

**Record of Decision for Interim Remedial Action
at Solid Waste Management Units 2 and 3
of Waste Area Group 22
at the Paducah Gaseous Diffusion Plant
Paducah, Kentucky**



July 1995

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Department of Energy

Oak Ridge Operations
Paducah Site Office
P.O. Box 1410
Paducah, KY 42001

July 27, 1995

Mr. Tony Able
Remedial Project Manager
United States Environmental Protection Agency
Region IV
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Ms. Caroline Patrick Haight, Director
Division of Waste Management
Kentucky Department for Environmental Protection
14 Reilly Road, Frankfort Office Park
Frankfort, Kentucky 40601

RECORD OF DECISION (ROD) FOR INTERIM REMEDIAL ACTION (IRA) AT SOLID WASTE MANAGEMENT UNITS (SWMUs) 2 AND 3 OF WASTE AREA GROUPING (WAG) 22 AT THE PADUCAH GASEOUS DIFFUSION PLANT (PGDP)

Dear Mr. Able and Ms. Haight:

Enclosed for your review is the Record of Decision (ROD) for Interim Remedial Action (IRA) at Solid Waste Management Units (SWMUs) 2 and 3 of Waste Area Grouping (WAG) 22 at the Paducah Gaseous Diffusion Plant (PGDP) (DOE/OR/06-1351&D1). In accordance with recent conversations, the Department of Energy (DOE) anticipates the Environmental Protection Agency (EPA) and the Kentucky Department for Environmental Protection (KDEP) approval of the enclosed ROD. We are requesting a formal response to the enclosed ROD within 30 days, i.e. by August 29, 1995, if possible.

If you have any questions or require additional information, please call David W. Dollins at (502) 441-6819.

Sincerely,

David W Dollins
Jimmie C. Hodges, Site Manager *for*
Paducah Site Office

EF-22:Dollins

Enclosure

cc: J. Stickney, KDEP/Frankfort
T. Taylor, KDEP/Frankfort

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July 27, 1995

JE/PAD/95-0222

Mr. Jimmie C. Hodges
Site Manager
Paducah Site Office
U.S. Department of Energy
P.O. Box 1410
Paducah, KY 42001

Subject: Contract No. DE-AC05-93OR22028, Task Order No. 36—Transmittal of the Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D1

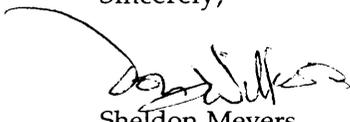
Dear Mr. Hodges:

Enclosed please find the July 1995 *Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky*, document number DOE/OR/06-1351&D1. This Record of Decision (ROD), the first such document for a source unit at the Paducah Gaseous Diffusion Plant, is being submitted to the Department of Energy in accordance with the DOE's FY 1995 compliance milestone commitments. The Jacobs ER Team has prepared the enclosed document in accordance with requirements and responsibilities under contract No. DE-AC05-93OR22028, Task Order No. 36.

This ROD has been revised to reflect comments received from the DOE on the D0 version issued March 1995. This ROD also contains a responsiveness summary for the 30-day public comment period on the proposed plan for this interim action. Following issuance to the U.S. Environmental Protection Agency and the Kentucky Department for Environmental Protection by July 30, 1995, the DOE is scheduled to receive formal response from the regulatory agencies by August 29, 1995.

If you require additional copies or have questions concerning this document, please contact our Paducah Site Manager Don J. Wilkes at (502) 462-2550.

Sincerely,


Sheldon Meyers
Program Manager

Enclosure

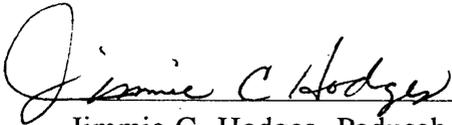
SM:DJW/ams

CERTIFICATION

Document Identification: Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

U. S. Department of Energy
Owner and Operator



Jimmie C. Hodges, Paducah Site Manager
Paducah Site Office
U. S. Department of Energy

7-13-95

Date Signed

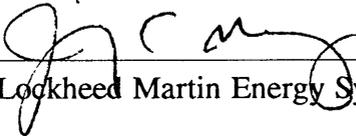
The Department of Energy has signed as "owner and operator" and Lockheed Martin Energy Systems, Inc., has signed as "co-operator" this application for the permitted facility. The Department has determined that dual signatures best reflect the actual apportionment of responsibility under which the Department's RCRA responsibilities are for policy, programmatic, funding, and scheduling decisions, as well as general oversight, and the contractor's RCRA responsibilities are for day-to-day operations (in accordance with general directions given by the Department of Energy as part of its general oversight responsibility), including but not limited to, the following responsibilities: waste analyses and handling, monitoring, record keeping, reporting, and contingency planning. For purposes of the certification required by 40 CFR Section 270.11(d), the Department of Energy's representatives certify, to the best of their knowledge and belief, the truth accuracy and completeness of the application for their respective areas of responsibility.

CERTIFICATION

Document Identification: Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Lockheed Martin Energy Systems, Inc.
Co-Operator



Lockheed Martin Energy Systems, Inc.

7/13/95

Date Signed

The Department of Energy has signed as "owner and operator" and Lockheed Martin Energy Systems, Inc., has signed as "co-operator" this application for the permitted facility. The Department has determined that dual signatures best reflect the actual apportionment of responsibility under which the Department's RCRA responsibilities are for policy, programmatic, funding, and scheduling decisions, as well as general oversight, and the contractor's RCRA responsibilities are for day-to-day operations (in accordance with general directions given by the Department of Energy as part of its general oversight responsibility), including but not limited to, the following responsibilities: waste analyses and handling, monitoring, record keeping, reporting, and contingency planning. For purposes of the certification required by 40 CFR Section 270.11(d), Lockheed Martin Energy Systems, Inc.'s, representatives certify, to the best of their knowledge and belief, the truth accuracy and completeness of the application for their respective areas of responsibility.

**Record of Decision for Interim Remedial Action
at Solid Waste Management Units 2 and 3
of Waste Area Group 22
at the Paducah Gaseous Diffusion Plant
Paducah, Kentucky**

July 1995

Prepared by
Jacobs Engineering Group Inc.
175 Freedom Boulevard • Kevil, KY 42053
Under Contract DE-AC05-93OR22028

Prepared for
United States Department of Energy
Environmental Restoration Division

PREFACE

This *Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant* (DOE/OR/06-1351&D1) was prepared in accordance with requirements under the Comprehensive Environmental Response, Compensation and Liability Act, Resource Conservation and Recovery Act, and K.R.S. 224.46-530 for documenting the selection of a preferred interim remedial action, or corrective measure, for a solid waste management unit. This Record of Decision has been prepared in accordance with the "Record of Decision" outline prescribed in Appendix D of the draft Federal Facility Agreement for the Paducah Gaseous Diffusion Plant dated December 22, 1993. This work was performed under Work Breakdown Structure 1.4.12.7.1.02.11.02 (Activity Data Sheet 5302, "Offsite Groundwater Contamination"). Publication of this document meets a milestone pursuant to the United States Department of Energy's fiscal year 1995 commitments to federal and state regulatory agencies. This primary milestone document provides a record of information to be considered and the rationale which the United States Environmental Protection Agency and the United States Department of Energy will utilize in the selection of a preferred remedial action, or corrective measure, at Solid Waste Management Unit 2, the C-749 Uranium Burial Ground, and will formally record the decision to implement this interim action. This document also contains a schedule for conducting remedial design phase activities for this project. Information provided in this document forms the basis for the development of the Remedial Design Report for this project.

ACKNOWLEDGMENT

Jacobs Engineering Group Inc. under prime contract to the United States Department of Energy developed this document with the assistance of the Jacobs Environmental Restoration Team members:

Geraghty and Miller, Inc.

Lockwood Greene Technologies, Inc.

PAI Corporation

Solutions To Environmental Problems

United Science Industries

University of Tennessee

Additional support was given to the team by Lockheed Martin Energy Systems, Inc.

CONTENTS

PREFACE.....	ii
ACKNOWLEDGMENT.....	iii
TABLES.....	vi
FIGURES.....	vi
ACRONYMS AND ABBREVIATIONS.....	vii
PART 1. DECLARATION	
SITE NAME AND LOCATION	
STATEMENT OF BASIS AND PURPOSE	
ASSESSMENT OF THE SITE	
DESCRIPTION OF SELECTED REMEDY	
STATUTORY DETERMINATIONS	
PART 2. DECISION SUMMARY 1	
2.1 Site Name, Location, and Description	2
2.2 Site History and Enforcement Activities.....	5
2.3 Highlights of Community Participation	6
2.4 Scope and Role of Operable Unit	6
2.5 Site Characteristics.....	7
Hydrogeologic Characteristics	7
Nature and Extent of Contamination at Solid Waste Management Unit 2.....	9
Conceptual Site Model for Transport and Exposure Pathways at Solid Waste Management Unit 2.....	11
2.6 Summary of Site Risks.....	11
Human Health Risks.....	11
Environmental Risks.....	14
Remedial Action Objectives	14
2.7 Description of Alternatives.....	15
Alternative 1—No Action.....	15
Alternative 2—Limited Action	15
Alternative 3—Excavation, Treatment, and Storage/Disposal	16
Alternative 4—Low Permeability, Multilayered Cap, Dewatering, Additional Monitoring and Institutional Controls	16
Alternative 5—Low Permeability, Multilayered Cap, Additional Monitoring, and Institutional Controls.....	17
2.8 Summary of the Comparative Analysis of Alternatives.....	18
Overall Protection of Human Health and the Environment.....	19
Compliance with Applicable or Relevant and Appropriate Requirements	19
Long-Term Effectiveness and Permanence	19
Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	25
Short-Term Effectiveness.....	25
Implementability	25
Cost.....	25
State Acceptance	25
Community Acceptance	26
2.9 Selected Remedy.....	26
2.10 Statutory Determinations	27

	Overall Protection of Human Health and the Environment.....	27
	Applicable or Relevant and Appropriate Requirements.....	28
	Chemical-specific applicable or relevant and appropriate requirements.....	30
	Location-specific applicable or relevant and appropriate requirements.....	30
	Action-specific applicable or relevant and appropriate requirements.....	31
	Cost Effectiveness.....	34
	Utilization of Permanent Solutions and Alternative Treatment Technologies	34
	Reduction of Toxicity, Mobility, or Volume through Treatment	34
	Permanent Remedy	44
2.11	Documentation of Significant Changes.....	44
2.12	Five-Year Review	44
PART 3.	RESPONSIVENESS SUMMARY	45
3.1	Responsiveness Summary Introduction.....	46
3.2	Community Preferences/Integration of Comments	46
APPENDIX		
	Remedial Design Schedule	

TABLES

Table 2-1.	Summary of Long-Term Risk at Solid Waste Management Unit 2 under No Action and Interim Action.....	13
Table 2-2.	Comparative Analysis of Alternatives.....	20
Table 2-3.	Cost Estimates for Interim Action	27
Table 2-4.	Applicable or Relevant and Appropriate Requirements for Remedial Action: Low Permeability, Multilayered Cap and Monitoring Wells.....	35

FIGURES

Figure 2-1.	Paducah Gaseous Diffusion Plant Vicinity Map	3
Figure 2-2.	Location of Solid Waste Management Units in Waste Area Group 22.....	4
Figure 2-3.	General Subsurface Profile of the Paducah Gaseous Diffusion Plant Area.....	8
Figure 2-4.	Sampling Locations at Solid Waste Management Unit 2	10
Figure 2-5.	Conceptual Site Model of Solid Waste Management Unit 2.....	12

ACRONYMS AND ABBREVIATIONS

The following list of acronyms and abbreviations is provided to assist in the review of this document.

⁹⁹ Tc	technetium-99
ARAR	applicable or relevant and appropriate requirement
bls	below land surface
BMP	best management practice
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act of 1970
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended
cm	centimeter(s)
COC	chemical of concern
COPC	chemical of potential concern
DNAPL	dense nonaqueous phase liquid
DOE	United States Department of Energy
EMEF	Environmental Management and Enrichment Facilities
EPA	United States Environmental Protection Agency
Fed. Reg.	<i>Federal Register</i>
FFCA	Federal Facility Compliance Agreement
FS	feasibility study
ft	foot (feet)
gal	gallon(s)
HSWA	Hazardous and Solid Waste Amendments of 1984
in	inch(es)
J-value	qualifier indicating estimated value
K.A.R.	Kentucky Administrative Regulations
KDEP	Kentucky Department for Environmental Protection
KPDES	Kentucky Pollutant Discharge Elimination System
l	liter(s)
LDR	land disposal restriction
LLW	low-level (radioactive) waste
m	meter(s)
µg/l	microgram(s) per liter
mrem	millirem(s)
MW	monitoring well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
O&M	operation and maintenance
PCB	polychlorinated biphenyl
pCi/g	picoCurie(s) per gram
pCi/l	picoCurie(s) per liter
PGDP	Paducah Gaseous Diffusion Plant
PPE	personal protective equipment
PW	Present Worth over 30-year period
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act, as amended
RGA	Regional Gravel Aquifer
RI	remedial investigation
ROD	record of decision
SARA	Superfund Amendments and Reauthorization Act of 1986
SWMU	solid waste management unit

TBC	to be considered
TCE	trichloroethene
U.S.C.A.	United States Code Annotated
UCRS	Upper Continental Recharge System
WAG	waste area group
WKWMA	West Kentucky Wildlife Management Area
yd ³	cubic yards
yr	year(s)

PART 1
DECLARATION

**DECLARATION FOR THE RECORD OF DECISION
FOR INTERIM REMEDIAL ACTION
AT SOLID WASTE MANAGEMENT UNITS 2 AND 3
OF WASTE AREA GROUP 22**

SITE NAME AND LOCATION

Solid Waste Management Units 2 and 3 of Waste Area Group 22
Paducah Gaseous Diffusion Plant
Paducah, Kentucky

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected interim remedial action for Solid Waste Management Units (SWMUs) 2 and 3 of Waste Area Group (WAG) 22 at the Paducah Gaseous Diffusion Plant (PGDP) near Paducah, Kentucky, chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the administrative record for this site.

The United States Department of Energy (DOE) entered into an Administrative Order by Consent pursuant to Sections 104 and 106 of CERCLA, effective November 23, 1988, with the United States Environmental Protection Agency (EPA). The PGDP was issued a Kentucky Hazardous Waste Management Permit and an EPA Hazardous and Solid Waste Amendments (HSWA) Permit July 16, 1991. The PGDP was placed on the National Priorities List effective June 30, 1994 (59 Federal Register 27989, May 31, 1994). Currently the DOE, the EPA, and the Kentucky Department for Environmental Protection (KDEP) are negotiating a Federal Facility Agreement for the PGDP site. On February 10, 1994, the EPA approved the DOE's January 20, 1994, proposal to issue a feasibility study report for SWMUs 2 and 3 of WAG 22. The concept of limiting the feasibility study to these two SWMUs was originally discussed among the EPA, the KDEP, and the DOE representatives during a June 11, 1992, meeting, and again during a January 5, 1994, meeting. Since SWMU 3 underwent Resource Conservation and Recovery Act (RCRA) closure in 1987, it does not require additional remedial or corrective actions at this time. Data gaps exist which prevent development and evaluation of final remedial actions at SWMU 2. In order to mitigate risks posed to ground water and the potential for direct contact, the DOE will implement an interim remedial action at SWMU 2. This interim remedial action will be initiated pursuant to the Interim Measure provisions of PGDP's Kentucky Hazardous Waste Management Permit issued by the KDEP and K.R.S. 224.46-530, the HSWA Permit issued by the EPA, and this Record of Decision (ROD). The Commonwealth of Kentucky concurs with the DOE and the EPA on the selected interim remedial action. This action will serve as an incremental step toward comprehensively addressing PGDP site problems.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from SWMU 2, if not addressed by implementing the response action selected in this ROD for interim remedial action, may present an imminent and substantial endangerment to public health, welfare, or the environment in the future.

DESCRIPTION OF SELECTED REMEDY

The primary objective of this interim remedial action, or corrective measure, is to reduce the infiltration of precipitation into buried wastes and mitigate any leaching of chemicals of concern from the wastes while the DOE collects additional data to support evaluation of a final remedial action. The Surface Water Integrator Operable Unit and the Ground Water Integrator Operable Unit at the PGDP will be addressed comprehensively in subsequent operable units. Solid Waste Management Units 2 and 3 are identified as source units at the PGDP. This interim remedial action for a source unit constitutes an incremental step toward comprehensively addressing site-wide problems at the PGDP. Decisions regarding final remedial actions will be made through the remedial investigation and remedy selection process after the source units are more fully understood.

The principal threat associated with SWMU 2 is the potential for transport of contaminants to the ground water operable unit and subsequent threats associated with the potential contamination of an aquifer and transport of contaminants beyond DOE property. The major components of the interim action remedy include:

- Once a determination has been made regarding possible ground water interaction with the buried wastes, a low permeability, multilayered cap may be placed on SWMU 2, the C-749 Uranium Burial Ground, to reduce infiltration of surface water from precipitation events into and through buried wastes. This will reduce potential leaching of contaminants to ground water. The cap will also decrease the gamma exposure rate to background levels and further decrease the likelihood of on-site workers and terrestrial animals coming into direct contact with the buried wastes.
- A ground water monitoring program will be implemented in the uppermost aquifer, the Regional Gravel Aquifer, to detect any release of contaminants from SWMU 2.
- Institutional controls will be implemented to prevent transferal of the SWMU 2 property and prevent future intrusive activities at the unit.

The EPA and the KDEP have participated in the development of this ROD, including review and comment on the content of the document.

STATUTORY DETERMINATIONS

This interim action is protective of human health and the environment in the short term and is intended to provide adequate protection until a final ROD is signed for this unit. This interim action also complies with federal and state applicable or relevant and appropriate requirements for this limited-scope action, and is cost effective. This interim remedial action meets Condition IV. E. of the Kentucky Hazardous Waste Management Permit relating to interim corrective measures. This interim action is not intended to fully address the statutory mandate for permanent solutions and alternative treatment technologies to the maximum extent practicable for SWMU 2. Since this action does not constitute the final remedy for SWMU 2, the statutory preference for remedies which employ treatment that reduce toxicity, mobility, or volume as a principal element will be considered during evaluation of a final response action. Subsequent actions are planned to fully address the principal threats posed by the conditions at SWMU 2. Since this interim remedy will result in hazardous substances potentially remaining above health-based levels, a review will be conducted to ensure that the remedy continues to provide

adequate protection of human health and the environment within five years after commencement of the interim remedial action. Since this is an Interim Action ROD, review of this unit and of this remedy will be ongoing, as the DOE continues to develop final remedial alternatives for SWMU 2 of WAG 22 at the PGDP.

_____ Date _____
Robert D. Dempsey
Assistant Manager for Environmental Management
United States Department of Energy

_____ Date _____
John H. Hankinson, Jr.
Regional Administrator
United States Environmental Protection Agency, Region IV

PART 2
DECISION SUMMARY

DECISION SUMMARY

2.1 Site Name, Location, and Description

The United States Department of Energy (DOE) is conducting environmental cleanup activities at the Paducah Gaseous Diffusion Plant (PGDP) under the DOE Environmental Management and Enrichment Facilities (EMEF) Program. These cleanup efforts are required to address contamination that has resulted from past waste handling and disposal practices at the plant. The DOE is conducting the remedial activities in compliance with the requirements of the Kentucky Department for Environmental Protection (KDEP) and the United States Environmental Protection Agency (EPA).

The PGDP, located in western Kentucky, is an active uranium enrichment facility owned by the DOE. Effective July 1, 1993, the DOE leased the plant production operations facilities to the United States Enrichment Corporation, which in turn contracted with Lockheed Martin Utility Services, Inc. to provide operations and maintenance services. Lockheed Martin Energy Systems, Inc. manages EMEF Program activities for the DOE.

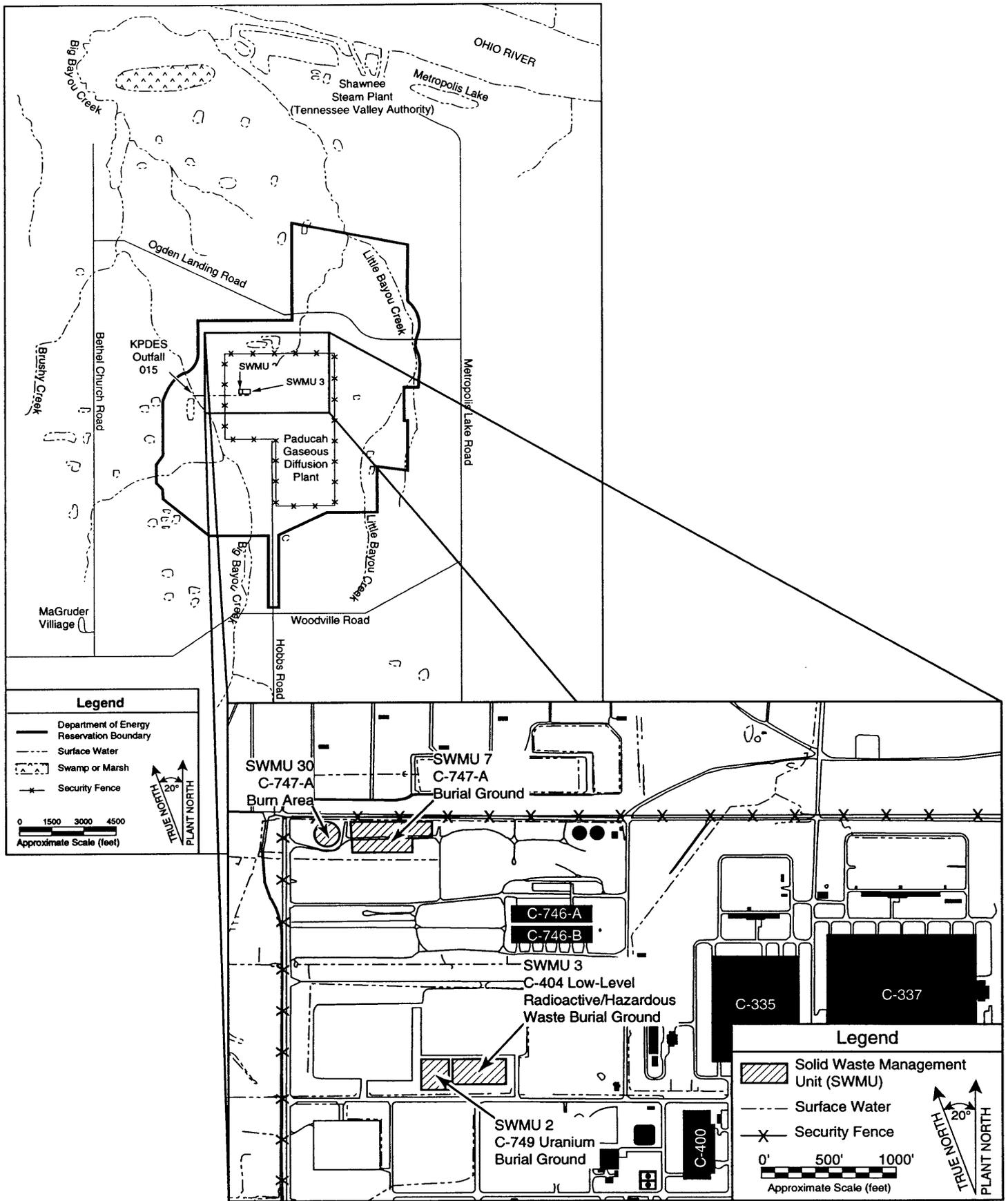
The PGDP is located in McCracken County in western Kentucky, approximately 3.5 miles south of the Ohio River (Figure 2-1). The PGDP facility covers about 540 hectares (1,335 acres), with approximately 300 hectares (740 acres) situated within a fenced security area; the remaining 240 hectares (595 acres) are maintained by the DOE as a buffer zone surrounding the plant. Approximately 850 hectares (2,100 acres) of land beyond the buffer zone are leased by the DOE to the Commonwealth of Kentucky as part of the West Kentucky Wildlife Management Area (WKWMA). The WKWMA is used extensively for recreation, primarily hunting and fishing.

The principal pathway of ground water flow at the PGDP is the Regional Gravel Aquifer (RGA), which consists of unconsolidated gravel and sand deposits occurring between 12 and 33 meters (m) [40 and 100 feet (ft)] below land surface (bls). From the PGDP, ground water within the RGA flows in a northward direction toward the Ohio River, which is the local base level for the system. Ground water contaminant plumes originating from the PGDP and extending north and northeast from the plant are located within this aquifer.

Waste Area Group (WAG) 22 consists of the following solid waste management units (SWMUs):

- SWMU 2, the C-749 Uranium Burial Ground;
- SWMU 3, the C-404 Low-Level Radioactive/Hazardous Waste Burial Ground;
- SWMU 7, the C-747-A Burial Ground; and
- SWMU 30, the C-747-A Burn Area.

These four units are situated within the security-fenced area in the northwest portion of the plant (Figure 2-2). Although SWMUs 7 and 30 are contained in WAG 22, it has been mutually determined by the DOE, the EPA, and the KDEP that remedy selection at these two units will not be conducted until further characterization activities have been completed. Consequently, SWMUs 7 and 30 will not be considered further in this document. As shown in Figure 2-2, SWMUs 2 and 3 are located near the west-central portion of the security-fenced area of the PGDP. Both burial grounds have been capped, SWMU 2 with a 15-centimeter (cm) [6-inch (in)] clay cap and 46-cm (18-in) vegetative



Jacobs ER Team, 1995

Figure 2-2. Location of Solid Waste Management Units in Waste Area Group 22

cover and SWMU 3 (a regulated unit) with a Resource Conservation and Recovery Act (RCRA) multilayered clay cap. The surfaces of both burial grounds are primarily grass covered. Surface elevations vary from about 113 to 119 m (370 to 390 ft) above mean sea level in the immediate vicinity of the two units. Surface runoff from the SWMUs flows into the ditches located north, south, and east of the units and discharges through Kentucky Pollutant Discharge Elimination System (KPDES) Outfall 015 to Big Bayou Creek.

2.2 Site History and Enforcement Activities

The C-749 Uranium Burial Ground (SWMU 2) is located in the west-central portion of the plant north of Virginia Avenue and on the western edge of the C-404 Low-Level Radioactive/Hazardous Waste Burial Ground (Figure 2-2). It encompasses an area of approximately 2,970 m² [32,000 square feet (ft²)] with approximate dimensions of 48.8 by 61.0 m (160 by 200 ft) and is divided into 6.1 by 6.1 m (20 by 20 ft) sections. The C-749 Uranium Burial Ground was used from approximately 1951 to 1977 for the disposal of uranium and uranium containing wastes. The exact depth of the buried waste is not known. Wastes were reportedly placed in trenches excavated to a total depth of approximately 2.1 to 5.2 m (7 to 17 ft) and then covered with 0.61 to 1.2 m (2 to 4 ft) of soil. Occasionally, fires were reported as a result of oxidation of pyrophoric uranium metal, but no subsidence was observed resulting from potential volume reductions due to the fires. In 1982, the C-749 Uranium Burial Ground was covered with a 15-cm (6-in) clay layer and a 46-cm (18-in) vegetative cover. It has been estimated that 2.44 × 10⁵ kilograms (270 tons) of uranium, 2.23 × 10⁶ liters (l) [59,000 gallons (gal)] of oils, and 1.70 × 10³ l (450 gal) of trichloroethene (TCE) were buried in SWMU 2. Most of the waste consisted of pyrophoric uranium metal in the form of machine shop turnings, shavings, and sawdust. Pyrophoric uranium metal was usually placed in 20-, 30-, or 55-gal drums and petroleum-based or synthetic oils were used to stabilize the waste. It is possible these oils may have included some polychlorinated biphenyl-(PCB) contaminated oils. Other forms of uranium, including oxides of uranium (solid and dissolved in aqueous solutions), uranyl fluoride solutions, uranium-zirconium alloy, slag, and uranium tetrafluoride were buried in smaller quantities.

There is no documentation of technetium-99 (⁹⁹Tc) disposal at SWMU 2, but its presence is suspected due to its association with operations at the PGDP. Technetium was produced at the PGDP as a by-product from reprocessing of reactor tailings. A portion of the uranium-containing wastes disposed in burial grounds at the PGDP likely contains ⁹⁹Tc from this source. In addition, detections of ⁹⁹Tc in ground water samples from nearby monitoring wells indicate that it may be present in SWMU 2.

In August 1984, Area 9 [which is approximately 6.1 by 4.3 m (20 by 14 ft)] and located on the southern border of SWMU 2) of the C-749 Burial Ground was excavated in response to concern about the integrity of the drums containing TCE reportedly disposed in this area. Little documentation is available concerning this activity. During excavation, four of the fifteen 30-gal drums believed to be in Area 9 were recovered, and three of them were in such poor condition that their content could not be determined. In addition to the four 30-gal drums, approximately 36 plastic-lined 55-gal drums were excavated. Five of the 55-gal drums were of poor integrity. There was no record of the 55-gal drums having been buried in Area 9.

The C-404 Low-Level Radioactive/Hazardous Waste Burial Ground (SWMU 3) is located immediately east of the C-749 Burial Ground in the west-central area of the plant (Figure 2-2). It is approximately 42.7 by 115.8 m (140 by 380 ft) and was originally constructed in the early 1950s as an aboveground holding pond, with an on-grade

tamped earth floor and 1.8-m (6-ft) high clay dike walls. The burial ground was used from 1951 to 1957 as a primary disposal area for ⁹⁹Tc and uranium-contaminated effluent. In 1957, all free liquids were removed, and disposal of uranium-contaminated bulk solid wastes began at the unit. In 1976, after the facility was filled with bulk solid waste, it was covered with compacted earth and the weir at the southwest corner was converted into a leachate collection sump. From 1977 until closure of the unit in 1986, the upper portion of SWMU 3 was used for the disposal of bulk and containerized uranium-contaminated solid waste. A portion of this waste, consisting of approximately 645 drums of precipitation filter cake (end products from the gold dissolver process) was found to be RCRA hazardous in 1986. Solid Waste Management Unit 3 was subsequently covered with a RCRA multilayered cap and certified closed in 1987. It is regulated under RCRA as a land disposal unit and is required to comply with a RCRA post-closure permit which was issued on September 1992.

Because SWMU 3 is closed with a RCRA cap and is being addressed by RCRA post-closure permit requirements, only SWMU 2 will be addressed by the interim remedial action described in this Record of Decision (ROD). Solid Waste Management Unit 3 will continue to be regulated under the existing RCRA permit which requires continued ground water monitoring.

2.3 Highlights of Community Participation

From May 31 to June 29, 1995, a notice of availability regarding the Proposed Remedial Action Plan was published in a regional newspaper, *The Paducah Sun*. The *Proposed Remedial Action Plan for Interim Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22* (DOE/OR/06-1315&D3) was released to the public May 31, 1995.

Specific groups which received individual copies of the Proposed Remedial Action Plan include the local PGDP Neighborhood Council, Natural Resource Trustees, and the PGDP Environmental Advisory Committee. A public meeting was tentatively scheduled for June 22, 1995, if requested by June 12, 1995. Since no requests were made for a public meeting, a notice of the meeting's cancellation was published in the Sunday, June 18, 1995, edition of *The Paducah Sun*.

2.4 Scope and Role of Operable Unit

Consistent with the DOE strategy, this interim action is intended as an incremental step toward addressing the source unit, SWMU 2. A potential contamination release into the RGA has been identified as the primary threat posed by SWMU 2. The objective of this interim action is to reduce infiltration of leachate through the unsaturated waste and delay the potential breakthrough of uranium and other chemicals of concern (COCs) to the RGA. By implementation of this interim action, leaching of contaminants into the ground water will be reduced while a final remedy for SWMU 2 is being evaluated.

Several data gaps exist which prevent the DOE from evaluating a final remedial action for SWMU 2. The missing data regarding SWMU 2 relates to the depth of the waste, the volume of the waste, and the form of the waste. One of the more important data gaps is whether any of the buried wastes are saturated or in direct contact with ground water. If the waste is in fact saturated, the effectiveness of the cap is limited and the contaminants are more likely to migrate within the RGA, thus posing a risk to off-site receptors. Additional information will be collected to fill data gaps as necessary to evaluate a final action in three separate manners. Field work associated with implementation of this action will fill some data gaps. Information collected during the course of other DOE projects near SWMU 2 will also fill data gaps. In addition, the DOE will prepare a

separate sampling plan currently scheduled to be submitted to the EPA and the KDEP in late 1995. The sampling plan will address those critical data gaps which will not be filled as a direct result of this interim action or other field projects. This interim action is an efficient, cost effective means of reducing risks posed by SWMU 2 at an early stage, while information necessary to evaluate a final action is being collected. Once the proper information has been collected, the DOE will evaluate and recommend a final remedial action for SWMU 2.

2.5 Site Characteristics

Hydrogeologic Characteristics

The subsurface at the PGDP consists of approximately 103.7 m (340 ft) of unconsolidated sediments overlying Mississippian limestone bedrock. Figure 2-3 presents a general subsurface profile of the PGDP area. The following discussion focuses on those lithologies present beneath SWMU 2.

Surficial deposits in the vicinity of SWMU 2 consist of approximately 4.0 to 6.1 m (13 to 20 ft) of silt loam and silty clay loam. These deposits consist of about 1.8 m (6 ft) of soil and an underlying 2.1 to 4.3-m (7 to 14-ft) thick layer of wind-deposited, fine-grained, silty material called loess.

Underlying the surficial deposits are unconsolidated sediments consisting of interbedded and interlensing gravel, sand, silt, and clay. These deposits, divided into the Upper and Lower Continental Deposits, were laid down in the region during the late Tertiary and Quaternary periods. The Upper Continental Deposits consist primarily of clayey silt, with thin layers of sand and occasional gravel found at a depth of about 4.0 to 6.1 m (13 to 20 ft) bls. They are approximately 12.2 to 15.2 m (40 to 50 ft) thick in the vicinity of SWMU 2. The loess and the Upper Continental Deposits have been informally grouped into a ground water flow system referred to as the Upper Continental Recharge System (UCRS). Water level measurements from a UCRS monitoring well, located at the northern edge of SWMU 2, Monitoring Well (MW) 154, indicate an area of high ground water elevations exists at SWMU 2. The ground water flow direction within the UCRS is ultimately downward through the low permeability clay, silt, or clayey silt layer separating the Upper and Lower Continental Deposits.

The top of the Lower Continental Deposits is typically found at depths of approximately 18.3 to 21.3 m (60 to 70 ft) bls. The Lower Continental Deposits consist predominantly of well-rounded chert gravel with sand and are approximately 6.1 to 9.1 m (20 to 30 ft) thick in the vicinity of SWMU 2. The principal gravel facies of the Lower Continental Deposits, the RGA, is the uppermost aquifer at the PGDP.

The Continental Deposits are underlain by the McNairy Formation at depths of approximately 25.9 to 30.5 m (85 to 100 ft) bls. The McNairy Formation in this area of the plant site has been described as brown to gray, silty, clayey, very fine to fine sand with dark gray silty clay. The total thickness of the McNairy Formation is approximately 68.6 m (225 ft). Directly underlying the McNairy Formation are the Mississippian rubble zone and the Cretaceous Tuscaloosa Formation, which consist of a 1.5 to 6.1 m (5 to 20 ft) thick layer of subangular chert and silicified limestone fragments. Deep borings at the PGDP have encountered Mississippian limestone bedrock approximately 102 to 107 m (335 to 350 ft) bls.

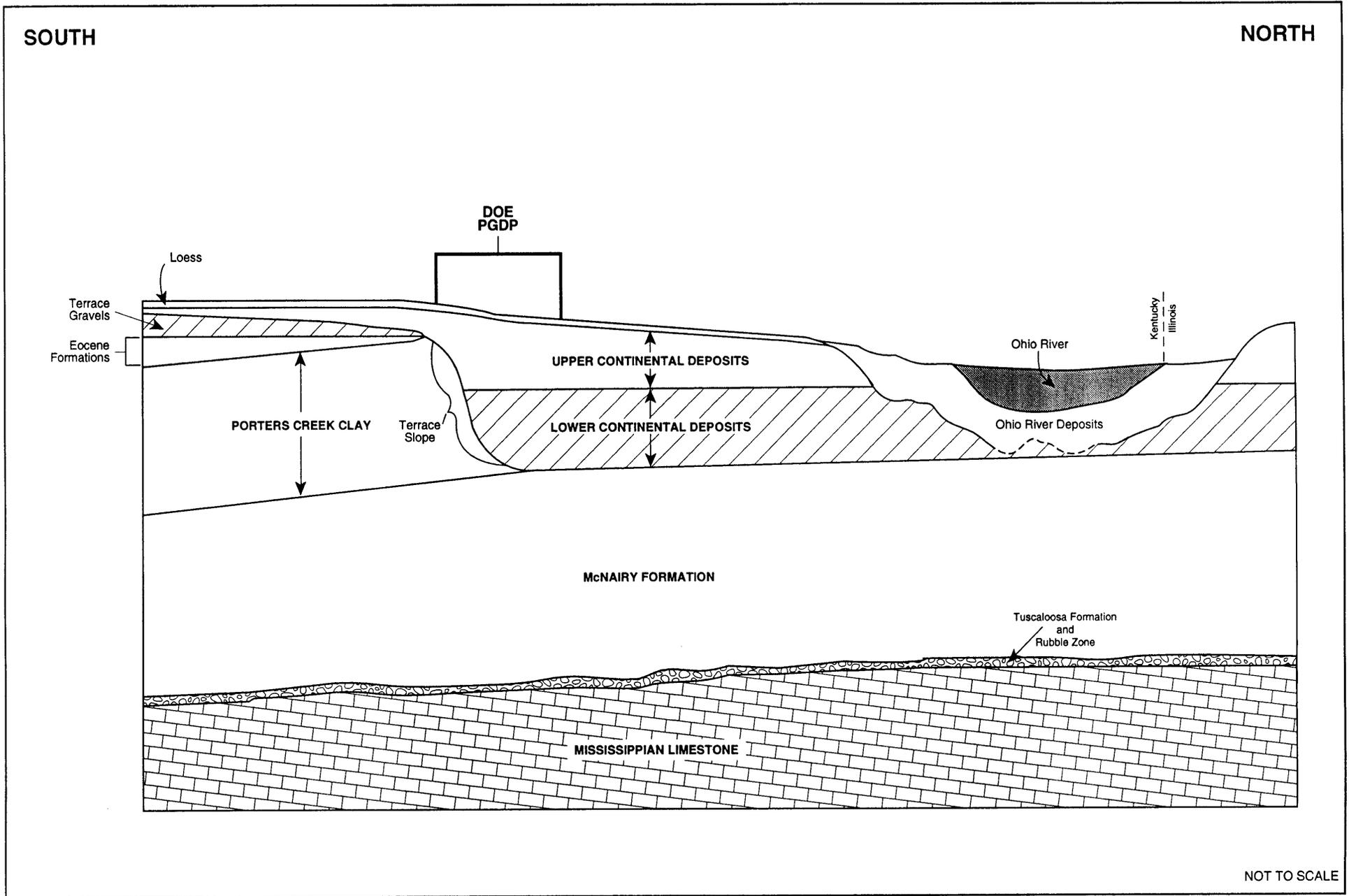


Figure 2-3. General Subsurface Profile of the Paducah Gaseous Diffusion Plant Area

Nature and Extent of Contamination at Solid Waste Management Unit 2

The results of the Phase I and Phase II Site Investigations indicate that organic, metal, and radionuclide contamination is present in surface soils, subsurface soils, and ground water in the SWMU 2 area. Sampling locations at SWMU 2 are shown in Figure 2-4. The possible source of this contamination is the low-level (radioactive) waste (LLW), primarily uranium and uranium-contaminated material, buried within the unit.

Over 30 chemicals of potential concern (COPCs) were identified in the *Remedial Investigation Addendum for Waste Area Grouping 22, Burial Grounds, Solid Waste Management Units 2 and 3, at the Paducah Gaseous Diffusion Plant* risk assessment. Nineteen of these COPCs were determined to pose a potential risk great enough to be considered COCs for the *Feasibility Study for Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant*. The criteria used to identify the COPCs and COCs, as well as the uncertainties associated with the identification process, are presented in the Remedial Investigation (RI) Addendum and in Appendix A of the Feasibility Study (FS).

The principal organic contaminant detected in the ground water at SWMU 2 is TCE, found primarily in the UCRS at concentrations varying from about 4 to 1,400 micrograms per liter ($\mu\text{g}/\text{l}$). Trichloroethene also has been detected in the upper RGA, at levels ranging from <5 to $98 \mu\text{g}/\text{l}$. Trichloroethene is transported as a dissolved phase liquid in the direction of ground water flow. It also has the potential to migrate in the form of a dense nonaqueous phase liquid (DNAPL). As the buried waste containers degrade within SWMU 2, DNAPLs could potentially migrate to subsurface soils and ground water.

Metals have been detected above Phase II Site Investigation reference levels in soil and ground water samples at SWMU 2. Arsenic and silver were detected above reference levels in soil samples taken from borings located at the perimeter of SWMU 2. The principal inorganic contaminants in the ground water at SWMU 2 are manganese, vanadium, and beryllium. Beryllium was detected in total (unfiltered) metals analyses at levels above allowable drinking water maximum contaminant levels in the UCRS. Manganese and vanadium were detected at levels above reference values in UCRS wells located near SWMU 2.

Radiological contamination has been detected in shallow soil samples from borings located at the perimeter of SWMU 2, primarily at H 221 northwest of SWMU 2 and at H 262 southwest of SWMU 2. The radionuclides ^{99}Tc [up to 58 picoCuries per gram (pCi/g)] and total uranium (up to $89 \text{ pCi}/\text{g}$) have been detected in surface soils and in the ditch southwest of the unit to a depth of approximately 1.8 m (6 ft). The extent of surface radiological contamination likely extends from H 221 in the swale west of SWMU 2 and from H 262 in the ditch south of SWMU 2 to Outfall 015.

Ground water sampling indicates radiological contamination is present in the UCRS near SWMU 2. The principal radiological contaminants are ^{99}Tc and, at lower levels, uranium. In ground water samples from the UCRS wells near the unit, ^{99}Tc was detected at levels ranging from < 25 to $2,175 \text{ pCi}/\text{l}$. Uranium has been detected at varying levels in UCRS wells; the maximum values (total fraction analysis) detected in UCRS wells at SWMU 2 were $10 \text{ pCi}/\text{l}$ (J-value) uranium-234 in MW 49, $1.0 \text{ pCi}/\text{l}$ uranium-235 in MW 91, and $27 \text{ pCi}/\text{l}$ uranium-238 in MW 154. In general, the radiological contamination in the UCRS is higher than that found in the RGA. The principal radiological contaminant detected in the RGA is ^{99}Tc . Two downgradient wells in the area, MW 51 and MW 67, have reported ^{99}Tc values up to $53.2 \text{ pCi}/\text{l}$ in the upper RGA. Uranium has not been detected above reference levels in the RGA in the vicinity of

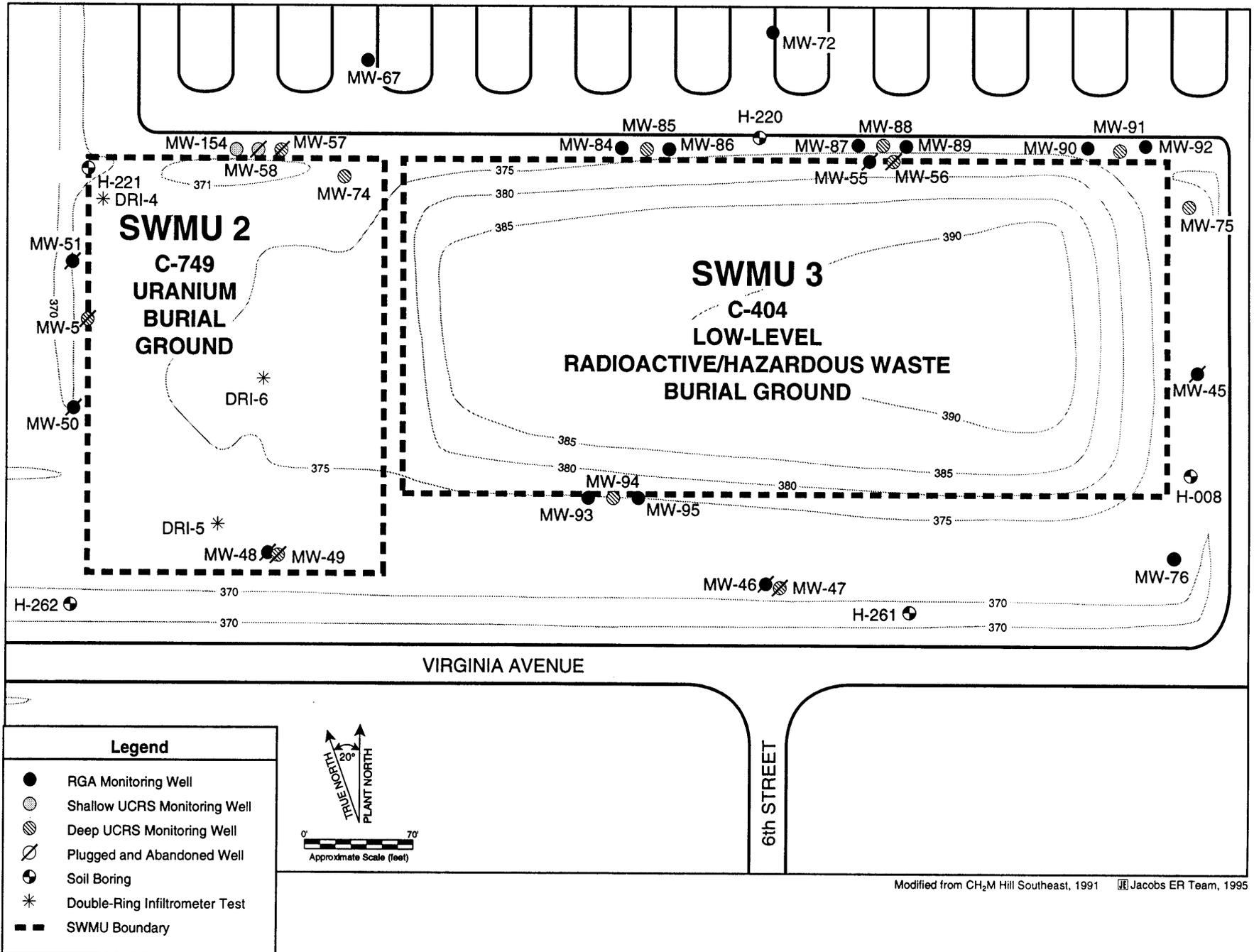


Figure 2-4. Sampling Locations at Solid Waste Management Unit 2

SWMU 2. The RESRAD (Residual Radioactivity) computer code was used for the FS to model potential leaching of uranium from SWMU 2. Results of this modeling indicate that uranium may migrate from SWMU 2, although very slowly, taking approximately 1,900 years to migrate to the RGA.

Two radiation walk-over surveys of SWMU 2 were conducted in August 1994. Detailed information concerning these surveys can be found in the FS. The survey results indicate that a generalized, low-level gamma field exists across SWMU 2. The field may be partially attributable to the large quantities of uranium metal buried in SWMU 2. Cylinder storage yards located adjacent to SWMU 2 are also likely contributing to the elevated gamma readings. In addition, during the Phase II Site Investigation, a radiation walk-over survey of the ditch located south of SWMU 2 was conducted. The results of this survey indicate that beta and gamma emitters are present at the surface of the ditch at levels exceeding three times background.

Conceptual Site Model for Transport and Exposure Pathways at Solid Waste Management Unit 2

The conceptual site model presented in Figure 2-5 identifies the probable and potential contaminant migration and exposure pathways at SWMU 2. From the source, defined as the low-level radioactive waste buried within SWMU 2, two probable pathways are identified: (1) a probable pathway to the adjacent soils; and (2) a probable pathway to ground water due to leaching and dissolution of contaminants. Consistent with the DOE strategy, DNAPL is considered a potential source beneath the buried waste since burial records indicate that TCE, a potential DNAPL compound, was buried at SWMU 2. However, the presence of DNAPL has not been identified at SWMU 2. Potential exposure to contamination at SWMU 2 via air is currently limited since SWMU 2 is covered with a 15-cm (6-in) clay cap and a 46-cm (18-in) vegetative cover. These are the primary pathways and will be the focus of Section 2.6. The interim action presented in this document is intended to address the potential transport of contaminants to ground water via infiltration of precipitation through the buried waste materials at this SWMU. The risks that are addressed by this interim action are discussed in the following section.

2.6 Summary of Site Risks

The results of the risk assessment suggest there is sufficient potential risk to the public and environment to warrant action. A summary of the long-term risk is presented in Table 2-1. The principal goal of the interim remedial action is to implement source control measures which will diminish infiltration of surface water from precipitation events the buried waste. This will reduce potential leaching of TCE and uranium into the ground water. The interim action will also eliminate the present and future potential for direct contact with the buried waste by both humans and terrestrial animals. A summary of the risk assessment is presented below.

Human Health Risks

The data from the Site Investigation were evaluated in the human health risk assessment. To identify contaminants of potential concern, all constituents detected in the surrounding soils and ground water were evaluated using established guidelines. From this data, contaminants of potential concern included metals, organic compounds, and radionuclides. Whether the chemicals detected in the ground water beneath the unit are associated with SWMU 2 is not known due to a lack of sampling data from the waste. Since uranium and TCE are two primary waste sources in SWMU 2, source term

**Table 2-1. Summary of Long-Term Risk at Solid Waste Management Unit 2
under No Action and Interim Action**

	No Action	Interim Action
Future Unrestricted Workers		
Direct contact with waste	Direct contact with waste possible; risks from direct contact unacceptable.*	Potential for direct contact reduced by physical barrier created by the low permeability multilayered cap.
Future Potential Ground Water User		
Ingestion of ground water	Risk posed by ground water contamination is unacceptable. Contaminant concentrations in ground water expected to increase.	Migration of contaminants reduced through reduction of water movement through unit by the cap.

* Unacceptable risk: a potential risk higher than one additional cancer case in a population of one million people exposed to a certain level of a pollutant during a lifetime.

concentrations were estimated from disposal records as input parameters for the soil leaching models.

The exposure pathways evaluated in the human health risk assessment are shown in Figure 2-5. As indicated by this figure, the risk assessments considered SWMU 2 to be an industrial site both under current and future conditions. However, the future resident using ground water was also evaluated for the site. For these scenarios, the principal pathways considered are inhalation potentially associated with the combustion of pyrophoric uranium, direct contact with the pyrophoric waste, and ingestion of potentially contaminated ground water. Although the contaminants in the ground water do not pose a threat at present, the potential for migration of TCE and uranium to off-site ground water does exist. As the primary contaminant migration pathway, potential future releases from SWMU 2 to ground water were evaluated using predictive models to estimate leaching.

Toxicity information used in the risk assessment was taken from approved EPA documents and data bases. The potential adverse human health effects associated with the primary contaminants of concern include carcinogenic effects and noncarcinogenic or systemic effects. Uranium exposure is associated with radiocarcinogenic and chemical toxic effects. Exposure to TCE through inhalation and ingestion causes cancer and various adverse effects on human health.

Risk characterization for workers indicated that under current conditions, the risk at the unit was not unacceptable. However, the risk characterization for workers under future conditions indicated that the risk at the unit was unacceptable due to potential direct contact with the buried waste. Also, the risk characterization for use of contaminated ground water indicated that ground water use could pose significant unacceptable risk to human health under future conditions. The primary driver of risk was ingestion of contaminated ground water. The primary contaminants contributing risk were TCE and uranium for the interim action.

Table 2-1 presents a summary of the long term risk at SWMU 2 for workers and ground water users under both the baseline (no action) condition and after the interim action is in place. As shown in this table, the interim action is effective in reducing risk from direct contact with the waste and in reducing the risk posed by the pyrophoricity of the

buried uranium. Also, the interim action is effective in reducing risk from ground water use by reducing the rate of contaminant leaching from the buried waste to the underlying aquifer.

Several uncertainties, or factors that could significantly affect the results of the risk assessment, were identified in the risk assessment. Primary uncertainties included needs to estimate the quantity of buried waste at SWMU 2 and the physical and chemical makeup of the waste. The effect of having to estimate these factors is unknown; however, since the risk assessment used estimates of concentrations of uranium and TCE that were unlikely to underestimate waste volume or mass, the results of the risk assessment are not likely to be underestimates of risk.

Another uncertainty identified as being important was the fact that rates of exposure used in the assessment were likely to be overestimates for most parameters. Both methods for evaluating TCE and uranium in ground water assumed reasonable maximum leaching. Therefore, concentrations of TCE and uranium under no action may result in overestimates of risks.

A third uncertainty that affected the results of the risk assessment is the assumed pyrophoric nature of the buried uranium. To address this uncertainty, the risk assessment considered the various conditions that would need to occur for spontaneous combustion of the buried uranium. These conditions were presented to ensure that any remedial alternative selected for SWMU 2 would reduce the risk posed by the pyrophoricity of the buried uranium.

Environmental Risks

Potential ecological effects were qualitatively evaluated in the ecological risk assessment. According to the Site Investigation, neither critical habitat nor known federal or state threatened and endangered species were located inside the PGDP boundary. Only various soil and sediment dwelling invertebrates (e.g., earthworms, chironomids), aquatic and terrestrial insects and their larvae, frogs and salamanders, and small mammals were reported. The principal source of potential adverse impacts to ecological resources at SWMU 2 was the possible failure of the buried waste containers and the subsequent release of COPCs to a subsurface environment.

The major exposure pathways for terrestrial animals include ingestion of contaminated biota and, to a lesser extent, ingestion and direct contact with contaminated soils. Ingestion of water and sediment at SWMU 2 is probably a minor pathway of exposure for terrestrial animals. Exposure to COPCs would likely have adverse effects to terrestrial animals and biota.

The risk to terrestrial animal populations and biota populations is small under the current condition. Potential risks may be associated with ingestion and direct contact with buried wastes due to possible releases of COPCs to the environment. The interim action will limit potential risks by reducing the possibility of a release of COPCs to the environment.

Remedial Action Objectives

Results of the human health risk assessment (Table 2-1) indicate that ingestion of contaminated ground water and direct contact with the buried waste pose unacceptable risks in the future. The remedial action objectives for the interim action are to mitigate migration of uranium and TCE from SWMU 2 to ground water, and to prevent

disturbance or contact with the buried waste materials. The interim action will reduce infiltration of precipitation, which will reduce potential leaching of TCE and uranium. The interim action will also reduce human health risks estimated for TCE and uranium exposure through ground water. In addition, the interim action will provide current and future protection from direct contact with the buried waste.

2.7 Description of Alternatives

The following paragraphs present a description of the five alternatives evaluated in the approved *Feasibility Study for Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant* (DOE/OR/06-1246&D2).

Alternative 1—No Action

Pursuant to 40 C.F.R. § 300.430(e)(b) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the DOE is required to consider a no action alternative. This alternative served as a baseline to which the other alternatives were compared. Under this alternative, no further action would be taken at SWMU 2.

Since no wastes would be generated, this alternative did not include the use of any treatment technologies, containment, or storage components. No additional costs were associated with this alternative. In addition, the alternative would not provide compliance with applicable or relevant and appropriate requirements (ARARs), and it would not reduce risk. A summary of the detailed evaluation of this alternative is presented in Section 2.8 of this ROD.

Alternative 2—Limited Action

This alternative primarily consisted of institutional controls designed to prevent access to SWMU 2. The alternative contained three primary components. First, deed restrictions would be executed to prevent property transfer, inappropriate use of the property, and any intrusive activities which could expose buried waste materials. Second, a suitable fence and warning signs would be installed around the unit to prevent unauthorized entry. Third, the DOE would conduct reviews of the action no less than once every five years, since contaminants would remain in the unit. Although this alternative does not include construction of additional piezometers or ground water monitoring wells, information collected as a result of ground water monitoring activities at the PGDP would be utilized during the review proceedings.

A minimal volume of wastes would be expected to be generated from implementation of this alternative. Soils which would potentially be generated during installation of fencing would not be expected to contain COCs, so the soils would not require any special handling. However, if the soils were determined to contain a significant concentration of any COCs following characterization, they would be handled appropriately and may require treatment, storage, or disposal. Fencing would be erected to prevent access to an area encompassing approximately 2,973 m² (32,000 ft²) or more. This alternative would not address potential long-term risks to ground water, and potentially would not comply with ARARs. Estimated costs and a summary of the detailed evaluation of this alternative are presented in Section 2.8 of this ROD.

Alternative 3—Excavation, Treatment, and Storage/Disposal

This alternative consisted of excavation of the buried wastes, treatment, and storage/disposal options. The alternative contained three primary components. First, the buried waste materials and associated contaminated soils would be excavated. Dewatering, stabilization of pyrophoric uranium, segregation of waste types, and a temporary storage facility would likely be required. Second, the wastes would require appropriate treatments to reduce toxicity. Sampling and analysis would be required to determine if the wastes would be classified as LLW and/or RCRA characteristically hazardous waste. Any contaminated water collected during dewatering activities would also require treatment. Third, the wastes would be stored/disposed in compliance with regulatory waste management practices. One option evaluated in this alternative would include a long-term storage facility at the PGDP. At this time, the PGDP does not have such a long-term storage facility or the capacity to accept the volume of LLW and/or RCRA hazardous wastes which would be generated by this alternative. The other disposal option considered in this alternative would consist of off-site disposal at an appropriate facility, likely at another DOE facility.

A significant volume of waste would be generated as a result of this alternative. Assuming an excavation depth of 5.2 m (17 ft) at SWMU 2 and potentially contaminated soils which immediately surround the unit, the volume of wastes generated was estimated to be in excess of 24,000 m³ [31,000 cubic yards (yd³)]. A significant volume of on-site storage capacity would be required for the wastes expected to be contaminated with volatile organic compounds and semi-volatile organic compounds, metals, radionuclides, and possibly PCBs. The wastes could either be treated or disposed at an appropriate DOE facility. In addition, dewatering would likely be required to conduct excavation activities. This alternative included construction of a treatment plant onsite to treat the extracted water. Potential treatment mechanisms included precipitation/coagulation, air stripping, ion exchange, and carbon adsorption. Treatability testing could be required to optimize treatment of wastes and/or extracted ground water. Appropriate controls would be utilized during the excavation phase to prevent adverse effects to workers and the surrounding environment. This alternative would address, or eliminate, long-term risks to the environment and could be conducted in accordance with ARARs. However, this alternative may not be safe to implement since it would include excavation of pyrophoric uranium. Estimated costs and a summary of the detailed evaluation of this alternative are presented in Section 2.8 of this ROD.

Alternative 4—Low Permeability, Multilayered Cap, Dewatering, Additional Monitoring and Institutional Controls

This alternative consisted of construction of a cap, long-term dewatering of the buried wastes, installation of additional monitoring wells and piezometers, and institutional controls. The alternative contained four primary components. First, a low permeability, multilayered cap would be constructed over SWMU 2 to significantly reduce surface water infiltration from precipitation events. Three conceptual capping options, which vary based on the type and number of layers employed, were evaluated in this alternative. The estimated cost and modeled effectiveness of each of the three capping options were compared to the estimated cost and modeled effectiveness of a RCRA cap. Second, a dewatering mechanism would be constructed to provide long-term, or continuous, dewatering of the buried waste materials. One dewatering option evaluated in this alternative would consist of approximately sixteen 9.1-m (30-ft) deep extraction wells/well points placed around the perimeter of SWMU 2. The second dewatering option evaluated in this alternative would consist of a highly permeable, approximately

9.1-m (30-ft) deep drainage trench placed around the perimeter of SWMU 2. Since the drainage trench would be placed under the edges of the cap, construction of the trench would precede construction of the cap. Treatment of liquids collected by a dewatering system would require construction of a treatment system. Third, four RGA ground water monitoring wells and two UCRS piezometers would be installed to monitor SWMU 2 and the effectiveness of this alternative at mitigating the potential for release of contaminants by reducing infiltration of precipitation. Fourth, two of the institutional controls identified in Alternative 2 (deed restrictions and periodic administrative reviews) would be enacted.

This alternative would generate solid and liquid wastes. A minimal volume of waste would be generated if well points were installed for long-term dewatering. The volume of wastes associated with installation of drainage trenches on the north, south, and west sides of SWMU 2 was estimated to be in excess of 1,350 m³ (1,840 yd³). The wastes produced during installation of either dewatering mechanism, piezometers, and ground water monitoring wells would likely be managed within the operable unit and placed on SWMU 2 as contour material for a low permeability, multilayered cap. In addition, dewatering would likely be required during trench construction activities. This alternative included construction of a treatment plant onsite to treat the extracted water. Estimates indicated dewatering activities would produce approximately 0.50 liters per second (7.9 gallons per minute) of potentially contaminated ground water. Potential treatment mechanisms included precipitation/coagulation, air stripping, ion exchange, and carbon adsorption. Treatability testing could be required to optimize treatment of wastes and/or extracted ground water. Appropriate controls would be utilized during the construction phases to prevent adverse effects to workers and the surrounding environment. This alternative would address long-term risks to ground water and could be conducted in accordance with ARARs. However, this alternative would require a significant amount of long-term care in the form of operation and maintenance, and ground water extraction and treatment. Estimated costs and a summary of the detailed evaluation of this alternative are presented in Section 2.8 of this ROD.

Alternative 5—Low Permeability, Multilayered Cap, Additional Monitoring, and Institutional Controls

This alternative consisted of construction of a cap, implementation of a ground water monitoring program, and institutional controls. The alternative contained three primary components. First, a low permeability, multilayered cap would be constructed over SWMU 2 to significantly reduce infiltration of surface water from precipitation events into the unit. Three conceptual capping options, which vary based on the type and number of layers employed, were evaluated in this alternative. The estimated cost and modeled effectiveness of each of the three options were compared to the estimated cost and modeled effectiveness of a RCRA cap. Second, a ground water monitoring program would be established in the RGA to detect potential contaminant releases from SWMU 2. The monitoring program would also evaluate the cap's effect(s) on the shallow ground water level in the UCRS and fill data gaps. Third, the institutional controls identified in Alternative 2 (deed restrictions and periodic administrative reviews) would be enacted.

This alternative would generate a relatively minor volume of solid wastes; for example, installation of one RGA monitoring well at the PGDP will produce approximately 2.5 m³ (85 cubic feet) of wastes. These wastes would likely be managed within the operable unit and placed on SWMU 2 as contour material for a low permeability, multilayered cap. Appropriate controls would be utilized during the construction phases to prevent adverse effects to workers and the surrounding environment. This alternative would reduce risks to ground water and could be conducted in accordance with ARARs.

Estimated costs and a summary of the detailed evaluation of this alternative are presented in Section 2.8 of this ROD.

2.8 Summary of the Comparative Analysis of Alternatives

This section provides the basis for determining which alternative: (1) meets the threshold criteria of overall protection of human health and the environment, and compliance with ARARs; (2) provides the best balance between effectiveness and reduction of toxicity, mobility, or volume through treatment, implementability, and cost; (3) satisfies state and community acceptance; and (4) is consistent with the Kentucky Hazardous Waste Permit. Although the selected remedy is consistent with the permit, the selection of an interim corrective measure under the permit does not require the following comparative analysis of alternatives.

Nine criteria are required by Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) for evaluating the expected performance of remedial actions. The nine criteria are identified below and the interim action has been evaluated on the basis of these criteria:

1. *Overall protection of human health and the environment.* This threshold criterion requires that the remedial alternative adequately protects human health and the environment, in both the short and long term. Protection must be demonstrated by the elimination, reduction, or control of unacceptable risks.
2. *Compliance with ARARs.* This threshold criterion requires that the alternatives be assessed to determine if they attain compliance with ARARs of both state and federal law.
3. *Long-term effectiveness and permanence.* This primary balancing criterion focuses on the magnitude and nature of the risks associated with untreated waste and/or treatment residuals remaining at the conclusion of remedial activities. This criterion includes consideration of the adequacy and reliability of any associated containment systems and institutional controls, such as monitoring and maintenance requirements, necessary to manage treatment residuals and untreated waste.
4. *Reduction of contaminant toxicity, mobility, or volume through treatment.* This primary balancing criterion is used to evaluate the degree to which the alternative employs recycling or treatment to reduce the toxicity, mobility, or volume of the contamination.
5. *Short-term effectiveness.* This primary balancing criterion is used to evaluate the effect of implementing the alternative relative to the potential risks to the general public, potential threat to workers, potential environmental impacts, and the time required until protection is achieved.
6. *Implementability.* This primary balancing criterion is used to evaluate potential difficulties associated with implementing the alternative. This may include: technical feasibility, administrative feasibility, and the availability of services and materials.

7. *Cost.* This primary balancing criterion is used to evaluate the estimated costs of the alternatives. Expenditures include the capital cost, annual operation and maintenance (O&M), and the combined net present value of capital and O&M costs.
8. *State acceptance.*
9. *Community Acceptance.* This modifying criterion provides for consideration of any formal comments from the community on the Proposed Remedial Action Plan.

A summary of the comparative analysis of alternatives is provided in Table 2-2.

Overall Protection of Human Health and the Environment

An alternative must meet this threshold criterion to be eligible for selection. As discussed in Section 2.6, this interim action is necessary to address risks posed by SWMU 2. Alternative 1 does not meet this criterion since it does not address the risks at SWMU 2. Alternative 2 does not meet this criterion because short-term risks associated with direct contact to contaminants would be mitigated, long-term risks associated with contamination of ground water would not be addressed. Alternative 3 would meet this criterion; removal of the contaminants, treatment, and disposal at a secure, permitted facility would eliminate nearly all risks. Alternative 4 would also meet this criterion; direct contact would be mitigated, surface water infiltration from precipitation events would be significantly reduced, and dewatering would ensure the wastes are not in contact with water in the UCRS and provide protection of the RGA. Similarly, Alternative 5 would meet this criterion; the cap and institutional controls would physically and administratively mitigate direct contact, and infiltration of precipitation would be reduced, while additional data is collected to support evaluation of a final action.

Compliance with Applicable or Relevant and Appropriate Requirements

An alternative must meet this threshold criterion to be eligible for selection. Alternatives 1 and 2 would not provide compliance with ARARs since risks to ground water would not be reduced. Alternatives 3, 4, and 5 would provide compliance with ARARs. A detailed description of ARARs for the selected remedy is presented in Section 2.10 of this ROD.

Long-Term Effectiveness and Permanence

This criterion is generally not pertinent to measures implemented as interim actions. However, the selected interim remedial action is expected to prove effective until a final remedial action is implemented. Alternative 3 would meet this criterion; excavation, treatment of wastes, and disposal at a secure permitted facility would provide long-term effectiveness and permanence. Alternative 4 would meet this criterion also; a cap and continuous dewatering of the unit would provide long-term effectiveness. Alternative 5 also would meet this criterion until a final remedial action is implemented. Based on leaching model results from the FS, the estimated time it will take for TCE to migrate from the UCRS to the RGA without the proposed cap is from 35 to 156 years. Placement of a cap to reduce infiltration into the waste may significantly increase that amount of time. Uranium would require an even longer period to dissolve and leach to the RGA.

Table 2-2. Comparative Analysis of Alternatives

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Excavation, Treatment, and Storage/Disposal	Alternative 4 Low Permeability Cap, Dewatering, Additional Monitoring, and Institutional Controls	Alternative 5 Low Permeability Cap, Additional Monitoring, and Institutional Controls
Threshold Criteria					
Overall Protection of Human Health and the Environment	No reduction in risk to human health or the environment	Short-term, direct contact risk mitigated Long-term, ground water pathway risk not addressed	All risks mitigated by removal of source Wastes treated and stored/disposed in a permitted, secure facility	Direct contact risk mitigated by cap and institutional controls Infiltration of precipitation into wastes significantly reduced by cap Risk to ground water significantly reduced Dewatering ensures waste is not in contact with UCRS water	Direct contact risk mitigated by cap and institutional controls Infiltration of into wastes significantly reduced by cap Risk to ground water significantly reduced
Compliance with ARARs	Would not comply with ARARs	May not comply with ARARs	Would comply with ARARs	Would comply with ARARs	Would comply with ARARs
Primary Balancing Criteria					
Long-term Effectiveness and Permanence	Source would not be removed or contained; existing risk will remain	Interim action, however, source would not be removed or contained; existing risk to ground water will remain until final action implemented	Source would be removed; maximum risk reduction level would be achieved Wastes would be treated and stored/disposed at permitted, secure facility(ies)	Interim action, however, source would not be removed; some risk would remain Source would be partially contained to reduce some risks until final action implemented Cap and continuous dewatering would provide long-term effectiveness Some future contaminant migration would be possible Ground water monitoring program implemented to detect any contaminant releases	Interim action, however, source would not be removed; some risk would remain Does not address risk posed by wastes which may be in contact with UCRS ground water Source would be partially contained to reduce some risks until final action implemented; limited to vadose zone Ground water monitoring program implemented to detect any contaminant releases

Table 2-2. Comparative Analysis of Alternatives (continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Excavation, Treatment, and Storage/Disposal	Alternative 4 Low Permeability Cap, Dewatering, Additional Monitoring, and Institutional Controls	Alternative 5 Low Permeability Cap, Additional Monitoring, and Institutional Controls
Primary Balancing Criteria (continued)					
Reduction of Toxicity, Mobility, or Volume through Treatment	No reduction	Interim action; no reduction	<p>Toxicity reduced through treatment</p> <p>Mobility reduced by excavation and treatment</p> <p>Volume may or may not be reduced through treatment</p>	<p>Mobility reduced as a result of cap and dewatering</p> <p>Toxicity and volume of contaminants in extracted water reduced through treatment</p>	<p>Some future contaminant migration would be possible</p> <p>Interim action, however, mobility of wastes in unsaturated zone should be reduced to some extent as a result of cap</p>
Short-term Effectiveness	Short-term risks to community, workers, and environment not increased	<p>Short-term risks to community and environment not increased</p> <p>Risk to workers would be mitigated with standard health and safety precautions</p> <p>Objectives achieved in relatively minimal time</p>	<p>Short-term risks to community would be minimal</p> <p>Although health and safety precautions would be taken, increased risk to workers from pyrophoric uranium is significant and has been determined to be unacceptable</p> <p>Although risk would be minimized by use of engineering controls, risk to environment (including ground water and surface water) would be increased</p> <p>Objectives may be achieved within three years</p>	<p>Short-term risks to community would be minimal</p> <p>Risk to workers mitigated with standard health and safety precautions; installation of drainage trench poses greater risk than installation of well points</p> <p>Risk to environment minimized by use of engineering controls</p> <p>Objectives may be achieved within two to three years, but sooner than with Alternative 3</p>	<p>Short-term risks to community not increased</p> <p>Risk to workers mitigated with standard health and safety precautions (poses less risk than Alternative 3 or 4)</p> <p>Any risk to environment would be minimized by use of engineering controls</p> <p>Objectives would be achieved sooner than with Alternative 4</p>

Table 2-2. Comparative Analysis of Alternatives (continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Excavation, Treatment, and Storage/Disposal	Alternative 4 Low Permeability Cap, Dewatering, Additional Monitoring, and Institutional Controls	Alternative 5 Low Permeability Cap, Additional Monitoring, and Institutional Controls
Primary Balancing Criteria (continued)					
Implementability	Not applicable	Technically and administratively feasible Services are readily available	Technically feasible; may require additional information/study Administratively feasible Excavation services are readily available; treatment services for some COCs are available; off-site disposal is considered available; on-site disposal is currently unavailable	Technically feasible and most services are readily available; construction of drainage trenches (to an estimated depth of 30 feet) may require innovative techniques Administratively feasible; regulatory approval required to deposit excavated soils and/or well cuttings on unit as contour material for cap	Technically feasible; services are readily available Administratively feasible; regulatory approval required to deposit any excavated soils and/or well cuttings on unit as contour material for cap

Table 2-2. Comparative Analysis of Alternatives (continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Excavation, Treatment, and Storage/Disposal	Alternative 4 Low Permeability Cap, Dewatering, Additional Monitoring, and Institutional Controls	Alternative 5 Low Permeability Cap, Additional Monitoring, and Institutional Controls
Primary Balancing Criteria (continued)					
Cost (K = 1,000) (Total cost includes 30 years of O & M) (PW = Present Worth over 30-year period)	No additional costs	Capital cost: \$215K 1 st year O&M: \$3,377K Total cost: \$5,197K PW: \$2,591K	<u>With on-site disposal</u> Capital cost: \$69,579K 1 st year O&M: \$0 Total cost: \$508,511K PW: \$236,650K <u>With off-site disposal</u> Capital cost: \$69,586K 1 st year O&M: \$0 Total cost: \$564,311K PW: \$288,862K	<u>With RCRA cap and well points</u> Capital cost: \$6,319K 1 st year O&M: \$1,031K Total cost: \$29,049K PW: \$16,708K <u>With RCRA cap and drainage trench</u> Capital cost: \$4,923K 1 st year O&M: \$1,031K Total cost: \$23,224K PW: \$13,403K <u>With low permeability cap and drainage trench</u> Capital cost: \$3,970K 1 st year O&M: \$1,031K Total cost: \$22,034K PW: \$12,208K	<u>With RCRA cap (for comparison only)</u> Capital cost: \$3,240K 1 st year O&M: \$165K Total cost: \$8,337K PW: \$5,846K <u>With low permeability cap (Cap option 1)</u> Capital cost: \$2,825K 1 st year O&M: \$76K Total cost: \$5,380K PW: \$4,004K <u>With low permeability cap (Cap option 2)</u> Capital cost: \$2,946K 1 st year O&M: \$76K Total cost: \$5,531K PW: \$4,114K <u>With low permeability cap (Cap option 3)</u> Capital cost: \$2,615K 1 st year O&M: \$76K Total cost: \$5,117K PW: \$3,761K

Table 2-2. Comparative Analysis of Alternatives (continued)

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Limited Action	Alternative 3 Excavation, Treatment, and Storage/Disposal	Alternative 4 Low Permeability Cap, Dewatering, Additional Monitoring, and Institutional Controls	Alternative 5 Low Permeability Cap, Additional Monitoring, and Institutional Controls
Modifying Criteria					
State Acceptance	The KDEP concurs with implementing Alternative 5 as an interim remedial action, consistent with the requirements of the Hazardous Waste Management Permit.				
Community Acceptance	As indicated in Part 3 of this ROD, the Responsiveness Summary, no groups or organizations opposed the proposed interim remedial action, Alternative 5.				

This modeling does not account for buried wastes which may potentially be in contact with water in the UCRS. Alternatives 4 and 5 would allow sufficient time to collect additional data and evaluate a final action. Long-term effectiveness and permanence will be fully addressed when a final remedial action for SWMU 2 is evaluated and selected.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment

Alternative 3 would meet this criterion; mobility of contaminants would be reduced as a result of excavation; and toxicity would be reduced through treatment. Alternative 4 would not meet this criterion; although mobility would be significantly reduced as a result of dewatering. Alternative 5 would not meet this criterion either, although mobility of contaminants in the unsaturated/vadose zone would be reduced as the cap reduces infiltration. This criterion will also be addressed when a final action for SWMU 2 is evaluated and selected.

Short-Term Effectiveness

Alternative 3 would not meet this criterion; although appropriate safety measures would be utilized, excavation of wastes from SWMU 2 (including pyrophoric uranium) would produce significant risks to workers. Risks to ground water, surface water, and the environment would also be increased during implementation of Alternative 3. Alternative 4 would likely meet this criterion; utilization of appropriate safety measures during trench and cap installation should prevent significant risks to workers and the environment. Alternative 5 would meet this criterion; utilization of appropriate safety measures and best management practices (BMPs) would mitigate risks to workers and the environment during construction of the cap and installation of the monitoring wells and piezometers. None of the five alternatives would present significant risks to a nearby community.

Implementability

Alternative 3 would be implementable; although it is technically and administratively feasible, significant health and safety concerns exist. Alternative 4 would be feasible; innovation would be required to efficiently construct the drainage trenches to the proposed depth of 9.2 m (30 ft). Alternative 5 is readily implementable; it is technically and administratively feasible and the services required for implementation are readily available from a number of vendors/suppliers.

Cost

Estimated capital, 30-year O&M, and 30-year present worth costs for each alternative, including the options considered for the third, fourth, and fifth alternatives, are presented in Table 2-2.

State Acceptance

This interim remedial action will be initiated pursuant to the Interim Measure provisions of PGDP's Kentucky Hazardous Waste Management Permit issued by the KDEP. An RI Addendum, FS, and Proposed Remedial Action Plan, have been approved by the KDEP and the EPA. The KDEP concurs with this interim remedial action, consistent with the requirements of the Hazardous Waste Management Permit.

Community Acceptance

As indicated in Part 3 of this ROD, the Responsiveness Summary, no groups or organizations opposed this interim remedial action.

2.9 Selected Remedy

Based upon the evaluation of the alternatives utilizing the nine CERCLA criteria, the remedy which best meets the threshold, balancing, and modifying criteria for the scope and objectives of this interim action is Alternative 5. This alternative has been refined through a series of negotiations and meetings between the DOE, the EPA, and the KDEP from that presented in the approved FS. The modifications presented in the selected remedy will allow greater flexibility, expedited field investigation activities, and promote an incremental approach to implementation of the interim remedial action. The DOE will prepare a detailed design for this interim remedial action in accordance with the requirements specified in the Declaration of this ROD. The remedial design and remedial action phase activities for the interim action will be finalized following completion of additional investigative activities planned for SWMU 2. A schedule of remedial design activities is presented in the appendix of this ROD.

The selected remedy will consist of the following elements, at a minimum:

- *A low permeability, multilayered cap constructed over the areal limits of SWMU 2.* The cap will be designed to direct rainfall away from the unit and inhibit infiltration of precipitation into the unit. The cap will also serve as a physical barrier to inhibit direct contact with buried waste materials and soil contamination. The conceptual capping option may consist of compacted soil as contour material, a geosynthetic clay liner, a geomembrane liner, and a drainage layer with a vegetative soil cover.
- *A ground water monitoring program implemented in the uppermost aquifer, the RGA, to detect the potential release of contaminants from SWMU 2.* The monitoring program will also evaluate the cap's effect(s) on the shallow ground water level in the UCRS and fill data gaps. Any waste soil generated during sampling and remedial action activities will be managed within the limits of SWMU 2 and placed on the unit as contour material for the cap. All other wastes [such as personal protective equipment (PPE)] will be initially containerized and managed at the PGDP in accordance with approved protocols.
- *Institutional controls implemented to further prevent access to SWMU 2.* Deed restrictions may be utilized to ensure the DOE retains ownership of the property which SWMU 2 encompasses. Deed restrictions also may prevent future uses of the property which could result in the spread of contamination, such as installing wells or excavating. Since contaminants will remain in the unit following this interim remedial action, the DOE will conduct administrative reviews of the action and monitoring data no less than once every five years, at least until a final remedial action has been selected and/or implemented for SWMU 2.

This action will provide overall protection of human health and the environment. It also can be implemented in compliance with ARARs. This interim action will provide effectiveness until a final remedy is enacted at SWMU 2. Although treatment will not be employed, contaminant mobility will be reduced as a result of reduced infiltration. This alternative will provide short-term effectiveness and may be readily implemented. As

shown in Table 2-3, the total estimated cost for this alternative and cap option is \$5,117,000 (present value of \$3,761,000).

Table 2-3. Cost Estimates for Interim Action

Direct Costs	\$1,184 K	
Indirect Costs	\$1,431 K	
<u>Total Capital Costs^a</u>		<u>\$2,615 K</u>
O&M Costs ^a Year 1	\$76 K	
O&M Costs Years 2-30	\$1,350 K	
5-Year Review Costs	\$54 K	
<u>Total O&M Costs</u>		<u>\$1,480 K</u>
<u>Total Contingency^b</u>		<u>\$1,022 K</u>
Total Cost ^c		\$5,117 K
Present Value ^d		\$3,761 K
K=1,000		

a - Capital costs for cap only; monitoring well and piezometer capital costs incorporated into first year O&M.

b - Total contingency is conclusive of direct, indirect, and all O&M costs associated contingencies.

c - Cost estimates intended to be consistent with EPA guidance which recommends a +50% to -30% level of accuracy.

d - Present value estimates based on a 30-year time span with a 7% discount rate.

2.10 Statutory Determinations

This interim action is protective of human health and the environment; complies with CERCLA [as amended by Superfund Amendments and Reauthorization Act of 1986 (SARA)], statutory requirements of K.R.S. 224.46-530 and federal and state ARARs directly associated with this action; and is cost effective. This action uses permanent solutions to the maximum extent practicable, given the limited scope of the action. Because this action does not constitute the final remedy for SWMU 2, the statutory preference for remedies employing treatment that reduces toxicity, mobility, or volume through treatment as principal elements will be addressed at the time of selection of the final response action. Subsequent actions are planned to fully address the principal threats posed by SWMU 2.

Overall Protection of Human Health and the Environment

The selected interim action contributes to protection of human health for the PGDP employees and the public through institutional controls to limit the potential for direct exposure and engineering controls to mitigate the infiltration and migration of

contaminants from SWMU 2 until a final action is selected and implemented. The remedy provides effective management of all residual wastes generated during implementation of the action.

Applicable or Relevant and Appropriate Requirements

Congress specified in Section 121 of CERCLA that remedial actions for cleanup of hazardous substances must comply with requirements, criteria, standards, or limitations under federal or more stringent state environmental laws that are applicable or relevant and appropriate to the hazardous substances or circumstances at a site. Inherent in the interpretation of ARARs is the assumption that protection of human health and the environment is ensured.

The following is an explanation of the terms used throughout this section:

Applicable requirements are “those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site” (40 C.F.R. § 300.5).

Relevant and appropriate requirements are “those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site” (40 C.F.R. § 300.5).

Chemical-specific requirements are usually “health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, result in the establishment of numerical values” (53 Fed. Reg. 51437, 1988). These values establish the acceptable amount or concentration of a chemical that may remain in, or be discharged to, the ambient environment.

Location-specific requirements “generally are restrictions placed upon the concentration of hazardous substances or the conduct of activities solely because they are in special locations” (53 Fed. Reg. 51437, 1988). Some examples of special locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats.

Action-specific requirements are usually “technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes or requirements to conduct certain actions to address particular circumstances at a site” (53 Fed. Reg. 51437, 1988). Selection of a particular remedial action at a site will invoke the appropriate action-specific ARARs that may specify particular performance standards or technologies, as well as specific environmental levels for discharged or residual chemicals.

The CERCLA requires that the RCRA and other environmental laws be evaluated as ARARs [42 U.S.C.A. § 9621(d)(2)(A) and 40 C.F.R. § 300.430(f)(1)(i)(A)]. This in no way limits, takes away, or negates the KDEP’s RCRA authority at the PGDP.

Requirements under federal or state law may be either applicable or relevant and appropriate to CERCLA cleanup actions, but not both. However, if a requirement is not

applicable it must be both relevant and appropriate for compliance to be necessary. In the cases where both a federal and a state ARAR are available, or where two potential ARARs address the same issue, the more stringent regulation must be selected. However, CERCLA § 121(d)(4) provides several ARAR waiver options that may be invoked, providing that the primary requirement for protection of human health and the environment is met.

Pursuant to CERCLA § 121(e), remedial actions under CERCLA conducted entirely onsite (as defined in 40 C.F.R. § 300.5) must comply with the substantive provisions of laws and regulations, but are exempt from the procedural or administrative requirements [42 U.S.C.A. § 962(e)(1)]. In order to ensure that CERCLA response actions proceed as rapidly as possible, the EPA has affirmed its position on permit and administrative exemptions in the final NCP (40 C.F.R. § 300). Substantive requirements pertain directly to the actions or conditions at a site, while administrative requirements facilitate their implementation (e.g., permit applications and procedural requirements).

Other information that does not meet the definition of an ARAR may be necessary to determine what is protective or may be useful in developing CERCLA remedies. In addition, ARARs do not exist for every chemical or circumstance likely to be found at a CERCLA site. Therefore, the EPA believes it may be necessary, when determining cleanup requirements or designing a remedy, to consult reliable information that would not otherwise be considered a potential ARAR (55 Fed. Reg. 8745, 1990). Criteria or guidance developed by the EPA, other federal agencies, or states may assist in determining, for example, health-based levels for a particular contaminant or the appropriate method for conducting an action for which there are no ARARs. This other information is to be considered (TBC) guidance and may be used when developing CERCLA remedies. The TBC guidance generally falls within three categories: (1) health effects information; (2) technical information on how to perform or evaluate investigations or response actions; and (3) policy.

Response actions under the NCP will comply with the provisions for response action worker safety and health in 29 C.F.R. § 1910.120 (40 C.F.R. § 300.150). These regulations are designed to protect the safety and health of workers; however, they are not considered ARARs. Requirements, standards, and regulations of the Occupational Safety and Health Act of 1970 (29 U.S.C. § 651 *et seq.*) and of state laws, not directly referenced in Section 300.150 of the NCP must also be complied with where pertinent. Federal Occupational Safety and Health Administration requirements include, among other things, construction standards, general industry standards, and general duty requirements (40 C.F.R. § 300.150). In addition, Section 300.150 of the NCP specifies that all government agencies and private employers are directly responsible for the health and safety of their own employees.

The DOE, in DOE Order 5480.4, *Environmental Safety and Health Standards*, establishes requirements for mandatory environmental protection, safety, and health standards for all DOE and DOE contractor operations while providing a list of references and sources of Environmental Safety and Health standards. This is an internal standard for the protection of workers within the DOE and is not an ARAR. The DOE Order should be followed during design, construction, operation, modification and decommissioning.

In addition to establishing general occupational protection standards, the DOE establishes standards for occupational radiation protection of workers at its facilities in 10 C.F.R. § 835. Pursuant to this regulation, exposure of general employees resulting from the DOE activities, other than planned special exposure or emergency exposure situations, shall be controlled so the following annual dose limits are not exceeded: total

effective dose equivalent of 5 rems; the sum of the deep dose equivalent for external exposures and the committed dose to any organ or tissue other than the lens of the eye of 50 rems; a lens of the eye dose equivalent of 15 rems; and a shallow dose equivalent of 50 rems to the skin or to any extremity. Again, DOE Orders pertaining to worker protection are internal standards and are not ARARs.

Potential chemical-, location-, and action-specific requirements which exist for this interim action are described in the following paragraphs.

Chemical-specific applicable or relevant and appropriate requirements

Radiation Protection of the Public and the Environment, DOE Order 5400.5, limits radiation exposure to members of the public to an effective dose equivalent of less than 100 millirems/year (mrem/yr) from all exposure modes and a dose of less than 5 mrem/yr to any organ. The Order regulates exposure of the public as a consequence of all the DOE activities, including routine activities, remedial actions, and naturally occurring radionuclides released by the DOE processes and operations. In addition, this Order mandates that the DOE personnel and contractors shall strive to ensure that radiation doses to members of the public are as low as reasonably achievable below the appropriate limits. The DOE Order 5400.5 is TBC guidance for the radioactive waste that is left in place at SWMU 2. However, this Order is expected to be promulgated in the Code of Federal Regulations (C.F.R.) in August 1995 and will become an applicable requirement for the PGDP upon promulgation.

On-site activities involved with construction of the cap such as site grading and smoothing, earthmoving, and material stockpiles (i.e., clay, soil, etc.) will produce airborne pollutants. It is not expected that any radionuclide emissions will result from the site preparation of SWMU 2. However, if radionuclide emissions were to occur, emission standards for DOE facilities would apply. The regulations promulgated pursuant to the Clean Air Act of 1970 (CAA) set emission standards for radionuclides other than radon from the DOE facilities. The DOE is required to ensure that emissions from its facilities shall not exceed those amounts that would cause any member of the public to receive, in any year, an effective dose equivalent of 10 mrem/yr (40 C.F.R. § 61.92). The regulations in 40 C.F.R. § 61.92 are applicable requirements to DOE facilities. Also, *Radiation Protection of the Public and the Environment*, DOE Order 5400.5, and *Radioactive Waste Management*, DOE Order 5820.2A, which are TBC Guidance, refer to the CAA for emission level standards for radionuclides.

Location-specific applicable or relevant and appropriate requirements

No wetlands have been identified in the area of the proposed action. However, potential wetlands have been identified in adjacent drainage ditches. These ditches run east and west parallel to Virginia Avenue, and north and south parallel to the access road east of SWMU 3. Final wetland determination for these areas was not possible due to health and safety restrictions denying access to any ditches located on the PGDP. Consequently, for the purposes of this section, these areas are considered to be wetlands. Therefore, location-specific ARARs pertaining to wetlands are included in the event these areas are identified as wetlands in the future. Also, a functions and values analysis of these wetlands was completed to assess these areas in their present condition for possible ARAR purposes should they be identified as wetlands in the future.

Although all ARARs discussed in this section are applicable, they will be met by avoidance of the resources. However, if impacts become apparent, due to construction or other plan modifications, additional requirements (e.g., final wetland determination

and meeting ARARs) will need to be addressed and/or initiated to comply with the ARARs.

Construction of the cap must avoid or minimize adverse impacts on wetlands and act to preserve and enhance their natural and beneficial values [Executive Order 11990, 40 C.F.R. § 6.302(a), 40 C.F.R. Part 6; Appendix A, and 10 C.F.R. Part 1022].

Construction in wetlands should be avoided unless there are no practicable alternatives [40 C.F.R. § 6.302(a)]. Degradation or destruction of wetlands must be avoided to the extent possible [40 C.F.R. § 230.10 and 33 U.S.C.A. § 1344(b)(1)]. Considerations about protection of wetlands must be incorporated into planning, regulating, and decision-making [10 C.F.R. § 1022.3(b)]. Any action involving the discharge of dredged or fill material into wetlands must be avoided to the extent possible (33 U.S.C.A. § 1344, 40 C.F.R. Part 230, and 33 C.F.R. Parts 320 to 330).

Discharges of dredged or fill material for which there are practicable alternatives with fewer adverse impacts, or those which would cause or contribute to significant degradation, are prohibited [40 C.F.R. § 230.10(a)]. Discharges are also prohibited unless there are no practicable alternatives, and practicable, appropriate mitigation methods are available [40 C.F.R. § 230.10(d)]. Further, 40 C.F.R. § 230.10(b) prohibits discharges that cause or contribute to violations of state water quality standards, violate toxic effluent standards or discharge prohibitions (33 U.S.C.A. § 1317), or jeopardize threatened or endangered species or their critical habitat under the Endangered Species Act (16 U.S.C.A. § 1531, *et seq.*). If it becomes apparent that impacts to wetlands are unavoidable, due to construction plans or other modifications, the specific requirements of 33 C.F.R. § 330 (nationwide permits), or 33 C.F.R. § 325 (processing of general permits), and statutes governing discharges of dredged or fill material into waters of the United States would become applicable.

Action-specific applicable or relevant and appropriate requirements

On-site construction activities involved with the construction of the cap, such as site grading and smoothing, earthmoving, and material stockpiles (i.e., clay, soil, etc.) will produce airborne pollutants. Although SWMU 2 is well within the DOE property boundary, precautions must be taken to prevent particulate emission levels caused by construction activities from exceeding the Kentucky Air Quality regulations found in 401 K.A.R. 63:010 *et seq.* The Kentucky Air Quality regulations contain general standards of performance governing fugitive dust emissions (401 K.A.R. 63:010 *et seq.*). Most roads leading to SWMU 2 are asphalt or concrete and traffic would not create dust; however, in the event that roads made of dirt or gravel were used, the regulations in 401 K.A.R. 63:010 § 3(1) require the use of water or chemicals, if possible, and/or placement of asphalt or concrete on roads and material stockpiles to control dust. Visible fugitive dust must not be discharged beyond the property line of where the dust originated [401 K.A.R. 63:010 § 3(2)]. Additionally, all open bodied trucks which operate outside the property boundary and which may emit materials that could be airborne must be covered [401 K.A.R. 63:010 § 3(4)]. This regulation would be applicable.

Storm water discharges from construction activities onsite at the PGDP will be regulated by the KPDES Permit (KY00004049) established pursuant to 401 K.A.R. 5:055. Remedial activities will generate storm water runoff from SWMU 2 into Outfall 015 which is regulated by the KPDES Permit. The PGDP is exempted from the Kentucky General Permit for Storm Water Point Sources (KYR 100000) under 401 K.A.R. 5:055 because it has an individual KPDES Permit. Pursuant to 401 K.A.R. 5:055, the PGDP's KPDES

Permit specifies that BMPs and sediment and erosion controls be implemented at a site to control stormwater runoff.

The interim remedial action may involve the installation of monitoring wells which are regulated under 401 K.A.R. 6:310 § 13. Under this regulation, monitoring wells must be installed to maintain existing natural protection against the introduction of pollutants into aquifers and to prevent the entry of pollutants through the borehole [401 K.A.R. 6:310 § 13(2)]. In addition, the well shall be constructed to prevent the intermingling of ground water from different aquifers [401 K.A.R. 6:310 § 13(2)].

Pursuant to 401 K.A.R. 6:310 § 13, the appropriate materials for the purpose of the well shall be used during the construction of monitoring wells. In order to prevent pollution of the ground water samples, the annular space above the sampling depth shall be sealed with a suitable material, such as cement grout or bentonite [401 K.A.R. 6:310 § 13(3)]. Also, the well shall be completed at least four inches above the ground level or have a waterproof flush mount device capable of preventing surface water runoff, pollutants and contaminants from entering the well [401 K.A.R. 6:310 § 13(3)]. The well shall also have a locking cap within 30 days of its construction [401 K.A.R. 6:310 § 13(3)]. Lastly, monitoring wells must be properly abandoned within 30 days of the last sampling date or upon the determination that the well is found to be inadequate [401 K.A.R. 6:310 § 13(6)]. The Kentucky regulations for monitoring well construction are applicable to the well installation involved with this interim remedial action.

This interim remedial action will generate a minimal amount of waste. The waste generated from the installation of the two piezometers and ground water monitoring wells will likely be managed within the operable unit and placed on SWMU 2 as part of the low permeability, multilayered cap. However, there is a remote possibility that PPE worn by workers during site preparation and construction activities would be determined to be hazardous or radioactively contaminated waste. The remaining ARARs in this section will only apply in the event that PPE is determined to be RCRA hazardous or in the event that soil is not managed inside of SWMU 2 and is determined to be RCRA hazardous.

Although the waste will be left in place and capped, there may be excess soil and PPE from site grading and smoothing and from well installation that will need to be managed and ultimately disposed. Regardless of the amount, the excess waste will be stored in accordance with applicable ARARs. The PPE and any soil not placed in the cap will be characterized to determine if the waste is RCRA hazardous 401 K.A.R. 34:020 § 4 and/or radioactive. If the excess material is hazardous, then it will be containerized and stored onsite or shipped offsite for treatment or disposal.

Pursuant to 401 K.A.R. 32:030 § 5, on-site accumulation of hazardous waste may occur for 90 days or less without being placed in a RCRA permitted storage area, if the waste is placed in containers that comply with 401 K.A.R. 35:180. The regulation requires that containers holding the waste be in good condition (401 K.A.R. 35:180 § 2). Also, the waste must be stored in containers lined with materials that are compatible (401 K.A.R. 35:180 § 3). Furthermore, containers must be managed to ensure that: the containers are always closed during storage, except when necessary to add or remove waste; containers are not opened, handled, or stored in any manner which may rupture the container or cause it to leak; and the containers are labeled with the notation "Hazardous Waste" and the date upon which the accumulation began (401 K.A.R. 35:180 § 4). Also, inspections must be conducted at least weekly to determine if there are leaks or deterioration of the containers (401 K.A.R. 35:180 § 5). These selected requirements in 401 K.A.R. 35:180 are applicable to the management of hazardous waste

stored onsite for less than 90 days if any RCRA hazardous waste is derived from this action.

Only a remote possibility exists that excess soils and PPE would be contaminated with ignitable, reactive, or incompatible waste that would need to be managed. If such wastes are excavated during this remedial action, special precautions must be taken when managing ignitable, reactive, or incompatible wastes. Containers holding ignitable or reactive waste must be located at least 15 m (49 ft) from the facility's property line (401 K.A.R. 35:180 § 6). In addition, potentially incompatible wastes (as defined in 401 K.A.R. 35:030) must not be placed in the same container or be placed in an unwashed container that previously held an incompatible waste, unless there is compliance with 401 K.A.R. 35:020 § 8 (2) [401 K.A.R. 35:180 § 7(1)-(2)]. Lastly, a container holding hazardous waste that is incompatible with any waste or other materials stored nearby must be separated from the other materials by means of a dike, berm, wall, or other device [401 K.A.R. 35:180 § 7(3)]. These requirements apply when ignitable, reactive, or incompatible waste is stored onsite for less than 90 days.

If waste is accumulated onsite for more than 90 days, it will be stored in a permitted facility and the requirements in 401 K.A.R. Chapter 34 and the permit requirements in Chapter 38 would apply. However, on-site accumulation of as much as 55 gal of hazardous waste or one quart of acutely hazardous waste may occur for more than 90 days, provided §§ 2, 3, and 4(1) of 401 K.A.R. 35:180 are followed and the containers are marked with the notation "Hazardous Waste" [401 K.A.R. 32:030 § 5(3)(a)]. These requirements are applicable to on-site storage of hazardous waste for more than 90 days.

Radioactive Waste Management, DOE Order 5820.2A, establishes policies, guidelines, and requirements by which the DOE manages its radioactive and mixed waste and contaminated facilities. The Order ensures that radioactive and mixed wastes shall be managed in a manner which protects the health and safety of the public, DOE employees, contractor employees, and the environment. This Order requires a standard that assures that external exposure to the waste and concentrations of radioactive material which may be released into surface water, ground water, soil, plants, and animals results in an effective dose equivalent that does not exceed 25 mrem/yr to any member of the public. If excess soils and PPE derived from the installation of the low permeability cap and monitoring wells are determined to be radioactively contaminated or mixed waste, this Order would be TBC guidance for the management of those materials. The external exposure limits of this Order would be TBC guidance for the radioactive waste left in place.

The DOE Order 5820.2A applies to the management of LLW and the design, operational, and monitoring requirements for disposal of solid LLW containing no RCRA-regulated materials. The Order specifies that waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable. While there is only the slightest possibility that pyrophoric material will be excavated for well installation, the DOE Order 5820.2A would be TBC guidance were such material encountered.

Contaminated PPE from site preparation activities or any soil not placed atop SWMU 2 may be determined to be RCRA land disposal restricted. Pursuant to 401 K.A.R. 37:050 and 40 C.F.R. § 268.50, the storage of hazardous wastes restricted from land disposal under 401 K.A.R. 37:030 is prohibited, unless the generator stores such wastes in tanks, containers, or containment buildings onsite solely for the purpose of accumulating such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal. Such storage must be in compliance with the requirements in 401 K.A.R. 32:030

§ 5 and 401 K.A.R. Chapter 34. Furthermore, each container must be clearly marked with the identification of its contents, the date each accumulation period began, and the quantity of each hazardous waste (401 K.A.R. 37:050). These regulations apply to the management of hazardous wastes prohibited from land disposal that are stored onsite. The PGDP has a Part B Permit which abides by these standards.

Movement of residuals containing RCRA characteristically hazardous waste and/or mixed waste that are land-disposal restricted outside of SWMU 2 may trigger the land disposal restrictions (LDRs) documented in 401 K.A.R. 37:030. The DOE and the EPA entered into a Federal Facility Compliance Agreement (FFCA) Docket No. 92-03-FFR on June 30, 1992, to allow for the continued storage of radioactive mixed waste containing an LDR-prohibited hazardous waste component while treatment capacity is being developed. The FFCA governs all wastes generated at the PGDP. The LDR requirements will only apply to restricted waste not managed within SWMU 2. In the unlikely event LDR waste is generated from this interim action and managed outside SWMU 2, the waste will be subject to and managed consistent with the FFCA.

A summary of ARARs for this remedial action is presented in Table 2-4.

Cost Effectiveness

This interim remedial action employs a remedy which provides overall effectiveness to prevent further spread of contamination while being proportional to its cost. The action represents the least expensive alternative to reduce surface water infiltration from precipitation and future migration of the contaminants while a final remedy is being devised. Compared to other cap options, such as the RCRA cap, this particular cap is the most cost effective.

Utilization of Permanent Solutions and Alternative Treatment Technologies

The objectives for this interim action are to stabilize the site by instituting the cap to reduce infiltration of leachate through unsaturated waste and to delay the potential breakthrough of uranium to the RGA. With the use of institutional controls, this remedial action should protect human health and the environment. However, since the waste is left in place, the interim remedial action does not fully address the principal threats to human health and the environment posed by this unit. Therefore, the principal threats posed by the current conditions will be fully addressed when a final action for SWMU 2 is evaluated and selected.

Reduction of Toxicity, Mobility, or Volume through Treatment

This remedial action is expected to reduce the mobility of unsaturated wastes at the unit. The volume of water infiltrating through the unit will be significantly reduced as a result of the multilayered cap. Since the waste is not treated or removed, neither the toxicity nor the volume of the waste left in place will be reduced under this interim remedial action. This criterion will be addressed fully when a final action for SWMU is evaluated and selected.

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
CHEMICAL-SPECIFIC				
Protection of the general public from all sources of radiation	General public must not receive an effective dose equivalent greater than 100 mrem/yr or 5 mrem/yr to any organ from all exposure modes.	Dose received by the general public from all sources of radiation exposure at a DOE facility - TBC guidance for the waste left in place	DOE Order 5400.5	
	All releases of radioactive material must be ALARA.	Release of radioactive material from all DOE activities - TBC guidance for the waste left in place	DOE Order 5400.5	
Emission Standards	Emissions from DOE facilities shall not cause members of the public to receive, in any year, an effective dose equivalent of 10 mrem/yr.	Emissions of radionuclides other than radon from DOE facilities - applicable if construction activities at the site produce airborne pollutants - DOE Orders 5820.24A and DOE Order 5400.5 would also be TBC guidance for this requirement	40 C.F.R. § 61.92	

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
LOCATION-SPECIFIC				
Protection of wetlands	Avoid or minimize adverse impacts on wetlands to preserve and enhance their natural and beneficial values.	Any federal action that will have an impact on wetlands - applicable if avoidance is not accomplished	10 C.F.R. § 1022; Executive Order 11990; 40 C.F.R. § 6:302 (a)	
	Avoid degradation or destruction of wetlands to the extent possible.	Any action involving discharge of dredged or fill material into wetlands - applicable if avoidance is not accomplished	40 C.F.R. § 230.10; 33 U.S.C.A. § 1344 (b)(1)	
	Incorporate considerations about protection of wetlands into planning, regulating, and decisionmaking.	Any federal action that will have an impact on wetlands - applicable if avoidance is not accomplished	10 C.F.R. § 1022.3(b)	

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
Discharge of dredged or fill material into waters of the United States	Discharges for which there are practicable alternatives with fewer adverse impacts or those which would cause or contribute to significant degradation are prohibited.	Any action involving discharge of dredged or fill material into wetlands - applicable if avoidance is not accomplished	40 C.F.R. § 230.10(a)	
	Significant degradation is also prohibited unless there are practicable alternatives and practicable, appropriate mitigation methods are available.	Any action involving discharge of dredged or fill material into wetlands - applicable if avoidance is not accomplished	40 C.F.R. § 230.10(d)	
	Discharges which cause or contribute to violations of state water quality standards, violate toxic effluent standards or discharge prohibitions, or jeopardize threatened and endangered species under the Endangered Species Act.	Any action involving discharge of dredged or fill material into wetlands - applicable if avoidance is not accomplished	40 C.F.R. § 230.10(b); 33 U.S.C.A. § 1317; 16 U.S.C.A. § 1531	
	Unavoidable discharges can be permitted with a general or nationwide Section 404 Permit.	Any action involving discharge of dredged or fill material into wetlands - applicable if avoidance is not accomplished	33 U.S.C.A. 1344; 33 C.F.R. § 330; 33 C.F.R. § 325	

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
ACTION-SPECIFIC				
Site preparation	Although SWMU 2 is well within the plant boundary, precautions must be taken to prevent particulate matter from becoming airborne.	Handling, processing, construction, road grading, stockpiles, and land clearing activities - applicable if it is determined that airborne dust will reach the plant fence		63:010 § 3
	A responsible party must:			
	<ul style="list-style-type: none"> • Use water or chemicals to control dust from construction activities and place asphalt, oil, water, or suitable chemicals on roads and material stockpiles to control dust; 			63:010 § 3 (1)(a); 63:010 § 3 (1)(b)
	<ul style="list-style-type: none"> • Ensure that no visible fugitive dust is emitted beyond the property line; and 			63:010 § 3(2)
	<ul style="list-style-type: none"> • Ensure that all open bodied trucks are covered if any materials in truck could become airborne. 			63:010 § 4(1)
Surface water control	Implement good site planning and best management practices to control storm water discharge; comply with storm water runoff requirements of KPDES Permit KY0004049.	Construction activities at industrial sites where stormwater runoff would occur - applicable		5:055

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
Well installation	Wells must be installed to:	Construction or modification of a monitoring well - applicable		6:310 § 13(2)
	<ul style="list-style-type: none"> • Maintain the existing natural protection against pollutants into the aquifer; 			6:310 § 13(2)
	<ul style="list-style-type: none"> • Prevent the entry of pollutants through the bore-hole; and 			6:310 § 13(2)
	<ul style="list-style-type: none"> • Prevent the intermingling of ground water from different aquifers. 	Construction or modification of a monitoring well - applicable		6:310 § 13(3)
	Certain construction requirements shall be followed, such as:			6:310 § 13(3)
	<ul style="list-style-type: none"> • The annular space shall be sealed with cement grout or bentonite; 			6:310 § 13(3)
<ul style="list-style-type: none"> • Completed at least 4 inches above the ground or have a waterproof mount device; and 			6:310 § 13(6)	
<ul style="list-style-type: none"> • Have a locking well cap within 30 days of its construction. 	Wells should be properly abandoned within 30 days of the last sampling date or the determination is made that the well is unsuitable for use as a monitoring well.		32:010 § 2	
Waste management *		Generators of waste shall determine if it is RCRA hazardous.	Generation of waste material - applicable	40 C.F.R. § 262.11

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
Container storage (onsite) - for less than 90 days *	Containers of hazardous waste must be:	Storage of RCRA hazardous waste (listed or characteristic) not meeting small quantity generator criteria held for a temporary period before treatment, disposal, or storage elsewhere, in a container (i.e., any portable device in which a material is stored, transported, disposed, or handled). A generator who accumulates or stores hazardous waste onsite for 90 days or less in compliance with 40 C.F.R. § 262.34 (a)(1-4) is not subject to RCRA interim or final status storage requirements - applicable to any excavated soil and PPE identified as RCRA hazardous waste	40 C.F.R. § 265.171	35:180 § 2
	• Maintained in good condition;		40 C.F.R. § 265.172	35:180 § 3
	• Compatible with hazardous waste to be stored; and		40 C.F.R. § 265.173(a)	35:180 § 4(1)
	• Closed during storage (except to add or remove waste).		40 C.F.R. § 265.173(b)	35:180 § 4(2)
	Containers must not be handled, opened, or stored in any manner which may rupture the container or cause it to leak.		40 C.F.R. § 265.174	35:180 § 5
	Inspections must be conducted at least weekly to determine leaks or deterioration.		Containers must be labeled with the notation "Hazardous Waste."	35:180 § 4(3)

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
Container storage (onsite) of ignitable, reactive or incompatible waste for less than 90 days. *	Containers holding hazardous waste must be managed so that:	Management of ignitable, reactive or incompatible waste - applicable if any excavated soil or PPE is determined to be ignitable, reactive, or incompatible waste	40 C.F.R. § 265.176	35:180 § 6
	<ul style="list-style-type: none"> Containers are located at least 15 meters from the property boundary; and 		40 C.F.R. § 265.177(a)	35:180 § 7(1)
	<ul style="list-style-type: none"> Incompatible waste are not placed in the same container or placed in an unwashed container that previously held an incompatible waste. 		40 C.F.R. § 265.177(b)	35:180 § 7(2)

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
Waste management *	Must follow the RCRA permit for on-site storage more than 90 days.	Storage of hazardous waste in RCRA permitted storage area	HSWA Permit KY 8-890-008-982	Kentucky Permit KY 8-890-008-982 32:030 § 5(3)(a)
	Hazardous waste may be accumulated for more than 90 days for as much as 55 gallons of hazardous waste or one quart of acutely hazardous waste.	Accumulation of hazardous waste		
	Radioactive and mixed waste shall be managed in a manner which assures the health and safety of the public, the DOE, contractor employees, and the environment.	Management of LLW - TBC Guidance if excavated soil and PPE is determined to be radioactively contaminated	DOE Order 5820.2A	
	External exposure to the waste and concentrations of radioactive material which may be released into surface water, ground water, soil, plants, and animals shall not result in an effective dose equivalent that exceeds 25 mrem/yr to any member of the public.	Management of LLW - TBC Guidance if excavated soil and PPE is determined to be radioactively contaminated	DOE Order 5820.2A	
	Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.	Management of LLW - TBC Guidance if excavated soil or PPE is determined to be pyrophoric	DOE Order 5820.2A	
	Movement of residuals containing RCRA characteristic waste and radionuclides to another unit will trigger LDRs.	Movement of LDR waste from one land disposal unit to another - applicable if LDR restricted waste is excavated from the unit	40 C.F.R. § 268	37:030

**Table 2-4. Applicable or Relevant and Appropriate Requirements
and To Be Considered Guidance for the Interim Remedial Action (continued)**

Actions	Requirements	Prerequisites	Federal Citation	Title 401 K.A.R., Citation
Waste management (continued) *	The storage of hazardous waste restricted from land disposal is prohibited, unless the generator stores such wastes in tanks, containers, or containment buildings onsite solely for the purpose of accumulating such quantities of hazardous waste as necessary to facilitate proper recovery, treatment, or disposal.	Storage of RCRA restricted hazardous waste onsite - applicable to any excavated soil or PPE that is determined to be land disposal restricted hazardous waste	40 C.F.R. § 268.50	37:050
	Containers of land disposal restricted waste must meet other RCRA storage requirements in addition to being clearly marked with the identification of its contents, the date the accumulation began, and the quantity of each waste.	Container storage of LDR waste - applicable if any of the excavated soil or PPE is determined to an LDR waste	40 C.F.R. § 268.50	37:050
	Continued storage of radioactive mixed waste containing an LDR prohibited hazardous waste component is allowed while treatment capacity is being developed.	Storage of radioactive mixed waste onsite - applicable if excavated soil or PPE is determined to be mixed waste	FFCA Docket No. 92-03-FFR	

* These ARARs will only apply if PPE is determined to be RCRA hazardous or excess soil is not managed within the unit.

RCRA listed as an ARAR is a requirement of CERCLA in ROD documentation. By doing this, it in no way limits, takes away, or negates the Commonwealth of Kentucky's RCRA authority at the site.

Permanent Remedy

This action is an interim remedial action. The DOE will collect additional data necessary to evaluate a final remedial action for SWMU 2. The final ROD for SWMU 2 may retain or replace portions or all of the actions conducted pursuant to this ROD. However, actions conducted pursuant to the ROD are not intended to be inconsistent with likely final remedial actions. The interim action defined in this ROD will reduce the threat to human health and the environment while additional characterization information is obtained to fill data gaps. Additional characterization will allow for the evaluation of a final remedy in the future.

2.11 Documentation of Significant Changes

The Proposed Remedial Action Plan for Interim Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 (DOE/OR/06-1315&D3) was made available for a 30-day public review and comment period May 31 through June 29, 1995. The Proposed Remedial Action Plan identified Alternative 5, a low permeability, multilayered cap, additional monitoring, and institutional controls, as the preferred alternative. No written or verbal comments were received during the 30-day public comment period; therefore, no significant changes to the remedy, as identified in the Proposed Remedial Action Plan, were necessary.

2.12 Five-Year Review

This interim action at SWMU 2 will be reviewed periodically until a final remedial action is selected in a ROD. The CERCLA requires remedial actions which result in hazardous substances, pollutants, or contaminants remaining at the site above levels that do not allow for unlimited use and unrestricted exposure, be reviewed no less often than once every five years after initiation of the selected remedial action. This interim remedial action will leave waste in place which will require restricted access; therefore, SWMU 2 will be reviewed no less than once every five years. In addition to the five-year review, the ground water data will be evaluated annually. The ground water monitoring program for SWMU 2 will be specified in the forthcoming sampling and analysis plan, which will be subject to review and approval by the EPA, the KDEP, and the DOE.

PART 3
RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY

3.1 Responsiveness Summary Introduction

The responsiveness summary has been prepared to meet the requirements of Sections 113(k)(2)(b)(iv) and 117 (b) of CERCLA, as amended by SARA, which requires the DOE as "lead agency" to respond "...to each of the significant comments, criticisms, and new data submitted in written or oral presentations" on the Proposed Remedial Action Plan.

The DOE has gathered information on the types and extent of contamination found, evaluated remedial measures, and has recommended an interim remedial action to mitigate leaching of COCs from the buried wastes while the DOE collects additional data to support evaluation of a final remedial action. As part of the remedial action process, a notice of availability regarding the Proposed Remedial Action Plan was published in *The Paducah Sun*, a major regional newspaper of general circulation. The *Proposed Remedial Action Plan for Interim Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 (DOE/OR/06-1315&D3)* was released to the general public May 31, 1995. This document was made available to the public at the Environmental Information Center in the West Kentucky Technology Park in Kevil, Kentucky, and at the Paducah Public Library. A 30-day public comment period began May 31, 1995, and continued through June 29, 1995. The Proposed Remedial Action Plan also contained information which provided the opportunity for a public meeting to be held, if requested. No public meeting was requested.

Specific groups which received individual copies of the Proposed Remedial Action Plan included the local PGDP Neighborhood Council, Natural Resource Trustees, and the PGDP Environmental Advisory Committee. In addition, information regarding the proposed interim remedial action and copies of the Proposed Remedial Action Plan were made available during a public workshop which the DOE held July 13, 1995.

Public participation in the CERCLA process is required by SARA. Comments received from the public are considered in the selection of the remedial action for the site. The responsiveness summary serves two purposes: (1) to provide the DOE with information about the community preferences and concerns regarding the remedial alternatives, and (2) to show members of the community how their comments were incorporated into the decision-making process.

3.2 Community Preferences/Integration of Comments

The Proposed Remedial Action Plan clearly indicated comments could be issued to a local DOE representative, the Kentucky Division of Waste Management, or the EPA. Neither the DOE, the KDEP, nor the EPA received either verbal or written comments during the 30-day public comment period. In addition, no substantive comments were generated during the DOE's July 13, 1995, public workshop. Since no comments were received, modifications to this ROD have not been required to integrate public concerns.

Appendix
Remedial Design Schedule

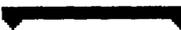
Remedial Design Schedule for Interim Action at SWMU 2 of WAG 22

ID	Activity	Duration	Start	Finish	1995			1996				1997			
					Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	
1	EPA ROD signature & KDEP letter of concurrence	0d	9/11/95	9/11/95		◆									
2															
3	Sampling and Analysis Plan (SAP) Development	180d	9/1/95	2/27/96			▬								
4	EPA & KDEP review D1 SAP	91d	9/1/95	11/30/95		▨									
5	DOE incorporate EPA & KDEP comments	59d	12/1/95	1/28/96			▨								
6	EPA & KDEP review D2 SAP [See footnote A]	30d	1/29/96	2/27/96				▨							
7	EPA & KDEP approve SAP	0d	2/27/96	2/27/96				◆							
8															
9	Remedial design (RD) phase: Wells	0d	8/15/95	8/15/95											
10	Design completed by DOE	0d	8/15/95	8/15/95	◆										
11															
12	Sampling activities and Remedial action phase: Wells	281d	1/29/96	11/4/96				▬							
13	Procurement [See footnote B]	134d	1/29/96	6/10/96				▨							
14	Mobilization	60d	6/11/96	8/9/96					▨						
15	Install wells/soil sampling/geophysics	87d	8/10/96	11/4/96						▨					
16															
17	Waste/ground water interaction meeting	1d	8/30/96	8/30/96											

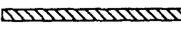
Revised: July 27, 1995

A: D2 SAP submittal date contingent upon receipt of comments on D1 SAP by 12/1/95.

B: Procurement contingent upon approval of task order contract and approval of SAP by 2/27/96.

Summary 

Milestone 

Activity 

Durations presented in calendar days.

Remedial Design Schedule for Interim Action at SWMU 2 of WAG 22

ID	Activity	Duration	Start	Finish	1995			1996				1997						
					Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3				
18	Remedial design (RD) phase: Low permeability, multilayered cap	273d	8/31/96	5/30/97														
19	Design procurement	61d	8/31/96	10/30/96														
20	DOE develop 30% design [See footnote C]	43d	10/31/96	12/12/96														
21	EPA & KDEP review 30% design	22d	12/13/96	1/3/97														
22	DOE develop 60% design	31d	1/4/97	2/3/97														
23	EPA & KDEP review 60% design	17d	2/4/97	2/20/97														
24	DOE develop 90% design and construction schedule	31d	2/21/97	3/23/97														
25	EPA & KDEP review 90% design and construction sched.	31d	3/24/97	4/23/97														
26	EPA & KDEP approve 90% design and construction sched.	0d	4/23/97	4/23/97														
27	Complete design	22d	4/24/97	5/15/97														
28	Design certified for construction (CFC)	15d	5/16/97	5/30/97														

Revised: July 27, 1995

C: Design activities contingent upon DOE, EPA, and KDEP concurrence to proceed with a definite strategy by 8/30/96.

Summary 
Activity 

Milestone 

Durations presented in calendar days.

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COMMENT RESPONSE

SUMMARY

for the
March 1995

**Record of Decision for Interim Remedial Action
at Solid Waste Management Units 2 and 3 of Waste Area Group 22
at the Paducah Gaseous Diffusion Plant
Paducah, Kentucky**

DOE/OR/06-1351&D0



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DE-AC05-93OR22028

Prepared for
U.S. Department of Energy
Environmental Restoration
Oak Ridge Operations Division

COMMENT RESPONSE SUMMARY

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Comment Number	Page; Section; Para.	Reviewer and Comment	Response
1.	General Comments	United States Department of Energy (DOE)/D. Dollins & R. Seifert: "This document is too long, please cut down to about 35 to 40 pages."	An attempt has been made to reduce the length of the document by deleting what may be considered extraneous information.
2.	Page vii; Acronyms & Abbreviations	DOE/D. Dollins & R. Seifert: "ERWM needs to be changed EMEF-Environmental Management Enrichment Facilities."	Agree. Text has been revised as suggested.
3.	Part 1; Statement of Basis	DOE/D. Dollins & R. Seifert: "I believe that we are not calling this a statement of basis anymore. Please check previous regulator comments to the Proposed Plan."	Agree; however, the section titled "Statement of Basis and Purpose" is a heading prescribed in EPA guidance for CERCLA records of decision. It should not be confused with a RCRA "Statement of Basis." The text has not been modified in response to this comment.
4.	Part 1; Page 1; Para. 2	DOE/D. Dollins & R. Seifert: "End of first sentence states '...with the participation of the Commonwealth of Kentucky.' Is this true? I don't understand."	Agree. The referenced phrase has been deleted.
5.	Part 1; Page 1; Para. 2	DOE/D. Dollins & R. Seifert: "Does State concur or not. They should concur."	Agree. The text has been modified to indicate the Commonwealth does concur.
6.	Part 1; Page 2; Bullet 2	DOE/D. Dollins & R. Seifert: "Add '...and to detect the release of contaminants, if any, from the unit.' to the end of the first sentence."	Agree. The second bullet now states, "An effective ground water monitoring program will be implemented in the uppermost aquifer, the Regional Gravel Aquifer (RGA), to detect the potential release of contaminants from SWMU 2."

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
7.	Part 1; Page 2; Bullet 2; Sentence 5	DOE/D. Dollins & R. Seifert: "Let's not make the same mistake as we did at C-404 by installing wells too close!"	Agree. The exact location(s) of upgradient RGA monitoring well(s) will be addressed during the remedial design phase and will be included in the draft sampling and analysis plan.
8.	Part 1; Second page; Bullet 3	DOE/D. Dollins & R. Seifert: "Misspelled transferral."	Noted. According to Webster's New World Dictionary of the American Language, the referenced word may be correctly spelled "transferral" or "transferral."
9.	Part 1; Second page; Last Para.	DOE/D. Dollins & R. Seifert: "Are these two sentences supposed to be here?"	Yes. The brackets have been removed for clarification. The second sentence has been deleted.
10.	Part 1; Third page; 1st signature line	DOE/D. Dollins & R. Seifert: "Should read, Robert D. Dempsey Assistant Manager for Environmental Management U.S. Department of Energy."	Agree. Text has been revised as suggested.
11.	Page 2; Section 2.1; Para. 1	DOE/D. Dollins & R. Seifert: "Change Environmental Restoration and Waste Management (ERWM) to Environmental Management and Enrichment Facilities (EMEF)."	Agree. Text has been revised as suggested.
12.	Page 2; Section 2.1; Para. 1	DOE/D. Dollins & R. Seifert: "Last sentence. Delete Division of Waste Management after KDEP's. There are others involved such as CHR-Radiation Control Branch-They are not KDEP."	Agree. Text has been revised as suggested.
13.	Page 2; Section 2.1; Para. 2	DOE/D. Dollins & R. Seifert: "Last sentence change ERWM to EMEF."	Agree. Text has been revised as suggested.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
14.	Page 2; Section 2.1; Para. 5	DOE/D. Dollins & R. Seifert: "Is Magruder Village southwest of PGDP or Southeast? See John Morgan."	Southwest. Paragraph 5 has been deleted in response to Comment #1.
15.	Page 7; Section 2.3; Para. 3	DOE/D. Dollins & R. Seifert: "Is the sentence in the brackets supposed to be there?"	The sentence should be in this section to note what is to be included in the Record of Decision. The brackets have been removed from the D1 ROD.
16.	Page 7; Section 2.4; Para. 1	DOE/D. Dollins & R. Seifert: "1st sentence. Add '...and the Commonwealth of Kentucky.' after '...submitted to the EPA.'"	Agree. Text has been added.
17.	Page 7; Section 2.4; Para. 2	DOE/D. Dollins & R. Seifert: "The last sentence does not make sense. Please clarify."	Agree. Text has been modified.
18.	Page 8; Section 2.5	DOE/D. Dollins & R. Seifert: "This section can be cut back."	Agree. Text has been shortened as suggested.
19.	Page 14; Section 2.6	DOE/D. Dollins & R. Seifert: "This section is already covered in detail by the WAG 22 Feasibility Study. Cut this section down to a brief summary."	Agree. The risk section has been shortened and rewritten to focus on key risk drivers.
20.	Page 16; Section 2.6; Para. 2	DOE/D. Dollins & R. Seifert: "The first full sentence of pg 16 states that future receptors of COPCs exposure to be off-site residential...due to groundwater. Instead, suggest that they be called potential receptors."	Agree. Section has been rewritten to place emphasis on primary risk drivers.

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
21.	Page 16; Section 2.6; Para. 3	DOE/D. Dollins & R. Seifert: "Same as comment #3. 1st sentence."	Not applicable.
22.	Page 16; Section 2.6; Para. 7	DOE/D. Dollins & R. Seifert: "Table 2.2 is called out on this page, but the table is not presented until 2 pages later."	Agree. Table 2-1 (formerly Table 2-2) now directly follows the call out.
23.	Page 19; Section 2.7	DOE/D. Dollins & R. Seifert: "Is this section a requirement by EPA for RODs. If not, why is it included?"	Agree. This section is now an un-numbered subsection of Section 2.6.
24.	Page 53; Section 2.12	DOE/D. Dollins & R. Seifert: "The dates for the public review and comment period is incorrect. Please change."	Agree. Text has been revised as suggested.
25.	Page 55; Section 3.1	DOE/ D. Dollins & R. Seifert: "Same as comment #[24]."	Agree. Text has been revised as suggested. Section 3.1 has expanded following public comment period.
26.	Page 55; Section 3.2	DOE/ D. Dollins & R. Seifert: "Same as comment #[24]."	Agree. Text has been revised as suggested. Section 3.2 has expanded following public comment period.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
27.	Part 2; Page 13; Para. 4	Foster Wheeler Environmental Corporation (FWEC)/ D. Jones: "A radiation walkover survey of the ditch located south of SWMU 2 revealed that beta and gamma emitters are present at levels exceeding three times background. It appears that this ditch will be one of the drainage channels for the cap, and the design may require equipment to operate in the ditch in order to grade the cap slopes. Will this type of activity be allowed, or will this ditch be 'off-limits' (as well as other contaminated ditches during construction)?"	LMES Health Physics personnel have stated that the ditch area is not identified as a HAZWOPER zone; however, any workers entering the area, like the cap area, would require radiological protection.
28.	Part 2; Page 24; Last Sentence	FWEC/D. Jones: "Several places throughout the document state that 'water infiltration would significantly be reduced.' Suggest clarifying by adding ' <i>surface</i> water infiltration from precipitation events...' The cap would not reduce water infiltration from groundwater flowing in from off-site, which is a possibility according to the FS."	Agree. Text has been modified for clarification as suggested.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
29.	Part 2; Page 33; Para. 1	<p>FWEC/D. Jones:</p> <p>"Reads, 'Cuttings generated during installation of monitoring wells and piezometers <u>may</u> be managed within the limits of SWMU 2 and <u>may</u> be placed on the unit as contour material for the cap.' What are the other possibilities for this material? (Also, according to Table 2-3, page 27, approval to deposit this type of material under cap is required for Alternative 4 but not Alternative 5.) The paragraph also read, 'All other wastes will be initially containerized and managed at the PGDP in accordance with approved protocols.' Does this refer to the waste generated by the contractor, such as PPE?"</p>	<p>Other options for managing the cuttings, if they are determined to be hazardous, include containerization and storage onsite or shipment offsite for treatment or disposal.</p> <p>The text of Table 2-2 (formerly Table 2-3) has been revised to indicate approval is also required to deposit the material as a part of Alternative 5.</p> <p>The final sentence of the paragraph has been clarified to indicate that "other wastes" includes items such as PPE.</p>
30.	Part 2; Page 38; Para. 4	<p>FWEC/D. Jones:</p> <p>"Reads, 'The <u>excess soils</u> and associated materials, such as PPE, will have to be characterized to determine if the waste is RCRA hazardous and/or radioactive. If the <u>excavated waste</u> is hazardous, then it would be containerized and stored onsite or shipped offsite for treatment or disposal.' What are excess soils and excavated waste? Will grading (smoothing) of the existing site be allowed? If so, what will be the maximum 'cut' allowed?"</p>	<p>The term "excavated waste" will be changed to "excess material." There will be smoothing and grading of the existing site in addition to the soil excavated for well installation that will have to be characterized.</p>
31.	Part 2; Page 40; Cost Effectiveness	<p>FWEC/D. Jones:</p> <p>"Reads, 'The action represents the least expensive alternative to <u>prevent</u> leaching and future migration of the contaminants while a final remedy is being devised.' Suggest toning down[(see comment 28)] and rewording to say, '<u>minimize</u> leaching.'"</p>	<p>The word "prevent" has been replaced with "prevent surface water infiltration from precipitation."</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
32.	Part 2; Page 40; Last Para.	FWEC/D. Jones: "Reads, 'This remedial action will <u>not</u> significantly reduce the actual mobility of the contaminants at the unit.' Is this a correct statement?"	The sentence has been revised to state: "This remedial action is expected to reduce the mobility of unsaturated wastes at the unit."
33.	Appendix A; Remedial Design Schedule	FWEC/D. Jones: "Only 2 days are shown for the 30% design review. This should be noted as an on-board review."	Agree. This is noted on the revised schedule.
34.	Part 1; Second page; Bullet 2	Lockheed Martin Energy Systems (LMES)/ R. R. Bonczek: "a) The point of compliance given in line 12 of this bullet does not match that in the current Site Management Plan. This issue needs to be resolved. "b) The statement 'analyzed for COCs' in line 15 of this bullet is unnecessarily vague. At least the primary COCs for the site should be listed."	Agree. The second bullet now states, "A ground water monitoring program will be implemented in the uppermost aquifer, the Regional Gravel Aquifer (RGA), to detect the potential release of contaminants from SWMU 2."
35.	Page 2; Section 2.1; Para. 6	LMES/R. R. Bonczek: "I suggest that you include a figure showing this information (i.e., the location of the site in relation to the principal tributaries)."	Agree. Figure 2-2 has been modified to show surface water features.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
36.	Page 4; Section 2.1; Para. 4	<p>LMES/R. R. Bonczek:</p> <p>"The material in this paragraph references a 'security-fenced area; however, this area is not shown on the referenced figure (2.2). I suggest that a new Fig. 2.2 be prepared showing both the fenced area and the principal tributaries. [Please see (previous comment)]. Similarly, later in the paragraph reference is made to ditches. However, these ditches are also not shown; I recommend adding the ditches to a figure because they are important in describing potential contaminant transport and justifying the need for an action to eliminate or control this pathway."</p>	Agree. Figure 2-2 has been modified as suggested.
37.	Page 6; Section 2.2; Para. 2	<p>LMES/R. R. Bonczek:</p> <p>"a) The word 'uranium' in 'reactor tails uranium' should be deleted or replaced. Its usage is not correct.</p> <p>"b) The reference to 'radioactive impurities' should be replaced with a more descriptive phrase, such as 'fission products (impurities).'</p> <p>"c) The reference to 'uranium-contaminated wastes' should be changed to 'uranium-containing wastes' because it is not true that the waste was accidentally contaminated with uranium prior to disposal. The waste disposed contained uranium because of it process source."</p>	<p>a) Agree. The text has been arranged to state "uranium reactor tails."</p> <p>b) Agree. Text has been modified.</p> <p>c) Agree. Text has been clarified.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
38.	Page 6; Section 2.2; Para. 3	<p>LMES/R. R. Bonczek:</p> <p>"a) Should note that the 40 drums found were more than were reported in the area. (Note your current explanatory clause 'some were not recorded...' is confusing. Need to rework how you state this.)</p> <p>"b) Would be valuable to expand on the meaning of 'in poor condition.'"</p>	<p>a) Agree. Text has been expanded.</p> <p>b) Agree. Text has been added.</p>
39.	Page 6; Section 2.2; Para. 4	<p>LMES/R. R. Bonczek:</p> <p>"Is it possible to give a better description of the 'precipitation filter cake?'"</p>	<p>Agree. Additional text has been added to explain the term.</p>
40.	Page 7; Section 2.4; Para. 3	<p>LMES/R. R. Bonczek:</p> <p>"(This is the third paragraph of § 2.4 on this page.) the fact that the waste may be in water is listed as being an important data gap; however, why this is an important data gap which prevents final action is not stated. The paragraph should state why this data gap is important. Also, please note that the simple fact that the waste is in water is not important unless this fact increases the risk to human health and/or the environment in some way. When the importance of the data gap is included, it should be written in the context of a potential for increased risk."</p>	<p>Agree. Text has been expanded.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
41.	Page 10; Section 2.5; Para. 2	LMES/R. R. Bonczek: "The COCs listed in Table 2-1 may not be correct. Information collected while preparing the WAG 22/SWMU 2 SAP indicates that the well in which some COCs were detected was not associated with SWMU 2. Please see comment on Table 2-1 below."	Noted. The COC list has been deleted and text has been modified to focus on the principal contaminants (TCE, uranium, and Tc-99)

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
42.	Page 12; Table 2-1	<p>LMES/R. R. Bonczek:</p> <p>"a) In preparing the WAG 22/SWMU 2 SAP the list of COCs was examined to determine if the list of analytes could be reduced. During this examination, it was found that 2,4-dinitrotoluene, N-nitroso-di-n-propylamine, and pentachlorophenol were included on the list of COCs because of their detection in one sample from MW 93 (see RI Addenda and the FS). It is questionable if the reported detection of these analytes in this sample means that these are COCs at SWMU 2. Of great importance is the fact that MW 93, a well completed in the RGA, is located to the east of SWMU 2 and to the south of SWMU 3. Also, on the PGDP data base, the metadata indicates that this well is a 'background well' for SWMU 3. Therefore, it is difficult to see how a detection in this well makes an analyte a COC at an adjacent unit. Of potentially greater importance is the fact that it is questionable if these analytes were ever detected? After determining that there was only one detection of these analytes in MW 93 (a fact reported to me by Jay Claussen), I examined the Phase II SI data base to determine if this sample was analyzed in duplicate or if there were other samples from this well. This examination determined that the reported detection (in the RI Addenda and the FS) may be incorrect! The data listed in Volume 4A of the Phase II SI report does not indicate that these analytes were detected in</p>	<p>a) Good points. Sampling results given from Environmental Information Management System (EIMS) list the reported detects for these three analytes from MW-93 for the 10/10/89 sampling event. The questionable validity of using sampling data from MW-93, a SWMU 3 background well, to determine COCs at SWMU 2 is a valid point. The COC list has been deleted from the ROD and text has been modified to focus on the principal conatminants (TCE, uranium, and Tc-99).</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
42. (Cont'd)		<p>a sample from MW 93. In fact, as far as I can tell, these analytes may not have been detected at all in a sample from any well associated with SWMU 2. Therefore, the material listed in Table 2-1 needs to be verified as being correct independent of what is reported in the RI Addenda and the FS.</p> <p>"b) The potential impact of the 'new' background values for soil in EM-77 and for groundwater in DOE/OR/07-1286&D1 (Dissolved Phase NW Plume Technical Report) should be presented in relation to the COCs A comparison performed by me indicates that several of the COCs can be removed based on the comparison of the maximum detect versus the background concentrations. For example the detected maximum for arsenic in groundwater (UCRS) is presented as 8.9 µg/l. This value is less than the background concentration used in the NW Plume report for the RGA (11.2 µg/l). Similarly, the groundwater maximum detects for beryllium, (20.8 vs. 286 µg/l), cadmium (5.1 vs. 20.6 µg/l), and thallium (0.9 vs. 108 µg/l) are less than the RGA background concentrations. At the very least, the new background information should be discussed.</p> <p>"c) It is not clear if the soil concentrations and activities are for direct contact with surface soil or subsurface soil or a for protection of groundwater. This should be clarified."</p>	<p>b) A comparison of the new background values with the maximum detected values would be more appropriately addressed in the RI Report to follow sampling and analysis activities.</p> <p>The new background values support the proposed monitoring for just principal threat contaminants, TCE and uranium. (See Comment #34.)</p> <p>c) The table presents the maximum detected concentrations in soil and ground water for the COCs at SWMU 2 and the maximum detected background concentrations from the Phase II report for these COCs. The table has been deleted.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
43.	Page 15; Figure 2-5	LMES/R. R. Bonczek: "In the first column of the figure, 'Air', should be deleted. It is incorrect to list 'Air' as a source. Please note, that the listing of 'Air and Airborne Particles' as 'Primary Contaminated Media' in column 3 is correct."	Agree. The "Air" box in the source column, along with arrows leading out from it, has been deleted.
44.	Page 16; Section 2.6; Para. 1	LMES/R. R. Bonczek: "In line 3, delete 'off-site.' Because the groundwater assessed was from wells was located adjacent to the unit, the potential residential users assessed were on-site."	The paragraph has been deleted.
45.	Section 2.6; General Comments	LMES/R. R. Bonczek: "Need to pay closer attention to verb tense throughout this section. Past tense should be used throughout this section when describing what the assessment determined."	Agree. Past tense has been used throughout this section when describing what the assessment determined.

COMMENT RESPONSE SUMMARY

Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
46.	Page 17; Section 2.6; Paras. 3 through 6	<p>LMES/R. R. Bonczek:</p> <p>"These paragraphs need to be rewritten. Uncertainty is a difficult concept to understand and, when mixed with risk results, becomes even more difficult to understand. Generally, the word 'uncertainty' should be used sparingly and the actual cause of the 'uncertainty' should be used in its place. For example, it would be good to replace 'Uncertainties are associated with the standard calculations...' (T5 topic sentence) with something like 'The standard calculations used in determining the toxicity of chemicals may cause the risk assessment to determine risks that are higher than those that are really present,' and expand on why this is so in additional sentences. Also, please note that each of the major uncertainties should be presented in a separate paragraph. This paragraph should start by describing the uncertainties effect on the risk values and continue with an explanation of why this effect is believed to be of valid concern."</p>	<p>Agree. Paragraphs 3 through 6 have been deleted and replaced with the following:</p> <p>"Several uncertainties, or factors that could significantly affect the results of the risk assessment, were identified in the risk assessment. Of the uncertainties listed, the one of greatest importance was that the risk assessment needed to estimate the quantity of buried waste at SWMU 2 and the physical and chemical makeup of the waste. The effect of having to estimate these factors is unknown; however, since the risk assessment used estimates of concentrations of uranium and TCE that were unlikely to underestimate waste volume or mass, the results of the risk assessment are not likely to be underestimates of risk.</p> <p>"Another uncertainty identified as being important was the fact that rates of exposure used in the assessment were likely to be overestimates for most parameters. Both methods for evaluating TCE and uranium in ground water assumed reasonable maximum leaching. Therefore, concentrations of TCE and uranium under no action may result in overestimates of risks.</p> <p>"A third uncertainty that affected the results of the risk assessment is the assumed pyrophoric nature of the buried uranium. To address this uncertainty, the risk assessment considered the various conditions that would need to occur for spontaneous combustion of the buried uranium. These conditions were presented to ensure that any remedial alternative selected for SWMU 2 would reduce the risk posed by the pyrophoricity of the buried uranium."</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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Comment Number	Page; Section; Para.	Reviewer and Comment	Response
47.	Page 18; Table 2-2	<p>LMES/R. R. Bonczek:</p> <p>"a) 'Future Off-Site Resident' should be changed to 'Future On-site Resident.'</p> <p>"b) The HQ and ILCR under 'Interim Action, <u>RG</u><u>A with Multilayered Cap</u>' are probably incorrect. The uncertainty related to the effect of having the waste in water has not been reconciled; therefore, the modeling results are suspect. Also please note, if the multilayered cap could completely eliminate the risks, then this is the alternative that should be selected.</p> <p>"c) The statement in the 'Primary Risk Uncertainties' regarding future land use is not complete. Because the contaminant concentration data used to determine the risk from groundwater to residents were from wells at the unit, the risk from contaminants in groundwater is unlikely to be higher for a future resident than that reported under both current and future (modeled). In addition, the modeling for the risk assessment (as modified by using ResRad) was so conservative that it is unlikely that the future risk levels underestimated the true future risk. These uncertainties should be reexamined after the uncertainty section of the text has been rewritten."</p>	<p>Agree. "Future off-site resident" has been changed to "future potential ground water user."</p> <p>Agree. The table has been revised.</p> <p>Agree. The Primary Risk Uncertainty portion has been deleted from Table 2-2. The same information previously contained in Table 2-2 has been added to the discussion of uncertainties in Section 2.6.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
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Comment Number	Page; Section; Para.	Reviewer and Comment	Response
48.	Page 19; Section 2.7; Para. 2	LMES/R. R. Bonczek: "The first RAO is poorly stated and the second RAO is incomplete. The RAOs should be rewritten to note that the RAOS are to prevent exposure to contaminated groundwater and soil, to prevent exposure to gamma radiation emitted from the source, and to prevent disturbance or contact with the buried waste materials. These RAOs can be achieved in two primary ways: first, reducing contaminant levels and second, preventing contact. Please note that these are the RAOs that are actually evaluated in the material which is presented in § 2.8."	Agree. The text has been revised accordingly. The RAO information has been completely rewritten and is now included in Section 2.6.
49.	Page 19; Section 2.7; Para. 3	LMES/R. R. Bonczek: "The conclusion of this paragraph states that the interim action will meet the RAOs for groundwater and soil. However, soil is not discussed earlier in the paragraph (waste is). Need to include soil in the earlier material in the paragraph and waste in the concluding sentence."	Agree. Soil has been deleted since ingestion of ground water and direct contact with the waste are the primary risk drivers.
50.	Page 20; Section 2.8; Para. 4	LMES/R. R. Bonczek: "In the second line from the bottom of the page, the word 'costly' should be deleted. No evidence related to the cost of this alternative has been presented previously, and the use of the word may be considered to show bias against the alternative."	Agree. Text has been modified as suggested.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
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DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
51.	Page 31; Section 2.9; Para. 3	LMES/R. R. Bonczek: "The time-frame of the cost is not apparent from what is presented (unless I missed it.) Need to state the time-frame under which the cost will be incurred."	Agree. The text has been clarified as suggested to indicate the cost estimates were generated assuming a 30-year project life.
52.	EPA Draft Comm.	LMES/R. R. Bonczek: "Under 'General Comments.' EPA states, 'Subsection 2.6, 'Summary of Site Risks,' difficult to follow', I agree with this comment. The subsection should be rewritten to improve clarity and readability. All jargon should be removed."	Agree. This section has been rewritten to improve clarity and readability.
53.	Pages 40 and 52; Table 2-5	LMES/B. A. Bowers: "As discussed in my review record to you (March 16) for the D2 FS, 10 CFR 1022 should have been identified as a location-specific ARAR with regards to wetlands. This would be addressed on p. 40 and p. 52 (Table 2-5). Based on the information in the FS, the substantive requirements of 10 CFR 1022 would be met by any of the alternatives. However, it should still be identified as a location-specific ARAR in the ROD. I don't believe this would change any other text as the conclusion regarding compliance with ARARs would not change."	While the areas have not been determined to be wetlands, 10 CFR § 1022 has been added as a location-specific ARAR for completeness. In the event the areas are identified as wetlands, 10 CFR § 1022 will be applicable. The functions and values analysis will be incorporated in the administrative record and referenced in the IROD.

<p align="center">COMMENT RESPONSE SUMMARY</p> <p align="center">Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)</p>			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
54.	General Comments	<p>LMES/J. L. Clausen:</p> <p>"The document fails to mention the fact the risk modeling indicates no risk from uranium in the RGA using the SWMU boundary as the compliance point until approximately 3700 years from the present. This risk analysis was performed using a worst case scenario and a fairly conservative Kd value of 45 ml/g. Indeed, the sensitivity analysis did not indicate much difference when the Kd was changed to 15. These are important facts that should be brought out and highlighted for the public so they can truly evaluate the cost-effectiveness of the preferred alternative."</p>	<p>Information regarding specific risks is contained in Section 2.6, Summary of Site Risks. As the section title suggests, the ROD only presents a summary of the risks. Detailed information is contained in the RI Addendum and the FS report. For clarification, the referenced modeling predicted a maximum dose at 2,450 years using a K_d value of 45. It should be noted here that previous modeling indicates risks associated with leaching of TCE may be present in as few as 35 years.</p>
55.	Part 1; Statement of Basis and Purpose; Para. 2; Sentence 8	<p>LMES/J. L. Clausen:</p> <p>"Delete word significant and start sentence with Data."</p>	<p>Agree. Text has been modified as suggested.</p>
56.	Part 1; Statement of Basis and Purpose; Para. 2; Sentence 9	<p>LMES/J. L. Clausen:</p> <p>"What groundwater is being referred to in this sentence? If the sentence refers to the RGA, it should be pointed out that there is no risk until approximately some 3000 years from the present. If the sentence refers to the UCRS, what is the receptor pathway by which one would be exposed?"</p>	<p>The sentence refers to ground water in the aquifer, the RGA; however, previous modeling indicates risks associated with leaching of TCE may be present in as few as 35 years.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
57.	Part 1; Assessment of the Site	<p>LMES/J. L. Clausen:</p> <p>"The words imminent and substantial endangerment are a bit overstated, even assuming leachate has been generated and is present in the UCRS based on results from MW 58. There is no off-site receptor pathway via groundwater since we are providing water to the public. Also, no uranium has been detected in RGA wells downgradient of this unit. Additionally, this area is inside the plant perimeter fence so the public has no direct contact to the soils. In terms of an industrial worker exposure, there is a 6-inch clay cap on the unit and the area is roped off as radiological area. In terms of groundwater, there is no exposure pathway unless one were to drink out of MW 154. Finally, this unit has existed since 1952 and has not presented any imminent danger to the public in the past. It is not reasonable to assume that anything is going to change that would suddenly make the unit an imminent danger. Suggest the word imminent and substantial endangerment be deleted. A more accurate statement is that SWMU 2 has been identified as a possible threat for contaminants to leach from the unit into the RGA."</p>	<p>The phrase "in the future" has been added to the end of the referenced sentence.</p>
58.	Part 1; Description of Selected Remedy; Bullet 2	<p>LMES/J. L. Clausen:</p> <p>"The sentence needs to be rewritten. The wells are used to make water level measurements. Data from a number of wells is then used to develop a potentiometric surface. Finally, groundwater flow directions are inferred from the development of the potentiometric surface map."</p>	<p>Agree. The sentence has been completely reworded in response to other comments.</p>

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
59.	Part 1; Statutory Determinations	LMES/J. L. Clausen: "One could argue that the existing 6-inch clay cap is also protective of human health and the environment in the short term. This statement seems a rather weak [sic] justification for spending 3 million dollars over the next 30 years."	Noted. The statements are consistent with the DOE Site Manager's June 3, 1994, letter which states: "The Department of Energy (DOE) proposes to add a fifth alternative...[which] would include a Resource Conservation and Recovery Act (RCRA) cap and installation of additional monitoring wells to detect contaminants leaving the site. The DOE also recommends this to be the Preferred Alternative."
60.	Part 1; Statutory Definitions	LMES/J. L. Clausen: "How is this interim action cost-effective? Compared to what? Compared to existing contamination migrating off-site, an action at this unit appears not to be cost-effective since there is no immediate or near-term risk. The unit does not pose a risk to an off-site receptor in the near term via the RGA and only limited risk to an on-site industrial worker in the near-term via surface soils. As for UCRS contamination, there is no receptor pathway in the near-term."	As indicated in Part 2, Sections 2.8 and 2.9, the preferred alternative is deemed to be cost effective in comparison to Alternatives 3 and 4.
61.	Page 2; Section 2.1; Para. 3; Sentence 3	LMES/J. L. Clausen: "The gaseous diffusion process is based on selective concentration and not rate; correct sentence."	This paragraph has been deleted in response to Comment #1.
62.	Page 2; Section 2.1; Para. 6; Sentence 3	LMES/J. L. Clausen: "Reword sentence; it sounds like the plant sits on a surface water divide, which it does not."	This paragraph has been deleted in response to Comment #1.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
63.	Page 2; Section 2.1; Para. 6; Sentence 4	LMES/J. L. Clausen: "Big Bayou Creek is not a perennial stream!"	This paragraph has been deleted in response to Comment #1.
64.	Page 4; Section 2.2; Para. 4; Sentence 6	LMES/J. L. Clausen: "No fires have been reported at C-749. The correct location is the C-746-F Burial Ground."	The language in the IROD is consistent with information presented in the RI Addendum, which CH2M HILL prepared for MMES/LMES. Although fires may have been reported at C-746-F, it has no relevance to the possibility of fires which reportedly occurred at C-749.
65.	Page 6; Section 2.2; Para. 2; Sentence 3	LMES/J. L. Clausen: "Place the word 'uranium' before reactor."	Agree. Text has been revised as suggested.
66.	Page 6; Section 2.2; Para. 2; Sentence 4	LMES/J. L. Clausen: "Reword sentence, awkward."	Agree. Text has been modified.

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
67.	Page 6; Section 2.2; Para. 3	LMES/J. L. Clausen: "It seems much of this discussion is based on what CH2M Hill dug up. Although there is limited written documentation, there are a number of people still working at the facility that participated in this activity. As far as I can tell, the burial records are fairly accurate. My discussion with individuals indicate uranyl nitrate solution was found in drums instead of uranyl fluoride solution in Cell 8. These drums were in good condition and the nitrate solution was siphoned out of the drums. Although the type of uranium solution was different than the records indicated, the fact that a uranium solution was found suggests reasonable agreement with the records. Furthermore, although TCE drums were expected to be found in Cell 8, the records indicate TCE drums in Cells 8 and 9. A small portion of Cell 9 was excavated and the remains of several TCE drums were found. The remainder of Cell 9 was not excavated. It seems reasonable to expect the remainder of the TCE drums, what is left of them, resides in Cell 9."	Disagree. It is not known how inaccurate the disposal records are. Furthermore, due to the fact that the disposal records have been incorrect, it is not safe to assume that the remaining TCE drums reside in Cell #9.
68.	Page 7; Section 2.4; Para. 2; Sentence 3	LMES/J. L. Clausen: "This statement is incorrect. The groundwater in the RGA downgradient of SWMU 2 is already contaminated with TCE and ⁹⁹ Tc."	Agree. The referenced sentence has been deleted.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
69.	Page 7; Section 2.4; Para. 2; Sentence 4	LMES/J. L. Clausen: "At this point in time, it is not known if the waste is unsaturated or saturated. Correct sentence accordingly. Secondly, it is correct that the interim action will reduce infiltration and thus leachate generation. However, it should be pointed out that if now action were to occur, leachate currently present in the UCRS would not reach the RGA, using the SWMU 2 boundary as the compliance point, until some 3700 years hence. This is an important point that the reader of this document should be aware."	Disagree. See Comment #54 for discussion.
70.	Page 7; Section 2.4; Para. 2; Last Sentence	LMES/J. L. Clausen: "The last part of this sentence, 'while a final remedy...', is incomplete."	Agree. Text has been modified.
71.	Page 8; Section 2.5; Para. 3; Sentence 5	LMES/J. L. Clausen: "No!!!! The entire unit from HU 1 through HU 4 is considered the UCRS, not just the permeable sand lenses in HU 2."	Partially agree. The text has been revised to clarify that the UCRS includes the loess and the upper continental deposits. (HU 4 is grouped with HU 5, the RGA.)
72.	Page 8; Section 2.5; Para. 3; Sentence 6	LMES/J. L. Clausen: "Delete 'that' and change 'having' to 'of.'"	Agree. Text has been revised as suggested.
73.	Page 8; Section 2.5; Para. 3; Sentence 9	LMES/J. L. Clausen: "Doubtful statement. The most reasonable scenario is the high water levels in the UCRS are associated with mounding at C-404 or the ditch located immediately south of the unit."	Agree. Sentence 9 has been deleted.

COMMENT RESPONSE SUMMARY

Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
74.	Page 10; Section 2.5; Para. 1; Last Sentence	LMES/J. L. Clausen: "Change 'likely' to 'possible.' It is just as reasonable the TCE and ⁹⁹ Tc seen in the UCRS and RGA is associated with C-404. Additionally, the upgradient wells of C-404 also indicate contamination. So, it is not possible to say what is the source of the UCRS and RGA contamination. Even the uranium contamination seen at MW 58 and MW 154 cannot be definitely tied to SWMU 2 since C-404 was a holding pond at one time for liquid waste from C-400."	Agree. Text has been revised as suggested.
75.	Page 10; Section 2.5; Para. 4; Sentence 1	LMES/J. L. Clausen: "Rewrite sentence; a high potential for transport makes little sense."	Agree. Text has been modified.
76.	Page 10; Section 2.5; Para. 4; Sentence 2	LMES/J. L. Clausen: "This is not a valid statement. I could site numerous papers where very low TCE concentration in water have been associated with DNAPL sites. Residual DNAPL could be present in the UCRS. Given the fact that drums of TCE were disposed at the unit, DNAPL presence cannot be ruled out."	Agree. The last half of the referenced sentence has been deleted.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
77.	Page 10; Section 2.5; Para. 5 and Table 2-1	LMES/J. L. Clausen: "A recent background soil analysis (March 1995) by J. K. Moore (ORNL/TM-12897) and work by N. E. Korte in a memo dated March 28, 1995 from N. E. Korte to C. J. Marshall, would seem to place your metal COCs in question. The values for arsenic and silver found in SWMU 2 soil are below background thresholds developed for the site and are well within the range found in soils throughout the U.S."	Good point. See Comment #42.
78.	Page 13; Section 2.5; Para. 3; Sentence 6	LMES/J. L. Clausen: "Delete sentence."	Agree. Text has been deleted.
79.	Page 13; Section 2.5; Para. 3	LMES/J. L. Clausen: "A sentence should be added mentioning the fact no uranium above background levels has been detected in the RGA in the vicinity of SWMU 2."	Agree. Text has been added as suggested.
80.	Page 13; Section 2.5; Para. 4; Sentence 5	LMES/J. L. Clausen: "If background was not measured, how does one know that background is 10 μ R/hr? What is the basis for this sentence? Please provide a reference; otherwise delete."	Agree. Text has been deleted (along with other detailed information concerning the rad surveys) in response to Comment #1.

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
81.	Page 13; Section 2.5; Para. 4; Sentence 6	LMES/J. L. Clausen: "Again, since there was no background to compare with, this statement cannot be made since these measurements could represent background. It seems just as reasonable if a low-level gamma field exists that the uranium cylinder storage yard could be the contributor of the gamma field. Areal surveys show the gamma field from the C-745-B & C cylinder yards extends all the way to both the north and south plant fence boundaries and a similar distance to the east and west."	Agree. Added "Cylinder Storage Yards located adjacent to SWMU 2 are also likely contributing to the elevated gamma readings."
82.	Page 13; Section 2.5; Last Para.; Sentence 1	LMES/J. L. Clausen: "Reword sentence. Highest potential does not make sense."	Agree. Sentence has been deleted.
83.	Page 13; Section 2.5; Last Para.; Sentence 2	LMES/J. L. Clausen: "Sentence needs to be rewritten to make it clear RESRAD is not a groundwater contaminant transport flow model. This model does not imply migration, but rather risk. One can construe if the model shows a risk, then migration could have occurred."	Agree. The referenced sentence has been deleted.
84.	Page 14; Section 2.5; Para. 1; Sentences 3 and 4	LMES/J. L. Clausen: "These sentences are in conflict with each other. If SWMU 2 has a 6-inch clay cap and 18 inches of vegetative cover, where is the pathway for direct contact with contaminated soils? It should be pointed out surface contamination exists due activities at C-404."	Agree. Text and Figure 2-5 have been revised.

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
85.	Page 14; Section 2.5; Para. 1; Sentence 6	LMES/J. L. Clausen: "This assumes the waste is not already saturated."	Noted. If it is determined the waste is saturated, further actions may be warranted.
86.	Page 14; Section 2.5; Para. 1; Last Sentence	LMES/J. L. Clausen: "One could argue the 6-inch clay cap already prevents direct access to the buried waste. By the same argument, a RCRA cap does not prevent humans or animals from directly accessing the waste. The last part about exposure to gamma rays appears to be a dubious and unsubstantiated claim. See Comment [80] and [81]."	Noted. This sentence has been deleted. (See response to Comment #95.)
87.	Page 14; Section 2.6; Para. 2; Sentence 4	LMES/J. L. Clausen: "RESRAD does not estimate leaching, it only portrays the risk based on known input parameters and assumptions. Given over 50 percent of the input parameters are assumptions, the risk assessment appears to have a high degree of uncertainty."	Noted. RESRAD computer code is used to estimate uranium concentration in the RGA as a result of uranium leaching. See FS.
88.	Page 14; Section 2.6; Para. 2; Sentence 6	LMES/J. L. Clausen: "How will reducing leaching minimize contact with the buried waste?"	Agree. The whole paragraph has been deleted.
89.	Page 14; Section 2.6; Para. 1; Sentence 1	LMES/J. L. Clausen: "Should point out the risk to groundwater (RGA) does not occur until 3700 years from the present."	Disagree. See response to Comment #54.

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
90.	Page 16; Section 2.6; Para. 1; Sentence 3	LMES/J. L. Clausen: "Potential of risk from off-site groundwater appears questionable in the interim (i.e., 30 years). Actions have already been taken to mitigate this risk including 1) providing drinking water to the public in an area around the facility, 2) groundwater monitoring program, and 3) installation of a pump and treat facility downgradient of SWMU 2."	Noted. The baseline risk assessment assumes no action to mitigate risk. It is an analysis of risks with no efforts to eliminate exposure.
91.	Page 16; Section 2.6; Para. 2; Sentence 1	LMES/J. L. Clausen: "Again, as pointed out in [Clausen's first comment], only risk models were run, not groundwater flow or leaching models."	Disagree. The Summers model and the RESRAD computer code are both used to estimate the leaching.
92.	Page 16; Section 2.6; Para. 2; Sentence 2	LMES/J. L. Clausen: "It needs to be clearly stated the Summers model is a risk model and not a leaching model."	Disagree. See response to Comment #91.
93.	Page 16; Section 2.6; Para. 2; Sentence 3	LMES/J. L. Clausen: "Future uranium concentrations were not evaluated! It was future risk that was evaluated with the RESRAD model. There is a distinct difference."	Disagree. The RESRAD computer code estimates uranium isotope concentrations as a function of uranium leaching to the RGA using leaching components. See Table A3-11 in the FS.
94.	Page 16; Section 2.6; Para. 6; Last Sentence	LMES/J. L. Clausen: "Lets clarify future. The public needs to be aware the future in this case is 3700 years from the present."	Disagree. See response to Comment #54.

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
95.	Page 17; Section 2.6; Para. 1; Sentence 2	LMES/J. L. Clausen: "This statement just does not make sense when their [sic] is an existing 6-inch clay cap."	Noted. Risks to future, unrestricted workers associated with direct contact with the buried waste cannot be eliminated by the present cap without institutional controls.
96.	Page 17; Section 2.6; Para. 1; Sentence 3	LMES/J. L. Clausen: "First, it is not clear what modeled concentrations are being referred to; however, it appears to be discussing groundwater (UCRS). If the leachate is not a risk in the UCRS after installing a cap, then by the same logic it cannot be a risk if no action alternative is selected. As far as the RGA is concerned, the implementation of the cap does not change the risk from the RGA during the interim period (30 years) since no contaminants (i.e., uranium) are currently present in the RGA from SWMU 2 and there will be none in 30 years based on the risk modeling for a no-action."	Noted. The paragraph has been revised for clarity.
97.	Page 17; Section 2.6; Para. 1; Sentence 4	LMES/J. L. Clausen: "There already is a 6-inch cap limiting direct exposure to the uranium. An additional RCRA cap does not change this exposure potential. The only exposure is due to limited fallout related to C-404 activities."	Noted. See response to Comment #95.
98.	Page 17; Section 2.6; Para. 2; Sentence 3	LMES/J. L. Clausen: "What perspective, that the risk model is plus or minus several hundred or thousand percent?"	Section 2.6 has been completely rewritten to provide clarification.

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
99.	Page 17; Section 2.6; Para. 5; Sentence 1	LMES/J. L. Clausen: "Basically, what this sentence says is we do not know what the risk is because of uncertainties. Doesn't this then put into question the IROD since the decision is risk based?"	Noted. Uncertainty analysis has been rewritten for clarification.
100.	Page 17; Section 2.6; Para. 5; Sentence 2	LMES/J. L. Clausen: "If the uncertainties are nonquantifiable by their nature, then how does one know the overestimated risk outweighs the underestimated risk? Basically, what this sentence says is the risk is not known with any degree of certainty. Then how do we know what affect will implementing the cap ROD?"	Noted. See response to Comment #99.
101.	Page 18; Table 2-2; Row 2; Column 2	LMES/J. L. Clausen: "The no-action risk seems in error. How can there be a 10^{-4} risk for worker exposure for the no-action alternative when there is already a 6-inch clay cap and 18 inches of soil? I do not see how the worker risk from exposure to soil would be any different with the existing cap or a additional RCRA cap."	Noted. Table 2-1 (formerly Table 2-2) has been extensively revised for clarification. See response to Comment #95 for the risk associated with direct contact with the buried waste.
102.	Page 18; Table 2-2; Row 3; Column 2	LMES/J. L. Clausen: "The various COCs for the no-action should be listed in this table."	Disagree. The interim action is focused on the primary risk drivers, TCE and uranium, not all the COCs.
103.	Page 18; Table 2-2; Row 4; Column 1	LMES/J. L. Clausen: "A leaching model was not used, but rather a risk model."	Disagree. See response to Comment #91

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
104.	Page 19; Section 2.7; Para. 1; Sentence 1	LMES/J. L. Clausen: "Is this risk discussed a current risk or a future risk? Currently, the groundwater pathway does not pose a risk since the UCRS, the location for this data, is not accessible to the public. The only pathway or risk is for the future (i.e., 3700 years), hence, via the RGA groundwater."	The RAO information has been completely rewritten and is now included in Section 2.6.
105.	Page 23; Section 2.8; Para. 1; Sentence 5	LMES/J. L. Clausen: "The RGA wells are not being installed to monitor the cap[']s effectiveness."	Agree. The sentence has been rewritten.
106.	Page 24; Section 2.9; Para. 2; Sentence 3	LMES/J. L. Clausen: "Given the uncertainties in the risk assessment and the driver of risk being groundwater contamination, 3700 years, hence. Alternatives 1 and 2 appear to be viable candidates as an interim action with the collection of additional data. Namely, a determination of whether or not the waste is saturated and the forms of uranium present in the UCRS water."	Noted. In response to KDEP comments on the proposed plan, remedial design of the completion of the cap will be/has been halted upon completion of the 10% design package. The cap design may later be resumed following an evaluation of the GDT survey results in an attempt to determine if any of the buried waste is saturated by ground water. Also, see response to Comment #59 regarding selection of the preferred alternative.
107.	Page 31; Section 2.9; Para. 2; Last Sentence	LMES/J. L. Clausen: "What is this revised cost?"	The revised cost is presented. The text has been modified as indicated in the response to Comment #188.
108.	Page 32; Section 2.10; Bullet 2; Sentence 6	LMES/J. L. Clausen: "The RGA wells are not being installed to evaluate the effectiveness of the cap. The RGA wells are only being installed to monitor potential releases."	Agree. The second bullet has been rewritten.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
109.	Page 33; Section 2.10; Bullet 2	LMES/J. L. Clausen: "Delete specific reference to parameters being analyzed, laboratories, sampling frequency, etc. The cost estimate for the FS was not based on a COC analysis."	The text has been modified to indicate "...a ground water monitoring program will be implemented..."
110.	Page 33; Section 2.10; Para. 3; Last Sentence	LMES/J. L. Clausen: "Again, what is the revised cost?"	The revised cost is presented. The text has been modified as indicated in the response to Comment #188.
111.	Page 37; Section 2.11; Para. 6	LMES/J. L. Clausen: "These regulations apply to RCRA monitoring and not CERCLA; therefore, they are not applicable. Delete."	Agree. RCRA monitoring requirements were being evaluated as relevant and appropriate; however, these requirements would not be appropriate for this interim action.
112.	Page 37; Section 2.11; Para. 7	LMES/J. L. Clausen: "Again, this applies to RCRA monitoring and not CERCLA Delete."	See response to Comment #111.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
113.	General ARARs Comments	<p>LMES/L. T. Cusick:</p> <p>"Thank you for providing a copy of the draft ROD for review. Overall it looks very good. I do have one comment in regard to the location-ARARs.</p> <p>"It is my understanding that the D2 FS was to have an appendix/attachment letter from Jacobs Engineering re: the functions and values of the potential wetlands in the ditch adjacent to the SWMU. Based on that function and value analysis, I believe that it was determined that the ditch did not exhibit any functions and values for habitat, water recharge, etc., and that the proposed action would therefore not have an adverse effect on the potential wetlands. The logic would follow that for these reasons, 10 CFR 1022 is not ARAR, because although it may be 'relevant' it is not 'appropriate', (CERCLA requires that it be both relevant <i>and</i> appropriate).</p> <p>"If the above is accurate and the attachment will be made part of the FS, exclusion of 10 CFR 1022 from the ARARs in the ROD appears to be correct. However, it is imperative that the function and value analysis be a part of the record, otherwise we cannot substantiate that we took this (potential) resource into consideration."</p>	<p>The ARAR for 10 C.F.R. § 1022 has been added in the event wetlands are determined to exist in the area. See Comment #53 for discussion.</p>
114.	Page 25; Alternative 4; Compliance with ARARs	<p>LMES/L. T. Cusick:</p> <p>"Change comply to 'comply.'"</p>	<p>Agree. Text has been revised as suggested.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
115.	Description of Selected Remedy	<p>LMES/T. E. Fitzgerald:</p> <p>"Is the remedial action a corrective measure or a remedial action, both stated in text.</p> <p>"Installation of this cap <i>will not</i> directly mitigate leaching of chemicals from this unit. The cap <i>will</i> stop infiltration from acting as a potential transport mechanism for these constituents. The actual concentration of the COCs could actually increase, if data is collected in the UCRS, simply due to the fact that the typical infiltration was not present to dilute the COCs concentrations. Therefore, a concentration increase in the UCRS may actually mean that the cap is working as designed, and as an added bonus, inhibiting the potential for migration.</p> <p>As to the performance of the cap, once the clay or clay max mats are in place, and the cap is completed a P.E. will be required to certify the installation of the cap. This certifies that the cap has met the requirements of the interim ROD, (i.e.) reduction of rainwater infiltration through wastes buried in the unit. Water levels will be the only requirement to be monitored here, so as to determine if waste in place is in contact with the waster table. No chemical analysis will determine this, only the proposed geophysics. Suggest striking the first sentence after, 'precipitation into the buried wastes.'"</p>	<p>Although it is technically a corrective action, it is sometimes referred to as a corrective measure since DOE CERCLA documents integrate RCRA.</p> <p>Agree. Consistent with the response to Comment #28, text throughout the ROD has been revised to indicate the cap would reduce infiltration of surface water from precipitation events.</p> <p>The referenced sentence has been modified as described in the response to Comment #6.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
116.	Major Components Bullets	<p>LMES/T. E. Fitzgerald:</p> <p>"There should not be anything in this declaration that requires the placement of wells, the POC or any action level. This is only an interim cap that will keep rain water from potentially damaging containers.</p> <p>"Under the first bullet of major components surface water is references. Should that be infiltration from rainwater. The only surface water nearby is the ditch. I don't think is will be effected by the cap.</p> <p>"The second bullet identifies that wells will be installed. This unit is a SWMU well inside the fence, not a regulated unit as is C-404. There are a large number of wells that are already in place. We could identify a preexisting well downgradient as a monitoring point for the unit.</p> <p>"Wells in the RGA will in <i>no way</i> monitor the effect of the cap. Only for reducing rainwater infiltration.</p> <p>"Piezometers will be utilized in the RI so as to determine water levels and allow access for geophysical equipment to monitor under the waste. If we must state specifically what data is expected to be collected, please include only water table in the UCRS."</p>	<p>The reference to the point of compliance has been deleted as described in the response to Comment #34. The ground water monitoring wells are an integral part of the selected remedy because it is an interim action.</p> <p>Agree. The text has been modified as described in the response to Comment #28.</p> <p>The intent of placing ground water monitoring wells near SWMU 2 is to detect the potential release of contaminants and to collect data for evaluation of a final action at SWMU 2.</p> <p>Agree. The text has been modified as described in the response to Comment #6.</p> <p>Again, the RGA ground water monitoring wells are an integral part of the interim action.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
116. (Cont'd)		<p>Why is the RCRA Detection Monitoring Guidance referenced, when RCRA will only be relevant, due to the nature of parts of the waste, and possibly not appropriate here since this non-regulated SWMU is in the middle of the facility and will be incorporated in the site-wide SMP. By using this strategy, we will place a minimum of four wells at each SWMU which will put the number of just monitor wells around 200+ SWMUs at 800 within the fence.</p> <p>The Point of Compliance is referenced here as being along the Northern and Western Boundaries of the unit. This is not a regulated unit and is not be required to have the POC at the unit boundary. Even if it was a regulated unit the POC can be moved back from the unit. In 40 CFR 264.95(b)(2) the POC for more than one regulated unit is defined as an imaginary line that circumscribes the several regulated units. Thereby, encompassing those units so as to obtain data that will determine if a release has occurred from any of these units, using the same wells for each.</p> <p>Any new RGA wells will not produce substantial data than those that are already in place. Those wells can also be used to monitor the potentiometric surface of the RGA and have COCs analysis performed from samples collected from them. If no wells are screened in the bottom of the RGA, then well(s) may be required to represent that entire RGA.</p>	<p>Agree. the reference to "RCRA Detection Monitoring guidance" has been deleted. The proposal to install four ground water monitoring wells has not been deleted.</p> <p>Agree. Again, the reference to the point of compliance has been deleted.</p> <p>The ROD has been revised to indicate "an effective ground water monitoring program will be implemented in the uppermost aquifer, the RGA, to detect the potential release of contaminants from SWMU 2." Details of the ground water monitoring system will be presented in the forthcoming sampling and analysis plan for SWMU 2.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
116. (Cont'd)		<p>“Why do we want a statistical increase in the RGA will determine the SWMU 2’s as a contributor, especially since we are looking for 10 ppm directly above the RGA. If so, we need to clarify this. The postage stamp approach, making a pin cushion out of this site with wells is very excessive and costly. For example, it makes little sense to have another extraction well system upgradient from an other. Only place a pump and treat systems would only be of any value on site, is where the highest concentrations have been found (C-400), thereby eliminating or mitigating the source area.</p> <p>“In the third bullet institutional controls are stated as to be inplaced. Has the Jacobs attorneys looked into how this will be done.”</p>	<p>Agree. The reference to use of a statistical method has been deleted.</p> <p>Implementation of any institutional controls will be implemented in accordance with DOE Order 5400.5.</p>
117.	Sect. 2.1	<p>LMES/T. E. Fitzgerald:</p> <p>“On page 4 the RGA is stated as stopping at the floodplain of the Ohio. Doesn’t the RGA discharge into the Ohio.”</p>	Agree. This sentence has been deleted.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
118.	Page 4; Section 2.1	<p>LMES/T. E. Fitzgerald:</p> <p>"The RGA meets the definition of Uppermost Aquifer, according to USEPA's Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy 12/86, adopted by Kentucky in their 91 issue paper. This is the source of the definition of uppermost aquifer.</p> <p>In the discussion of the caps on the two units we may want to interject (a regulated unit) after SWMU 3. This can help separate these two units as to the regulatory requirements both are required, be implemented."</p>	<p>Noted.</p> <p>Agree. Text has been modified as suggested.</p>
119.	Figure 2-2; Section 2.1	<p>LMES/T. E. Fitzgerald:</p> <p>"There is no separation between SWMUs 2 and 3 on the Figure, can we place a line noting separation between the two."</p>	<p>Agree. The figure has been modified as suggested.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
120.	Sect. 2.4	<p>LMES/T. E. Fitzgerald:</p> <p>"In the first sentence do you want to reference the State as well.</p> <p>In the second sentence removal is stated twice. Should the second one be remedial.</p> <p>In the second paragraph a reference is made as to the contamination of clean resources. The RGA flow system appears to be channelized out through the NW corner at this location. This groundwater is already contaminated. No 'clean area' would be involved, even if allowed to migrate off-site, since the plume extends well beyond the fence line.</p> <p>This action does not directly stabilize the SWMU. May want to strike that reference, since leachate will migrate without infiltration.</p> <p>Data gaps are stated as being filled by three separate manners, these three did not appear to be clearly defined."</p>	<p>Agree. Text has been added as suggested.</p> <p>Agree. Text has been revised as suggested.</p> <p>Text has been modified to clarify this statement. However, even if the ground water is already contaminated, measures must be taken to prevent further contamination.</p> <p>Agree. Text has been revised appropriately.</p> <p>Agree. Text has been clarified.</p>
121.	Sect. 2.5	<p>LMES/T. E. Fitzgerald:</p> <p>"On page 10 DNAPLs are stated as not being present yet in SWMU 2. TCE product has been identified as being disposed of here. Product would then be present in the SWMU and would be considered DNAPL. No evidence has been found to date that suggests that TCE is present outside the burial unit."</p>	<p>Agree. Sentence 2 in Paragraph 5 has been changed in response to Comment #76.</p>

COMMENT RESPONSE SUMMARY			
Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
122.	Figure 2-4; Section 2.5	LMES/T. E. Fitzgerald: "Could another line be drawn so as to separate the two SWMUs from each other."	Agree. Figure has been modified as suggested.
123.	Table 2-1; Section 2.5	LMES/T. E. Fitzgerald: "Should you reference where the COCs were determined and where this information is located in this ROD or previous documents."	Table 2-1 has been deleted.
124.	Section 2.5; Radiological contamination	LMES/T. E. Fitzgerald: "In the second paragraph there is a discussion of MW-58 and 154. Is this needed in the ROD. Also a statement after that says, 'In general,' simply state that rad contamination the UCRS to date is significantly higher than that found in the RGA. No data has been collected within a ten fold factor of the MCL for TC99. The last sentence of that paragraph references that there is only one well immediately down gradient, that may be plenty. Doesn't appear to be needed to be in the ROD, since there are other wells located downgradient in WAG 22. The last full paragraph on 13 talks of the ditch. If this area is hot why don't we see if this could be added into the dirt required to be placed under the cap, so as to build the required slope. Could simply state that we will consider once in design. Is this considered a wetland in any way, or just a drainage ditch."	Agree. The discussion of MW 58 and MW 154 has been deleted. A sentence has been added to clarify "Uranium has not been detected above reference levels in the RGA in the vicinity of SWMU 2." Agree. Sentence has been deleted. The ditch is part of the surface water integrator unit and beyond the scope of this interim action. The ditch contains a "potential wetland" according to <i>Investigations of Sensitive Geological Resources Inside the Paducah Gaseous Diffusion Plant</i> (7916-003-FR-BBRY, August 1994).

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
125.	Table 2-2; Section 2.6	<p>LMES/T. E. Fitzgerald:</p> <p>"From looking at the interim action risks associated with the Risk Results table it would appear that no further action would be required at this point, since the risks are reduced to below residential scenarios. The urgency for and quantities of more data would also follow this logic."</p>	<p>Agree. Table 2-1 (formerly Table 2-2) has been revised for clarification.</p>
126.	Section 2.8; Alternative 5	<p>LMES/T. E. Fitzgerald:</p> <p>"Why are we putting in four RGA wells for this IROD cap? Only where there is a remedy inplace should there be any consideration as to the installation of permanent wells. Well installation, or even the number of wells is not required to be included in the ROD. Should all be placed in the RI for the area.</p> <p>Soil that is generated from outside the unit during any well installation would not be allowed to be brought back to the unit and placed on the land if above LDRs for all constituents present in the soil. This soil could be generated outside the CERCLA AOC and would be considered placement of waste."</p>	<p>The ROD has been revised to indicate "an effective ground water monitoring program will be implemented in the uppermost aquifer, the RGA, to detect the potential release of contaminants from SWMU 2." Details of the ground water monitoring system will be presented in the forthcoming sampling and analysis plan for SWMU 2.</p> <p>Agree; however, soil which will be generated is expected to be "clean" since it will be collected from outside the unit. If any of the collected soil is not "clean," it is likely that it would then be identified as having been collected from within the unit and the concerns raised in this comment become a moot point. This is an issue which also needs to be considered during the remedial design and remedial action phases of the project.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
127.	Sect. 2.10; Selected Remedy	<p>LMES/T. E. Fitzgerald:</p> <p>"In the second bullet the first sentence once again the wells and piezometer are described as monitoring the effectiveness of the cap, when this is not the case. The second sentence also discusses cap performance via piezometer. Please edit.</p> <p>"Do we need to determine the depth of the screens in the ROD. This should be done in the field, allowing more flexibility to the location and depths for placement.</p> <p>"The RCRA monitoring requirements are not applicable here.</p> <p>"No statistical analysis is required for the RGA when we are looking for greater than 10 pm in the UCRS above. Even if a significant increase were documented what would be the response. This unit is in the center portion of the facility. Unless major contamination is found in the UCRS or the RGA no independent actions would be beneficial.</p> <p>"Waste associated with soil cuttings will not be allowed to be placed on the land back at the SWMU if above LDR limits for each constituent identified from the analysis that could be required. If analysis of any borings taken show that the waste would not be characteristically hazardous, [or] fail the TCLP requirements then LDRs would not be a problem. It is my understanding that the State has commented verbally of this, at a previous remedial action and stated that they did not recognize EPA's guidance, or preamble discussion of the promulgated NCP dated 3/8/90 in the Federal Register."</p>	<p>Agree. The sentence has been modified consistent with the response to Comment #6.</p> <p>Agree. The referenced sentence has been deleted.</p> <p>Agree. Refer to response to sixth paragraph in Comment #116.</p> <p>Agree. Refer to response to sixth paragraph in Comment #116.</p> <p>Agree. Refer to response to second paragraph of Comment #126.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
128.	Section 2.11; ARARs	<p>LMES/T. E. Fitzgerald:</p> <p>"Writing entire sections of a regulation in as boiler plate leaves requirements that are not warranted for this action.</p> <p>The Federal Register reference noted in the definitions of Chemical, Location, and Action Specific Requirements leaves out the date when these were published. These appear in the Proposed NCP Preamble dated 12/21/88. These were not finalized until the NCP was promulgated on 3/8/90. The preamble discussion on ARARs there was included on pages 55FR 8741 through 8750 3/8/90. The definitions that have been given were referenced in the final NCP preamble.</p> <p>The waivers references at the bottom of 34 are included in those pages of the promulgated NCP given above.</p> <p>The third paragraph starts out with EPA's treatment, should this be DOE's treatment of instead.</p>	<p>Agree. ARARs have undergone comprehensive revisions.</p> <p>Disagree. The final preamble cites the proposed preamble for these definitions.</p> <p>Disagree. It is actually CERCLA § 121 that sets out waiver options. The final preamble to the NCP refers back to the statute for these waivers.</p> <p>No. This is a discussion of how the EPA treats state ARARs consistent with the way it treats federal requirements.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
128. (Cont'd)		<p>This interim action installs a clay cap over a burial area less than an acre in size well within the DOE fence. There is no pump and treat at this location, no remediation to residential drinking water standards. The only water involved will be that generated from monitoring wells. MCLs are applicable to drinking water at the tap, that is correct. There are not actions here that require any person drinking water from the UCRS or the RGA, via a monitoring well. Any water that is generated from purging of existing or temporary borings will be sent to a waste water treatment facility on site, where it will be treated to meet the KPDES discharge levels established in the permit, 81 ppb. There is no connection between the WWTU/KPDES discharge numbers and the MCLs for drinking water at the faucet. The last two paragraphs of 35 and the top of 36 should be removed.</p> <p>If the air emissions are considered a problem then included them. If they have been calculated and determined to not be a problem then state that this is the case. The same applies to occupational radiation, clarify as best we can as to how these will impact this interim action."</p>	<p>Agree. Text has been deleted due to the fact that this is an interim action not focused on ground water cleanup.</p> <p>Agree. Text has been modified.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
129.	Section 2.11; Action-Specific	<p>LMES/T. E. Fitzgerald:</p> <p>"How does PGDP typically handle this. All roads to the unit are either asphalt, concrete, or gravel. The SWMU is well within the property line and the only dust that would be generated would be during placement of any dirt on top of the unit. It appears that there will be little dust problems and this could be addressed in this section.</p> <p>The 264.310 and 34.230 references are RCRA requirements for final closure of a regulated unit. Please state the regulation from which the reference is made (RCRA Closure and Post-closure Care), since this is critical as to how these identified requirements apply to the subject at hand. This is not a regulated unit, this is not a final action. At the most these requirements would be relevant, whether they are appropriate is the question that needs to be addressed, verse listing boiler language from sections of the regulation. This interim action will meet those requirements that best fit the needs of the unit, since it is not a RCRA unit, or going through a final remedy. For example, no leachate collection system will be needed here when the cover is installed. Yet this is a requirement which has been identified here via the entire 264.310 reference.</p> <p>Another paragraph is given to 264.310, those requirements that are relevant and appropriate from this reference should be incorporated and discussed with respect to the action at hand, and what will be an appropriate action for this interim action.</p>	<p>Text has been modified to be more specific.</p> <p>Text has been tailored to more appropriately address the action. However, these requirements are relevant and appropriate.</p> <p>Again, the requirements have been tailored to more appropriately fit the action.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
129. (Cont'd)		<p>The next reference is to the 264.97 RCRA General Groundwater Monitoring Requirements, which is stated that a system will be installed in the uppermost aquifer. The Required Programs section 264.91(a)(1) states: 'Whenever hazardous constituents under 264.93 from a regulated unit are detected at a compliance point under 264.95, the owner or operator must institute a compliance monitoring program under 264.99.' The requirements outlined in 264.87 apply to 264.99. This unit is not a regulated unit, there has been no POC determined for this or any other SWMU unit at PGDP. Therefore, no POC violations could have occurred that would require that those requirements specified in 264.99 or 264.87 be implemented. These general groundwater requirements are relevant to what actions that will occur away from the cap itself (monitoring for RI data), whether they are appropriate at this stage of the game is of some doubt. The SMP and POC included in that will address these concerns for units in general.</p> <p>Monitor wells are thought to be temporary borings that will be backfilled once the RGA has been sampled at the appropriate depths. Permanent wells are not required to be installed for here. The 264.97 reference once again is for a RCRA regulated unit.</p>	<p>Agree. The monitoring wells in this action have been made an integral part of this action by agreement. The RCRA ground water monitoring requirements are not both relevant and appropriate.</p> <p>These requirements have been deleted. However, these wells are not temporary and will be implemented as part of the interim remedial action.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
129. (Cont'd)		<p>40CFR264.60 is reference here as well as 264.98 detection monitoring. The text states that this action will be performed, and that three wells will be installed down gradient, and one will be installed upgradient. There is no mention here that these requirements once again are for RCRA regulated units, and at best would be a relevant and appropriate requirement to be considered in the course of this decision. This type of monitoring system, where it is located would not be cost effective. Data from other wells and field borings as done in Phase IV could easily provide the RI data need for the FS and subsequent final action.</p> <p>The statistical testing may not be appropriate here, due to the location and nature of the unit and the waste itself.</p> <p>At the top of page 38 a new POC is stated as being determined once a compliance monitoring program is in place. I don't think we will be able to move the POC once we establish it. Please state that 264.99 is for RCRA regulated units, and see the above discussion on 264.99.</p> <p>Is there a CFR reference to the 401 KAR 34.310 Section 13 in the CFR. Please note that if temporary borings are used then monitoring well requirements may not apply.</p>	<p>All monitoring requirements under RCRA have been deleted. If this were a final action, the requirements may have been relevant and appropriate.</p> <p>Agree. References to statistical analysis have been deleted from the text.</p> <p>Agree. This text has been deleted.</p> <p>An equivalent federal citation does not exist; however, the wells are not temporary so the Kentucky regulations would apply. This citation applies to any monitoring well installed within the Commonwealth.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
129. (Cont'd)		<p>The third full paragraph on page 38 does not give any references for the discussion on monitoring wells. Permanent wells may not be used during the RI phase of this action.</p> <p>Characterizing the PPE in the fourth paragraph on 38 does not list any CFR references. Only characteristic waste criteria is required for PPE, soil, and groundwater from a SWMU.</p> <p>How do the remaining ARAR references apply to the actions for the IROD. Please specify whether they are applicable or relevant and appropriate."</p>	<p>The citation "401 K.A.R. 34:310 § 13" has been added to this discussion.</p> <p>Agree. The text has been modified.</p> <p>Agree. Text has been added for clarification.</p>
130.	Section 2.11; ARAR Tables; Chemical-Specific	<p>LMES/T. E. Fitzgerald:</p> <p>"The first ARAR list[s] protection of drinking water sources as an ARAR. This interim action places a clay cap on a burial area less than an acre in size, in the middle of the plant. The other portion of the IROD calls for the installation of water level indicators under the unit, and some type of monitoring of the RGA. There is no type of groundwater extraction system that is going to clean up the RGA to SDWA MCLs. This requirement is listed as an applicable requirement. The only way that it could be applicable is if we were putting in a water fountain next to the unit for public use, since these regulations are only applicable at the drinking water tap. Please remove the MCLs from the text and tables."</p>	<p>Agree. The MCLs have been deleted because this is an interim action.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
131.	Section 2.11; ARAR Tables; Action-Specific	<p>LMES/T. E. Fitzgerald:</p> <p>"Under surface water control there are two options; over or under five acres. This action is for an area of approximately one acre. This should be reflected in the table, making this requirement relevant and appropriate.</p> <p>For low permeability, multi-layer cap, 264.310 final capping regulations are referenced. Please note that these are the RCRA requirements for final closure of a permitted facility.</p> <p>Those subparts that are listed should have the appropriate notation listed under the Federal or State Citation, since not all of the final closure regulations in 26.310 were not included in the table. For example leachate collection requirements are in 310, but were left out of the table.</p> <p>It appears that the 40 CFR 264.30 reference on page 44 is incorrect, please review.</p> <p>The groundwater monitoring requirements listed are RCRA requirements. This should be noted in the citation. This regulated unit regulation is at best relevant and appropriate in this situation. There is no reference made to this. Do not tie this unit to these requirements.</p> <p>Under the citation heading list the subtitle that is appropriate for each section.</p> <p>The third requirement states that samples are taken that pass through the unit. You need to define or clarify what is met by passing through the unit.</p>	<p>The five-acre requirement does not apply to the PGDP and has been deleted.</p> <p>These requirements have been deleted.</p> <p>Text has been modified to specify that not all requirements under a particular RCRA regulation will apply.</p> <p>Agree. The citation has been deleted.</p> <p>Ground water monitoring will be performed in this action pursuant to agreement by DOE, but requirements under RCRA have been deleted. While the RCRA ground water monitoring requirements may be relevant, they are not appropriate for this particular action.</p> <p>Disagree. This is an appropriate citation.</p> <p>This statement has been deleted.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
131. (Cont'd)		<p>A major section is missing that can help this RI work that is being initiated via this IROD. See 40 CFR 264.97(b): 'If a facility contains more than one regulated unit, separate ground water monitoring systems are not required for each regulated unit provided that provisions for sampling the ground water in the uppermost aquifer will enable detection and measurement at the compliance point of hazardous constituents from the regulated units that have entered the groundwater in the uppermost aquifer.' This would be <i>just as</i> relevant and appropriate for the action being taken at this non-regulated unit.</p> <p>Under the monitor well section the three subparts are broken out. In the CFR they are all combined. There is no reference as this requirement being relevant and appropriate, or that these are for RCRA regulated units. Please list the subtitles in the regulations where these specific requirements were taken from."</p>	<p>These requirements have been deleted from the text.</p> <p>Ground water monitoring requirements under RCRA have been deleted.</p>
132.	Section 2.11; Groundwater Monitoring (detection monitoring)	LMES/T. E. Fitzgerald: "See above comment."	See response to Comment #131.
133.	Section 2.11 Well Installation	LMES/T. E. Fitzgerald: "Are the piezometer[s] considered wells by the State, I think they are."	The same requirements that apply to wells will apply to piezometers.

<p align="center">COMMENT RESPONSE SUMMARY</p> <p align="center">Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)</p>			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
135.	Page 50; Section 2.11	LMES/T. E. Fitzgerald: "An interim status facility reference is given again."	Pursuant to 401 K.A.R. 32:030 § 5 on-site storage for less than 90 days will follow interim-status requirements.
136.	Page 51; Section 2.11	LMES/T. E. Fitzgerald: "Closure requirements have no Federal or State Citations, or Prerequisites."	Noted. However, this ARAR has been deleted.
137.	Section 2.11; Waste Management	LMES/T. E. Fitzgerald: "You may want to qualify that we are not expecting to handle any pyrophoric materials in this IROD."	Agree. Text has been modified to qualify that this is a remote possibility.
138.	Page 52; Section 2.11	LMES/T. E. Fitzgerald: "A disclaimer as to the storage of potentially hazardous waste will occur at facilities that are already in operation, which are in compliance with State and Federal regulations. No storage of hazardous waste will occur at the unit from operations included in this IROD. I don't think that there will be any movement from one land disposal area of hazardous waste that will be reapplied at another land disposal unit during this work, not sure if we need this in there either. Could reference the newly promulgated TCLP UTS LDRs that are applicable to the land disposal of solid or hazardous waste."	Agree. Disclaimer has been added. Agree. Compliance with this ARAR will be met through non-movement.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
139.	General Comment	<p>LMES/L. Houlberg:</p> <p>"The MCLs for chromium and cadmium were revised in 1991 to 0.1 mg/l and 0.005 mg/l, respectively (56 FR 3526, January 30, 1991, effective July 30, 1992). The MCL for barium was also revised in 1991 to 2.0 mg/l (56 FR 30266, July 1, 1991, effective January 1, 1993). The interim MCL for silver was revoked in 1991 and replaced with a secondary MCL (56 FR 3526, January 30, 1991, effective July 30, 1992)."</p>	Agree. MCLs have been deleted from the IROD.
140.	Page 36; Section 2.11; First Full Sentence	<p>LMES/L. Houlberg:</p> <p>"The 4 mrem/year MCL should be identified as relevant and appropriate, not applicable."</p>	All references to MCLs have been deleted from this IROD.
141.	Page 36; Section 2.11; Para. 1	<p>LMES/L. Houlberg:</p> <p>"This paragraph discusses the dose limits in DOE Order 5400.5 Suggest noting that the 100 mrem/year effective dose equivalent for the public is from all exposure modes from all routine DOE activities. I am unable to find the 10 mrem/year organ dose in the Order or in the proposed rule for this Order. Suggest you verify that number and perhaps give chapter and page citations from the Order for these EDEs."</p>	Agree. Text has been clarified.
142.	Page 36; Section 2.11; Para. 1; Last Sent.	<p>LMES/L. Houlberg:</p> <p>"Discusses promulgation of DOE Order 5400.5. Suggest adding that this Order is scheduled to be promulgated in August 1995."</p>	Agree. Text has been added.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
143.	Page 36; Section 2.11; Para. 3; and Table 2-5; Page 42	LMES/L. Houlberg: "Discusses 10 CFR 835, <i>Occupational Radiation Protection</i> , as an applicable ARAR. This discussion should be deleted from the ARARs text and tables. OSHA and all other worker protection requirements/regulations are considered by EPA to be public health laws, not environmental laws and, as such, are not considered to be part of the ARARs process under CERCLA Section 121(d)(2). (See Preamble to the Final NCP, 55 FR 8680, March 9, 1990 for a discussion of this topic)."	Agree. The discussion of 10 C.F.R. § 835 has been moved to immediately follow the discussion of OSHA regulations.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
144. (Cont'd)		Third sentence states that pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable. Since the pyrophoric waste at this site is buried in the ground, and your alternative is to leave it there and cap it, I don't think you need to cite this sentence about treatment as TBC guidance. The intent of that part of the Order is that if you have pyrophoric material in a waste you're handling (above ground), you need to treat, prepare, and package it so it's nonflammable before it's disposed. It really doesn't apply to pyrophoric materials that have been buried in the ground for a long time and will continue in that state."	There is a possibility, although very remote, that pyrophoric material will be brought up when the monitoring wells are installed. However, the has been clarified to discuss this remote possibility.
145.	Page 39; Section 2.11; First Line	LMES/L. Houlberg: "The derived concentration guides discussed in DOE Order 5400.5 are screening values for considering whether BAT (best available technology) needs to be applied to the discharges to water and air. They are the levels that correlate to the 100 mrem/year EDE in the Order. They are not 'release limits' or 'cleanup limits.' Since BAT applications are not part of this remedial action, I don't think you should be citing the DCGs. Citing the 100 mrem/year EDE from the Order and the MCL for beta particle and photon activity is sufficient for the rad-contaminated groundwater."	Agree. This sentence has been deleted.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
146.	Page 39; Section 2.11; Para. 1	LMES/L. Houlberg: "Paragraph discusses DOE Order 5480.4, <i>Environmental Safety and Health Standards</i> . This discussion should be deleted from the ARARs text. OSHA and all other worker protection requirements/regulations are considered by EPA to be public health laws, not environmental laws and, as such, are not considered to be part of the ARARs process under CERCLA Section 121(d)(2). (See Preamble to the Final NCP, 55 FR 8680, March 9, 1990 for a discussion of this topic)."	Agree. The text has been modified as indicated in the response to Comment #143.
147.	Page 39; Section 2.11; Para. 4	LMES/L. Houlberg: "Unless you expect any excavated soils or PPE to be contaminated with ignitable, reactive, or incompatible wastes, you do not need to include this paragraph. If you do expect such contamination, suggest you note that these requirements would apply to the containerization and handling of these wastes only. It would not apply to the pyrophoric uranium left in the ground."	There is a possibility, albeit very remote, that pyrophoric materials will be brought up when wells are installed. The text has been modified to specify this.
148.	Page 40; Section 2.11; Paras. 1 and 2	LMES/L. Houlberg: "Discussion of LDRs—suggest you clarify that the LDRs may apply to the excavated soils and PPE if testing shows them to be RCRA restricted waste. They would not apply to the soil left in the ground. Also, suggest you discuss, as TBC guidance, the EPA/DOE LDR/FFCA which allows DOE to store LDR restricted mixed wastes beyond the one-year limit pending development of treatment capacity."	Agree. Text has been tailored to more specifically fit the action.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
149.	Page 40; Section 2.11; Para. 3	LMES/L. Houlberg: "This paragraph states that there are no location-specific ARARs for this alternative. The FS for this site discusses wetlands, both jurisdictional and non-jurisdictional, in the drainage ditches surrounding the area. Since the preferred alternative involves digging trenches around the perimeter as a dewatering option, it appears the wetlands in these drainage ditches could be impacted. Suggest adding 10 CFR 1022 as an ARAR in case the wetlands are impacted."	See response to Comment #53.
150.	Page 41; Section 2.11; Table 2-5	LMES/L. Houlberg: "SDWA MCLs should be cited as relevant and appropriate, not applicable. Also, the MCL for barium should be 2.0 mg/l, not 1.0 mg/l. The 0.1 mg/l level cited for silver is actually an SMCL, not an MCL, and should be noted as such. Also, the table cites two numbers for technetium-99, neither of which is an MCL. The 900 pCi/l level is calculated to be equal to the present gross beta MCL of 4 mrem/year; it should be footnoted as such. The 3,790 pCi/l level is the calculated equivalent level in the proposed rule; it should be footnoted as such, as well as noting that it is TBC guidance rather than relevant and appropriate, since that rule is not yet promulgated."	MCLs have been deleted due to the fact that this is an interim ROD that will not intend to remediate the ground water.
151.	Page 49; Section 2.11; Table 2-5	LMES/L. Houlberg: "Suggest qualifying the applicability statement under 'prerequisites' to say it is applicable to any excavated soil and personal protective equipment identified as RCRA hazardous waste."	Agree. Text has been added.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
152.	Page 51; Section 2.11; Table 2-5	LMES/L. Houlberg: "Unless you are sure excavated soils or personal protective equipment (PPE) would contain pyrophoric materials, suggest you delete the 'requirements' bullet dealing with pyrophoric waste. It would not apply to the pyrophoric material left in the ground."	There is a remote possibility excavated soil from well installation and/or site grading activities could contain pyrophoric materials. The text has been qualified to reflect the noted concern.
153.	Page 52; Section 2.11; Table 2-5	LMES/L. Houlberg: "The citation for the LDRs (40 CFR 268) does not line up with the LDR requirements bullet. It should be clarified that the LDRs would only be triggered for movement of excavated soils or PPE off the operable unit and disposal into another operable unit. Also, suggest adding a bullet discussing the EPA/DOE LDR-FFCA to this page as TBC guidance for storage of any excavated soils or PPE identified as RCRA restricted mixed waste."	Agree. Text has been modified.
154.	Preface	LMES/J. W. Morgan: "Delete reference to RA Workplan in last line. Plans under the FFA/SMP are to incorporate this type of information in the RD Report."	Agree. The reference to the "Remedial Action Workplan and Report" has been deleted as suggested.
155.	Statement of Basis and Purpose	LMES/J. W. Morgan: "a) I thought the NPL date was May 31, 1994. "b) Reference to '{concur/does not concur}' is confusing. Either they concur or they do not?"	The text has been revised to indicate the PGDP NPL listing became effective June 30, 1994 and was published in the May 31, 1994 Federal Register. Agree. The text has been modified to indicate the Commonwealth does concur.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
156.	Description of Selected Remedy	<p>LMES/J. W. Morgan:</p> <p>"In the 2nd bullet I would suggest we delete references to RCRA detection monitoring and point of compliance. There are a lot of requirements we are not planning to follow that are associated with RCRA detection monitoring. Inclusion of such references will eliminate DOE's flexibility to modify the sampling and analysis plan. Point of Compliance reference should also be deleted since this is a current point of negotiation under the SMP."</p>	<p>Agree. Consistent with the response to the sixth paragraph of Comment #116, the reference to "RCRA Detection Monitoring guidance" has been deleted. Consistent with the response to the seventh paragraph of Comment 116, the reference to the point of compliance has been deleted.</p>
157.	Statutory Determination	<p>LMES/J. W. Morgan:</p> <p>"Line 9 implies the final action will be an 'action' that will employ treatment to reduce toxicity...however, the cap selected under this interim action may also be adopted as the final action. Suggest replacing the word 'addressed' with the word 'considered.'"</p>	<p>Agree. The text has been modified as suggested.</p>
158.	Page 7; Section 2.4; Para. 5	<p>LMES/J. W. Morgan:</p> <p>"The referenced phrase '...incremental step toward addressing the ground water system' implies this is a groundwater action. While this action is intended to be protective of groundwater, it is a source action not a ground water action. Suggest deletion or revision."</p>	<p>Agree. Text has been modified.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
159.	Pages 10 through 13 and Figure 2-1; Section 2.5	LMES/J. W. Morgan: "The <u>intent</u> of the discussion of COCs and the corresponding table is confusing. Does the table reflect all contaminants of concern, those that are naturally occurring, or both? Is this section committing us to sampling for all these COCs during the Sampling and Analysis activities. Additional clarification may be needed."	The table was intended to identify <u>all</u> COCs as evaluated in the FS. The table has been deleted in response to Comment #1. No commitments has been made in the ROD concerning the analytes for the proposed sampling and analysis activities.
160.	Page 14; Sect. 2.6; General	LMES/J. W. Morgan: "Third line references off-site resident. Are you referring to a point modeled off of DOE property, or an assumed residential exposure at the SWMU boundary? If the answer is the SWMU boundary, a residential exposure scenario at that location is inappropriate. Past agreements between DOE and the regulators include evaluation of future residential scenarios during the baseline risk assessment and FS. However, in the proposed plan and ROD, the Parties are to make a risk management decision on land use for remedy selection. Since waste is left in place, industrial land use is the selection by default. However, the discussion implies some residential exposure. This comment is applicable throughout the document."	Noted. Although industrial land use was determined for SWMU 2, there was a potential for ground water to migrate offsite. Therefore, a hypothetical ground water user (a residential exposure) was evaluated as a reasonable maximum exposure. This section has been revised for clarity.
161.	Page 20; Section 2.8; Para. 3; Lines 10 and 11	LMES/J. W. Morgan: "This sentence references 'one disposal option...consist of on-site disposal in a long-term storage facility.' A storage facility is not a disposal option, nor does PGDP have an on-site disposal option for RAD or RCRA wastes."	Agree. The text has been corrected, and the sentence on lines 12 and 13 has been expanded to indicate that such a storage facility does not exist.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
162.	Page 33; Section 2.10; Para. 1; Line 2	LMES/J. W. Morgan: "The statement 'ground water samples will be collected from each monitor well on a semi-annual basis and analyzed for the COC' is committing the DOE to infinite sampling (>30 years) for all the COC in Table 2-1. This should be deleted. The decisions on the sampling frequency and COC should be left to the S&A plan or O&M plan. We need to leave as much flexibility in the ROD as possible."	The ROD has been revised to indicate "an effective ground water monitoring program will be implemented in the uppermost aquifer, the RGA, to detect the potential release of contaminants from SWMU 2." Details of the ground water monitoring system will be presented in the forthcoming sampling and analysis plan for SWMU 2.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
163.	Pages 35 through 52; Section 2.11; ARARs; General Comments	<p>LMES/J. W. Morgan:</p> <p>"a) This section references MCLs as ARARs. While this action is intended to be protective of groundwater with regard to future releases migrating from the unit to groundwater, the action targets the source unit and will not involve groundwater remediation. Therefore, groundwater contamination beneath the WAG 22 will not be remediated to MCLs. Additionally, MCLs imply residential land use at the unit. Suggest deletion of all references to MCL as ARARs.</p> <p>"b) The text and table in this section includes numerous references to RCRA groundwater monitoring requirements as ARARs. While we plan to conduct some groundwater monitoring and sampling activities at WAG 22, we do not plan to follow the RCRA Subpart F regulations verbatim. Identifying these requirements as ARARs will require DOE to follow a very specific procedure that specifies an extensive analyte list, certain sampling frequencies, certain statistical methods, 30 years of monitoring, etc... There are a lot of requirements we are not planning to follow that are associated with Sub part F monitoring. Inclusion of such references will eliminate DOE's flexibility for sampling and analysis activities. I suggest we delete these references and leave these types of decisions on sampling to the S&A plan or O&M plan. We need to leave as much flexibility in the ROD as possible.</p>	<p>a) Agree. The MCLs have been deleted from this IROD.</p> <p>b) Agree. Ground water monitoring under RCRA has been deleted. While these requirements may be relevant, they are not appropriate for this action. The ground water monitoring to be performed in this action is not required by law, but has been chosen to be implemented as an integral part of this interim remedial action.</p>

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
163. (Cont'd)		c) Page 44—This identifies RCRA capping requirements as an ARAR (40 CFR 264.310). The project team did not select a RCRA cap as the alternative (see Section 2.10). While they did select a cap option, it will not be designed as a RCRA cap. Please delete RCRA ARARs for the cap.”	Agree. This text has been deleted.
164.	General Comments	LMES/R. A. Pratt: “Change all references to Martin Marietta Energy Systems to read Lockheed Martin Energy Systems.”	Agree. Document has been modified as suggested.
165.	Page 4; Section 2.1; Para. 3	LMES/R. A. Pratt: “The way the sentence is written at this time may lead the reader to the conclusion that there is only a 6” layer of soil material over the existing waste at SWMU-2. I suggest that a few more words be added to the sentence addressing 3’ layer of soil that is under the 6” clay layer.”	Agree. Text has been revised to include the 18-in vegetative cover as well as the 6-in clay cap. The additional 2-4 ft of soil beneath the cap has been mentioned in Section 2.2.
166.	Page 5; Figure 2-2	LMES/R. A. Pratt: “As presented the figure shows SWMU-7 over laying SWMU-12, which is located in the SE corner of the current SWMU-7 block. SWMU-12 is currently being assigned to WAG-24 an will not be addressed in relation to WAG-22 activities.”	Agree. Figure 2-2 has been modified to show area containing SWMU 12 is not in WAG 22.

COMMENT RESPONSE SUMMARY

Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
167.	Page A-2; Appendix A; Schedule	LMES/R. A. Pratt: "ID# 5 should read Well Installation Mobilization Period at 35 calendar days. Following ID#5 will be Start of Well installation a milestone date."	Agree. The schedule has been significantly revised. Remedial design of the cap has been halted upon completion of the 10% design package. The cap design may later be resumed if determined to be appropriate after field activities provide an indication whether any portion of the buried waste is saturated by ground water.
168.	Distribution List	LMES/R. A. Pratt: "Add Jennifer R. Woodard to the distribution list under Lockheed Martin Energy Systems. Her address will be the same as the other Lockheed Martin addresses."	Disagree. Although the intent of the suggestion is appropriate, the distribution lists which are formally presented in DOE-PGDP documents are of limited length and prepared as directed by the DOE.
169.	Page 2; Section 2.1; Para. 5	LMES/C. J. Winkler: "From line 3 replace 'The next closest' with 'Close communities, both...' It seems somewhat confusing to say that the Magruder Village is 1.5 miles and that the 'next closest' is 1-2 miles."	This paragraph has been deleted in response to Comment #1.
170.	Page 4; Section 2.1; Para. 2	LMES/C. J. Winkler: "Should the last sentence be revised to mention a NW plume?"	The last sentence provides the necessary general information for this ROD—no change was made.
171.	Page 7; Section 2.4	LMES/C. J. Winkler: "The last sentence of paragraph 2 'By implementation of this interim action, increased stabilization...while a final remedy for SWMU 2.' Sentence does not appear complete. Unable to suggest modification because I am uncertain of what is trying to be conveyed."	Agree. Text has been modified.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
172.	Page 23; Alternative 5	LMES/C. J. Winkler: "The second paragraph, 3rd line states that 70 CF is the expected waste volume for the wells and piezometers. This is approx. 10 drums of waste [with] little to no head space allowance. This estimate is extremely low based on work completed for groundwater phase IV and the landfill wells. One RGA well, completed using hollow stem augers, will generate more than 12 drums of waste. Please revise this estimate."	Agree. The text has been modified as suggested.
173.	Page 31; Implementability	LMES/C. J. Winkler: "3rd line...Change to read 'Alternative 3 would...administratively feasible, significant safety and health concerns exist.'"	Agree. The text has been modified as suggested.
174.	Page 38; Para. 4	LMES/C. J. Winkler: "Change 1st sent. to read 'Although the majority of the waste will be used/placed on top of the SWMU as soil cover and capped, there will still be excess soil and personal protective equipment (PPE) that will need to be managed and ultimately disposed.'"	Agree. Text has been revised to better clarify the specifics of this action.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
175.	Schedule	<p>LMES/C. J. Winkler:</p> <p>"This schedule assumes that the wells will be installed by a service contractor. The ROD states that these wells are a part of the interim remedial action/remedy. The expected DB ruling for these wells is a construction contract. The schedule presented should show the design and procurement process for a construction contract for the wells. Another approach would be to submit the Davis Bacon and then complete this schedule based on the actual DB ruling."</p>	<p>Noted. According to the LMES Program Manager, since the service contracting period is six months and the construction contracting period is three months, the greater of the two was used to produce a conservative estimate.</p>
176.	Estimate Costs	<p>LMES/C. J. Winkler:</p> <p>"There are figures provided for the cost of the various alternatives. Was there a formal cost estimate done for each of the alternatives? If so, can I get a copy of it to review the projected costs for the well and piezometer installation?"</p>	<p>Formal cost estimates have been prepared for each alternative. The DOE, LMES, Jacobs ER Team, and Foster-Wheeler Corporation even conducted a "mini-cost review" of the preferred alternative March 15, 1995. LMES has copies of all cost estimates prepared by the Jacobs ER Team for the feasibility study. In addition, Foster-Wheeler Corporation is has prepared a more detailed cost estimate of the preferred alternative as part of the draft 10% design package.</p>
177.	General Comments	<p>LMES/J. R. Woodard:</p> <p>"Change all references to 'Commonwealth of Kentucky' to 'Kentucky Department for Environmental Protection.'"</p>	<p>Agree. References were modified as suggested as appropriate throughout the document.</p>
178.	Declaration; Page 1; Para. 2; Line 11	<p>LMES/J. R. Woodard:</p> <p>"What concept was discussed at the meetings?"</p>	<p>The phrase "This concept" refers to a feasibility study report specifically for SWMUs 2 and 3 of WAG 22, i.e., excluding SWMUs 7 and 30. The text has been modified to provide clarification.</p>

<p style="text-align: center;">COMMENT RESPONSE SUMMARY Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3 of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky DOE/OR/06-1351&D0 (issued March 1995) (continued)</p>			
Comment Number	Page; Section; Para.	Reviewer and Comment	Response
179.	Declaration; Page 2; Bullet 2	LMES/J. R. Woodard: "Monitoring wells have two functions: measuring effectiveness of cap and gathering additional groundwater data."	The referenced text has been modified as indicated in the response to Comment #6.
180.	Page 2; Section 2.1; Para. 2	LMES/J. R. Woodard: "After MMUS and LMES add 'a Lockheed Martin company.'"	Consistent with the response to Comment #11, references to MMES have been revised to Lockheed Martin Energy Systems (LMES) and all references to MMUS have been revised to Lockheed Martin Utility Services.
181.	Page 6; Para. 7; Line 1; and Page 7; Para. 1; Line 4	LMES/J. R. Woodard: "Change the dates of the notice of availability to the new schedule dates of May 31 to July 14."	Agree. The appropriate changes have been made.
182.	Page 7; Para. 1	LMES/J. R. Woodard: "Change release date of the PP to May 31."	Agree. The date has been changed accordingly.
183.	Page 7; Para. 2	LMES/J. R. Woodard: "Check with Dennis Hill to see if the mid-June reference for public meeting is still appropriate."	Noted. Mid-June data is appropriate.
184.	Page 7; Section 2.4; Para. 2; Last Line	LMES/J. R. Woodard: "Last part of sentence is missing."	Agree. Remainder of sentence has been added

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
185.	Page 13; Para. 4	LMES/J. R. Woodard: "It should be noted that the burial ground is bounded on two sides by cylinder yards. The walkovers also indicate that these cylinder yards are contributing to the gamma readings."	Agree. Added statement "cylinder storage yards located adjacent to SWMU 2 are also likely contributing to the elevated gamma readings."
186.	Page 14; Sentence 1	LMES/J. R. Woodard: "Replace 'very slowly' with an time frame."	Agree. Added "taking approximately 1,900 years to migrate to the RGA."
187.	Page 31; Para. 2	LMES/J. R. Woodard: "May need to explain what the 'significant concerns' are."	Agree. The phrase "health and safety" has been added prior to the word "concerns."
188.	Page 31; Para. 3; and Page 33; Para. 3	LMES/J. R. Woodard: "Explain why '(revised)' is inserted or omit the reference."	Agree. The term "revised" was in reference to the cost estimate for the preferred alternative following the March 15, 1995, "mini-cost review." The word "revised" has been deleted.
189.	Page 32; Table 2-4	LMES/J. R. Woodard: "Table presents data for Alternative 5C only, text (p. 31, para. 3) states the table will present the data for each alternative."	The referenced text has been corrected to reference Table 2-2 (formerly Table 2-3). Table 2-3 (formerly Table 2-4) is correctly referenced in the final paragraph of Section 2.9 (formerly Section 2.10).
190.	General Comments	LMES/J. R. Woodard: "Sometimes cost effective is hyphenated and sometimes not, be consistent."	Consistent with style guides, including in-house style guides produced by MMES, the hyphenated version of the term in question is used as an adjective. The hyphen is not used when the term is not an adjective. Use throughout the document has been reviewed.

COMMENT RESPONSE SUMMARY

**Record of Decision for Interim Remedial Action at Solid Waste Management Units 2 and 3
of Waste Area Group 22 at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky
DOE/OR/06-1351&D0 (issued March 1995) (continued)**

Comment Number	Page; Section; Para.	Reviewer and Comment	Response
191.	General Comments	LMES/J. R. Woodard: "Technical papers should avoid using 'there is/are', use action verbs."	Noted.
192.	General Comments	LMES/J. R. Woodard: "Technical papers should avoid using 'because', use 'since' or 'due to' instead."	Agree. Such usage has been edited, as appropriate.