

# **2011 Remediation Effectiveness Report (RER)**

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**BJC Water Resources Restoration Program**

**June 8, 2011**

# 2011 RER

## Purpose

- Assess progress of remedial actions toward a stated goal and compliance with long-term stewardship requirements.

## Scope

- Ongoing actions status
- Monitoring results (FY 2010)
- Remedy effectiveness
- Stewardship activities (FY 2010)
- Actions/Recommendations

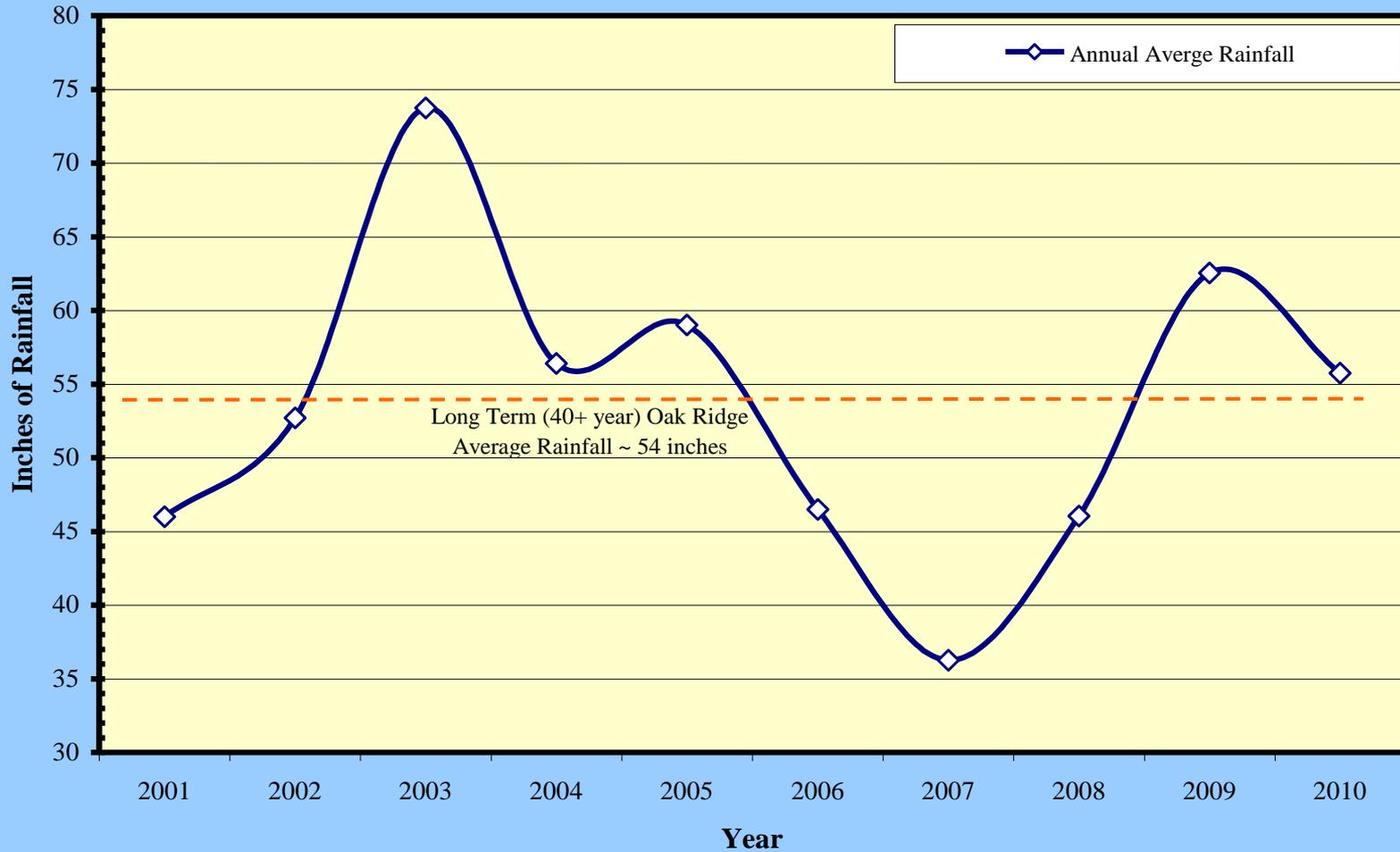
# 2011 RER

## Remedial Action Status

- UEFPC – BSWTS captures and treats significant mercury mass. Annual Hg flux measured at Station 17 (IP) shows the influence of BSWTS and second consecutive year of above average rainfall
- Bear Creek Valley – uranium flux goal at IP (BCK-9.2) is yet to be attained; monitoring indicates NT-8 (BCBGs) remains a significant contributor to uranium flux at (IP)
- ETPP D&D – Removal of the K-25 building west wing was completed in FY 2010.
- 6 low-risk/low-complexity facilities were demolished and debris removed in FY 2010.
- ETPP RA –
  - Mitchell Branch hexavalent chromium RmAR (4/10)
  - K-1070-B burial ground excavation
  - Groundwater Treatability Study
  - Ponds Removal Action
  - K-770 Scrap Yard soil
  - Zone 1/Zone 2 soil
  - Zone 1 Final ROD project started
- Bethel Valley
  - BLDG 4501 mercury removal PCCR
  - CH-8 plume extraction system upgrade started
  - BV 7000 area TCE plume treatability study
- Melton Valley
  - Goals at WOD continue to be met as result of hydraulic isolation of Melton Valley source areas
  - Drinking water provided to offsite residents and MV offsite groundwater monitoring wells installed

# 2011 RER

## ORR Rainfall Above Average in FY10



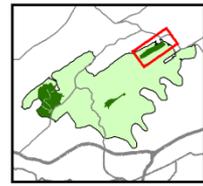
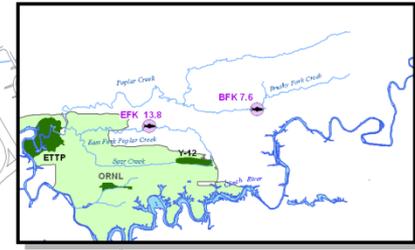
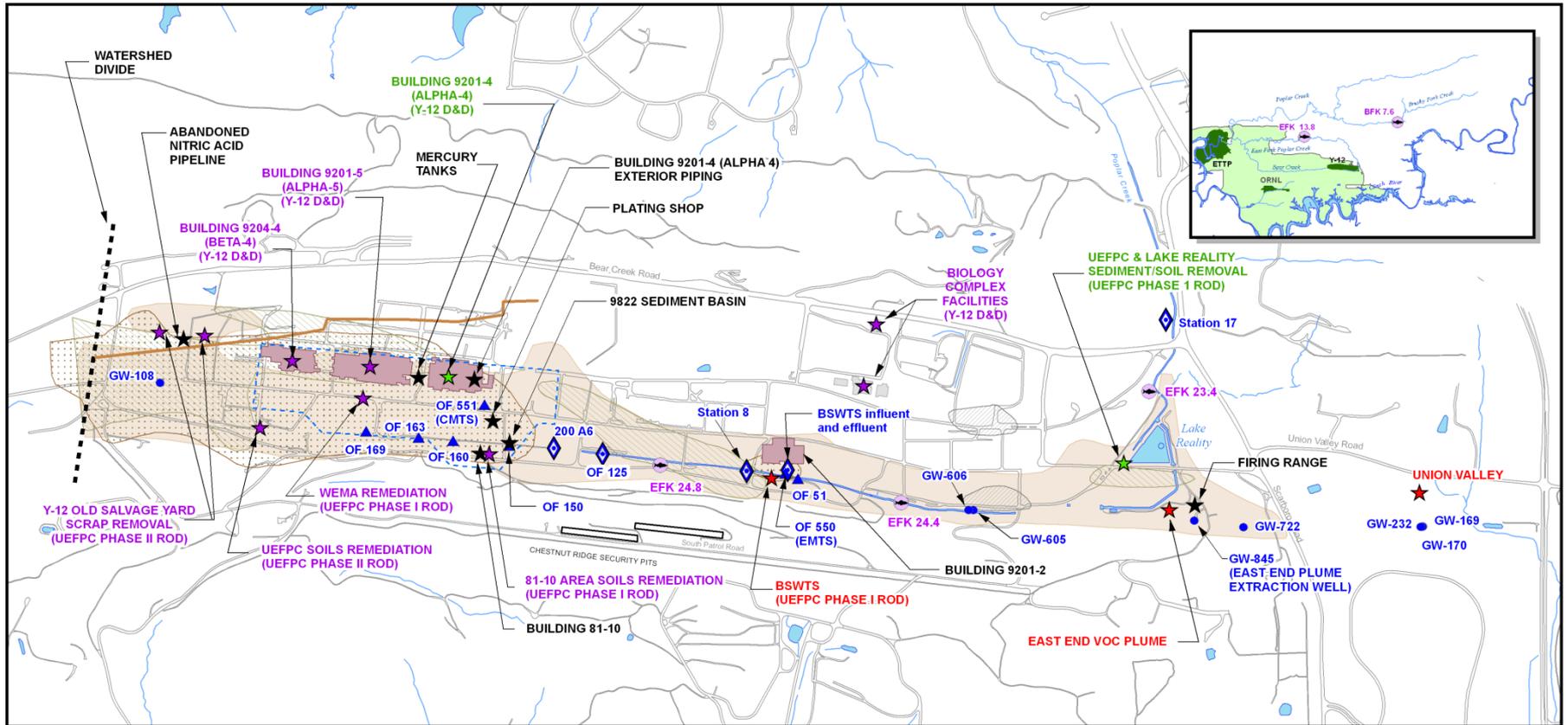
# 2011 RER

## Upper East Fork Poplar Creek

- Key remedial actions include:
  - East End VOC Plume Pump and Treat
  - Big Springs Mercury Treatment System
- Both actions continue to effectively reduce offsite contamination
- Ongoing progress includes
  - Removal of scrap metal and debris from Old Salvage Yard [15.7 million pounds (8.7 M to EMWMF, 7 M to NNSS)]
  - UPEFPC Soils RAWP awaiting approval
  - Time critical removal actions for removal of legacy materials at Alpha 4 and Alpha 5 and demolition of Biology Complex and 2 other buildings in process
  - RAWP for Y-12 Facilities D&D submitted to streamline the process

# 2011 RER

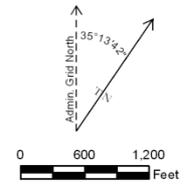
## Upper East Fork Poplar Creek



- ★ Completed action, monitoring and/or LTS is required
- ★ Completed action, no monitoring or LTS is required
- ★ Specific watershed action not yet implemented
- ★ Action in Progress
- Groundwater Monitoring Location
- ▲ Outfall

- ◆ Surface Water Monitoring Location
- Biological Monitoring Location
- Former Mercury Use Area
- Abandoned Nitric Acid Pipeline

- ▨ Alpha-Beta Plume \*
- ▨ Nitrate Plume \*
- ▨ Alpha Plume \*
- ▨ VOC Plume \*
- ▨ WEMA



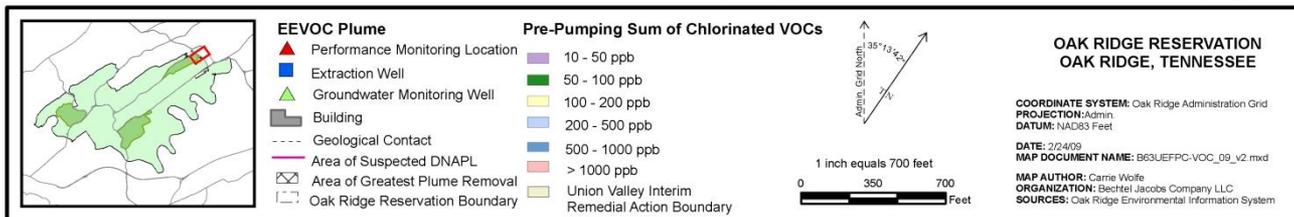
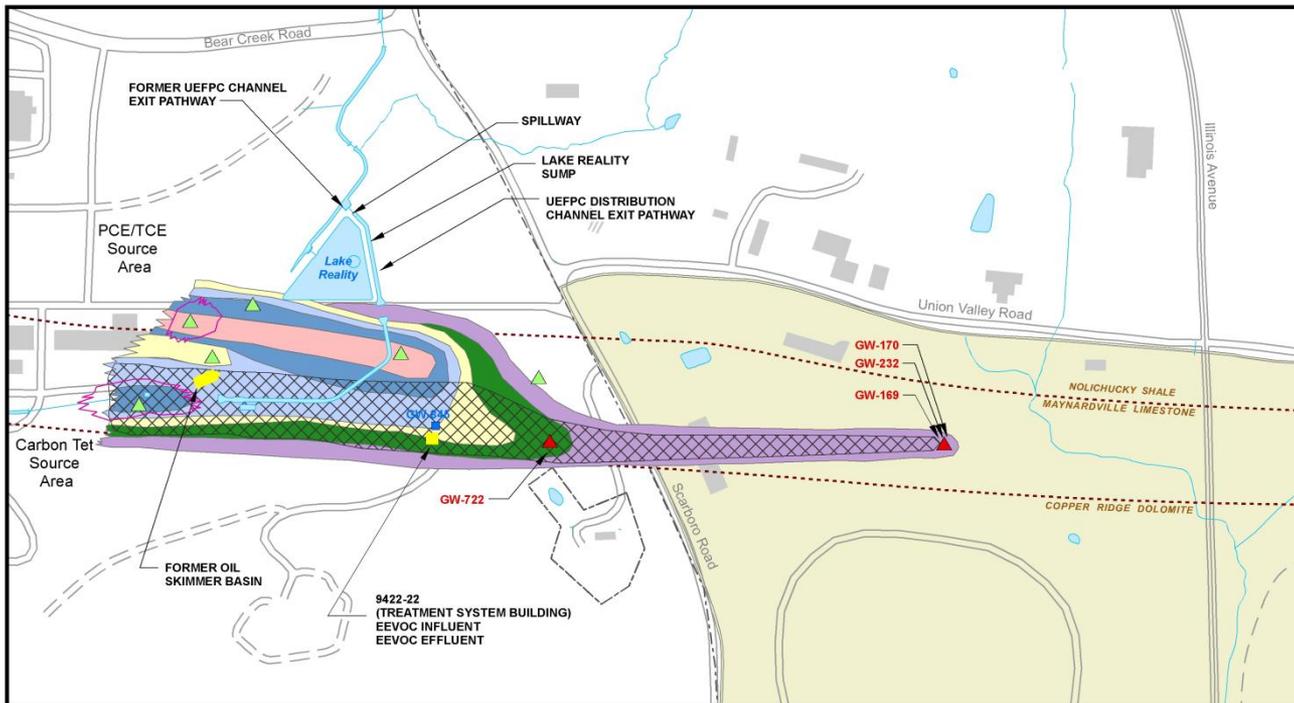
### OAK RIDGE RESERVATION OAK RIDGE, TENNESSEE

COORDINATE SYSTEM: Oak Ridge Administration Grid  
 PROJECTION: Admin  
 DATUM: NAD83 Feet  
 DATE: 11/16/2010  
 MAP DOCUMENT NAME: RER\_UEFCP\_watershed\_site\_map\_v2.mxd  
 MAP AUTHOR: Richard Lambert  
 ORGANIZATION: Bechtel Jacobs Company LLC  
 SOURCES: Oak Ridge Environmental Information System

\* "Report on Remedial Investigation of the Upper East Fork Poplar Creek Characterization Area at the Y-12 Plant, Oak Ridge, Tennessee" (DOE/OR/01-1641/V3&D2), 1998.

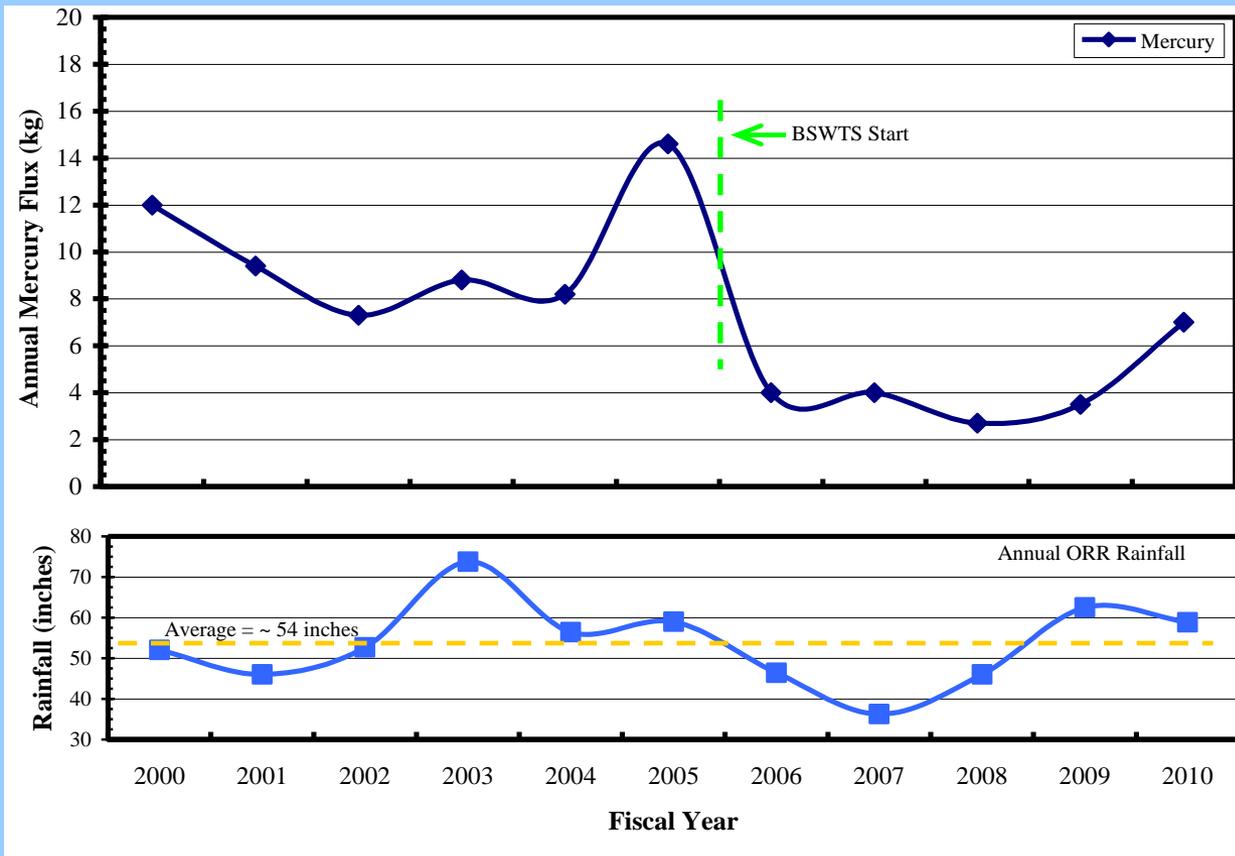
# 2011 RER EEVOC Pump and Treat

- Pump and treat has contained the VOC plume – protects offsite groundwater quality



# 2011 RER

## Mercury Flux Reduction at Station 17



- BSWTS captures and removes several kg's of mercury per year reducing offsite releases
- ROD goal not yet attained

# New Issue for UEFPC

- During FY 2010 inflow to BSWTS exceeded system design treatment capacity necessitating bypass flow to occur during significant periods of time
  - Flow measurements being made to estimate mercury mass discharged as well as to evaluate possible actions to mitigate the discharge

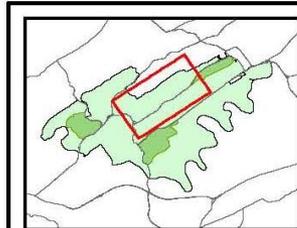
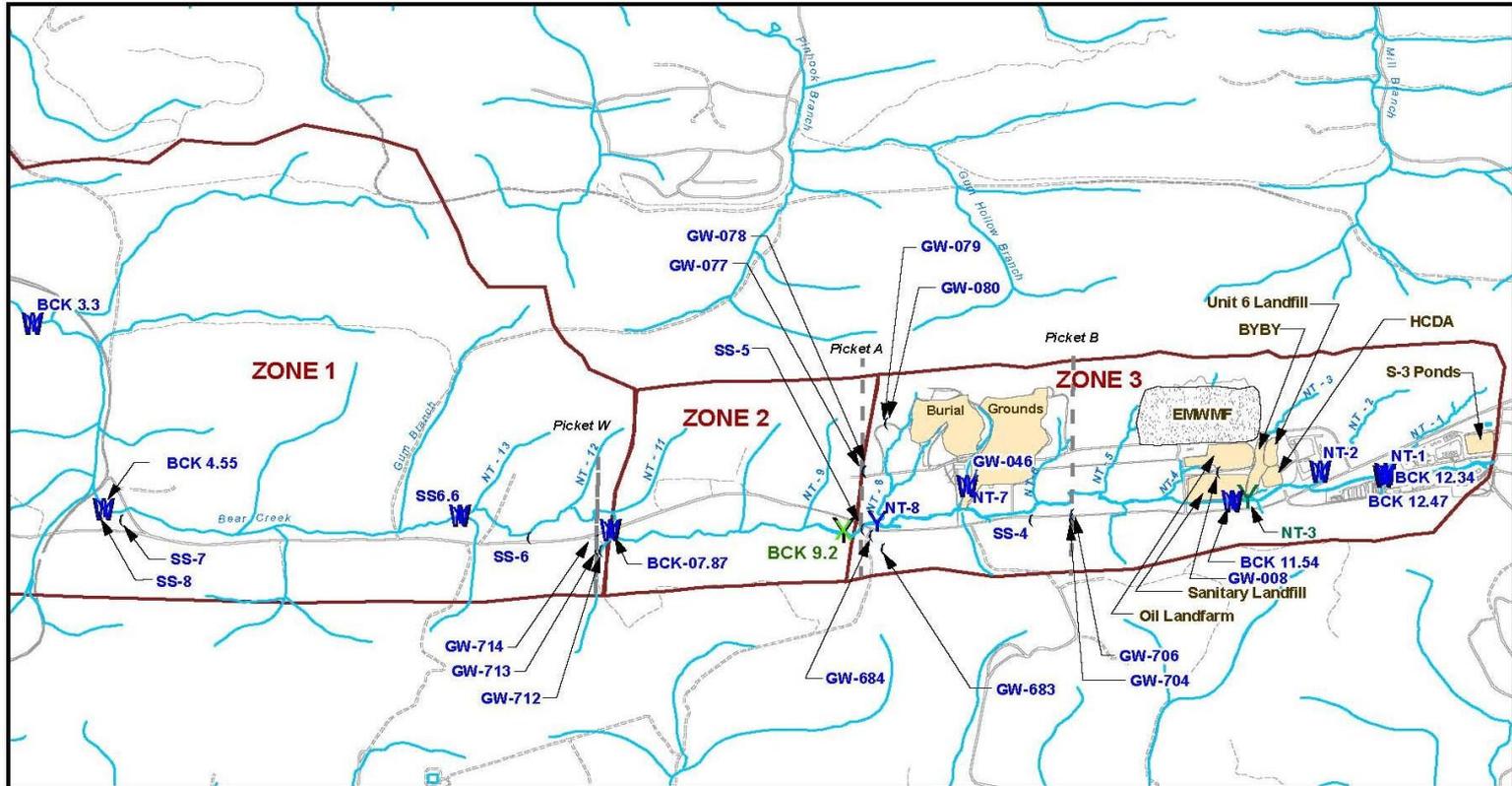
# 2011 RER

## Bear Creek Valley

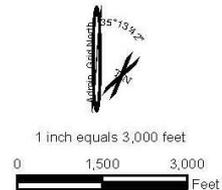
- Uranium and nitrate are principal surface water contaminants
  - Uranium goal not met at Integration Point (IP) and not yet met consistently at BCK 12.34 (S-3 Ponds)
  - NT-8 (western side of Bear Creek Burial grounds) contributed ~ 50% of FY10 IP uranium flux
  - NT-3 uranium flux was 14.5 kg which exceeds the BYBY remediation goal and comprises ~ 12% of IP uranium flux. Isotopic signature indicates source is different from the BYBY waste.

# 2011 RER

## Bear Creek Valley



- BCK 9.2 Integration Point
- NT-3
- Well or Spring
- Other Surface Water Locations
- Land Use Zones

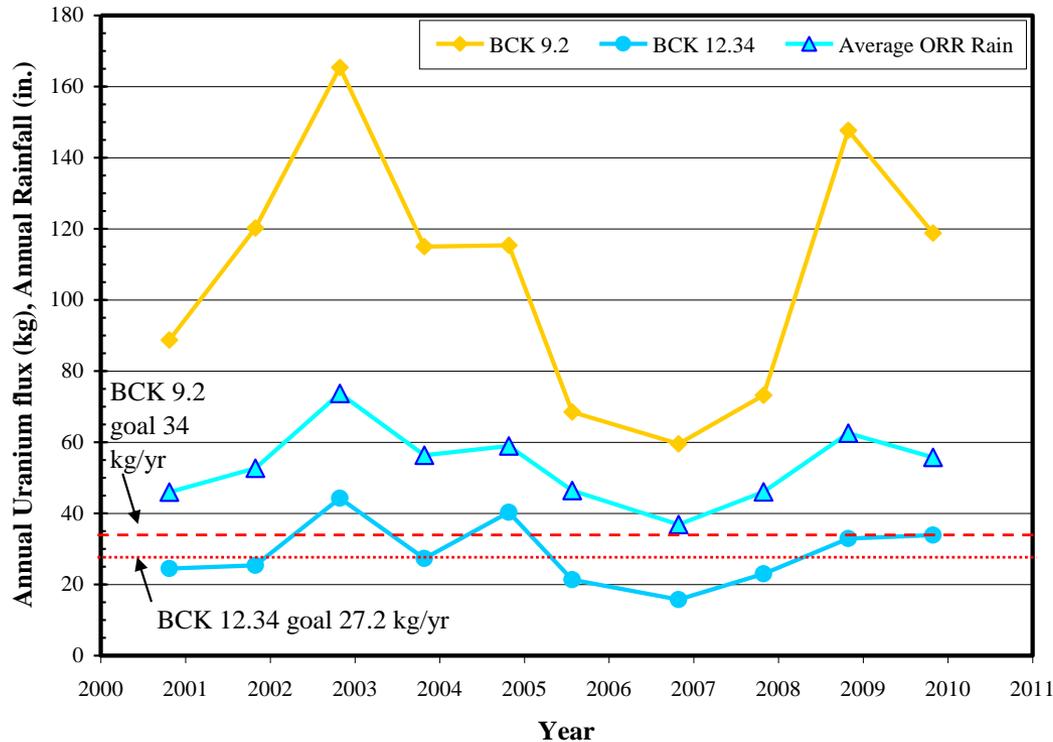


### OAK RIDGE RESERVATION OAK RIDGE, TENNESSEE

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 DATE: 12/03/07  
 MAP DOCUMENT NAME: BCV\_LU\_SWGW\_08.mxd  
 MAP AUTHOR: Carrie Wolfe  
 ORGANIZATION: Bechtel Jacobs Company, LLC  
 SOURCES: Oak Ridge Environmental Information System

# 2011 RER

## Bear Creek Valley Uranium



- BCK 12.34 flux goal met 6 of 10 years when annual rainfall is at or below average
- Flux goal not met at BCK 9.2
- Fluxes trend with annual rainfall

# New Issues for Bear Creek Valley

- Document the discharge of contaminants from upstream sources in NT-8
  - Sampling conducted to identify areas from which uranium, VOCs, and PCBs originate in the NT-8 tributary to Bear Creek
- Five years of riparian monitoring completed at BCK 4.55
  - Monitoring shows the site is well on its way to recovery. Recommend discontinuation of monitoring.

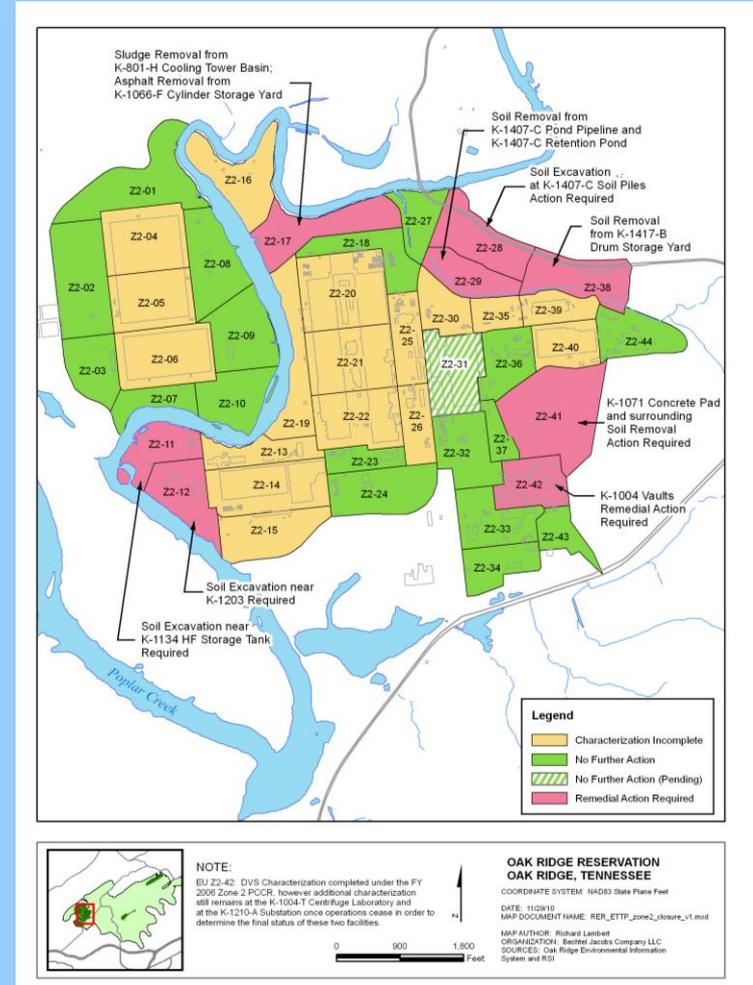
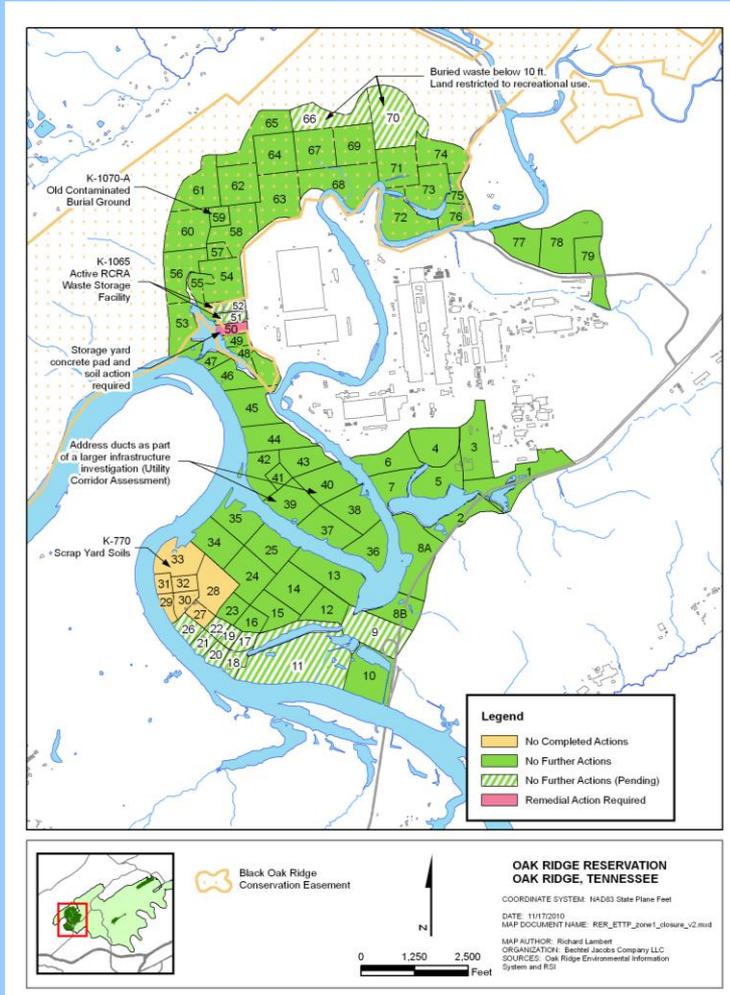
# 2011 RER

## Progress at ETTP

- D&D Program FY 2010 accomplishments
  - Demolition of the K-25 building West Wing was completed in FY 2010. Pre-demolition activities continued in the East and North Wings
  - Pre-demolition work was completed on the K-27 building
- 6 low-risk/low-complexity facilities were demolished
- K-1007-P1 Pond remediation field work was completed, addendum to RmAWP approved, and RmAR submitted.
- Excavation completed at K-770 Scrap Metal Yard and PCCR submitted
- Excavation continued at K-1070-B Classified Burial Ground
- Plume containment pumping and treatment of the hexavalent chromium plume near Mitchell Branch is controlling contamination below TDEC AWQC limit. Action Memorandum for long term pump and treat approved.
- Monitoring of groundwater and surface water show that contaminant conditions are stable
- Groundwater treatability study for VOC source treatment ongoing

# 2011 RER

## ETTP Zone 1 / Zone 2 Soils



# New Issue at ETTP

- Fish barrier at K-1007-P1 Pond was damaged during storm events allowing invasion of the pond by undesirable fish species
  - Fish barrier was repaired and undesirable species removed to the extent possible

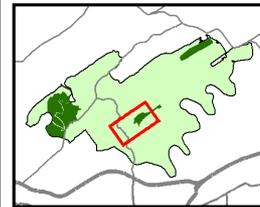
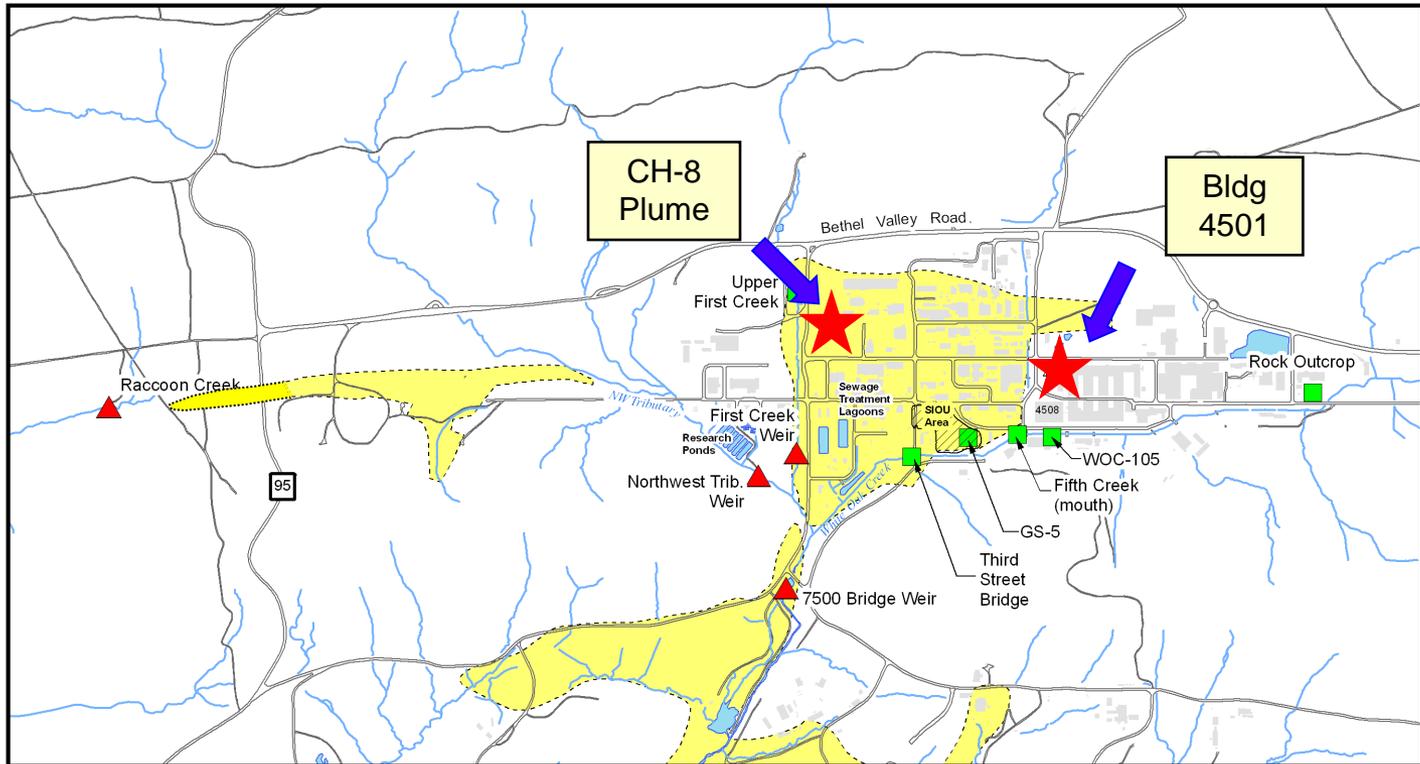
# 2011 RER

## Bethel Valley

- Key CERCLA environmental actions to date
  - Bldg 4501/4505 basement sump mercury diversion to treatment
  - Core Hole 8 Plume containment pumping
- Ongoing monitoring of surface water, groundwater, and aquatic biota
- ARRA Bethel Valley Burial Grounds Remedial Action at SWSAs 1 & 3 ongoing – hydraulic isolation and soil cover
- ARRA Building D&D
  - Bldg 3026 demolished --- >1.7 MLb waste to EMWMF
  - 2000 East Complex demolished – 5700 yd<sup>3</sup> to Y-12 landfill
  - Bldg 3074 and 3136 demolished

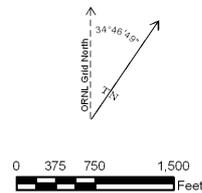
# 2010 RER

## Bethel Valley Surface Water Monitoring



### Surface Water Monitoring Locations

- Sampling Frequencies
- ▲ Flow-Paced Continuous and Grab Sample
  - Grab Sample
  - Areas of Groundwater Contamination



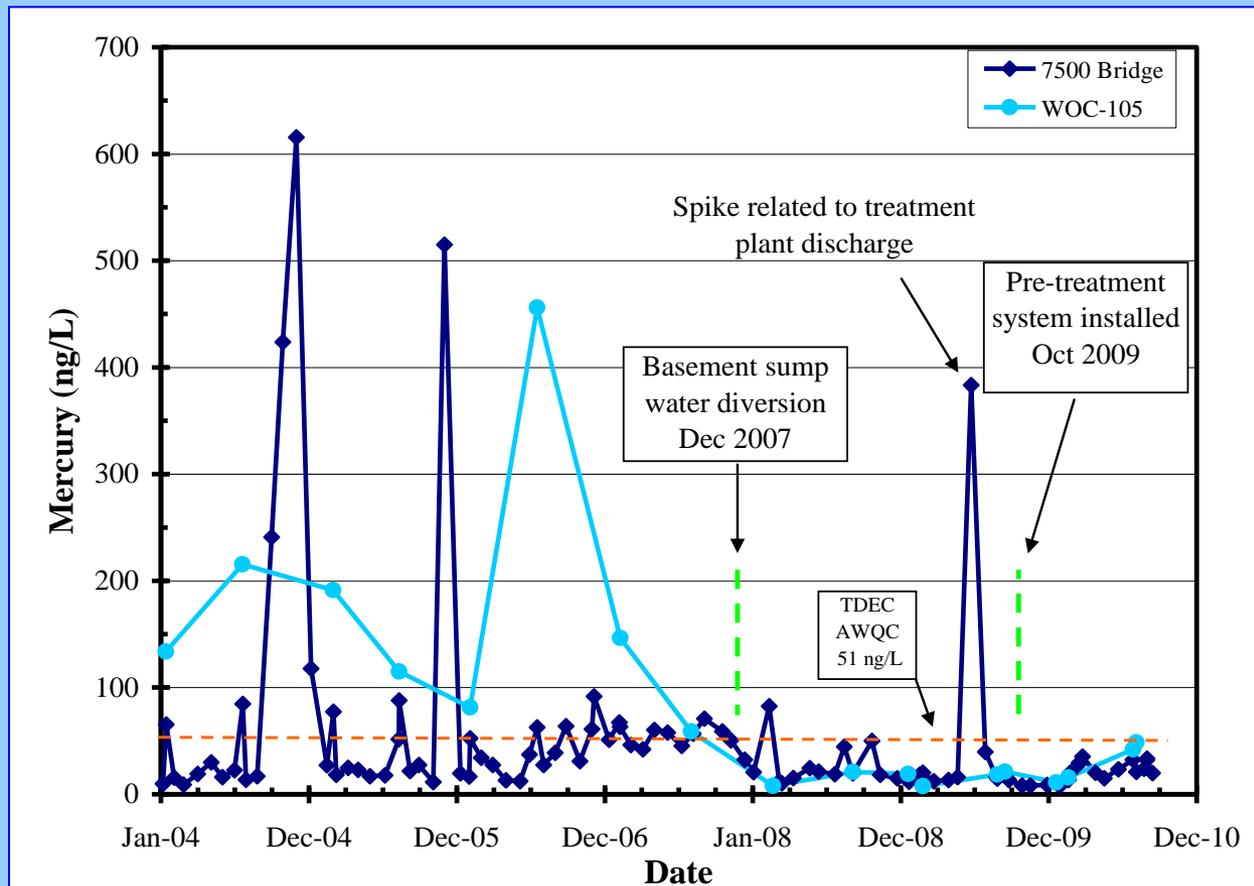
### OAK RIDGE RESERVATION OAK RIDGE, TENNESSEE

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PROJECTION: ORNL  
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MAP DOCUMENT NAME: RER\_BV\_SW\_monitoring\_locations\_v1.mxd  
MAP AUTHOR: Richard Lambert  
ORGANIZATION: Bechtel Jacobs Company LLC  
SOURCES: Oak Ridge Environmental Information System

# 2011 RER

## Reduction of Mercury in White Oak Creek

- Routing of Bldg 4501/4505 basement sump water to treatment reduces mercury in surface water



# 2010 RER

## Core Hole 8 Plume Collection

- Core Hole 8 plume collection system did not meet performance goals for FY10.
- Continuing mechanical problems and utility water line leaks caused increased plume water discharges to First Creek.
- Corrective actions are under way.

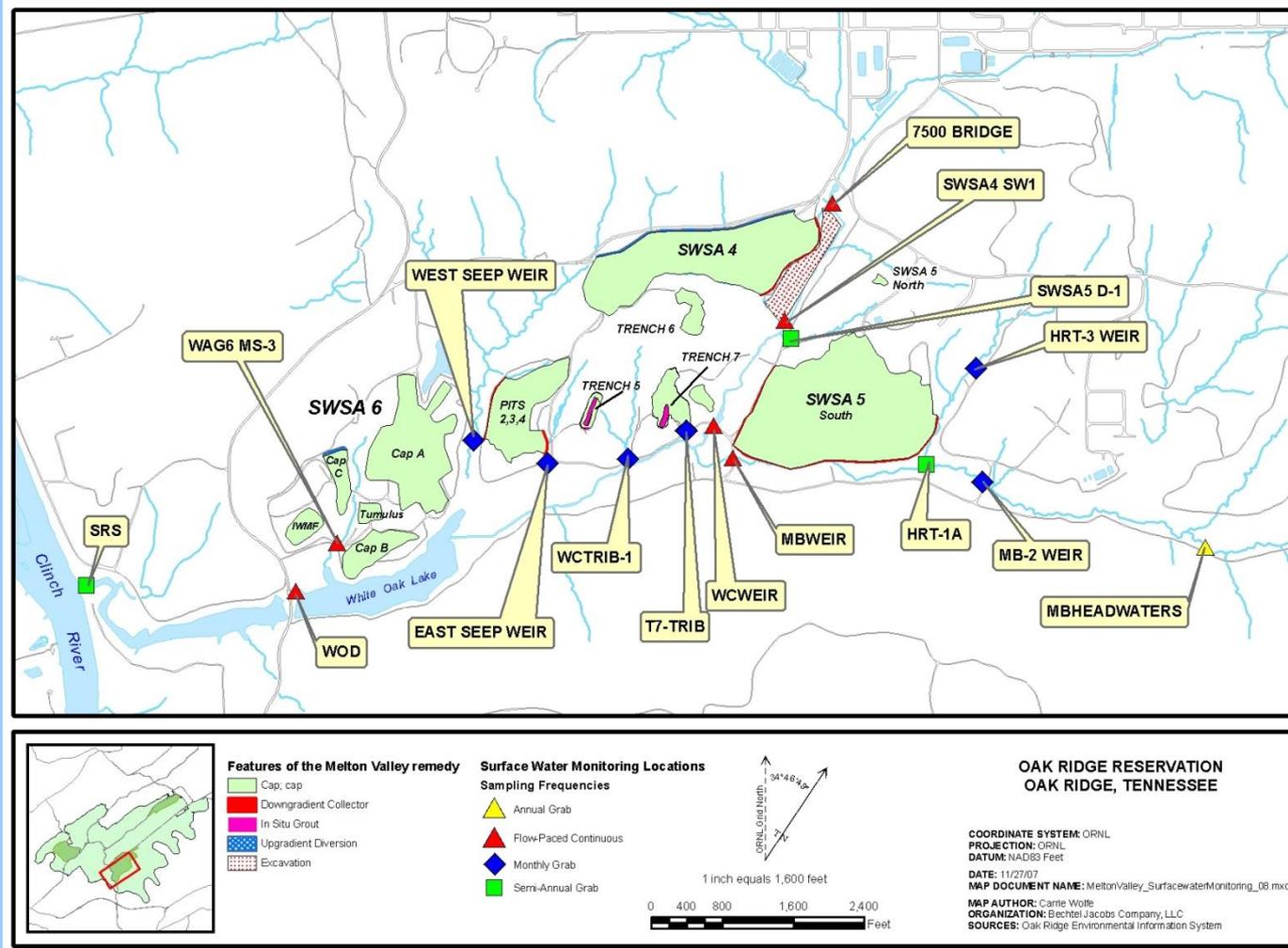
# 2011 RER

## Melton Valley

- ROD actions completed by end of FY06
- Performance monitoring includes surface water quality and effectiveness of hydrologic isolation of buried waste units
- Aquatic biota monitored to evaluate ecological recovery

# 2011 RER

## Melton Valley Surface Water Monitoring



# 2011 RER

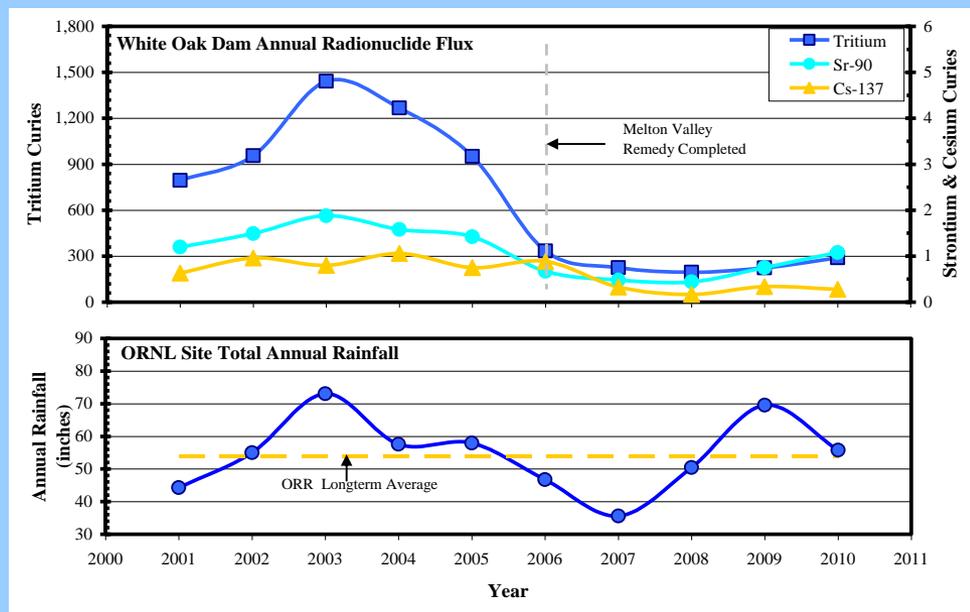
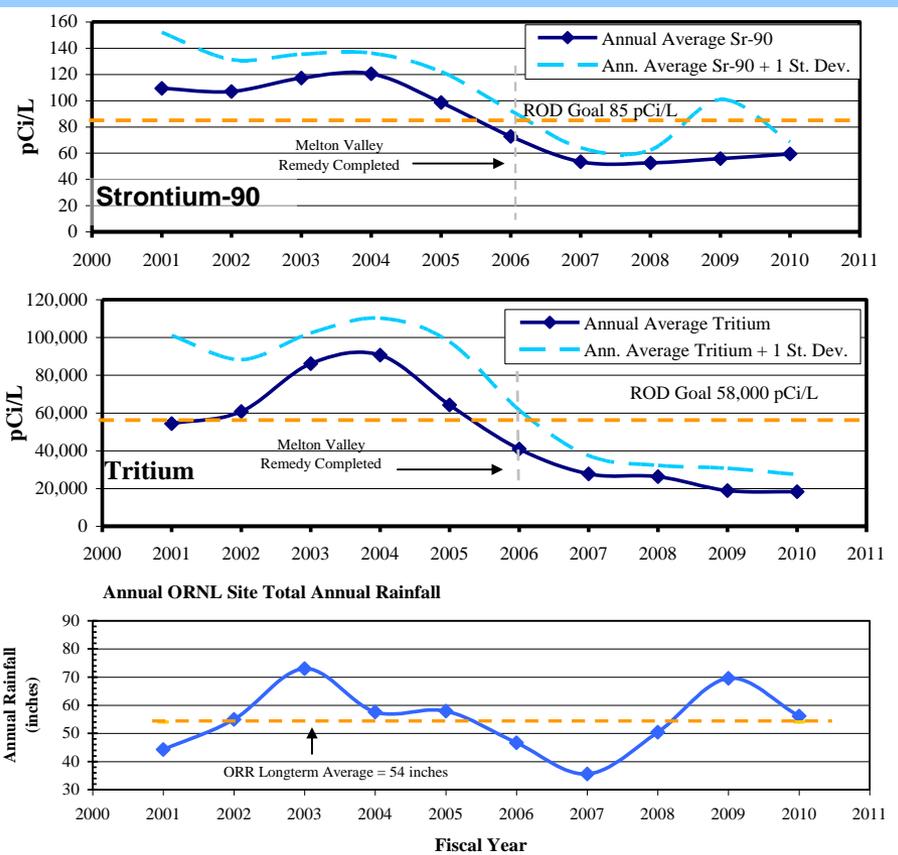
## MV ROD Water Quality Goals

- Residential-based goals to protect water quality at the integration point (White Oak Dam)
  - Goals have been met in FY 2007 through 2010
- Recreation-based goals established for streams within Melton Valley
  - Goals have been met in FY 2007 through 2010
- Ambient Water Quality Criteria for fish and aquatic life were met during FY 2010 although largemouth bass in White Oak Lake continue to show elevated mercury and PCBs
- Restored wetland areas at SWSAs 4, 5, and 6 are doing well

# 2011 RER

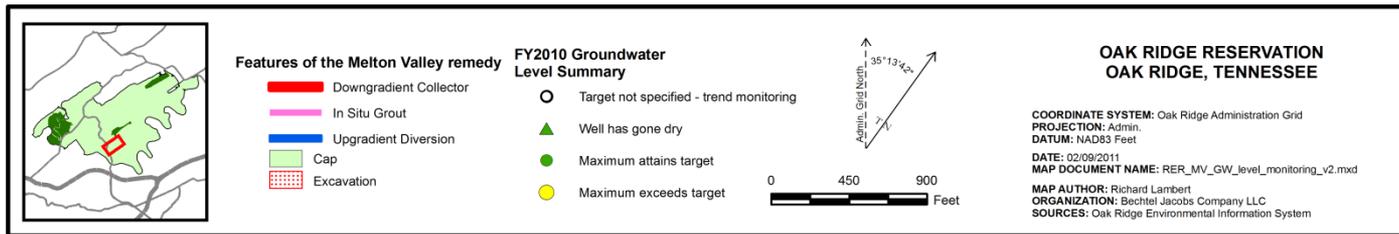
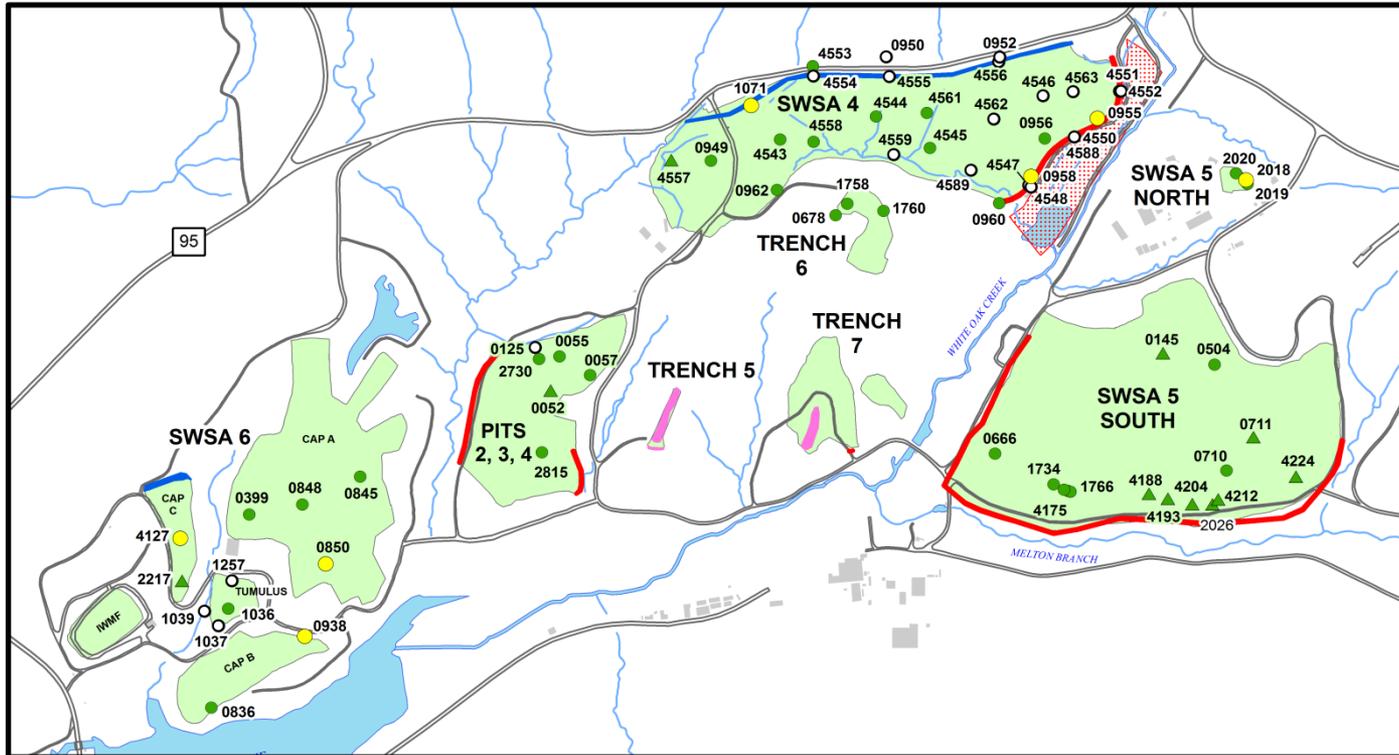
## White Oak Dam (IP) Data

•  $^{90}\text{Sr}$ , tritium (and  $^{137}\text{Cs}$ ) goals at the IP have been attained and maintained since completion of MV remedy and have shown minimal response to above average rainfall during FY 2009 and FY 2010



# 2011 RER

## MV Hydrologic Isolation



# 2011 Melton Valley Exit Pathway and Offsite Groundwater

- Past detection of DOE contaminants in onsite exit pathway wells was followed by installation of offsite monitoring wells.
- DOE provided permanent utility water supplies to residents offsite and near Clinch River.
- Monitoring of DOE-built offsite wells showed presence of TCE, cis-1,2-DCE, vinyl chloride in a single well on one occasion,  $^{90}\text{Sr}$  in 2 wells on single occasions, and  $^{99}\text{Tc}$  in one well on one occasion. All were below drinking water limits.
- DOE has scheduled milestones to plan additional onsite and offsite groundwater characterization and monitoring near the Clinch River in Melton and Bethel Valleys.

# New Issues for Melton Valley

- Second round of sampling of offsite wells identified low concentrations of VOCs and metals
  - Monitoring continues
  - DOE plans to scope and conduct additional monitoring investigations of onsite/offsite groundwater
- Performance of SWSA 4 downgradient seepage collection trench during prolonged wet seasons allows some discharge of contaminated groundwater to White Oak Creek
  - Maintenance actions will be conducted on the extraction wells to improve performance and potential further actions will be scoped

# 2011 RER ORR Offsite

- LEFPC – mercury concentrations in fish tissue continue to exceed EPA criteria
- Lower Watts Bar/Clinch River/Poplar Cr
  - PCBs in reservoir fish trending downward since 1980's
  - Mercury in LWBR fish are below EPA criteria

# 2011 RER

- Comments due June 22, 2011

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