Annual Report of Site Surveillance and Maintenance Activities at the Rocky Flats, Colorado, Site

Calendar Year 2011

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at the Rocky Flats, Colorado, Site

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Available on CD:

Appendix A  Hydrologic Data
Appendix B  Water-Quality Data
Appendix C  Landfill Inspection Forms—Fourth Quarter CY 2011
Appendix D  Data Evaluation Flowcharts Reproduced from RFLMA and the RFSOG
Appendix E  Technical Memorandum Regarding Instrumentation and Monitoring at the Rocky Flats OLF
Appendix F  Solar-Powered Air Stripping at the Rocky Flats Site, Colorado
Appendix G  RFLMA Contact Records

Available on DVD:

Ecology DVD: 2011 Annual RFS Ecology Reports
Abbreviations

Ag    silver
Am    americium
AMP   Adaptive Management Plan
ANOVA Analysis of Variance
AOC   Area of Concern
ASH   MSPTS Air Stripper Housing
B     boron
B     For sampling data, a laboratory and/or validation qualifier that indicates the constituent was also detected in the blank.
Be    beryllium
BMP   best management practice
CAD/ROD Corrective Action Decision/Record of Decision
Cd    cadmium
CDPHE Colorado Department of Public Health and Environment
CERCLA Comprehensive Environmental Response, Compensation, and Liability Act (also known as “Superfund”)
CFR   Code of Federal Regulations
cfs   cubic feet per second
CNHP  Colorado Natural Heritage Program
COU   Central Operable Unit
Cr    chromium
Cu    copper
CY    calendar year
D     For sampling data, a laboratory and/or validation qualifier that indicates analysis was performed at a dilution.
D&D   decontamination and decommissioning
DCA   dichloroethane
DCB   dichlorobenzene
DCE   dichloroethene
DER   duplicate error ratio
DOE   U.S. Department of Energy
DQA   data quality assessment
EPA   U.S. Environmental Protection Agency
ERP   Emergency Response Plan for Rocky Flats Site Dams
ESL   Environmental Sciences Laboratory
ETPTS East Trenches Plume Treatment System
FC    Functional Channel
FR    Federal Register
ft/yr  feet per year
g gram
GIS geographic information system
gpm gallons per minute
GWIS Groundwater Intercept System
HRC Hydrogen Release Compound
IA Industrial Area
IC institutional control
IHSS Individual Hazardous Substance Site
IMP Integrated Monitoring Plan
ITPH Interceptor Trench Pump House
ITS Interceptor Trench System
J For sampling data, a laboratory and/or validation qualifier that indicates an estimated value.
K-H Kaiser-Hill Company, LLC
L liter
LANL Los Alamos National Laboratory
LCS laboratory control sample
LM Office of Legacy Management
M&M monitoring and maintenance
m³ cubic meter
MDA minimum detectable activity
M-K Mann-Kendall
µg microgram
µg/L micrograms per liter
mg/L milligrams per liter
MS matrix spike
MSD matrix spike duplicate
MSPTS Mound Site Plume Treatment System
NA not applicable
Ni nickel
NOIPD Notice of Intent for Partial Delete
NPL National Priorities List
OBP Oil Burn Pit
OLF Original Landfill
OU Operable Unit
PARCC precision, accuracy, representativeness, completeness, and comparability
PCE tetrachloroethene
pCi picocurie
pCi/L picocuries per liter
pCi/µg picocuries per microgram
PIP  Public Involvement Plan
PLF  Present Landfill
PLFTS  Present Landfill Treatment System
POC  Point of Compliance
POE  Point of Evaluation
POU  Peripheral Operable Unit
PQL  practical quantitation limit
Pu  plutonium
PU&D  Property Utilization and Disposal
QA  quality assurance
QC  quality control
R  For sampling data, a laboratory and/or validation qualifier that indicates a value rejected as unusable.
RCRA  Resource Conservation and Recovery Act
RER  relative error ratio
RFCA  Rocky Flats Cleanup Agreement
RFETS  Rocky Flats Environmental Technology Site
RFLMA  Rocky Flats Legacy Management Agreement
RFSOG  Rocky Flats Site Operations Guide
RMRS  Rocky Mountain Remediation Services
RPD  relative percent difference
Se  selenium
SED  Sitewide Ecological Database
SEEPro  Site Environmental Evaluation for Projects
SEP  Solar Evaporation Pond
SID  South Interceptor Ditch
S-K  Seasonal-Kendall
SPP  Solar Ponds Plume
SPPTS  Solar Ponds Plume Treatment System
STP  Sewage Treatment Plant
SVOC  semivolatile organic compound
TCA  trichloroethane
TCB  trichlorobenzene
TCE  trichloroethene
TSS  total suspended solids
U  uranium
U  For sampling data, a laboratory and/or validation qualifier that indicates an analyte not detected at the indicated concentration.
UHSU  upper hydrostratigraphic unit
USFWS  U.S. Fish and Wildlife Service
V&V  validation and verification
VC    vinyl chloride
VOC   volatile organic compound
WQP   water quality parameter
WWTP  Wastewater Treatment Plant
yr    year
Zn    zinc
ZVI   zero-valent iron
Executive Summary

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is responsible for implementing the final response action selected in the Final Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and Central Operable Unit (CAD/ROD) issued September 29, 2006, for the Rocky Flats Site (Site).

Under the CAD/ROD, two Operable Units (OUs) were established within the boundaries of the Rocky Flats property: the Peripheral OU (POU) and the Central OU (COU). The COU consolidates all areas of the Site that require additional remedial or corrective actions while also considering practicalities of future land management. The POU includes the remaining, generally unimpacted portions of the Site and surrounds the COU. The response action in the Final CAD/ROD is no action for the POU and institutional and physical controls with continued monitoring for the COU. The CAD/ROD determined that conditions in the POU were suitable for unrestricted use. The U.S. Environmental Protection Agency (EPA) subsequently published a Notice of Partial Deletion from the National Priorities List for the POU on May 25, 2007.

DOE, EPA, and the Colorado Department of Public Health and Environment (CDPHE) have chosen to implement the monitoring and maintenance requirements of the CAD/ROD under, and as described in, the Rocky Flats Legacy Management Agreement (RFLMA), executed March 14, 2007. RFLMA Attachment 2 defines the COU remedy surveillance and maintenance requirements. The requirements include environmental monitoring; maintenance of the erosion controls, access controls (signs), landfill covers, and groundwater treatment systems; and operation of the groundwater treatment systems.

LM prepared the Rocky Flats Site Operations Guide to serve as the primary internal document to guide work performed to satisfy the requirements of RFLMA and implement best management practices at the Site.

This report addresses all surveillance and maintenance activities conducted at the Site during Calendar Year (CY) 2011 (January 1 through December 31, 2011). Highlights of the surveillance and maintenance activities are as follows:

- RFLMA references the use of contact records to document CDPHE approvals of field modifications to implement approved response actions. RFLMA Attachment 2 references the use of contact records to document the outcome of consultation related to addressing any reportable conditions. This report discusses RFLMA contact records issued in 2011 and the contact record status as of December 31, 2011.

- Monitoring of the Original Landfill (OLF) inclinometers installed in 2008 showed deflection, indicating localized movement, and minor localized surface cracking was also observed. The inclinometers were installed as part of the geotechnical investigation to address localized slumping and settling of the OLF cover observed in 2007. The annual report includes a review of the inclinometer data by a qualified geotechnical engineer. The data review concluded that the observed conditions are consistent with the geotechnical investigation findings. Continued monitoring and routine maintenance are presently considered adequate to address any observed surface cracking resulting from minor slumping due to observed localized movement.
The biannual topographic survey of the OLF was completed in 2011 and reviewed by a qualified geotechnical engineer. Maintenance of the OLF diversion berms following the recommendations of the geotechnical engineer was performed in 2011 to maintain the required minimum berm heights.

Modifications to surface-water and groundwater monitoring locations specified in RFLMA Attachment 2, “Legacy Management Requirements,” were approved by CDPHE and EPA and implemented in 2011.

Surface-water flow volumes continue to show expected reductions resulting from land configuration changes and removal of impervious surfaces.

All surface-water Points of Compliance showed acceptable water quality for the entire year.

Reportable 12-month rolling average plutonium (Pu) activities were observed starting on April 30, 2010, in surface water at RFLMA Point of Evaluation (POE) monitoring station SW027, which is located on the SID upstream of Pond C-2. SW027 has flowed very little since 2010, and no new analytical data have been collected. As of April 30, 2011, the 12-month rolling average for Pu is no longer reportable at SW027.

Reportable 12-month rolling average uranium concentrations were observed starting on April 30, 2011, in surface water at RFLMA POE monitoring station GS10, which is located on South Walnut Creek upstream of former Pond B-1. Reportable 12-month rolling average americium (Am) activities were also observed starting on August 31, 2011. As of the end of CY 2011, both analytes were still reportable.

All other POE analyte concentrations remained below reporting levels throughout CY 2011.

The results of statistical evaluations of groundwater quality at the OLF and Present Landfill (PLF) were largely identical to the results of these evaluations performed in 2009.

Water monitoring at the Present Landfill Treatment System (PLFTS) during CY 2011 showed two analytes detected above the applicable standards for individual sample results. The observed concentrations did not recur and RFLMA consultation was not required. Boron in groundwater samples from one of the downgradient PLF Resource Conservation and Recovery Act (RCRA) wells, and chromium and selenium in samples from another well, were both statistically higher in concentration than in upgradient groundwater and on increasing trends. The boron condition is consistent with 2010 results. Regulatory consultation was conducted in response to these conditions. Similar regulatory consultation was conducted in 2010.

Surface-water monitoring for the OLF during CY 2011 showed two analytes detected above the applicable standards for individual sample results. The observed concentrations did not recur and RFLMA consultation was not required. Consistent with 2010, boron in all three downgradient OLF RCRA wells and uranium in one of these wells was determined to be present at statistically higher concentrations than in upgradient groundwater. None of these is on an increasing trend. Regulatory consultation was conducted in response to these conditions. Similar regulatory consultation was conducted in 2010.

Analytical results for effluent from the Mound Site Plume Treatment System (MSPTS) and East Trenches Plume Treatment System continued to demonstrate the vast majority of contaminants is removed. However, concentrations of some volatile organic compounds in system effluent exceeded target concentrations. The treatment media at the MSPTS was replaced, the subsurface discharge gallery was repaired, and a test air stripper was installed.
in the existing effluent manhole to polish water exiting the treatment cells. The air stripper, which operates for 12 hours per day and uses solar power, was optimized through the course of the year and will continue to be adjusted in 2012. It removes substantial residual contaminants from system effluent.

- Phase II and Phase III upgrades to the Solar Ponds Plume Treatment System (SPPTS) were completed and implemented in May 2009. Concentrations of nitrate and uranium measured at the effluent discharge gallery have sharply decreased since Site closure, demonstrating the overall improvement resulting from the phased upgrades installed since 2008. However, the Phase II uranium treatment component is not performing adequately; alternative approaches to uranium treatment were identified and are being tested in 2012. Phase III pilot-scale nitrate treatment studies were completed in 2011. Full-scale design based on the Phase III components is not practical; alternative approaches to nitrate treatment are being finalized. Increased sampling of SPPTS and North Walnut Creek locations continued to support various evaluations, including increasing uranium concentrations.

- Groundwater quality and flow at the Site were generally consistent with previous years. Statistical trending calculations indicated numerous significant concentration trends.

- Elevated nitrate concentrations in groundwater that led to the reportable condition at Area of Concern well B206989 (located east of the Landfill Pond dam) in 2007 did not continue into 2011. Concentrations of nitrate reported in 2011 were below the 10 milligrams per liter standard. A steadily decreasing trend in nitrate concentrations is evident, and it appears to have an inverse correlation to the water level in this well and a temporal correlation to changes in sampling methods.

- All RFLMA-required ecological data collection, analysis, and reporting were completed as scheduled.

- Revegetation monitoring data continue to document the establishment of the desirable grassland species at the Site. Several locations met success criteria this year.

- The annual data quality assessment showed that the Site continues to collect high-quality data sufficient for decision making.