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Primary Document

Site Evaluation Report for Rubble Areas at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

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Site Evaluation Report for Rubble Areas at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

Date Issued—November 2009

Prepared for the
U.S. DEPARTMENT OF ENERGY
Office of Environmental Management

Prepared by
PADUCAH REMEDIATION SERVICES, LLC
managing the
Environmental Remediation Activities at the
Paducah Gaseous Diffusion Plant
under contract DE-AC30-06EW05001

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PREFACE

This *Site Evaluation Report for Rubble Areas at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky,* DOE/LX/07-0227&D0, (SER) was prepared following the implementation of the *Sampling and Analysis Plan for Rubble Areas at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0060&D2 (DOE 2008).

This SER is the fourth of four to address soil and rubble area areas in the vicinity of the Paducah Gaseous Diffusion Plant, as identified in the Notification Letter submitted to U.S. Environmental Protection Agency and Kentucky Department for Environmental Protection, dated February 16, 2007. This SER addresses surveying of rubble areas located in the vicinity of the Paducah Gaseous Diffusion Plant and in the Ballard County Wildlife Management Area. It was developed in accordance with the requirement in Section IX of the Federal Facility Agreement for submittal of an integrated removal/remedial Site Evaluation and Solid Waste Management Unit Assessment Report.

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CONTENTS

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FIGURES

TABLES

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ACRONYMS

AOC	area of concern
ASTM	American Society for Testing and Materials
BWMA	Ballard Wildlife Management Area
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CRDL	contract required detection limit
CSM	conceptual site model
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FFA	Federal Facility Agreement
GPS	global positioning system
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
KDEP	Kentucky Department for Environmental Protection
NCP	National Contingency Plan
PCB	polychlorinated biphenyl
PGDP	Paducah Gaseous Diffusion Plant
PPPO	Portsmouth/Paducah Project Office
PRS	Paducah Remediation Services, LLC
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SAP	Sampling and Analysis Plan
SER	Site Evaluation Report
SWMU	solid waste management unit
TVA	Tennessee Valley Authority
WAG	waste area group
WKWMA	West Kentucky Wildlife Management Area
XRF	X-ray fluorescence

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EXECUTIVE SUMMARY

This Site Evaluation Report (SER) presents the results of the comprehensive surveying effort completed for Rubble Areas within the vicinity of the Paducah Gaseous Diffusion Plant (PGDP) and Ballard County Wildlife Management Area. Surveys were completed in accordance with the following agency-approved secondary document: *Sampling and Analysis Plan for Rubble Areas at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, DOE/LX/07-0060&D2 (SAP) (DOE 2008).

Initial field reconnaissance, field radioactivity measurements, and limited surveying at the Rubble Areas were completed in December 2006. Results of these efforts showed no radioactivity exceeding twice background (background is considered approximately 7,000 counts per minute) with the exception of rubble area KY-19. There were 29 newly identified areas noted in the February 2007 notification letter that are addressed in this SER. The field investigation was conducted between February and March 2009.

PROJECT OBJECTIVES

The study was designed to obtain sufficient data of known quality to support the following objectives:

- Determine if contamination from PGDP is present in the rubble and/or the soils contacting rubble.
- If contamination is present, define the nature and extent of contamination to determine if future action is necessary.

INVESTIGATION SUMMARY

The following provides a summary of the information collected for the Rubble Areas. The Rubble Areas SAP specified the collection of this data.

- The location of the rubble areas [on or off U. S. Department of Energy (DOE) property].
- Current use of the rubble areas.
- Institutional knowledge about the origin of rubble area material.
- Visual inspection of the rubble areas.
- Radiation screening of the rubble areas and soils if required.
- Chemical characterization of soils if required.

INVESTIGATION FINDINGS

Results obtained from the 29 areas indicate that much of the rubble is being used for an intended purpose such as erosion control or pond bank stabilization (See SAP for Rubble Areas, Appendix C). There is no visual evidence of where the material originated, no visual evidence of contamination, and no radiological readings above twice background except for KY-19 used for bank stabilization and noted to have fixed radiological contamination previously identified in the SAP as "unfiltered 200 counts per minute; fixed contamination." KY-19 includes an area of approximately 80 ft by 20 ft and includes one concrete slab and a 6 ft long, 1 inch metal pipe with fixed radiological contamination. As a result of this investigation, no rubble areas are recommended for removal; therefore, as noted in the SAP, no soil samples are required. It should be noted that soil samples were collected from beneath those rubble areas agreed to be removed as a maintenance action (areas KY-18, KY-23, AE, BH, and BX) and the results indicate constituents at or near background levels. On another note, drums were identified off DOE property at KY-24 that appeared to contain "Formula 480 Liquid Clay Concrete" and "Quaker State Motor Oil."

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1. INTRODUCTION

1.1 PROJECT SCOPE

This Site Evaluation Report (SER) has been developed in accordance with the requirement in Section IX of the Paducah Gaseous Diffusion Plant (PGDP) Federal Facility Agreement (FFA) (EPA 1998) for the submittal of an integrated removal/remedial SER/Solid Waste Management Unit (SWMU) Assessment Report. The report is organized as follows:

- Project Scope, Objectives, and Background
- Area Description
- Field Surveying and Sampling Approach
- Quality Assurance/Quality Control (QC)
- Discussion and Results
- Conclusions
- Recommendations

On November 2, 2006, Paducah Remediation Services, LLC, (PRS) radiological control technicians observed and surveyed a series of soil piles on the U. S. Department of Energy (DOE) Reservation. DOE notified the U. S. Department of Environmental Protection (EPA), the Kentucky Department for Environmental Protection (KDEP), and the Kentucky Department of Wildlife Management. Following notification, KDEP identified additional rubble areas. DOE also began additional surveys to identify any other soil and rubble areas. Fifty-one rubble areas were identified. Twenty-two rubble areas previously were investigated under the Waste Area Group (WAG) 17 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), and 29 areas newly identified by KDEP and DOE were determined to require additional investigation (Figure 1).

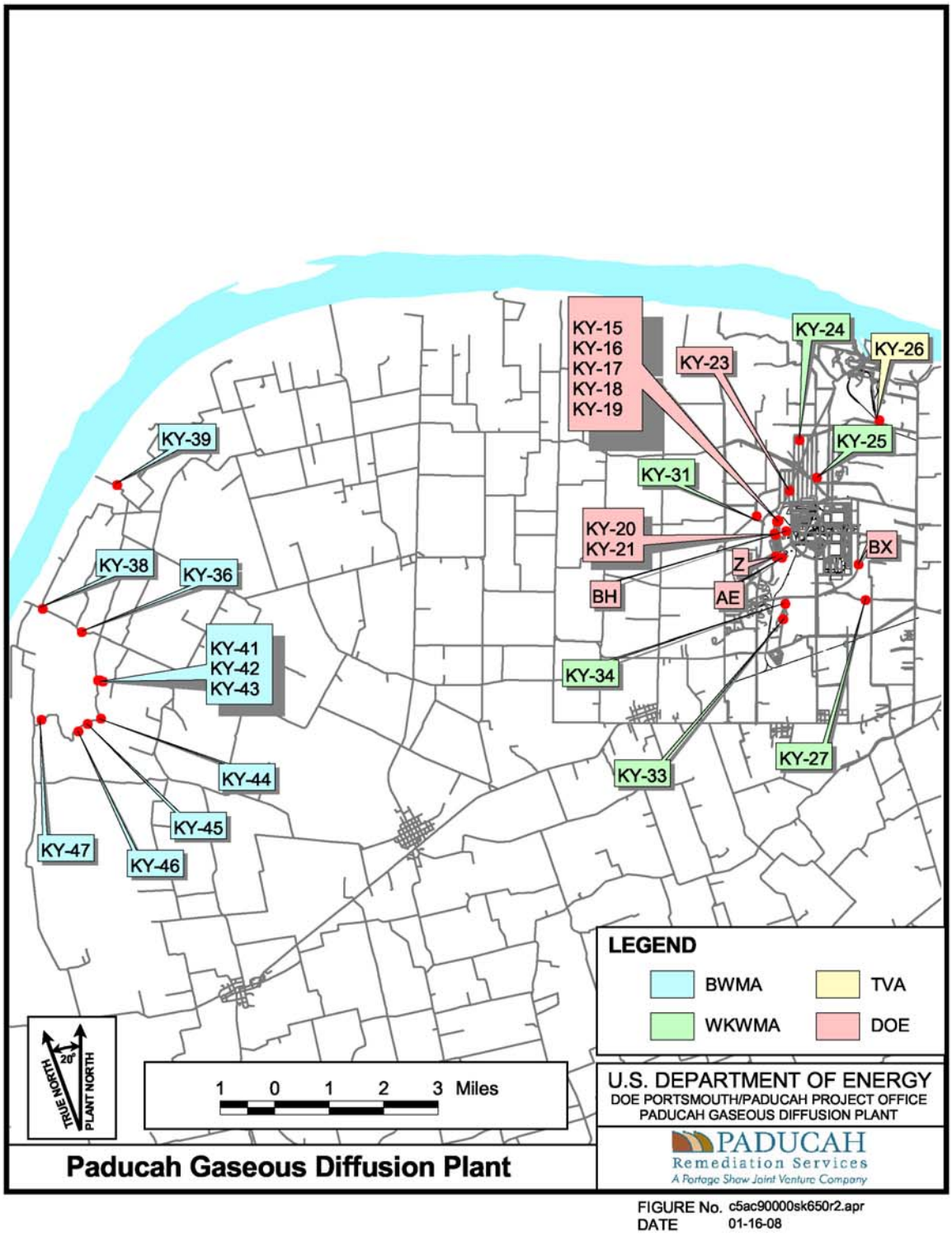

Figure 1. Newly Identified Rubble Area Locations

1.2 PROJECT OBJECTIVES

The study was designed to obtain sufficient data of known quality to support the following objectives:

- Determine if contamination from PGDP is present in the rubble and/or the soils contacting rubble.
- If contamination is present, define the nature and extent of contamination to determine if future action is necessary.

1.3 STUDY AREA BACKGROUND

PGDP, located within the Jackson Purchase region of western Kentucky, is an active uranium enrichment facility owned by the DOE. PGDP was owned and managed first by the Atomic Energy Commission and the Energy Research and Development Administration, DOE's predecessors; DOE then managed PGDP until 1993. On July 1, 1993, the United States Enrichment Corporation assumed management and operation of the PGDP enrichment facilities under a lease agreement with DOE. DOE retains ownership of the enrichment complex. The DOE Portsmouth/Paducah Project Office (PPPO) is responsible for certain environmental restoration activities associated with PGDP (CERCLIS # KY8-890-008-982) and serves as the lead agency under the FFA for response actions at PGDP. EPA Region 4 and KDEP serve as the regulatory oversight agencies for the facility.

1.3.1 Previous Studies

Previous studies are referenced to provide information on previously identified rubble areas and how they were investigated, similar to the current approach presented in this document. Results of previous studies of rubble areas at PGDP and surrounding areas are presented in four reports (IT Corp. 1989; PGDP 1992; CH2M HILL 1992; DOE 1995). Of these studies, the WAG 17 RFI (DOE 1995) was the most extensive investigation, with some areas of concern (AOCs) from WAG 17 referred to WAG 25, which is now part of the SWOU. During the RFI, 37 AOCs were investigated. The RFI was completed between October and December 1995.

The RFI employed a step-wise approach, which relied on field screening techniques to identify areas of suspected contamination followed by fixed laboratory measurements to quantify potential contamination. The field screening techniques were visual inspection; radioactivity surveys for alpha, beta, and gamma radioactivity; and sampling and analysis using polychlorinated biphenyl (PCB) test kits. Samples were collected for fixed laboratory analysis if field radioactivity values exceeded local background levels and/or if field PCB results exceeded 1 part per million.

Soil/sediment samples were analyzed in a fixed-base laboratory for radionuclides, target analyte list metals, and PCBs. Organic constituents other than PCBs were excluded from characterization. The following radionuclides were evaluated: technetium-99, thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, uranium-238, neptunium-237, plutonium-239, plutonium-242, and americium-241.

The rubble areas were grouped considering the use of rubble. These groups were as follows:

- Stream bank and erosion control
- Dam and structural support
- Bridge support and erosion control

- Roadway stabilization
- Isolated rubble areas

The WAG 17 RFI was organized further by dividing AOCs into three groups (Category 1, Category 2, and Category 3 AOCs) using results from previous investigations. Table 1 summarizes the logic used in categorizing the rubble areas investigated as part of WAG 17.

Table 1. WAG 17 AOC Categories

Category	Description	Surveys Employed
1	Demonstrated radiological contamination of concrete, soil, or sediment. PCBs and metals associated with PGDP activities also were analyzed.	Radioactivity, PCB, Visual
2	No demonstrated radiological contamination of concrete or soil, but field reconnaissance/process knowledge indicated the possibility of PCB or metals contamination.	PCB, Visual
3	No radiological contamination of concrete or soil; located within areas of known radiological and/or PCB contamination; visually inspected only.	Visual

The findings of the WAG 17 RFI are provided in the Remedial Investigation Report (DOE 1997a) and in the WAG 17 Record of Decision (DOE 1997b).

1.4 REGULATORY OVERVIEW

PGDP was placed on the National Priorities List on May 31, 1994. In accordance with Section 120 of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), DOE entered into an FFA with EPA Region 4 and Kentucky. The FFA established one set of consistent requirements for achieving comprehensive site remediation in accordance with CERCLA and RCRA, including stakeholder involvement.

The DOE PPPO is responsible for environmental management activities associated with PGDP (CERCLIS# KY8-890-008-982) and serves as the lead agency for remedial actions at PGDP. EPA Region 4 and KDEP serve as the regulatory oversight agencies for the facility.

Rubble Areas are identified in the notification letter dated February 16, 2007.

Historical research was performed to attempt to determine the origin of the areas and in response to EPA's previous request for soil and rubble area information pursuant to RCRA 3007 (2007). The origin of the Rubble Areas remains unknown.

2. AREA DESCRIPTION

2.1 RUBBLE AREAS

In total, 29 rubble areas were identified in the Notification of Soil and Rubble Areas (See Figure 1) as follows:

- Twelve rubble areas have been identified on DOE Reservation property, four of which are located on property licensed to the West Kentucky Wildlife Management Area (WKWMA);
- One has been identified on private lands managed by the Tennessee Valley Authority (TVA);
- Six rubble areas have been identified on WKWMA property; and
- Ten rubble areas have been identified in Ballard Wildlife Management Area (BWMA).

The origin of 28 of the 29 newly identified rubble areas is unknown. The origin of the remaining rubble area (KY-26 on Figure 1) is thought to be TVA Shawnee Steam Plant material. Seventeen of the rubble areas currently serve a number of functions including bank and erosion control, dam and structural support, and roadway stabilization. The remaining 12 are isolated rubble.

Five of the 29 rubble areas (KY-18, KY-23, AE, BH, and BX) on DOE property were removed as a maintenance action as requested by DOE in a letter dated April 28, 2008, and verbally concurred upon May 29 and 30, 2008, by Kentucky and EPA, respectively (documented in e-mail dated May 29 and 30, 2008). No contamination was found and the material was to be placed in the on-site C-746-U Landfill.

Based on field reconnaissance, the rubble areas range in size from a 7 ft x 3 ft area that consists of rubble pieces to a 60 ft x 30 ft area forming a wall used for erosion control. The rubble areas include the following varied materials:

- Wood planks
- Railroad ties
- Wooden benches
- Metals stands
- Metal pipes and pieces
- Crushed 55-gal drums
- Metal and concrete culverts
- Plastic dishes
- Cinder blocks
- Clay pipes

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3. FIELD SURVEYING AND SAMPLING APPROACH

3.1 APPROACH

The approach for the rubble areas is consistent with industry standard guidance. Similar studies such as WAG 17, in addition to 2006 radiological survey data, indicate there is no widespread contamination in rubble areas. The planned approach was implemented consistent with Figure 2.

All 29 areas were visually inspected and radiologically surveyed, with global positioning system (GPS) coordinates documented.

3.1.1 Evaluation of Rubble not on DOE Property

The origins of rubble areas on lands held by TVA, WKWMA, or BWMA are unknown. The emphasis of the survey effort for rubble not on DOE property was to evaluate and document radiological condition, and to visually inspect and obtain GPS coordinates.

Seventeen of the rubble areas are not on DOE property [See Appendix C of the Sampling and Analysis Plan (SAP) for Rubble Areas]: one on TVA property; six on the WKWMA; and ten on BWMA as follows: TVA–KY-26; WKWMA–KY-24, KY-25, KY-27, KY-31, KY-33, and KY-34; BWMA–KY-36, KY-38, KY-39, KY-41, KY-42, KY-43, KY-44, KY-45, KY-46, and KY-47. Of these 17 rubble areas not on DOE property with an unknown origin, 9 are considered serving a beneficial function (KY-27, KY-33, KY-34, KY-36, KY-41, KY-42, KY-44, KY-45, and KY-47) with the remainder considered as isolated rubble (KY-24, KY-25, KY-26, KY-31, KY-38, KY-39, KY-43, and KY-46).

All of the rubble not on DOE property was free of radiological contamination, no visual oil staining was noted, and the origin of the rubble was undetermined.

3.1.2 Evaluation of Rubble Serving A Beneficial Function on and off DOE Property

Rubble areas serving a beneficial function were visually inspected and radiologically surveyed with GPS coordinates documented. Examples of rubble serving a beneficial function include the following:

- Stream bank and erosion control
- Dam and structural support
- Bridge support and erosion control
- Roadway stabilization

The total number of rubble areas serving a beneficial function is 17; 3 are located on WKWMA (KY-27, KY-33, and KY-34); 6 on BWMA (KY-36, KY-41, KY-42, KY-44, KY-45, and KY-47); and 8 on DOE (KY-15, KY-16, KY-17, KY-19, KY-20, KY-21, AE, and BX).

The remaining 12 rubble areas are considered isolated rubble and are as follows: TVA–KY-26; WKWMA–KY-24, KY-25, and KY-31; BWMA–KY-38, KY-39, KY-43, and KY-46; and DOE–KY-18, KY-23, BH, and Z.

It should be noted that rubble area Z is on DOE property, but it is a large clay pipe connected to a Kentucky Ordnance underground pipeline and not considered DOE responsibility.

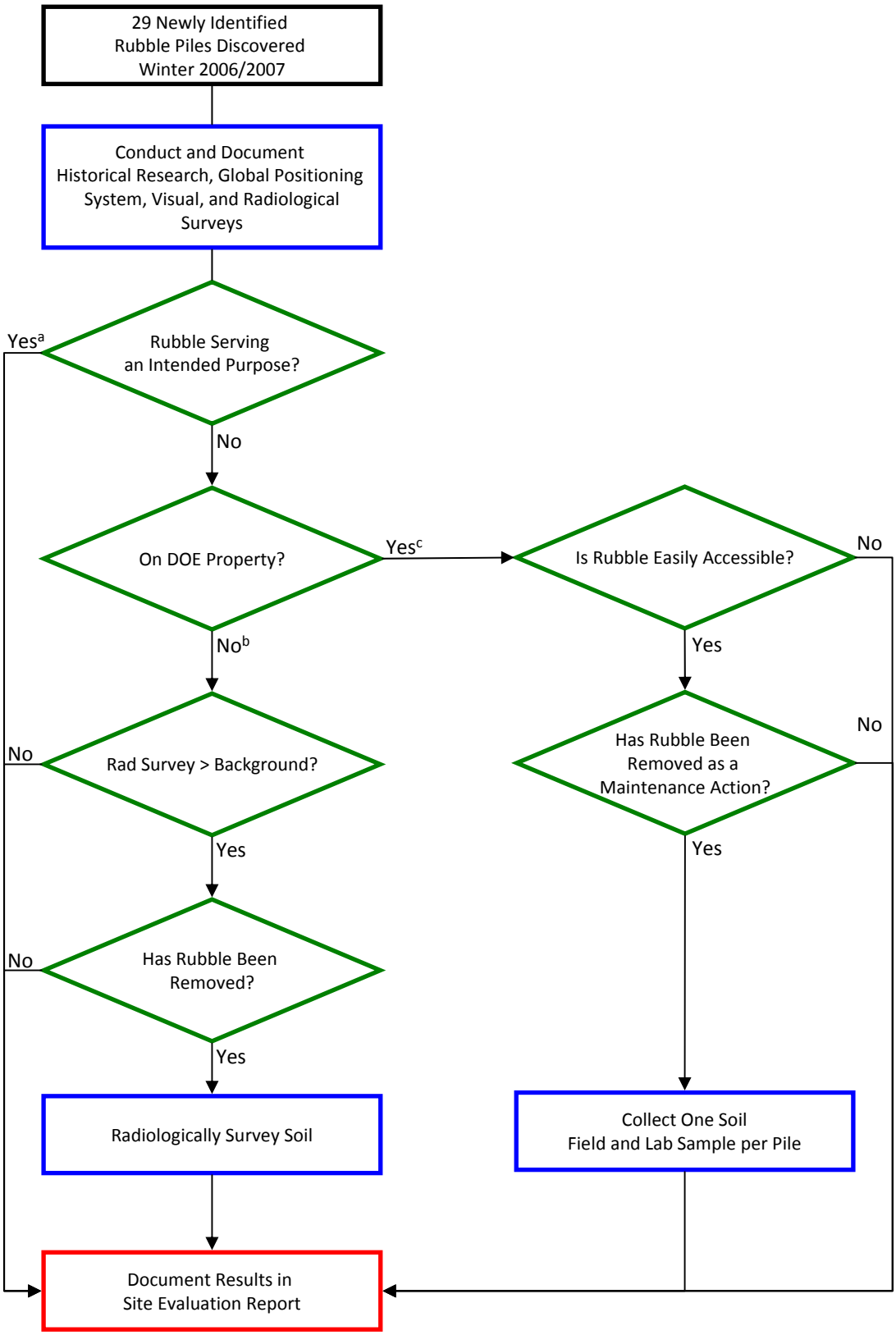

Figure 2. Sampling Approach for Newly Identified Rubble Piles

[a] 17 piles serving an intended purpose (3 West Kentucky Wildlife Management Area, 6 Ballard Wildlife Management Area, and 8 DOE)
[b] 8 piles not on DOE property and not serving an intended purpose
[c] 4 piles on DOE Property and not serving an intended purpose

All of the rubble on or off DOE property serving a beneficial function was free of radiological contamination, no visual oil staining was noted and the origin of the rubble was undetermined, with one exception. The exception is that KY-19 had fixed radiological contamination present at 200 counts per minute (50 cpm is considered background). KY-19 includes an area of approximately 80 ft by 20 ft and includes one concrete slab and a 6 ft long, 1 inch metal pipe with fixed radiological contamination.

See Table 2 for a summary of rubble areas by owner and serving a beneficial function vs. isolated rubble.

Table 2. Rubble Areas

Owner	BWMA	DOE	TVA	WKWMA	Totals
Serving a	KY-36	KY-15		KY-27	
beneficial	KY-41	KY-16		KY-33	
function	KY-42	KY-17		KY-34	
	KY-44	KY-19			
	KY-45	KY-20			
	KY-47	KY-21			
		*AE			
		*BX			
Totals	6	8	0	3	17
Isolated	KY-38	*KY-18	KY-26	KY-24	
Rubble	KY-39	*KY-23		KY-25	
	KY-43	*BH		KY-31	
	KY-46	**Z			
Totals	4	4	1	3	12
Grand Total	10	12	1	6	29
* Removed as a maintenance action					
** Not Considered DOE responsibility					

3.1.2.1 Evaluation of rubble areas that DOE removed as a maintenance activity and on DOE property

For rubble in five areas (KY-18, KY-23, AE, BH, and BX) that DOE has removed as a non-CERCLA maintenance activity, the following steps were taken to verify that underlying soils are not contaminated:

- Conducted and documented a 100% radiological survey of all underlying soil surfaces.
- Examined all underlying soil and/or sediment surfaces for oil staining.
- Collected one soil sample from beneath each area for parameters identified in the SAP.

Although rubble areas AE and BX were considered as serving an intended purpose, in addition to concrete used for roadway stabilization, AE contained crushed drums and piping that was removed and concrete used for roadway stabilization at BX was removed due to the roadway culvert being replaced.

All of the rubble on DOE property was free of radiological contamination, no visual oil staining was noted and the origin of the rubble was undetermined, with one exception. The exception is that KY-19 had fixed radiological contamination present at 200 counts per minute (50 cpm is considered background). See Appendix A for this information noted on the checklists.

3.1.3 Surveys

Each rubble area, including a 3-ft buffer zone surrounding the rubble, was visually inspected, radiologically surveyed, and surveyed using GPS.

The following field observations were documented in the project field logbook as applicable for each rubble area (See Appendix A for the checklist documenting this information for each rubble area).

- Can the area be accessed by driving in a car?
- Are there any markings on the concrete that indicate where it may have originated?
- Are there any physical characteristics associated with the rubble that pose obvious hazards?
- Are there any oil stains on the surface of the rubble?
- Would the size of any rubble allow members of the public to remove it by hand (< 1 ft^2)?
- Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)?
- Does the radiological survey indicate readings greater than background?
- What are the four point GPS readings?

3.1.4 Sampling

The following sections detail the process that was used to collect samples from soil underlying any rubble areas on DOE property removed as a non-CERCLA maintenance activity.

One surface soil grab sample (0–1 ft) was collected at the lowest point beneath the removed area.

Soil samples underwent field X-ray florescence (XRF) measurements for RCRA metals, total uranium, and PCB field measurements. Detection limit for uranium (field) was 8 mg/kg and for PCBs (field) was 1 mg/kg. The field data, including metals and PCBs, in addition to the fixed laboratory data can be found on the CD, Appendix B. The samples collected following removal also were submitted for the following fixed laboratory analyses: (a) radiochemistry, (b) total metals, (c) PCBs and asbestos. Table 3 identifies the constituents that were characterized using fixed laboratory analyses.

The data indicates that all constituents are near or within twice background levels (DOE 2001). The uranium result in soil below pile BX (removed as a maintenance action) indicated 7.57 mg/kg uranium that is within twice the background level of 4.9 mg/kg. (See Appendix B for the data associated with removal of the rubble areas as a maintenance action). The method used for measuring total uranium in soil was SW846-6020, which is Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). The method for measuring isotopic uranium in soil was Alpha Spectrometry. The appropriate qualifiers will be placed on the isotopic uranium data once these qualifiers have been agreed to by all parties.

Table 3. Fixed Laboratory Analyses for Soil Sampling

Analysis	CRDL[a]	Analytical Method:	Analysis	CRDL	Analytical Method:
PCBs (Aroclors/Total)	130 µg/kg	EPA 3540/8082	**^{235}U wt% (enrichment)**	--	Alpha Spec
Gamma-emitting radionuclides	0.1 pCi/g	Gamma Spec	**Uranium-238**	0.05 pCi/g	Alpha Spec
Americium-241	0.05 pCi/g	Alpha Spec	**Arsenic**	1 mg/kg	EPA 6020
Neptunium-237	0.05 pCi/g	Alpha Spec	**Barium**	2.5 mg/kg	EPA 6010
Plutonium-239/240	0.05 pCi/g	Alpha Spec	**Cadmium**	0.5 mg/kg	EPA 6020
Thorium-228	0.05 pCi/g	Alpha Spec	**Lead**	1.0 mg/kg	EPA 6020
Thorium-230/232	0.05 pCi/g	Alpha Spec	**Mercury**	0.2 mg/kg	EPA 7471
Total Uranium	1.0 mg/kg	EPA 6020	**Selenium**	1.0 mg/kg	EPA 6020
Uranium-234	0.05 pCi/g	Alpha Spec	**Silver**	1 mg/kg	EPA 6020
Uranium-235 radioactivity	0.05 pCi/g	Alpha Spec	**Zinc**	20 mg/kg	EPA 6010
Plutonium-238	0.05 pCi/g	Alpha Spec	**Asbestos**	Pass/Fail	ASTM D 6480-05
Technitium-99	1 pCi/g	Liquid Scintillation	**Chromium**	1 mg/kg	EPA 6010 or 6020

[a] CRDL = contract required detection limit ASTM=American Society for Resting and Materials

3.1.5 Survey and Sampling Implementation Techniques

Data acquisition relied on both field measurements and fixed laboratory data to determine if contamination issues exist in the underlying soils. Field screening and visual inspection comprised most of the initial data gathering, with laboratory and *ex situ* field analysis occurring only to support investigation of areas of suspected contamination. Field methods included field radioactivity measurements using a GM Probe©. Field methods for soils and/or sediment underlying removed rubble included RCRA metals + uranium using XRF and PCBs using immunoassay/colorimetric test kits as outlined in the SAP. In addition, in regard to fixed-base laboratory isotopic uranium analyses, it should be noted that nitric acid was used for dissolution. The data in the database will be qualified to note the use of nitric acid in lieu of hydrofluoric acid during dissolution.

The following standard operating procedures were used for the calibration, maintenance, and use of noted field methods:

- PRS-RAD-0506, *Radiological Protection Operating Guide*
- PRS-RAD-1309, *Setup for Operability Tests of Portable Field Instruments*
- Method 6200, *Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment*
- *NITON XLi 700 Series Environmental Analyzer User's Guide*
- *Hach Pocket Colorimeter™II Test Kit Immunoassay Instruction Manual*

3.2 FIELD QUALITY CONTROL SAMPLES

Field quality control samples included the following: field splits and field blanks. Both field splits and field blanks were collected and analyzed at a minimum frequency of one for every 20 samples collected or 5%. As only five samples were collected, only one field split and one field blank were collected. All quality control sample results including field blank and field split results were noted as acceptable in the data assessment checklist. Although serial dilution exceedances did occur, they did not adversely affect the quality of the data.

Subsurface sampling was not required for the rubble verification effort; therefore, equipment rinseates were not collected.

3.2.1 Deviations from the SAP

Several piles as noted in the completed checklists initially were unable to be accessed due to fallen trees or limbs from the January 2009 ice storm. Once access was cleared, the checklists were completed on a second form. Also, a few of the areas could not be accessed entirely to provide radiological survey or GPS data due to high water in the ditch or creek. The portion of the area that was accessible, however, was surveyed. Those rubble areas that could not be 100% accessed due to water included KY-17, 18, 19, 20, 21, 34, 41, and 44. A minimum of 50% of the rubble typically was surveyed, with the exception of one (40%), as noted in the completed checklists. In addition, some rubble areas such as KY-31 and KY-38 may have varying descriptions from the SAP compared to what is presented in this SER. The areas were documented using GPS coordinates, and the varying descriptions, based upon multiple interpretations by inspectors, do not have an adverse impact on determining if contamination is present at the rubble areas. Inspections occurred during the summer (full foliage) for the SAP and then during the winter (after ice storm) for the implementation of the SAP which also attributed to varying descriptions.

On another note, drums were identified off DOE property at KY-24 that appeared to contain "Formula 480 Liquid Clay Concrete" and "Quaker State Motor Oil."

4. DISCUSSION AND RESULTS

The following section presents and evaluates the results for the Rubble Areas investigation. It includes a discussion of the conceptual site model (CSM) as it was defined for investigation planning and a discussion of findings.

4.1 CONCEPTUAL SITE MODEL

The following information describes the CSM for the rubble areas (see Figure 3). Recreational activities known to take place in and around the PGDP rubble areas include the following:

- Bow Hunting
- Field trials (horses and dogs)

Although not authorized, other recreational uses such as hiking also are possible; therefore, recreational user exposure to rubble or to surface soils potentially contaminated by rubble is the primary exposure pathway. The recreational user could be exposed to contaminants through contact with rubble or with surface soils potentially contaminated by rubble through the following exposure routes:

- External exposure (ionizing radiation) (most likely)
- Dermal contact
- Incidental ingestion
- Inhalation

Recreational user exposure through the dermal contact, incidental ingestion, and inhalation exposure routes is limited given that most rubble areas and soils or sediments in the adjoining areas are covered by vegetation continually. Industrial worker exposure would be similar for nonintrusive activities.

Rubble areas proximal to surface water drainage areas could result in several potential secondary exposure routes for human health and the environment. The majority of the secondary routes assume contaminants either have been released to adjacent waterways or moved through the food chain. Precipitation could result in contaminant migration from the rubble areas, if contaminated. Surface water or sediment samples (if required) will be collected as part of the future SWOU Off-Site investigation.

Plant uptake and corresponding accumulation in animal tissue is unlikely, but soil ingestion as part of normal feeding activities may be a complete pathway if surrounding soils and sediments were contaminated. While ecological receptors may be exposed to on-site contaminants, the primary focus of the characterization effort was to determine risks to human health. Current plans are to conduct the ecological risk assessment in future remedial investigative activities for the Surface Water Operable Unit.

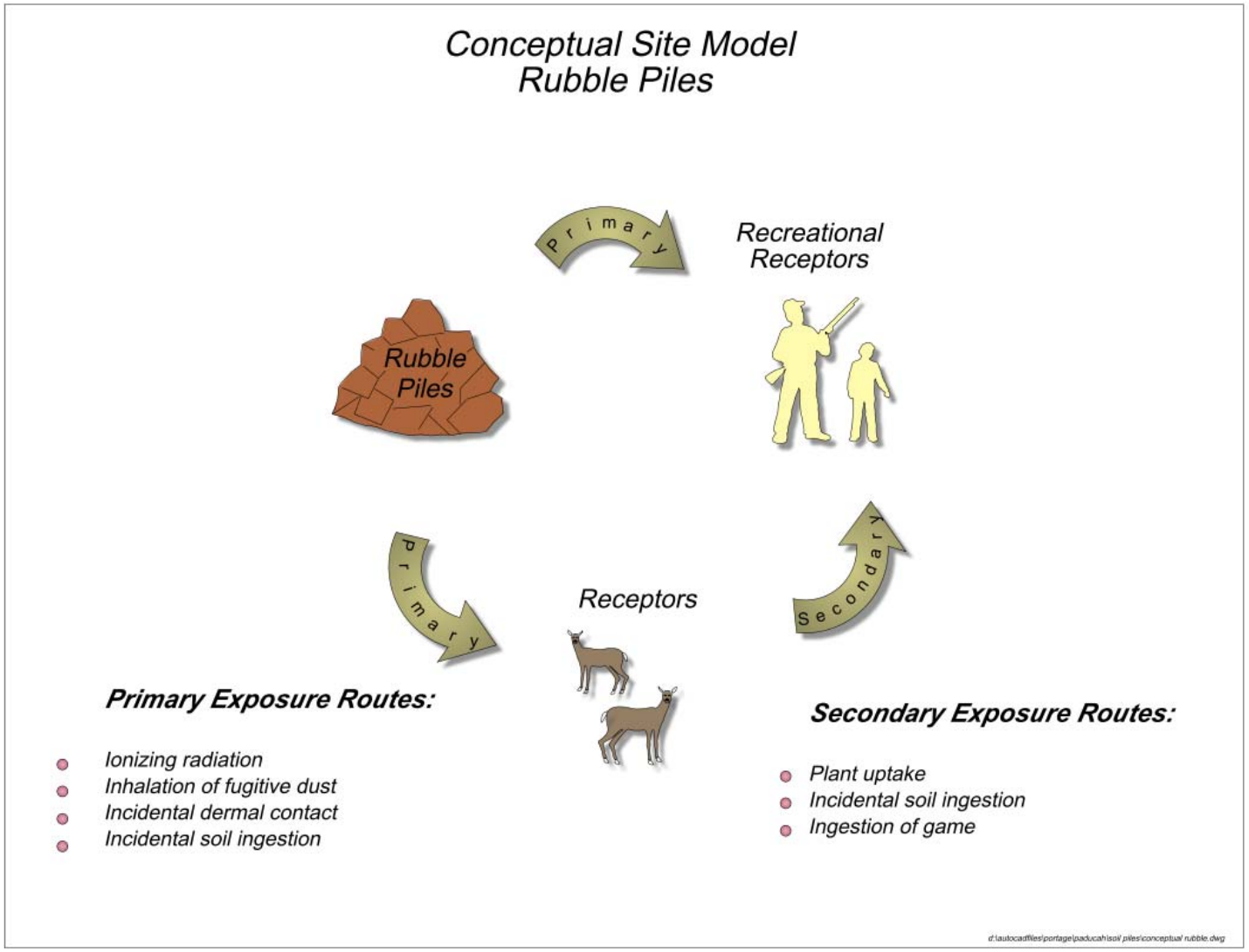

Figure 3. Conceptual Site Model

4.2 SURVEY RESULTS

The rubble areas were visually surveyed to determine if they can be accessed easily, picked up by hand, provide information as to its origin, determine if it is being used for a beneficial purpose and determine if any oil staining is present. The areas also were radiologically surveyed to determine if the rubble may be contaminated. Results indicate that none of the rubble areas were greater than twice background, and no signs of visual contamination were present, with one exception. KY-19, used for bank stabilization, was noted to have fixed radiological contamination at a fixed point previously identified in the SAP as "unfiltered 200 counts per minute; fixed contamination." (See Appendix A for completed Rubble Area SAP Field Checklist for all 29 rubble areas). The 2009 survey results confirmed the fixed contamination. The five soil samples collected below the five rubble areas removed as a maintenance action (KY-18, KY-23, AE, BH, and BX) were sampled and analyzed for radiological, PCBs, and metals parameters. All data for the five samples are included on a CD in Appendix B. Results from soil sampling beneath the five rubble areas removed as a maintenance action indicate levels below or near background (DOE 2001). No information was found as to the origin of the rubble. In addition, please see Table 4 for Rubble Area GPS coordinates.

Table 4. Rubble Pile GPS Coordinates

Rubble Pile	Easting[a]	Northing[a]	Elevation[b]
KY-15	591852.4	226866.2	363.5
	591851.4	226869	365.1
	591846.7	226865.8	369.9
	591848.5	226864.3	366.4
KY-16	591845	226867.8	365.6
	591846.1	226872.7	369.3
	591842	226875.3	356.0
	591838.9	226868.4	367.4
KY-17	591828.8	226847.1	366.6
	591826.2	226846.1	368.6
	591822.4	226848.6	365.6
	591822.6	226851	359.8
KY-18	591823.2	226835.7	364.5
	591823.2	226835.7	364.5
	591823.2	226835.7	364.5
	591823.2	226835.7	364.5
KY-19	591828.7	226865.2	371.6
	591827.8	226864.4	359.8
	591831.3	226860.5	367.5
	591849.9	226860.3	364.3
KY-20	591506.6	226628.5	365.6
	591532.2	226632	364.9
KY-21	591492.9	226627.6	366.2
	591467.2	226666.4	365.3
KY-23	592756.3	227599.8	NA
	592754.5	227594.1	NA
	592770.6	227587.5	NA
	592774.5	227590.9	NA

Table 4. Rubble Pile GPS Coordinates (Continued)

Rubble Pile	Easting[a]	Northing[a]	Elevation[b]
KY-24	593841.2	228374.8	370.8
	593811.1	228364.1	384.3
	593817.6	228336.8	376.3
	593861.7	228348.4	373.1
KY-25	592606.6	228407.6	380.0
	592598.1	228427.1	385.2
	592600.6	228428.2	391.2
	592611.7	228410.6	376.0
KY-26	593480.9	230749.7	362.8
	593480.9	230754.5	359.4
	593495.1	230751.5	360.6
	593495.4	230755.1	360.7
KY-27	588699.7	228394.1	396.9
	588702.2	228385.7	388.9
	588695.5	228388	389.2
KY-31	592175.3	226898.5	361.5
	592176.9	226893.6	373.6
	592177.4	226896.3	373.0
	592176.1	226902.1	353.0
KY-33	589071.2	225923.5	414.9
	589068.2	225925	440.5
	589067.4	225923.6	421.6
	589074	225921.8	413.2
KY-34	589457.2	226150.1	400.2
	589447.4	226146.4	398.9
	589456.6	226129.3	390.4
	589467.9	226135.7	396.8
KY-36	596775.8	206367.9	319.1
	596774.3	206363.5	315.1
	596857.8	206334.5	313.0
	596858	206338	318.3
KY-38	597530.9	205700.3	319.4
	597529.5	205698.7	322.6
	597532.5	205697.4	325.6
	597533.7	205699.4	323.0
KY-39	600116.2	209109.8	323.3
	600114.9	209113	314.4
	600115.2	209113.4	323.5
	600113.7	209110.1	320.2
KY-41	594962.3	206454.1	323.1
	594944.3	206506.2	319.9
KY-42	594968.5	206436.4	315.5
	594969.4	206431.1	314.9
	594981.5	206436.6	329.6
	594978	206442.2	321.0
KY-43	594965.7	206427.9	327.2
	594941.3	206428.8	1328.9
	594944.4	206439.4	316.6
	594962.5	206436.1	321.2
KY-44	593893.5	206093.5	326.2

Table 4. Rubble Pile GPS Coordinates (Continued)

Rubble Pile	Easting[a]	Northing[a]	Elevation[b]
KY-45	593879.4	205672.6	314.3
	593874.7	205672.7	311.7
	593874.8	205667.3	326.3
	593877.1	205667.8	326.6
KY-46	593804	205209.1	312.6
	593801.4	205211.4	301.7
	593799.5	205209	297.5
	593799.9	205205.6	318.0
KY-47	594485.1	204427.8	316.8
	594486.5	204433.9	324.7
	594483.6	204435	319.8
	594482.4	204427.7	318.7
AE	590774.9	226572.1	379.5
	590777.7	226574.4	370.3
	590776.3	226578.1	371.7
	590773.2	226575.9	384.0
BH	589736.9	228588.5	376.3
	589748.3	228591.9	378.4
	589744.1	228601.1	382.5
	589734.1	228594.4	376.1
BX	591411	226976.4	352.6
	591388.9	227007.9	365.7
	591452.9	227015.6	378.2
	591485.3	226970.7	378.6
Z	590892.9	226413.5	369.8
	590894.4	226415.5	375.7
	590896.8	226414.1	378.2
	590895.7	226411.9	379.0

[a] Coordinates are provided in North American Datum 1983 Kentucky State Plane, South Zone (m).
[b] Elevation is in ft amsl.
NA–Not Available

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5. CONCLUSIONS

The following provides a summary of the major findings and conclusions for the rubble areas evaluation. The objectives of the rubble areas investigation were to do the following:

- Determine if contamination from PGDP is present in the rubble and/or the soils contacting rubble.
- Define the nature and extent of contamination to determine if future action is necessary, if contamination is present.

Consistent with Section 40 *CFR* § 300.420(c)(5) of the National Contingency Plan (NCP), information on the nature of waste handling, known contaminants, pathways of migration of contaminants, human and environmental targets, and a recommendation on further action is contained in this report.

Consistent with Section 40 *CFR* § 300.415(b)(2) of the NCP, the factors that should be considered in determining the appropriateness of a removal action for rubble areas are discussed below.

(i) **Actual or potential exposure to nearby human populations, animals, or food chain from hazardous substances or pollutants or contaminants.**
Laboratory results were below or near background. KY-19 rubble currently is used for bank stabilization and was noted to have fixed radiological contamination previously identified in the SAP as "unfiltered 200 counts per minute; fixed contamination." PCBs were not detected.

(ii) **Actual or potential contamination of drinking water supplies or sensitive ecosystem.**
There is no known use of groundwater or surface water for drinking water, feedstock watering, or crop irrigation from the rubble areas.

(iii) **Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release.**
There are no containers or tanks associated with the rubble areas.

(iv) **High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate.**
Survey results from rubble areas indicate no migration is occurring.

(v) **Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.**
Survey results from rubble areas indicate no migration is occurring.

(vi) **Threat of fire or explosion.**
The rubble areas do not present a threat of fire or explosion.

(vii) **The availability of other appropriate federal or state response mechanisms to respond to the release.**
This factor is not applicable to the rubble areas.

(viii) **Other situations or factors that may pose threats to public health or welfare of the United States or the environment.**

There are no other situations or factors at the rubble areas that would pose a threat to public health or the environment.

5.1 NATURE AND EXTENT OF CONTAMINATION

Radiological survey results were at or below background for the 29 rubble areas as a result of implementing the field work as discussed and as prescribed in the approved SAP, with one exception. KY-19, used for bank stabilization, was noted to have fixed radiological contamination previously identified in the SAP as "unfiltered 200 counts per minute; fixed contamination." No evidence was found of a release of hazardous waste or hazardous constituents that would pose a current or potential threat to human health or the environment. Additionally, no indication was found of treatment, storage, or disposal of solid or hazardous waste, with the exception of drums located off DOE property at KY-24 that appeared to contain "Formula 480 Liquid Clay Concrete" and "Quaker State Motor Oil."

5.2 HUMAN HEALTH RISKS

The radiological results used to quantify risks and hazards were below or near background levels for all 29 rubble areas with the exception of KY-19, as noted previously. Radiological results are below recreational user screening levels for a 1 mrem/year dose and, therefore, below the "walk away" level in the PGDP Risk Methods Document (DOE 2001).

6. RECOMMENDATIONS

The following provides recommendations for future activities at rubble areas. The recommendations are based on the findings of the investigation and lessons learned during the planning and execution of study efforts at the rubble areas.

6.1 FUTURE ACTIVITIES

The following are recommendations based on the findings of the 29 rubble areas:

- No removal action is recommended for the rubble areas at this time.
- SWMU Assessment Reports are not recommended for the rubble areas. The only exception is KY-19 that indicated fixed radiological levels (200 counts per minute) above background. KY-19 is recommended as an AOC and as a result, a SWMU/AOC Assessment Report is provided in Appendix C.
- The factors described in 40 *CFR* 300.415 (b)(2) will be considered in determining whether a removal action for KY-19 (currently used for bank stabilization) is appropriate. KY-19 has been assigned to the Soils Operable Unit. If it is determined that a removal action is appropriate for this location due to actual or potential exposure of fixed radiological contamination to nearby populations, a removal notification will be made under Section X of the FFA.

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7. REFERENCES

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APPENDIX A

COMPLETED RUBBLE PILE SAP FIELD CHECKLISTS

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Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-15

DATE: 2-17-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No

   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-15

3/17/09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No) (1)

   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes ~~No~~

Notes:

(1) WAS USED AS A BARRICADE FOR OUT OF SERVICE BRIDGE. THE BRIDGE HAS SINCE WASHED OUT & IS NO LONGER IN PLACE.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-16

DATE: 2-17-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-16
3/17/09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:
NONE

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-17

DATE: 2-17-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-17

3.25-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? (2) (Yes) No

   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) ONLY SURVEYED DEBRIS @ TOP OF CREEK BANK. UNABLE TO GET TO DEBRIS BY WATER. SURVEYED APPROX. 40% OF KY-17. (2) POTENTIAL TO BE CONSIDERED BANK STABILIZATION.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-18

DATE: 2-12-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? (2) (Yes) No

   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) COUPLE PIECES OF CONCRETE LOCATED ON CREEK BANK. WATER IN CREEK & UNABLE TO SURVEY 100% OF EXPOSED CONCRETE (1 PIECE OUT OF 10 TOTAL)

(2) CONCRETE LYING ON BANK COULD BE CONSIDERED AS BANK STABILIZATION.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-19

DATE: 2-17-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-19
3-25-09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No) (2)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? (Yes) No
   If yes, describe below. (1)
6. Does the radiological survey indicate readings greater than background? Yes (No) (1)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO
   - Does the soil underlying the rubble have oil staining? Yes (No)
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes (No)
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes (No)

Notes:

(1) ONLY ABLE TO SURVEY SOIL @ TOP OF CREEK BANK. DEBRIS LOCATED ON SIDE OF BANK & TOO STEEP INCLINE TO GAIN ACCESS. Collected GPS POINTS & SURVEYED GROUND. (2) COULD BE CONSIDERED BANK STABILIZATION.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-20

DATE: 2-16-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (Yes) No ①

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Retention Pond (Yes) No

   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No) ③ ②

7. Collected the four point GPS readings? Yes (No)

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

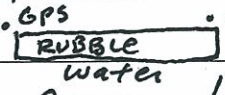
   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes ~~No~~

Notes:

① Rubble used as BANK stabilization can only access top portion. ② ONLY GOT 2 GPS POINTS. COULD NOT get down BANK.



③ ONLY ABLE to Rad survey top 50% OF RUBBLE DUE to steep BANK/water.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-21

DATE: 2-19-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (Yes) No (1)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Retention Pond (Yes) No

   If yes, describe below. (3)

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? Yes (No) (2)

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) Pile used as Retention Pond Bank Stabilization. Can only access the top portion due to steep incline & water

(2) Bank too steep to get 4 GPS points

(3) Unable to RAD survey 100% of Rubble due to Steep Bank/water. Only surveyed top Half (50%)

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-23

DATE: 2-19-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-23 3/13/09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? (Yes) No
   If yes, describe below.
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes No

Notes:

Culvert Buried and IN USE. Only Have Ends Exposed

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-24

DATE: 2-19-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-24
3-23-09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. (2) (Yes) No
4. Are there any oil stains on the surface of the rubble? (3) (Yes) No
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes No

Notes:

(1) DRUMS LOCATED IN BUNKER. THE STRUCTURE HAS FALLEN IN ON SOME OF THE DRUMS. POTENTIAL ASBESTOS CONTAINING MATERIAL IDENTIFIED IN THE BUNKER/DEBRIS (2) ONE SET (4 DRUMS) OF DRUMS IS SHRINKWRAPPED. THE MARKING IS "FORMULA 480 LIQUID CLAY CONCRETE." ONE SINGLE DRUM HAS MARKING OF "QUAKER STATE MOTOR OIL." (3) UNABLE TO 100% VERIFY BUT DRUM W/OIL ON LABEL PROBABLY HAS OIL.

NOTE: 20 DRUMS IDENTIFIED PORTIONS ~~(DOE-1)~~ OF THE DRUMS SURVEYED. 16 DRUMS ACCESSIBLE

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-25

DATE: 2-16-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)

   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) SLIPS/TRIPS/FALLS NOTE: RUBBLE (DEBRIS) LOCATED IN ABANDONED OPEN TOP BUNKER. NOTE: KY-25 IS LOCATED IN BUNKER ON BOULDRY School Road.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-26

DATE: 2-23-09

1. Are the rubble areas easily accessible? (1)
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO
   - Does the soil underlying the rubble have oil staining? Yes (No)
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes (No)
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes (No)

Notes:

(1) HAVE TO GO ONTO TVA PROPERTY (i.e., through GUARD GATE) TO GET TO RUBBLE PILE.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-27

DATE: 2-19-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No) (1)

7. Collected the four point GPS readings? Yes (No)

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) RADCON ONLY ABLE TO TAKE 3 POINT GPS READING DUE TO LAYOUT of Rubble Pile.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-31

DATE: 2-19-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-31

3-17-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

THE TEAM SURVEYED the Rubble Pile that CLOSELY MATCHED the APPENDIX C DESCRIPTION. NOTE that there is Rubble SCATTERED THROUGHOUT the AREA.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-33

DATE: 2-23-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)

   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

NOTE: ONLY IDENTIFIED CONCRETE CULVERT. UNABLE TO FIND CONCRETE DEBRIS THAT WAS IN THE DESCRIPTION IN APP C. TABLE NOTE: SURVEYED 100% OF EXPOSED AREA ON CULVERT

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-34

DATE: 2-23-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? (Yes) No (2) If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No) (3)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO

   - Does the soil underlying the rubble have oil staining? Yes No

   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No

   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) ON STEEP DITCH BANK, ON BOTH SIDES OF ROAD WITH LIMBS DOWN OVER PORTIONS OF THE RUBBLE.

(2) DEBRIS ON BANK OF STREAM AND COULD BE CONSIDERED AS BANK STABILIZATION

(3) ONLY ABLE TO SURVEY APPROX. 70% OF the Rubble

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-36 BWMA 2-25-09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., ~~stream~~ LAKE bank stabilization)? (Yes) No
   If yes, describe below. LAKE BANK Stabilization
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes No

Notes:

(1) UNEVEN WALKING. LAKE BANK STABILIZATION

2-18-07

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-38 BWMA

DATE: 2-18-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? (Yes) No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? ~~NOS~~ BOS (NO)

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes ~~No~~

Notes:

NOTE: The description says 4' x 5' x 1'. There were only 2 pieces of rubble identified covering an area of approx. 8 SF.

2/18/09

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-39 BWMA

DATE: 2-18-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? (1) (Yes) No

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) SOIL (3FT) AROUND RUBBLE HAD READINGS @ ~~ABOVE~~ BACKGROUND ~~BACKGROUND IS 7,000 DPM. READINGS REACHED UP TO 12,000 DPM.~~ CPM CPM

- SEE RAD SUPERVISOR E-MAIL 2/24/09 AS READINGS ARE IN CPM AND TECH WENT & RESURVEYED W/NO ELEVATED CONTAMINATION DETECTED.

CSS 02/25/09

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-41

DATE: 2-24-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., ~~stream~~ LAKE bank stabilization)? (Yes) No
   If yes, describe below. RUBBLE (CONCRETE) LINING ONE BANK OF LAKE

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? Yes (No)

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

(1) RUBBLE BEING USED AS LAKE BANK STABILIZATION. THERE IS A STEEP DECLINE. SHOULD HAVE NO PROBLEM REMOVING DEBRIS WITH EQUIPMENT.

(2) UNABLE TO GET 4 POINTS DUE TO WATER. ALSO, UNABLE TO SCAN 3' DUE TO WATER

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-42 BWMA 2-24-09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes (No)

Notes:

(1) SEVERAL LIMBS ON GROUND IN AREA MAKE IT TOUGH TO WALK EQUIPMENT WILL HAVE NO PROBLEM GETTING TO RUBBLE PILE.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-43

DATE: 2-24-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-43 BKMA

3-3-09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (Yes) No
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes No

Notes:

Rubble located in area w/ steep bank. Walking hazard. Equipment will have no problem removing rubble.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-44 BWMA 2-25-09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (1) (Yes) No
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? (Yes) No
   If yes, describe below: Could be creek stab. Is located in creek and on bank
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (1) Yes (No)
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes No

Notes:

(1) Running creek, when originally identified creek was dry. Only surveyed part of pile due to running creek. Only got 1 GPS point

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-45

DATE: 2-24-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

NONE

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-46 BWMA 2-25-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NO

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

NONE

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-47 BWMA

DATE: 2-25-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation KY-47 BKMA

3-3-09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? (Yes) No
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. (Yes) No
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (ND)
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes No

Notes:

Steep Bank, Slips/ Trips/ Falls, Equipment will have no problem removing debris.

Rubble Pile SAP Field Checklist

Rubble Pile Designation AE

DATE: 2-12-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation AE 3/11/09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^3)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

CRUSHED DRUMS ONLY THING IDENTIFIED. IF THERE WAS CONCRETE ON STREAM BANK IT IS CURRENTLY UNDER WATER.

Rubble Pile SAP Field Checklist

Rubble Pile Designation BH

DATE: 2-12-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation BH 3/12/09

1. Are the rubble areas easily accessible?
   - Can the area be accessed by driving in a car? Yes (No)
   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)
2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)
3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)
4. Are there any oil stains on the surface of the rubble? Yes (No)
5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.
6. Does the radiological survey indicate readings greater than background? Yes (No)
7. Collected the four point GPS readings? (Yes) No
8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? (NO)
   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.
   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.
   - Collected the four point GPS readings? Yes No

Notes:

Very Large Area. MAJOR CLEARING WILL need to be completed prior to DEBRIS REMOVAL

Rubble Pile SAP Field Checklist

Rubble Pile Designation BX

DATE: 2-19-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation BX 3-11-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? (Yes) No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? NC

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes / No

Notes:

* Have to use shield on RAD INSTRUMENT due to close proximity of CYLINDER YARD.

*

Rubble Pile SAP Field Checklist

Rubble Pile Designation Z

DATE: 2-12-09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes No

   - Can rubble be picked up by hand (< 1 ft^2)? Yes No

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes No

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes No

4. Are there any oil stains on the surface of the rubble? Yes No

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes No
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes No

7. Collected the four point GPS readings? Yes No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated?

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

DUE TO THE WINTER ICE STORM THE RUBBLE PILE WAS NOT SURVEYED. OVERHEAD LIMBS AND/OR DOWNED TREES POSE HEALTH & SAFETY CONCERNS. THE DEBRIS WILL HAVE TO BE REMOVED TO ALLOW FOR SAFE ACCESS.

Rubble Pile SAP Field Checklist

Rubble Pile Designation Z

3/17/09

1. Are the rubble areas easily accessible?

   - Can the area be accessed by driving in a car? Yes (No) ①

   - Can rubble be picked up by hand (< 1 ft^2)? Yes (No)

2. Are there any physical characteristics associated with the rubble that pose obvious hazards? If yes, describe below. Yes (No)

3. Are there any markings on the concrete that indicate where it may have originated? If yes, describe below. Yes (No)

4. Are there any oil stains on the surface of the rubble? Yes (No)

5. Is the rubble currently serving a beneficial function (e.g., stream bank stabilization)? Yes (No)
   If yes, describe below.

6. Does the radiological survey indicate readings greater than background? Yes (No)

7. Collected the four point GPS readings? (Yes) No

8. If rubble has been removed by a previous DOE maintenance action, is the soil underlying the rubble contaminated? ND

   - Does the soil underlying the rubble have oil staining? Yes No
   If yes, then collect field and lab samples.

   - Is the Rad survey > background? Yes No
   If yes, then collect field and lab samples of the soil beneath the removed rubble.

   - Collected the four point GPS readings? Yes No

Notes:

① LOCATED IN WOODS, HAVE TO PARK CAR & WALK

APPENDIX B

(CD) FIXED AND FIELD LABORATORY RESULTS

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(CD)
FIXED AND FIELD LABORATORY RESULTS

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APPENDIX C

SOLID WASTE MANAGEMENT UNIT ASSESSMENT REPORT

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Rubble Area KY-19
Solid Waste Management Unit (SWMU) Assessment Report

SWMU/AOC NUMBER: 565

DATE OF ORIGINAL SAR: 09/13/09

DATE OF SAR REVISIONS: NA

REGULATORY STATUS: Area of Concern (AOC)

LOCATION: Along Bayou Creek north of C-611 Water Treatment Plant

APPROXIMATE DIMENSION OR CAPACITY: Approximately 60 ft by 30 ft

FUNCTION: Used for erosion control along north wall of Bayou Creek, north of C-611 Water Treatment Plant.

BRIEF HISTORY: This area was discovered in November 2006, during walkover/radiological surveys after soil and rubble areas were found along Little Bayou and Bayou Creeks. This rubble area was designated as Rubble Area KY-19. The readings collected in November 2006 were 200 counts per minute (background is ~ 50 cpm), fixed contamination, for KY-19. The area was immediately posted. This area was further visited on February 17, 2009; however, it was unaccessible due to limbs fallen from the ice storm. The area was cleared and revisited on March 25, 2009, at which time only the top of the creek bank was accessible due to water in the creek.

PRESENT OPERATIONAL STATUS: Inactive; however, it is used for erosion control.

DATES OPERATED: Unknown

SITE/PROCESS DESCRIPTION: Unknown

WASTE DESCRIPTION: Fixed radiological readings of 200 counts per minute.

WASTE QUANTITY: The waste quantity is estimated to be less than 10 yd^3.

SUMMARY OF ENVIRONMENTAL SAMPLING DATA: During the March 25, 2009, visit, the following information was gathered: 1) the area can be accessed by a vehicle, but the material is very large and cannot be picked up by hand; 2) the rubble is difficult to access once on-site due to steep incline of creek bank; 3) there are no markings indicating where the rubble may have originated; 4) there are no visible oil stains on the rubble; 5) the material is serving a beneficial function (erosion control of the creek bank); 6) the radiological readings obtained during March, 2009 on top of the creek bank were background. Radiological readings obtained on an accessible concrete slab within the creek bank during November, 2006 indicated 200 counts per minute fixed readings; and 7) GPS readings were collected.

DESCRIPTION OF RELEASE AND MEDIA AFFECTED:

GROUNDWATER:	None known
SURFACE WATER:	None known
SOIL:	None known
ECOLOGY AFFECTED (i.e., threatened/endangered species):	None known

DOCUMENTATION OF NO RELEASE: No documentation identified.

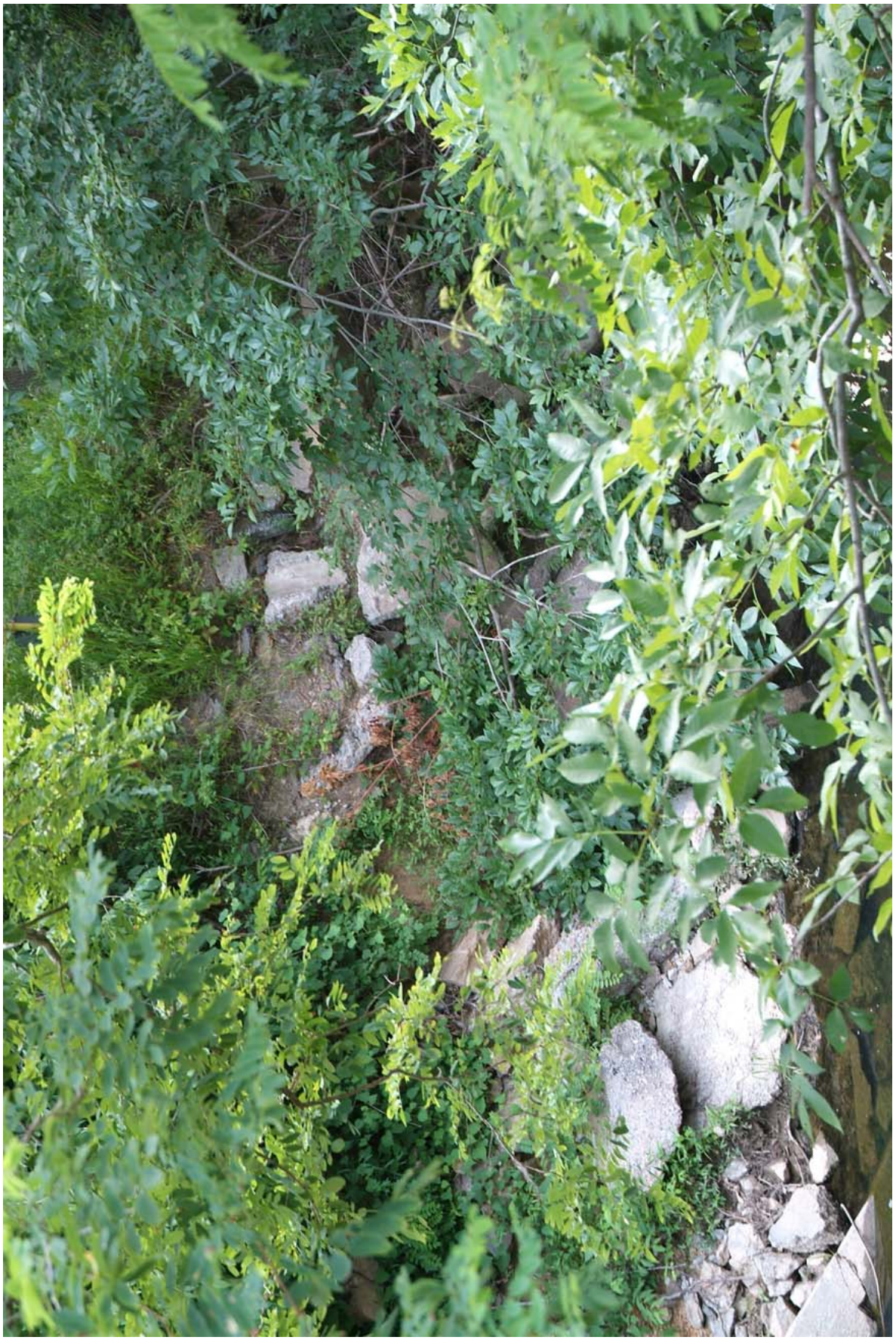
IMPACT ON OR BY OTHER SWMU/AOC: There is no evidence that this AOC impacts or is being impacted by other SWMUs/AOCs.

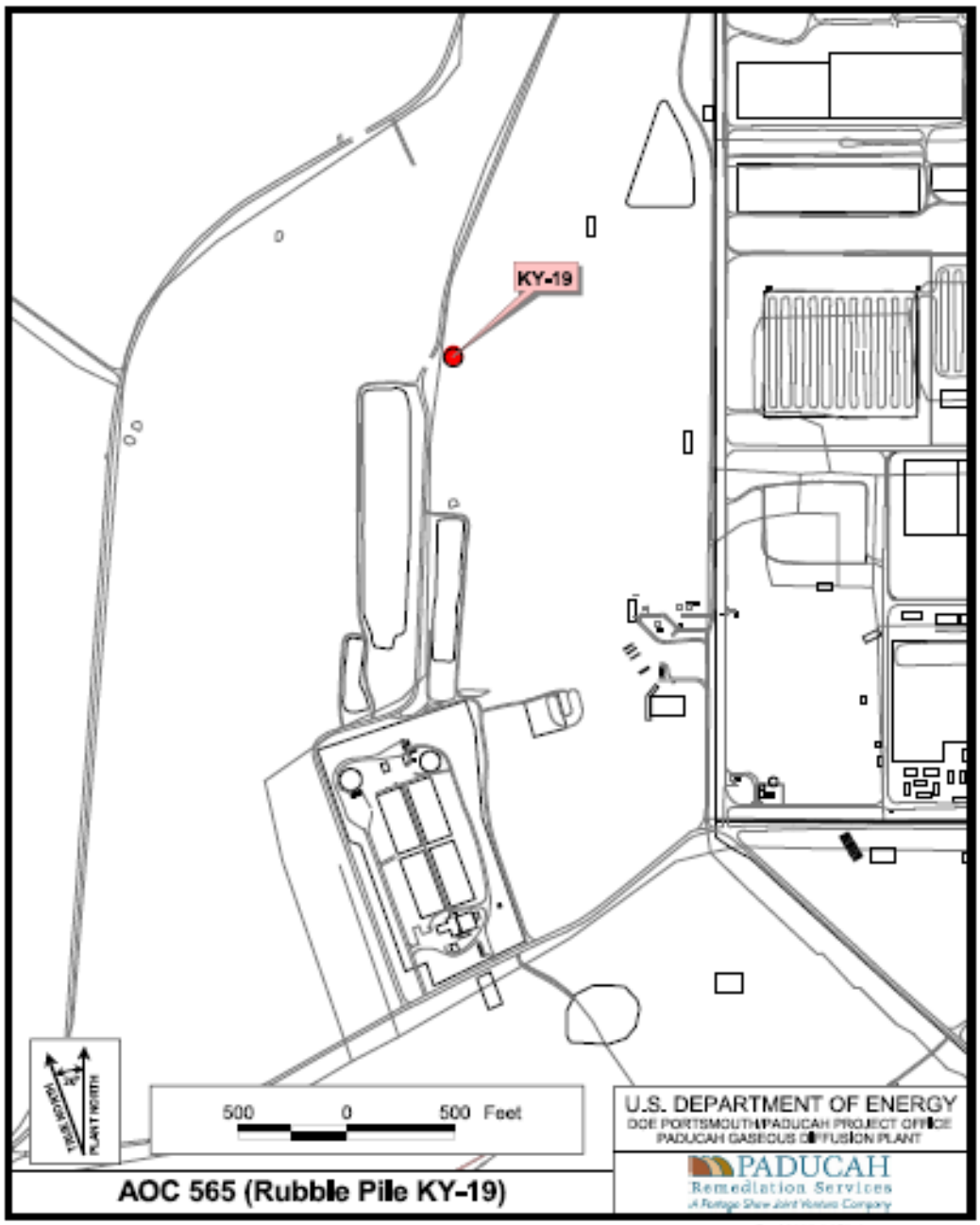
PRG COMPARISON: N/A

RFI NECESSARY: Yes.

OPERABLE UNIT ASSIGNMENT: Soils Operable Unit

PHOTOGRAPH OF RUBBLE AREA KY-19 (AOC 565)




KY-19
TRUE NORTH
PLANT NORTH
500 0 500 Feet
U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT
PADUCAH
Remediation Services
A Portage Shaw Joint Venture Company
AOC 565 (Rubble Pile KY-19)
FIGURE No. cfac90000ek550r4.apr
DATE 07-10-09