



# Second Five-Year Review Report for the Rocky Flats Site

Rocky Flats Stewardship Council, August 6, 2007





# Introduction

- **First CERCLA five-year review**
  - covered May 1997 to April 2002
  - Report issued by DOE in August 2002
  - approved by EPA in September 2002
- **Second CERCLA five-year review**
  - covers May 2002 to April 2007
  - Report issued by DOE in July 2007
  - DOE has submitted Report to EPA for approval
  - Report is available on the Rocky Flats website.
- **Based on this review the remedy remains protective of human health and the environment.**

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act; DOE – U.S. Department of Energy EPA – U.S. Environmental Protection Agency; website - [www.lm.doe.gov/land/sites/co/rocky\\_flats/rocky.htm](http://www.lm.doe.gov/land/sites/co/rocky_flats/rocky.htm)



## **Introduction (cont.)**

- **Cleanup and closure of Rocky Flats completed during the second five-year review period**
  - **Final remedy selected in September 2006 CAD/ROD, based on results of the July 2006 RI/FS, including a CRA (human health and ecological).**
  - **The second five-year review assesses the performance of the final remedy.**
  - **CERCLA five-year reviews do not reopen remedy decisions.**

**CAD/ROD – Corrective Action Decision/Record of Decision; RI/FS – Remedial Investigation/Feasibility Study; CRA – Comprehensive Risk Assessment**





## Current Site Status

- **OU 3, Offsite Areas, was addressed under a separate 1997 No Action CAD/ROD.**
- **Peripheral OU remedy is No Action (2006 CAD/ROD).**
- **Central OU remedy is institutional and physical controls (2006 CAD/ROD).**
- **Central OU will remain on the NPL.**

**OU – Operable Unit; NPL – CERCLA National Priority List**



## Current Site Status (cont.)

- **RFLMA implements the CAD/ROD so the Central OU remedy will remain protective.**
- **EPA certified that cleanup and closure is complete and Central OU remedy is operating properly and successfully (May 2, 2007).**
- **Notice of Partial Deletion for the Peripheral OU and OU 3 (May 25, 2007).**
- **Most Peripheral OU land transferred to USFWS (July 12, 2007).**

**EPA – U.S. Environmental Protection Agency; NWRA – National Wildlife Refuge Act; US FWS – US Fish and Wildlife Service; RFLMA – Rocky Flats Legacy Management Agreement; DOE – U.S. Department of Energy; CDPHE – Colorado Department of Public Health and Environment**



# Central OU Conditions

- **PLF and OLF closed with**
  - **Engineered covers,**
  - **Run-on and runoff controls and**
  - **Monitoring wells.**
- **PLF Seep Treatment System**
  - **VOCs treated in a passive aeration treatment system.**
  - **Arsenic, boron and manganese above surface water standards**
    - **Triggered downstream PLF Pond water sampling – now discontinued based on DOE, CDPHE and EPA consultation**
    - **Boron remained slightly above RFLMA standards at end of 2006.**



## Central OU Conditions (cont.)

- **Some areas of subsurface soil contamination:**
  - VOCs, metals, and radionuclides
  - remains of former building and infrastructure components,
  - debris and incinerator ash.
- **Groundwater contaminant plumes:**
  - VOCs, nitrates and uranium may impact surface water quality.
- **Ground water collection and treatment systems reduce ground water contamination loading to surface water :**
  - MSPTS and ETPTS (treat VOCs)
  - SPPTS (treats uranium and nitrates)

MSPTS – Mound Site Plume Treatment System; ETPTS – East Trenches Plume Treatment System; SPPTS – Solar Ponds Plume Treatment System



## Central OU Conditions (cont.)

- **Surface soil contaminated with low levels of plutonium-239/240 and americium-241 could impact surface water quality if soil disturbance causes erosion and mobilizes contaminants.**
- **Subsurface soil contaminated with uranium and VOCs contribute contaminants to ground water, which may impact surface water.**
- **Some subsurface areas have VOC contamination at levels that preclude occupied buildings.**
- **Contaminated surface soil in some parts of the Central OU poses risk at low end of CERCLA acceptable range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$  ( $2 \times 10^{-6}$  from plutonium-239/240) to the WRW.**

WRW – Wildlife Refuge Worker



# Remedy Components

- **Institutional Controls prohibit:**
  - **Soil-disturbing activities that are not appropriately controlled;**
  - **Activities that could damage the landfill covers or other components;**
  - **Non-remedy-related use of ground water or surface water.**
- **Physical controls consist of signs prohibiting access and listing Institutional Controls prohibitions.**
- **Monitoring includes inspections and maintenance of remedy components and sampling of ground water and surface water at specified locations and frequencies.**



# Review Process

- **Review team - DOE, DOE's LM contractor, CDPHE, EPA and FWS staff.**
  - **The team used EPA's *Comprehensive Five-Year Review Guidance*, June 2001.**
- **Recap site background and chronology, remediation history, and progress since first five-year review.**
- **Focus on post-closure conditions and final remedy implementation.**
  - **Closure conditions achieved in late 2005.**

LM – Legacy Management



## Review Process (cont.)

- **Community notice and involvement.**
- **Document review**
  - **Remedy selection documents**
  - **Implementation of RFLMA requirements**
  - **ARARs and CRA Factors**
  - **Ground water and surface water data set for RFLMA locations through December 31, 2006.**
- **Inspections of the Central OU.**
- **Review operation and maintenance costs.**
- **Review new technologies.**

ARARs – applicable or relevant and appropriate requirements



# Technical Assessment

- **Question A: Is the remedy functioning as intended? “Yes” = Protective**
  - **The technical performance of the remedy is consistent with that intended by the CAD/ROD.**
  - **Institutional controls and physical controls are in place and successfully preventing exposure.**
  - **Monitoring and inspections of remedy components are done per RFLMA requirements.**
  - **No significant items were found that would call into question the protectiveness of the remedy.**
- **The answer to Question A is “yes.”**



## Technical Assessment (cont.)

- **Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs still valid? “Yes” = Protective**
  - **The CRA underlying WRW exposure scenarios and parameters remain valid.**
  - **No changes to reference doses or slope factors, or ARARs that would change the protectiveness of the remedy.**

RAO – remedial action objective

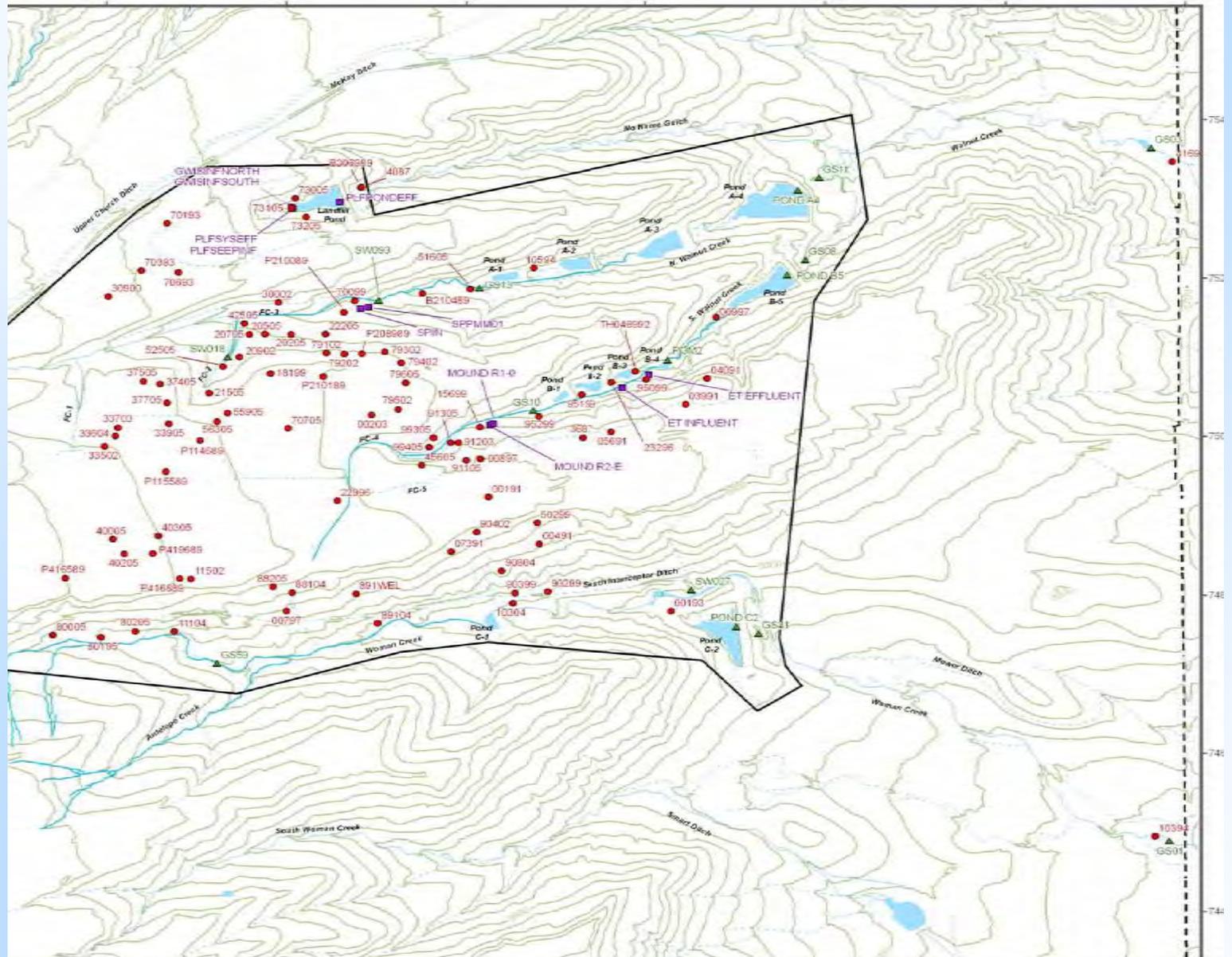


## Technical Assessment (cont.)

- **RAOs also remain valid.**
  - **The RAOs for contaminated ground water are to prevent adverse impacts to surface water quality, prevent exposure to ground water above MCLs, and restore ground water to meet surface water standards. The RAO for surface water is to meet surface water standards.**
  - **RAOs for contaminated soil are to prevent adverse impacts to ground water and surface water and to prevent unacceptable risks from exposure.**
  - **The answer to Question B is “yes.”**



# RFLMA Water Monitoring Locations





## Technical Assessment (cont.)

- **Question C: Has any other information come to light that could call into question the protectiveness of the remedy? “No” = Protective**
  - **No new information not addressed or anticipated in the CAD/ROD was identified that could call into question the protectiveness of the remedy.**
- **The answer to Question C is “no.”**



# Issues, Recommendations, and Follow-Up Actions

## GS10 Uranium Concentrations

- ***Issue:*** Uranium concentrations above the surface water standard in 2006.
  - Surface water discharged from the Central OU meets RFLMA surface water standards.
  - Ground water with predominantly naturally occurring uranium makes up a larger proportion of stream flow at GS10.
- ***Recommendation:*** Continue to monitor per RFLMA requirements. LANL analysis to see if natural uranium isotopic signatures have significantly changed.



## Issues, Recommendations, and Follow-Up Actions (cont.)

### Uranium Concentrations at OLF Wells

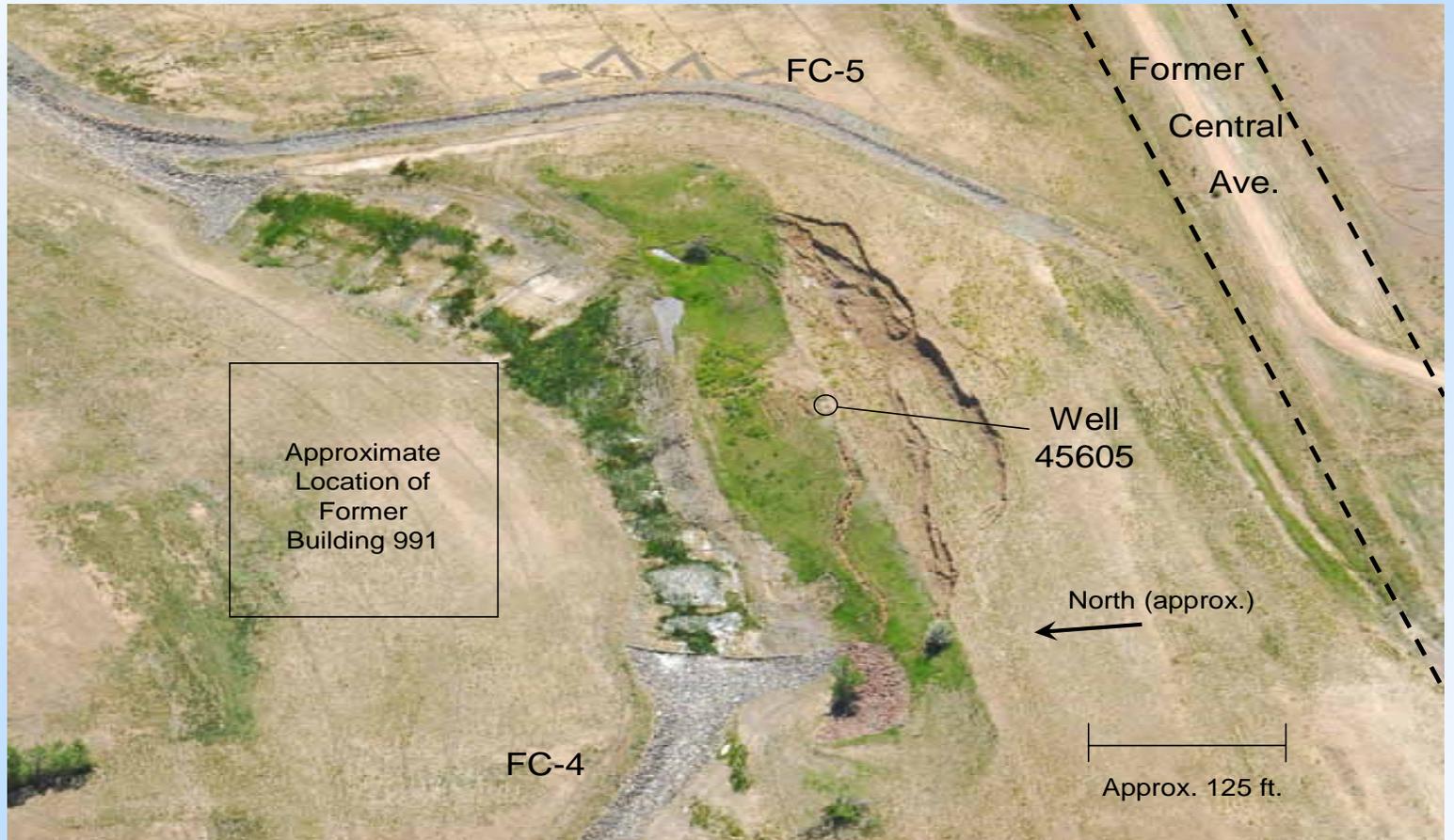
- ***Issue:*** Uranium analytical results are higher than the surface water standard in one of three downgradient wells.
  - Results are below RFLMA ground water uranium threshold.
- ***Recommendation:*** Continue to monitor in accordance with RFLMA requirements. LANL analysis to see if natural uranium isotopic signatures have significantly changed.



## Issues, Recommendations, and Follow-Up Actions (cont.)

### Sentinel Well 45605

- ***Issue:*** Sentinel well 45605 is in hillside slump south of former Building 991.
  - Well casing has moved out of vertical, and the serviceability of the well is uncertain.
- ***Recommendation:*** Continue to monitor this well in accordance with RFLMA. If necessary, after movement in the area stops, replace the well after regrading of the hillside has been completed.





## Issues, Recommendations, and Follow-Up Actions (cont.)

### Water Quality Standards Changes

- ***Issue:*** Changes to RFLMA surface water standards for arsenic, copper, and uranium may be promulgated by the CWQCC in 2009 triennial review.
  - Temporary modification to nitrates and certain VOCs surface water standards are set to expire in 2009.
  - Impacts of any changes will depend on the results of continuing remedy implementation.
- ***Recommendation:*** DOE should actively participate in the triennial review process to identify issues and collect and provide any necessary data to the CWQCC for its decision-making process.

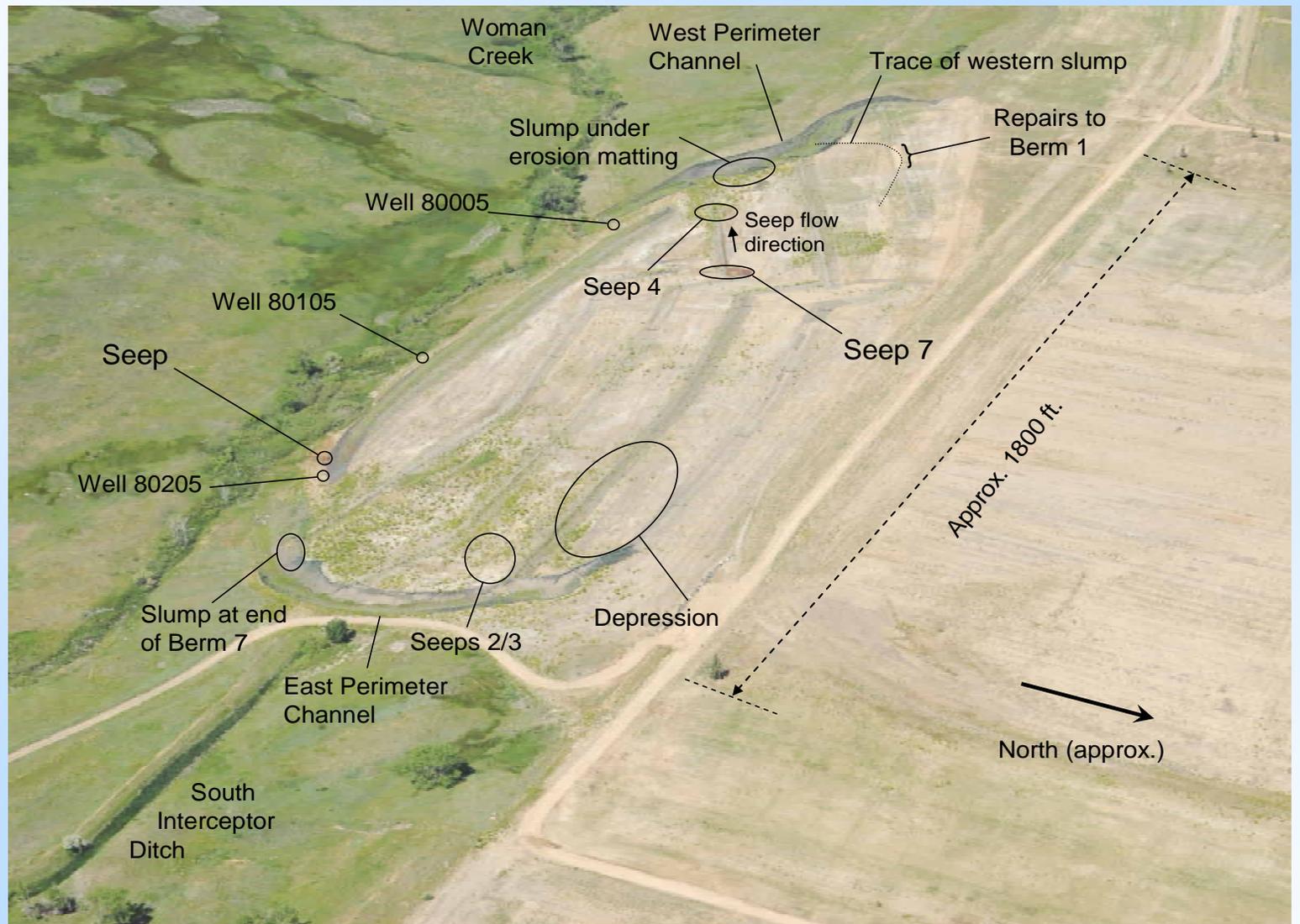


## Issues, Recommendations, and Follow-Up Actions (cont.)

### OLF Cover

- ***Issue:*** Historical seeps and small areas of slumps and slides on the OLF cover need to be addressed and repaired as necessary to continue to meet cover design criteria.
- ***Recommendation:*** Continue to inspect and repair the OLF cover in accordance with RFLMA and OLF M&M Plan so that design criteria continue to be met. Complete engineering evaluation to identify possible causes and approaches to address the causes.

M&M - Monitoring and Maintenance



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## Issues, Recommendations, and Follow-Up Actions (cont.)

### SPPTS Treatability Study

- ***Issue:*** Routine maintenance for this system is difficult and inefficient.
- ***Recommendation:*** Complete treatability study to determine whether a simpler, more efficient, and less management-intensive system could be designed and installed. Based on the results, proposed modifications should be developed in accordance with RFLMA.



## **Issues, Recommendations, and Follow-Up Actions (cont.)**

- **RFLMA requires an evaluation of actions that could reduce the need to rely on Institutional Controls.**
  - **Surveyed new technologies that might reduce ground water contamination faster or more efficiently than the current remedy.**
  - **None were identified for further investigation at this point.**
- **RFLMA also specifies that the inspection frequency of the final cover and stormwater management systems for the OLF and PLF be evaluated.**
  - **Per M&M Plans, monthly inspections have been ongoing since June 2006.**
  - **recommend frequency be reduced to quarterly for the PLF.**



## Next Five-Year Review

- **Central OU contaminants are expected to remain at levels that do not allow unlimited use or unrestricted exposure.**
- **Central OU will require continued remedy implementation for the foreseeable future.**
- **A third five-year review will be required.**