SIXTH FIVE-YEAR REVIEW REPORT FOR DISTLER FARM SUPERFUND SITE JEFFERSON COUNTY, KENTUCKY

SEPTEMBER 2018

Prepared by

U.S. Environmental Protection Agency
Region 4
Atlanta, Georgia

Franklin E. Hill, Director
Superfund Division

9/25/18
Date

Table of Contents

Tables

Figures

LIST OF ABBREVIATIONS AND ACRONYMS

1,1,1-TCA	1,1,1-Trichloroethane
ARAR	Applicable or Relevant and Appropriate Requirement
ASC	Allowable Soil Concentration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGA	Coarse-Grained Aquifer
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
DCE	Dichloroethylene
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FGA	Fine-Grained Aquifer
FS	Feasibility Study
FYR	Five-Year Review
HQ	Hazard Quotient
IC	Institutional Control
KDEP	Kentucky Department for Environmental Protection
KNREPC	Kentucky Natural Resources and Environmental Protection Cabinet
LTRA	Long Term Response Action
MCL	Maximum Contaminant Level
µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
NA	Not Applicable
NCP	National Contingency Plan
NE	Not Established
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethylene
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SDWA	Safe Drinking Water Act
SVOC	Semi-Volatile Organic Compound
SWRAU	Sitewide Ready for Anticipated Use
TCE	Trichloroethylene
UU/UE	Unlimited Use and Unrestricted Exposure
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the sixth FYR for the Distler Farm Superfund site (the Site). The triggering action for this policy review is the completion date of the previous FYR. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU). OU1 addresses the soil and groundwater remedy. This FYR addresses OU1.

EPA remedial project manager (RPM) Michael Townsend led the FYR. Participants included EPA community involvement coordinator (CIC) Angela Miller, Shital Jiwane and Cheryl Harris from the Kentucky Department for Environmental Protection (KDEP), and Johnny Zimmerman-Ward and Kirby Webster from EPA FYR support contractor Skeo. The review began on 11/13/2017. Appendix A includes documents reviewed as part of this FYR. Appendix B includes EPA's site status information. Appendix C provides the Site's chronology of events.

Site Background

The 3-acre Site is located in Jefferson County, Kentucky, about a mile northeast of West Point (Figure 1). In the 1970s, a private citizen used the property for unauthorized chemical waste disposal and storage. The facility operated concurrently with a similar operation at the nearby Distler Brickyard Superfund site. Drum contents contaminated soil and groundwater. The Site is located in a rural area. Agricultural land is located northeast and southwest of the Site. The Ohio Valley Speedway is located southeast of the Site. Future plans for the Site are unknown and the Site is not currently being used. Previous owners planted clover on site to encourage the presence of deer.

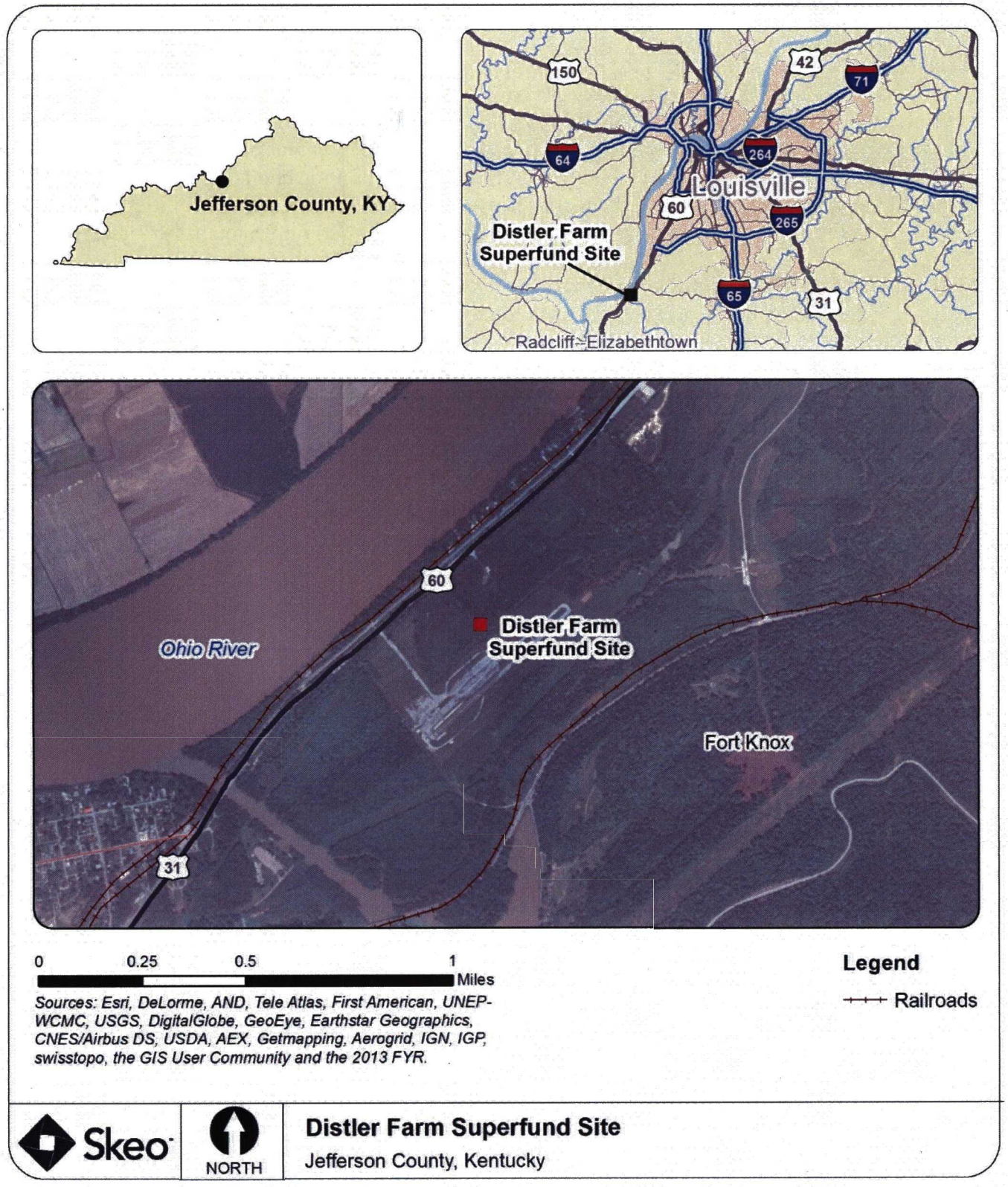
Current site features include a parking lot and remaining out of use extraction wells. Site vegetation includes underbrush, grass and trees. It is located in the Salt River Drainage Basin, which discharges into the Ohio River near West Point. The Site is about a mile northeast of the confluence of the Salt River and the Ohio River. Stump Gap Creek runs across the Site. The Site lies within the creek's 10-year floodplain, and frequently inundates with water during heavy rains due to poor drainage and proximity to moving water. Quaternary-age alluvium and glacial outwash deposits of the Ohio River Alluvium underlie the Site. Two hydrostatic units make up the glacial outwash deposits – the fine-grained alluvium (FGA) and the coarse-grained alluvium (CGA). The CGA is directly below the FGA and is a laterally continuous, gravel-sand unit with a minor distribution of silt and clay. Groundwater movement

in the FGA is to the southeast. Groundwater in the CGA flows in the opposite direction, to the northwest, toward the Ohio River.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Distler Farm		
EPA ID: KYD980601975		
Region: 4	**State:** Kentucky	**City/County:** West Point/Jefferson
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the Site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA		
Author name: Michael Townsend (EPA) and Johnny Zimmerman-Ward and Kirby Webster (Skeo)		
Author affiliation: EPA and Skeo		
Review period: 11/13/2017 – 9/1/2018		
Date of site inspection: 1/18/2018		
Type of review: Policy		
Review number: 6		
Triggering action date: 9/20/2013		
Due date ***(five years after triggering action date)*****:** 9/20/2018		

Figure 1: Site Vicinity Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In December 1978, the Ohio River flooded the site property and scattered hundreds of drums along the floodplain of Stump Gap Creek. The Kentucky governor declared an environmental emergency and requested assistance from the EPA. In January 1979, EPA Region 4 supervised the recovery and temporary on-site storage of more than 800 drums containing chemicals characteristic of the paint and varnish industry. The Kentucky Natural Resources and Environmental Protection Cabinet (KNREPC) later removed the drums and disposed of them at approved hazardous waste disposal facilities. The EPA placed the Site on the Superfund program's National Priorities List (NPL) on September 8, 1983.

The EPA conducted remedial investigations (RIs) and feasibility studies (FSs) between 1983 and 1985. In February 1984, the EPA halted RI work for two months while it removed buried drums and waste containers from four burial locations. Approximately 120 55-gallon drums and 2,620 smaller containers were unearthed and sampled. The EPA removed site wastes and visibly-contaminated soil and transported them to permitted hazardous waste disposal facilities. Chemical analyses revealed that the wastes included toxic, volatile, ignitable, radioactive (lab packs) and reactive materials. Following the removal operations, the pits were backfilled and the entire affected area was graded, cultivated and sown with grass seed to control erosion. Table 1 shows site contaminants of concern (COCs) identified during the RI.

Table 1: COCs by Media

COC	Soil	Groundwater
Benzene	X	
Bis(2-ethylhexyl)phthalate	X	X
Chromium	X	X
Di-n-butyl phthalate	X	X
Isophorone	X	X
Lead	X	X
Naphthalene	X	X
Tetrachloroethylene (PCE)	X	
Trans dichloroethylene (DCE)		X
1,1,1-Trichloroethane (1,1,1-TCA)		X
Trichloroethylene (TCE)	X	X
Toluene	X	X
Vinyl chloride		X
Notes: Blank = COC not present in media		

Based on the RI results and additional hydrogeologic studies, potential human and environmental receptors included:

- Nearby users of groundwater for drinking or domestic purposes.

- Human contact with surface waters.
- Human consumption of game animals.
- Third-party intruder direct dermal contact with contaminants.
- On-site remediation worker inhalation or dermal contact.
- Environmental receptors, including aquatic biota, terrestrial fauna and stressed vegetation.

Response Actions

The EPA selected the Site's long-term remedy in the Site's August 1986 Record of Decision (ROD). It identified the following remedial action objectives (RAOs) for the Site:

Soil Contamination

- Source control.
- Reduce concentration of contaminants.
- Control potential migration of surface and subsurface contaminants resulting from contaminated soils.
- Prevent or minimize surface erosion and consequent contaminant runoff, including environmental hazards associated with potential flooding of Stump Gap Creek, as well as the Salt River and/or Ohio River.
- Prevent, minimize or eliminate the on-site potential for exposure by direct contact, the on-site potential for airborne releases, the potential for contaminant migration by surface water pathways, and the migration of contaminants to groundwater.

Groundwater Contamination

- Manage plume migration.
- Prevent increases of contaminant concentrations.
- Reduce concentrations of contaminants.
- Prevent or minimize further migration of contaminants.

Based on additional information discovered during the RI, the EPA issued an Explanation of Significant Differences (ESD) in October 1988. The ESD modified the remedy selected in the Site's 1986 ROD. The ROD and 1988 ESD identified the following remedy for the Site:

- Excavation and removal of contaminated soil so that water leaching into the aquifer will not exceed the health-based values in Table 2
- Backfilling of excavated areas with clean soil, grading and revegetation.
- Groundwater remediation to the drinking water standards and the health-based values in Table 2.

Table 2: Groundwater and Soil COC Cleanup Goals

COC	Groundwater Cleanup Goal[a] (µg/L)	Soil[b] (mg/kg)
Arsenic	50	NA
Chromium	50	413
Lead	50	338
Benzene	5	NA
Bis-2-ethylhexylphthalate	NA	500
2-Butanone	170	NA

COC	Groundwater Cleanup Goal[a] (µg/L)	Soil[b] (mg/kg)
Dibutylphthalate	NA	500
1,1-DCE	7	0.00418
Trans-1,2-DCE	70	0.04181
Isophorone	NA	500
Toluene	2,000	149.331
1,1,1-TCA	200	5.6
TCE	5	0.01213
Vinyl chloride	NA	0.00015

Notes:

a. From the 1988 ESD, pages 5 and 6. This list of COCs has fewer groundwater and soils COCs than were originally identified and listed in Table 1 of this FYR Report.

b. 1988 ESD Allowable Soil Concentrations (ASCs) for chromium and lead are listed in Attachment A (page 57), Appendix C of the 1988 ESD. Organics are listed in Attachment A, Table 7 of the 1988 ESD (page 22).

NA = Cleanup goals not defined in the 1988 ESD.
µg/L = micrograms per liter
mg/kg = milligrams per kilogram

Status of Implementation

The EPA started the Site's remedial design in April 1987 and finished it in September 1988. Soil boring data collected by the EPA during the RI showed that no additional excavation was necessary at the Site. The EPA documented the findings and the decision in the October 1988 ESD. However, in November 1988, additional drums were uncovered during excavation for a site access road. The drums contained medical and laboratory waste, herbicide, solvents and lab pack materials. During the subsequent removal action, which began in September 1988 and finished in September 1989, approximately 25 drums, some of which had rusted out, were retrieved. Contaminated soils were removed to a depth of about 15 feet in the surrounding area.

An extensive magnetometer survey followed this removal action, which led to the discovery of additional drums. Excavation of the drums along with surrounding and underlying soil occurred. Excavation and sampling ceased after at least 6 inches of native soil were removed and all contaminant concentrations were below background levels or concentrations established in the ESD. Excavated areas were then backfilled and revegetated.

Installation of a groundwater remediation system occurred in 1989; the system included eight extraction wells and a temporary water storage tank. Groundwater was extracted and stored on site temporarily, and contaminated groundwater was taken to an off-site facility for treatment. Uncontaminated groundwater was reinjected into the aquifer. Groundwater remediation took place between December 1991 and December 2001 as part of the long-term response action (LTRA). In January 2002, the Commonwealth of Kentucky assumed responsibility for the Site. The KDEP shut down the groundwater extraction system after an April 2003 sampling event found all COC concentrations below cleanup levels. The system is no longer operational and has been removed from the Site. The only system components that remain are the extraction wells. In 2013, in agreement with the EPA, KDEP abandoned 28 groundwater wells. They were no longer capable of producing samples representative of aquifers at the Site because of their old age and poor condition. In 2014, KDEP installed three pairs of groundwater wells and took subsurface soil samples during well installation. KDEP sampled the wells in April 2015.

As the Site remedial objectives are being achieved the EPA has begun the process of deleting the Site from the NPL and KDEP has concurred with the decision to begin the delisting process.

Systems Operations/Operation and Maintenance (O&M)

Estimated costs from the 1986 ROD included annual O&M costs of $113,600 for years one through 10 and $20,200 for years 11 through 30. KDEP is responsible for current O&M activities. These activities consist of mowing and general site maintenance, including fencing, signage and a locked gate. In 2013, costs were high because KDEP abandoned wells that were no longer usable. In 2014, three new groundwater well pairs were installed. Table 3 shows annual O&M costs for construction activities. There is a potentially responsible party (PRP) group responsible for reimbursing KDEP for the costs of the O&M activities.

Table 3: O&M Costs Over the FYR Period

Year	Total Cost
2013	$82,000
2014	$25,000
2015	$3,000
2016	0
2017	$1,000

III. PROGRESS SINCE THE PREVIOUS REVIEW

This section includes the protectiveness determinations and statements from the previous FYR as well as the recommendations from the previous FYR and the status of those recommendations.

Table 4: Protectiveness Determinations/Statements from the 2013 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The remedy at the Site currently protects human health and the environment because contaminated soils were removed from the Site and, historically, contaminated groundwater has not been detected outside of the Site. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: abandon and properly decommission monitoring wells and install new monitoring wells and sample quarterly for at least one year to establish current groundwater conditions.

Table 5: Status of Recommendations from the 2013 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	Site monitoring wells do not provide samples representative of aquifer conditions, but have not been decommissioned.	Abandon and properly decommission monitoring wells.	Ongoing	KDEP abandoned 28 groundwater monitoring wells in 2013. One off-site well remains to be abandoned.	NA

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	New monitoring wells have not been installed to establish current groundwater conditions.	Install new monitoring wells and sample quarterly for at least one year to establish current groundwater conditions.	Completed	KDEP installed three pairs of groundwater monitoring wells in 2014 and sampled the wells once in April 2015.	4/1/2015

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Community Involvement and Site Interviews

A public notice was made available by posting in the Sentinel newspaper on 3/15/2018 (Appendix D). It stated that the FYR was underway and invited the public to submit any comments to the EPA. The results of the review and the report will be made available at the Site's information repository, West Point City Hall, located at 509 Elm Street in West Point, Kentucky.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date. The interviews are summarized below. Completed interview forms are included in Appendix E.

KDEP's Shital Jiwane stated that the project appears to be close to achieving its remedial objectives. As the Site remedial objectives are being achieved, the EPA has begun the process of deleting the Site form the NPL and KDEP has concurred with the decision to begin the delisting process. Ms. Jiwane indicated extraction wells need to be properly abandoned; the associated power lines and remnants of the former remediation building need to be removed; and the groundwater monitoring wells also need to be properly abandoned once the Site is deleted from the NPL. These activities do not affect the site remedy but are necessary from a liability perspective.

Data Review

KDEP collected groundwater samples from the three well pairs (DFMW-1S/D, DFMW-2S/D and DFMW-3S/D) (Figure 2) and analyzed them for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls, total metals and dissolved metals once since the previous FYR, in April 2015. Table 6 below shows maximum detections observed for site COCs during the April 2015 sampling event. Lead was the only COC detected. The concentration, 11 micrograms per liter (µg/L), is below the groundwater cleanup goal of 50 µg/L as well as below the current EPA maximum contaminant level (MCL) of 15 µg/L. The arsenic detection limit (25 µg/L) is greater than the current MCL (10 µg/L), but less than the groundwater cleanup goal (50 µg/L). In April 2018, the EPA resampled groundwater for arsenic. The arsenic concentrations in the shallow wells were below the current MCL. The arsenic concentrations in the deep wells exceeded the current MCL (Table 7). The method used to analyze the samples is prone to provide anomalous detections of arsenic.

Table 6: April 2015 Groundwater Sampling Results

COC	Groundwater Cleanup Goal (µg/L)	Current MCL (µg/L)	April 2015 Maximum Detection (µg/L)
Arsenic	50	10	**<25**
Chromium	50	100	<5
Lead	50	15	11 (DFMW-1S)
Benzene	5	5	<5
2-Butanone	170	No MCL	<25
1,1-DCE	7	7	<5
Trans-1,2-DCE	70	100	<5
Toluene	2,000	1,000	<5
1,1,1-TCA	200	200	<5
TCE	5	5	<5

Notes:
Analytical data from 5040161 certificate of analysis
Bold = Detection limit exceeds the current MCL
µg/L = micrograms per liter

Table 7: April 2018 Arsenic Groundwater Sampling Results

Monitoring Well	Groundwater Cleanup Goal (µg/L)	Current MCL (µg/L)	Arsenic Sampling Result (µg/L)
DFMW-1S	50	10	1
DFMW-1D	50	10	**17**
DFMW-3S	50	10	5.6
DFMW-3D	50	10	**14**

Notes:
Source: Distler Farm Sampling Investigation Report, May 2018
Bold = exceeds the current MCL
µg/L = micrograms per liter

Soil samples were taken during the installation of the 2014 groundwater monitoring wells at intervals of about 35, 55 and 70 feet below ground surface. Table 8 shows maximum concentrations or maximum detection limits of site COCs identified in the soil sampling. There were no detections observed above the allowable soil concentrations (ASCs) for site COCs. However, detection limits for four COCs were above their respective soil ASCs (Table 8). Because these samples are from depth, the detection limits are not an issue. Soil ASCs are discussed further in Question B and Appendix I.

Table 8: Soil Concentrations in 2014

COC	Soil ASC (mg/kg)	Maximum Concentration in 2014 (mg/kg)
Chromium	413	11.6 (DFMW-1D35)
Lead	338	9.4 (DFMW1D35 and DFMW-1S35)

COC	Soil ASC (mg/kg)	Maximum Concentration in 2014 (mg/kg)
Bis-2-ethylhexylphthalate	500	ND (0.510, DFMW-1D35)
Dibutylphthalate	500	ND (0.510, DFMW-1D35)
1,1-DCE	0.00418	**ND (0.180, DFMW-1D55)**
Trans-1,2-DCE	0.04181	**ND (0.180, DFMW-1D55)**
Isophorone	500	ND (0.510, DFMW-1D35)
Toluene	149.331	0.0134 (DFMW-3D70)
1,1,1-TCA	5.6	ND (0.180, DFMW-1D55)
TCE	0.01213	**ND (0.180, DFMW-1D55)**
Vinyl chloride	0.00015	**ND (0.180, DFMW-1D55)**

Notes:
ND = not detected
Bold = Detection limit exceeds the soil ASC
mg/kg = milligrams per kilogram

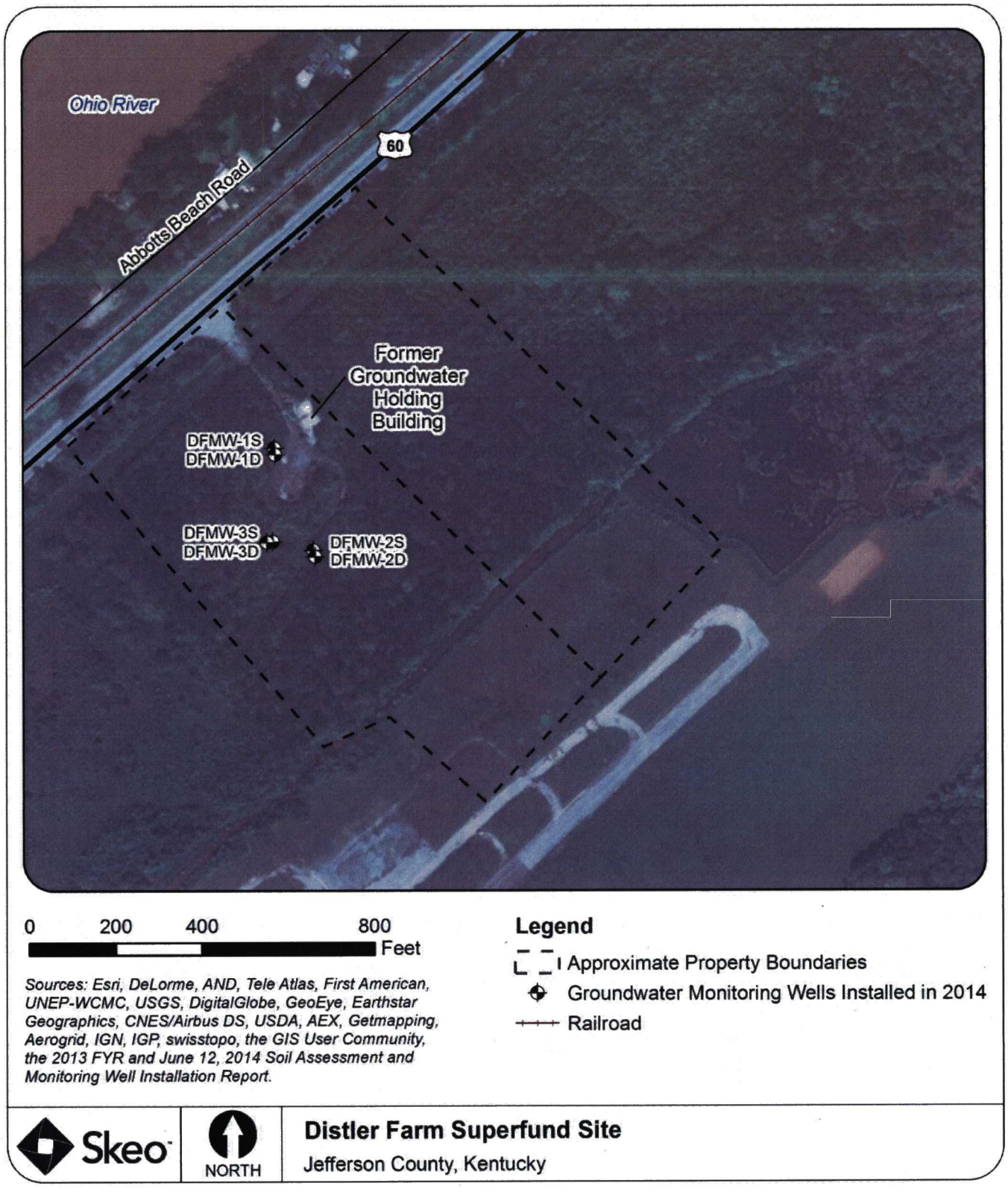
Site Inspection

The FYR site inspection took place on January 18, 2018. In attendance were Shital Jiwane and Cheryl Brown from KDEP and Johnny Zimmerman-Ward and Kirby Webster from EPA FYR contractor Skeo. The purpose of the inspection was to assess the protectiveness of the remedy. Appendix F includes the site inspection checklist. Appendix G includes site inspection photographs.

Site access is off Dixie Highway and was restricted by a locked gate. Site inspection participants observed general site conditions. The building that housed the former collection tank has been removed from the Site. Most monitoring wells have been abandoned. The extraction wells from the pump system are still in place. A paved road crosses part of the Site and ends at the end of the extraction wells. A paved parking area is located along the road near the former remediation tank building. The road was in good shape at the time of the inspection. The Site generally appeared to be in good condition; KDEP mows the Site twice a year. A stream flows across the eastern portion of the Site. Future plans for the property are unknown.

On January 18, 2018, Skeo staff visited the designated site repository, West Point City Hall, as part of the site inspection. No documents were available. KDEP updated the repository in February 2018 with electronic copies of site documents on a compact disc.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:
The remedy required in the ROD and ESD is functioning as intended. Excavation and removal of contaminated soils occurred at the Site. Between late 1988 and early 1989, the EPA installed the groundwater extraction system. Groundwater was extracted and stored on site temporarily, and contaminated groundwater was taken to an off-site facility for treatment. Uncontaminated groundwater was reinjected into the aquifer. KDEP shut down the groundwater extraction system after an April 2003 sampling event showed all COC concentrations were below cleanup levels. The system is no longer operational and has been dismantled except for the extraction wells, which remain on site. KDEP installed three new groundwater monitoring well pairs in 2014. Groundwater sampling indicated that all groundwater contaminants are below cleanup goals. Arsenic was detected in deep wells at concentrations greater than the current federal MCL of 10 µg/L, but below the cleanup goal of 50 µg/L during this FYR period.

There are no institutional controls required at the Site and no institutional controls are needed.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Question B Summary:
The exposure assumptions and the RAOs used at the time of the remedy selection are still valid. The cleanup goals established for groundwater in the 1988 ESD were federal and state drinking water standards. Since 1988, MCLs for arsenic, lead and toluene have become more stringent. Current groundwater sampling indicates that, with the exception of arsenic, all contaminants are below current cleanup standards. In 2018, the EPA sampled groundwater for arsenic. Arsenic was detected in deep wells at concentrations greater than the current federal MCL of 10 µg/L. Additional groundwater sampling should be conducted for arsenic with appropriate detection limits using analytical method 7026. The chemical 1,4-dioxane, which has historically been used as a stabilizing agent in chlorinated solvents, primarily 1,1,1-trichloroethane (1,1,1-TCA), was most recently analyzed in site groundwater in May 2007. As 1,1,1-TCA was identified as a COC at the Site, it is possible that 1,4-dioxane may have been present. May 2007 sampling of 1,4-dioxane did not detect it.

Cleanup goals established for soil in the 1986 ROD were based on the minimum analytical quantitation level. After the EPA determined the difficulty of attaining the required levels, the EPA developed alternative ASCs in the 1988 ESD. ASCs were developed to ensure that contaminant concentrations in water leaching into the aquifer would not exceed groundwater applicable or relevant and appropriate requirements (ARARs). Using the ASCs as revised cleanup goals for soil, the EPA determined that site soils no longer require excavation to protect groundwater. An evaluation of current residential regional screening levels (RSLs) included in Appendix I, Table I-2, indicates that the 1988 soil cleanup goals are protective of human health and the environment for unrestricted use.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the FYR:
None

OU(s): 1	Issue Category: Monitoring			
	Issue: Groundwater detection limits during the April 2015 sampling event were greater than current MCLs for arsenic. The 2018 re-sample for arsenic detected the arsenic levels slightly above the MCL, the method used to analyze the samples is prone to provide anomalous detections of arsenic.			
	Recommendation: Sample groundwater for arsenic with appropriate detection limits using analytical method 7026.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA/State	671/2019

OTHER FINDINGS

Two additional recommendations were identified during the FYR. These recommendations do not affect current and/or future protectiveness.

- Abandon extraction wells, associated power lines and remnants of the former remediation building.
- Properly abandon the groundwater monitoring wells once it is determined that they are no longer needed.

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective
Protectiveness Statement: The remedy at the Site currently protects human health and the environment because there are currently no completed exposure pathways. However, in order for the remedy to be protective in the long term, the following actions need to be taken: sample groundwater for arsenic with appropriate detection limits using analytical method 7026.

VIII. NEXT REVIEW

The next FYR Report for the Distler Farm Superfund site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

Analysis Report. Distler Farm. McCoy & McCoy Laboratories, Inc. Received by KDEP May 23, 2007.

Distler Farm Sampling Investigation Report. Distler Farm Superfund Site. USEPA – Region 4. Project Date: April 3-4, 2018. Report Date: May 9, 2018.

EPA Superfund Record of Decision: Distler Farm. Jefferson County, Kentucky. EPA Region 4. August 19, 1986.

Explanation of Significant Differences: Distler Brickyard and Distler Farm. West Point, Kentucky. United States Environmental Protection Agency Region 4. October 26, 1988.

Fifth Five-Year Review Report for Distler Farm. West Point, Jefferson County, Kentucky. United States Environmental Protection Agency Region 4. September 20, 2013.

Memorandum: Distler Farm NPL Site – April 2015 Sampling. Kentucky Department for Environmental Protection. September 21, 2017.

Soil Assessment and Monitoring Well Installation Report. Micah Group. June 12, 2014.

Superfund Checklist for Reporting the Sitewide Ready for Anticipated Use GPRA Measure. September 19, 2017.

APPENDIX B – CURRENT SITE STATUS

Environmental Indicators
- *Current human exposures at the Site are under control.* - *Current groundwater migration is under control.*

Are Necessary Institutional Controls in Place?
☒ All ☐ Some ☐ None

Has the EPA Designated the Site as Sitewide Ready for Anticipated Use?
☒ Yes ☐ No

Has the Site Been Put into Reuse?
☐ Yes ☒ No

APPENDIX C – SITE CHRONOLOGY

Table C-1: Site Chronology

Event	Date
The Ohio River flooded the Site and scattered drums of waste in the area Kentucky's governor sought emergency assistance from the EPA at Site	December 1978
The EPA conducted emergency removal action at the Site The EPA began site sampling, initial private well sampling and various site studies	January 1979
The EPA proposed the Site for listing on the NPL	December 30, 1982
The EPA completed site sampling, initial private well sampling and various site studies	July 1983
The EPA listed the Site on the NPL	September 8, 1983
The EPA began Site's RI/FS	September 13, 1983
The EPA began removal action	March 26, 1984
The EPA completed removal action	May 27, 1984
The EPA began enforcement activities	December 1985
The EPA completed RI/FS and signed ROD	August 19, 1986
The EPA began remedial design	April 18, 1987
The EPA began remedial action Superfund-State Contract signed	September 14, 1988
Soil remediation began	September 30, 1988
The EPA issued ESD	October 26, 1988
The EPA conducted additional drum and soil removal action	November 1988
The EPA began groundwater remedial action	September 1989
Removal action completed	September 30, 1989
LTRA started	December 30, 1991
The EPA completed remedial action Interim Site Close-Out Report signed	July 9, 1992
The EPA signed Site's first FYR Report	September 28, 1993
Consent Decree signed	October 2, 1995
Consent Decree signed	November 15, 1995
State-Lead-Fund-Financed Cooperative Agreement for LTRA signed	April 1, 1996
The EPA signed Site's second FYR Report	September 23, 1998
Mandatory take-over of site O&M activities by KDEP	January 1, 2002
KDEP shut down groundwater cleanup system	April 2003
The EPA signed Site's third FYR Report	September 25, 2003
KDEP conducted groundwater sampling event	May 2007
The EPA signed Site's fourth FYR Report	September 26, 2008
KDEP conducted groundwater sampling event	March 2010
The EPA signed Site's fifth FYR Report	March 20, 2013
KDEP installed three new groundwater well pairs	2014
KDEP conducted groundwater sampling event	April 2017
The Site achieved sitewide ready for anticipated use (SWRAU) status	September 19, 2017

APPENDIX D – PRESS NOTICE

The U.S. Environmental Protection Agency, Region 4 Announces Five-Year Reviews for the Distler Farm and Distler Brickyard Superfund Sites, West Point, Kentucky

Purpose/Objective: The EPA is conducting Five-Year Reviews of the remedies for the Distler Farm and Distler Brickyard Superfund sites (the Sites) in West Point, Kentucky. The purpose of the Five-Year Reviews is to make sure the selected cleanup actions effectively protect human health and the environment.

Site Background: The 3-acre Distler Farm site is located in the southwest corner of Jefferson County. Unauthorized chemical waste disposal and storage activities took place there in the 1970s. Drums and containers of industrial wastes were buried and stored above ground. The EPA's initial site inspection identified about 600 waste drums. Ohio River flooding in 1978 led to the identification of more than 800 additional drums. Site activities contaminated soil and groundwater with volatile organic compounds (VOCs) such as toluene and benzene and heavy metals including chromium and lead.

The 3-acre Distler Brickyard site is located in West Point, Kentucky. From the late 1800s to the mid-1970s, a brick manufacturer operated on site. Waste storage operations took place on site from 1976 to 1979. These operations resulted in the contamination of groundwater and soil. The EPA placed both sites on the Superfund program's National Priorities List (NPL) in 1983.

Cleanup Actions: The EPA selected the remedy for the Distler Farm site in the Agency's August 1986 Record of Decision. Major parts of the remedy included digging up and removal of contaminated soil to background levels and disposal of contaminated soil at a permitted hazardous waste landfill; extraction and temporary on-site storage of contaminated groundwater; treatment and discharge of water at a publicly owned treatment facility; and reinjection of uncontaminated water into the aquifer. The EPA updated the Site's remedy in the Agency's October 1988 Explanation of Significant Differences. Major changes included the use of alternate groundwater cleanup levels. Additionally, soil contaminant concentrations were below levels that would cause groundwater to exceed drinking water standards. For this reason, the EPA determined that it would not be necessary to dig up and remove site soils.

The EPA selected the remedy for the Distler Brickyard site in the Agency's August 1986 Record of Decision. Major parts of the remedy included digging up contaminated soils and disposing of them off site and extracting, treating, and re-injecting groundwater on site. The EPA updated the site's remedy in the Agency's October 1988 Explanation of Significant Differences, selecting alternate groundwater cleanup levels.

Five-Year Review Schedule: The National Contingency Plan requires review of remedial actions that result in any hazardous substances, pollutants or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure every five years to ensure the protection of human health and the environment. Both the sixth of the Five-Year Reviews for the Distler Farm site and the fifth of the Five-Year Reviews for the Distler Brickyard site will be completed by September 2018.

EPA Invites Community Participation in the Five-Year Review Process: The EPA is conducting these Five-Year Reviews to evaluate the effectiveness of the remedies and to ensure that the remedies remain protective of human health and the environment. As part of the Five-Year Review process, EPA staff is available to answer any questions about the Sites. Community members who have questions about the Sites or the Five-Year Review process, or who would like to participate in a community interview, are asked to contact:

Michael Townsend, EPA Remedial Project Manager Coordinator
Phone: (404) 562-8813
Email: townsend.michael@epa.gov

Angela Miller, EPA Community Involvement
Phone: (404) 562-8561 | (800) 241-1754 (toll-free)
Email: miller.angela@epa.gov

Mailing Address: U.S. EPA Region 4, 61 Forsyth Street, S.W., 11th Floor, Atlanta, GA 30303-8960

A copy of the completed Five-Year Review will be made available at the Site's local document repository, West Point City Hall, located at 509 Elm Street in West Point, Kentucky, and online at http://www.epa.gov/superfund/distler-farm and http://www.epa.gov/superfund/distler-brickyard.

APPENDIX E – INTERVIEW FORMS

Distler Farm Superfund Site	Five-Year Review Interview Form
Site Name: Distler Farm	**EPA ID No.:** KYD980601975
Subject Name: Shital Jiwane	**Affiliation:** Kentucky Dept. for Environmental Protection
Subject Contact Information: 502-782-6232	
Time: 10:14 a.m.	**Date:** 02/9/2018
Interview Format (circle one): In Person	Phone Mail Other:

Interview Category: State Agency

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? **The project appears to be close to achieving its remedial objectives. After the newly installed groundwater wells showed no contamination during one sampling event in 2015, EPA decided to delete the site from the NPL and asked for concurrence from the Commonwealth of Kentucky. The state gave concurrence to delete the site from the NPL in March 2016. EPA is in the process of deleting the site from the NPL. After these developments, apart from occasional site visits, no O&M activities have occurred at the site. KDEP is not aware of any reuse activity at this time.**

2. What is your assessment of the current performance of the remedy in place at the Site? **The soils samples taken during the groundwater wells installation in 2014 and groundwater samples taken in 2015 after new wells were installed showed concentrations of COCs below Regional Screening Levels. The groundwater sampling was conducted only once after the new wells were installed. No further monitoring has been conducted to corroborate the results.**

3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? **No.**

4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities. **28 groundwater monitoring wells were abandoned in 2013. One off-site well was not abandoned. The wells were removed because of old age and poor condition. They were not capable of producing samples representative of aquifers at the site. In 2014, three pairs of nested wells were installed, where one nested well represented shallow aquifer and the other was screened in deep aquifer. After the new wells were installed, KDEP sampled the wells once in April 2015. None of the contaminants were detected above regulatory limits. Based on the results of this sampling event, EPA decided to delete the site from the NPL.**

5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy? **No.**

6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues? **There are no institutional controls at the Site.**

7. Are you aware of any changes in projected land use(s) at the Site? **No.**

8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? **The groundwater extraction system is no longer operational. Ten extraction wells need to be properly abandoned. The associated power lines and remnants of the former remediation building need to be removed. The current nested groundwater monitoring wells also need to be properly abandoned once the site is deleted from NPL. These activities do not affect the site remedy but are necessary from a liability perspective.**

9. Do you consent to have your name included along with your responses to this questionnaire in the FYR report? **Yes.**

APPENDIX F – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION

Site Name: Distler Farm	**Date of Inspection:** 01/18/2018
Location and Region: West Point, KY, Region 4	**EPA ID: KYD980601975**
Agency, Office or Company Leading the Five-Year Review: EPA Region 4	**Weather/Temperature:** high teens, sunny

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☒ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other: Soil removal
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (check all that apply)

1. **O&M Site Manager** _____ Name _____ Title _____ Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems, suggestions ☐ Report attached: _____

2. **O&M Staff** _____ Name _____ Title _____ Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone: _____
   Problems/suggestions ☐ Report attached: _____

3. **Local Regulatory Authorities and Response Agencies** (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.

   Agency KDEP
   Contact Shital Jiwane _____ 01/29/2018 502-782-6232
   Name Title Date Phone No.
   Problems/suggestions ☒ Report attached: Appendix E

   Agency _____
   Contact _____Name _____ _____ _____
   Title Date Phone No.
   Problems/suggestions ☐ Report attached:_____

   Agency _____
   Contact _____ _____ _____ _____
   Name Title Date Phone No.
   Problems/suggestions ☐ Report attached:_____

   Agency _____
   Contact _____ _____ _____ _____
   Name Title Date Phone No.
   Problems/suggestions ☐ Report attached: _____

   Agency _____

Contact _____ _____ _____ _____
Name Title Date Phone No.
Problems/suggestions ☐ Report attached: _____

4. **Other Interviews** (optional) ☐ Report attached: _____

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan**	☐ Readily available	☐ Up to date	☒ N/A
☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

3. **O&M and OSHA Training Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits: _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

5. **Gas Generation Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

6. **Settlement Monument Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

7. **Groundwater Monitoring Records**	☒ Readily available	☐ Up to date	☐ N/A

Remarks: _____

8. **Leachate Extraction Records**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

10. **Daily Access/Security Logs**	☐ Readily available	☐ Up to date	☒ N/A

Remarks: _____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for state

☐ PRP in-house ☐ Contractor for PRP

☐ Federal facility in-house ☐ Contractor for Federal facility

☒ PRP via the State

2. **O&M Cost Records**

☒ Readily available ☒ Up to date

☒ Funding mechanism/agreement in place ☐ Unavailable

Original O&M cost estimate: _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From: 01/01/2013 Date	To: 12/31/2013 Date	$82,000 Total cost	☐ Breakdown attached
From: 01/01/2014 Date	To: 12/31/2014 Date	$25,000 Total cost	☐ Breakdown attached
From: 01/01/2015 Date	To: 12/31/2015 Date	$3,000 Total cost	☐ Breakdown attached
From: 01/01/2016 Date	To: 12/31/2016 Date	$0 Total cost	☐ Breakdown attached
From: 01/01/2017 Date	To: 12/31/2017 Date	$1,000 Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs during Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☒ N/A

A. Fencing

1. **Fencing Damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: _____

B. Other Access Restrictions

1. **Signs and Other Security Measures** ☐ Location shown on site map ☐ N/A

Remarks: _____

C. Institutional Controls (ICs)

1. **Implementation and Enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A

Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by): _____

Frequency: _____

Responsible party/agency: _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Reporting is up to date ☐ Yes ☐ No ☐ N/A

Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A

Violations have been reported ☐ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A

Remarks: _____

D. General

1. **Vandalism/Trespassing** ☐ Location shown on site map ☒ No vandalism evident

Remarks: _____

2. **Land Use Changes On Site** ☒ N/A

Remarks: _____

3. **Land Use Changes Off Site** ☒ N/A

Remarks: _____

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads Damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks: _____

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Pumps, Wellhead Plumbing and Electrical**

☐ Good condition ☐ All required wells properly operating ☐ Needs maintenance ☐ N/A

Remarks: Groundwater pumping is no longer occurring.

2. **Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines ☐ Applicable ☒ N/A

1. **Collection Structures, Pumps and Electrical**

☐ Good condition ☐ Needs maintenance

Remarks: _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances**

☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Spare Parts and Equipment**

☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (check components that apply)

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers

☐ Filters: _____

☐ Additive (e.g., chelation agent, flocculent): _____

☐ Others: _____

☐ Good condition ☐ Needs maintenance

☐ Sampling ports properly marked and functional

☐ Sampling/maintenance log displayed and up to date

☐ Equipment properly identified

☐ Quantity of groundwater treated annually: _____

☐ Quantity of surface water treated annually: _____

Remarks: _____

2. **Electrical Enclosures and Panels** (properly rated and functional)

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

3. **Tanks, Vaults, Storage Vessels**

☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs maintenance

Remarks: _____

4. **Discharge Structure and Appurtenances**

☐ N/A ☐ Good condition ☐ Needs maintenance

Remarks: _____

5. **Treatment Building(s)**

☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks: _____

6. **Monitoring Wells** (pump and treatment remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☐ N/A

Remarks: _____

D. Monitoring Data

1. **Monitoring Data**

☐ Is routinely submitted on time ☒ Is of acceptable quality

2. **Monitoring Data Suggests:**

☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ All required wells located ☐ Needs maintenance ☒ N/A

Remarks: _____

X. OTHER REMEDIES

If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions).

The remedy included soil removal and groundwater extraction. The State shut the extraction system down in 2003 after no more contaminants were identified in groundwater. The remedy appears to have been effective and is functioning as designed.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

There have been no O&M issues.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

KDEP and the EPA need to determine and implement steps to close out the Site.

APPENDIX G – SITE INSPECTION PHOTOS

Locked entrance gate on Dixie Highway

Location of former building and tank

Asphalted area with new wells DFMW-1S and DFMW-1D on right

Former recovery wells near Stump Gap Creek

Stump Gap Creek, south of recovery wells

New wells DFMW-3S and DFMW-3D

Trees and open space on site

APPENDIX H – DETAILED ARARS REVIEW TABLES

CERCLA Section 121(d)(1) requires that Superfund remedial actions attain "a degree of cleanup of hazardous substance, pollutants, and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment." The remedial action must achieve a level of cleanup that at least attains those requirements that are legally applicable or relevant and appropriate. In performing the FYR for compliance with ARARs, only those ARARs that address the protectiveness of the remedy are reviewed.

Groundwater ARARs

The 1988 ESD identified federal MCLs under the Safe Drinking Water Act (SDWA) as ARARs. Cleanup goals were based on the MCLs, and when primary MCLs were unavailable, health-based levels were established as the cleanup goals. These health-based values are assessed in Appendix I. Table H-1 shows that current MCLs for arsenic, lead, and toluene are more stringent than ESD cleanup goals.

Table H-1: Previous and Current ARARs for Groundwater COCs

COCs[a]	1988 ESD Cleanup Goals[c] (µg/L)	Current ARARs[d] (µg/L)	ARAR Change
Arsenic	50	10	more stringent
Chromium	50	100	less stringent
Lead	50	15	more stringent
Benzene	5	5	none
2-Butanone	170	NE	NE
1,1-DCE	7	7	none
Trans-1,2-DCE	70	100	less stringent
Toluene	2,000	1,000	more stringent
1,1,1-TCA	200	200	none
TCE	5	5	none

Notes:

a. COCs from Site's 1988 ESD

b. Based on the SDWA primary MCL. Current SDWA standards can be found at: https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants (accessed 12/28/2017).

NE = Chemical-specific ARARs in the form of MCLs have not been established for these COCs. Thus, the EPA developed health-based criteria for these COCs.

µg/L = micrograms per liter

Soil ARARs

There are no chemical-specific soil ARARs for the Site identified in the decision documents for OU1.

APPENDIX I – SCREENING-LEVEL RISK REVIEW

MCLs were not established for all groundwater COCs in OU1. The EPA selected health-based levels as the cleanup goals for 2-butanone. Table I-1 evaluates the health-based cleanup goal against current residential screening levels. The evaluation indicates the cleanup goal is valid for unrestricted use.

Table I-1: Health Evaluation of OU1 Sitewide Groundwater Cleanup Goals

COC	1988 ESD Cleanup Level (µg/L)	Tap Water RSL[a] (µg/L)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
2-Butanone	170	NE	5,600	--	0.03

Notes:

a. Current EPA RSLs, dated November 2017, are available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-november-2017 (accessed 12/29/2017).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:

cancer risk = (cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer hazard quotient (HQ) was calculated using the following equation:

HQ = cleanup level ÷ noncancer-based RSL

NE = toxicity values not established by the EPA

-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established

Bold = noncancer HQ exceeds 1.0 or a cancer risk of 1 x 10^{-4}

µg/L = micrograms per liter

According to the 1988 ESD, soil cleanup goals were based on the protection of groundwater. Table I-2 compares soil cleanup goals to current RSLs. Table I-2 indicates soil cleanup goals are protective of unrestricted use.

Table I-2: Health Evaluation of OU1 Sitewide Soil Cleanup Goals

COC	1988 ESD Cleanup Level (mg/kg)	Resident Soil RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		
Chromium[d]	413	NE	120,000	--	0.003
Lead	338	400		NA	
Bis-2-ethylhexylphthalate	500	39	1,300	1.3 x 10^{-5}	0.4
Dibutylphthalate	500	NE	6,300	--	0.08
1,1-DCE	0.00418	NE	2,30	--	0.00002
Trans-1,2-DCE	0.04181	NE	1,600	--	0.00003
Isophorone	500	570	13,000	9 x 10^{-7}	0.04
Toluene	149.331	NE	4,900	--	0.03
1,1,1-TCA	5.6	NE	8,100	--	0.0007
TCE	0.01213	0.94	4.1	1 x 10^{-8}	0.003
Vinyl chloride	0.00015	0.059	70	2.5 x 10^{-9}	0.000002

COC	1988 ESD Cleanup Level (mg/kg)	Resident Soil RSL[a] (mg/kg)		Cancer Risk[b]	Noncancer HQ[c]
		1 x 10^{-6} Risk	HQ=1.0		

Notes:

a. Current EPA RSLs, dated November 2017, are available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-november-2017 (accessed 2/22/2018).

b. The cancer risks were calculated using the following equation, based on the fact that RSLs are derived based on 1 x 10^{-6} risk:

cancer risk = (cleanup level ÷ cancer-based RSL) × 10^{-6}

c. The noncancer HQ was calculated using the following equation:

HQ = cleanup level ÷ noncancer-based RSL

d. Chromium III used for comparison

NA = not applicable
NE = toxicity values not established by the EPA
-- = cancer risk or noncancer HQ could not be calculated; toxicity values not established
Bold = noncancer HQ exceeds 1.0 or a cancer risk of 1 x 10^{-4}
mg/kg = milligram per kilogram