

Solving Cleanup Challenges Through Risk Reduction

CERCLA 5-Year Review

Briefing for the
Paducah Citizens
Advisory Board
November 20, 2008



E *M* *Environmental Management*

safety ❖ performance ❖ cleanup ❖ closure

Review Objectives

The Five-Year Review is used to accomplish the following:

1. Evaluate whether the remedy is operational and functional;
2. Evaluate those assumptions critical to the effectiveness of remedial measures or the protection of human health and the environment (e.g., land use, site conditions, applicable standards) made at the time of the remedial decision to determine, given current information, whether these assumptions are still valid;
3. Determine what corrective measures are required to address any identified deficiencies; and
4. Evaluate whether there are opportunities to optimize the long-term performance of the remedy or reduce life-cycle costs.

The evaluations of the completed response actions were conducted during January through March 2008



Review Requirements

- The U.S. Environmental Protection Agency (EPA) has defined two types of Five-Year Reviews:
 - Statutory
 - Policy
- This PGDP Five-Year-Review is a combination of statutory and policy reviews because the site implemented removal and remedial actions
- The triggering action is the five-year anniversary of the first and second five-year reviews conducted at this site
- Reviews are conducted using a standard format as described by EPA guidance, which includes
 - Site summary
 - Identified issues
 - Recommendations
 - Protectiveness statements



Process for Review

ADMINISTRATIVE COMPONENTS

- Document review
- Data review
- Site inspection
- Interviews of personnel responsible for specific aspects of some of the response actions
- Five-Year Review Report development and review

COMMUNITY NOTIFICATION AND INVOLVEMENT

- Community involvement handled primarily in conjunction with the CAB
- Site inspections referenced throughout this document are Administrative Record documents; therefore, copies are available to the public
- All Administrative Record documents, along with copies of other decision documents, are available at the Environmental Information Center



Process for Review

DOCUMENT REVIEW

- Relevant documents to the remedial action of each of the units
- Previous Five-Year-Reviews
- Conducted January – March 2008

DATA REVIEW

- Groundwater, surface water, and sediment sample results stored in the OREIS database

SITE INSPECTIONS

- Inspections conducted at each response action sites, except for those currently underway, in March 2008
- Results discussed in each of the technical assessment subsections

INTERVIEWS

- Interviews conducted during March 2008 with personnel connected to response actions, e.g.:
 - Operating Engineer of the Northwest and Northeast Plumes treatment systems
 - DOE Portsmouth/Paducah Project Office health physicist



Process for Review

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (from WasteLAN): Paducah Gaseous Diffusion Plant		
EPA ID (from WasteLAN): KY8890008982		
Region: 4	State: KY	City/County: Paducah/McCracken
SITE STATUS		
NPL status: Final		
Remediation status (choose all that apply): Under Construction Operating		
Multiple OUs?* YES	Construction completion date: ___ / ___ / _____	
Has site been put into reuse? NO		
REVIEW STATUS		
Lead agency: U.S. Department of Energy		
Author name: Kelly Layne		
Author title: Senior Engineer Scientist	Author affiliation: Paducah Remediation Services, LLC	
Review period: 01/17/2008 to 03/21/2008		
Date(s) of site inspection: 03/05/2008 through 03/11/2008		
Type of review: Post-SARA		
Options: Post-SARA; Pre-SARA; NPL-Removal only; Non-NPL Remedial Action Site; NPL State/Tribe-lead; Regional Discretion		
Review number: 3 (third)		
Triggering action: Previous Five-Year Review Report		
Options: Actual RA On-site Construction at OU # ____; Actual RA Start at OU# ____; Construction Completion Other (specify)		
Triggering action date (from WasteLAN): 12/20/2003		
Due date (five years after triggering action date): 12/20/2008		

* "OU" refers to operable unit.

** Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.

NPL = National Priorities List



Project Review Outline

I REMEDY SELECTION

II REMEDY IMPLEMENTATION

III SYSTEMS OPERATIONS/OPERATIONS AND MAINTENANCE

IV TECHNICAL ASSESSMENT

Question A: Is the Remedy Functioning as Intended by the Decision Documents?

Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs Used at the Time of the Remedy Selection Still Valid?

Question C: Has Any Other Information Come to Light That Could Call into Question the Protectiveness of the Remedy?

V ISSUES



Projects Included in the Review

- Northwest Plume
- Northeast Plume
- Cylinder Drop Test Area (LasagnaTM)
- Water Policy
- North-South Diversion Ditch Source Control
- North-South Diversion Ditch Sections 1 and 2
- C-746-K Landfill
- Fire Training Area
- Surface Water Interim Corrective Measures
- C-749 Uranium Burial Ground
- C-402 Lime House
- C-405 Incinerator
- GWOU C-400 Electrical Resistance Heating
- D&D OU C-410 Infrastructure Removal



Project Details - Northwest Plume

- Since operations began, the Northwest Plume treatment system had processed 1.3 billion gal of water
- Removed approximately 25,895 pounds (2,216 gal) of TCE at an operation cost of \$251 million
- The operational data and the site inspection indicate that the mechanical components of the remedy are functioning as intended by the ROD.
- Persistent contaminant levels of approximately 100–800 $\mu\text{g/L}$ TCE and 100–400 pCi/L 99Tc in water samples from downgradient Monitoring Wells indicate some dissolved contamination may be bypassing the South Extraction Well Field



Project Details - Northeast Plume



- Implementation consisted of utilizing process water cooling towers to volatilize TCE
- Since operations began, the Northeast Plume treatment system has processed ~905 million gal of water
- The system has removed ~2,801 pounds (230 gal) of TCE
- TCE concentrations throughout the Northeast Plume have declined so that they are below 1,000 ug/L at Extraction Wells and Monitoring Wells; therefore, the goal of the Northeast Plume System has been achieved.



Project Details - Cylinder Drop Test Area (Lasagna™)

- Remedy consisted of treatment of contaminated soil by the Lasagna™ electro-osmosis technology
- Primary objective was to reduce the concentration of TCE in soil to 5.6 mg/kg or lower
- Remediation completed in 2002 at a cost of \$4M
- Remedy designed to be protective of future groundwater use at the fence line of the facility by meeting the TCE MCL value of 5 ug/L.



Conclusion: The average residual soil level of TCE around the site is less than one-tenth of the original level calculated to be protective of groundwater in the ROD; therefore, the remedy employed is as protective of drinking water as it was when the ROD was implemented.

Project Details - North-South Diversion Ditch Sections 1 and 2

- The ditch has been well-maintained; grass was established in the channel, but was not impeding flow. There was no excessive debris over the gabion screens.
- The aboveground piping was in good condition and functioning properly
- NSDD inspections are ongoing as part of the current remediation contractor's scope
- This action is protective of human health and the environment because contaminated soils and sediments were excavated, eliminating the threat of exposure



Project Details - Surface Water Interim Corrective Measures

- The objectives were :
 - To restrict access by the general public and site personnel to contaminated areas, thus reducing direct exposure;
 - To restrict access by the general public to contaminated areas for recreational uses;
 - To identify contamination areas to the public and site personnel; and
 - To monitor water and sediments as part of the KPDES program.
- The locations of the signs and the wording on them, as well as the fencing remain appropriate.
- Potential users of creeks, ponds, or streams outside the PGDP security fence are warned that contact with contaminated water and sediment may pose potential dangers.
- The monitoring program through the KPDES program still is successful in meeting informational objectives.



Issues Considered - 2008 Review

Groundwater Operable Unit

Northwest Plume—The remedy remains protective, however, the action could be optimized by ascertaining whether the high-concentration core of TCE of the Northwest Plume at the North Extraction Well Field has migrated eastward of the capture zone of the well field.

Surface Water Operable Unit

Interim Corrective Measures—Additional signs were posted as part of another project near the Surface Water ICM signs. Although the content between the two types of signs does not conflict, DOE is considering uniform language for the sign postings.



Recommendations and Follow-Up - 2008 Review

Groundwater Operable Unit

Northwest Plume—Evaluate preferential pumping of high-concentration wells. Assess contaminant trends at the current locations of the core of the downgradient plume.

Surface Water Operable Unit

NSDD Section 1 and 2—Perform a residual risk calculation to determine if the remedy can be optimized (e.g., risks are at a level that would support modification of institutional controls and/or cessation of five-year reviews).

Interim Corrective Measures—Evaluate whether ICM signs should be removed or replaced with new signs with language approved for the Environmental Indicator signs.



Summary

The assessments of this Five-Year Review find that DOE has implemented and operated the remedies in accordance with the requirements of the RODs.

All actions remain protective of human health and the environment.





DOE Portsmouth/Paducah Project Office