Paducah Citizens Advisory Board Subcommittee Projects Briefing

Reinhard Knerr

Paducah Site Lead

Department of Energy

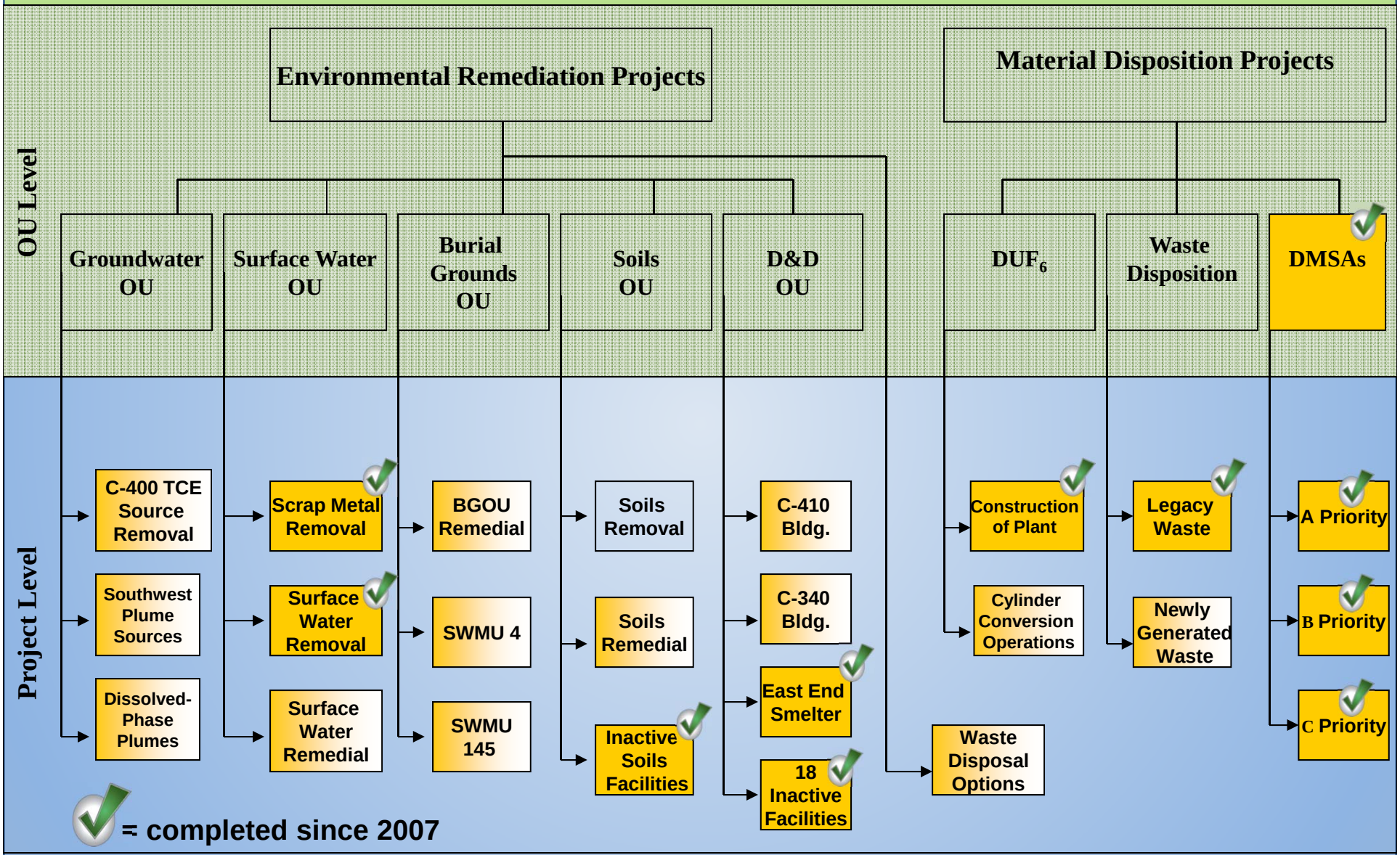
November 17, 2011

Environmental Management

safety ❖ performance ❖ cleanup ❖ closure

PADUCAH CITIZENS ADVISORY BOARD

Current Project Status



Pre-Shutdown Scope

NOTE: Each environmental project is expected to have a corresponding CERCLA decision document (i.e., ROD, AM)

Current Site Challenges

TCE Groundwater Seeps
(Groundwater OU: Dissolved-Phase Plumes)
- Upspringing in Little Bayou Creek

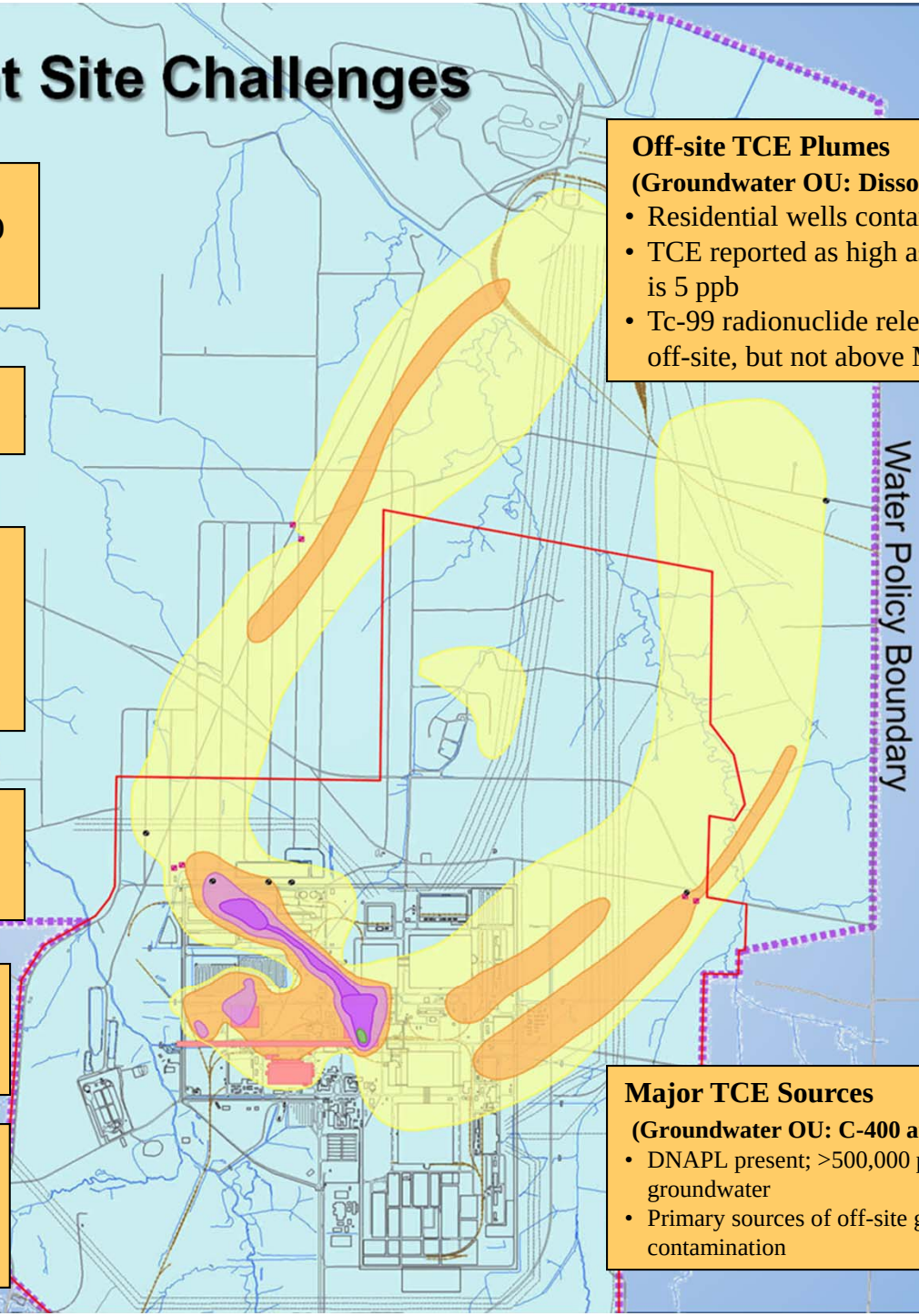
Depleted Uranium (DUF_6)
- 41,000 cylinders

Contaminated Sediments (Surface Water OU)
- Metals, radionuclides, and volatile organics have migrated off-site
- Potential impact to ecological receptors

Contaminated Soils (Soils OU)
- PCB soil levels have exceeded 1,000 ppm; TSCA cleanup level 25 ppm

Inactive Facilities (D&D OU)
- Two facilities remaining with no planned reuse

Burial Grounds (Burial Ground OU)
- Ten burial grounds covering ~60 acres
- Some contain radioactive, pyrophoric, and RCRA waste



Off-site TCE Plumes
(Groundwater OU: Dissolved-Phase Plumes)
- Residential wells contaminated
- TCE reported as high as 1,000 ppb; MCL is 5 ppb
- Tc-99 radionuclide releases have migrated off-site, but not above MCLs

Major TCE Sources
(Groundwater OU: C-400 and Southwest Plumes)
- DNAPL present; >500,000 ppb of TCE in groundwater
- Primary sources of off-site groundwater contamination

Groundwater Operable Unit (GWOU)

- The Groundwater Operable Unit (GWOU)
  - Subsurface areas from ~10ft to 100ft belowground surface that consist of TCE and/or
  - Tc-99 contamination sources
  - Sources of contamination include the C-400 Degreaser Building, Oil Land Farm and C-720 Maintenance Building.
  - These areas contribute to contamination in the NW, NE, and SW groundwater plumes

- Current cleanup projects include these:
  - C 400 TCE extraction
  - Southwest Plume
  - Dissolved-Phase Plume
  - Northeast and Northwest Pump and Treat

Groundwater Operable Unit

Source Area	Cumulative TCE Removed (gal)*	Remaining TCE Estimate (gal)
Northwest Plume Pump-and-Treat	2,602	900*
Northeast Plume Pump-and-Treat	265	350*
C-400 Six-Phase Treatability Study	1,900	Project complete
C-400 Phase I	580	Project complete
C-400 Phase II	Project in planning	600 –7,000
Dissolved-Phase Plume	Project in planning	1,600
Other sources (i.e., SWMU 91, LASAGNA™)	246	Project complete
Total	5,593	2,200-8,600

* Part of Dissolved-Phase Plume

GWOU C-400 TCE Extraction History

- C-400 Cleaning Building-Located near center of industrial portion of PGDP
  - Cleaning of machinery parts, decon of used UF_6 cylinders, plant laundry
- 1986 – TCE soil contamination discovered
  - Leak from drain line from basement sump to storm sewer
  - Designated SWMU 11
  - 301 ft^3 of contaminated soil excavated after leak site discovery
- 2003 – Six-Phase Heating Treatability Study
  - Removed over 22,000 lbs of TCE (<2,000 gal TCE)
- 2005 – Record of Decision for C-400 Interim Remedial Action (RA) finalized

GWOU C-400 TCE Extraction

- 2010 – Phase I ERH thermal heating Remedial Action Implemented

ACCOMPLISHMENTS

Attained project objectives in the UCRS soils in the Phase l areas

Obtained information for optimizing Phase ll design and implementation

ISSUE

Heating of RGA (70ft-100ft) using ERH is not economically feasible

- Convective heat loss and buoyancy hindered attainment of desired temps in RGA

SOLUTION

Identify source remedy technology for Phase IIb (RGA)

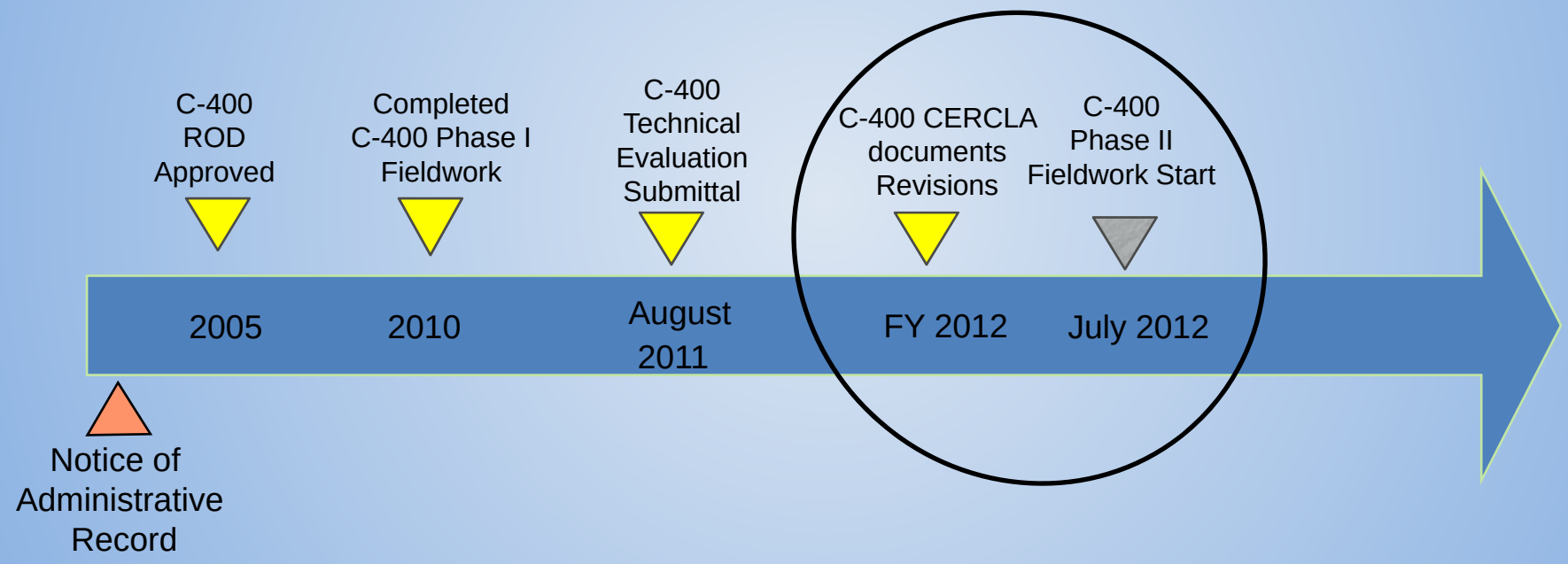
- *In situ* chemical treatment (e.g., oxidation)

GWOU C-400 TCE Extraction Completing the Process

2011 – Phase II RA delayed and divided into Phase IIa (10ft - 70ft) and Phase IIb (70ft - 100ft) Implement Phase II of the IRA based on Lessons Learned from Phase I:

- Split Phase II into subphases – lla and llb
- Phase lla – Electrical Resistance Heating in upper soils (UCRS) and upper RGA
  - » Construction 7/12 – 3/13
  - » Operations 4/13 – 10/13
- Phase llb – Issue Revised Proposed Plan and Amendment to Record of Decision
  - » Proposed Plan Public Comment Period 2/12 – 3/12
  - » Issue Amendment to Record of Decision 5/12
  - » Remedy Construction 12/13 – 4/14
  - » Operations 4/14 – 4/15

Groundwater
FY 2012 Schedule Focus



Southwest Plume VOC Sources Remedial Action History

- Oil Landfarm (SWMU 1)
  - Landfarming of waste oils from 1973-1979
- C-720 Northeast (SWMU 211-A) and Southeast (SWMU 211-B) sites
  - C-720 Building is an active machine shop
  - C-720 NE – Solvents released during equipment cleaning and rinsing
  - C-720 SE – Releases to drains that lead to SE corner of building
- Previous Investigations 1989-2007
  - Phase I and II Site Investigations – 1989-1991
  - WAG 23 Removal Action – 1998 (removed 23 yd^3 of dioxin-contaminated soil from SWMU 1)
  - WAG 26 Remedial Investigation – 1998
  - Groundwater OU Feasibility Study – 2001
  - SW Plume Site Investigation – 2007

Southwest Plume VOC Sources Remedial Action Status

- The estimates of contaminant mass present and anticipated cost effectiveness were refined
- Revised Focused Feasibility Study and Proposed Plan evaluated a broadened range of cost effective technologies and alternatives
- SWMU1 preferred alternative is Deep Soil Mixing
- C-720 NE and SE preferred alternative is Enhanced *In Situ* Bioremediation, or Long-term Monitoring
  - » Additional data will be collected at the C-720 sites to determine if Enhanced *In Situ* Bioremediation or Long-Term Monitoring will be implemented

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CAB recommendations needed on other potential technical issues in finalizing the FS and selecting alternatives to address SWMUs 5 and 6

Southwest Plume VOC Sources Remedial Action Completing the Process

Complete the CERCLA documentation process

- Public Comment Period for Proposed Plan October 2-November 16, 2011
- Issue Draft Record of Decision December 2011

Oil Landfarm – (Deep Soil Mixing)

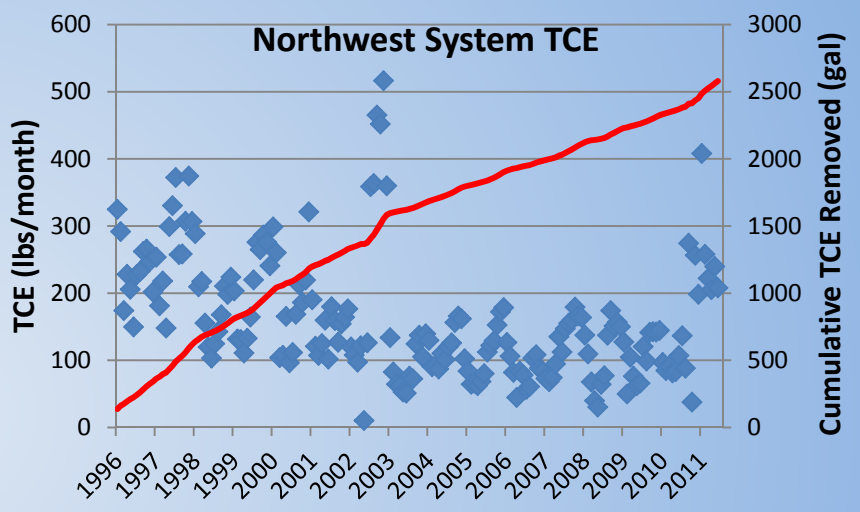
- Remedial Design Support Investigation – April – July 2012
- Remedial Design – Jan-Sept 2012
- Initiate Construction – Jan 2013

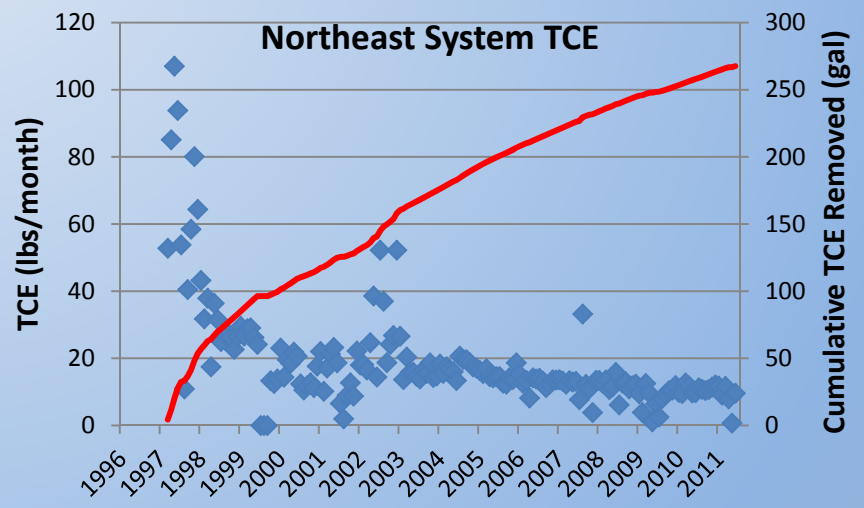
C-720A & B – (Long-Term Monitoring / Enhanced *In Situ* Bioremediation)

- Remedial Design Support Investigation – April – July 2012
- Complete contingent remedy design – Feb 2013
- Initiate Construction – June 2014

Northwest/Northeast Plume Extraction and Treatment

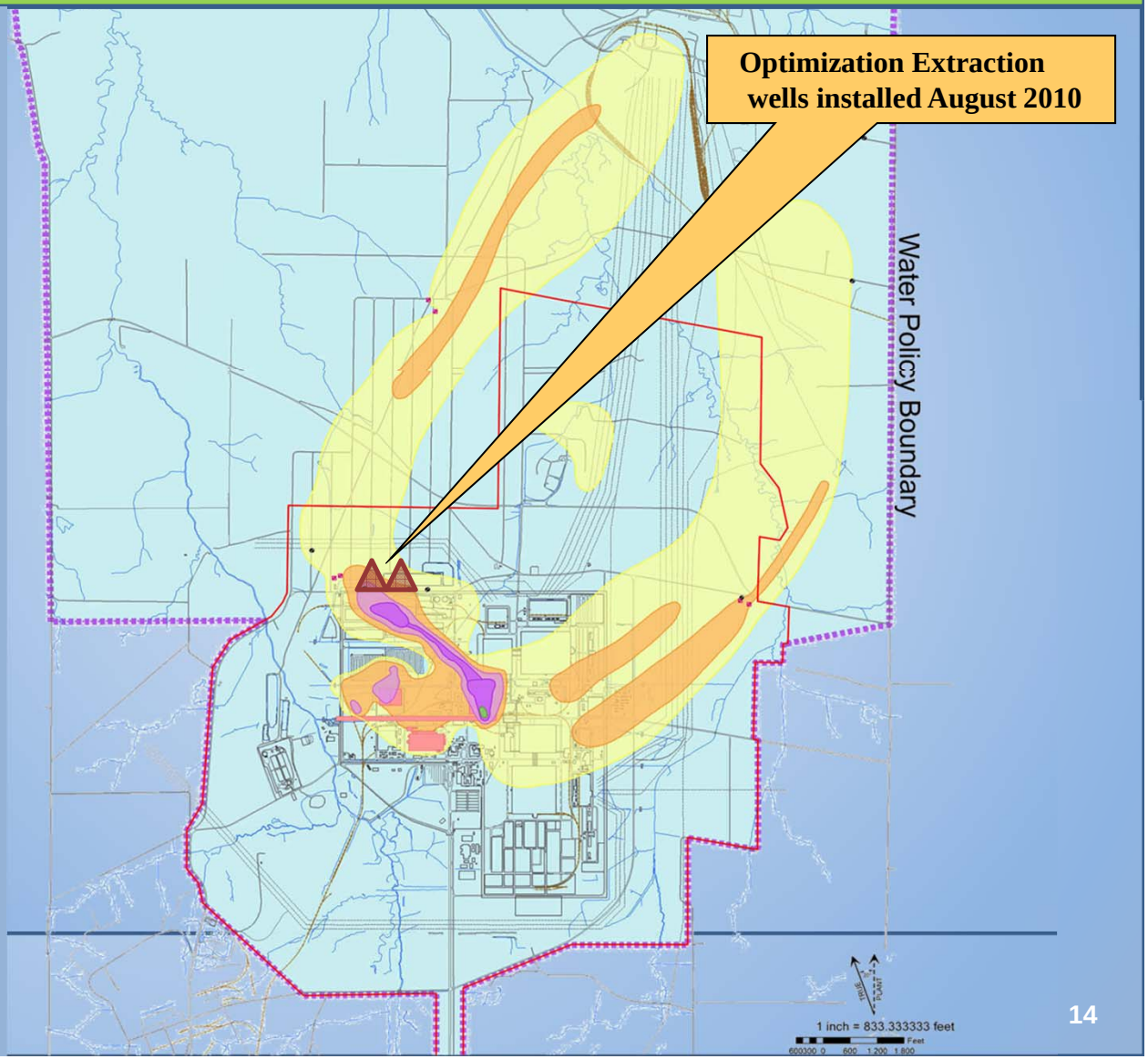
- Northwest Plume Extraction and Treatment System
  - System Startup August 1995
  - Optimization August 2010
  - Cumulative TCE removed through FY 11 – 2,602 gal
- Northeast Plume Extraction and Treatment System
  - System Startup February 1997
  - Optimization planning , design, procurement in FY 2012
  - Cumulative TCE removed through FY 11 – 265 gal





Northwest Plume System Optimization

- Installed two new extraction wells in FY 2010
- Results are - improved mass capture at NW fence line
- Testing in October 2010 indicates capture zone of new pumping wells includes
  - Most all of NW plume at plant boundary



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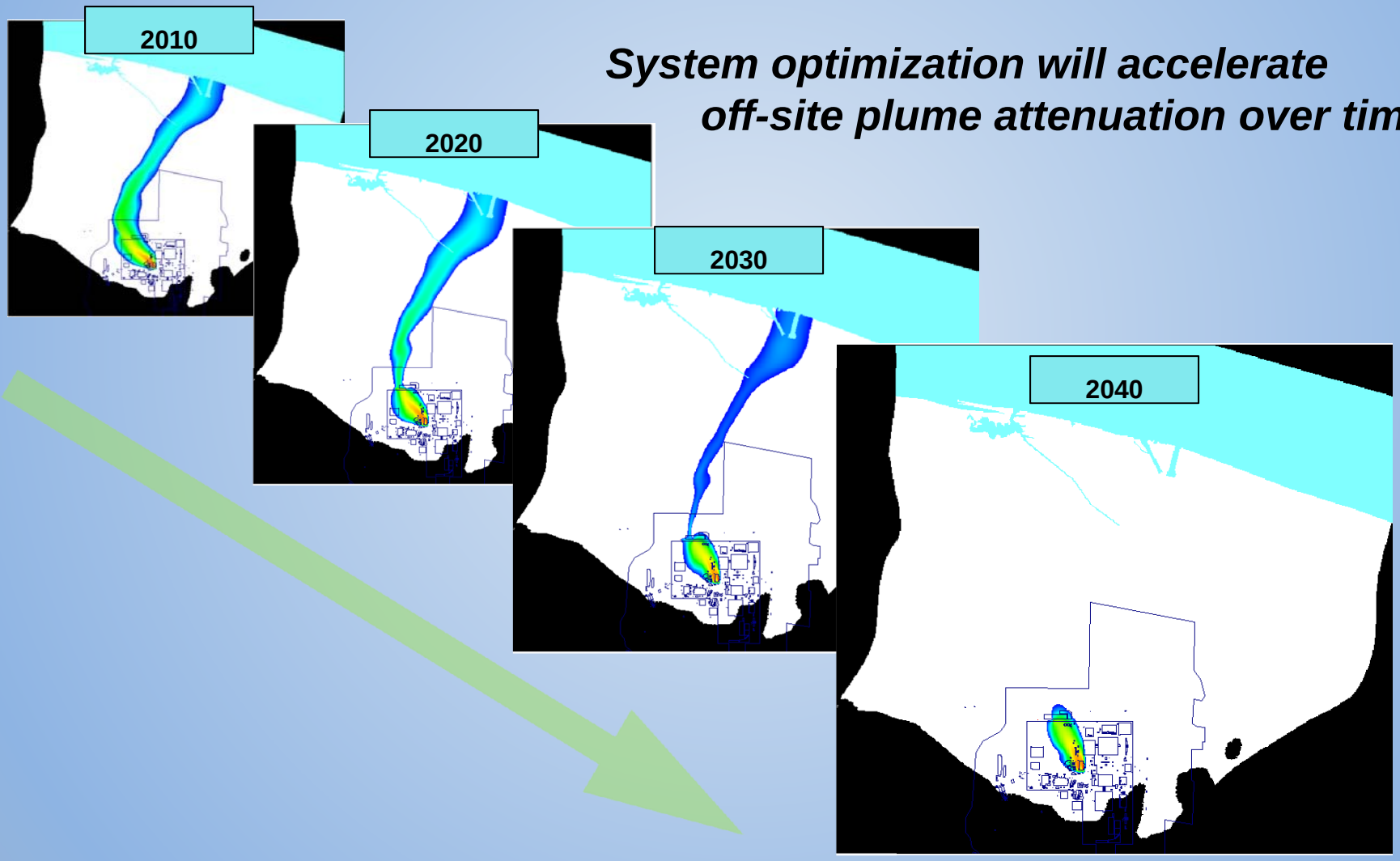
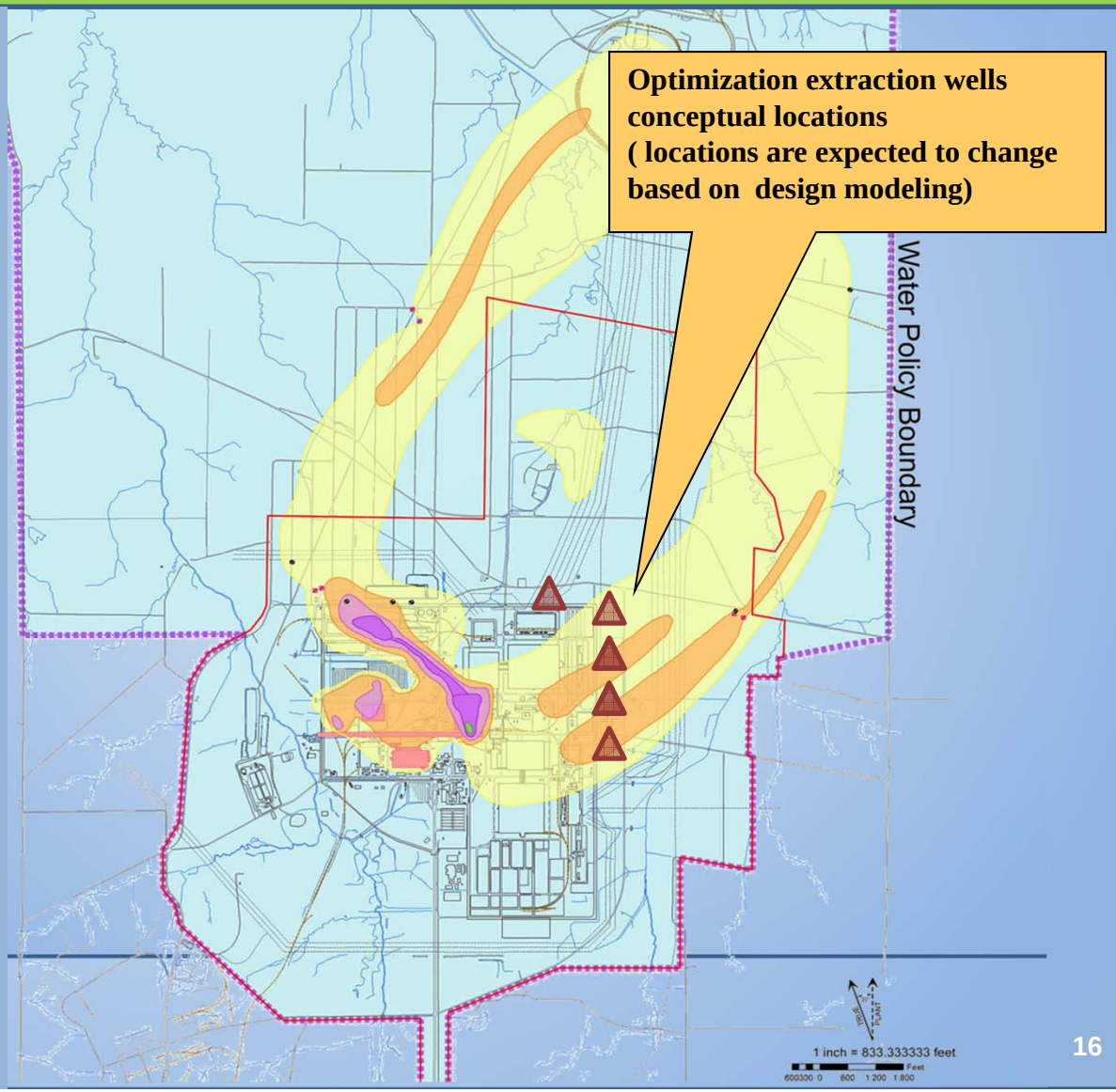


System optimization will accelerate off-site plume attenuation over time

Northeast Plume System Optimization

- Planning , design, procurement in FY 2012
- Construction
  FY 2013
- System start-up target June 2013
- Expected results are improved mass capture at eastern fence line



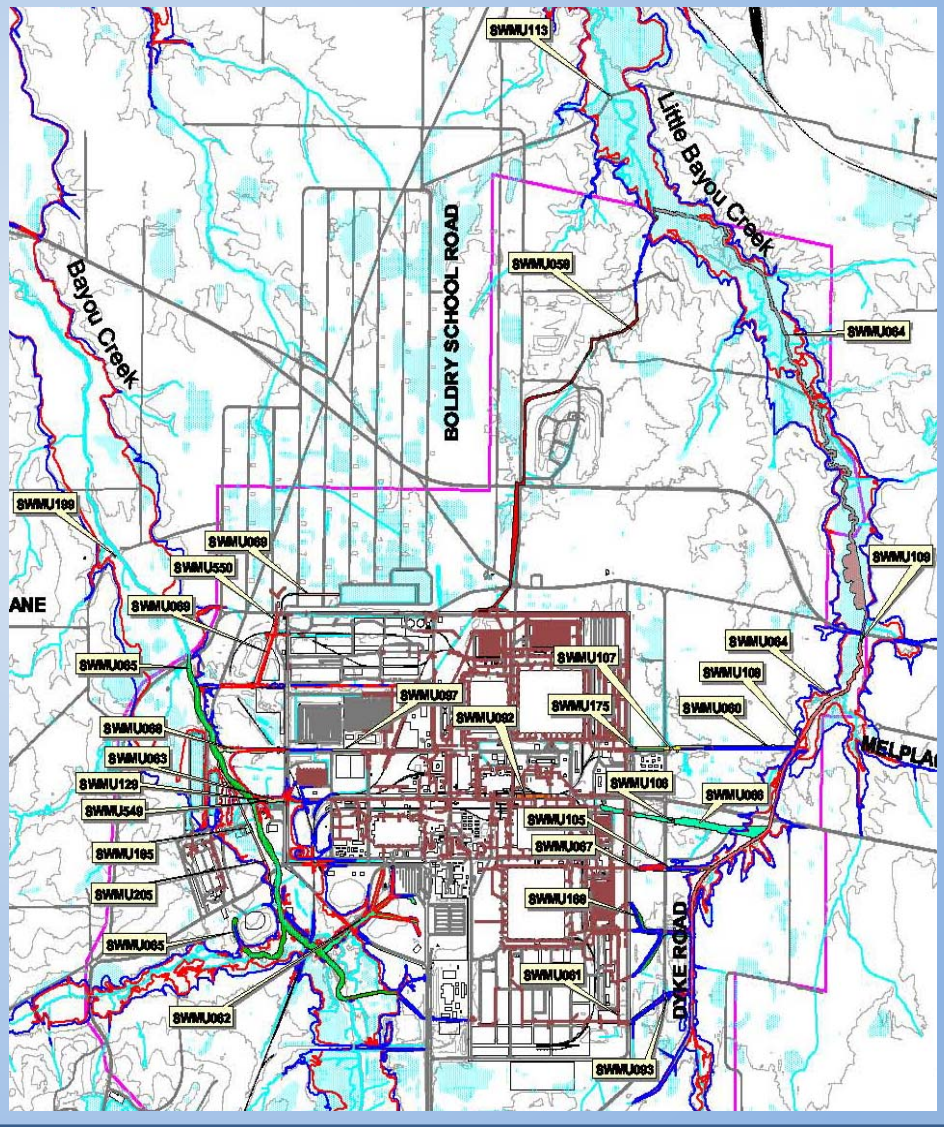
Groundwater Operable Unit Planned Accomplishments for FY12

- Southwest Plume – Proposed Plan (PP) and Record of Decision (ROD)
  - DOE has 15 months to implement remedy post-ROD signing
- Northeast Plume – Remedial Action Work Plan and begin optimization field work in late FY 2012
  - Similar to NW Plume Optimization

Surface Water Operable Unit

- Surface Water OU consists of areas of sediment or surface water that are contaminated

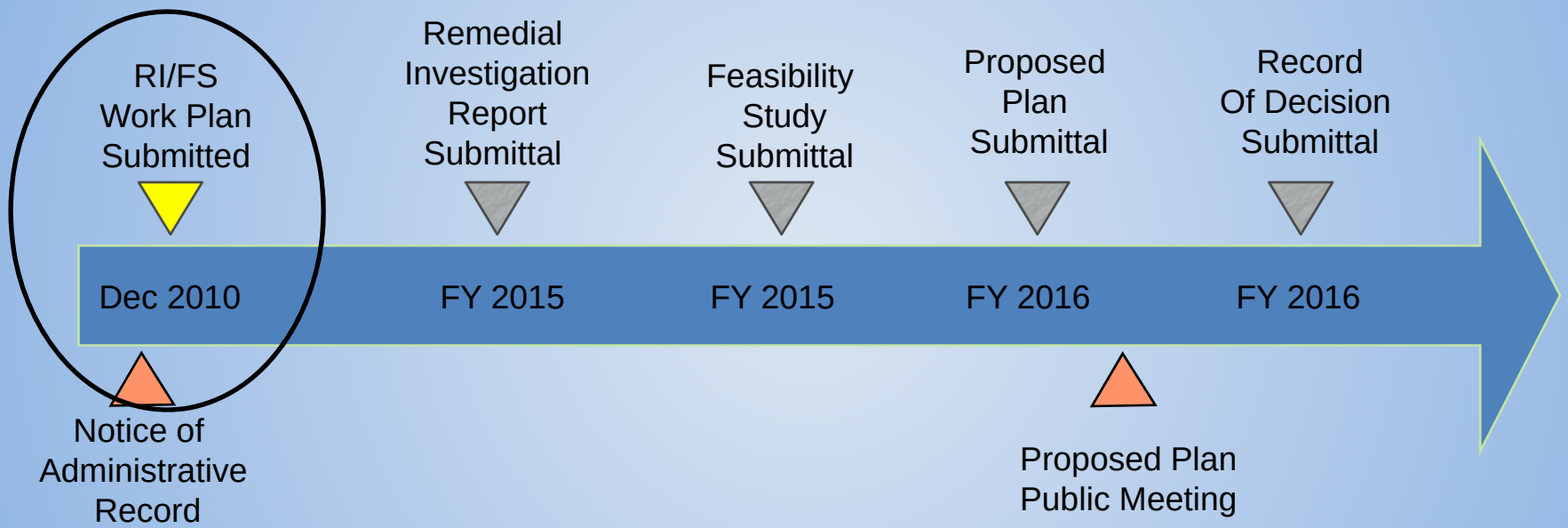
- Surface Water OU consists of 32 solid waste management units (SWMUs) inside and outside the plant fence, including the plant ditches that flow off-site to Bayou and Little Bayou Creeks



Surface Water Operable Unit Projects for FY 12

- D2 Remedial Investigation Work Plan is due to be submitted on Dec 12, 2011, it addresses sediment contamination in the creeks and includes a sitewide ecological risk assessment
- Surface Water Operable Unit Remedial Investigation Work Plan approval anticipated in FY 12
  - Investigation of 6 miles of creeks and ditches (Bayou and Little Bayou Creeks) Field Work expected in FY 13 and FY 14
  - Excavation of uranium and PCB contaminated sediment in 2018

Surface Water
FY 2012 Schedule Focus



A CAB recommendation is needed on options to consider for SWMU remediation.

Burial Grounds Operable Unit

The Burial Grounds Operable Unit consists of areas of contamination associated with burial areas and landfills in the northwest quadrant of the plant. Contents may include hazardous, PCB, and low-level radioactive waste.

- There are 10 burial areas within the Burial Grounds Operable Unit (BGOU)
- These areas typically have items buried < 20ft from the surface; a determination will be made in regard to action that may need to be taken (e.g., excavate, capped, or left in place)
- Received regulatory nonconcurrence on the Feasibility Study (FS) in Jan 2011; entered informal dispute resolution under the FFA
- 109 comments/issues were resolved on the FS in the informal dispute process
- EPA and DOE were unable to resolve seven comments related to Principal Treat Waste (PTW) through the informal dispute process
- On September 27 EPA initiated the formal dispute process to resolve the PTW-related issues

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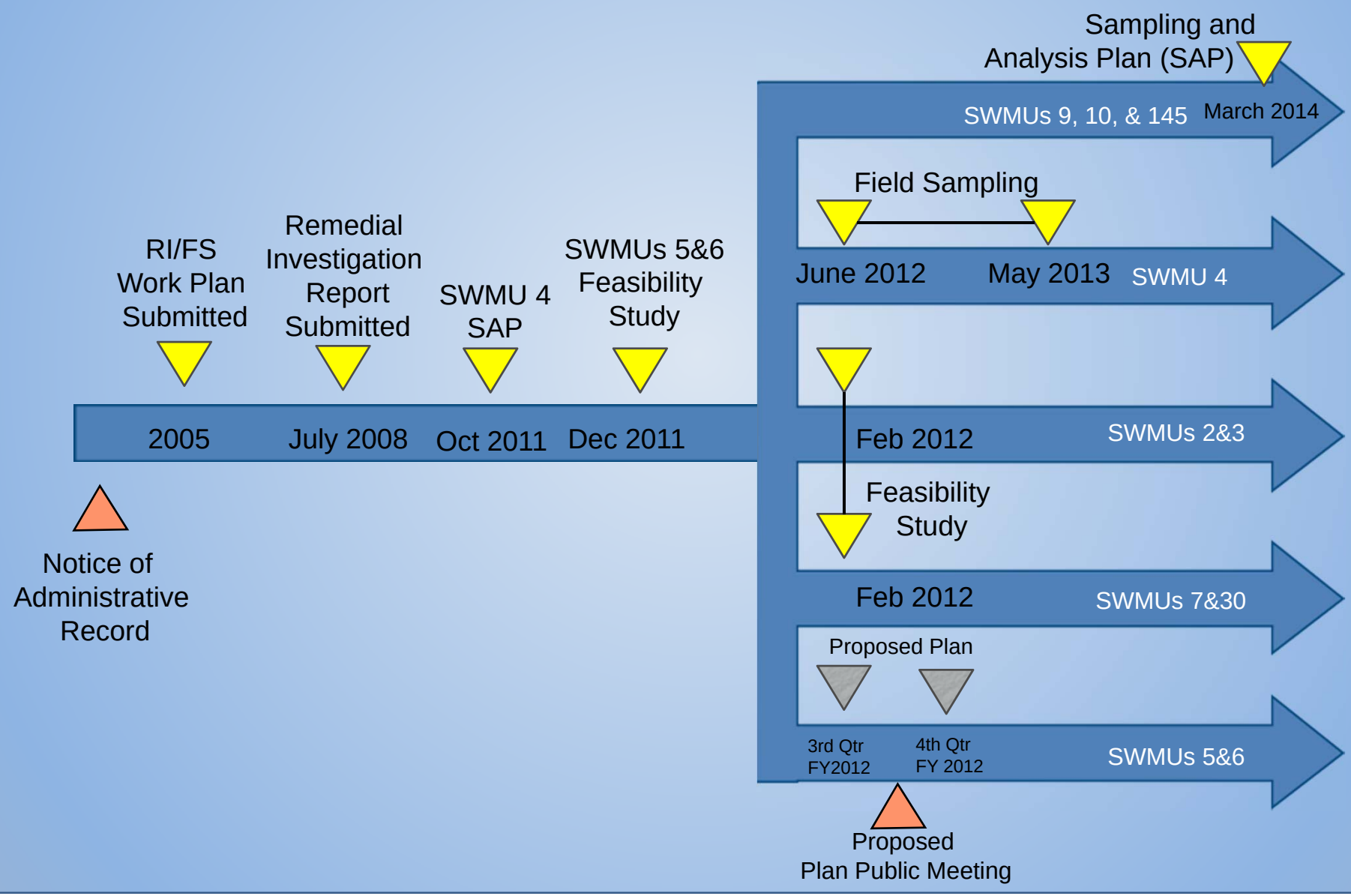
CAB recommendations needed on other potential technical issues in finalizing the FS and selecting alternatives to address SWMUs 5 and 6

Burial Grounds Operable Unit

- **Issue**: The burial grounds contain material such as sanitary waste, hazardous waste, and radioactive waste

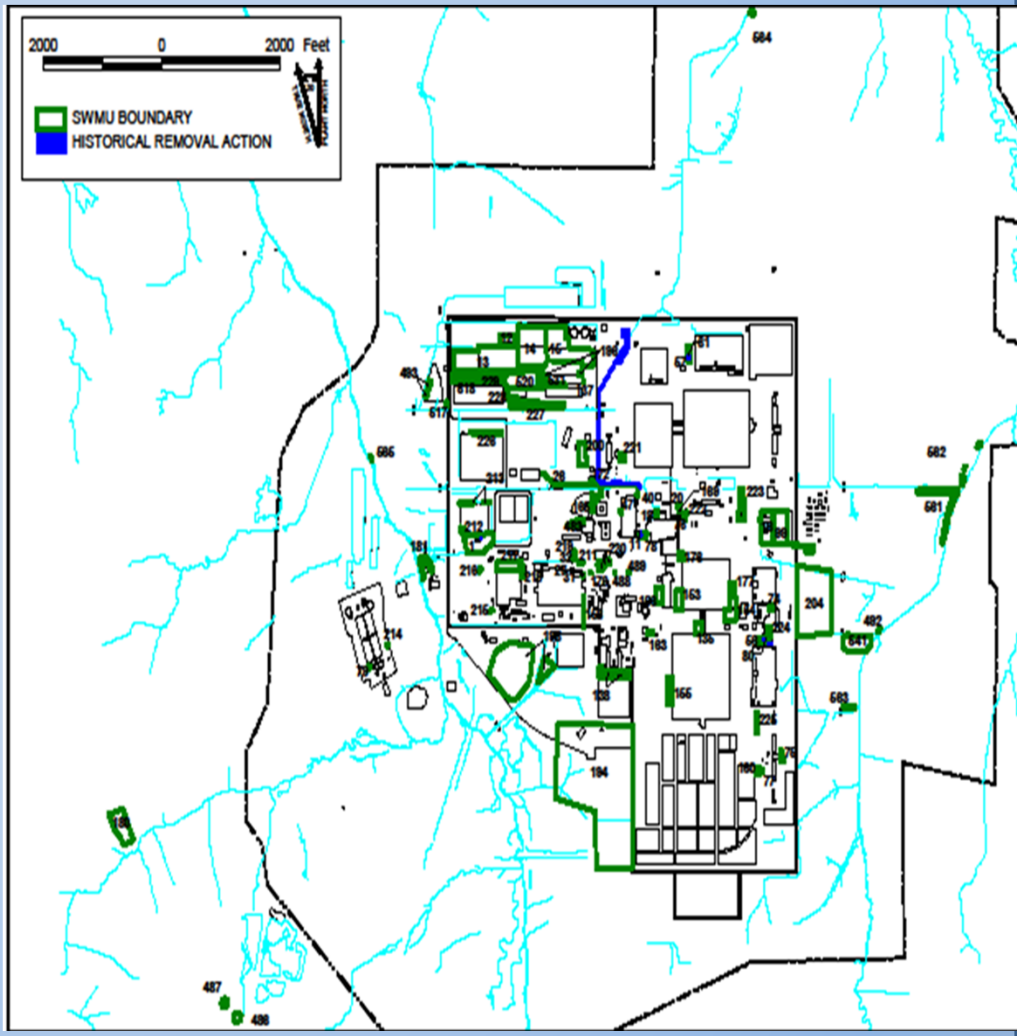
- **Solution**: Following the CERCLA process, develop, select, and, as needed, implement response actions that will be protective of human health and the environment

Burial Grounds CERCLA Evaluation
FY 2012 Schedule Focus



Soils Operable Unit SWMUs

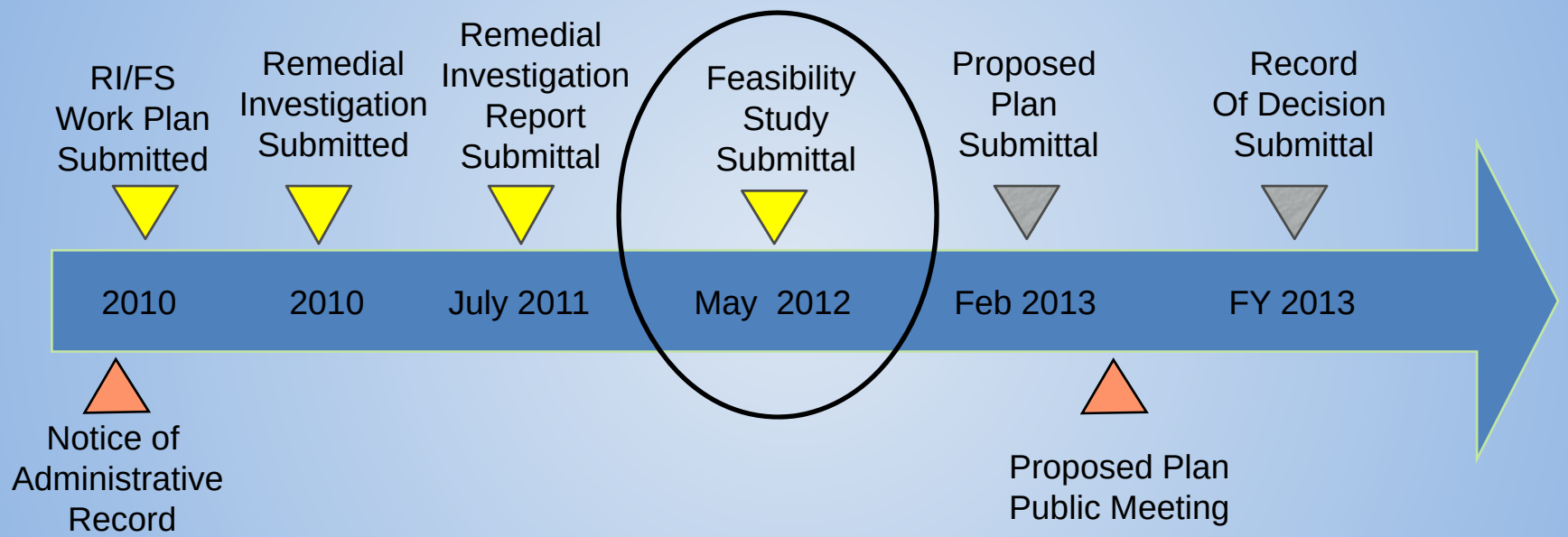
- The Soils Operable Unit consists of areas with uranium, PCBs, or metals contamination from 0ft to 10ft below surface
- Soils OU consists of 86 SWMUs/Areas Of Concern (AOC)
- Over 3,000 samples were collected from 0ft to 10ft for radiological, PCB, and metals analysis in 2010 for the Remedial Investigation (RI)
- A Feasibility Study (FS) is being developed based on the RI
- Of the 86 SWMUs/AOCs, 14 have been moved to post-GDP shutdown due to ongoing plant activities



Soils Operable Unit Projects for FY 12

- Soils Operable Unit Remedial Investigation Report
  - 86 SWMUs over 200 acres total; uranium, PCB, and metals contaminated soil
- Feasibility Study due 3rd quarter of 2012
- Sitewide Evaluation Report is due 3rd quarter of 2012
  - Documents flyover, walkover, and survey findings to determine if any surface soil contamination exists on DOE property outside the limited area

Soils
FY 2012 Schedule Focus



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A CAB recommendation is needed on options to consider for SWMU remediation.

D & D
Planned Accomplishments for FY 12

- Demolition of C-340 Metals Plant (~ 60,000 ft^2 remaining) to slab and all waste disposed of
  - Assumed 70% waste on-site and 30% waste off-site
  - Award demolition subcontractor by November
- Demolition of C-410 Feed Plant (~ 170,000 ft^2 remaining) to slab
  - Assumed 70% waste on-site and 30% off-site
  - Award demolition subcontractor in Spring 2012
- Dispose ~ 10,000 yd^3 of debris from Metals Plant demolition in FY 12 and ~ 10,000 yd^3 of debris from Feed Plant demolition in FY 13
- Inactive facilities to be demolished in FY 13 and FY 14

- C-615-T01, T02, T03, T04, T05 – 800 ft^2 ea
- C-415 Feed Storage Plant – 3,672 ft^2
- C-746-A Warehouse – 63,100 ft^2
- C-746-B Warehouse – 71,100 ft^2
- C-720-N Scale House – 192 ft^2
- C-746-M Waste Storage – 560 ft^2
- C-728 Motor Cleaning Facility - 1,597 ft^2

Waste Disposal Options History

- 2001 – Siting Study
- 2008 - RI/FS Scoping Document
- 2011 - RI/FS Work Plan approved
- 2011 - RI/FS Report to be submitted to regulators

Waste Disposition Options
Remedial Investigation/Feasibility Study (RI/FS)

The RI/FS serve as the mechanism for collecting data to determine if future waste goes to an off-site facility or is to be disposed of in an on-site facility

- Remedial Investigation
  - Characterize site conditions and determine nature of the waste
  - Assess risk to human health and the environment
  - Assess waste disposition options
- Feasibility Study
  - Develop and present alternatives for waste disposal (on-site versus off-site), risk comparisons
  - Develop cost estimates for the waste disposal alternatives
  - Compare options and select alternate

Combined RI/FS

The following provide information to evaluate waste disposal options:

On-site
- Siting
- Waste Acceptance Criteria
- Conceptual Design

Off-site
- WAC established off-site
- Existing design
- Properly permitted

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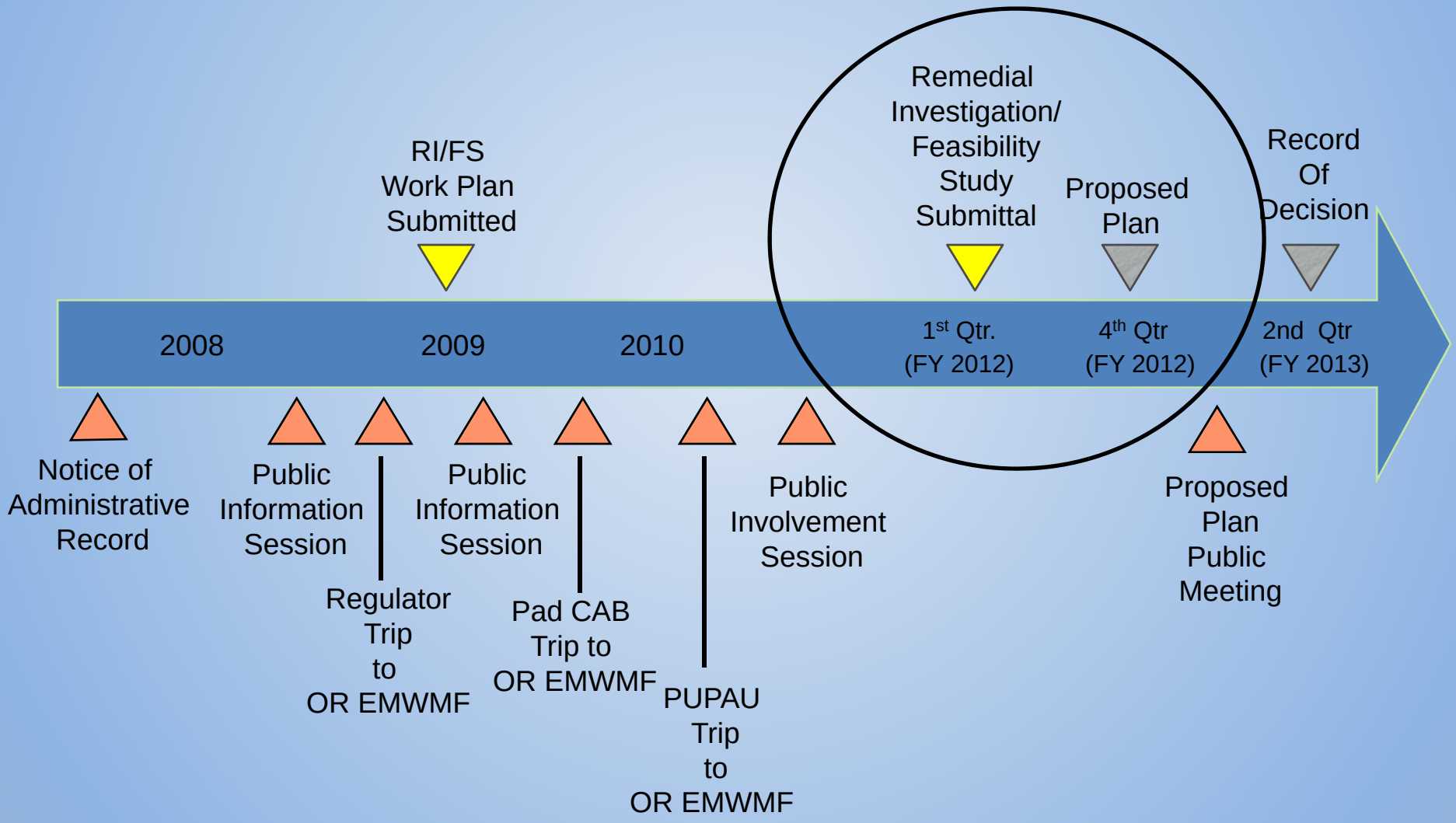
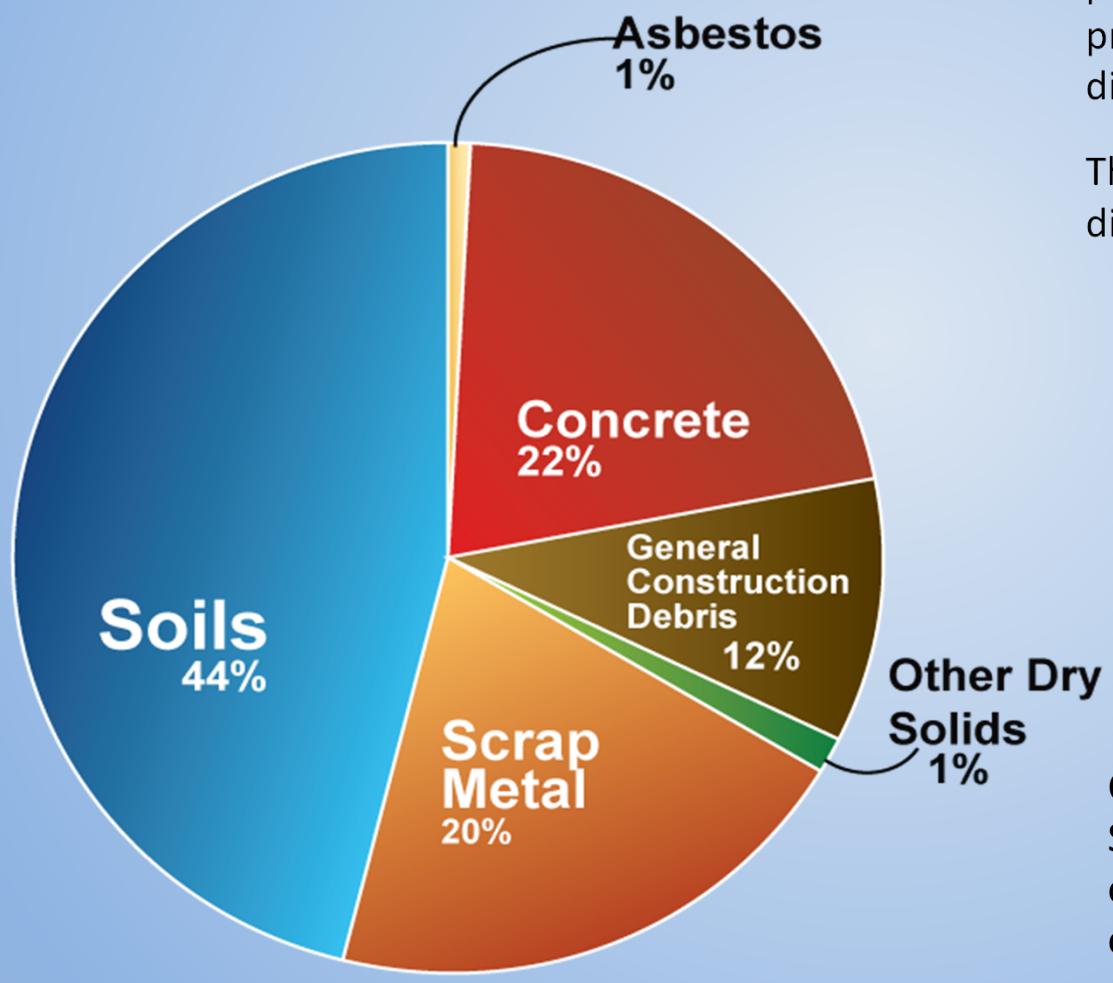
CAB recommendation needed on selecting alternative to address CERCLA waste-disposal cell and where to locate the cell if on-site.

Waste Disposal Options Evaluation
FY 12 Schedule Focus



Waste Disposal Options

Types of waste for disposal



Off-site disposal costs and other potentially limiting off-site factors prompted DOE to look at alternate disposal options through CERCLA

Three possibilities for long-term waste disposal

1. Continue making waste disposal decisions project by project
2. Decide sitewide to ship waste to licensed facilities in other states
3. Build an engineered waste-disposal facility on-site

Continued cleanup of the Paducah Site could generate about 3.6M yds^3 of waste, enough to more than fill one of the plantfts massive 26-acre process buildings

Integrated Priorities Listing

- CAB will compile the Integrated Priorities Listing (IPL) and discuss the FY 2013 budget
- Next IPL will be developed in February 2012 time frame to support FY 2014 budget formulation

Need CAB recommendation on project priorities to support FY 2014 budget request.

Discussion…

Thank you for participating

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EM Environmental Management

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