

## **Waste Management Plan for the Holocene Project**

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Prepared for  
United States Department of Energy Portsmouth/Paducah Project Office  
Acknowledgment: This material is based upon work supported by the Department of Energy under  
Award Number DE-FG05-03OR23032.



**June 2005**

**UK/KRCEE Doc #: P17.2 2005**

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## 1.0 INTRODUCTION

This Waste Management Plan (Plan) establishes procedures for addressing the potential generation of material related to drilling operations, collection of cores, and closing boreholes. Because the coring locations are outside of the C-746-U Landfill (Attachment 1, Figure 1) and the final depth of the cores will be approximately 20 feet below ground surface, it is not anticipated that contaminated investigation derived material and/or waste (IDM/IDW) will be generated during coring operations. All waste that is generated will be the property of the U.S. Department of Energy (DOE). KRCEE and its subcontractors will minimize waste generation. At no time will KRCEE or its subcontractors take ownership or possession of waste generated during core collection operations. As wastes are generated during the drilling and core collection phases, handling, accumulation, staging, and ultimate disposition of wastes are the responsibility of the DOE.

This Plan supports activities designed to assess whether displacement of Holocene-aged material has occurred at the C-746-U Landfill. The KRCEE will obtain 80+ cores with Direct Push Technology (DPT) from target zones associated with faults identified by previous seismic studies to the north and west of the C-746-U Landfill. Nationally recognized experts, organized specifically for their individual expertise related to seismic evaluations, will provide technical guidance for the project. Data and information will be gathered to assess whether Holocene displacement has occurred in the immediate area of the landfill.

The work areas along the transects range in elevation from approximately 367' above mean sea level (msl) at the eastern end of the E-W transect, to 372' msl at the southern end of the N-S transect. The areas along the two (2) transects are currently grassed or covered with gravel and are readily accessible. The two transects are outside of the C-746-U Landfill security fence. The E-W transect cuts across the northern extent of the C-746-U SWMU boundary. Site maps are presented in the Field Sampling Plan.

It is not expected that the coring operations at selected locations will pose a hazard to workers or impact on-going site remedial or field activities. Based on the history of releases from PGDP and operational processes at the facility, the site contaminants that have the greatest possibility of being present are trichloroethylene (TCE) and technetium-99 (<sup>99</sup>Tc). However, it is unlikely that TCE or <sup>99</sup>Tc will be encountered, especially since the borings will not extend into the Regional Groundwater Aquifer (RGA).

The intent of this investigation is to determine if a horizon of datable Holocene material occurs and is widespread across the shallow subsurface at the C-746 U-Landfill and whether the Holocene material has been displaced by seismic activity in the last 10-11,000 years. In order to accomplish this objective, DPT cores will be obtained from locations along the two (2) transects. Cores will be screened for radiological and volatile chemical contamination and will be sampled as directed by KRCEE. The DPT cores will be obtained in approximately 5-foot long sections at each borehole location. DPT cores will be obtained in a manner that will minimize

fragmentation of the cores and thus decrease the potential for generating waste. After screening, cores will be transported to the UK for evaluation, correlation, and long-term storage.

Any residual cuttings from boring operations will be screened to determine the fate of the material. Since cores will be collected intact, it is not anticipated that core collection will generate residual material. However, core material may contain residual water; therefore, they will be placed on an impermeable membrane in the laydown area. This will allow residual water, if present, to drain and be collected by DOE for characterization and disposal.

Specific tasks include:

- Surveying of transects,
- Mobilization and staging of equipment and supplies,
- Erecting temporary access controls around the drilling locations,
- Placing bermed-plastic ground cover in the laydown area to isolate core material from surface soil,
- Coring,
- Sampling,
- Collecting cores
- Closing borings,
- Obtaining C-14 samples from potential Holocene horizons from 50+ cores,
- Containerizing materials,
- Surveying materials and equipment,
- Decontaminating equipment, as needed, and
- Transporting containerized material to the Paducah Waste Management facility (to be performed by DOE).

## **2.0 SCOPE**

The scope of Waste Management Plan (Plan) will apply to material that has the potential to be classified as investigation derived material and/or waste generated during the execution of the “Work Plan for the Field Study and Peer Review for Determination of Holocene Displacement at the C-746-U Landfill at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky”. If waste is generated, this Plan addresses investigation-derived material/waste (IDM/IDW) from generation to disposition. However, handling, control, storage, and final disposition of any IDM/IDW are the responsibility of the DOE.

## **3.0 PLAN EXECUTION**

### **3.1 WASTE FORECAST**

Waste generation is linked to the method of drilling used to install the boreholes. Based on the drilling method and the final depth of the boreholes, it is not anticipated that significant volumes of waste will be generated from coring operations. If soil cuttings are generated from coring operations, the volume is unlikely to exceed 5% of the core volume. The total volume of

material including IDM/IDW should be less than 50 cubic feet. It is not anticipated that the residual cuttings will contain <sup>99</sup>Tc or TCE levels that would preclude on-site disposal.

### **3.2 WASTE TYPES**

As previously indicated, it is unlikely that contaminated waste will be generated by field coring activities. However, if contaminated waste is generated, the waste would be expected to consist of:

- Soil cutting classified as LLW,
- Soil cutting classified as mixed LLW,
- Residual core water, or
- IDM/W (including PPE and plastic and decontamination liquids and solids)

### **3.3 WASTE STREAMS**

#### **3.3.1 Coring Debris**

- Debris associated with coring operations.

#### **3.3.2 Soil Cuttings and Residual core water**

- Residual material from removal of cores
- Residual water from cores

#### **3.3.3 Investigation Derived Waste**

- IDM/W material such as PPE, wipes, or materials associated with coring

### **3.4 QUANTITY**

Estimated quantity of material generated during coring operations should be less than 55 cubic feet.

### **3.5 SOIL CUTTINGS DISPOSITION**

If material is generated from coring operations, it is anticipated that it will be uncontaminated. If residual coring material results from coring operations, it may be disposed of on the ground surface in the vicinity of the boring.

### **3.6 IDENTIFICATION, SEPARATION, AND PACKAGING**

It is not expected that material will exceed screening levels established in the Work Plan; however, if material exceeds screening criteria, cuttings from the borings will be analyzed for <sup>99</sup>Tc and TCE. If analytical data document the presence of either contaminant, it will be the

responsibility of the DOE to ensure that the material is handled, classified, separated, and packaged according to DOE requirements.

Soil waste and IDM/IDW generated during the installation of borings will be containerized for subsequent disposition by the DOE.

### **3.7 CHARACTERIZATION OF MATERIALS**

DOE will be responsible for the characterization of all containerized waste materials as required for proper disposition. The management of sample residuals will be the responsibility of DOE.

### **3.8 WASTE STAGING REQUIREMENTS**

Waste accumulation will be minimized and waste will be placed in DOT-approved containers provided by DOE. The contents will be properly documented on Request for Disposal Forms and the waste containers will be labeled in compliance with BJC standards. This action will ensure containers meet the C-746 U-Landfill requirements for disposal. DOE should segregate material. All waste must be maintained in a secure location by DOE. As indicated above, as waste is generated and containerized during coring operations, the waste would be expected to meet the requirements established for disposition at the C-746 U-Landfill.

### **3.9 TRAINING**

Personnel shall be trained to match their job duties. Personnel will be briefed prior to the initiation of the project on ALARA requirements. Training for the project is specified in the Health and Safety Plan for the “Field Study and Peer Review for Determination of Holocene Displacement at the C-746-U Landfill at the Paducah Gaseous Diffusion Plant, Paducah, Kentucky.”

### **3.10 PERMITS AND AUTHORIZATIONS**

It is anticipated that an excavation/penetration permit will be needed from BJC for the coring operations. Although DOE will take possession of any generated containerized waste, a report detailing project activities regarding waste generation will be provided to DOE subsequent to completion of the project.

### **3.11 MOVEMENT OF WASTE FOR DISPOSITION AT PGDP**

DOE will be responsible for the movement and disposition of waste generated during the field operations phase of the project.

### **3.12 WASTE MINIMIZATION**

To support DOE's commitment to waste reduction, an effort will be made during field activities to minimize waste generation as much as possible, largely through ensuring that potentially contaminated wastes are localized and do not come into contact with any clean media (which could create more contaminated waste). Waste minimization also will be accomplished through waste segregation, selection of PPE, and waste handling (spill control).

Solid wastes such as Tyvek coveralls and packaging materials will be segregated. An attempt will be made to separate visibly soiled Tyvek coveralls from unsoiled ones. In some instances, partially soiled coveralls can be cut up and segregated. Other solid waste will not be allowed to contact potentially contaminated drill cuttings. Efforts will be made to keep Tyvek coveralls clean, reuse clean coveralls, and wear coveralls only when absolutely necessary. Proper waste handling and spill-control techniques will help minimize waste, particularly around the decontamination areas, if required, where decontamination water must be contained. In addition, hoses used in the decontamination area will not be permitted to leak, which would create additional wastewater that would require disposal.

### **3.13 HEALTH AND SAFETY ISSUES RELATED TO WASTE ACTIVITIES**

Health and safety procedures will follow the Health and Safety Plan developed for use by field crews during field activities and waste management activities during this project.

# ATTACHMENT 1 – HOLOCENE FAULT STUDY AREA WITH TRANSECTS 1 AND 2 IN GREEN

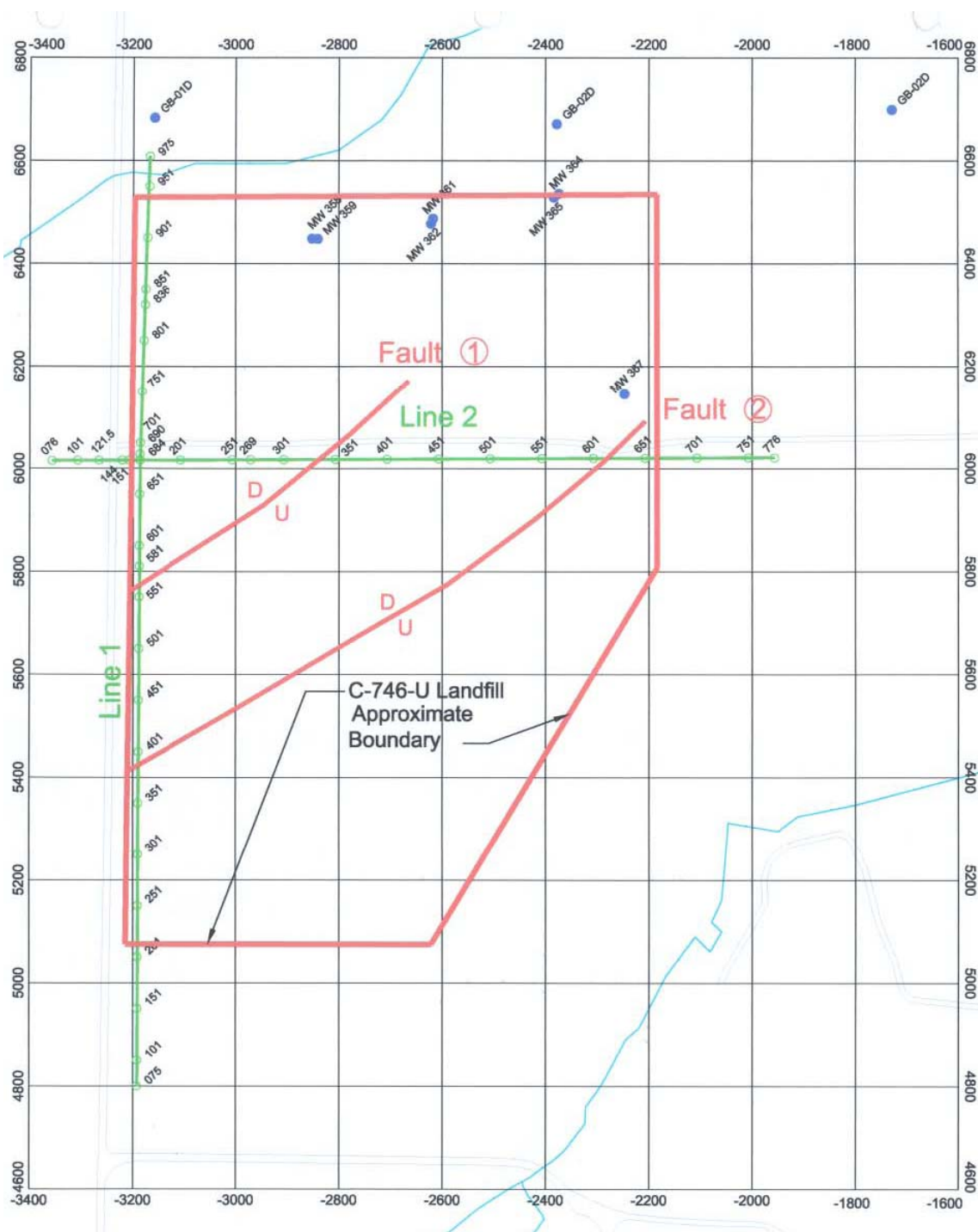


Figure 1. Holocene Fault Study Area w/Transects 1 and 2 in Green.

ATTACHMENT 2

**ATTACHMENT 2 - CHEMICALS AND RADIONUCLIDES**

<b>Chemical</b>	<b>TLV, PEL, STEL, IDLH or DAC<sup>a</sup></b>	<b>Health Effects/ Potential Hazards<sup>b</sup></b>	<b>Chemical and Physical Properties<sup>b</sup></b>	<b>Exposure Route(s)<sup>b</sup></b>
Gasoline and diesel (fuel)	TLV/TWA: 300 ppm IDLH: NA	Dizziness, eye irritation, dermatitis; flammable liquid	Liquid with aromatic odor; FP: -45°F	Inhalation Ingestion Contact
Trichloroethylene	PEL/TLV: 100 ppm	Eye and skin irritation, potential carcinogen	Liquid with chloroform odor; VP: 58 mm; IP: 9.45 eV; FP: Combustible liquid, but burns with difficulty	Inhalation Ingestion Contact
Uranium isotopes	Exposure Limits established by 10 CFR Part 835 and 902 KAR 100:019	Kidney toxicity, cancer	Variable by compound but probably solid; See <i>National Low-Level Waste Management Program Radionuclide Report Series, Volume 15: Uranium-238, 1995; NCRP Report No. 65</i>	Inhalation Ingestion Contact
Technetium-99	Exposure Limits established by 10 CFR Part 835 and 902 KAR 100:019	Cancer	Variable based on compound but exists in soil as either +7 or +4 oxidation state; See <i>National Low-Level Waste Management Program Radionuclide Report Series, Volume 2: Technetium-99, 1992; NCRP Report No. 65</i>	Inhalation, Ingestion