Rocky Flats Site, Colorado
Annual Report Summary

Calendar Year 2020

Rocky Flats Stewardship Council Meeting
June 7, 2021
COVID-19 Minimum Safe Operations

- Minimum Safe (MinSafe) protocols began March 26, 2020 reducing some field operations.
- All surface water and groundwater monitoring took place as required by the Rocky Flats Legacy Management Agreement (RFLMA).
- Groundwater treatment systems functioned as normal.
- The Original Landfill maintenance project continued as scheduled following U.S. Centers for Disease Control and Prevention guidelines.
Annual Monitoring and Reporting

- Annual reports are required as part of the 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
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) 2020

Woman Creek, facing east
Performance monitoring location GS59
Present Landfill Performance Monitoring

- Present Landfill (PLF) — location PLFSYSEFF (system effluent)
  - Quarterly sample results for the first, second, and third quarters of CY 2020 showed arsenic concentrations above the RFLMA water quality standard of 10 ug/L
  - According to RFLMA evaluation protocols, each result triggered an increase in sampling frequency from quarterly to monthly during these quarters
  - For each quarter, the first monthly sample result showed an arsenic concentration below the RFLMA standard, and sampling frequency returned to monthly
  - For all other monitored constituents during all of 2020, concentrations were below the applicable RFLMA standards
Point of Evaluation Monitoring

- No RFLMA Point of Evaluation (POE) analyte concentrations were reportable during 2020.

POE monitoring location GS10
Point of Compliance Monitoring

- No RFLMA Point of Compliance (POC) analyte concentrations were reportable during 2020
Questions?

POE GS10
Groundwater Monitoring and Operations
RFLMA Groundwater Monitoring Overview

- RFLMA monitoring network:
  - No changes in 2020
  - 10 Resource Conservation and Recovery Act (RCRA) wells (quarterly)
    - Evaluate potential impacts from OLF and PLF
  - Nine Area of Concern (AOC) wells and 1 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, near 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 2020

- Sampled all wells
- Results were generally consistent with previous data
  - Several locations were dry when visited for sampling
    - Second and fourth quarters: two wells that are usually dry
    - Fourth quarter: six additional locations that are not usually dry
      - Four wells and two surface locations
      - Attributed to continuing dry conditions
RFLMA Monitoring in 2020 (continued)

- AOC well 10304 in 2020 was not reportable for trichloroethene (TCE)
  - Exceeded the 2.5 ug/L RFLMA standard for TCE in second quarter but not fourth quarter
    - Second quarter: 3.9 ug/L
    - Fourth quarter: 2.3 ug/L
  - Modeling predicted higher TCE in this area following wet years
    - See Consultation Posting 010819, Contact Record 2015-10, annual reports for 2015 and 2018
  - Woman Creek location SW10200 was not sampled in 2020
RFLMA Monitoring in 2020 (continued)

- Evaluation well 33502 produced water with unusually low concentrations of VOCs
  - Monitors Vinyl Chloride Plume source area
  - Samples typically contain vinyl chloride and cis-1,2-dichloroethene at concentrations of several hundred to thousands of ug/L
  - Second-quarter results were single-digit ug/L
  - Collected follow-up sample in third quarter to confirm (not a RFLMA requirement)
    - Concentrations in this sample were even lower
  - Natural biodegradation is the reason elevated concentrations of these VOCs are detected here
    - May be a factor in lower concentrations observed in these samples
    - Did not see similar decreases in nearby wells
    - Additional data from well 33502 may help to identify cause(s)
- Data are presented and evaluated in the 2020 annual report
RFLMA Monitoring in 2020 (continued)

- Results of statistical evaluations of OLF and PLF data
  - Comparisons of downgradient water quality with upgradient water quality
    - Results: identical or nearly so to results in previous years
  - Look at whether downgradient groundwater shows increasing concentration trends
    - Results: also, nearly identical to results in previous years
      - Only difference was at PLF: boron is no longer calculated to be on an increasing trend in one of the wells (for 2019, calculated to be increasing in all three downgradient wells)
  - 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
  - See the 2020 annual report for more details
RFLMA Monitoring in 2020 (continued)

- In addition to RCRA wells, performed statistical trending calculations for Sentinel and Evaluation wells
  - As in other years, identified numerous concentration trends, both increasing and decreasing

- Statistical evaluations followed two different approaches
  - Same as in 2018 and 2019 annual reports
  - 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
Primary groundwater treatment systems continued to remove contaminants

- Total flow at each system in 2020 was less than calculated annual average for post-closure years
- 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 January
  - Removed approximately 30% of the uranium
  - At performance monitoring location GS13, average uranium concentration was approximately 9.4 ug/L (RFLMA standard is 16.8 ug/L)
Improvements in Groundwater and Contaminant Collection

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

Note: Increases are largely due to remedial activities completed in 2005 at Oil Burn Pit #2 next to the Mound source area.
Improvements in Groundwater and Contaminant Collection (continued)

- **SPPTS**

*Note: Increases are largely due to installation of the ITSS (Interceptor Trench System Sump) in late 2008*
Other Activities in 2020

- Continued evaluating SPPTS path forward for uranium treatment
  - Preparing procurement package
  - Field-based testing and design
  - Leading to construction of full-scale uranium treatment component
- Installed drain in open-bottomed vault at SPPTS to protect equipment
- Installed additional piezometer to evaluate slump east of SPPTS (North Walnut Creek Slump)
- Installed line of piezometers west of SPPTS groundwater collection trench
  - Evaluate groundwater in an area that was not accessible when SPPTS was built
Other Activities in 2020 (continued)

- Repaired water transfer line from MSPCS to ETPTS
  - Replaced poorly-constructed cleanouts with new molded pieces
  - Replaced covers over cleanouts with stronger units to help protect against future damage from elk

- Replaced batteries at ETPTS
  - Replaced 96 lead-acid batteries with eight lithium-iron-phosphate batteries that have a much longer service life
  - Also replaced several electrical components and rewired power system for better operation
  - Replaced solar panels that had cracked glass
Groundwater Monitoring and Operations Summary

- Big-picture results since the site closed:
  - Overall groundwater quality in and downgradient of source areas has not changed dramatically
  - Treatment systems are collecting and treating more contaminated groundwater
Questions?
Site Operations

North Walnut Creek Hillside (2020)
Quarterly Sign Inspections

- RFLMA physical control
- Signs inspected quarterly
  - Signs reattached or replaced as needed
Additional Inspections and Records Confirmations

- **Restrictive Notice (formerly the Environmental Covenant)**
  - Confirmed in Administrative Record and on file in Jefferson County records (March 16, 2020)

- **Annual site inspection completed on May 31, 2020**
  - No evidence of violations of institutional or physical controls was observed
  - No adverse biological conditions were noted

- **Additional inspections of former building areas (B371, B771, B881, and B991) as a best management practice**
  - Conducted quarterly and in response to significant precipitation

- **Filled small depression at B881 on Nov. 6, 2020**
  - Approximately 3-foot diameter and 3-foot depth
  - Identified during inspection in Dec. 2019
Site Operations: PLF

- Performed quarterly and one weather-related inspection combined with the second quarter of 2020
- 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 PLF
Site Operations: OLF

- OLF stabilization project field activities completed in Aug. 2020:
  - 267 tie anchors installed along 13 anchor rows (seven on east side, six on west side)
  - Permanent drains were installed, eliminating the need to operate pumps in the temporary groundwater intercept (GWI) wells installed previously
  - The siphon system installed at Seep 10 in 2018 was replaced with a permanent drain
  - The 2-foot-thick soil cover was reestablished, disturbed areas were revegetated, and erosion controls were installed in affected areas

*East area facing west, showing bubble-up structure with anchor row*
Site Operations: OLF (continued)

Compost stockpiles

Erosion controls, east side

OLF hillside on Sep. 1, 2020, after earthwork was complete
North Walnut Creek Slump

- Visual observations made weekly except during MinSafe restrictions
- Slump monitoring points surveyed monthly as a best management practice
  - Visual observations and monitoring data show slope creep
  - Greater movement during wetter periods
- Additional geotechnical investigation fieldwork completed in September
  - Four additional geotechnical borings — three completed as inclinometers and one completed as a piezometer
- Data will be incorporated into the previous slope stability evaluation to provide a more comprehensive hillside stabilization evaluation

Drilling on NWCS hillside
Miscellaneous

- Test pits to supplement piezometers near SPPTS Collection Trench and Interceptor Trench System
- Site roads regraded and dust suppressant applied to the primary routes (November); a few other spots repaired
- Site erosion controls monitored and maintained

Rock crossing repair
Questions?
Ecological Monitoring
Vegetation Management

- Herbicide applications
  - Approximately five acres treated by spot spraying in 2020

- Interseeding and revegetation
  - Approximately 20 acres were revegetated in 2020
  - Most of this was associated with the OLF stabilization project
Ecological Monitoring

- Revegetation monitoring
  - 17 areas monitored
  - Nine areas continue to meet success criteria
  - Eight areas 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
Wildlife Monitoring

- Prairie dog monitoring
  - No active prairie dog towns within the COU

- Nest boxes
  - Five of 25 nest boxes were active in 2020 (tree swallows and house wrens)
  - Others had evidence of activity

- Raptor nests
  - No active raptor nests were observed in 2020 in the COU

- Elk
  - Approximately 230 elk in early 2020
Questions?

B991 (before)  

B991 (after)