Appendix F

2017 RFLMA Contact Records and Written Correspondence
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Purpose: Original Landfill Temporary Groundwater Intercept System

Contact Record Approval Date: February 16, 2017

Site Contact(s)/Affiliation(s): Scott Surovchak, U.S. Department of Energy (DOE);
Jeremy Wehner, Linda Kaiser, and David Ward, Navarro Research and Engineering, Inc. (Navarro)

Regulatory Contact(s)/Affiliation(s): Carl Spreng, Colorado Department of Public Health and Environment (CDPHE); Vera Moritz, U.S. Environmental Protection Agency (EPA)

Date of Consultation Meetings: October 12, 2016, and January 10, 2017

Consultation Meeting Participants: Scott Surovchak and Jeff Murl, DOE; Carl Spreng and Lindsay Masters, CDPHE; Vera Moritz, EPA; Linda Kaiser, Jeremy Wehner, John Boylan, Clay Carpenter, Michelle Hanson, George Squibb, Jody Nelson, and David Ward, Navarro

Related Contact Records: CR 2016-02 and CR 2016-03

Introduction: Rocky Flats Legacy Management Agreement (RFLMA) Contact Record (CR) 2015-03, dated May 26, 2015, documented that the localized instability of the East Perimeter Channel (EPC), a storm-water management structure of the Original Landfill (OLF), was caused by higher than normal groundwater levels. Movement of the EPC occurred after several weeks of heavy precipitation events in the spring of 2015. This movement disrupted OLF storm-water management structures (EPC and berms), which control surface water run-on and runoff. Immediate maintenance actions were taken in May, June, and July 2015 to reestablish storm-water flow, as required by the OLF Monitoring and Maintenance Plan (DOE 2009), Section 3.6.2, “Maintenance Action Activities.” The process to evaluate long-term maintenance actions and address movement caused by high groundwater levels was initiated at that time. In the spring of 2016, the EPC and some of the surrounding area slumped, but not as significantly as in 2015. Repairs began in September 2016 and were completed in October 2016. The slumping in 2016 demonstrates that slope instability requires ongoing maintenance.

As part of the process to evaluate long-term actions, a Geoprobe investigation of the distribution of groundwater upgradient of the OLF was conducted in August and September of 2016 (CR 2016-03, dated July 28, 2016, includes a Soil Disturbance Review Plan [SDRP]). The initial results of the Geoprobe investigation indicated that additional information about groundwater distribution needs to be obtained to better evaluate long-term options.

An observation of the 2015 maintenance action and subsequent evaluation determined that the East Subsurface Drain (ESSD) located in the northeast corner of the EPC was plugged and required maintenance. The maintenance included reconstructing the drain, installing
improvements such as a perforated drain pipe that could be cleaned out as needed, and using a filter geotextile between the native soils and drain rock to reduce the potential for clogging. At the same time, a second solid-wall pipe was installed for potential future use in groundwater management actions. The reconstructed ESSD was installed in January 2017 (CR 2016-04 with a SDRP, dated October 19, 2016).

Two separate geotechnical engineering subcontractors (CD & E and Tetra Tech) confirmed that the instability of the OLF hillside observed over the past several years is due to saturated conditions in the subsurface during periods of extended precipitation as reported in the *Original Landfill Path Forward, Rocky Flats Site, Colorado* (DOE 2017) (Appendices F and G). This saturation further weakens the inherently weak geologic features such as the underlying organic-rich unit and the contact between low-permeability claystone bedrock material and the overlying hillslope colluvium. (As illustrated by visible slump features, this mechanism also drives hillside instability in other areas with similar geologic settings along the Front Range.) Reducing the inflow of groundwater to this hillside, particularly in the less-stable eastern portion of the constructed OLF hillside, is therefore a primary objective. This was the intent of the ESSD reconstruction maintenance action. A network of storm drains associated with the former 400 Area north of the OLF included storm drains that transect the OLF. The Kaiser-Hill Company, LLC closure report *Utilities and Infrastructure Closure Report, Sector 8A (440 and 460 Area)* (August 2005) documents disruption of these components; however, a large area of saturation and instability generally coincides with what is mapped as the southern extent of the remnant of the drain network. The Geoprobe activities in August and September 2016 targeted components of this network upgradient of the OLF. The results of that work have not confirmed that this drain network routes groundwater into the OLF, but it is likely.

**Discussion:** The purpose of the proposed project is to install wells to intercept what appear to be preferential groundwater flows into the OLF that follow abandoned storm-drain lines and bedding corridors for these lines from former Buildings 460 and 440/444 (see attached Figure 1). The project will include geophysical surveying to better define the bedrock surface and attempt to better locate the two storm-drain line corridors. The geophysical survey may include inserting rods 18 inches into the ground near the expected lines to obtain subsurface information.

This project is designed and will be constructed as a temporary measure for 2 years of operation during the high groundwater season (spring), to allow for groundwater data collection and to evaluate its potential effectiveness in enhancing hillside stability. The goal is to develop a long-term, sustainable maintenance solution for peak groundwater elevation reduction at the OLF during periods of extended precipitation to enhance hillside stability.

The plan view of the proposed temporary groundwater intercept project is shown on Figure 1. The project consists of two 8-inch-diameter wells, each with a depth of approximately 45 feet below ground surface. Both wells will penetrate the top of the weathered bedrock and each will be equipped with a submersible well pump. The pumps will be powered by a single propane-powered electric generator supplied by a 500-gallon propane tank. Electric power will be distributed to the pumps by conduit buried in an 18-inch-deep trench as shown on Figure 1. The pumps will discharge to a 4-inch-diameter gravity drain pipe staked to the ground with anchors as shown on Figure 1. The gravity drain pipe will be connected to the solid-wall pipe that was installed during the reconstruction of the ESSD and water will flow into the existing riprap downgradient of the ESSD.

RFLMA Contact Record 2017-01
Well construction (and abandonment) will comply with the State of Colorado’s Division of Water Resources Guideline 2009-1 Concerning the State Engineer’s Permitting Authority Over Wells Located on Hazardous Waste Remediation Sites and Rules and Regulations for Water Well Construction, Pump Installation, Cistern Installation, and Monitoring and Observation Hole/Well Construction (Volume 2 Code of Colorado Regulations 402-2), as applicable to the Rocky Flats Site.

The estimated maximum electrical load requirement to operate this groundwater intercept project is approximately 50% of the maximum load of the generator. On the basis of the manufacturer’s emission data, the air emissions from the generator will be below the Air Pollutant Emission Notice reporting requirements under the current operating conditions. Air emissions reporting requirements will be reevaluated if operating requirements change.

**IC Evaluation:** The soil disturbance work is subject to Institutional Controls (ICs) 2, 3, and 6. Table 1 recaps these ICs.

### Table 1. Institutional Controls

<table>
<thead>
<tr>
<th>IC 2</th>
<th>Excavation, drilling, and other intrusive activities below a depth of three feet are prohibited, without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2.</th>
</tr>
</thead>
</table>
| IC 3 | **Objective:** Prevent unacceptable exposure to residual subsurface contamination.  
**Rationale:** Contaminated structures, such as building basements, exist in certain areas of the Central Operable Unit, and the Comprehensive Risk Assessment did not evaluate the risks posed by exposure to this residual contamination. Thus this restriction eliminates the possibility of unacceptable exposures. Additionally, it prevents damage to subsurface engineered components of the remedy. |
| IC 6 | **Objective:** Prevent migration of residual surface soil contamination to surface water.  
**Rationale:** Certain surface soil contaminants, notably plutonium-239/240, were identified in the fate and transport evaluation in the Remedial Investigation as having complete pathways to surface water if disturbed. This restriction minimizes the possibility of such disturbance and resultant impacts to surface water. Restoring the soil surface to preexisting grade maintains the current depth to subsurface contamination or contaminated structures. |
| IC 6 | Digging, drilling, tilling, grading, excavation, construction of any sort (including construction of any structures, paths, trails, or roads), and vehicular traffic are prohibited on the covers of the Present Landfill and the Original Landfill, except for authorized response actions.  
**Objective:** Ensure the continued proper functioning of the landfill covers.  
**Rationale:** This restriction helps ensure the integrity of the landfill covers. |
The required SDRP for IC 2 was approved for this area in CR 2016-03 on July 28, 2016. The proposed soil disturbance is very similar; therefore, a new SDRP is not necessary. The *Erosion Control Plan for Rocky Flats Property Central Operable Unit*, which has been approved by CDPHE and EPA, provides erosion control best-management practices that meet the IC 3 requirements. The gravity drain pipe will be installed across the cover of the OLF, including a portion of the waste footprint, and will be staked in place as indicated on Figure 1. Approval of this CR provides authorization for this response action as required by IC 6.

**Resolution:** CDPHE, after reviewing information regarding the proposed soil disturbance and excavation, and after consultation with EPA, has approved the proposed activity. CDPHE has determined the proposed activity (1) will not compromise or impair the function of the remedy or (2) will result in an unacceptable release or exposure to residual subsurface contamination. CDPHE has also determined the proposed project meets the rationale and objectives of IC 2. (IC 3 and IC 6 rationale and objectives have been addressed as stated above.)

The work will not start until after CDPHE’s approval, and in any case DOE will not begin the approved soil disturbance until 10 calendar days after this CR is posted on the Rocky Flats Site public website and stakeholders are notified of the posting in accordance with the RFLMA Public Involvement Plan.

Progress and completion of the work will be reported by DOE in RFLMA quarterly and annual reports of surveillance and maintenance activities for period(s) in which these activities occur.

**Closeout of Contact Record:** This CR will be closed when the construction is completed, post-construction reseeding has been performed, and post-construction erosion controls are in place.

**Contact Record Prepared by:** David Ward and Jeremy Wehner, Navarro

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**Distribution:**
Scott Surovchak, DOE  
Carl Spreng, CDPHE  
Vera Moritz, EPA  
Linda Kaiser, Navarro  
Document_Determination  
Records  
File: RFS 0025.02  
   RF Contact Record File
Figure 1. OLF Temporary Groundwater Intercept System Site Plan
Purpose: Reportable condition for evaluation purposes for uranium at Walnut Creek Point of Compliance (WALPOC).

Contact Record Approval Date: March 6, 2017

Site Contact(s)/Affiliation(s): Scott Surovchak, U.S. Department of Energy (DOE); George Squibb, Linda Kaiser, David Ward, Navarro Research and Engineering, Inc. (Navarro)

Regulatory Contact(s)/Affiliation(s): Carl Spreng, Colorado Department of Public Health and Environment (CDPHE); Vera Moritz, U.S. Environmental Protection Agency (EPA)

Date of Consultation Meeting: January 31 and February 28, 2017

Consultation Meeting Participants: Carl Spreng, CDPHE; Scott Surovchak, DOE

Discussion: A reportable condition occurred at surface water Point of Compliance (POC) WALPOC (sampling location identification) at the Rocky Flats Site, based on an evaluation of validated analytical results for uranium from the composite sample collected during the period of 9:29 a.m. on June 16, 2016, to 11:40 a.m. on January 3, 2017.

The evaluation was performed in accordance with Rocky Flats Legacy Management Agreement (RFLMA) Attachment 2, Figure 5, “Points of Compliance,” and resulted in a calculated 30-day average concentration for uranium of 16.9 micrograms per liter (µg/L) on December 8, 2016. This concentration exceeds the RFLMA-applicable Table 1 standard of 16.8 µg/L for uranium. Validated results were received on January 30, 2017.

Pursuant to RFLMA Attachment 2, Section 6.0, “Action Determinations,” a reportable condition necessitates the following actions:

- DOE must submit a plan and schedule for an evaluation to address the condition within 30 days of receiving the validated data for the reportable condition.
- DOE will consult with CDPHE and EPA to determine if mitigating actions are necessary.
- The objective of the consultation will be to determine a course of action (if necessary) to address the reportable condition and to ensure that the remedy remains protective.
- The results of the consultation will be documented in contact records, written correspondence, or both.
Representatives of CDPHE and DOE discussed this result on January 31, 2017, and February 28, 2017, and developed a path forward. Formal notification to the regulatory agencies and the public—in accordance with RFLMA Attachment 2, Figure 5—was made by email on February 3, 2017. This contact record documents DOE’s consultation with CDPHE on January 31, 2017, and February 28, 2017.

The RFLMA Parties agreed on the evaluation steps described below and agreed that no mitigating actions are necessary at this time, for the following reasons:

- The remedy remains protective. The remedy standard for total uranium at the WALPOC sampling location is the calculated 12-month rolling average. Using the most recent validated data, the calculated 12-month rolling average at WALPOC for total uranium on December 31, 2016, is 11.5 µg/L and remains well below the 16.8 µg/L remedy performance standard.

- WALPOC has been a RFLMA monitoring location for roughly 5.5 years. During that period, the Site experienced one of its driest years (2012), its wettest month (September 2013), and one of its wettest springs (2015), according to precipitation data collected since 1990. Because uranium concentrations are influenced by changing environmental conditions, varying uranium concentrations at WALPOC are anticipated. While significant uranium concentration variability can be seen in both individual sample results and in the 30-day averages, the observed variability is not outside of anticipated ranges and remains well below 30 µg/L drinking water standard (i.e., the maximum contaminant level).

- Measured concentrations of total uranium at WALPOC include both naturally occurring and anthropogenic uranium. Previous high-resolution isotopic uranium analyses for WALPOC show signatures that are between 68–87 percent naturally occurring uranium.

- The variability of the uranium concentration influenced by environmental conditions was detailed in a study conducted by a qualified geochemistry subcontractor, the results of which were published in the Evaluation of Water Quality Variability for Uranium and Other Selected Parameters in Walnut Creek at the Rocky Flats Site (September 2015). This report can be found at https://www.lm.doe.gov/Rocky_Flats/Documents.aspx.

- Although the recent result was above the 16.8 µg/L Site standard, it remains well below the 30 µg/L drinking water standard for uranium. The 16.8 µg/L standard is a level at which there are no known or anticipated adverse effects on the health of a person, and is based on an adult weighing 70 kilograms consuming 2 liters of water per day for a lifetime. Because WALPOC has an intermittent flow of water and Walnut Creek is not a source of drinking water, there remains an adequate margin of safety. Therefore, the remedy remains protective of human health and the environment.
Plan and Schedule to Address the Reportable Condition: The RFLMA Parties agreed that steps described in this Contact Record shall serve as the plan and schedule for the evaluation.

The following steps have been or are being taken and will be utilized during the evaluation.

- Flow-paced composite samples routinely being collected at WALPOC will continue to be analyzed on a 2-week turnaround.
- High-resolution isotopic uranium analysis will be conducted on the most recent WALPOC samples to determine the percentages of natural and anthropogenic uranium for comparison to the historical data.
- DOE will provide CDPHE with a split sample from the next composite sample collected at WALPOC. That composite sample was started on January 30, 2017. This split sample will be analyzed for uranium by the State of Colorado.

DOE will report the results of continued monitoring, isotopic analysis, and of the subsequent evaluation in RFLMA quarterly and annual reports of surveillance and monitoring activities. This plan and schedule may be modified based on the outcome of RFLMA Party consultation related to the evaluation.

To keep the public informed, the outcome of continuing RFLMA Party consultation regarding the evaluation will be reported in RFLMA quarterly and annual reports of surveillance and monitoring activities or in subsequent contact records.

Resolution: CDPHE, after consultation with EPA, approves this contact record.

Closeout of Contact Record: This contact record will be closed when the results from the evaluation have been transmitted to CDPHE or as the RFLMA Party consultation related to this evaluation directs.

Contact Record Prepared by: George Squibb and David Ward, Navarro

Distribution:
Carl Spreng, CDPHE
Vera Moritz, EPA
Scott Surovchak, DOE
Linda Kaiser, Navarro
Documentation Determination
Records
Purpose: North Walnut Creek Slump 2017 Maintenance and Soil Disturbance Review Plan

Contact Record Approval Date: March 27, 2017

Site Contact(s)/Affiliation(s): Scott Surovchak, U.S. Department of Energy (DOE); Jeremy Wehner, Linda Kaiser, and David Ward, Navarro Research and Engineering, Inc. (Navarro)

Regulatory Contact(s)/Affiliation(s): Carl Spreng, Colorado Department of Public Health and Environment (CDPHE); Vera Moritz, U.S. Environmental Protection Agency (EPA)

Date of Consultation Meeting: May 27, 2016; January 10, 2017; and February 6, 2017

Consultation Meeting Participants: Scott Surovchak and Jeff Murl, DOE; Carl Spreng and Lindsay Masters, CDPHE; Vera Moritz, EPA; Linda Kaiser, Jeremy Wehner, John Boylan, Michelle Hanson, George Squibb, Jody Nelson, Patty Gallo, and David Ward, Navarro

Related Contact Records: None

Introduction: The North Walnut Creek Slump (NWCS) was first observed as a surface crack prior to Rocky Flats Site (Site) closure. The hillside was identified as a “landslide deposit that consists of masses of earth and rock that have moved downslope as earthflows and slumps” in the Rocky Flats Solar Ponds Plume Treatment System (SPPTS) Geotechnical Investigation Report (Tetra Tech, October 2009). This feature is noted in Annual Report of Site Surveillance and Maintenance Activities at the Rocky Flats Site, Colorado, Calendar Year 2015 (2016) and is east of the SPPTS. The NWCS is threatening to damage some components of the SPPTS. The SPPTS collects and treats nitrate and uranium in contaminated groundwater from the former Solar Evaporation Ponds.

Slumps, such as the NWCS, are common on the hillsides at the Site and also along much of the Front Range of Colorado because of the local geology. The Rocky Flats Alluvium on the pediment surface typically overlays less permeable, low-strength claystone, and as water from precipitation infiltrates through the alluvium, it meets the claystone. Rather than continuing to move downward through the less permeable claystone material, this groundwater moves laterally on top of the claystone and often daylights as seeps on the hillsides. When above-average precipitation is received and the claystone beneath the steep hillsides adjacent to the pediment becomes saturated, slumping of the hillsides can occur.

The NWCS has existed for several years. Aerial photographs indicate it was present in the early 2000s, and anecdotal evidence suggests the slump crack was evident even prior to that time. This slump is of greater interest than most others on the Site because of its potential impact to subsurface and aboveground components of the SPPTS. Informal tracking of the slump
movement began in the 2012 timeframe. In fall 2013 and again in spring 2015, the Site received above-average precipitation, after which substantial movement of the hillside at the NWCS was observed; that movement continued in 2016. The crack at the top of the slump, which until relatively recently showed only 1–2 feet of vertical displacement, now shows approximately 10 feet of vertical displacement in places (Figure 1), and lateral movement is also evident. As a result, several problem areas have been identified on the hillside.

- A critical component of the SPPTS is the subsurface groundwater collection trench (CT), which intercepts contaminated groundwater and routes it to the treatment components of the SPPTS. Most of this groundwater CT (the green line on Figure 1) is adjacent to the northern edge of the road to the SPPTS. The groundwater CT is approximately 1100 feet long and 20–30 feet deep; it consists of an impermeable barrier along its downgradient side, and along its length is a 4-inch-diameter perforated pipe bedded in sand above a bentonite layer on the upgradient side of the barrier. Small cracks have been observed as far south as the north edge of the road, potentially indicating movement in the vicinity of the groundwater CT. If the top of the slump is allowed to migrate southward, this could potentially damage the groundwater CT.

- Also present in the subsurface of this hillside is the preexisting and more extensive Interceptor Trench System (ITS) composed of 4-inch-diameter perforated pipes seated in gravel (the system of orange lines on Figure 1). This ITS also collects groundwater from the hillside. Part of the ITS is intercepted by the SPPTS groundwater collection trench, as described above and illustrated on Figure 1. The parts of the ITS that are beyond the SPPTS trench (to the northeast and downgradient) feed water to the Interceptor Trench System Sump (ITSS), which pumps collected water up the hill to the SPPTS treatment components. Given the location of the NWCS in relation to the ITS, it is possible that a portion of the ITS may be damaged or broken as a result of the movement on the hillside.

- Some cracking and uplifting of the soils are now observed directly adjacent to some of the ITSS components in the valley bottom (Area #5 on Figure 1), suggesting that parts of the ITSS may be at risk from further movement of the slump.

- The road used for access to the ITSS components of the SPPTS (in the valley bottom near the stream) has been destroyed by vertical and horizontal displacement, and it has been buried by part of the slump (Area #3 on Figure 1). As a result, vehicle access is no longer possible and maintenance must be conducted on foot. This creates potential health and safety issues and also limits possible activities to those that can be achieved by hand-carrying maintenance equipment into the area. At some point, heavy items that cannot be manually transported, such as the batteries that connect to the solar panels to power the ITSS pump, will need to be replaced. Vehicle access needs to be restored (Area #3 on Figure 1).

- A different slump (referred to as the Road Slump) near the intersection of the SPPTS and ITSS Roads is threatening the road and must be repaired and recontoured (Area #2 on Figure 1).

- At the toe of the main part of the NWCS, Rocky Flats Legacy Management Agreement (RFLMA) groundwater monitoring well B210489 is also threatened by the toe of the slump (Area #4 on Figure 1).
Discussion:
In order to prevent damage to the SPPTS and the other infrastructure, the NWCS area will be the subject of a series of activities, from investigation (such as evaluating groundwater distribution and characteristics and evaluating subsurface soil conditions) to repairs (such as regrading, adding or restoring groundwater collection components, and others as warranted). The initial action planned for early 2017 is intended to minimize further slumping resulting from precipitation and investigate soil and groundwater characteristics for a slope stabilization analysis. The slope stabilization analysis will be utilized to develop future projects in this area. The actions addressed in this contact record are the following:

- Use a Geoprobe at multiple locations upgradient of the slump and in the slump area to evaluate groundwater characteristics and bedrock depth. The expected average depth of the Geoprobe boreholes is approximately 20 feet. Temporary piezometers may be installed in these boreholes.
- Conduct geophysical testing of the slopes and slump area to attempt to identify depth to bedrock and attempt to locate ITS lines prior to construction activities (i.e., grading, excavating, or other intrusive activities near the ITS lines).
- Regrade the hillside and slump areas to fill cracks, regrade the scarps, and create positive drainage to reduce the potential for ponding of water on the hillslope. Cracks 4 inches wide and wider will be excavated to a depth of 4 feet and backfilled with native soil. This will help reduce the amount of water infiltrating to the subsurface and reduce the potential for further slumping. Area #1 on Figure 1 outlines the area of the hillside to receive this attention.
- Repair and recreate the two-track road, providing vehicle access to the ITSS area for maintenance activities (Area #3 on Figure 1).
- Regrade that part of the slump toe that threatens monitoring well B210489 in the valley bottom, moving slump material away from the well (Area #4 on Figure 1).
- Regrade and stabilize slopes near the SPPTS ITSS to protect this infrastructure from damage (Area #5 on Figure 1).
- Regrade the slump that threatens the upper east end of the A-Pond Road and repair this road as necessary (Area #2 on Figure 1).
- Possibly add seep drains to improve slope stability as the need is identified during regrading.
- Conduct a geotechnical drilling project that includes drilling up to 15 borings throughout the project area to evaluate geotechnical properties of soils and install piezometers for groundwater level monitoring and characteristics. Borings may be up to 14 inches in diameter and will penetrate unweathered bedrock up to 5 feet. The estimated total depth of each boring will be approximately 50 feet.

The regrade work for the hillside slump (Area 1 on Figure 1) will follow a “field fit” approach, cutting scarps and mid-slope elevated areas and using that soil to fill depressions to obtain a generally uniform slope of approximately 4 to 1 (horizontal to vertical). Excess material from the hillside slump area may also be used to repair the slump threatening the upper east end of the road to the ITSS Area 2 on Figure 1 to obtain a uniform slope of approximately 3 to 1. It is anticipated that to obtain a 4 to 1 slope for the hillside slump, the mid-slope bulge of the slump will be leveled and the crown of the scarp laid back. The mid-slope scarp is estimated to be
approximately 15 feet in height. The existing trees on this hillside are providing some stability and will be kept, to the extent possible.

A portion of the proposed work is in the Preble’s Mouse Critical Habitat and Protection Area (Figure 1). A Consultation Biological Assessment for this project has been submitted to U.S. Fish and Wildlife Service (USFWS) for approval. Intrusive work will not begin within these areas prior to receipt of this approval from USFWS.

Surface water runoff will be diverted around the construction area. Water (surface or ground) collected in the construction area during construction will be characterized using test strips for nitrate. The water will be dispositioned upgradient of SPPTS CT as previously approved in Contact Records 2008-06 and 2015-08.

**IC Evaluation:** This maintenance action will require excavating soil greater than 3 feet and will not return the surface to preexisting grade. Therefore, the soil disturbance work for this maintenance action is subject to Institutional Controls (ICs) 2 and 3, and requires approval of this contact record (2017-03). Table 1 recaps these ICs.

<table>
<thead>
<tr>
<th>IC 2</th>
<th>Excavation, drilling, and other intrusive activities below a depth of three feet are prohibited, without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2.</th>
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<tbody>
<tr>
<td><strong>Objective:</strong></td>
<td>Prevent unacceptable exposure to residual subsurface contamination.</td>
</tr>
<tr>
<td><strong>Rationale:</strong></td>
<td>Contaminated structures, such as building basements, exist in certain areas of the Central OU (Central Operable Unit), and the Comprehensive Risk Assessment did not evaluate the risks posed by exposure to this residual contamination. Thus, this restriction eliminates the possibility of unacceptable exposures. Additionally, it prevents damage to subsurface engineered components of the remedy.</td>
</tr>
</tbody>
</table>

| IC 3 | No grading, excavation, digging, tilling, or other disturbance of any kind of surface soils is permitted, except in accordance with an erosion control plan (including Surface Water Protection Plans submitted to EPA under the Clean Water Act) approved by CDPHE or EPA.
Soil disturbance that will not restore the soil surface to preexisting grade or higher may not be performed without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2. |
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<td><strong>Objective:</strong></td>
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<td><strong>Rationale:</strong></td>
<td>Certain surface soil contaminants, notably plutonium-239/240, were identified in the fate and transport evaluation in the Remedial Investigation as having complete pathways to surface water if disturbed. This restriction minimizes the possibility of such disturbance and resultant impacts to surface water. Restoring the soil surface to preexisting grade maintains the current depth to subsurface contamination or contaminated structures.</td>
</tr>
</tbody>
</table>

The required Soil Disturbance Review Plan (SDRP) for IC 2 and IC 3 (for not restoring surface to preexisting grade) is in Attachment 1. The *Erosion Control Plan for Rocky Flats Property Central Operable Unit*, which has been approved by CDPHE and EPA, provides erosion control best-management practices that meet the requirements of IC 3.
**Resolution:** CDPHE, after reviewing information regarding the proposed soil disturbance and excavation and after consultation with EPA, will approve, approve with modification, or disapprove the proposed activity. CDPHE will determine whether the proposed activity (1) will not compromise or impair the function of the remedy or (2) will result in an unacceptable release or exposure to residual subsurface contamination. CDPHE will also determine whether the proposed project meets the rationale and objectives of IC 2 and IC 3.

The work will be conducted after CDPHE’s approval, but DOE will not conduct the approved soil disturbance work until 10 calendar days after this Contact Record is posted on the Rocky Flats Site’s website and stakeholders are notified of the posting in accordance with the RFLMA Public Involvement Plan. In addition, no intrusive work will be conducted within the Preble’s Mouse Protected Area or Critical Habitat without USFWS approval to perform this work.

Progress and the completion of the work will be reported by DOE in RFLMA quarterly and annual reports of surveillance and maintenance activities for period(s) in which these activities occur.

**Closeout of Contact Record:** This contact record will be closed when the construction is completed, post-construction reseeding has been performed, and post-construction erosion controls are in place.

**Contact Record Prepared by:** David Ward and Jeremy Wehner, Navarro

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**Distribution:**
Scott Surovchak, DOE
Carl Spreng, CDPHE
Vera Moritz, EPA
Linda Kaiser, Navarro
Document_Determination
Records
File: RFS 0025.02
RF Contact Record File
Attachment 1

Rocky Flats Legacy Management Agreement Soil Disturbance Review Plan

**Proposed Project:** Soil Disturbance Review Plan (SDRP) for the North Walnut Creek Slump Maintenance Activities


Description of the proposed project, including the purpose, the location, and the lateral and vertical extent of excavation.

The North Walnut Creek Slump maintenance project for early 2017 includes investigating the groundwater and bedrock, regrading the hillside east of the Solar Ponds Plume Treatment System (SPPTS) and, as needed, installing seep drains. This effort is intended to improve hillslope drainage, minimize further slumping, and reduce the risk of damage to the SPPTS from further hillside movement. The total disturbed area is approximately 6 acres. The soil from the cut areas will be completely used in the fill areas and there will be no imported soils. The depths of cuts are expected to be less than 10 feet in most areas. Portions of the project will be within the Preble’s Mouse Protection Area and Critical Habitat. Since portions of the area will not be returned to the preexisting grade the area will be surveyed after the regrading is complete to document the finish grade.

Information about any remaining subsurface structures in the vicinity of the proposed project (or state that there are none if that is the case).

The only remaining subsurface structures in the area are used in current operations and are not abandoned contaminated structures. They are the following:

- Interceptor Trench System (ITS) lines
- SPPTS collection trench (CT) and associated components (e.g., piezometers and cleanouts)
- Collection sump, transfer lines, and electrical lines associated with the Interceptor Trench System Sump (ITSS)
- Monitoring well B210489

Information about any former Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern, or other known or potential soil or groundwater contamination in the vicinity of the proposed project.

This area is IHSS 101, Solar Evaporation Ponds. In accordance with Environmental Restoration RSOP Notification #02-08 (DOE 2002), soil was removed from six hot spot locations. Confirmation sampling was conducted in the excavations to confirm that sufficient soil had been removed. All contaminant concentrations and activities were less than Rocky Flats Cleanup Agreement (RFCA) Tier II Soil Action Levels (SAL), except for one beryllium concentration, which was slightly greater than the RFCA Tier II SAL (1.10 milligrams per kilogram [mg/kg] vs 1.04 mg/kg). None of the results exceeded the wildlife refuge worker (WRW) SALs (DOE 2003).
After completion of accelerated actions, No Further Action was recommended for IHSS 101 based on the following:

- Contaminant concentrations and activities were less that RFCA Tier II SALs, with minor exceptions. No Tier I SALs were exceeded
- Results of an evaluation indicated additional action was not necessary


Any water encountered will be dispositioned upgradient of SPPTS CT.
Field Change Concurrence
121917

Purpose: Field Change to Actions Approved in Contact Record 2017-03, North Walnut Creek Slump 2017 Maintenance and Soil Disturbance Review Plan

Concurrence Date: December 19, 2017

Related Contact Record: 2017-03 (approved March 3, 2017)

Description of Change: DOE has received a field change request from the subcontractor to install three inclinometers along the central line of the slope movement at the North Walnut Creek Slump (NWCS). These inclinometers were not included in the initial scope of the geotechnical investigation as it was believed that the continuous sampling method used would reveal the slip plane. Upon completion of the geotechnical investigation and review of the boring logs and samples, an obvious slip plane for the NWCS slope movement was not identified. Identification of the slip plane is a critical piece of information in the calibration of the slope stability models. The inclinometers will identify how the slope is moving with depth, and that information can be used to calibrate the slope stability models.

The geotechnical investigation and associated soil disturbance review plan (SDRP) was approved by CDPHE in CR 2017-03. Although this CR does not discuss the installation of inclinometers at the NWCS, this activity is very similar to the geotechnical investigation work approved by CR 2017-03. The inclinometers would be installed in the same area, using the same drilling equipment, and using the same safety protocols as the recent geotechnical work. Therefore, we do not believe a new CR and SDRP are necessary. If you concur, the three inclinometers will be installed in borings drilled to a depth of approximately 60 to 75 feet below ground surface in the January 4–10, 2018, timeframe.

Resolution: After consultation with EPA, CDPHE concurred via email with the proposed field change under CR 2017-03.
Purpose: OLF 2017 Interim Maintenance Work: Creating Positive Drainage and Minor Adjustments to Berm Heights, in accordance with Soil Disturbance Review Plan

Contact Record Approval Date: October 6, 2017

Site Contact(s)/Affiliation(s): Scott Surovchak, U.S. Department of Energy (DOE); Jeremy Wehner, Linda Kaiser, David Ward (Navarro)

Regulatory Contact(s)/Affiliation(s): Carl Spreng, Colorado Department of Public Health and Environment (CDPHE); Vera Moritz, U.S. Environmental Protection Agency (EPA); Lindsay Masters (CDPHE)

Date of Consultation Meeting: September 21, 2017

Consultation Meeting Participants: Scott Surovchak, Carl Spreng, Vera Moritz, Lindsay Masters, Linda Kaiser, Jeremy Wehner, David Ward, John Boylan, George Squibb, Michelle Hanson


Discussion:

Original Landfill 2017 Maintenance Work to Create Positive Drainage

Maintenance activities at the Original Landfill (OLF) are planned and expected to be performed in October 2017. The planned 2017 maintenance activities are consistent with activities outlined in the Original Landfill Monitoring and Maintenance Plan. A geotechnical evaluation (Contact Record 2015-06 Implementation of Interim Action to Reestablish Surface Water Management on Portions of the OLF) is in progress; it is evaluating the effects of 2015-2017 events on slope stability. At the completion of the evaluation, additional actions may be selected for implementation at the OLF to increase slope stability. Field implementation of these additional actions is expected to begin in summer 2018.

The OLF 2017 maintenance work will include:

1. regrading the lower portion of the slump to (a) eliminate cracks and pooling areas and (b) create positive drainage,
2. conducting minor regrading of the upper portion of the slump for positive drainage, and
3. conducting surface compaction of the entire slump area to minimize infiltration.
Erosion controls and revegetation will be installed in accordance with the approved Erosion Control Plan for Rocky Flats Property Central Operable Unit (2007).

The East Perimeter Channel (EPC) outlet is blocked by the slump below Berm 7 (as described in the May to current monthly inspection reports). The slump completely blocks flow in the EPC, forcing channelized flow in the EPC to overflow its east (lower) bank, and then flow downgradient through the well-established vegetation to Woman Creek. OLF berms and the EPC are shown in the attached figure.

Similar slumps into the EPC were removed during the 2014, 2015, and 2016 maintenance work. However, it appears that the current slump toe is acting as a buttress to the hillside above, which has moved in prior years. Before the May slump event, a small tension crack developed north of Berm 4 in the vicinity of the 2015 slump scarp (as noted in monthly reports). In order to minimize adverse impacts to the hillside stability, EPC slump material will not be removed during the 2017 maintenance work. Instead, the current flow path—as described above—will be left in place until the 2018 slope stabilization project design is underway and the discharge location(s) can be reevaluated. This new overland flow area will be inspected during all routine OLF inspections, and maintenance conducted as needed. No erosion has been noted in this area to date.

Minor Adjustments to Berm Heights

The 2009 Original Landfill Monitoring and Maintenance Plan (M&M Plan), Section 3.4.1, “Monitoring Locations and Procedures,” discusses monitoring for the OLF soil cover and states:

“If visual inspections of the diversion berms indicate a departure from the design heights, as shown in Figure 3–3, the height and gradient will be measured to determine if maintenance is required. In addition, the periodic topographical survey results shall be evaluated to determine if berm maintenance is required.”

Contact Record (CR) 2015-06 “OLF Implementation of Interim Action to Reestablish Surface Water Management on Portions of the OLF, with Soil Disturbance Review Plan,” states:

“The important concept here is to not add any more weight to the OLF cover or water management structures during this interim action. Therefore, the designed berm heights and cover thickness will not be maintained in these areas during this action.”

To minimize weight on the cover the designed berm heights will not be maintained until the longer-term implementation for the OLF stabilization is complete.

The periodic topographical survey required by the OLF M&M Plan was performed in 2017. A majority of the berm heights meet or exceed the minimum required heights recalculated in the 2013 technical memorandum. In 2015, berm areas impacted by slumping were regraded in accordance with CR 2015-06 and reconfigured to promote positive drainage, without adding additional weight to the OLF cover. Since 2015, positive drainage off the cover has been maintained to eliminate ponding. However, this Contact Records documents the proposal that minimum berm heights will not necessarily be maintained so as to minimize weight on the cover as recommend in CR 2015-06. Minor adjustments to berm heights may be required to prevent downgradient erosion. Work will be performed in some berm channels to reduce ponding.
The longer-term implementation for OLF stabilization, based on recommendations from the geotechnical evaluation in progress, is scheduled to be completed in fall 2018.

Soil disturbance, filling, and grading on the OLF cover are subject to the requirements of Rocky Flats Legacy Management Agreement (RFLMA) institutional controls (ICs), discussed below. An approved SDRP is required. Here, the SDRP is included as Attachment 1 to this CR. The Erosion Control Plan for Rocky Flats Property Central Operable Unit, which has been approved by CDPHE and EPA, provides erosion control best-management practices that meet the IC 3 requirements.

IC Evaluation: Soil disturbance work is subject to ICs 2, 3 and 6. Table 1 recaps these ICs.

Table 1. Institutional Controls

<table>
<thead>
<tr>
<th>IC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC 2</td>
<td>Excavation, drilling, and other intrusive activities below a depth of three feet are prohibited, without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2.</td>
</tr>
<tr>
<td>Objective: Prevent unacceptable exposure to residual subsurface contamination.</td>
<td></td>
</tr>
<tr>
<td>Rationale: Contaminated structures, such as building basements, exist in certain areas of the Central OU, and the Comprehensive Risk Assessment did not evaluate the risks posed by exposure to this residual contamination. Thus, this restriction eliminates the possibility of unacceptable exposures. Additionally, it prevents damage to subsurface engineered components of the remedy.</td>
<td></td>
</tr>
<tr>
<td>IC 3</td>
<td>No grading, excavation, digging, tilling, or other disturbance of any kind of surface soils is permitted, except in accordance with an erosion control plan (including Surface Water Protection Plans submitted to EPA under the Clean Water Act) approved by CDPHE or EPA. Soil disturbance that will not restore the soil surface to preexisting grade or higher may not be performed without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2.</td>
</tr>
<tr>
<td>Objective: Prevent migration of residual surface soil contamination to surface water.</td>
<td></td>
</tr>
<tr>
<td>Rationale: Certain surface soil contaminants, notably plutonium-239/240, were identified in the fate and transport evaluation in the Remedial Investigation as having complete pathways to surface water if disturbed. This restriction minimizes the possibility of such disturbance and resultant impacts to surface water. Restoring the soil surface to preexisting grade maintains the current depth to subsurface contamination or contaminated structures.</td>
<td></td>
</tr>
<tr>
<td>IC 6</td>
<td>Digging, drilling, tilling, grading, excavation, construction of any sort (including construction of any structures, paths, trails, or roads), and vehicular traffic are prohibited on the covers of the Present Landfill and the Original Landfill, except for authorized response actions.</td>
</tr>
<tr>
<td>Objective: Ensure the continued proper functioning of the landfill covers.</td>
<td></td>
</tr>
<tr>
<td>Rationale: This restriction helps ensure the integrity of the landfill covers.</td>
<td></td>
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</tbody>
</table>

Resolution: CDPHE, after reviewing information regarding the proposed soil disturbance and excavation and after consultation with EPA, has approved proposed activities in this Contact Record. CDPHE has determined that the proposed activity: (1) will not compromise or impair the function of the remedy, and (2) will not result in an unacceptable release or exposure to residual subsurface contamination. CDPHE also determined that the proposed project meets the rationale and objectives of IC 2, 3 and 6.
DOE will conduct this work after (1) CDPHE’s approval, and (2) 10 calendar days from the date stakeholders are notified of the posting in accordance with the RFLMA Public Involvement Plan (i.e., posting this Contact Record on DOE’s Rocky Flats website).

Progress and the completion of the work will be reported by DOE in RFLMA quarterly and annual reports of surveillance and maintenance activities for the period(s) in which these activities occur.

It is expected that additional, OLF maintenance activities will be required to maintain positive drainage off the OLF.

**Closeout of Contact Record:** This CR will be closed out when the longer-term implementation for the OLF stabilization is complete.

**Contact Record Prepared by:** David Ward, Patty Gallo and Jeremy Wehner

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**Distribution:**
Carl Spreng, CDPHE
Vera Moritz, EPA
Lindsay Masters, CDPHE
Scott Surovchak, DOE
Linda Kaiser, Navarro
Rocky Flats Contact Record File
LEGEND

- Groundwater Intercept Well
- Settlement Monument
- Apparent Seep Source (July 17, 2017)
- Culverts, Storm Drains, and Associated Features
- East Subsurface Drain
- Streams
- Approximate OLF Waste Footprint

Area of 2017 Slump Maintenance

October 4, 2017

Original Landfill
August 2017
Rocky Flats Site

RFLMA Contact Record 2017-04
Rocky Flats Legacy Management Agreement Soil Disturbance Review Plan

Proposed Project: Soil Disturbance Review Plan (SDRP) for Implementation of 2017 Interim Maintenance Work at the Original Landfill (OLF)

This SDRP provides information required by Rocky Flats Legacy Management Agreement (RFLMA) Attachment 2, “Legacy Management Requirements,” Section 4.1, “Soil Disturbance Review Plan,” regarding the work proposed by DOE.

Description of the proposed project, including the purpose, the location, and the lateral and vertical extent of excavation.

The purpose of the proposed project is to regrade portions of the OLF cover to reduce the slope grades in the slumped area, to improve slope stability, and improve or reestablish drainage features to minimize the potential for infiltration of precipitation in the short term.

The figure attached to Contact Record 2017-04 shows the location and the lateral extent of the planned regrading, excavation, and soil disturbance in the slump area. In addition, minor regrading of berms 1, 1A, 2, 4, 5, and 6, and the channels behind these berms, will be conducted to maintain positive drainage and maintain a minimum berm height of 1-foot. Regrading the face of the cover in the berm and channel areas will require no more than a 0.5-foot cut. Regrading in the slump area (outside the waste footprint and cover) may require excavation depths up to 3-feet.

Information about any remaining subsurface structures in the vicinity of the proposed project (or state that there are none if that is the case).

There are no remaining subsurface structures in the vicinity of the proposed project. An abandoned buried natural gas line operated by Xcel Energy is in the utility easement corridor north of the OLF. The location and alignment of this abandoned line is well known and marked with signs. It is well outside of the soil disturbance area.

Information about any former Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern, or other known or potential soil or groundwater contamination in the vicinity of the proposed project.

The OLF is former IHSS 115. The OLF design had a 2-foot-thick soil cover over the location of the disposed waste materials and clean Rocky Flats Alluvium fill surrounding the waste materials for the placement and configuration of storm water and seep water management features. Limits of the waste area are shown in the figure attached to Contact Record 2017-04.

The project area is in the Upper Woman Drainage Exposure Unit (EU) evaluated in the Comprehensive Risk Assessment, Appendix A, of the Remedial Investigation/Feasibility Study. The only contaminants of concern (COCs) identified for this EU are benzo[a]pyrene and dioxins/furans for surface soil/surface sediment.
Dioxin/furan concentrations were converted to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxicity equivalents (TEQs) for COC screening and risk characterization. Risks were calculated for benzo[a]pyrene and 2,3,7,8 TCDD TEQ. The estimated total excess lifetime cancer risk to the wildlife refuge worker at the EU is 8 in one million. Noncancer risks for benzo[a]pyrene and 2,3,7,8-TCDD TEQ were not evaluated because those COCs do not have noncancer toxicity values.