



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10

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OFFICE OF  
ENVIRONMENTAL CLEANUP

SEP 18 2013

Colonel Brian M. Newberry  
Commander  
92<sup>nd</sup> Air Refueling Wing  
1 E. Bong St, Suite 203  
Fairchild AFB, Washington 99011-3000

Dear Colonel Newberry:

The U.S. Environmental Protection Agency Region 10 has reviewed the Third CERCLA Five-Year Review report for Superfund sites, specifically for Operable Units (OU) 1, 2, and 3, associated with Fairchild Air Force Base, Washington. The conclusions in this letter are based on the signed final report, which was received electronically by the EPA on 5 September 2013 and formally transmitted on 12 September 2013. The *Third Five-Year Review Report* was approved and signed by the United States Air Force (USAF) on 12 August 2013. The EPA reviewed this report for technical adequacy, accuracy, and consistency with the National Contingency Plan and the EPA guidance. The document provides a summary of the status and protectiveness for OUs for which Records of Decision (RODs) have been completed but have not been determined as No Further Action. It does not address OU-5 for which an Interim ROD has been completed but remedial actions have not yet started. This document also identifies actions to be taken that ensure protectiveness of the selected remedies and on-going remedial actions, and provides a schedule for completion of the recommended actions.

The following are EPA's protectiveness determinations for these OUs and the overall site protectiveness that will be reported to Congress in the EPA's annual report. Also included are additional recommendations and follow-up actions necessary to address issues raised in the Five-Year Review report that affect or could affect protectiveness. In general, the EPA concurs with the protectiveness determinations in this report. Issues and recommendation for each OU are summarized in Table 1 and discussed individually below.

**OU 1 – Craig Road Landfill Site**

The EPA concurs that short term protectiveness is appropriate for the remedy for Craig Road Landfill (CRL): on-site access to groundwater is restricted through implementation of Base Land Use Controls (LUCs), and monitoring of off-site water supply wells provides no evidence of exposure to impacted groundwater. There are no buildings currently located within the vicinity of monitoring wells with concentrations above the maximum contaminant level (MCL). Approximately 1,324 pounds of trichloroethylene (TCE) have been removed from the CRL site through optimization of the groundwater extraction and treatment system (GETS). We appreciate USAF's efforts to evaluate the green and sustainable remediation (GSR) impacts of selected source reduction alternatives (batch treatment, In Situ Chemical Oxidation (ISCO) injections and soil vapor extraction) while ensuring that the other primary

objectives are met: to reduce and maintain hydraulic control of the on-site TCE plume and to prevent further migration across the site boundary and to a lower aquifer. A forthcoming post-ROD treatability study will establish whether source area technologies are reducing the 75-year time frame (established in the ROD) for achieving Remedial Action Objective goals for groundwater while maintaining hydraulic control of the on-site plume. A ROD Amendment will be prepared to select additional source treatment activities, as necessary, to document off-site land use controls that have been augmented and enhanced to increase communication and notification and to select any necessary land use restrictions needed to prevent building or drilling water supply wells in the vicinity of the off-site plume. We support the recommendation to enhance off-site LUCs. Revisions to the Base LUC Management Plan must apply EPA guidance (OSWER Directive 9355.6-12; EPA, 2013) to ensure the protectiveness of CERCLA remedies.

We concur that for the remedy to be protective in the long-term, off-site LUCs must be enhanced to prevent potential exposure to contaminated groundwater. However, to ensure protectiveness in the long term, the remedy must include enhanced LUCs and additional off-site monitoring to evaluate plume stability. TCE concentrations in groundwater at off-site monitoring well (MW)-118, while trending downward, are still orders of magnitude above the MCL. Reliance on off-site LUCs and continued monitoring of MW-118 (Recommendation #2) is not adequate for verifying plume extent and stability. Monitored natural attenuation (MNA) for the off-site plume requires a performance monitoring system that meets the objectives of OSWER Directive 9200.4-17P (EPA, 1999) to assist in an evaluation of whether the plume is expanding down gradient, laterally or vertically. A more detailed evaluation of the off-site plume must be included in the forthcoming *Treatability Study Report* (and subsequent investigations as necessary). Revisions to the LUC Management Plan and a program for monitoring MNA must be documented in the ROD Amendment.

In addition, recommendations for long-term protectiveness at CRL must include appropriate notification, and necessary institutional controls that require a vapor intrusion (VI) investigation or building mitigation if and before a building is constructed on-site or in the vicinity of the off-site plume. Remedies are protective in the short term because buildings are currently not present and Figure 3-1C of the *Third Five-Year Review Report* shows that land use consists of mining and heavy industrial activities down gradient of the CRL, but there is nothing to restrict construction of buildings in the vicinity of the off-site plume now or in the future. In absence of shallow groundwater wells in the vicinity, the screening analysis performed for this *Third Five-Year Review Report* was based on a depth to groundwater of 65 feet below ground surface which may overestimate the depth of the source. The results from the analysis indicate an increased lifetime risk of  $2.6 \times 10^{-6}$  and hazard quotient (HQ) of 0.9 for industrial/commercial use and an increased lifetime risk of  $1.8 \times 10^{-5}$  and HQ of 3.7 for residential use. For screening purposes, EPA Region 10 recommends not exceeding a cancer risk of  $1 \times 10^{-6}$  for individual chemicals of concern (COCs) and a hazard quotient of 0.1 when there are multiple COCs at a site (EPA, 2012). Further investigation will be needed if development is ever considered.

## **OU 2 – On-Base Priority One Sites**

The EPA concurs that the remedies for OU 2 sites are protective in the short term and that some areas (Site WW-1 - Industrial Wastewater Lagoons) require additional actions to remain protective in the long term. Site WW-1 is protective of human health and the environment in the short term because potential exposure to contaminated groundwater continues to be prevented by on-Base LUCs, and off-Base monitoring of water supply wells provides no evidence of exposure to impacted groundwater. USAF's *Third Five-Year Review Report* recommendations for identified issues on Table 9-2 appropriately call

for an Explanation of Significant Differences (ESD) to include vinyl chloride and arsenic as COCs, evaluation of MNA for the off-Base plume, and enhanced off-Base LUCs. However, it is premature to make the determination that future VI risks are acceptable based on the screening analysis presented in Section 6.3.4.2. Results of the VI screening analysis for off-Base TCE and vinyl chloride combined indicated an increased cancer risk of  $4.6 \times 10^{-5}$  and  $3.1 \times 10^{-6}$  for residential land use and commercial/industrial land use, respectively. These risks exceed the screening criteria presented in EPA Region 10 guidelines. Remedies are protective in the short term because buildings are currently not present, but there is nothing to restrict construction of buildings in the vicinity of the off-Base plume in the future. Therefore, recommendations for on-Base and off-Base LUCs must include appropriate notification, and necessary institutional controls that require a VI investigation or building mitigation if and before further development (building construction) occurs in the vicinity of the plume.

### **OU 3 – On-Base Priority Two Sites**

The EPA concurs that the remedies for OU 3 sites currently protect human health and the environment and that additional soil investigations at site PS-10 to evaluate potential sources of TCE to groundwater in the SS-39 plume are appropriate.

Consistent with EPA's August 1, 2011 memorandum "*Program Priorities for Federal Facility Five-Year Reviews*", the Five-Year Review Guidance Section 1.3.3 has been superseded and the future Five-Year Review dates will be based on the completion date for this review to assure that the due dates will not change if the reports are early or late. The due date for the next Five-Year Review will be September 18, 2018.

Thank you for the USAF's hard work in completing the *Third Five-Year Review Report*. I want to commend your staff on addressing the EPA comments on earlier drafts and the efforts your project team demonstrated in finalizing the document. We feel the EPA and Fairchild project teams have an excellent working relationship and look forward to continuing this cooperative effort as the work moves forward.

Sincerely,



Cami Grandinetti  
Program Manager  
Remedial Cleanup Program

Enclosure

cc: Marc Connally, Fairchild Air Force Base  
Hun Seak Park, Washington Department of Ecology

## References

1. EPA 1991. Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, Directive 9200.4-17P. U.S. Environmental protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.  
<http://www.epa.gov/swerust1/directiv/d9200417.pdf>
2. EPA 2012. Memorandum: OEA Recommendations Regarding Trichloroethylene Toxicity in Human Health Risk Assessment. From Joyce C. Kelly, Director, Office of Environmental Assessment to Rick Albright, Director, Office of Environmental Cleanup and Kate Kelly, Director, Office of Air, Waste & Toxics. December 13, 2012.
3. EPA 2013. Memorandum: Sample Federal Facility Land Use Control ROD Checklist with Suggested Language (LUC Checklist). From Reggie Cheatham, Director, Federal Facilities Restoration and Reuse Office (5106P) and David J. Kling, Director, Federal Facilities Enforcement Office to Superfund national Policy Managers, Regions 1-10. OSWER Directive 9355.6-12. January 4, 2013.

**Table 1:**  
**Issues and Recommendations Identified in 3<sup>rd</sup> Five-Year Review, as Modified for CERCLIS.**

**Ou-1 – Craig Road Landfill**

Issue Category	Issue	Issue Comments	Recommendation	Recommendation Comments	Milestone Date
Remedy Performance	Remedy Performance – Other	Source treatment via ISCO and SVE pilot tested to reduce time to reach remedial objectives. To maximize ISCO effectiveness, groundwater extraction temporarily reduced to avoid withdrawing treatment substrate from aquifer. Potential impact to hydraulic control of remedy.	Remedy Performance - Other Recommendations	Evaluate reductions to GETS following ISCO with regard to hydraulic control. Present evaluation in post-ROD treatability study report and annual RA-O reports.	September 2013
Monitoring	Monitoring inadequate to assess performance	TCE concentrations in off-site monitoring well (MW-118) located downgradient of CRL are decreasing but remain above MCL.	Expand/modify monitoring program	Evaluate TCE concentrations at MW-118 in a ROD Amendment. >>MNA for off-site plume requires performance monitoring per OSWER Directive 9200.4-17P (EPA 1999) to assist in evaluation off whether plume is expanding downgradient, laterally or vertically.	August 2016
Remedy Performance	Remedy Performance Other	Recent optimization activities (i.e.,SVE and ISCO) not included in CRL ROD. ROD Amendment will be required if additional remedies selected to reduce time to RAOs.	Remedy Performance - Other Recommendation	Prepare draft Proposed Plan and ROD Amendment to select one or more remedial optimization (source reduction) techniques as potential remedy components at CRL.	August 2016
Monitoring	Monitoring Other	Secondary impacts from ISCO operations may include potential increases in dissolved chromium concentrations, which exceed MCL	Monitoring – Other	Evaluate chromium background concentrations and potential increases in dissolved chromium that may result from ISCO .	November 2014
Institutional Controls	Institutional Controls – Other	Current off-base LUCs to prevent the use of contaminated groundwater will need to be supplemented. However, no off-base exposures are occurring.	Institutional Controls – Other Recommendation	Evaluate LUCs in ROD Amendment. >>Revisions to LUC management plan must apply EPA guidance (OSWER Directive 9355.6-12) >>LUCs must include appropriate notification and necessary ICs that require vapor intrusion investigation or building mitigation if and before a building is constructed on site or in vicinity of off-site plume	August 2016

**Protectiveness Statement** – The remedies implemented for OU-1 are protective of human health and the environment in the short term because potential exposure to contaminated groundwater continues to be prevented by base LUCs and off-site monitoring of water supply wells provides no evidence of exposure to contaminated groundwater. For the remedy to remain protective in the long-term, offsite LUCs should be enhanced to prevent potential exposure to contaminated groundwater >> and MNA for off-site plume should be evaluated to determine if plume is stable.

**Ou-2 – On-Base Priority One Sites**

Issue Category	Issue	Issue Comments	Recommendation	Recommendation Comments	Milestone Date
Monitoring	Monitoring - Other	Site WW-1. Vinyl chloride and arsenic exceed their respective MCLs in shallow alluvial groundwater on base and off base. Regularly monitored at this site but not identified as COCs.	Monitoring – Other Recommendation	Prepare an ESD to include vinyl chloride and arsenic as COCs for groundwater. Conduct base-wide background study for arsenic and evaluate arsenic mobilization under reducing conditions.	March 2015
Monitoring >>Remedy Performance	MNA not occurring or not effective	Site WW-1. TCE concentrations in off-base well MW-120 continue to exceed the MCL.	Reassess natural attenuation	Site WW-1. Evaluate TCE concentrations trends at MW-120 and nearby wells to determine whether MNA should be added as a remedy component.	August 2018
Institutional Controls	Institutional Controls – Other	Site WW-1. Current off-base LUCs to prevent the use of contaminated groundwater will need to be supplemented. However, no off-base exposures are occurring.	Institutional Controls – Other Recommendation	Revise residential monitoring program and enhance off-base LUCs with an ESD. >>Revisions to LUC management plan must apply EPA guidance (OSWER Directive 9355.6-12) >>LUCs must include appropriate notification and necessary ICs that require VI investigation or building mitigation if and before a building is constructed on site or in vicinity of off-site plume	March 2015

**Protectiveness Statement** – The remedies implemented for OU-2 are protective of human health and the environment. However, some areas of the OU require additional actions to remain protective in the long-term. The remedies as implemented for Site SW-1, Site PS-2, Site PS-8 and Site FT-1 are protective of human health and the environment. These remedies are functioning as intended and all human and ecological risks are under control and are anticipated to be under control in the future. The remedy as implemented for Site WW-1 is protective of human health and the environment in the short term because potential exposure to contaminated groundwater continues to be prevented by on-base LUCs and off-base monitoring of water supply wells provides no evidence of exposure to impacted groundwater. For the remedy to remain protective in the long-term, offsite LUCs should be enhanced to prevent potential exposure to contaminated groundwater.

**Ou-3 – On-Base Priority Two Sites**

Issue Category	Issue	Issue Comments	Recommendation	Recommendation Comments	Milestone Date
Changed Site Conditions	Changed Site Conditions – Other Issue	Site PS-10. Residual TCE contaminated soil beneath recently demolished building not addressed during soil removal activities completed in 1996.	Define extent of additional contamination	Conduct additional soil investigations to evaluate whether site soils remain an ongoing source of TCE contamination to groundwater associated with Site SS-39.	Sept. 2013

**Protectiveness Statement** – The remedies implemented for OU-3 are currently protective of human health and the environment and will be protective of human health and the environment upon attainment of remedial action objectives. In the interim, LUCs exist that prevent exposure to contaminated media.

**Notes**

>> -EPA additional comments  
 CRL – Craig Road Landfill  
 CERCLIS – Comprehensive Environmental Response, Compensation and Liability Information System  
 COC – contaminant of concern  
 ESD – explanation of significant difference  
 GETS – groundwater extraction and treatment system  
 IC – institutional control  
 ISCO – in-situ chemical oxidation  
 LUC – land use control  
 MCL – maximum contaminant level  
 MNA – monitored natural attenuation  
 MW – monitoring well  
 RA-O – remedial action operations  
 RAO – remedial action objective  
 ROD – record of decision  
 SVE – soil vapor extraction  
 TCE – trichloroethylene  
 VI – vapor intrusion