Ellsworth Air Force Base Environmental Restoration Program announces the completion of its 2010 Five Year Review for Ellsworth Air Force Base

Ellsworth Air Force Base is a Federal "Superfund" site under the Federal Comprehensive Environmental Restoration, Compensation, and Liability Act ("CERCLA", also known as the "Superfund" Law). The Air Force has completed its third "Five Year Review" of the status of the environmental cleanup program for 2010. Five Year Reviews were completed in 2000 and 2005. The next Five Year Review is scheduled for 2015.

The purpose of this review was to evaluate the implementation and performance of the remedies in order to determine if the remedies are protective of human health and the environment. The process included a review of data and information, inspection of the site, and community interviews.

The Five Year Review showed that all remedies are protective of human health and the environment. For OUs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 12, remedies are protective of human health and the environment because waste is covered, contained, and not available for exposure. A Base-wide order restricts access to the waste areas, prevents groundwater use, and prevents disturbance of the remedy at these locations. All systems are in place, which provide for long term protectiveness, and working as intended.

Groundwater from all OUs has been transferred to OU-11. At OU-11, remedies are protective of human health and the environment because exposure to contaminated groundwater is controlled by a Base-wide order and numerous individual agreements with off-site landowners. Sources of groundwater contamination have been treated or removed. Groundwater migration is controlled at the Base boundary by a collection and treatment system, which is working as intended to maintain long term protectiveness. Both pump-and-treat and in-situ treatment systems are in place and working as intended to reduce groundwater contamination in the long term.

A brief description of the selected remedy; a summary of contamination addressed by the remedy; a brief summary of the Five Year Review results; the protective statements; and a brief summary of data and information the basis for determining the results of the Five Year Review can be found in the attached Executive Summary taken from the 2010 Five Year Review.

A copy of the review report is available at the locations listed below or will be available to review by appointment at the base environmental office.

Rapid City Public Library	Holbrook Library
610 Quincy St.	650 Doolittle Dr.
Rapid City, SD 57701	Ellsworth AFB, SD 57706
394-4171	385-1686

For more information please contact, the 28th Bomb Wing Public Affairs office, at (605) 385-5056 or e-mail 28bw.pa@ellsworth.afmil.

FINAL

2010 FIVE-YEAR REVIEW

ACC 4-BASE PBC
ELLSWORTH AIR FORCE BASE

September 20, 2010

Prepared for:

United States Air Combat Command

Ellsworth Air Force Base

and

Air Force Center for Engineering and the Environment
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EXECUTIVE SUMMARY

The United States Air Force (USAF) has completed a five-year review of the remedial actions implemented at Ellsworth Air Force Base (EAFB), South Dakota, as required by Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA [also known as Superfund]). The review was done from March 2010 through September 2010. The first EAFB five-year review was completed in 2000. All of the sites currently under CERCLA remediation within EAFB are on a consolidated review cycle. All were included in the first and second five-year reviews, and they are all included in this review. The United States Environmental Protection Agency (USEPA) Superfund Identification Number for EAFB is SD2571924644.

EAFB is located about 6 miles east of Rapid City, South Dakota and is adjacent to the City of Box Elder, South Dakota. Military airfield operations began in 1942. The installation covers 4,858 acres in Meade and Pennington Counties. EAFB is an active military installation with runways and airfield operations, industrial areas, housing, and recreational facilities. Land use on and around EAFB is a mixture of industrial (primarily on Base), commercial, residential, and agricultural.

The USAF began investigation of possible chemical release sites at EAFB in 1985 under the Installation Restoration Program (IRP). Sampling of environmental media at suspected release sites was completed under IRP Phase II Stage I (1988) and IRP Phase II Stage II (1989). EAFB was included on the USEPA's National Priorities List (NPL) on August 30, 1990. A Federal Facility Agreement (FFA) for EAFB went into effect on April 1, 1992. The FFA identified 11 potential source area Operable Units (OUs) as well as a Basewide groundwater OU. The 12 OUs are identified as follows:

- OU-1 Fire Protection Training Area
- OU-2 Landfills No. 1 and No. 6
- OU-3 Landfill No. 2
- OU-4 Landfill No. 3
- OU-5 Landfill No. 4
- OU-6 Landfill No. 5
- OU-7 Low Level Radioactive Waste Burial Site
- OU-8 Explosive Ordnance Disposal Area (Pramitol Spill)
- OU-9 Old Auto Hobby Shop Area
- OU-10 North Hangar Complex
- OU-11 Basewide Groundwater
- OU-12 Hardfill No. 1

Records of Decision (RODs) have been signed that address all 12 of the OUs at EAFB. Surface soil, unsaturated subsurface soil, surface water, and sediments at OU-2, OU-3, OU-4, OU-5,

OU-6, OU-7, OU-8, OU-9, OU-10, and OU-12 were deleted from the CERCLA process on December 4, 2006. Remedial Action Objectives (RAOs), the selected response action, and performance standards are listed in Exhibit 1. USAF CERCLA response actions are tracked in the Air Force Restoration Information Management System (AFRIMS). The EAFB OUs, their CERCLA status, and corresponding AFRIMS identifiers are listed in Exhibit 2. Recommendations from the 2005 five-year review and follow-up actions are listed in Exhibit 3. Results of this review (i.e., protectiveness statements, recommendations, and follow-up actions) are provided in the following Five-Year Review Summary Form.

Chemicals of concern (COCs) detected in groundwater at EAFB include chlorinated volatile organic compounds (VOCs):

- 1,1-dichloroethane (1,1-DCA)
- 1,1-Dichloroethene (1,1-DCE)
- Cis-1,2-Dichloroethene (cis-1,2-DCE)
- Tetrachloroethene (PCE)
- Vinyl chloride (VC)

And fuel-related compounds:

- Benzene
- Toluene
- Ethylbenzene
- Xylenes
- Diesel Range Organics (DRO)
- Gasoline Range Organics (GRO)

The groundwater remedies at EAFB are in place and operating, and they protect human health and the environment because contaminated groundwater is contained at the Base boundary, high concentration source areas have been identified and are being treated, and because land use controls and alternate water supplies prevent groundwater use.

It is recommended that CERCLA §121(c) five-year reviews continue to be completed for all 12 of the EAFB OUs, except OU-9 and OU-10, which have no-action RODs that transferred groundwater to OU-11.

EXHIBIT 1
RECORDS OF DECISION

Operable Unit	CERCLA Status	Remedial Action Objectives	Selected Response Action	Performance Standards	Status
OU-1 Fire Protection Training Area No. 1	• IRA ROD August 1995 • ROD May 10, 1996 • ESD July 17, 2007	• Cleanup of groundwater to regulatory levels and, for contaminants where regulatory levels are not available, to levels considered safe for public drinking water. • The cleanup source area soils to levels that would not pose a threat of contaminating groundwater.	• SVE for source soils. • Dual wells and extraction wells for groundwater. • Soil vapor and groundwater treatment. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTO/LTM.	• Attainment of MCLs for groundwater. • Attainment of infiltration model calculated cleanup concentrations for soil.	• Vadose zone soils below cleanup levels. • Groundwater transferred to OU-11. • IRT in place. • In-situ oxygen curtain in place. • Bioventing in place. • Continued pump and treat. • Continued LTM.
OU-2 Landfills No. 1 and No. 6	• ROD May 15, 1996 • ESD July 17, 2007	• Provide protection against direct contact with contents of the landfills. • Provide protection against ingestion of contaminated groundwater at concentrations exceeding regulatory or risk-based goals. • Minimize the potential for transport of contaminants in the soils and groundwater beyond the boundaries of the landfills.	• Install an earth cover. • Install a perimeter fence and post warning signs. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTM.	• Maintain the earth cover, fencing and ICs. • Maintain groundwater regulatory standards at the downgradient landfill boundaries.	• Partial deletion from NPL. • Soil cover in place. • Groundwater transferred to OU-11. • IRT in place. • Continued LTM.

EXHIBIT 1
RECORDS OF DECISION

Operable Unit	CERCLA Status	Remedial Action Objectives	Selected Response Action	Performance Standards	Status
		• Three areas of concern: LF1, LF6, surface water bodies.			
OU-3 Landfill No. 2	• ROD June 7, 1996 • ESD July 17, 2007	• To reduce the potential risks posed by contaminants in surface soils, and • To reduce the mobility of potential contaminants in the landfill through containment. • Does not address Leachate remediation since identified wastes placed in the landfill do not typify that which would normally be associated with Leachate production. Groundwater monitoring will identify whether Leachate is being produced in the future.	• Install an earth cover. • Install a perimeter fence and post warning signs. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTM.	• Maintain the earth cover, fencing and ICs. • Maintain groundwater regulatory standards at the downgradient landfill boundary.	• Partial deletion from NPL. • Soil cover in place. • Continued LTM.

EXHIBIT 1
RECORDS OF DECISION

Operable Unit	CERCLA Status	Remedial Action Objectives	Selected Response Action	Performance Standards	Status
OU-4 Landfill No. 3	• IRA ROD August 1995 • ROD May 15, 1996 • ESD July 17, 2007	• Reduce the potential risks posed by contaminants in surface soils and groundwater. • To reduce the mobility of potential contaminants in the landfill through containment. • To prevent ingestion of contaminated groundwater.	• Install an earth cover. • Install a perimeter fence and post warning signs. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • Extraction wells for groundwater. • Groundwater treatment. • LTO/LTM.	• Maintain the earth cover, fencing and ICs. • Maintain groundwater regulatory standards at the downgradient Base boundary. • Attain MCLs for groundwater.	• Partial deletion from NPL. • Soil cover in place. • Groundwater transferred to OU-11. • IRT in place. • Continued pump and treat. • Continued LTM.
OU-5 Landfill No. 4	• ROD June 19, 1996 • ESD July 17, 2007	• To reduce the potential risks posed by contaminants in surface soils. • To reduce the mobility of potential contaminants in the landfill through containment.	• Install an earth cover. • Install a perimeter fence and post warning signs. • ICs (including deed recordation and land use with deed restrictions to be implemented in the event of property transfer). • LTM.	• Maintain the earth cover, fencing and ICs. • Maintain groundwater regulatory standards at the downgradient landfill boundary.	• Partial deletion from NPL. • Soil cover in place. • Continued LTM.

EXHIBIT 1
RECORDS OF DECISION

Operable Unit	CERCLA Status	Remedial Action Objectives	Selected Response Action	Performance Standards	Status
OU-6 Landfill No. 5	• ROD October 10, 1995 • ESD July 17, 2007	• To reduce the potential risks posed by contaminants in surface soils. • To reduce the mobility of potential contaminants in the landfill through containment.	• Install an earth cover. • Install a perimeter fence and post warning signs. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTM.	• Maintain the earth cover, fencing and ICs. • Maintain groundwater regulatory standards at the downgradient landfill boundary.	• Partial deletion from NPL. • Soil cover in place. • Continued LTM.
OU-7 Weapons Storage Area	• ROD June 19, 1996 • ESD July 17, 2007	• To reduce the potential risks posed by contaminants in soils. • To prevent ingestion of groundwater containing chemicals that are risk drivers at concentrations exceeding MCLs.	• ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTM.	• Maintain the ICs. • Attain MCLs for groundwater.	• Partial deletion from NPL. • Groundwater transferred to OU-11. • Continued MNA. • Continued LTM.

EXHIBIT 1
RECORDS OF DECISION

Operable Unit	CERCLA Status	Remedial Action Objectives	Selected Response Action	Performance Standards	Status
OU-8 Explosive Ordnance Disposal Area	• ROD June 19, 1996 • ESD July 17, 2007	• To reduce the potential risks posed by contaminants in surface soils. • To reduce the mobility of potential contaminants in the landfill through containment.	• Install an earth cover. • Install a perimeter fence and post warning signs. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTM.	• Maintain the earth cover, fencing and ICs. • Monitor contaminant concentrations in adjacent and downgradient drainages to evaluate the effectiveness of the cover.	• Partial deletion from NPL. • Soil cover in place. • Continued LTM.
OU-9 Old Auto Hobby Shop	• ROD May 15, 1996	• NO ACTION ROD. "No unacceptable risk" (current and future suggested but not explicit). • Pertains to surface water, sediment, and soil. Groundwater was covered in OU-11. • Petroleum handled separately, through SDDENR.	• Transfer cleanup of media contaminated by fuel-related compounds to the State of South Dakota petroleum cleanup program. • Transfer cleanup of groundwater contaminated by chlorinated VOCs to OU-11 Basewide groundwater.	• Groundwater contaminated by chlorinated VOCs was transferred to OU-11 by the OU-9 ROD May 15, 1996.	• Partial deletion from NPL. • Groundwater transferred to OU-11.

EXHIBIT 1
RECORDS OF DECISION

Operable Unit	CERCLA Status	Remedial Action Objectives	Selected Response Action	Performance Standards	Status
OU-10 North Hangar Complex	• ROD May 15, 1996	• NO ACTION ROD. "No unacceptable current or future risk."	• Transfer cleanup of media contaminated by fuel-related compounds to the State of South Dakota petroleum cleanup program. • Transfer cleanup of groundwater contaminated by chlorinated VOCs to OU-11 Basewide groundwater.	• Groundwater contaminated by chlorinated VOCs was transferred to OU-11 by the OU-10 ROD May 15, 1996.	• Partial deletion from NPL. • Groundwater transferred to OU-11.
OU-11 Basewide Groundwater	• ROD April 1997	• Prevent future human exposure to on-Base groundwater with contaminants exceeding State of South Dakota Ground Water Quality Standards (SDGWQS) and Maximum Containment Levels (MCLs). • Prevent additional groundwater containing contaminants above SDGWQS and MCLs from moving off Base. • Prevent human exposure to off-Base groundwater with contaminants exceeding SDGWQS and MCLs.	• Removal and containment of groundwater with contaminant concentrations above MCLs. • Groundwater treatment. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTO/LTM • Monitored Natural Attenuation (MNA) for off-Base groundwater east of the Base. • Construction of a water supply line in the area of the off-Base groundwater plume east of the Base to supply residents with an alternative potable water supply.	• Maintain the ICs. • Attain MCLs for groundwater.	• IRT in place. • Continued pump and treat. • Continued MNA (off Base). • Continued LTM.

EXHIBIT 1
RECORDS OF DECISION

Operable Unit	CERCLA Status	Remedial Action Objectives	Selected Response Action	Performance Standards	Status
			• Biodechlorination was added as a treatment technology in the 2007 ESD.		
OU-12 Hardfill No. 1	• ROD May 15, 1996 • ESD July 17, 2007	• To reduce the potential risks posed by contaminants in surface soils. • To reduce the mobility of potential contaminants in the hardfill through containment.	• Install an earth cover. • Install a perimeter fence and post warning signs. • ICs (including deed recordation and land use restrictions with deed restrictions to be implemented in the event of property transfer). • LTM.	• Maintain the earth cover, fencing and ICs. • Maintain groundwater and sediment regulatory standards at the downgradient hardfill boundary. • Attain MCLs for groundwater.	• Partial deletion from NPL. • Soil cover in place. • Groundwater transferred to OU-11. • Continued MNA. • Continued LTM.

EXHIBIT 2
AFRIMS SITE STATUS

AFRIMS No.	AFRIMS Name	RI/FS Completed	REM/IRA Completed	ROD Signed	RC	RIP	O&M/LTM
FT-01	Fire Protection Training Area No. 1	July 19, 1995	August 13, 1996	May 15, 1996		June 6, 1997	July 1, 1997
LF-02	Landfills No. 1 and No. 6	July 14, 1995	December 2, 1997	May 15, 1996		May 1, 1997	July 1, 1997
LF-03	Landfill No. 2	January 4, 1996		June 7, 1996		May 1, 1997	July 1, 1997
LF-04	Landfill No. 3	July 18, 1995	August 8, 1996	May 15, 1996		April 15, 1997	July 1, 1997
LF-05	Landfill No. 4	December 19, 1995		June 19, 1996		May 1, 1997	July 1, 1997
LF-06	Landfill No. 5	June 6, 1995		October 10, 1995		July 2, 1996	July 1, 1997
RW-07	Low-Level Radioactive Waste Burial Site	December 21, 1995		June 19, 1996		December 2, 1997	July 1, 1997
SS-11	Explosive Ordnance Disposal Area, Pramitol Spill	January 2, 1996		June 19, 1996		June 6, 1997	July 1, 1997
OT-20	Basewide Groundwater	February 12, 1997		April 1997		December 18, 1997	July 1, 1997
LF-21	Landfill No. 7 (Hardfill No. 1)	October 20, 1995		May 15, 1996		May 1, 1997	July 1, 1997

EXHIBIT 3
2005 REVIEW RECOMMENDATIONS

Operable Unit	2005 Review Recommendations	Actions/Progress
OU-1	• Transfer groundwater to OU-11. • Maintain ICs. • Optimize SVE for source soil. • Introduce oxygen to the subsurface.	Complete • ESD transferred groundwater in May 2007. • ICs have been maintained. • SVE optimization completed in May 2007. • Dissolved oxygen optimization completed in September 2008.
OU-4	• Complete the treatability study for in-situ biodechlorination, and implement in the source area and the plume, if successful.	Complete • Pilot testing of in-situ biodechlorination was completed in June 2006, and was found to be successful. • Vegetable-oil based organic substrate was injected in the source area and in treatment zone within the plume and at the plume boundary in August 2007 and September 2008. • Re-injection of some zones was completed in November 2009.
OU-11 Area 1, Pride Hangar	• Continue operation of the pump-and-treat system. • Implement aggressive biodechlorination of the TCE source area. • Operate the SVE system at the TCE source area to treat soil if this does not interfere with biodechlorination. • Continue to evaluate possible impact of TCE vapor in the Pride Hangar.	Complete • The pump-and-treat system was operated until May 2006, when performance data showed success of biodechlorination. • Lactate injection at the source area was done in October and November 2005. • Vegetable-oil based organic substrate was injected upgradient, at the source, and downgradient in July 2007 and August 2008. DHC bacteria were also injected. • The SVE system has not been used since testing in 2005. • Indoor air testing for TCE found vapor intrusion is not a problem at the Pride Hangar.

EXHIBIT 3
2005 REVIEW RECOMMENDATIONS

Operable Unit	2005 Review Recommendations	Actions/Progress
OU-1 Area 1, South Docks Main	• Continue operation of the pump-and-treat system. • Implement in-situ biodechlorination, as the technology proves to be applicable. • Shut down the pump-and-treat system when performance data proves the biodechlorination process is capable of treating remaining contamination.	Complete (Pump-and-treat shut down will be addressed in the next five-year review.) • The pump-and-treat system has continued to operate since the last five-year review. • Vegetable-oil based organic substrate was injected at the down gradient boundary and within the groundwater TCE plume in July 2007 and August 2008. DHC bacteria were also injected.
OU-11 Area 1, South Flightline Drain	• Monitoring should be completed and evaluated to determine whether additional remediation is warranted.	Complete • Testing in and around the South Flightline Drain in February and May 2009 did not find a TCE groundwater plume. • Discharge diversion to sanitary sewer is planned for 2010.
OU-11 Area 2, On Base	• Efforts should be made to locate and address the source of TCE contamination in this area. • Continue groundwater containment of the BG04 and BG05 plumes at the Base boundary until in-situ technologies can replace the active pumping systems.	Complete (Pump-and-treat shutdown will be addressed in the next five-year review.) • A data gaps investigation of the BG04 and BG05 areas was completed in August-December 2006, and a source was identified for the BG04 plume (former LOX plant). • Continued investigation in December 2008 and March 2009 found a source for the Twining/Risner-BG05 plume (maintenance on a former runway). • From July 2007 through September 2009, both source areas and both plumes were treated using in-situ biodechlorination (organic substrate and DHC bacteria injection). • The BG04 and BG05 Base boundary pumping systems have continued to operate since the last five-year review as the in-situ biodechlorination treatment zones have been established.

EXHIBIT 3
2005 REVIEW RECOMMENDATIONS

Operable Unit	2005 Review Recommendations	Actions/Progress
OU-11 Area 2, Off Base	• Continue to allow natural attenuation to operate. • LTM sampling indicates the plume extent is stable and the contaminant concentrations are decreasing.	Complete • Potable water continued to be supplied to off-Base resident by EAFB until March 2007, when a license for operation and maintenance of the water supply line by the City of Box Elder, South Dakota became active. • A new characterization investigation of the off-Base plume was completed by the USAF between June 2009 and February 2010. • A risk assessment completed using data from the new off-Base investigation found that concentrations of TCE in the off-Base plume were below preliminary remediation goals (PRGs) calculated for specific non-potable uses (e.g., irrigation, swimming, etc.) • The LTM program was optimized in April 2006 and again in March 2010 (following completion of the new groundwater investigation). The number of off-Base groundwater monitoring wells was increased from 11 to 30.
OU-11 Basewide	• Consolidate the LTM program, and report all sampling results together.	Complete • The LTM program has been consolidated, and each sampling event is now reported in a single Base-wide report since October 2005.
OU-12	• Monitoring of the area upgradient of OU-12 should be completed and evaluated to determine if remediation is warranted.	Complete • A groundwater investigation of this area was completed in September 2006. • A limited area of low-concentration TCE was found in groundwater. • It was determined that remediation was not warranted.

EXHIBIT 3
2005 REVIEW RECOMMENDATIONS

Operable Unit	2005 Review Recommendations	Actions/Progress
		• A new monitoring well was installed in October 2007, and LTM sampling has continued.
All OUs	• The groundwater components of the individual Records of Decision (RODs) of OUs 1, 2, 3, 4, 5, 6, 7, 8, and 12 were administratively transferred to OU-11 Basewide Groundwater by a Memorandum of Record signed by the three Remedial Project Managers (RPMs) in July 2005. The groundwater components of OUs 9 and 10 were already deferred to OU-11 by their respective RODs.	Complete • Groundwater at OUs 1, 2, 3, 4, 5, 6, 7, 8, and 12 was officially transferred to OU-11 through an Explanation of Significant Differences (ESD), which was signed by the USAF, USEPA Region 8, and SDDENR in May 2007.
OUs 2, 3, 4, 5, 6, 7, 8, 9, 10, and 12	• With groundwater management transferred to OU-11, the substantive requirements for site closure have been met. EAFB will prepare and submit a recommendation for partial deletion of the EAFB site, including these OUs.	Complete • USEPA Region 8, with concurrence from the State of South Dakota, announced deletion of portions of EAFB in Federal Register Notice 70318 – 70319, Volume 71, No. 232, Monday December 4, 2007. This partial deletion pertains to surface soil, unsaturated subsurface soil, surface water, and sediments at OUs 2, 3, 4, 5, 6, 7, 8, 9, 10, and 12. Partial deletion excluded soils at the Pride Hangar (OU-11 Area 1) and the Gateway Ash area (OU-6).
OUs 2, 3, 4, 5, 6, 8, and 12	• Institutional controls (ICs) identified in each respective ROD should be maintained. This would include annual landfill inspections to ensure compliance with statutory and ROD requirements.	Complete • On-Base land use restrictions are in force via a Continuing Order signed by the Base Commander (Attachment B). Landfills are inspected semi-annually rather than annually. Gates and fences that limit access are inspected and any breaches are identified and repaired when found.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name *(from CERCLIS)*: OU-1, OU-2, OU-3, OU-4, OU-5, OU-6, OU-7, OU-8, OU-9, OU-10, OU-11, and OU-12, Ellsworth Air Force Base		
EPA ID *(from CERCLIS)*: SD2571924644		
Region: 08	State: SD	City/County: Box Elder/Meade & Pennington
SITE STATUS		
NPL status: Final Deleted Other (specify): _____		
Remediation status (choose all that apply): Under construction Operating Complete		
Multiple OUs*? Yes No	Construction completion date: 12 / 18 / 1997	
Has site been put into reuse? Yes No		
REVIEW STATUS		
Lead agency: EPA State Tribe Other Federal Agency: U.S. Air Force		
Author name:		
Author title:	Author affiliation:	
Review period**: 3 / 15 / 2010 to 9 / 20 / 2010		
Dates(s) of site inspection: 5 / 17 / 2010		
Type of review: Post-SARA Pre-SARA NPL-Removal Only Non-NPL Remedial Action Site NPL State/Tribe-lead Regional Discretion		
Review number: 1 (first) 2 (second) 3 (third) Other (specify): _____		
Triggering action: Actual RA Onsite Construction at OU # _____ Actual RA Start at OU # _____ Construction Completion Previous Five-Year Review Report Other (specify): _____		
Triggering action date *(from CERCLIS)*: 9 / 30 / 2005		
Due date *(five years after triggering action date)*: 9 / 30 / 2010		

*OU refers to operable unit.
**Review period should correspond to the actual start and end dates of the Five-Year Review in *CERCLIS*.

FIVE-YEAR REVIEW SUMMARY FORM
(Continued)

Issues:

1. Unsaturated soils at OU-1 may be eligible for partial deletion.
2. Pump-and-treat systems, some of which focused on Base-boundary protection, are being replaced with IRT walls operating through plumes.
3. Recent off-Base groundwater sampling and evaluation indicates that limited non-potable groundwater use would be protective of human health.
4. Active groundwater extraction at OU-1 has become inefficient.
5. A contaminant "smear zone" at OU-1 remains near the water table.
6. Several maintenance issues were noted at these OUs during the site inspection.
7. The fish ingestion pathway transferred from OU-9 to OU-11, was never formally eliminated as a concern, although adequate data was collected to do so.

Recommendations and Follow-up Actions:

1. Evaluate OU-1 for partial deletion of surface soil, unsaturated subsurface soil, surface water, and sediment from the NPL.
2. Revise the LTM plan to describe when active groundwater remediation can be replaced by passive treatment, and when groundwater remediation and groundwater monitoring can be terminated.
3. Complete evaluation of the administrative process to return limited non-potable beneficial use of groundwater to off-Base residents.
4. Shut down extraction systems, implement biosparging.
5. Use oxygen infusion and IRT dechlorination to treat remaining contamination.
6. Review the current maintenance plan, and either revise the plan or improve its implementation.
7. Formalize a determination for the fish ingestion pathway in a decision document.

Protectiveness Statement(s):

For OUs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 12, remedies are protective of human health and the environment because waste is covered, contained, and not available for exposure. A Base-wide order restricts access to the waste areas, prevents groundwater use, and prevents disturbance of the remedy at these locations. All systems are in place, which provide for long term protectiveness, and working as intended.

Groundwater from all OUs has been transferred to OU-11. At OU-11, remedies are protective of human health and the environment because exposure to contaminated groundwater is controlled by a Base-wide order and numerous individual agreements with off-site landowners. Sources of groundwater contamination have been treated or removed. Groundwater migration is controlled at the Base boundary by a collection and treatment system, which is working as intended to maintain long term protectiveness. Both pump-and-treat and in-situ treatment systems are in place and working as intended to reduce groundwater contamination in the long term.

Other Comments: