Rocky Flats Site, Colorado Annual Report Summary

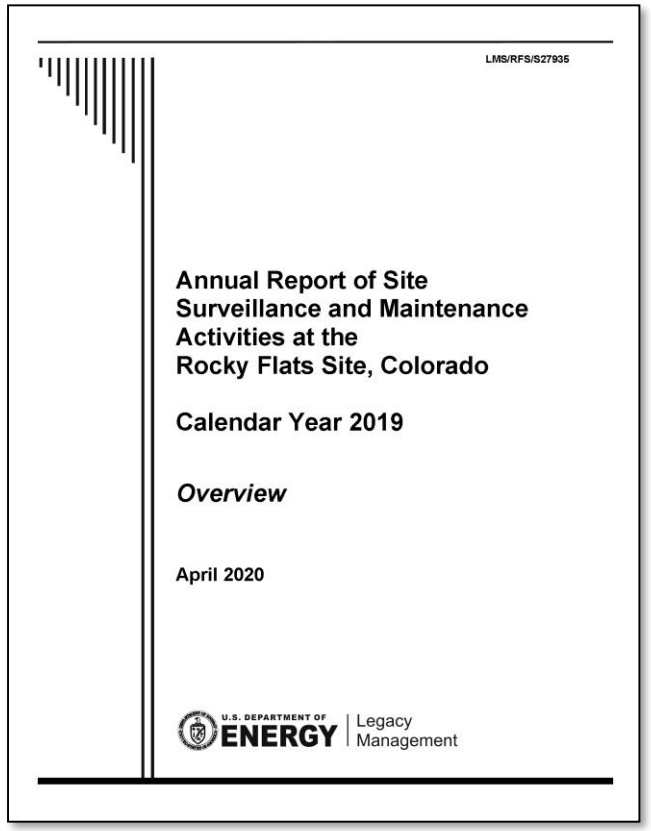
Calendar Year 2019

Rocky Flats Stewardship Council Meeting

June 8, 2020

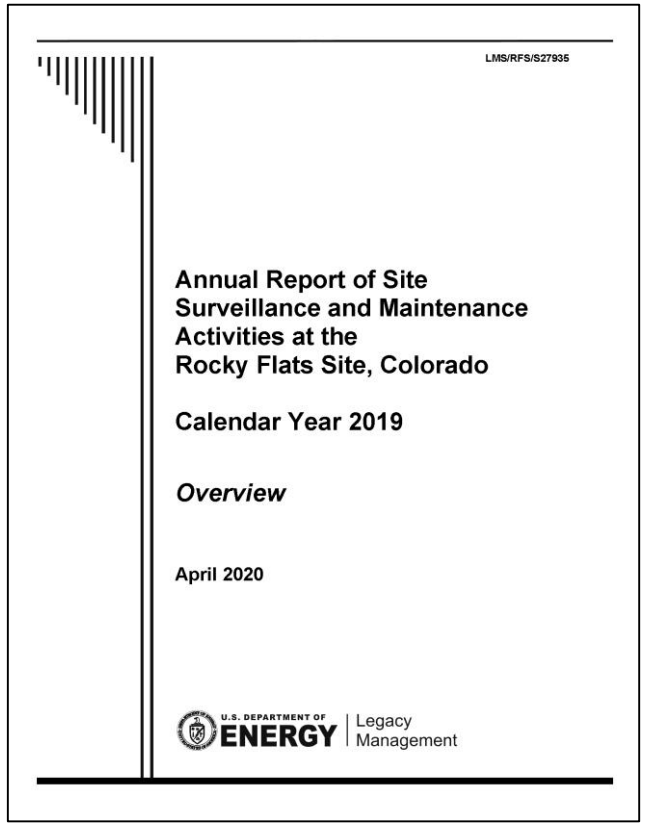
Annual Monitoring and Reporting

- Annual reports are required as part of the Rocky Flats Legacy Management Agreement (RFLMA) to document that the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedy continues to be protective of people and the environment
- Rocky Flats Site remedy components include:
  - Maintain two landfill covers
  - Maintain three groundwater treatment systems
  - Monitor surface water and groundwater
  - Maintain physical controls
    - Signage
    - Access restriction



Annual Monitoring and Reporting (continued)

- Rocky Flats Site remedy components also include:
  - Institutional controls
    - No occupied building construction
    - Excavation and soil-disturbance restrictions
    - No surface water consumption or agricultural use
    - No groundwater wells, except for monitoring
    - Protection of landfill covers and engineered remedy components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Annual Report of Site Surveillance and Maintenance Activities at the Rocky Flats Site, Colorado

Calendar Year 2019

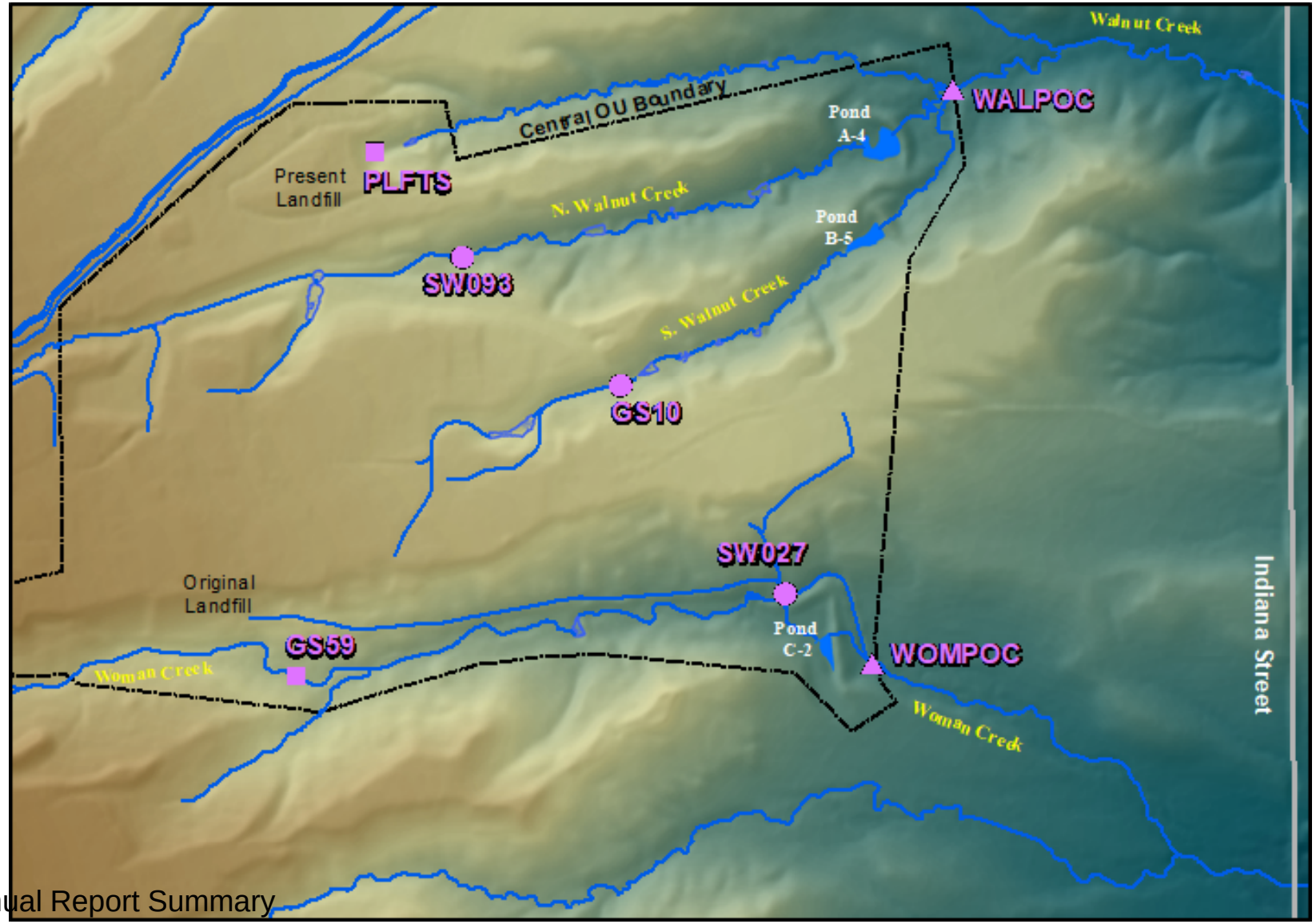
Overview

April 2020

U.S. DEPARTMENT OF ENERGY | Legacy Management

Surface Water Monitoring

Select RFLMA Surface Water Monitoring Locations



Original Landfill Performance Monitoring

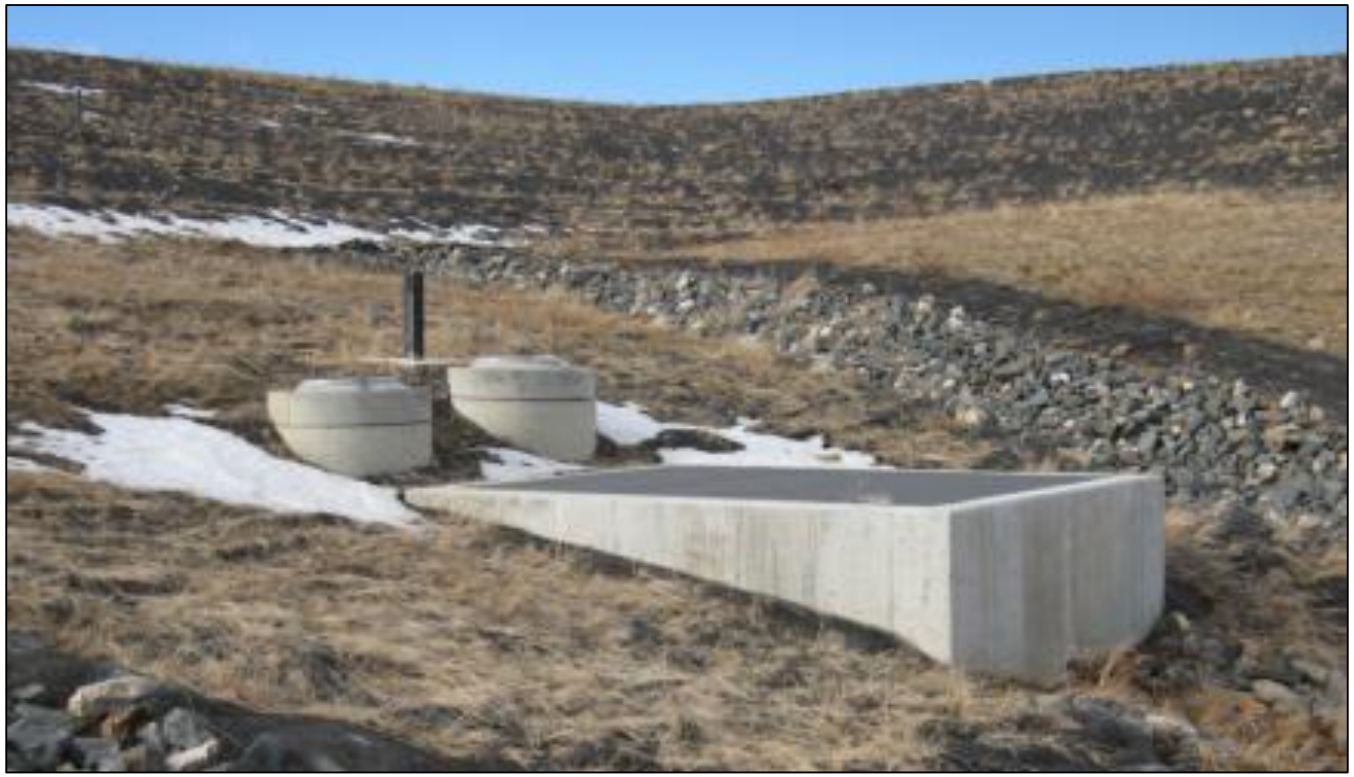
- Original Landfill (OLF) — Woman Creek
  - Quarterly concentrations for all analytes were below applicable RFLMA standards during all of calendar year (CY) 2019

Woman Creek, facing east

Performance Monitoring Location GS59

Present Landfill Performance Monitoring

- Present Landfill (PLF) — location PLFSYSEFF
  - Quarterly concentrations for all analytes were below applicable RFLMA standards during all of CY 2019



Present Landfill Treatment System (PLFTS)

Point of Evaluation Monitoring

- 12-month rolling average plutonium (Pu) concentrations at location SW027 were above the RFLMA standard of 0.15 picocuries per liter (pCi/L) — a reportable condition under the RFLMA — for January through April 2019
  - See RFLMA Contact Record (CR) 2019-01
  - Due to the very small volumes of water monitored at SW027 in 2019, no composite samples could be collected
  - Concentrations at the Woman Creek point of compliance (WOMPOC), downstream of SW027, remained well below 0.15 pCi/L
- No other RFLMA point of evaluation (POE) analyte concentrations were reportable during 2019

POE Monitoring Location SW027

Point of Compliance Monitoring

- No RFLMA point of compliance (POC) analyte concentrations were reportable during 2019

POC Monitoring Location WALPOC

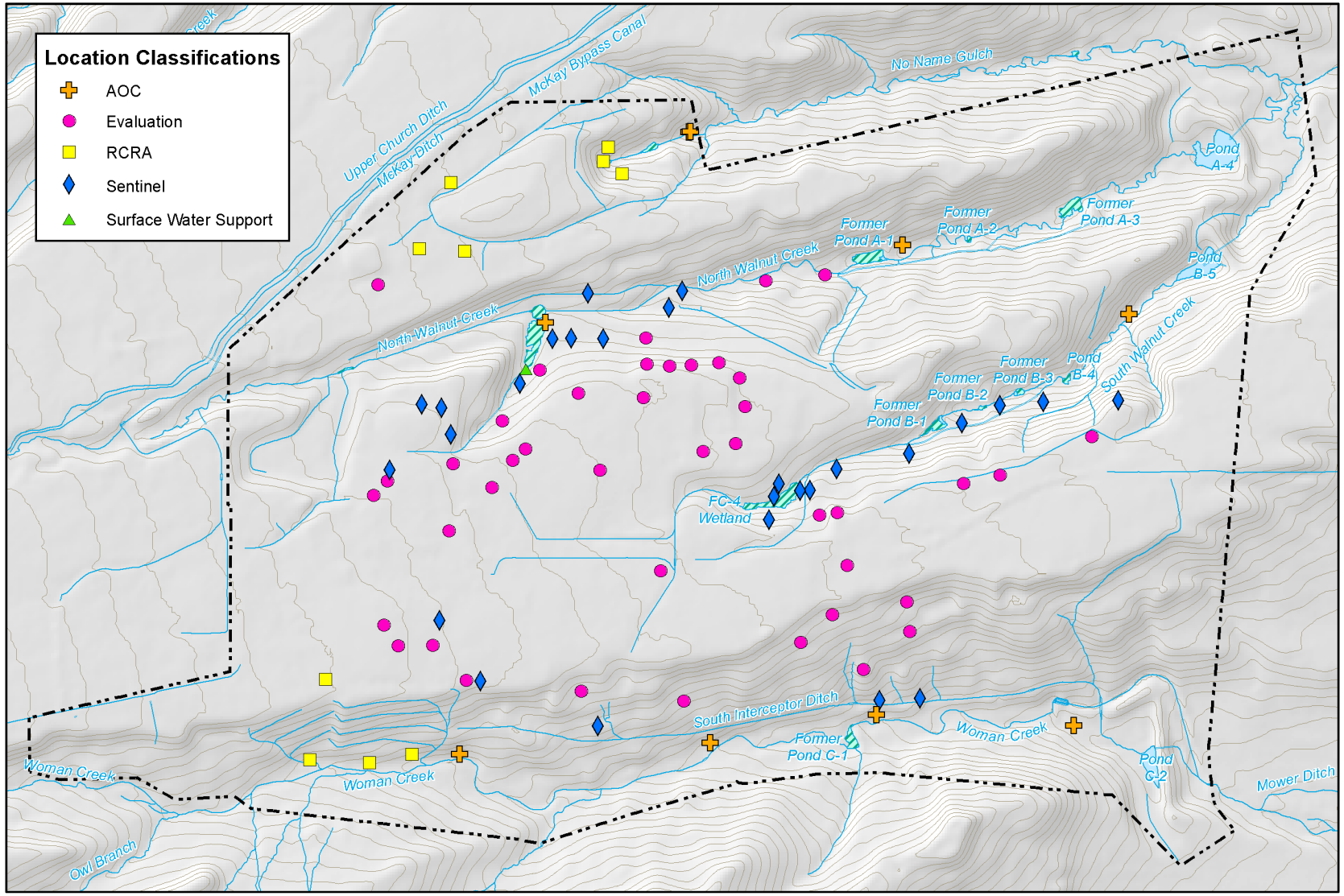
Questions?

New solar panel at telemetry repeater RPT2 above Woman Creek

Groundwater Monitoring and Operations

RFLMA Groundwater Monitoring Overview

- RFLMA monitoring network:
  - No changes in 2019
  - 10 Resource Conservation and Recovery Act (RCRA) wells (quarterly)
    - Evaluate potential impacts from OLF and PLF
  - Nine Area of Concern (AOC) wells and one Surface Water Support location (semiannually)
    - Located in drainages downstream of contaminant plumes
    - Evaluate for plumes discharging to surface water
  - 27 Sentinel wells (semiannually)
    - Downgradient of treatment systems, edges of plumes, and in drainages
    - Look for plumes migrating to surface water and treatment system problems
  - 42 Evaluation wells (biennially)
    - Within plumes, near source areas, and interior of Central Operable Unit (COU)
    - Evaluate whether monitoring of an area or plume can cease
  - Nine treatment system locations (seven semiannually, two quarterly)

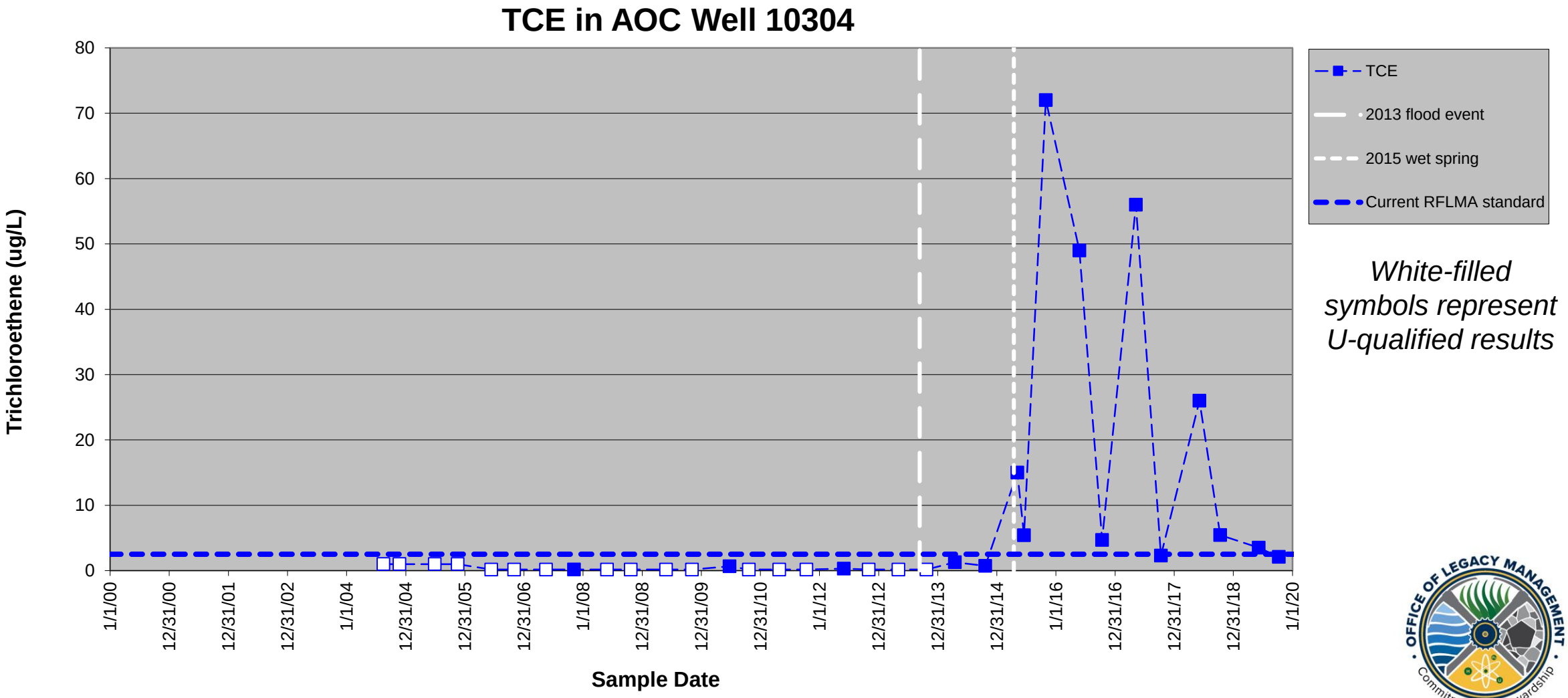


Groundwater treatment system locations omitted for clarity

RFLMA Monitoring in 2019

- Sampled all but the Evaluation wells
- Results were generally consistent with previous data
  - Several locations were dry when visited for sampling
    - Second and fourth quarters: two wells that are often or usually dry
    - Fourth quarter: five other locations that are not usually dry
      - All in Walnut Creek drainages
      - May reflect lingering effects of recent dry years (2016 and 2018) and drier third quarter
  - As of fourth quarter, AOC well 10304 is no longer reportable for trichloroethene (TCE)
    - See Consultation Posting 010819
    - Concentration reported in fourth quarter sample: 2.1 ug/L, below TCE standard of 2.5 ug/L
    - TCE was not detected in any of the samples collected from nearby Woman Creek location SW10200 (sampled in response to reportable condition)
  - Data are presented and evaluated in the 2019 annual report

RFLMA Monitoring in 2019 (continued)



White-filled symbols represent U-qualified results

RFLMA Monitoring in 2019 (continued)

- Results of statistical evaluations of OLF and PLF data:
  - Performed statistical comparisons of downgradient water quality with upgradient water quality
    - Results: same as in previous years for both landfills
  - Also look at whether downgradient groundwater shows increasing concentration trends
    - Results: almost the same as in previous years
      - Only difference was at PLF: identified increasing trends in boron in all three downgradient wells (previously confirmed in one well)
      - Highest concentration ever reported is 150 ug/L, well below RFLMA standard of 750 ug/L
  - None of the constituents identified in these statistical evaluations are volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs)
  - Also identified decreasing trends in downgradient groundwater and increasing trends in upgradient groundwater

RFLMA Monitoring in 2019 (continued)

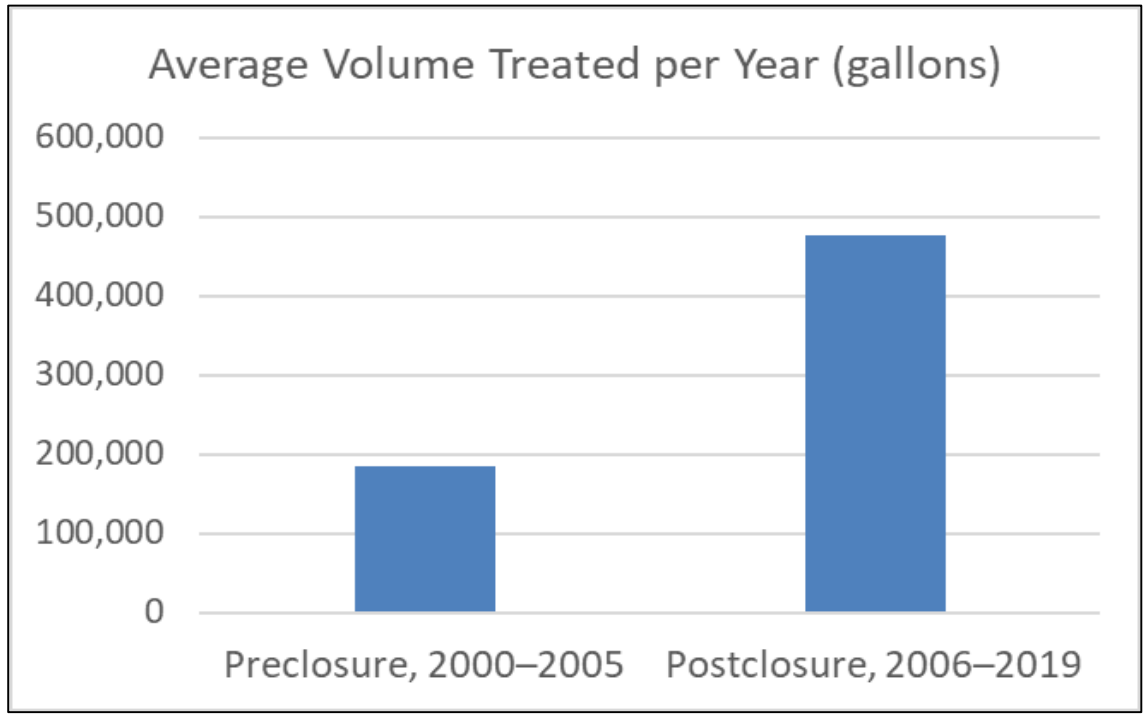
- Performed statistical trending calculations for Sentinel wells
  - As in other years, identified numerous concentration trends, both increasing and decreasing
- Statistical evaluations followed two different approaches
  - Same as in 2018 annual report
  - Differences in how non-detects are treated
    - "Conventional" approach is the same as has been used since pre-closure era
    - "Alternate" approach focuses on data collected starting in 2009, for constituents detected in at least 40% of the samples from a given well
  - Results from both approaches are summarized in the text of the report and presented fully in an appendix

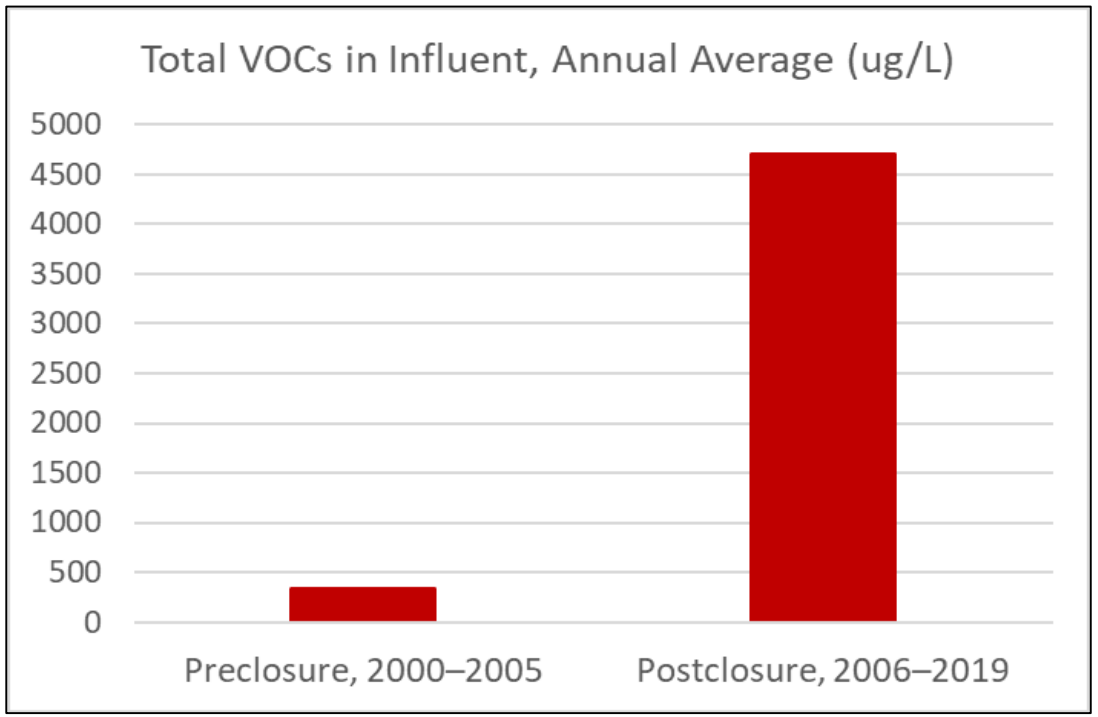
RFLMA Monitoring in 2019 (continued)

- Primary groundwater treatment systems continued to remove contaminants
  - Total flow at each system in 2019 was less than calculated annual average
  - East Trenches Plume Treatment System (ETPTS)
    - Met all treatment objectives for both collection/treatment systems (Mound and East Trenches)
  - Solar Ponds Plume Treatment System (SPPTS)
    - Met nitrate treatment objectives except for a couple instances in February and April
    - Removed approximately 35% of the uranium
    - Uranium treatment evaluation continued
      - Testing is based on in-situ tests being conducted at other Office of Legacy Management (LM) sites (e.g., Rifle, Shiprock)
      - Plans for procuring design firm and associated work will be 2020-2021 focus

Improvements in Groundwater and Contaminant Collection

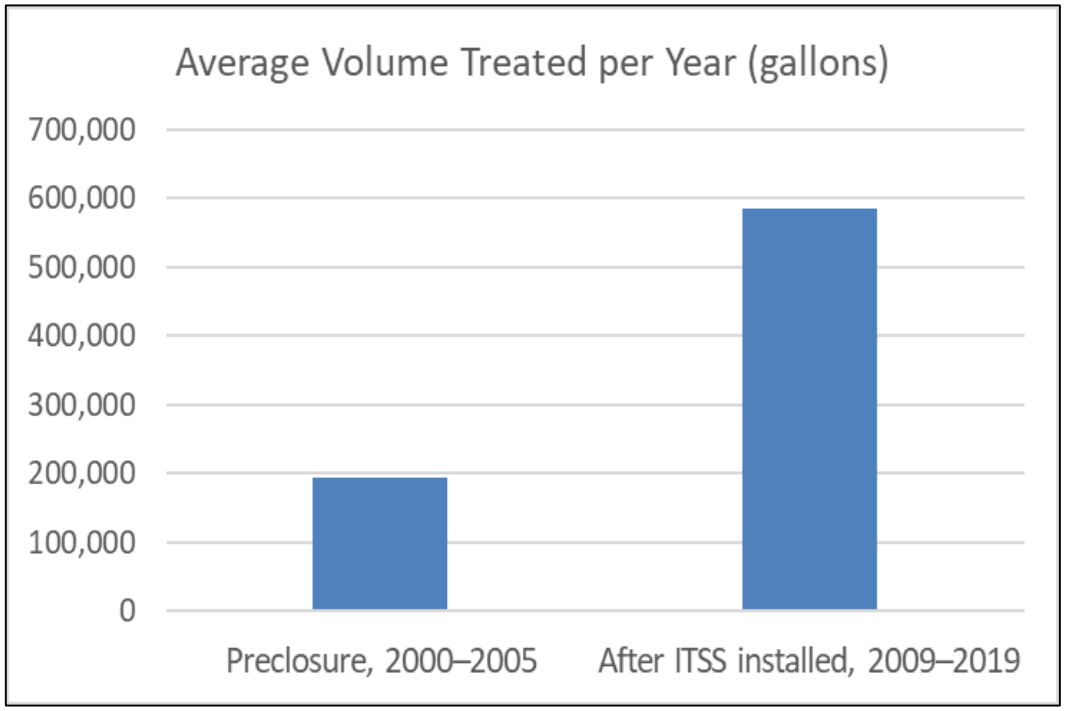
- Mound Site Plume Collection System (includes Mound Site Plume Treatment System)

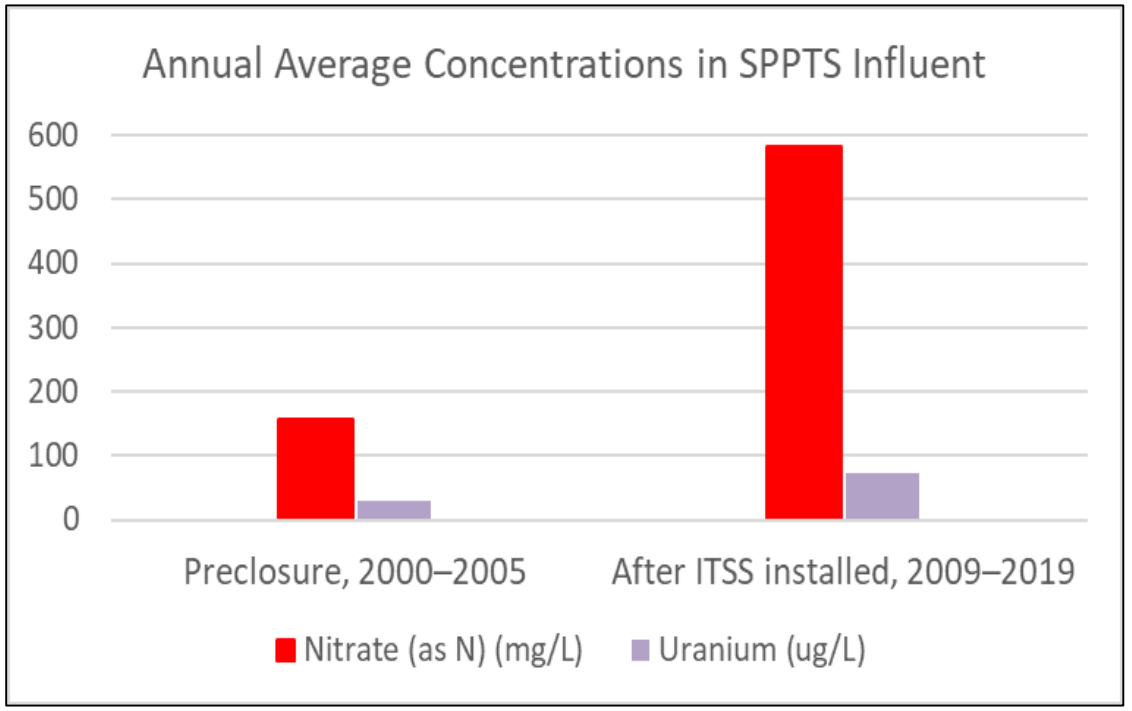




Improvements in Groundwater and Contaminant Collection (continued)

- SPPTS





Note: the ITSS is the Interceptor Trench System Sump installed in late 2008

Other Activities in 2019

- Split sampling with Colorado Department of Public Health and Environment (CDPHE)
  - Fourth quarter 2019
  - Six wells selected for sampling
    - CDPHE team accompanied LM team
    - One RCRA well, four Sentinel wells, and one AOC well
    - Collected two sets of samples for RFLMA-required analytes at each location (one for LM, one for CDPHE)
    - AOC well 10304 (reportable for TCE through second quarter) was included
      - Also included concurrent grab sampling in Woman Creek per Consultation Posting 010819 (represents a seventh sample location)
  - Analytical results were comparable
    - Only minor differences consistent with typical environmental variability and laboratory uncertainty
  - See annual report for details

Groundwater Monitoring and Operations Summary

- Big-picture results since the site closed:
  - Overall groundwater quality has not changed dramatically
  - Treatment systems are collecting and treating more contamination

A monitoring well and sampling equipment

Questions?

Collecting grab samples from Woman Creek location SW10200 in 2019 in response to the reportable condition at AOC well 10304

Site Operations

North Walnut Creek Hillside — Beginning of Revegetation Project 2017

North Walnut Creek Hillside – Revegetation 2019

Quarterly Sign Inspections

- RFLMA physical control
- Signs inspected quarterly
  - Signs reattached or replaced as needed

Main COU gate with signs

Additional Inspections and Records Confirmations

- Restrictive Notice (formerly the Environmental Covenant)
  - Confirmed in Administrative Record and on file in Jefferson County records (March 19, 2019)
- Annual site inspection was conducted on March 26, 2019
  - No evidence of violations of institutional or physical controls was observed
  - No adverse biological conditions were noted
- Former building areas (B371, B771, B881, and B991) were inspected as a Best Management Practice, in addition to their inclusion in the annual site inspection
  - Quarterly and after significant precipitation events in March, May, and July (five total)
  - No issues observed, except at B881
  - Small depression (3 feet in diameter, 3 feet deep) found on B881 in fourth quarter inspection

Site Operations: PLF

- Performed quarterly and weather-related inspections (six inspections in 2019)
- Landfill in good condition
  - No significant issues identified
- Settlement monuments surveyed annually
  - Vertical settling at each monument was within design limits

Vegetation on top of the Present Landfill — 2019

Site Operations: OLF

- Performed monthly and weather-related inspections (13 in 2019)
- Surveyed eight settlement monuments quarterly
  - Vertical settling at each monument was within design limits
- OLF Stabilization project ongoing, as of April 23, 2020:
  - 246 of 265 anchors are installed and locked off
  - Interceptor collection trenches are installed
  - Earthwork continues

East area facing west, showing bubble-up structure with anchor row

Site Operations: OLF (continued)

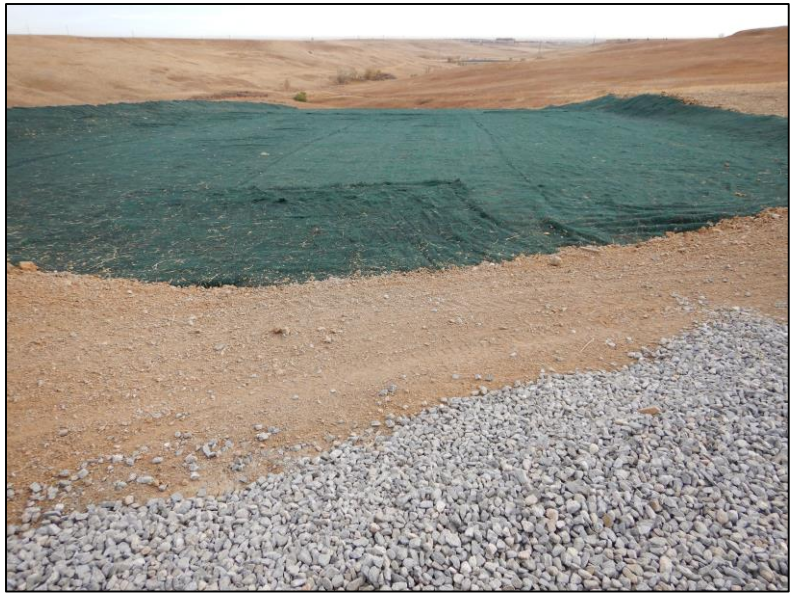
Site Operations: OLF (continued)

East side of OLF in April 2020

West side of OLF in April 2020

North Walnut Creek Slump

- Visual observations made weekly
- Slump monitoring points surveyed monthly as a Best Management Practice
  - Visual observations and monitoring data show slope creep
  - Greater movement during wetter periods
- SPPTS Road Area Surface Water Diversion Project (RASWDP)



SPPTS RASWDP at project completion

North Walnut Creek Slump (continued)

- Slope stability evaluation and cost estimate completed
  - Additional data required for final recommendation

NWCS Hillside revegetation — 2019

Miscellaneous

- Site roads regraded and dust suppressant applied to the primary routes (July through September), and repaired a few other spots
- Site erosion controls monitored and maintained
- U.S. Fish and Wildlife Service wildlife refuge surrounding COU is open

Road repairs — 2019 (before and after)

Ecological Monitoring

Vegetation Management

- Herbicide applications
  - Approximately 269 acres treated by broadcast and spot spraying in 2019
- Interseeding and revegetation
  - Approximately 1.9 acres were revegetated as part of a project in 2019

Spraying weeds using ATV

Ecological Monitoring

- Revegetation monitoring
  - 13 areas monitored
  - Eight continue to meet success criteria
  - Five were newer revegetation areas
- Preble's meadow jumping mouse mitigation monitoring
  - Habitat continues to establish at mitigation locations
- Wetland mitigation monitoring
- Forb nursery monitoring
  - Wildflowers continue to establish and spread

*Mexican Hat (*Ratibida columnifera*)*

Wildlife Monitoring

- Prairie dog monitoring
  - No active prairie dog towns within the COU
- Nest boxes
  - 16 of 25 nest boxes were active in 2019 (tree swallows and house wrens)
- Raptor nests
  - One Swainson's hawk nest observed in COU in 2019
- Elk

Leopard Frog

Questions?

B771 Area — before

B771 Area — after