Rocky Flats Site Quarterly Report of Site Surveillance and Maintenance Activities Third Quarter Calendar Year 2010

January 2011
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Abbreviations

AOC area of concern
CAD/ROD Corrective Action Decision/Record of Decision
CDPHE Colorado Department of Public Health and Environment
CY calendar year
DOE U.S. Department of Energy
EPA U.S. Environmental Protection Agency
ETPTS East Trenches Plume Treatment System
FC Functional Channel
gpm gallon per minute
GWIS Groundwater Intercept System
LM Office of Legacy Management
μg/L microgram per liter
M&M monitoring and maintenance
MSPTS Mound Site Plume Treatment System
OLF Original Landfill
pCi/L picocuries per liter
PLF Present Landfill
PLFTS Present Landfill Treatment System
PMJM Preble’s meadow jumping mouse
POC point-of-compliance
POE point-of-evaluation
RCRA Resource Conservation and Recovery Act
RFLMA Rocky Flats Legacy Management Agreement
RFSOG Rocky Flats Site Operations Guide
SID South Interceptor Ditch
Site Rocky Flats Site
SPPTS Solar Ponds Plume Treatment System
TSS total suspended solids
USFWS U.S. Fish and Wildlife Service
VOC volatile organic compound
ZVI zero-valent iron
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1.0 Introduction

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is responsible for implementing the final response action selected in the Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and Central Operable Unit (DOE 2006) issued on September 29, 2006, for the Rocky Flats Site (the Site). DOE, the U.S. Environmental Protection Agency (EPA), and the Colorado Department of Public Health and Environment (CDPHE) have chosen to implement the monitoring and maintenance requirements of the Corrective Action Decision/Record of Decision (CAD/ROD) as described in the Rocky Flats Legacy Management Agreement (RFLMA) (DOE 2007a). Attachment 2 of the RFLMA defines the Central Operable Unit remedy surveillance and maintenance requirements, the frequency for each required activity, and the monitoring and maintenance locations. 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. The RFLMA also requires that the institutional controls, in the form of use restrictions as established in the CAD/ROD, be maintained.

This report is required in accordance with Section 7.0 of RFLMA Attachment 2. The purpose of this report is to inform the regulatory agencies and stakeholders of the remedy-related surveillance, monitoring, and maintenance activities being conducted at the Site. LM provides periodic communications through several means, such as this report, web-based tools, and public meetings.

LM prepared the Rocky Flats Site Operations Guide (RFSOG) (DOE 2009a) to serve as the primary internal document to guide work to satisfy the requirements of the RFLMA and to implement best management practices at the Site.

Several other Site-specific documents provide additional detail regarding the requirements described in RFLMA Attachment 2, including all aspects of surveillance, monitoring, and maintenance activities, as well as data evaluation protocols.

Monitoring data and summaries of surveillance and maintenance activities for past quarters are available in the quarterly reports. Extensive discussion and evaluation of surveillance, monitoring, and maintenance activities are presented each calendar year in the annual report of Site surveillance and maintenance activities.

This report addresses remedy-related surveillance, monitoring, and operations and maintenance activities conducted at the Site during the third quarter of calendar year (CY) 2010 (July 1 through September 30). This report describes the following:

- Maintenance and inspection of the Original Landfill (OLF) and Present Landfill (PLF)
- Maintenance and inspection of the four groundwater treatment systems
- Erosion control and revegetation activities
- Routine (in accordance with the RFLMA and the RFSOG) water monitoring
2.0 Site Operations and Maintenance

2.1 Landfills

2.1.1 Present Landfill

The PLF is inspected quarterly in accordance with the requirements of the PLF Monitoring and Maintenance (M&M) Plan (DOE 2008a) and the RFLMA (DOE 2007a). Vegetation monitoring has been conducted on the PLF per the requirements in RFLMA Attachment 2, Table 3. The exit strategy for vegetation monitoring as outlined in Table 3 states that when the PLF M&M Plan grassland success criteria have been met, vegetation monitoring is no longer required. Based on the vegetation monitoring conducted in 2009 and reported in the 2009 Annual Report (DOE 2010a), these criteria have been met. Therefore, the specific PLF vegetation monitoring as outlined in the RFLMA will no longer be conducted, but rather the PLF vegetation will now be monitored as part of the ongoing general Site vegetation monitoring.

2.1.1.1 Inspection Results

The routine PLF inspection for the third quarter of CY 2010 was performed on August 31, 2010. No significant problems were observed during these inspections. Copies of the landfill inspection forms are presented in Appendix A.

2.1.2.2 Settlement Monuments

The annual settlement monument surveys were performed in December 2009. The next round of surveys will be completed in December 2010. Additional information on the settlement monuments is included in the Rocky Flats Site Quarterly Report of Site Surveillance and Maintenance Activities, First Quarter Calendar Year 2008 (DOE 2008b).

2.1.2 Original Landfill

The OLF is inspected monthly, in accordance with the requirements in the OLF M&M Plan (DOE 2009c) and the RFLMA. It was anticipated that after the first year, the inspection frequency might be reduced to quarterly for an additional 4 years. However, because of observed localized slumping and seep areas, and investigation and repairs to the OLF cover that were being planned at the time, no change to the monthly inspection frequency was recommended in the second 5-year review of the Site (DOE 2007b).

2.1.2.1 Inspection Results

Routine OLF inspections during the third quarter of CY 2010 were performed on July 19, August 31, and September 23, 2010. The landfill cover vegetation was evaluated on July 8, 2010. The completed inspection forms are presented in Appendix A.
2.1.2.2 Settlement Monuments

The OLF settlement monuments were surveyed on September 23, 2010. Survey data indicate that settling at each monument does not exceed the limits published in the OLF M&M Plan (DOE 2009c). The survey results are presented in Appendix A.

2.1.2.3 Inclinometers

As discussed in the quarterly report for the second quarter of CY 2009 (DOE 2009b), seven inclinometers were installed in boreholes at the OLF in 2008 as part of the geotechnical investigation (Figure 1).

Movement of the inclinometers has been monitored approximately monthly since installation. Inclinometers deflect based on lateral movement of the ground in which they are located and can deflect enough to cause the inclinometer tubes to break. Once an inclinometer tube breaks, the inclinometer will no longer be monitored. Inclinometer monitoring data provide information on localized soil movement and serve to focus the periodic inspections of the soil cover surface on signs of potential instability, such as cracking, vertical displacement, and slumping. A deflection of more than 1 inch is used as a trigger for evaluation of the data by a qualified geotechnical engineer. The engineer determines the significance of the deflection in relation to recommendations for maintenance or repairs to address potential instability in accordance with the OLF M&M Plan (DOE 2009c).

Inclinometer measurements were taken on July 28, August 30, and September 30, 2010. Measurements at inclinometers 5, 6, and 7 were not taken on August 30 but were taken on September 9, 2010. The measurements taken on September 30 were not able to be plotted, and the problem was traced to inadvertently reversing the orientation of the monitoring probe within the inclinometer tubes while taking the field readings.

The inclinometer readings showed little deflection. The largest deflection noted was for inclinometer 4. This inclinometer, which could not be measured below 13 feet in depth after May 2010 (as discussed in the quarterly report for the second quarter of CY 2010 [DOE 2010c]), showed approximately 0.1 inch of deflection.

In accordance with the OLF M&M Plan, a qualified geotechnical engineer has been consulted. The deflection noticed in this quarter, which had high precipitation, appears consistent with the findings of the geotechnical investigation that an organic layer lies near the bedrock surface and is a weak zone for the overlying soil, especially if it becomes lubricated by subsurface moisture. Seeps 4 and 7 also showed significant moisture and had surface expressions during this period. As described in Contact Record 2008-07, in 2008, the West Perimeter Channel was regraded, and a channel drain was added to improve the stability of the western side of the OLF cover.

Further geotechnical evaluation of whether the seeps are contributing to significant instability is planned, and results will be provided in subsequent quarterly reports.
2.1.2.4 Slumps

As discussed in the quarterly report for the first quarter of CY 2010 (DOE 2010b), areas where the landfill cover is pushed up or rolling are noticeable on the western end of the OLF between Berms 2 and 3; however, no new slumps were observed during the third quarter. The following discussion of the results of the inclinometer monitoring contains additional information regarding slope stability monitoring.

Berm 1

No new cracking was observed in the Berm 1 area during the third quarter of CY 2010. The decrease of movement in the area can most likely be attributed to the reduced seep activity on the landfill cover during the late summer months. Staff continued to perform routine and nonroutine inspections of the Berm 1 area to monitor this location for any changes.

Berm 7

The repaired outfall of Berm 7 continued to look good throughout the third quarter of CY 2010. Water flowing from Seep 7 down the trough of Berm 7 and into the East Perimeter Channel ceased to reach the end of the berm early in the third quarter. The erosion controls placed over the project area are functioning as designed and vegetation has started to come back in the area. As with the Berm 1 area, the Berm 7 project location is monitored during routine and nonroutine inspections for any changes in its condition.

As noted in the Stormwater Management Structure portion of the March 2010 OLF Inspection Report, which is included in Appendix A of the quarterly report for the first quarter of CY 2010 (DOE 2010b), Berm 7 was observed to be saturated at the base with some evidence of flow through the berm. Several very heavy precipitation events occurred in March and April 2010, which contributed to seep expressions on the OLF face in historical seep locations (see Section 2.1.2.5). A major contribution of the water being conveyed in the Berm 7 channel was from the expression of Seep 7, north and south of the eastern end of Berm 3.

Because this condition persisted in April 2010, a qualified geotechnical engineer was consulted to assist with further evaluation of the impacts of the saturated conditions on stability of the berm. Conditions of Seep 7 are noted in monthly inspection reports after May 2010 as becoming progressively smaller, and no visible runoff from Seep 7 to the Berm 7 channel was noted in August 2010.

The conclusion of the geotechnical engineer’s evaluation, which was completed in October 2010, is that Berm 7 will perform adequately during a design storm event. The evaluation plan and geotechnical engineer’s report will be included in the annual report for CY 2010.
Figure 1. Original Landfill Observed Surface Cracking Location and Inclinometer Locations
2.1.2.5 Seeps

Seeps at the OLF were evaluated during the monthly inspections as well as during unscheduled visits. Cover seeps on the OLF have dried up significantly since the last inspection report. Wetland vegetation is still thriving in most seep areas; however, there is much less surface expression associated with the seeps. Individual seep flows are outlined below.

Seep 1 was dry throughout the third quarter of CY 2010. The Seep 2 and 3 areas were saturated throughout the quarter and supported significant wetland vegetation. Seep 4 was saturated and showed surface expression throughout the third quarter. The Seep 4 area continued to support the thriving wetland vegetation that exists in this area throughout most of the year. The Seep 5 and 6 areas were dry on the surface for most of the third quarter; however, the wetland vegetation that exists in these areas continued to be successful. The Seep 7 area dried up significantly during the summer months and ceased to have any surface flow. The area was saturated only temporarily after precipitation events. Approximately one-half of the wetland vegetation in the Seep 7 area died toward the end of the quarter. Seep 8 continued to flow at a rate of 2 to 5 gallons per minute (gpm) throughout the third quarter of CY 2010. This location continues to see flow throughout most of the year as this is the designed drain outfall for the buttress.

2.1.2.6 OLF Soil Sampling Project

The OLF soil sampling project was discussed in the quarterly report for the second quarter of CY 2010 (DOE 2010c). Twelve locations were selected for sampling and the project was completed on July 8, 2010.

A map of the OLF Sampling and Analysis Plan (DOE 2010d) selected sampling locations is included in Appendix B.

A total of 228 samples were collected and analyzed (depending on the amount of recovery) for the following analytes:

- Volatile organic compounds (VOCs)
- Semivolatile organic compounds
- Pesticides and polychlorinated biphenyls
- Metals and radiochemical analytes

Laboratory analysis was completed in the third quarter of CY 2010. The sample data are included in Appendix B.

A report of the evaluation of the results will be presented in the annual report for CY 2010.

2.2 Groundwater Treatment Systems

Four groundwater treatment systems are operated and maintained in accordance with requirements defined in the RFLMA and the RFSOG. Three of these systems (the Mound Site Plume Treatment System [MSPTS], East Trenches Plume Treatment System [ETPTS], and Solar
Ponds Plume Treatment System (SPPTS) include a groundwater intercept trench (collection trench), which is similar to a French drain with an impermeable membrane on the downgradient side. Groundwater entering the trench is routed through a drain pipe into one or more treatment cells, where it is treated and then discharged. The fourth system, the PLF Treatment System (PLFTS), treats water from the northern and southern components of the Groundwater Intercept System (GWIS) and flow from the PLF seep.

2.2.1 Mound Site Plume Treatment System

Routine maintenance activities continued at the MSPTS through the third quarter of CY 2010. These activities included raking the media each week, checking and flushing filters, and inspecting influent and effluent flow conditions. The parallel upflow configuration established in June 2010 was maintained. Refer to Section 3.1.10.1 for information on water quality sampling.

Planning for replacing the treatment media at the MSPTS was underway and possible effluent polishing approaches were under consideration as the quarter ended.

2.2.2 East Trenches Plume Treatment System

Routine maintenance activities continued at the ETPTS through the third quarter of CY 2010. These activities included checking influent and effluent flow conditions and water levels in the cells. Refer to Section 3.1.10.2 for information on water quality sampling.

2.2.3 Solar Ponds Plume Treatment System

Routine maintenance activities continued at the SPPTS through the third quarter of CY 2010. These activities included weekly inspections of the solar/battery systems that power the pumps, the operation of the pumps, and influent and effluent flow conditions.

The Phase II and III upgrades that were completed in the second quarter of CY 2009 continued to be a focal point for optimization efforts. In particular, the treatment media in the Phase II cell was replaced in August 2010 to improve uranium removal. The new media, comprised of zero-valent iron (ZVI) mixed with a quartzite gravel, performed well through the balance of the quarter.

Operation of Phase III Cell A, which is filled with inert media and dosed with a liquid carbon source, was revised slightly. Through the second quarter of CY 2010, influent to the cell was separately dosed with the selected carbon source and a liquid phosphorus source. Having determined an appropriate ratio, beginning on July 1 a custom blend of the liquid carbon with added phosphorus was used. In addition, the dose rate was reduced in mid-September.

An auxiliary distribution gallery was installed in late July in the original Cell 1 (which is filled mainly with sawdust and is designed to treat nitrate) to improve flow through the Cell 1 media. Although flow through the media did improve, the gallery became clogged very quickly. Attempts to eliminate the clogging were successful, but only for a short time as the gallery quickly became clogged again. Clogging appeared to be due to a combination of biological fouling and mineralogical precipitates. Consistent with this observation, a sample of precipitates that was collected from the bottom of Phase III Cell A and analyzed appeared to be
predominantly biological detritus, possibly including carbonates of calcium (calcite) and iron (siderite) with some phosphates (possibly vivianite).

Section 3.1.10.3 summarizes the non-RFLMA sampling conducted at the SPPTS in the third quarter of CY 2010.

2.2.4 PLF Treatment System

Routine maintenance activities continued at the PLFTS through the third quarter of CY 2010. These activities generally consisted of inspecting the system for any issues or potential problems.

2.3 Erosion Control and Revegetation

Maintenance of the site erosion control features required continued effort throughout the third quarter of CY 2010, especially following high-wind or precipitation events. Erosion wattles and matting loosened and displaced by high winds or rain were repaired. Erosion controls were installed and maintained for the various projects that were ongoing during the third quarter of CY 2010. Several areas were interseeded with additional native species to increase vegetation cover.

3.0 Environmental Monitoring

This section summarizes the environmental monitoring conducted in accordance with the RFLMA.

3.1 Water Monitoring

This quarterly report presents data collected during the third quarter of CY 2010. This section includes:

- A discussion of analytical results for the point-of-compliance (POC), point-of-evaluation (POE), PLF, and OLF monitoring objectives
- A summary of Area of Concern (AOC) well, Boundary well, Evaluation well, and Sentinel well monitoring; treatment system monitoring; and Resource Conservation and Recovery Act (RCRA) groundwater monitoring and Surface Water Support monitoring at the Site.

Monitoring locations, sampling criteria, and evaluation protocols for all water monitoring objectives in the following sections are detailed in RFLMA Attachment 2 and the RFSOG. Appendix C provides analytical water quality data for the third quarter of CY 2010. More detailed interpretation and discussion will be provided in the annual report for CY 2010.

3.1.1 Water Monitoring Highlights

During the third quarter of CY 2010, the water monitoring network successfully met the targeted monitoring objectives as required by the RFLMA and in conformance with RFSOG implementation guidance. The RFLMA network consisted of 11 automated gaging stations, 10 surface water grab-sampling locations, 8 treatment system locations, 99 wells, and 8 precipitation gages. During the quarter, 16 flow-paced composite samples, 9 surface water grab
samples, 25 treatment system samples, and 10 groundwater samples were collected (in accordance with RFLMA protocols) and submitted for analysis. An additional 5 flow-paced composites were in progress during the quarter and were not complete by the end of the quarter.

All water-quality data at the RFLMA POCs remained well below the applicable standards through the third quarter of CY 2010.

Elevated levels of plutonium-239,240 were measured at POE SW027 during the second quarter. These data are presented and discussed further in Section 3.1.3.2. All other analyte concentrations at SW027 remained below reporting levels as of the end of the third quarter of CY 2010.

All POE analyte concentrations at GS10 and SW093 remained below reporting levels as of the end of the third quarter of CY 2010. Erosion and runoff controls, as well as extensive revegetation efforts, have been effective in measurably reducing both sediment transport and constituent concentrations. As of the end of the third quarter of CY 2010, these monitoring locations continued to show plutonium-239, plutonium-240, and americium-241 activities well below the RFLMA standards. With the removal of impervious areas (resulting in decreased runoff), the stabilization of soils within the drainages, and the progression of revegetation, water quality is expected to continue to be acceptable.

Groundwater monitoring results will be evaluated as part of the annual report for CY 2010.

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1 Composite samples consist of multiple aliquots (“grabs”) of identical volume. Each grab is delivered by the automatic sampler to the composite container at each predetermined flow volume or time interval. During the third quarter of CY 2010, the 16 flow-paced composites comprised 785 individual grabs.
3.1.2 POC Monitoring

The following sections include summary tables and plots showing the applicable 30-day and 12-month rolling averages for the POC analytes.

3.1.2.1 Monitoring Location GS01

Monitoring location GS01 is on Woman Creek at Indiana Street. Figure 2 and Figure 4 show no occurrences of reportable 30-day averages for the quarter. Figure 3 and Figure 5 show sampling data from 2005 through third quarter CY 2010.

![Graph showing 30-Day Average Plutonium and Americium Activities at GS01: Calendar Year Ending Third Quarter CY 2010](image)

pCi/L = picocuries per liter; the composite sample started on 8/17/10 is still in progress.

*Figure 2. Volume-Weighted 30-Day Average Plutonium and Americium Activities at GS01: Calendar Year Ending Third Quarter CY 2010*
Figure 3. Volume-Weighted 30-Day Average Plutonium and Americium Activities at GS01: Post-Closure Period Ending Third Quarter CY 2010

Figure 4. Volume-Weighted 30-Day Average Total Uranium Concentrations at GS01: Calendar Year Ending Third Quarter CY 2010

pCi/L = picocuries per liter; the composite sample started on 8/17/10 is still in progress

μg/L = micrograms per liter; the composite sample started on 8/17/10 is still in progress
Figure 5. Volume-Weighted 30-Day Average Total Uranium Concentrations at GS01: Post-Closure Period Ending Third Quarter CY 2010
3.1.2.2 Monitoring Location GS03

Monitoring location GS03 is on Walnut Creek at Indiana Street. Figure 6, Figure 8, and Figure 10 show no occurrences of reportable water quality for the quarter. Figure 7, Figure 9, and Figure 11 show sampling data from 2005 through third quarter CY 2010.

Figure 6. Volume-Weighted 30-Day Average Plutonium and Americium Activities at GS03: Calendar Year Ending Third Quarter CY 2010
pCi/L = picocuries per liter; the composite sample started on 7/29/10 is still in progress

Figure 7. Volume-Weighted 30-Day Average Plutonium and Americium Activities at GS03: Post-Closure Period Ending Third Quarter CY 2010

μg/L = micrograms per liter; the composite sample started on 7/29/10 is still in progress

Figure 8. Volume-Weighted 30-Day Average Total Uranium Concentrations at GS03: Calendar Year Ending Third Quarter CY 2010
Figure 9. Volume-Weighted 30-Day Average Total Uranium Concentrations at GS03:
Post-Closure Period Ending Third Quarter CY 2010

Figure 10. Volume-Weighted 85th Percentile of 30-Day Average Nitrate+Nitrite Concentrations at GS03:
Calendar Year Ending Third Quarter CY 2010
Figure 11. Volume-Weighted 85th Percentile of 30-Day Average Nitrate+Nitrite Concentrations at GS03: Post-Closure Period Ending Third Quarter CY 2010

Gaps in data are for periods of zero flow, no flow data, or no analytical result. Nitrate+Nitrite is only collected during terminal pond discharges.
### 3.1.2.3 Monitoring Location GS08

Monitoring location GS08 is on South Walnut Creek at the outlet of Pond B-5. Figure 12, Figure 14, and Figure 16 show no occurrences of reportable 12-month rolling averages for the quarter. Figure 13, Figure 15, and Figure 17 show sampling data from 2005 through third quarter CY 2010.

---

**Figure 12. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS08: Calendar Year Ending Third Quarter CY 2010**

- **RFLMA Standard for Pu-239,240 and Am-241 of 0.15 pCi/L**
- **Pu-239,240 12-Month Rolling**
- **Am-241 12-Month Rolling**

[pCi/L = picocuries per liter]
Figure 13. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS08: Post-Closure Period Ending Third Quarter CY 2010

Figure 14. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at GS08: Calendar Year Ending Third Quarter CY 2010
\(\mu g/L = \text{micrograms per liter};\ pCi/L = \text{picocuries per liter}\)

**Figure 15. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at GS08: Post-Closure Period Ending Third Quarter CY 2010**

**Figure 16. Volume-Weighted 12-Month Rolling Average Nitrate + Nitrite as Nitrogen Concentrations at GS08: Calendar Year Ending Third Quarter CY 2010**

Note: Nitrate + nitrite as nitrogen 12-month averages are conservatively compared to the nitrate standard only. mg/L = milligrams per liter
Note: Nitrate + nitrite as nitrogen 12-month averages are conservatively compared to the nitrate standard only. mg/L = milligrams per liter

Figure 17. Volume-Weighted 12-Month Rolling Average Nitrate + Nitrite as Nitrogen Concentrations at GS08: Post-Closure Period Ending Third Quarter CY 2010
3.1.2.4 Monitoring Location GS11

Monitoring location GS11 is on North Walnut Creek at the outlet of Pond A-4. Figure 18, Figure 20, and Figure 22 show no occurrences of reportable 12-month rolling averages for the quarter. Figure 19, Figure 21, and Figure 23 show sampling data from 2005 through third quarter CY 2010.

Figure 18. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS11: Calendar Year Ending Third Quarter CY 2010
Figure 19. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS11: Post-Closure Period Ending Third Quarter CY 2010

Figure 20. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at GS11: Calendar Year Ending Third Quarter CY 2010
**Figure 21. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at GS11:** Post-Closure Period Ending Third Quarter CY 2010

**Figure 22. Volume-Weighted 12-Month Rolling Average Nitrate + Nitrite as Nitrogen Concentrations at GS11: Calendar Year Ending Third Quarter CY 2010**
Figure 23. Volume-Weighted 12-Month Rolling Average Nitrate + Nitrite as Nitrogen Concentrations at GS11: Post-Closure Period Ending Third Quarter CY 2010
3.1.2.5 Monitoring Location GS31

Monitoring location GS31 is on Woman Creek at the outlet of Pond C-2. Figure 24 and Figure 26 show no occurrences of reportable 12-month rolling averages for the quarter. Figure 25 and Figure 27 show sampling data from 2005 through third quarter CY 2010.

![Graph showing monitoring data for GS31](image-url)

*Figure 24. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS31: Calendar Year Ending Third Quarter CY 2010*
Figure 25. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS31: Post-Closure Period Ending Third Quarter CY 2010

Figure 26. Volume-Weighted 12-Month Rolling Average Total Uranium Activities at GS31: Calendar Year Ending Third Quarter CY 2010
Figure 27. Volume-Weighted 12-Month Rolling Average Total Uranium Activities at GS31: Post-Closure Period Ending Third Quarter CY 2010
3.1.3 POE Monitoring

The following sections include summary tables and plots showing the applicable 30-day and 12-month rolling averages for the POE analytes.

3.1.3.1 Monitoring Location GS10

Monitoring location GS10 is on South Walnut Creek just upstream of the B-Series ponds. Figure 28 and Figure 30 show no reportable plutonium, americium, or total uranium values during the quarter. Figure 29 and Figure 31 show sampling data from 2005 through third quarter CY 2010. In addition, none of the 85th-percentile 30-day average metals concentrations were reportable for the quarter.

![Graph](image-url)

**Figure 28. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS10: Calendar Year Ending Third Quarter CY 2010**

\[ pCi/L = \text{picocuries per liter} \]
Figure 29. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at GS10: Post-Closure Period Ending Third Quarter CY 2010

Figure 30. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at GS10: Calendar Year Ending Third Quarter CY 2010
3.1.3.2 Monitoring Location SW027

Monitoring location SW027 is at the end of the South Interceptor Ditch (SID) at the inlet to Pond C-2. Figure 32 and Figure 34 show the 12-month rolling averages for plutonium, americium, and total uranium during the quarter. Figure 33 and Figure 35 show sampling data from 2005 through third quarter CY 2010.

The most recent continuous flow-paced composite sample collected at SW027 was started on April 27, 2010. On October 4, 2010, that composite sample did not yet include a quantity of water sufficient for a complete analysis for all routine analytes. The SID flows intermittently when there is enough runoff, which was the case during March and April 2010; however, the SID has been dry since June 18, 2010. Since it was not known when additional sample volume would have been collected at SW027 to complete the flow-paced composite sample started on April 27, the decision was made to collect the sample from the field and analyze for an abbreviated analyte suite. The April 27 composite sample was collected on October 4 and submitted to the lab for plutonium, americium, uranium, chromium, and beryllium analysis; there was not sufficient volume to analyze for cadmium or silver. These latest results are included in the plots below.

Figure 32 shows that the 12-month rolling average for plutonium exceeds the RFLMA standard of 0.15 picocurie per liter. The composite sampling results for plutonium at SW027 collected during CY 2010 are given in Table 1. All other analytes were not reportable during the quarter.
RFLMA Standard for Pu-239,240 and Am-241 of 0.15 pCi/L

Pu-239,240 12-Month Rolling

Am-241 12-Month Rolling

12-Month Rolling Averages
3rd Quarter CY10

Figure 32. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at SW027: Calendar Year Ending Third Quarter CY 2010

pCi/L = picocuries per liter

Figure 33. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at SW027: Post-Closure Period Ending Third Quarter CY 2010

pCi/L = picocuries per liter
Figure 34. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at SW027: Calendar Year Ending Third Quarter CY 2010

Figure 35. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at SW027: Post-Closure Period Ending Third Quarter CY 2010

μg/L = micrograms per liter; pCi/L = picocuries per liter
Table 1. CY 2010 Composite Sampling Results for Plutonium for SW027

<table>
<thead>
<tr>
<th>Date—Time Start</th>
<th>Date—Time End</th>
<th>Plutonium Result (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/13/10—11:11</td>
<td>3/29/10—11:55</td>
<td>0.122</td>
</tr>
<tr>
<td>3/29/10—11:55</td>
<td>4/23/10—11:11</td>
<td>0.300</td>
</tr>
<tr>
<td>4/23/10—11:11</td>
<td>4/23/10—19:12</td>
<td>0.294</td>
</tr>
<tr>
<td>4/23/10—19:12</td>
<td>4/27/10—12:07</td>
<td>0.029</td>
</tr>
<tr>
<td>4/27/10—12:07</td>
<td>10/4/10—12:39</td>
<td>0.040</td>
</tr>
</tbody>
</table>

While the 12-month rolling average values could not be formally calculated until complete analytical results were available for the April 27, 2010, sample, DOE initiated preemptive consultation with CDPHE on June 2, 2010. RFLMA Contact Record 2010-06, “Monitoring Results at Surface Water Point of Evaluation (POE) SW027,” provides a discussion of the monitoring results and recaps the outcome of the RFLMA Parties’ consultation regarding steps to be taken to evaluate the SW027 drainage area. Contact Record 2010-06 is available on the Rocky Flats website, http://www.lm.doe.gov/Rocky_Flats>ContactRecords.aspx.

Subsequent to Contact Record 2010-06, the Report of Steps Taken Regarding Monitoring Results at Surface Water Point of Evaluation (POE) SW027 was completed on August 31, 2010. This report provides data evaluation and an update on the steps taken in accordance with Contact Record 2010-06. Recommendations beyond the actions already taken and discussed in the Contact Record are also provided. This report is available on the Rocky Flats website, http://www.lm.doe.gov/Rocky_Flats>ContactRecords.aspx.
3.1.3.3 Monitoring Location SW093

Monitoring location SW093 is on North Walnut Creek 1,300 feet upstream of the A-Series ponds. Figure 36 and Figure 38 show no reportable plutonium, americium, or total uranium values during the quarter. Figure 37 and Figure 39 show sampling data from 2005 through third quarter CY 2010. None of the 85th-percentile 30-day average metals concentrations were reportable for the quarter.

![Graph showing monitoring data](image)

**Figure 36. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at SW093: Calendar Year Ending Third Quarter CY 2010**
Figure 37. Volume-Weighted 12-Month Rolling Average Plutonium and Americium Activities at SW093: Post-Closure Period Ending Third Quarter CY 2010

Figure 38. Volume-Weighted 12-Month Rolling Average Total Uranium Concentrations at SW093: Calendar Year Ending Third Quarter CY 2010
3.1.4 AOC Wells and Surface Water Location SW018

Neither the AOC wells nor SW018 were scheduled for RFLMA monitoring in the third quarter of CY 2010.

3.1.5 Boundary Wells

Boundary wells were not scheduled for RFLMA monitoring in the third quarter of CY 2010.

3.1.6 Sentinel Wells

None of the Sentinel wells were scheduled for RFLMA monitoring in the third quarter of CY 2010.

3.1.7 Evaluation Wells

None of the Evaluation wells were scheduled for RFLMA monitoring in the third quarter of CY 2010.

3.1.8 PLF Monitoring

All RCRA groundwater monitoring wells at the PLF were sampled during the third quarter of CY 2010. Analytical results (Appendix C) were generally consistent with past samples and will...
be discussed and statistically evaluated as part of the annual report for CY 2010. Section 3.1.10.4 discusses surface water monitoring at the PLF.

3.1.9 OLF Monitoring

All RCRA groundwater monitoring wells at the OLF were sampled during the third quarter of CY 2010. Analytical results (Appendix C) were generally consistent with past samples and will be discussed and statistically evaluated as part of the annual report for CY 2010.

During the third quarter of CY 2010, when routine surface water sampling was performed in Woman Creek downstream of the OLF (GS59), all available analytical results were less than the applicable surface water standards. Only VOC and mercury results from the routine quarterly grab sample were available for this report. The continuous flow-paced composite (providing analysis for metals and uranium) started on July 1, 2010, and is still in progress, so no results are available for this report. (GS59 was dry from July 28 through October 13, 2010.)

3.1.10 Groundwater Treatment System Monitoring

As described in Section 2.2, contaminated groundwater is intercepted and treated in four areas of the Site. The MSPTS, ETPTS, and SPPTS include a groundwater intercept trench. Groundwater entering the trenches is routed through a drain pipe into one or more treatment cells, where it is treated and then discharged to surface water. The PLFTS treats water from the northern and southern components of the GWIS and flow from the PLF seep.

3.1.10.1 Mound Site Plume Treatment System

MSPTS monitoring locations were not scheduled for RFLMA sampling in the third quarter of CY 2010. However, monthly samples were collected at several monitoring locations throughout the quarter as a continuation of the evaluation begun in June 2010 following the receipt of results from the second quarter CY 2010 sampling event. (Refer to the second quarter report [DOE 2010c and to Contact Record 2010-07 for additional background and discussion.) These sampling locations included the MSPTS system influent, effluent, and surface water performance locations (all of which are RFLMA locations), as well as two locations within Functional Channel (FC)-4 downgradient and generally north-northeast of the MSPTS discharge gallery (both of which are non-RFLMA locations). The two locations in FC-4 were dry in August and September, and one was again flowing in October. The results for sampling events through August are summarized in Contact Record 2010-07, and this evaluation will be discussed at greater length as part of the annual report for CY 2010.

Treatment effectiveness of the MSPTS is challenged by the high concentrations of daughter products in system influent, especially under higher-flow conditions such as those during and following the spring of 2010. Data from the MSPTS surface water performance location, GS10, reflect infrequent detections of VOCs. Under conditions such as those experienced this spring, when the ZVI media was clogged and flow rates were high (equivalent to a low residence time for water passing through the media), concentrations of VOCs in water from GS10 can exceed the applicable surface water standard. This was documented in the evaluation samples collected in June, wherein trichloroethene concentrations exceeded the standard (reported at 2.8 micrograms per liter [µg/L], compared to the RFLMA standard is 2.5 µg/L) and vinyl chloride was estimated at a concentration exceeding the RFLMA level (estimated concentration
of 0.69 µg/L, compared to the RFLMA practical quantitation level of 0.2 µg/L). The higher flows observed in June decreased, and samples collected from GS10 through the third quarter of CY 2010 did not exceed applicable RFLMA standards.

Evaluation of potential effluent polishing approaches to address VOCs is underway, and the media is scheduled for replacement in early 2011.

3.1.10.2 East Trenches Plume Treatment System

ETPTS monitoring locations were not scheduled for RFLMA sampling in the third quarter of CY 2010. However, monthly samples were collected at several locations throughout the quarter as a continuation of the evaluation begun in June 2010 following the receipt of results from the second quarter CY 2010 sampling event. (Refer to the second quarter CY 2010 report [DOE 2010c] and to Contact Record 2010-07 for additional background and discussion.) These sampling locations included the ETPTS system influent, effluent, and surface water performance locations (all of which are RFLMA locations), as well as two locations downgradient and generally north of the ETPTS discharge gallery between the discharge gallery and former Pond B-4 (both of which are non-RFLMA locations). The results for sampling events through August are summarized in Contact Record 2010-07, and this evaluation will be discussed at greater length as part of the annual report for CY 2010. In short, treatment effectiveness of the ETPTS has not changed dramatically since its installation in 1999, although periods of higher flow can reduce effectiveness (especially when the media is clogged, which does not apply at this time). Data from the ETPTS surface water performance location, POM2, do not suggest the treatment system is adversely impacting water quality.

3.1.10.3 Solar Ponds Plume Treatment System

SPPTS monitoring locations were not scheduled for RFLMA sampling in the third quarter of CY 2010. However, non-RFLMA samples were collected on multiple occasions at several monitoring locations to support continuing evaluation and optimization of the Phase II and Phase III upgrades, as summarized in Section 2.2.3. Most of these screening/optimization samples were analyzed by the in-house Environmental Sciences Laboratory in Grand Junction, Colorado, rather than by an EPA-certified contract laboratory, and cannot be validated. Several samples were also submitted to contract labs for confirmatory purposes.

The reduced effectiveness of the ZVI-based media in the Phase II cell led to replacement of the media in August, as noted in Section 2.2.3. As reported in results of samples of the effluent from this cell, by July the cell was removing essentially no uranium. As soon as the media was replaced and the cell was placed back online, uranium treatment effectiveness resumed. Even so, because the exact cause or causes for the reduced treatment effectiveness was not certain, considerations of alternative approaches to addressing uranium contamination were underway (for example, by revising the flow configuration so uranium treatment occurred following nitrate treatment, even though in a laboratory setting the opposite had been demonstrated to be effective).

Development was underway on the design for Phase IV (full-scale nitrate treatment based on concepts tested under Phase III). This effort is continuing and will be discussed at greater length in the annual report for CY 2010.
3.1.10.4 PLF Treatment System

During collection of the July 15, 2010, sample at the system influent (monitoring location PLFSEEPINF), the flow rate was 1.17 gpm. As of September 30, 2010, the Landfill Pond outlet remained in an open configuration.

During the third quarter of CY 2010, routine sampling of the treated effluent exiting the system (monitoring location PLFSYSEFF) showed that no analyte concentrations were greater than the applicable surface water standards.

3.1.11 Pre-Discharge Monitoring

Pre-discharge samples are collected prior to discharge at Ponds A-4, B-5, and C-2 on North Walnut Creek, South Walnut Creek, and Woman Creek, respectively.

Pre-discharge samples were collected at Pond C-2 during the third quarter of CY 2010. Data indicated that release of the retained water would result in acceptable water quality at the downstream POCs.

3.1.12 Non-RFLMA Monitoring

In addition to the RFLMA-required monitoring discussed in the previous sections, nonregulatory monitoring is performed at the Site to further describe the fate and transport of select constituents at the Site. Data in this section are not limited to the current quarter but include all available data.

3.1.12.1 Grab Sampling for Uranium and Nitrate+Nitrite in North and South Walnut Creeks

This monitoring objective is primarily intended to evaluate spatial variability of nitrate+nitrite and uranium at select locations along North and South Walnut Creeks (Figure 40). Samples are currently collected as grabs on a biweekly frequency. Sampling for this monitoring objective began on January 27, 2010. Summary statistics for the sampling to date are given in Table 2.
Legend

NO3+NO2 and Uranium Grab Sampling Locations
▲ Bi-Weekly Started 1/27/10

Uranium Grab Sampling Locations
▲ Bi-Weekly Started 1/27/10

Figure 40. Grab-Sampling Locations in North and South Walnut Creeks
Table 2. Summary Statistics for Nitrate+Nitrite and Uranium Grab Sampling

<table>
<thead>
<tr>
<th>Location Code</th>
<th>Location Description</th>
<th>NO3+NO2 as N (mg/L)</th>
<th>Uranium (ug/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Location Count</td>
<td>Average</td>
<td>Sample Count</td>
</tr>
<tr>
<td>Upstream</td>
<td>SW093</td>
<td>79.4</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>SPOUT*</td>
<td>12.8</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>GS13</td>
<td>18.2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>A1EFF</td>
<td>16.2</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>A2EFF</td>
<td>13.4</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>A3EFF</td>
<td>6.1</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>A4INFLOW*</td>
<td>3.8</td>
<td>10</td>
</tr>
<tr>
<td>Downstream</td>
<td>A4 POND</td>
<td>1.57</td>
<td>22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location Code</th>
<th>Location Description</th>
<th>NO3+NO2 as N (mg/L)</th>
<th>Uranium (ug/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Location Count</td>
<td>Average</td>
<td>Sample Count</td>
</tr>
<tr>
<td>Upstream</td>
<td>GS10</td>
<td>16.2</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>B3OUTFLOW</td>
<td>17.2</td>
<td>19</td>
</tr>
<tr>
<td>Downstream</td>
<td>BS POND</td>
<td>9.9</td>
<td>22</td>
</tr>
</tbody>
</table>

Notes: *SPOUT (SPPTS effluent) is not located in North Walnut Creek but is tributary to North Walnut between monitoring locations SW093 and GS13.

^A4INFLOW sampling was terminated on June 30, 2010, since data indicate that this monitoring location is essentially redundant with A3EFF.

Sample counts vary because some locations are periodically dry.

Summary includes all data available as of December 13, 2010; some recent results are not validated (preliminary and subject to revision).

3.1.12.2 Continuous Flow-Paced Composite Sampling for Uranium in North and South Walnut Creeks

This monitoring objective is primarily intended to evaluate long-term spatial variability of uranium at select locations along North and South Walnut Creeks (Figure 41). Samples are collected as continuous flow-paced composites during all flow conditions. Sampling for this monitoring objective began on March 10, 2010, in North Walnut Creek and on June 16, 2010, in South Walnut Creek. Summary statistics for the sampling to date are given in Table 3.
Figure 41. Continuous Flow-Paced Composite Sampling Locations in North and South Walnut Creeks

Table 3. Summary Statistics for Uranium Continuous Flow-Paced Composite Sampling

<table>
<thead>
<tr>
<th>North Walnut Creek</th>
<th>Location Code</th>
<th>Location Description</th>
<th>Volume-Weighted Average</th>
<th>Sample Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>SW093*</td>
<td>POE at downstream end of Functional Channel 3</td>
<td>7.1</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>GS13*</td>
<td>SPPTS Performance Monitoring Loc; influent to Pond A-1</td>
<td>8.4</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>GS12</td>
<td>Effluent from Pond A-3</td>
<td>11.5</td>
<td>15</td>
</tr>
<tr>
<td>Downstream</td>
<td>GS11*</td>
<td>Effluent from Pond A-4</td>
<td>9.8</td>
<td>9</td>
</tr>
<tr>
<td>Data start on 3/10/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>South Walnut Creek</th>
<th>Location Code</th>
<th>Location Description</th>
<th>Volume-Weighted Average</th>
<th>Sample Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>GS10*</td>
<td>POE at downstream end of Functional Channel 4</td>
<td>11.5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>B5INFLOW</td>
<td>Influent to Pond B-5</td>
<td>7.5</td>
<td>2</td>
</tr>
<tr>
<td>Downstream</td>
<td>GS08*</td>
<td>Effluent from Pond B-5</td>
<td>Insufficient Data</td>
<td>0</td>
</tr>
<tr>
<td>Data start on 6/16/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: *Data for SW093, GS13, GS11, GS10, and GS08 are acquired through the routine RFLMA-required monitoring at these locations. Sample counts vary because composite sampling periods vary with water availability. Summary includes all data available as of September 16, 2010; some recent results are not validated (preliminary and subject to revision).

3.1.12.3 Synoptic Storm-Event Sampling in North and South Walnut Creeks

This monitoring objective is primarily intended to evaluate spatial variability of plutonium, americium, uranium, and total suspended solids (TSS) at select locations along North and South
Walnut Creeks (Figure 42). This sampling is specifically targeted at previously breached Dams A-1, A-2, B-1, B-2, and B-3. Samples are collected as time-paced composites using automated samplers that trigger during the rising limb of a runoff hydrograph as the event moves down a drainage. This type of sampling is opportunistic; a group of samples is only analyzed when the runoff event results in a significant increase in flow rate, and samples are collected at each location on the same portion of the hydrograph (rising limb). As such, samples are periodically discarded when these criteria are not met. Sampling for this monitoring objective began in April 2010. Summary statistics for the sampling to date are given in Table 4.
Table 4. Summary of CY 2010 Synoptic Storm-Event Sampling

North Walnut Creek

<table>
<thead>
<tr>
<th>April 22, 2010 Event</th>
<th>Location Code</th>
<th>Location Description</th>
<th>Pu-239,240 (pCi/L)</th>
<th>Am-241 (pCi/L)</th>
<th>Uranium (ug/L)</th>
<th>TSS (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>GS13</td>
<td>Influent to Pond A-1</td>
<td>0.008 ± 0.007</td>
<td>0.01 ± 0.007</td>
<td>10.50</td>
<td>62.0</td>
</tr>
<tr>
<td>Downstream</td>
<td>A1EFF</td>
<td>Effluent from Pond A-1/Influent to Pond A-2</td>
<td>0.004 ± 0.006</td>
<td>0 ± 0.004</td>
<td>13.30</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>A2EFF</td>
<td>Effluent from Pond A-2</td>
<td>0.007 ± 0.006</td>
<td>0 ± 0.012</td>
<td>14.70</td>
<td>0.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>July 4, 2010 Event</th>
<th>Location Code</th>
<th>Location Description</th>
<th>Pu-239,240 (pCi/L)</th>
<th>Am-241 (pCi/L)</th>
<th>Uranium (ug/L)</th>
<th>TSS (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>GS13</td>
<td>Influent to Pond A-1</td>
<td>0.011 ± 0.01</td>
<td>0.006 ± 0.005</td>
<td>9.17</td>
<td>2.4</td>
</tr>
<tr>
<td>Downstream</td>
<td>A1EFF</td>
<td>Effluent from Pond A-1/Influent to Pond A-2</td>
<td>0.007 ± 0.008</td>
<td>0.003 ± 0.005</td>
<td>6.24</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>A2EFF</td>
<td>Effluent from Pond A-2</td>
<td>0.004 ± 0.008</td>
<td>0.002 ± 0.003</td>
<td>8.62</td>
<td>7.2</td>
</tr>
</tbody>
</table>

South Walnut Creek

<table>
<thead>
<tr>
<th>April 22, 2010 Event</th>
<th>Location Code</th>
<th>Location Description</th>
<th>Pu-239,240 (pCi/L)</th>
<th>Am-241 (pCi/L)</th>
<th>Uranium (ug/L)</th>
<th>TSS (mg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream</td>
<td>GS10</td>
<td>Influent to Pond B-1</td>
<td>0.015 ± 0.008</td>
<td>0.01 ± 0.006</td>
<td>17.30</td>
<td>33.0</td>
</tr>
<tr>
<td>Downstream</td>
<td>B3OUTFLOW</td>
<td>Effluent from Pond B-3</td>
<td>0 ± 0.005</td>
<td>0.01 ± 0.013</td>
<td>16.20</td>
<td>0.6</td>
</tr>
</tbody>
</table>

3.1.12.4 Pre-Abandonment Sampling of Off-Site Monitoring Wells

Four off-site wells were scheduled for abandonment (one at the Standley Lake dam, one at the Great Western Reservoir dam, and two immediately upstream of Great Western Reservoir) as the third quarter ended. During the quarter, the three wells associated with Great Western Reservoir were scheduled for sampling to collect splits of samples collected by representatives of the City of Broomfield. The requested analytes were VOCs and nitrate. One well provided insufficient water for sampling, and the other two were successfully sampled. Analytical results from the DOE splits are presented in Appendix C (wells 11894 and 49192) and include nondetects for VOCs and very low detections of nitrate.

4.0 Adverse Biological Conditions

No evidence of adverse biological conditions (e.g., unexpected mortality or morbidity) was observed during monitoring and maintenance activities in the third quarter of CY 2010.

5.0 Ecological Monitoring

During the third quarter of CY 2010, Preble’s meadow jumping mouse (PMJM) mitigation monitoring and wetland monitoring was conducted. The PMJM monitoring data will be summarized and delivered to the U.S. Fish and Wildlife Service (USFWS) in the 2010 USFWS Biological Opinion Reports for the Rocky Flats Site. These reports are due to USFWS on December 1, 2010. The wetland monitoring data will be summarized and delivered to EPA in the 2010 Rocky Flats Site Annual Wetland Mitigation Monitoring Report due on March 1, 2011. A brief summary of the information from both reports will be included in the annual report for CY 2010.
On September 21, 2010, EPA conducted vegetation monitoring as part of their own evaluation of revegetation success. Their monitoring report summary will be included as an appendix in the annual report for CY 2010.

6.0 References


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