

BACKGROUND

**Five Records of Decision (RODs)
Signed 1993 – 1996**

RODs Envisioned:

- **24 year cleanup for waste inventories,
buildings and contaminated soil**
- **27 year groundwater cleanup**

BACKGROUND

Accelerated Cleanup Plan Adopted In 1997

- **Cleanup of waste inventories, buildings and soil complete by 2006**
- **Groundwater cleanup to continue beyond 2006 until aquifer cleanup levels attained**

BACKGROUND

Progress in attaining the 2006 plan has been substantial

We are on track to complete the scope by the end of 2006

The accelerated cleanup plan has yielded a significant change in the timing of the wastewater flows since the issuance of the Operable Unit 5 ROD in January 1996

BACKGROUND

In March 2003 Fluor Fernald contract with DOE was modified

- Remove all facilities included within or supporting Operable Units 1-4**
- Complete sitewide cleanup of soil**
- Leave behind the most cost effective groundwater infrastructure**
- Recontour/revegetate the site to fulfill natural resource restoration plan obligations**

BACKGROUND

Advanced Wastewater Treatment (AWWT) facility and wells will be the only structures remaining on site after Fluor Fernald demobilizes in 2006

- AWWT represents a 3 acre area with 50,000 to 85,000 cubic yards of rubble**
- Off-site disposal of rubble will require 2400 to 5700 truck shipments to NTS or Envirocare**

BACKGROUND

What prompted the re-look at our strategy for the AWWT facility?

Recognizing that the source operable units (1,2,3,4) and soil cleanup are coming together for closure in 2006, we asked ourselves the question:

BACKGROUND

“What would it take to D&D the AWWT facility and underlying contaminated soil in time to make it into the OSDF before it closes in 2006?”

This question spawns several related ones:

- 1. What are the consequences if we don't have the opportunity to place AWWT in the OSDF?**
- 2. What are the possible options to prevent the need to ship the AWWT debris off site for disposal?**
- 3. What are the cost impacts, and technical pros/cons, of each option?**

OBJECTIVES FOR RE-LOOK AT PLAN FOR AWWT IN 2006

Leave behind the most cost effective groundwater infrastructure in 2006

- **Smallest possible infrastructure footprint**
- **Smallest quantity of contaminated debris to be dealt with after OSDF closes**
- **No change in risk-based remedial action objectives agreed to in RODs**

APPROACH FOR RE-LOOK

- Evaluate a range of options to achieve the objectives
- Only consider options that offer no significant change in risk to humans or the environment
- Consider options that meet all current ROD commitments and options that require relief from non risk-based ROD requirements
- Examine life cycle (through final disposal) costs to the taxpayer of all options
- Bring information to regulators and public to discuss whether we should further investigate a path different than the one we are currently on for AWWT

5105

RELEVANT REQUIREMENTS FROM THE OPERABLE UNIT 5 ROD

- **Restore the Great Miami Aquifer such that drinking water standards are met at all points in the aquifer on-site and offsite**
- **Meet risk-based surface water final remediation levels in the Great Miami River**
 - **530 parts per billion (ppb) total uranium outside the mixing zone**
 - * **represents 1×10^{-6} incremental lifetime cancer risk level**

RELEVANT REQUIREMENTS FROM THE OPERABLE UNIT 5 ROD

5105

- **Meet performance based uranium discharge limits**
 - **30 ppb total uranium on a monthly average**
 - **600 pounds of uranium as annual limit**
 - **Set in 1996 as best available technology driven levels based upon expected operational efficiency of AWWT**

GROUNDWATER CLEANUP PLAN COMPARISON (OU5 ROD - 2003)

	ROD (1996)	2003
<i>Earliest Predicted Cleanup If:</i> •all assumptions are realized •no new uncertainties encountered	2022	2021
Uranium Plume Size (Acres)	134	179
Maximum Target Pumping Rate (gallons per minute - gpm)	4000	6600
Maximum Target Re-Injection Rate (gpm)	0	1400
Number of Operating Extraction Wells	28	24
Number of Operating Re- Injection Wells	0	8

GROUNDWATER CLEANUP & WATER TREATMENT STATUS

- **Extracted more than 13.2 billion gallons of water**
- **Treated more than 9.1 billion gallons of water**
- **Removed more than 5290 pounds of uranium**
- **Plume Control:**
 - **Off property South Plume - 1993**
 - **South Field - 1998**
 - **Pilot Plant Drainage Ditch - 2002**

GROUNDWATER CLEANUP & WATER TREATMENT STATUS

- **All wells and treatment facilities in place on or ahead of schedule**
- **Groundwater pumped: greater than planned**
- **Groundwater re-injected: less than planned**
- **Uranium removed from aquifer: greater than planned**
- **Groundwater treated: greater than planned**
- **Groundwater bypassed: greater than planned**

GROUNDWATER CLEANUP & WATER TREATMENT STATUS

- **Estimated completion dates**
 - **Off-property: Year 2013**
 - **On-property: Year 2021**
- **Estimated amount of uranium remaining to be removed from Aquifer: 7700 pounds**
- **Estimate of when discharge limits can be met without treatment: Year 2007 - 2015**

DRIVERS FOR AWWT

- **AWWT – 2600 gallons per minute ion exchange wastewater treatment plant**
- **IAWWT/SPIT – 525 gallons per minute ion exchange wastewater treatment facilities; IAWWT is trailer mounted; SPIT is in small metal structure**
- **AWWT initially designed to meet DOE concentration guidelines which predated RODs**

DRIVERS FOR AWWT

- **Later relied upon to meet ROD discharge standards**
- **Treat highest concentration streams first**
 1. **Remediation wastewater (until sources are removed)**
 2. **Uranium laden stormwater (until soil is cleaned up)**
 3. **Groundwater (until discharge standards are met without treatment)**
- **Lower concentration extracted groundwater is currently blended with AWWT effluent prior to discharge to Great Miami River**

WASTEWATER FLOW STREAMS

Water Type	Max Flow	2003												2004												2005												2006											
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Waste Pits Wastewater Flows	200 gpm	Safe Shutdown and D&D Complete 12/31/04																																															
OSDF Leachate/Stormwater	200 gpm	All Cells Capped by 6/06 peak flows reduced from 200 gpm to 10 gpm 3/06																																															
Silos	<10 gpm	Treatment Facility Shutdown 10/05																																															
D & D Wash Water	< 5 gpm	Complete except for Silos by 11/05, Silos complete 5/06																																															
Impacted Storm Water	800 gpm	Likely that max flow will be down to 200 gpm by 4/01/05																																															
Groundwater*	2400 gpm	Treatment to meet current discharge limits ends 2006-2015																																															

* Groundwater is the only wastewater flow stream that may continue beyond 2006. Current estimates indicate that the need for groundwater treatment to meet the current discharge limits may end as early as 2006. Leachate flow will be reduced to less than 5 gpm after all cells are capped in 2006 and other leachate treatment options are being evaluated.

COMPONENTS OF THE OPTIONS CONSIDERED

- **Groundwater Recovery Wells**
 - Maintain and operate each pumping well as long as necessary
- **Treatment Facility and Capacity**
 - Operate the existing AWWT
 - Operate a scaled down AWWT
 - Operate the existing SPIT and/or IAWWT with certain upgrades
 - Operate a new mobile treatment plant in a certified clean area
 - Stop treatment completely

COMPONENTS OF THE OPTIONS CONSIDERED

- **Groundwater Injection Operation**
 - Maintain the current range of injection rates
 - Maintain lower injection rates supported by a reduced treatment capacity
 - Stop injection completely
- **Outfall Discharge Limits**
 - Maintain the current performance-based limits
 - Increase to acceptable risk-based limits

COMPONENTS OF THE OPTIONS CONSIDERED

- **Disposal Of D&D Debris Of the Existing Treatment Facilities And Underlying Impacted Soil**
 - Place in the OSDF prior to the end of 2006
 - Place in the OSDF after 2006 (A temporary cap is required on Cell 8)
 - Off site disposal

5105

22

GROUNDWATER REMEDIAL STRATEGY ALTERNATIVES CONSIDERED

ALTERNATIVE	Groundwater Recovery Wells	Treatment Facility And Capacity	Groundwater Injection Operation	Out Fall Discharge Limits	Disposal of AWWT Debris And Soil
1	Maintain and operate each pumping well as long as necessary	Operate the existing AWWT	Maintain the current range of injection rates	Maintain the current performance-based limits	Off site disposal after 2006
2	Maintain and operate each pumping well as long as necessary	Operate the existing AWWT	Maintain the current range of injection rates	Maintain the current performance-based limits	On site disposal after 2006 (interim cap)
2A/2B	Maintain and operate each pumping well as long as necessary	Operate a scaled down AWWT	Stop injection completely	Maintain the current performance-based limits	On site disposal after 2006 (interim cap)
3	Maintain and operate each pumping well as long as necessary	Operate the existing SPIT and/or IAWWT with certain upgrades	Stop injection completely	Maintain the current performance-based limits	On site disposal before the end of 2006; Off site for SPIT/IAWWT
4	Maintain and operate each pumping well as long as necessary	Operate the existing SPIT and/or IAWWT with certain upgrades	Stop injection completely	Maintain the current performance-based limits	On site disposal before the end of 2006; On Site for SPIT/IAWWT
5	Maintain and operate each pumping well as long as necessary	Operate a new mobile treatment plant in a certified area	Stop injection completely	Maintain the current performance-based limits	On site disposal before the end of 2006; Off site for the new plant
6	Maintain and operate each pumping well as long as necessary	Stop treatment completely	Stop injection completely	Increase to acceptable risk-based limits	On site disposal before the end of 2006
7	Maintain and operate each pumping well as long as necessary	Operate a new mobile treatment plant in a certified area for re-injection only	Maintain lower injection rates	Increase to acceptable risk-based limits	On site disposal before the end of 2006; Off site for the new plant

ALTERNATIVE 1: Currently Compliant Groundwater Restoration Approach. Operate the existing AWWT to provide injection water and to maintain the current performance-based discharge limits. When groundwater restoration is complete (year 2022) decontaminate and demolish (D&D) the AWWT facility and dispose of debris and associated soil off-site (2400-5700 trucks)

ALTERNATIVE 2: Currently Compliant Groundwater Restoration Approach. Operate the existing AWWT to provide injection water and to maintain the current performance-based discharge limits. When groundwater restoration is complete (year 2022) decontaminate and demolish (D&D) the AWWT facility and dispose of debris and associated soil on-site in the OSDF (a temporary cap is required on Cell 8). Alternatives 2A and 2B utilize AWWT at a reduced capacity with no re-injection, D&D and dispose of AWWT on-site when treatment is no longer required to meet discharge limits (year 2011 Alt. 2A, year 2006 Alt. 2B).

ALTERNATIVE 3: Reduced Post-Closure Groundwater Treatment Capacity Supplied by Upgraded SPIT and IAWWT System. Maintain current performance-based discharge limits but no groundwater re-injection. Treatment system will be shut down when no longer required to meet discharge limits. D&D with off-site disposal of D&D Waste (150-350 trucks) in year 2011 (Alt.3) or year 2006 (Alt. 3B).

ALTERNATIVES 4: Reduced Post-Closure Groundwater Treatment Capacity Supplied by Upgraded SPIT and IAWWT System. Maintain current performance-based discharge limits but no groundwater re-injection. Treatment system will be shut down when no longer required to meet discharge limits. D&D with on-site disposal of D&D Waste in the OSDF in year 2011 (Alt.4) or year 2006 Alt. 4B.

ALTERNATIVES 5: Reduced Post-Closure Groundwater Treatment Capacity Supplied by a New Mobile Treatment System. Maintain current performance-based discharge limits but no groundwater re-injection. Treatment system will be shut down when no longer required to meet discharge limits then will be transferred to another DOE facility in year 2011 (Alt. 5) or year 2006 (Alt. 5B).

ALTERNATIVE 6: No Post-Closure Groundwater Treatment Capacity. Regulatory relief is required from current outfall discharge limits, storm water treatment requirements and remediation wastewater treatment requirements, with no groundwater re injection. Total facility D&D with on-site disposal in the OSDF before 2006 closure.

ALTERNATIVE 7: Reduced Post-Closure Groundwater Treatment Capacity With a New Mobile Treatment System to Maintain Groundwater Re Injection. Regulatory relief is required from current outfall discharge limits, storm water treatment requirements and remediation wastewater treatment requirements. Total D&D of existing treatment facilities with on-site disposal in the OSDF before 2006 closure.