

Solving Cleanup Challenges Through Risk Reduction

Burial Grounds  
Operable Unit

Remedial Investigation  
Report Briefing

Paducah Citizens Advisory Board — August 21, 2008



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# Presentation Highlights

- BGOU overview
- Scope of the Remedial Investigation
- Investigation results
- Schedule



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# BGOU Overview

- Burial grounds are old landfills; some date to the plant's first years of operation
- Contain sanitary waste, hazardous waste, radioactive waste, and pyrophoric uranium



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# Remedial Investigation Purpose

The purpose of the Remedial Investigation is to identify available data and the additional data required to support an assessment of risks to human health and the environment to support future decisions regarding the selection of actions to reduce these risks.



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# Burial Grounds Operable Unit

- Work Plan for RI approved November 2006 established data needs for BGOU
- Data gaps were identified for SWMUs 2, 3, 5, 6, 7, 30, and 145 that led to a focused RI
- SWMU 4 had no data gaps identified

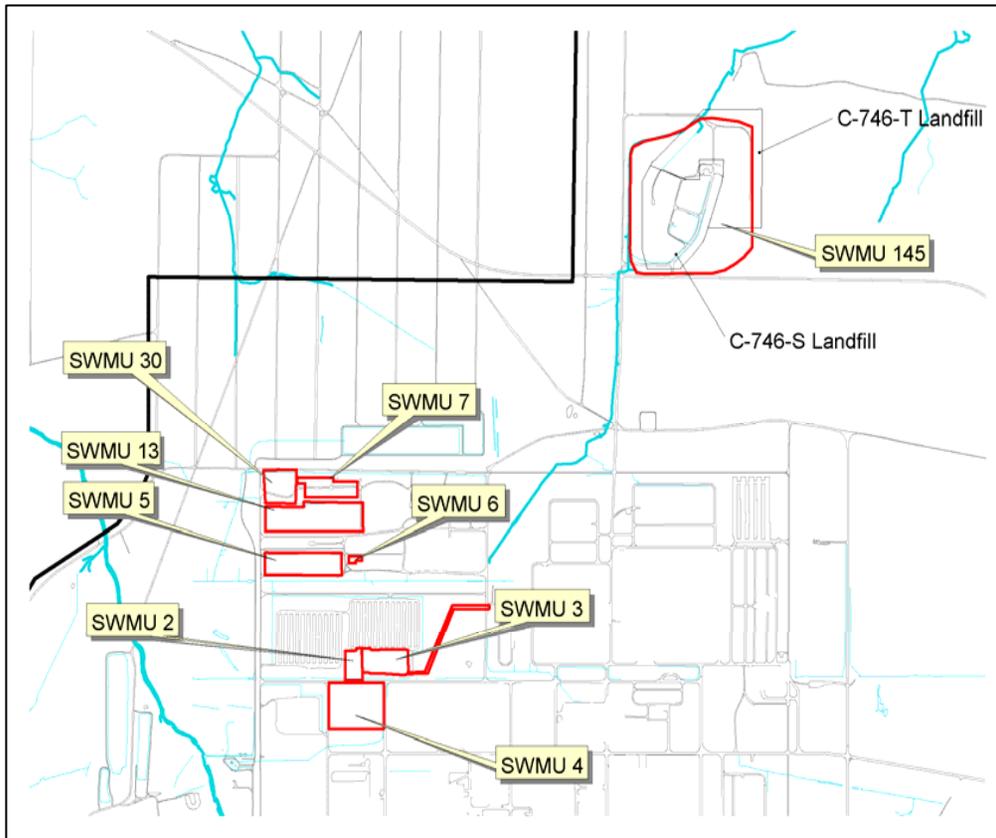


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# Remedial Investigation Scope



Names & Locations of Burial Grounds

- SWMU 2 - C-749 Uranium Burial Ground
- SWMU 3 - C-404 Low-Level Radioactive Waste Burial Ground
- SWMU 4 - C-747 Contaminated Burial Yard and C-748-B Burial Area
- SWMU 5 - C-746-F Burial Yard
- SWMU 6 - C-747-B Burial Ground
- SWMUs 7 and 30 - C-747-A Burial Ground and Burn Area and the area beneath SWMU 12
- SWMU 13 – C-746-P/P1 Scrapyard buried metal
- SWMU 145 - Area P (residential/inert borrow area) and old North-South Diversion Ditch (NSDD)



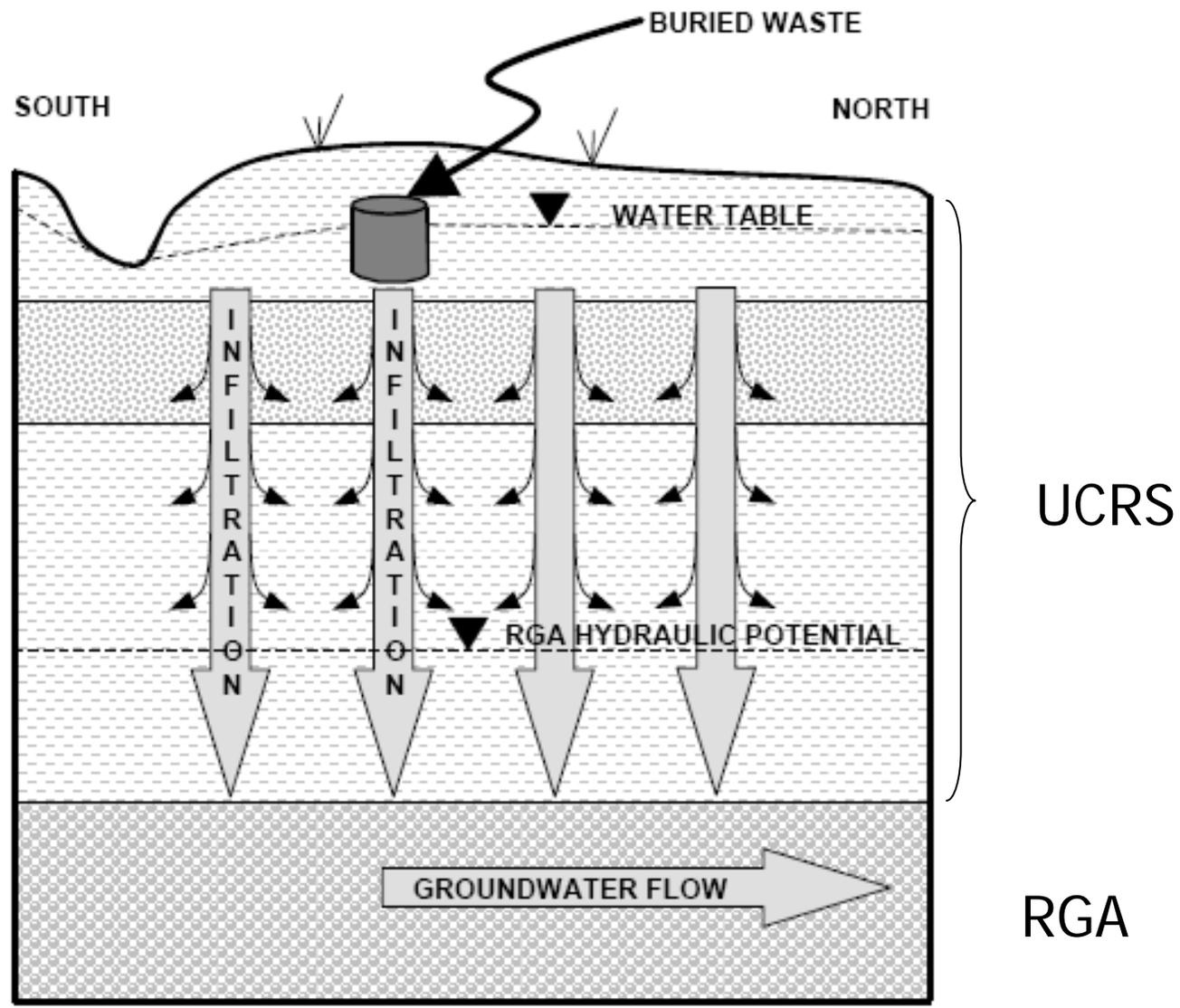
# Remedial Investigation

- 196 soil samples; 31 groundwater samples
- 32 angled borings (60 ft vertically)
- 6 vertical borings to 15 ft
- 3 vertical borings to base of RGA (~100 ft)
- Sampled for
  - Volatile organics
  - Semivolatile organics
  - PCBs
  - Radionuclides
  - Metals
- Historical sampling data

*Additional sampling will be conducted in area identified by plant worker as possibly containing buried material (SWMU 13) and will be included in the FS.*



# BGOU Conceptual Model



- Sand
- Clay
- Gravel

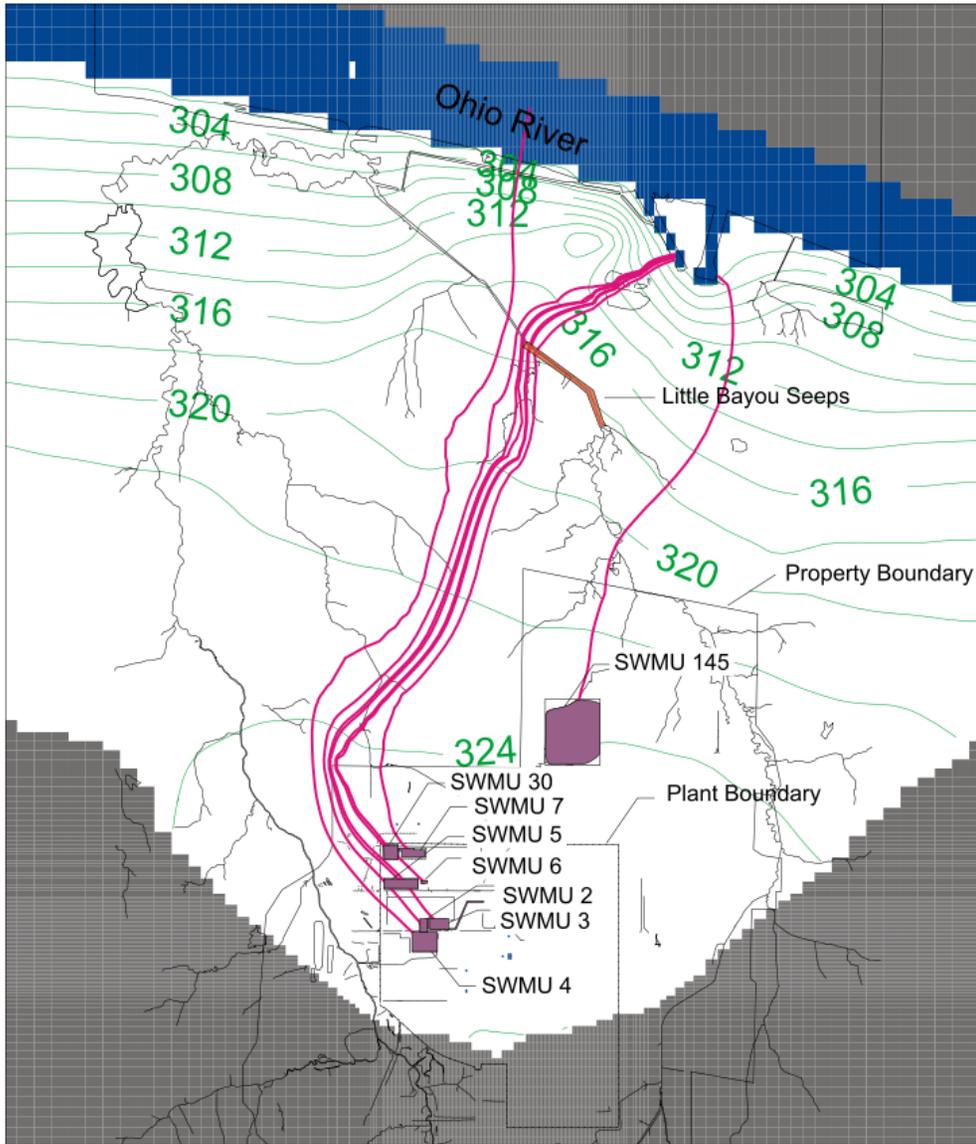


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# RGA Flow Paths



- Modeled Points of Exposure (POE):
  - SWMU boundary
  - Plant boundary
  - Property boundary
  - Little Bayou Creek
  - Ohio River
- Estimated contaminant concentrations at these points used in risk assessment
- POEs follow the Risk Methods Document 2001



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# Remedial Investigation Data

Subsurface soil analytes frequently detected above screening levels

*(Screening levels are based on background levels or risk based no action levels for excavation worker)*

Source Area	Metals	Organic Compounds	Radionuclides
SWMU 2	Arsenic, Iron, Manganese, Vanadium	--	--
SWMU 3	Arsenic	--	--
SWMU 4	Iron, Manganese, Vanadium	--	<sup>230</sup> Th, U, <sup>234</sup> U, <sup>238</sup> U
SWMU 5	Iron, Manganese, Vanadium	--	--
SWMU 6	Iron, Manganese, Vanadium	--	--
SWMU 7	Arsenic, Iron, Manganese	--	<sup>235/236</sup> U
SWMU 30	Iron, Manganese	--	<sup>235/236</sup> U
SWMU 145	Arsenic	--	<sup>228</sup> Th

-- = none

<sup>228</sup>Th = thorium-228

<sup>230</sup>Th = thorium-230

U = uranium

<sup>234</sup>U = uranium-234

<sup>235/236</sup>U = uranium-235/236

Frequently detected means 50% of all samples were detected above the screening level.



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# Remedial Investigation Data

UCRS groundwater analytes frequently detected above screening levels  
*(Screening levels are based on MCLs or risk based no action levels for child resident)*

Source Area	Metals	Organic Compounds	Radionuclides
SWMU 2	Beryllium, Iron, Manganese, Uranium	1,1-DCE; TCE	<sup>234</sup> U, <sup>238</sup> U
SWMU 3	Iron, Manganese	TCE	<sup>234</sup> U
SWMU 4	Arsenic, Iron, Lead, Manganese	<i>cis</i> -1,2-DCE; TCE	--
SWMU 5	Iron, Lead, Manganese, Molybdenum	--	--
SWMU 6	Iron, Lead, Manganese, Molybdenum, Uranium	--	<sup>99</sup> Tc, <sup>234</sup> U, <sup>238</sup> U
SWMU 7	Arsenic, Iron, Lead, Manganese, Molybdenum, Nickel	TCE; Vinyl chloride	<sup>222</sup> Rn, <sup>234</sup> U, <sup>238</sup> U
SWMU 30	Arsenic, Iron, Lead, Manganese, Molybdenum, Nickel, Uranium, Vanadium	--	<sup>234</sup> U, <sup>238</sup> U
SWMU 145	Iron, Manganese	--	<sup>222</sup> Rn, <sup>238</sup> U

-- = none

DCE = dichlorethene

<sup>222</sup> Rn = radon-222

TCE = trichloroethene

<sup>234</sup> U = uranium-234

<sup>238</sup> U = uranium-238

Frequently detected means 50% of all samples were detected above the screening level.



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# Remedial Investigation Data

RGA groundwater analytes frequently detected above screening levels

*(Screening levels are based on background levels, MCLs, or risk based no action levels for child resident)*

Source Area	Metals	Organic Compounds	Radionuclides
SWMU 2	Arsenic, Beryllium, Iron, Manganese, Vanadium	1,1-DCE; TCE	<sup>234</sup> U, <sup>238</sup> U
SWMU 3	Manganese	--	--
SWMU 4	Manganese	Chloroform, TCE	--
SWMU 5	Lead, Manganese	--	--
SWMU 6	Lead, Manganese	TCE	--
SWMU 7	Arsenic, Iron, Manganese	TCE	--
SWMU 30	Manganese	TCE	--
SWMU 145	--	--	--

-- = none

DCE = dichlorethene

TCE = trichloroethene

<sup>234</sup> U = uranium-234

<sup>238</sup> U = uranium-238

Frequently detected means 50% of all samples were detected above the screening level.



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# Remedial Investigation Results

- Environmental media (subsurface soil and groundwater) have been impacted by releases of contaminants at all of the BGOU SWMUs.
- Concentrations of TCE at SWMU 4 suggest that TCE DNAPL may be present both in the waste cells and underlying soils of the UCRS and in the matrix of the RGA.
- TCE trends at SWMUs 7 and 30 suggest that a potential TCE DNAPL source is constrained to the UCRS soils.



# BGOU Schedule

- D1 RI Report submitted to EPA and Kentucky on 7/25/08
- Feasibility Study due 60 days after RI Report approved (Target date: February 2009)
  - FS will evaluate methods to achieve cleanup goals as determined by DOE, EPA, and Kentucky
  - FS recommends best method to achieve the cleanup goal for each SWMU
  - Recommendation forms basis for Proposed Plan/Record of Decision
- Proposed Plan and ROD scheduled in 2010
  - Public comment period begins when proposed plan issued





**DOE Portsmouth/Paducah Project Office**