maintenance of the monitoring wells. The following table provides a summary of O&M costs as estimated in the ROD with actual expenditures.

Fiscal Year	Cost (ROD Estimate) Rounded to nearest \$ 1,000	Actual Cost Rounded to nearest \$ 1,000
2006	\$ 138,000	\$ 53,000
2007	\$ 82,000	\$ 8,000
2008	\$ 82,000	\$ 26,000
2009	\$ 82,000	\$ 43,000
2010	\$ 108,000	\$ 0

4.0 ONGOING ACTIVITIES

4.1 FIVE-YEAR REVIEWS

Five-year reviews are performed to evaluate whether the response action remains protective of human health and the environment. The focus depends on the original goal of the response action. At the FFTA-MAAF Site (OU 004), protectiveness is assured through exposure protection, through the use of ICs, and the degradation of contaminants by natural attenuation processes (monitored through groundwater monitoring). Therefore, the five-year review at the FFTA-MAAF Site (OU 004) will focus on whether the controls remain in place to prevent exposure and whether monitoring indicates that natural attenuation is occurring.

The following guidance for the execution of the Five-Year Review Report is abstracted from the Comprehensive Five-Year Review Guidance (USEPA, 2001):

- The five-year review includes all those Fort Riley OUs for which hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure per 40 CFR Part 300.430(f)(4)(ii).
- The five-year review is triggered by the first OU giving rise to a five-year review (i.e., at Fort Riley, it is the Southwest Funston Landfill). Discussions of subsequent remedies or OUs should be incorporated into the first five-year review conducted or in future reviews, as appropriate. The USEPA general requirements with respect to five-year reviews are applicable to all federal facilities on the NPL. See CERCLA section 120(a)(2).
- Federal agencies are responsible for the costs of all five-year reviews at their facilities.
- Federal agencies are responsible for annually reporting to Congress the reviews conducted at their own facilities, and actions recommended as a result of such reviews.

The following elements are included in a five-year review:

- Document Review
- Standards or ARAR Review
- Site Visit
- Report
- Public Notice

The sampling results at the FFTA-MAAF Site (OU 004) have demonstrated that there are no COCs above the MCLs present and have not been for five years.

The first Five-Year Review Report for Fort Riley sites was completed in July 2002 (Fort Riley IRP, 2002). At that time, the FFTA-MAAF Site (OU 004) was in the RI/FS phase of the CERCLA process. In September 2007, the second Five-Year Review Report was submitted (USACE, 2007). This was the first Five-Year Review Report conducted subsequent to the acceptance of the ROD (signed in August 2005) and the completion of the remedial design (January 2006) for the FFTA-MAAF Site (OU 004). This review concluded that MNA with ICs was protective of human health and the environment, and would continue to be protective as long as the remedy was operated and maintained. It also concluded that exposure pathways that could potentially result in unacceptable risks were being controlled.

Based on 40 CFR Part 300.430(f)(4)(ii), "If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less than every five years after initiation of the selected remedial plan." Per page 1-3 of the Record of Decision dated July 21, 2005 Section 1.4, "When the groundwater cleanup levels (MCLs) have been achieved at all of the monitoring wells (on and off the FFTA-MAAF Site [OU 004]) and have not been exceeded for a period of three consecutive years, the cleanup/recommendation of the FFTA-MAAF Site (OU 004) and the affected off-site areas will be considered complete, and the FFTA-MAAF Site (OU 004) will be recommended for close-out." No contaminants remain above actions levels (which were the MCLs); therefore, the site is eligible for unlimited use and unrestricted exposure. No further Five-Year Review Reports are required.

5.0 COMMUNITY INVOLVEMENT

The RI/FS process was conducted in accordance with CERCLA requirements to document the comprehensive remedial activities and proposed remedial plan for the FFTA-MAAF Site (OU 004). Primary documents developed during the RI/FS process included the RI report (with a BLRA for human health and ecological evaluations), FS report, and Proposed Plan (PP) for the FFTA-MAAF Site (OU 004) (BMcD, 2001, 2003a, and 2004a). In addition, the first Five-Year Review Report was prepared and issued in August 2002 (Fort Riley IRP, 2002). All of these documents have been made available for public review as part of the Administrative Record file at the PWE. The Administrative Record is the set of supporting information used to determine the preferred alternative. These reports were also made available to potentially affected persons and the public in the Dorothy Bramlage Public Library (Junction City) and the Manhattan Public Library.

Notices of availability of these documents and the notice for the public meeting to discuss the PP were published in the *Manhattan Mercury* and the *Junction City Daily Union*. A public comment period for the PP was declared from July 13, 2004 through August 11, 2004 to provide a reasonable opportunity for comment and to disseminate information regarding the document. No comments were received from the public.

A public meeting was held on Fort Riley the evening of July 20, 2004 in conjunction with the Restoration Advisory Board meeting to discuss the Proposed Plan. At this meeting, representatives for the DA, KDHE, and USEPA were available to inform the public about the FFTA-MAAF Site (OU 004) and remedial options under consideration. The official transcript for the public meeting was recorded and transcribed verbatim by a court recorder. There were no comments made by the public on the Proposed Plan during this meeting.

In 2007, the second Five-Year Review Report for Fort Riley sites was prepared (USACE, 2007). A public notice was printed in the *Manhattan Mercury* and the *Junction City Daily Union* on April 1, 2007 soliciting community input for this report. Upon finalizing of the Five-Year Review, a notice was published in these two newspapers announcing its completion and its location in Information Repositories, where it would be available for public review.

6.0 SUMMARY AND CONCLUSIONS

6.1 SUMMARY

MNA with ICs was selected as the remedy for the FFTA-MAAF Site (OU 004). This alternative used ICs to prevent exposure of receptors to contaminated groundwater. MNA relies on natural degradation processes demonstrated to be occurring at the FFTA-MAAF Site (OU 004) and off the site (downgradient) to further reduce contaminant concentrations to or below MCLs. Monitoring was conducted to evaluate the effectiveness and progress of natural attenuation. This remedy was chosen over the other alternatives because it provided risk reduction through degradation of contaminants in the groundwater and provided measures to prevent future exposure to contaminated groundwater. Based on information available at the time the ROD was finalized, the DA, USEPA, and KDHE believed the selected remedy would be protective of human health and the environment, would comply with ARARs, would be cost-effective, and would utilize permanent solutions to the maximum extent practicable (BMcD, 2005a). Although MNA with ICs did not involve engineered treatment, it did rely on natural degradation processes which were already occurring at the FFTA-MAAF Site (OU 004) to further reduce contaminant concentrations to levels below the MCLs.

Based on the human health and ecological risk assessments, the preliminary ARARs, the media of interest, the COCs in groundwater at this Site, and the anticipated land and beneficial groundwater use, the following RAOs were established for the FFTA-MAAF Site (OU 004):

- Prevent use of groundwater with contaminant levels exceeding the MCLs as a drinking water source; and
- Reduce contaminant levels, to the extent practicable and appropriate, through natural attenuation processes.

Fort Riley, as lead agency under the FFA, established a course of action to accomplish each of the components of the selected remedy for the FFTA-MAAF Site (OU 004). The following are key elements of the selected remedial action which were implemented:

- Removed the SVE shed and concrete slab;
- Plugged and abandoned all holes and removal of all piping at the SVE shed area;
- Decommissioned selected piezometers;

- Decommissioned selected monitoring wells determined to be unnecessary for future sampling events;
- Sampled selected groundwater monitoring wells;
- Sampled two private groundwater supply wells (M02-02 and R02-02) semi-annually in the first year, then annually the next two years if none of the target analytes are detected above the MCLs the first year;
- Conducted annual inspections and periodic maintenance and repair of the monitoring wells;
- Restricted site access and the installation and use of groundwater supply wells at and downgradient of the FFTA-MAAF Site (OU 004);
- Provide sampling results to the affected off-site landowners until groundwater quality has been restored; and
- Conduct a review in accordance with Section 121(c) of CERCLA at least every five years after initiation.

The first RAO has been met by the use of ICs, both on Fort Riley and on adjacent private property. The primary control for the off-post portion of the FFTA-MAAF Site (OU 004) was the implementation of ICs for property with environmental contamination above unrestricted land-use standards. The ICs restricted future use to agricultural, industrial, or commercial use and prohibited the installation of drinking water wells within the impacted areas. These restrictions limited the exposure at the FFTA-MAAF Site (OU 004) by:

- Providing access for DA to continue monitoring;
- Providing access for the USEPA and KDHE to conduct site inspections to confirm land and water use;
- Prohibiting installation of groundwater wells within the impacted area; and
- Ensuring that future owners and tenants were aware of contamination at the FFTA-MAAF Site (OU 004).

The primary IC for the on-post portion of the FFTA-MAAF Site (OU 004) was to restrict land use through the environmental overlay of the Fort Riley RPMP. The long-range component of the RPMP consists of narratives and supporting graphics that include a MPEO to reflect operational and environmental constraints. These constraints were reflected in the MPEO and in the land-use analysis narrative.

Summary and Conclusions

The FFTA-MAAF Site (OU 004) was designated as restricted land use in the RPMP. Restrictions limited exposure to contaminants at the FFTA-MAAF Site (OU 004) by:

- Limiting land use to non-residential;
- Controlling public access;
- Prohibiting installation of drinking water wells and other uses of groundwater in the area; and
- Involving the PWE personnel in planning for future activities at the FFTA-MAAF Site (OU 004).

Additionally, land use at the FFTA-MAAF Site (OU 004) was restricted because of its proximity to the floodplain of the Kansas River.

The second RAO stated that contamination levels would be reduced to below MCLs within the alluvial aquifer through use of natural attenuation. As discussed in detail in Section 3.2 of this report, the concentrations of the two COCs (TCE and *cis*-1,2-DCE) have been reduced below their respective MCLs as a result of natural attenuation within the aquifer. In addition, the concentrations of PCE are also below its MCL. These concentrations have been below MCLs since March 2005. Therefore, the requirements of the second RAO have been satisfied.

6.2 CONCLUSIONS

The following requirements stated in the ROD have been achieved at the FFTA-MAAF Site (OU 004):

- The RAOs established for this site have been met;
- ICs are in place and have successfully restricted the use of groundwater at the site, both on Fort Riley and on adjacent private property; and
- COCs have been reduced to concentrations below MCLs through the process of natural attenuation within the alluvial aquifer.

Therefore the following is recommended:

- The annual groundwater sampling be terminated;
- The ICs be dropped;
- The site be classified as eligible for unlimited use and unrestricted exposure based on the fact that none of the COCs have exceeded the MCLs since 2005 and meets the ROD requirement found on

page 2-45 of that document in the last bullet of Section 2.13.6; and

- The site be closed out and no further actions or five-year review sampling be required per 40 CFR 300.430(f)(4)(ii).

7.0 CERTIFICATION STATEMENT

**Lead Agency and Support Agency Acceptance of the RACR
Fort Riley Army Installation
Former Fire Training Area – Marshall Army Airfield (FFTA – MAAF) (OU004)**

The DA-Fort Riley certifies that this Remedial Action Completion Report summarizes the completion of remedial action objectives for the FFTA – MAAF (OU 004), the groundwater has attained cleanup standards (the MCL standards) for all chemicals of concern, and no further response actions under CERCLA are necessary. The FFTA – MAAF (OU 004) is eligible for “site completion” status under CERCLA and is a valid candidate for deletion from the NPL.

Approved by:



Kevin P. Brown
COL, IN
Garrison Commander
U. S. Department of the Army, Fort Riley, KS

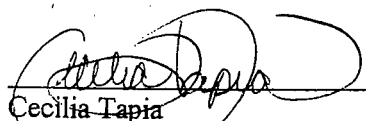
30 AUGUST 2010

Date

**Lead Agency and Support Agency Acceptance of the RACR
Fort Riley Army Installation
Former Fire Training Area - Marshall Army Airfield (FFTA - MAAF) (OU004)**

The USEPA, Region VII, with concurrence by the State of Kansas acting through KDHE-Bureau of Environmental Remediation, has determined that the remedial action under CERCLA has been completed at the FFTA - MAAF (OU 004), the remedial action objectives have been met, the groundwater has attained cleanup standards (the MCL standards) for all chemicals of concern, and no further response actions under CERCLA are necessary. The FFTA - MAAF (OU 004) is eligible for "site completion" status under CERCLA and is a valid candidate for deletion from the NPL.

Approved by:



Cecilia Tapia
Superfund Division Director
U. S. Environmental Protection Agency, Region VII

9/28/10

Date

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TABLES

Table 3-1
PCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-93-02		FP-93-04		FP-93-07		FP-94-09	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/7/2003	4.8	3/3/2003	1.1U	NS	NS	3/3/2003	1.1U
8/21/2003	4.8	8/19/2003	1.1U	NS	NS	8/22/2003	1.1U
2/20/2004	2.3	2/17/2004	1.1UJ	NS	NS	2/17/2004	1.1UJ
10/12/2004	2.4	10/13/2004	1.1U	NS	NS	10/14/2004	1.1U
3/1/2005	2.0	NS	NS	NS	NS	3/2/2005	1.1U
10/25/2006	2.1	10/25/2006	1.1U	10/25/2006	1.1U	10/26/2006	1.1U
3/30/2007	1.9	3/30/2007	1.1U	3/30/2007	1.1U	3/29/2007	1.1U
2/28/2008	1.4	2/28/2008	1.1U	2/28/2008	1.1U	2/27/2008	1.1U
2/24/2009	4.3	2/25/2009	1.1U	2/25/2009	1.1U	2/24/2009	1.1U
NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter

Table 3-1
PCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-96-26b		FP-98-27b		FP-98-28b		FP-98-29b	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/6/2003	1.1U	3/5/2003	1.1U	3/5/2003	1.1U	3/5/2003	1.1U
8/19/2003	1.1U	8/20/2003	1.1U	8/19/2003	1.1U	8/19/2003	1.1U
2/20/2004	1.1U	2/18/2004	1.1U	2/24/2004	1.1U	2/23/2004	1.1U
10/7/2004	1.1U	10/13/2004	1.1U	10/7/2004	1.1U	10/8/2004	1.1U
3/1/2005	1.1U	NS	NS	NS	NS	3/1/2005	1.1U
10/26/2006	1.1U	10/24/2006	1.1U	10/24/2006	1.1U	10/24/2006	1.1U
3/29/2007	1.1U	3/28/2007	1.1U	3/28/2007	1.1U	3/28/2007	1.1U
2/27/2008	1.1U	2/26/2008	1.1U	2/26/2008	1.1U	2/26/2008	1.1U
2/24/2009	1.1U	NS	NS	NS	NS	NS	NS
6/25/2009	1.1U	NS	NS	NS	NS	NS	NS
9/16/2009	1.1U	NS	NS	NS	NS	NS	NS

Notes:

1. Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 2. Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter

Table 3-1
PCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-98-29c		FP-98-30c		FP-98-31b		FP-99-32b	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/5/2003	1.1U	3/6/2003	1.1U	3/5/2003	1.1U	3/4/2003	1.1U
8/20/2003	1.1U	NS	NS	8/20/2003	1.1U	8/21/2003	1.1U
2/23/2004	1.1U	2/23/2004	1.1U	2/23/2004	1.1U	2/18/2004	1.1U
10/8/2004	1.1U	NS	NS	10/8/2004	1.1U	10/11/2004	1.1U
NS	NS	NS	NS	3/2/2005	1.1U	NS	NS
10/24/2006	1.1U	10/24/2006	1.1U	10/24/2006	1.1U	10/25/2006	1.1U
3/28/2007	1.1U	3/28/2007	1.1U	3/28/2007	1.1U	3/29/2007	1.1U
2/26/2008	1.1U	2/26/2008	1.1U	2/26/2008	1.1U	2/27/2008	1.1U
NS	NS	2/24/2009	1.1U	2/24/2009	1.1U	2/24/2009	1.1U
NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS

Notes:

1. Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 2. Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter

Table 3-1
PCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-99-32c		FP-04-33c		M02-02		R02-02	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/4/2003	1.1U	NS	NS	NS	NS	NS	NS
8/21/2003	1.1U	NS	NS	NS	NS	NS	NS
2/18/2004	1.1UJ	NS	NS	NS	NS	NS	NS
10/11/2004	1.1U	10/12/2004	1.1U	10/13/2004	1.1U	NS	NS
NS	NS	3/1/2005	1.1U	3/1/2005	1.1U	NS	NS
10/25/2006	1.1U	10/26/2006	0.6U	10/26/2006	1.1U	NS	NS
3/29/2007	1.1U	3/30/2007	1.1U	3/29/2007	1.1U	3/29/2007	1.1U
2/27/2008	1.1U	2/28/2008	1.1U	2/27/2008	1.1U	NS	NS
2/24/2009	1.1U	2/25/2009	1.1U	2/24/2009	1.1U	NS	NS
NS	NS	NS	NS	NS	NS	6/25/2009	1.1U
NS	NS	NS	NS	NS	NS	9/16/2009	1.1U

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter

Table 3-2
TCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-93-02		FP-93-04		FP-93-07		FP-94-09	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/7/2003	3.4	3/3/2003	0.6U	NS	NS	3/3/2003	0.6U
8/21/2003	2.8	8/19/2003	0.6U	NS	NS	8/22/2003	0.6U
2/20/2004	1.5	2/17/2004	0.6UJ	NS	NS	2/17/2004	0.6UJ
10/12/2004	1.0	10/13/2004	0.6U	NS	NS	10/14/2004	0.6U
3/1/2005	0.9	NS	NS	NS	NS	3/2/2005	0.6U
10/25/2006	1.1	10/25/2006	0.6U	10/25/2006	0.6U	10/26/2006	0.6U
3/30/2007	1.0	3/30/2007	0.6U	3/30/2007	0.6U	3/29/2007	0.6U
2/28/2008	0.8	2/28/2008	0.6U	2/28/2008	0.6U	2/27/2008	0.6U
2/24/2009	ND	2/25/2009	ND	2/25/2009	ND	2/24/2009	ND
NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 ND - Not Detected (reporting limit not known)
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates TCE results greater than the MCL of 5 ug/L.

Table 3-2
TCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-96-26b		FP-98-27b		FP-98-28b		FP-98-29b	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/6/2003	0.6U	3/5/2003	0.6U	3/5/2003	0.6U	3/5/2003	6.4
8/19/2003	0.6U	8/20/2003	0.6U	8/19/2003	0.6U	8/19/2003	3.9
2/20/2004	0.6U	2/18/2004	0.6U	2/24/2004	0.6U	2/23/2004	2.6
10/7/2004	0.6U	10/13/2004	0.6U	10/7/2004	0.6U	10/8/2004	0.7
3/1/2005	0.6U	NS	NS	NS	NS	3/1/2005	0.6U
10/26/2006	0.6U	10/24/2006	0.6U	10/24/2006	0.6U	10/24/2006	0.6U
3/29/2007	0.6U	3/28/2007	0.6U	3/28/2007	0.6U	3/28/2007	0.6U
2/27/2008	0.6U	2/26/2008	0.6U	2/26/2008	0.6U	2/26/2008	0.6U
2/24/2009	ND	NS	NS	NS	NS	NS	NS
6/25/2009	0.6U	NS	NS	NS	NS	NS	NS
9/16/2009	0.6U	NS	NS	NS	NS	NS	NS

Notes:

1. Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 2. Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 ND - Not Detected (reporting limit not known)
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates TCE results greater than the MCL of 5 ug/L.

Table 3-2
TCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-98-29c		FP-98-30c		FP-98-31b		FP-99-32b	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/5/2003	2.0	3/6/2003	0.7	3/5/2003	7.0	3/4/2003	2.8
8/20/2003	1.0	NS	NS	8/20/2003	4.8	8/21/2003	1.2
2/23/2004	0.6	2/23/2004	1.1	2/23/2004	3.4	2/18/2004	0.6U
10/8/2004	0.6U	NS	NS	10/8/2004	1.3	10/11/2004	0.6U
NS	NS	NS	NS	3/2/2005	0.8	NS	NS
10/24/2006	0.6U	10/24/2006	0.8	10/24/2006	0.6U	10/25/2006	0.6U
3/28/2007	0.6U	3/28/2007	0.7	3/28/2007	0.6U	3/29/2007	0.6U
2/26/2008	0.6U	2/26/2008	0.6U	2/26/2008	0.6U	2/27/2008	0.6U
NS	NS	2/24/2009	ND	2/24/2009	ND	2/24/2009	ND
NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 ND - Not Detected (reporting limit not known)
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates TCE results greater than the MCL of 5 ug/L.

Table 3-2
TCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-99-32c		FP-04-33c		M02-02		R02-02	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/4/2003	1.5	NS	NS	NS	NS	NS	NS
8/21/2003	0.7	NS	NS	NS	NS	NS	NS
2/18/2004	0.6UJ	NS	NS	NS	NS	NS	NS
10/11/2004	0.6U	10/12/2004	0.6U	10/13/2004	0.6U	NS	NS
NS	NS	3/1/2005	0.6U	3/1/2005	0.6U	NS	NS
10/25/2006	0.6U	10/26/2006	0.6U	10/26/2006	0.6U	NS	NS
3/29/2007	0.6U	3/30/2007	0.6U	3/29/2007	0.6U	3/29/2007	0.6U
2/27/2008	0.6U	2/28/2008	0.6U	2/27/2008	0.6U	NS	NS
2/24/2009	ND	2/25/2009	ND	2/24/2009	ND	NS	NS
NS	NS	NS	NS	NS	NS	6/25/2009	0.6U
NS	NS	NS	NS	NS	NS	9/16/2009	0.6U

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 ND - Not Detected (reporting limit not known)
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates TCE results greater than the MCL of 5 ug/L.

Table 3-3
cis -1,2-DCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-93-02		FP-93-04		FP-93-07		FP-94-09	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/7/2003	11.5	3/3/2003	0.5U	NS	NS	3/3/2003	64.9
8/21/2003	16.0	8/19/2003	1.2	NS	NS	8/22/2003	52.5
2/20/2004	30.1	2/17/2004	0.5 J	NS	NS	2/17/2004	16.1 J
10/12/2004	20.3	10/13/2004	2.4	NS	NS	10/14/2004	17.7
3/1/2005	13.5	NS	NS	NS	NS	3/2/2005	8.0
10/25/2006	7.0	10/25/2006	0.7	10/25/2006	0.5U	10/26/2006	11.0
3/30/2007	13.7	3/30/2007	0.5U	3/30/2007	0.5U	3/29/2007	7.1
2/28/2008	3.8	2/28/2008	0.5U	2/28/2008	0.5U	2/27/2008	22.9
2/24/2009	0.9	2/25/2009	0.5U	2/25/2009	0.5U	2/24/2009	15.6
NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates cis-1,2-DCE results greater than the MCL of 70 ug/L.

Table 3-3
cis -1,2-DCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-96-26b		FP-98-27b		FP-98-28b		FP-98-29b	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/6/2003	142	3/5/2003	17.1	3/5/2003	0.5U	3/5/2003	141
8/19/2003	89.6	8/20/2003	28.9	8/19/2003	0.5U	8/19/2003	125
2/20/2004	90.5	2/18/2004	10.9	2/24/2004	0.5U	2/23/2004	91.8
10/7/2004	70.9	10/13/2004	8.1	10/7/2004	0.5U	10/8/2004	45.2
3/1/2005	23.1	NS	NS	NS	NS	3/1/2005	29.7
10/26/2006	12.3	10/24/2006	1.3	10/24/2006	0.5U	10/24/2006	6.0
3/29/2007	28.3	3/28/2007	0.5U	3/28/2007	0.5U	3/28/2007	4.7
2/27/2008	10.4	2/26/2008	0.9	2/26/2008	0.5U	2/26/2008	6.6
2/24/2009	63.0	NS	NS	NS	NS	NS	NS
6/25/2009	5.4	NS	NS	NS	NS	NS	NS
9/16/2009	4.5	NS	NS	NS	NS	NS	NS

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates cis-1,2-DCE results greater than the MCL of 70 ug/L.

Table 3-3
cis -1,2-DCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-98-29c		FP-98-30c		FP-98-31b		FP-99-32b	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/5/2003	90.9	3/6/2003	1.6	3/5/2003	59.4	3/4/2003	41.4
8/20/2003	54.9	NS	NS	8/20/2003	67.8	8/21/2003	20.5
2/23/2004	34.2	2/23/2004	5.8	2/23/2004	69.9	2/18/2004	8.2
10/8/2004	6.3	NS	NS	10/8/2004	54.4	10/11/2004	2.8
NS	NS	NS	NS	3/2/2005	34.3	NS	NS
10/24/2006	1.2	10/24/2006	11.0	10/24/2006	15.0	10/25/2006	0.8
3/28/2007	0.7	3/28/2007	9.3	3/28/2007	8.3	3/29/2007	0.6
2/26/2008	0.8	2/26/2008	0.5U	2/26/2008	6.2	2/27/2008	0.5U
NS	NS	2/24/2009	2.2	2/24/2009	7.9	2/24/2009	0.5U
NS	NS	NS	NS	NS	NS	NS	NS
NS	NS	NS	NS	NS	NS	NS	NS

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates cis-1,2-DCE results greater than the MCL of 70 ug/L.

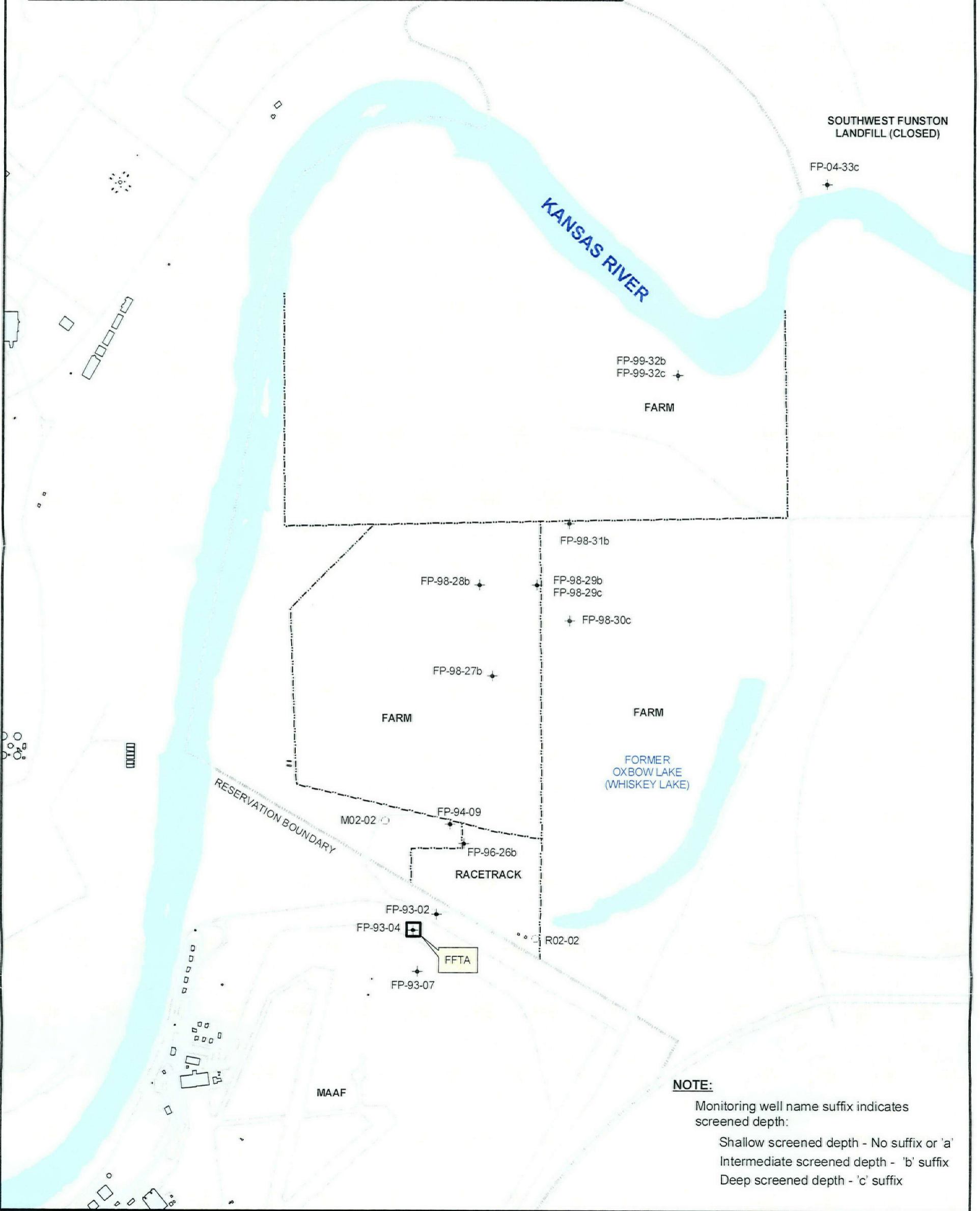
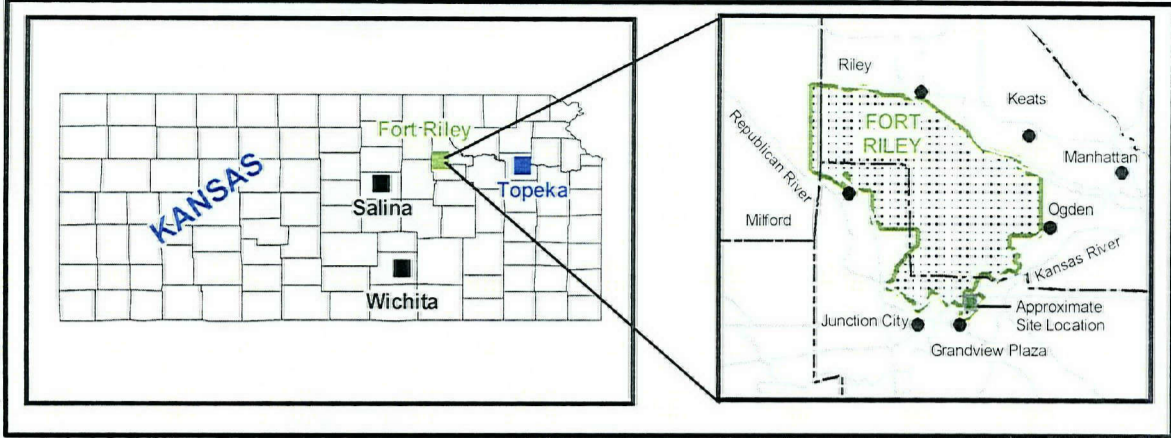
Table 3-3
cis -1,2-DCE Historical Detections
Remedial Action Completion Report
FFTA-MAAF
Fort Riley, Kansas

FP-99-32c		FP-04-33c		M02-02		R02-02	
Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)	Date Sampled	Result (ug/L)
3/4/2003	29.8	NS	NS	NS	NS	NS	NS
8/21/2003	17.2	NS	NS	NS	NS	NS	NS
2/18/2004	5.0 J	NS	NS	NS	NS	NS	NS
10/11/2004	1.8	10/12/2004	0.5U	10/13/2004	0.5U	NS	NS
NS	NS	3/1/2005	0.5U	3/1/2005	0.5U	NS	NS
10/25/2006	0.7	10/26/2006	0.5U	10/26/2006	0.5U	NS	NS
3/29/2007	0.5U	3/30/2007	0.5U	3/29/2007	0.5U	3/29/2007	0.5U
2/27/2008	0.5U	2/28/2008	0.5U	2/27/2008	0.5U	NS	NS
2/24/2009	0.5U	2/25/2009	0.5U	2/24/2009	0.5U	NS	NS
NS	NS	NS	NS	NS	NS	6/25/2009	0.5U
NS	NS	NS	NS	NS	NS	9/16/2009	0.5U

Notes:

- Well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix
 - Monitoring Wells FP-93-02, FP-93-04, FP-93-07, and FP-04-33c are located on Fort Riley. All other monitoring wells are located off the post on private property.
- J - Estimated.
 NS - Not Sampled
 U - Compound was not detected.
 ug/L - micrograms per liter
 Shaded indicates *cis*-1,2-DCE results greater than the MCL of 70 ug/L.

FIGURE



NOTE:
 Monitoring well name suffix indicates screened depth:
 Shallow screened depth - No suffix or 'a'
 Intermediate screened depth - 'b' suffix
 Deep screened depth - 'c' suffix

LEGEND

- ◆ Monitoring Well or Cluster
- Private Well
- Reservation Boundary
- Property Line
- Roads

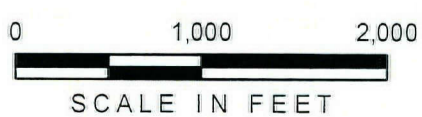


Figure 1-1
GENERAL SITE AND WELL LOCATIONS

FFTA - MAAF

ADDENDUM A
DOD/EPA JOINT GUIDANCE



THE DEPARTMENT OF DEFENSE
AND
THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY



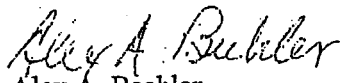
WASHINGTON, DC


SUBJECT: DoD/EPA Joint Guidance on Streamlined Site Closeout and NPL Deletion
Process For DoD Facilities

Attached is guidance developed by the Joint DoD/EPA Streamlining Task Force (Task Force) designed to streamline the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) site closeout and National Priorities List (NPL) deletion process for DoD facilities. The Task Force was charged with making recommendations to reduce time and manage costs associated with the CERCLA site closeout and deletion process by:

- examining ways to reduce document review time and revisions,
- identifying key documents for use in the closeout process,
- using the same documentation to memorialize both remedial action completion and deletion,
- establishing the process whereby DoD and EPA will document the completion of the remedial actions required by the Record of Decision (ROD) in a single, primary document, and
- memorializing the agreements reached through the modification of existing guidance and policy.

The joint guidance focuses on streamlining and restructuring a key site closeout document, the Remedial Action Completion Report (RACR), that is used to demonstrate remedial action completion. While the process is streamlined, it continues to ensure that all remedial action has been taken, remedial action objectives have been achieved, and human health and the environment have been protected. The joint guidance also identifies the key site closeout documents used in the site closeout process.


Alex A. Beehler
Assistant Deputy Under Secretary
of Defense (Environment, Safety
Occupational Health)
U.S. Department of Defense


Susan Bodine
Assistant Administrator
Office of Solid Waste and Emergency and
Response
U.S. Environmental Protection Agency

DEC 23 2005

Attachment

JAN 19 2006

**Department of Defense and Environmental Protection Agency
Joint Guidance
Recommended Streamlined Site Closeout and NPL Deletion Process
For DoD Facilities**

I. Background

This guidance document describes the recommended streamlined procedures for the completion of the final Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Remedial Action and the deletion of the site from the CERCLA National Priority List (NPL). The guidance only applies to Department of Defense (DoD) facilities on the NPL and was jointly developed by Environmental Protection Agency (EPA) and the DoD.

Nothing in this guidance changes state roles or authorities. The military Services and EPA Regions are encouraged to work with the states to implement this guidance.

II. Introduction

The guidance focuses on recommended ways to streamline and restructure a key site closeout document, the Remedial Action Completion Report (RACR)¹, which generally should be used to demonstrate remedial action completion at NPL sites. This guidance is the result of discussions by representatives on a Joint DoD/EPA Streamlining Task Force (Task Force) with input from EPA Regions and the Office of Solid Waste and Emergency Response's (OSWER's) Office of Site Remediation and Technology Innovation (OSRTI). The Task Force was charged with making recommendations to reduce time and manage costs associated with the CERCLA site closeout and deletion process by:

- Examining ways to reduce document review time and revisions;
- Identifying key documents for use in the closeout process;
- Using the same documentation to memorialize both remedial action completion and deletion;
- Establishing the process for documenting the completion of the remedial actions addressed by the Record of Decision (ROD) in a single, primary document, as defined in the model Federal Facilities Agreement²; and
- Memorializing the agreements reached through the modification of existing guidance and policy.

In an effort to objectively evaluate areas for streamlining opportunities, the Task Force focused on the core requirements of the CERCLA and the National Contingency Plan (NCP). The resulting process described in this guidance modifies certain portions of existing EPA and DoD procedures and guidance and is designed to be consistent with the NCP.

¹ The acronym RACR is used in lieu of "Remedial Action Report". Also, RACR is referred to as the Primary Document Memorializing Remedial Action Completion in certain CERCLA Section 120 agreements.

² This Joint Guidance does not alter the required contents of the DoD and EPA Model Federal Facilities Agreement and does not require the modification of current Federal Facilities Agreements.

Revisions to Other Guidance Documents

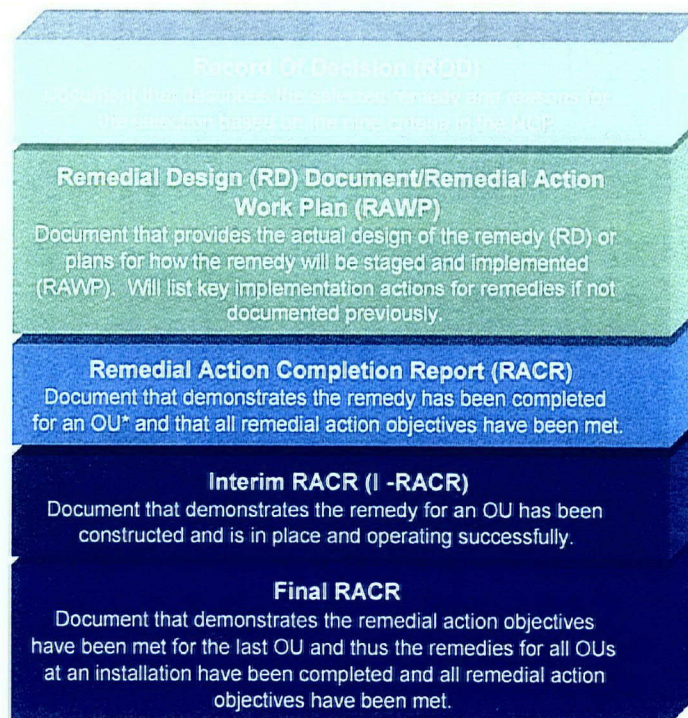
This guidance revises the following guidance documents to the extent they address documentation for DoD sites on the NPL:

- *Closeout Procedures for National Priorities List Sites*, OSWER Directive 9320.2-09A-P, January 2000.
- *Final National Strategy to Manage Post Construction Completion Activities at Superfund Sites*, OSWER Directive 9355.0-105, October 2005.
- *The Environmental Site Closeout Process Guide, Defining the process after cleanup decisions have been made*, issued in September 1999 by EPA, DoD, Army, Navy and the Air Force.
- *A Guide to Preparing and Reviewing Remedial Action Reports of Cost and Performance*, Engineering Pamphlet (EP) 1110-1-19, issued by the US Army Corp of Engineers, June 2001.

Although this guidance revises portions of these documents, they still include useful information that may be appropriate in preparing site closeout documents.

Key Site Closeout Documents Typically Prepared by DoD

In keeping with its mandate to eliminate redundancies and to identify main documents, the Task Force agreed on the recommended universe of key site closeout documents. The site closeout documents listed below are typically prepared by DoD in the site closeout process:

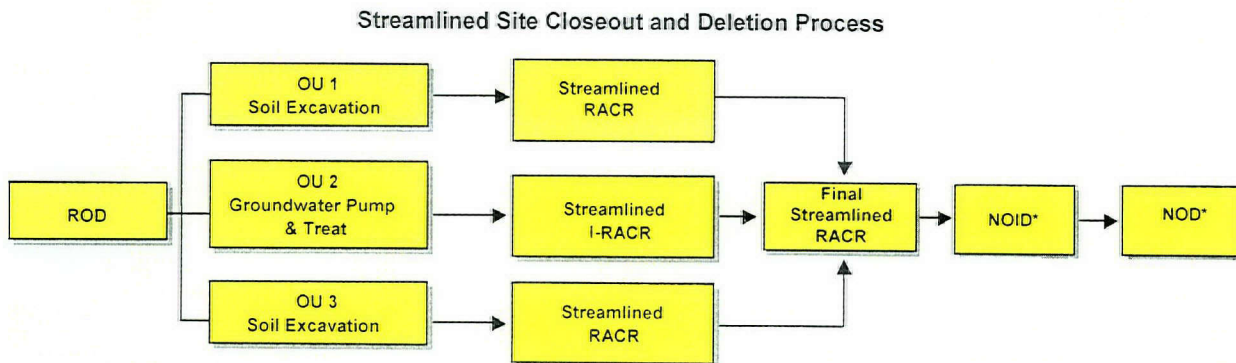


*The acronym "OU" is defined as "Operable Unit."

In addition, the five-year review should be a key document when it is required. When required by CERCLA Section 121(c), the five-year review is normally prepared no less often than every five years by the lead agency at sites where hazardous substances, pollutants or contaminants remain in place above levels that allow for unlimited use and unrestricted exposure (see NCP, Section 300.430(f)(4)(ii)).

III. Recommended Streamlined Site Closeout and NPL Deletion Process for DoD Facilities

The chart below depicts the recommended streamlined process.



*Prepared by EPA. The acronym "NOID" is defined as "Notice of Intent to Delete" and the acronym "NOD" is defined as "Notice of Deletion." As necessary, EPA will also prepare a Preliminary Closeout Report and Final Closeout Report.

For each Operable Unit (OU), a RACR or I-RACR should be prepared using the recommended streamlined guidelines provided in Section IV, and may provide information that can serve as a basis for whole or partial NPL deletion. Typically, a RACR is prepared to show that remedial action objectives for an OU have been achieved. For long-term remedies where it is anticipated that remedial action objectives will be achieved over a long period, an interim document, the I-RACR, generally should be prepared. The I-RACR should document Remedy-in-Place (RIP)³ and demonstrate that all remedial actions taken achieve remedial action objectives. The RACRs may be combined in any fashion that makes sense and provides sufficient documentation. For example, several OUs being completed at the same time may be combined into a single RACR. In some cases, RPMs may choose to maintain one RACR that could be amended each time an OU is completed. For OUs where a no-action ROD is signed, a RACR normally would not be prepared because there was no remedial action taken and the Remedial Investigation/Feasibility Study (RI/FS) and ROD contain all the information necessary to document the decision.

Once remedial action objectives have been met at the last OU, a final RACR should be prepared. The final RACR should contain all the information described in Section IV for the last OU completed, provide a brief summary of previous I-RACRs and RACRs, and provide references to where the previous RACRs are located, unless bundled as one RACR. This information should include adequate documentation that the institutional controls are in place and effective. After the final RACR is completed, EPA prepares the Notice of Intent to Delete (NOID), after obtaining state concurrence and publishes it in the Federal Register. The NOID should contain the rationale for the deletion of the site from the NPL.

³DoD's term "Remedy in Place" is roughly equivalent to EPA's "construction complete" milestone.

The final RACR generally should be the document that shows that the remedial action has been completed and the remedial action objectives in the ROD have been met for the overall site. The final RACR should contain all the essential elements needed for EPA to prepare the NOID. Because of this consolidation, DoD should not need to prepare a separate preliminary and/or final closeout report where the I-RACR and/or RACR, as outlined in this guidance, should serve as the functional equivalent for these documents. To achieve the site construction completion milestone, EPA should be able to prepare the Preliminary Closeout Report (PCOR) and/or the Final Closeout Report (FCOR) based on information provided in the I-RACR, RACR or final RACR.

IV. Recommended Contents of the Remedial Action Completion Report (RACR)

A Remedial Action Completion Report should meet the following criteria :

- All construction activities are complete;
- Remedial action objectives or cleanup goals stated in the ROD have been achieved;
- Institutional Controls are in place, as appropriate;
- A final inspection or equivalent has been conducted;
- Site is protective of human health and the environment; and
- EPA has approved the RACR.

Where appropriate, the RACR should rely heavily on cross-referencing existing material and not contain duplicative language from other reports. The content outlined below should enable the RACR to contain all information needed for the NOID, consistent with the NCP and existing guidance. The I-RACR should follow the same outline as the RACR and the EPA and DoD Remedial Project Managers (RPMs) should determine whether and how Sections D and E should best be included.

The streamlined RACR should consist of the following sections:

Recommended Streamlined RACR Outline	
Section	Contents
A: Overview	This section would include a very brief discussion of the OU characteristics, contaminants of concern, major findings and results of site investigation activities. For the Final RACR, this section would also briefly summarize conclusions from the previous RACRs and identify their location.
B: Remedial Action Objectives	This section would identify the remedial action objectives and cleanup standards specified in the ROD, and subsequent modifications, if any.
C: Remedial Actions	This section would briefly discuss the remedial actions taken to meet the remedial objectives.
D: Demonstration of Completion	This section would include information needed to demonstrate attainment of remedial objectives, e.g., final sampling report, visual inspection report.

Recommended Streamlined RACR Outline	
Section	Contents
E: Ongoing Activities	This section would describe the activities, if any, still being performed or to be performed, e.g., Operations and Maintenance (O&M), 5-year reviews.
F: Community Relations	This section would briefly summarize the public outreach activities conducted at the site, e.g., community relations plan; specify the date the RAB was formed and terminated; provide the dates of public meetings; discuss environmental justice initiatives.
G: Certification Statement	This section would consist of a statement by a Service representative authorized to sign decision documents, certifying that the RACR memorializes the completion of the remedial action objectives.

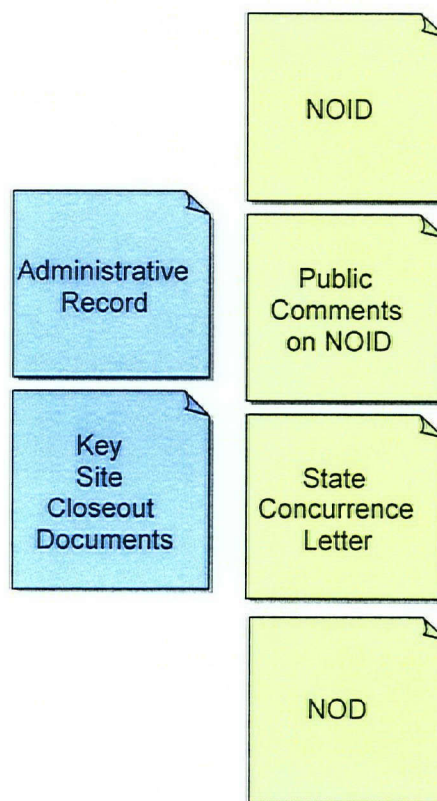
V. Summary of NPL Deletion Process

The NOID is generally one of the final documents prepared in the process to delete a site from the NPL. The NOID should inform the public of EPA's intent to delete an installation (or a portion thereof) from the NPL. This guidance does not modify EPA's NOID process, but is designed to ensure that the streamlined RACR satisfies the NCP, Section 300.425(e) and existing guidance.

The NCP, Section 300.425(e)(4), requires that information supporting a proposed deletion be placed in the information repository. The information needed to support a proposed deletion decision should be contained in key documents identified in Section III, the NOID, public comments on the NOID, EPA's responses to these comments, and documentation of State concurrence. No further information should be required to support a deletion decision. The Notice of Deletion (NOD) is the final document prepared in the process to delete a site from the NPL.

EPA may delete a portion of a defined geographic unit or a specific medium at a site, e.g. groundwater, depending upon the nature or extent of the releases, when no further response is appropriate for that portion of the site. Information contained in the RACR for that portion of the site can serve as the basis for the notice of intent for a partial deletion.

Information Supporting the Deletion Decision



ADDENDUM B
ADDITIONAL INFORMATION

Addendum to the Remedial Action Completion Report for the Former Fire Training Area
– Marshall Army Airfield Fort Riley, Kansas

This addendum is being provided to address the EPA, Region VII's letter dated 9 July 2010 in which a suggestion was made that a list be established to clarify the pertinent sections of previous primary documents, locations where the documents can be reviewed, & date of issue of those documents. The following list is referenced to the particular comments where issues were noted:

Comment #4 – Section 1.2: briefly include information on the other OUs at Fort Riley and how they relate to OU 004.

Additional Information: There are four other operable units on Fort Riley, Kansas.

1) Southwest Funston Landfill Operable Unit 001 – The Record of Decision (ROD) was signed 6 August 1997 & contains all the pertinent issues for this site. The site is a closed landfill that had with contamination from vinyl chloride. The ROD is on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas. A Remedial Action Completion Report was signed 18 February 2010 to cover all but the cover & bank stabilization repairs.

2) Pesticide Storage Facility Operable Unit 002 – The No Further Action (NFA) ROD was signed September 1997 & contains all the pertinent details for the site. The site had soil contamination from pesticides & a removal action was completed. An Explanation of Significant Difference was completed in April 2010 that closed out the site. Those documents are on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas.

3) Dry Cleaning Facilities Area Operable Unit 003 – The ROD was signed 16 January 2008 & contains all the pertinent details for the site. The site had contamination from tetrachloroethylene from drying cleaning operations. The ROD is on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas.

4) Former Fire Training Area – Marshall Army Airfield Operable Unit 004 - The Record of Decision (ROD) was signed 21 July 2005 & contains all the pertinent issues for this site. The site had contamination from the inadvertent release of tetrachloroethylene. The ROD is on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas.

5) 354 Area Solvent Detections – Operable Unit 005 – The Record of Decision (ROD) was signed 3 July 2006 & contains all the pertinent issues for this site. The site had contamination from tetrachloroethylene. The ROD is on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas.

Comment #8 - Section 1.3.1: include additional information on the vertical and lateral extent of contamination rather than simply referring to the RI report (specifically isoconcentration maps/cross sections for individual COCs). Cross section should show geology/stratigraphy discussed in Section 1 as well.

Additional Information: See Sections 2.3, 2.4, 2.5.1, & 2.5.2 for the text & Section 2.0 Tables 2-1 through 2-5 & Figures 2-1 through 2-14 of the Remedial Investigation (RI) Volume 1 dated 26 March 2001. The RI is on file at the Administrative Record in 407 Pershing Court Fort Riley, Kansas.

Comment # 10 – Section 1.3.3: include a table of the 9 alternatives evaluated in the FS. Include information for each one on effectiveness/permanence, cost, estimated remedial timeframes, and remedy components (ICs, etc.).

Additional Information: See Sections 3, 5, & 6 of the Feasibility Study (FS) dated 10 September 2003. See Sections 2.6 through 2.12 of the ROD dated 21 July 2005. The FS & ROD are on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas.

Comment #12 – Section 2.3: additional information is necessary about specific remedial actions that were undertaken to reach the RAOs. The first set of bullets are a generalized summary of these activities; everything after this summary (2nd set of bullets) appears to discuss the rationale for selecting the preferred remedy and was already stated in Section 1.3.3. The relevant text that is provided in Section 2.3 is very non-specific. Which wells were selected for periodic sampling and what was the frequency in which they were sampled? What were the groundwater samples from these wells sampled for? How were the wells sampled? What did the annual inspections entail? What maintenance and repairs were conducted on the monitoring wells? How was site access restricted? How was groundwater use restricted?

Additional Information: See Sections 1.5, 1.6, 1.7, all of 4.0, 5.1, 5.2, & 5.3 of the Remedial Design/Remedial Action Plan (RD/RAP) dated January 2006. The RD/RAP is on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas.

Comment #17 On the first set of bullets on page 3-4: include depth ranges for the terms "shallow zone," "intermediate zone," and "deep zone." Include information on these zones for the private wells (M02-02 and R02-02). Cross sections showing the screened intervals of wells and plume boundaries (as well as well construction diagrams) should be included in this section.

Additional Information: See Sections 5.0 through 9.0 & Appendices 2A through 7B of the Remedial Investigation (RI) Volumes 2 & 3 dated 26 March 2001. The RI is on file in the Administrative Record at 407 Pershing Court Fort Riley, Kansas.