

## **Clarification of Institutional Controls at the Rocky Flats Site Central Operable Unit and Implementation of the Soil Disturbance Review Plan - 13053**

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### **ABSTRACT**

Cleanup and closure of DOE's Rocky Flats Site in Colorado, which was placed on the CERCLA National Priority List in 1989, was accomplished under CERCLA, RCRA, and the Colorado Hazardous Waste Act (CHWA). The physical cleanup work was completed in late 2005 and all buildings and other structures that composed the Rocky Flats industrial complex were removed from the surface, but remnants remain in the subsurface. Other remaining features include two landfills closed in place with covers, four groundwater treatment systems, and surface water and groundwater monitoring systems.

Under the 2006 *Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and the Central Operable Unit (CAD/ROD)*, the response actions selected for the Central Operable Unit (OU) are institutional controls (ICs), physical controls, and continued monitoring and maintenance. The objectives of these ICs were to prevent unacceptable exposure to remaining subsurface contamination and to prevent contaminants from mobilizing to surface water and to prevent interfering with the proper functioning of the engineered components of the remedy. An amendment in 2011 of the 2006 CAD/ROD clarified the ICs to prevent misinterpretation that would prohibit work to manage and maintain the Central OU property. The 2011 amendment incorporated a protocol for a Soil Disturbance Review Plan for work subject to ICs that requires approval from the State and public notification by DOE prior to conducting approved soil-disturbing work.

## INTRODUCTION

The former Rocky Flats Plant in Colorado began operations as part of the nation's nuclear weapons complex in the early 1950s. DOE and its predecessor agencies exercised jurisdiction and control over the facility. By the 1980s the Plant's heavily industrialized area covered approximately 121 ha (300 ac) and was surrounded by an approximately 2,527 ha (6,245 ac) security buffer zone that comprised unoccupied open space with various support facilities and surface water management features. Because of releases of hazardous substances to the environment, the federally owned property and adjacent offsite areas were placed on the CERCLA National Priority List in 1989. When the nuclear production mission ended in the 1990s, DOE changed the plant's mission to cleanup and closure; the facility was renamed the Rocky Flats Environmental Technology Site, and subsequently just the Rocky Flats Site.

Cleanup and closure of the Rocky Flats Site was accomplished under CERCLA, RCRA, and the Colorado Hazardous Waste Act (CHWA). The *Rocky Flats Cleanup Agreement* (RFCA)[1] between DOE, EPA, and the Colorado Department of Public Health and Environment (CDPHE) provided the regulatory framework for remedial activities. The activities included decontamination, demolition, and removal of more than 800 buildings and other structures. While most of these were completely removed, some portions of buildings were left in place 0.9 m (3 ft) or more below the surface grade.

The physical cleanup work was completed in late 2005 following final grading, which was intended to return the site to the approximate surface contours that existed prior to construction of plant facilities and to accommodate storm water and snow melt drainage. Miles of utilities and infrastructure were removed, but portions were also left below the surface grade. What was an industrial city was turned back into open space.

The final CERCLA/RCRA/CHWA response actions were approved in the *Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and the Central Operable Unit* issued September 29, 2006 (CAD/ROD)[2]. Under the 2006 CAD/ROD, the response actions selected for the Central Operable Unit (OU) are institutional controls (ICs), physical controls, and continued monitoring and maintenance. For practical future land management, the boundary for the 529 ha (1,308 ac) Central OU was drawn to form a single parcel to include all areas that required a continuing response action<sup>1</sup>. The Central OU includes areas with portions of demolished buildings deeper than 0.9 m (3 ft) below grade and subsurface utility infrastructure remnants, areas with residual surface and subsurface soil contamination, areas with groundwater contamination and groundwater treatment systems, several disposal pits and trenches, and two closed landfills.

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<sup>1</sup> The Peripheral OU was deleted from the CERCLA National Priorities List in 2007, and jurisdiction and control of most of the Peripheral OU land was transferred to the U.S. Fish and Wildlife Service to establish the Rocky Flats National Wildlife Refuge. DOE manages the Central OU to be compatible with the surrounding wildlife refuge use, but if necessary, remedy implementation requirements take precedence.

Figure 1 is a map of the Central OU showing the location of monitoring wells, surface water monitoring stations, the four groundwater treatment systems, and the closed landfill covers. These items are engineered components of the remedy. Figure 1 also shows the location the several historical disposal pits and trenches that remain in the subsurface.

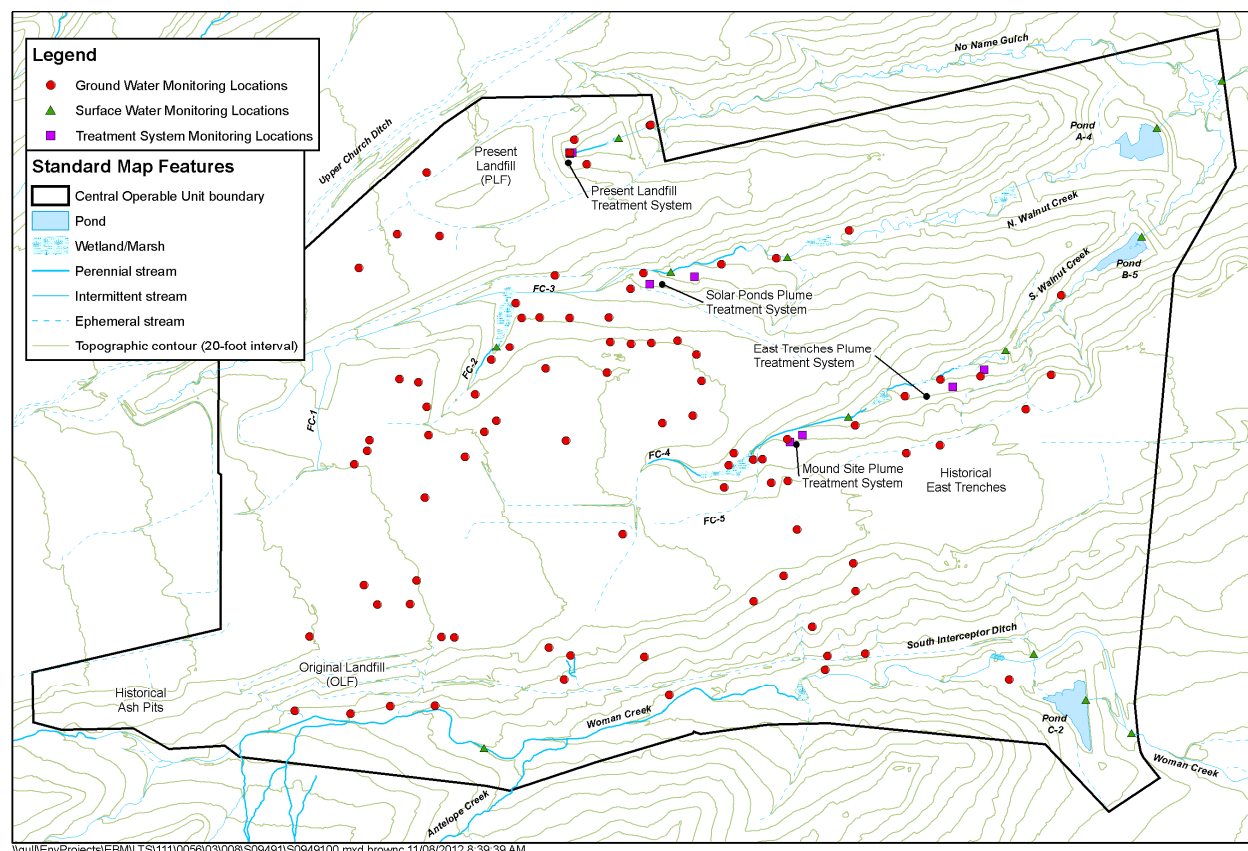


Fig. 1. Central OU Features.

Three of the Central OU treatment systems are configured to remove volatile organic compounds (VOCs) from groundwater: The Present Landfill Treatment System (PLFTS), the Mound Site Plume Treatment System (MSPTS), and the East Trenches Plume Treatment System (ETPTS). The PLFTS is a passive air-stripper system in which VOC-contaminated seep water flows over a series of steps, allowing the very low concentrations of VOCs in the seep water to volatilize. The MSPTS and ETPTS remove VOCs using zero-valent iron (ZVI) media. Each system has a groundwater intercept barrier downgradient of the VOC plume source area, and the collected groundwater is fed by gravity through two ZVI-filled treatment cells. The fourth treatment system, the Solar Ponds Plume Treatment System (SPPTS) also has a groundwater intercept barrier, which is downgradient of a depleted uranium and nitrate contamination plume. Because of its elevation relative to the intercept system, the SPPTS uses solar-powered pumps to feed water to the treatment cells, which are configured to biologically remove nitrate and to remove uranium using ZVI media.

Figure 2 shows the remnants of buildings and process waste lines that remain in the Central OU subsurface and also shows the outlines of former buildings or structures that were removed.

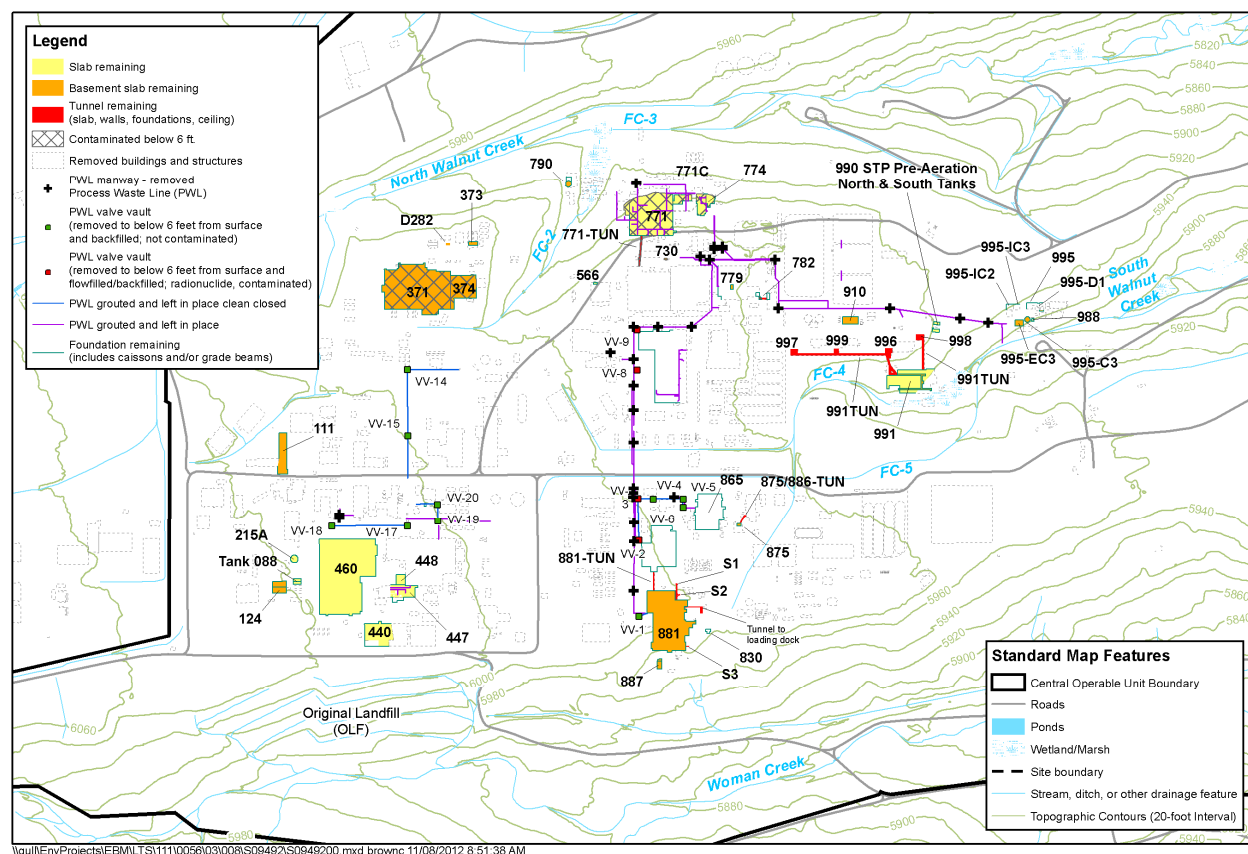


Fig. 2. Subsurface Features.

The investigation and cleanup process under RFCA included a thorough characterization of 421 known or suspected hazardous-substance-release locations. These locations were called Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern, and Potential Incidents of Concern. Generally, all these areas were referred to as IHSSs. The investigation and cleanup process also included the characterization of every building before D&D, and follow-up characterization surveys after decontamination (if required) and demolition. Soil sampling was conducted over the entire Rocky Flats property pursuant to CDPHE and EPA approved sampling and analysis plans, using accepted CERCLA methodology for the selection of sampling locations to provide adequate data for the remedy decision-making process.

To expedite remedial work and maximize early risk reduction, RFCA adopted an accelerated action approach to cleanup, equivalent to the removal authority in CERCLA. EPA and CDPHE approved all accelerated action decision documents after public review and comment. Under the accelerated action approach, some portions of building basements and process waste piping infrastructure were left in the subsurface with residual contamination. The contamination is fixed within the building materials or in piping that is grouted (to the extent feasible). The decision to leave these contaminated features rather than remove them was based on an evaluation of the effectiveness, implementability, and cost for removal, pursuant to the RFCA accelerated action protocols. A comparison of these factors resulted in an RFCA regulatory determination that leaving these contaminated features in the subsurface significantly reduced potential risks to

workers while maintaining adequate protection of human health and the environment. The RFCA accelerated action decisions included the requirement that these features are at least 1.8 m (6 ft) below ground surface. Also, some pits and trenches used to dispose of contaminated incinerator ash and construction debris did not require RFCA accelerated actions.

Low levels of VOCs and semivolatile organics, metals, uranium, plutonium, and americium remain in the Central OU surface and subsurface. The *RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study* (RI/FS)[3] included a Comprehensive Risk Assessment (CRA) based on conditions after completion of cleanup under RFCA. Details of the CRA are provided in Appendix A of the RI/FS report. Appendix B of the RI/FS summarizes each IHSS and its disposition under RFCA.

The CRA was conducted in accordance with the CDPHE- and EPA-approved *Comprehensive Risk Assessment Work Plan and Methodology*[4]. The CRA was designed to provide information to help determine a final remedy that is adequately protective of human health and the environment. The CRA estimated the risks posed by the site if no additional RFCA accelerated actions were taken.

The CRA methodology developed screening-level preliminary remediation goals (PRGs) for surface and subsurface soil and groundwater from a human health and ecological perspective. The PRGs were based on a site conceptual model, including exposure scenarios, exposure pathways, and receptors. The wildlife refuge worker receptor scenario resulted in the most conservative human health PRG. The PRGs are concentrations that correspond to a lifetime excess cancer risk of  $1 \times 10^{-6}$  from exposure to carcinogenic compounds and/or a hazard quotient less than 0.1 for noncarcinogenic compounds.

Under CERCLA, EPA considers environmental concentrations corresponding to a  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$  lifetime excess cancer risk range and a total noncancer hazard index less than or equal to 1.0 to be adequately protective of human health. Based on the CRA, the risk from residual contamination within the Central OU is calculated to be at the low end of the CERCLA risk range for anticipated future users.

In addition to the CRA, a radiation dose assessment of residual radionuclide contamination in surface soil and subsurface soil was performed to compare the applicable or relevant and appropriate requirements (ARARs) identified for the remedy. These ARARs are from CDPHE's Radiation Control Regulations (Title 6 *Code of Colorado Regulations* [CCR] 1007-1, Part 4) and are discussed in Section 10 of the RI/FS. The dose assessment calculations and results are presented in RI/FS Section 10, Attachment 1. The calculated dose rates show that the applicable dose limit is met for the wildlife refuge worker exposure scenario. In addition, the dose limit is also met for a rural resident exposure scenario in the areas with the highest surface soil and subsurface soil residual radionuclide concentrations if the land use was no longer restricted. The exposure scenario includes excavation of subsurface soil contaminated with the highest residual concentrations of radionuclides to construct a basement for a rural residence.

However, the contaminated subsurface features (e.g., remnants of some buildings) were not evaluated in the CRA because a site conceptual model for exposure to the residual contamination

in these features was not developed, since the features were not easily accessible, and the intake parameters that would result in uncontrolled exposure could not be reasonably developed. Consequently, an IC to prevent uncontrolled access to contaminated subsurface features was included in the remedy for the Central OU. The remedy also included other ICs to prevent uncontrolled soil erosion and prevent disturbance of engineered components that were designed to limit contaminant migration and to monitor remedy performance.

## IC IMPLEMENTATION

Table I lists the three (of seven) ICs in the CAD/ROD, Description of the Selected Remedy/Corrective Action (CAD/ROD pp. 69–70), that are the subject of this paper. Note that each IC includes an objective and rationale to clearly tie the IC to its purpose.

Table I. 2006 CAD/ROD ICs

<p><b>IC 2</b>—Excavation, drilling, and other intrusive activities below a depth of three feet [0.9 m] are prohibited, except for remedy-related purposes and routine or emergency maintenance of existing utility easements, in accordance with pre-approved procedures.</p>
<p><b>Objective:</b> Prevent unacceptable exposure to residual subsurface contamination.  <b>Rationale:</b> Contaminated structures, such as building basements, exist in certain areas of the Central OU, and the CRA 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.</p>
<p><b>IC 3</b>—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. Any such soil disturbance will restore the soil surface to preexisting grade.</p>
<p><b>Objective:</b> Prevent migration of residual surface soil contamination to surface water.  <b>Rationale:</b> Certain surface soil contaminants, notably plutonium-239/240, were identified in the fate and transport evaluation in the RI 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.</p>
<p><b>IC 7</b>—Activities that may damage or impair the proper functioning of any engineered component of the response action, including but not limited to any treatment system, monitoring well, landfill cap, or surveyed benchmark, are prohibited.</p>
<p><b>Objective:</b> Ensure the continued proper functioning of engineered portions of the remedy.  <b>Rationale:</b> This restriction helps ensure the integrity of other engineered components of the remedy, including monitoring and survey points.</p>

The *Rocky Flats Legacy Management Agreement* (RFLMA)[5] incorporated the ICs into RFLMA Attachment 2, “Legacy Management Requirements,” Table 4. For brevity, the rationale and objective for each IC were not included in Table 4. Shortly after RFLMA was finalized, several instances of work involving soil disturbance and excavation occurred to implement the remedy and to properly maintain the land in the Central OU.

The RFLMA consultation process was used to evaluate the proposed work and is documented in RFLMA regulatory contact records (CRs). CRs are posted on the Rocky Flats website at [http://www.lm.doe.gov/Rocky\\_Flats/ContactRecords.aspx](http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx). Stakeholders are notified of the posting of contact records in accordance with RFLMA Appendix 3, “Public Involvement Plan.” The following examples illustrate how the RFLMA parties implemented the ICs as work controls to ensure that the objectives and rationale of the ICs were met.

1. In 2007, the eastern portion of the bottom of the soil borrow area that became Functional Channel (FC)-1 during grading for closure was excavated from 0.9 to 1.5 m (3 to 5 ft) deep to provide additional fill material to fill some low spots around groundwater wells south of the former Building 371 area. The excavated area was contoured after fill material was removed; so that the water flowing in a ditch on the east side of the bottom of FC-1 would flow across the bottom of the excavated area to promote the formation of additional wetlands (see RFLMA CR 2007-03, [http://www.lm.doe.gov/Rocky\\_Flats/ContactRecords.aspx](http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx)).
2. In 2006, a slump began to develop on the hillside south of the location of former Building 991. In 2007, the slump was regraded and seeded to stabilize the hillside and address worker safety and aesthetic concerns. The slumping was likely due to water saturation of the soils caused by disruption of the French drain underlying the hill and the removal of the outfall associated with the drainage during closure. The hillside was constructed as part of the former Protected Area security fencing installation in the 1970s. The 2007 regrading approximated the topography of the area that existed prior to the hillside construction. Sentinel well 45605, located within the slumping area, was replaced after the grading work was completed. Movement of the soils creating the slump did not affect the implementation of the remedy, other than the sentinel well location (see RFLMA CR 2007-05, [http://www.lm.doe.gov/Rocky\\_Flats/ContactRecords.aspx](http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx)).
3. Prior to completing the cleanup and closure of Rocky Flats, DOE issued the *Pond and Land Reconfiguration Environmental Assessment Comment Response, and Finding of No Significant Impact*[6], in which it proposed to breach Dams A-1 and A-2 (located in North Walnut Creek) and Dams B-1, B-2, B-3, and B-4 (located in South Walnut Creek). The dams were not a component of the remedy. The dams were breached in 2008 and 2009 by constructing “notches” in them, allowing water to flow through with lower upstream pool levels. The excavations to accomplish the dam breach were more than 6 m (20 ft) below the surface. This reduced the active management and long-term surveillance and maintenance related to the dams and helped promote the formation of additional wetlands and enhance the natural aquatic and riparian environment by restoring the natural stream flows (see RFLMA CR 2008-02, [http://www.lm.doe.gov/Rocky\\_Flats/ContactRecords.aspx](http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx)).
4. In 2007, gravel road repairs and maintenance work included four areas where roadside drainage ditches and water bars were constructed to channel runoff. The centers of the ditches are 30 cm (1 ft) below the pre-existing grade, and the water bar depressions are 23 cm (9 inches) below the existing grade (see RFLMA CR 2007-04, [http://www.lm.doe.gov/Rocky\\_Flats/ContactRecords.aspx](http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx)).

The work in the four examples provided above did not restore soil to preexisting grade, because the work itself was designed to change the surface elevation. Some of the examples above included excavations deeper than 0.9 m (3 ft) for non-remedy-related purposes. These activities could be misconstrued to violate the literal language of ICs 2 and 3. However, through the RFLMA consultation process, the regulators evaluated each of these actions and determined that they were consistent with the objectives and rationale of these ICs. In particular, these projects did not affect depth to subsurface contamination or structures that could result in risk of exposure.

The work related to the hillside slump and the breaching of dams described above also included the CDPHE- and EPA-approved removal of several monitoring wells (and replacement with new wells where determined necessary).

### **NEED FOR IC CLARIFICATION**

In 2010 DOE proposed to breach the five remaining retention pond dams in the Central OU. The remedy does not require the retention ponds and dams. DOE prepared a Draft Surface Water Configuration Environmental Assessment<sup>2</sup> pursuant to the requirements of NEPA for the proposed action. CR 2010-02 documented the RFLMA parties' consultation regarding, and approval of, soil disturbance and excavation work related to the proposed dam breach work for the first two dams to be breached: the dams for Pond A-3 and the Present Landfill (PLF) Pond. DOE released the Draft Environmental Assessment for public review and comment on April 30, 2010, which included CR 2010-02 by reference. Some stakeholders expressed opposition to DOE's proposed action, commenting that because the proposed action was not remedy-related, the work would be prohibited by the IC that prohibits excavation deeper than 0.9 m (3 ft) below the surface.

CDPHE withdrew approval of Contact Record 2010-02 on October 15, 2010, to allow the RFLMA parties to consult regarding clarification of the soil excavation and soil disturbance prohibitions. The RFLMA parties agreed that the ICs as described in the 2006 CAD/ROD could be misinterpreted and that clarification was appropriate to document that the ICs are not intended to preclude DOE from appropriately managing the land comprising the Central OU.

### **CAD/ROD AMENDMENT**

The process to clarify the ICs was pursued through a CAD/ROD amendment prepared in accordance with CERCLA requirements<sup>3</sup>. While the proposed clarification did not alter the remedy and would not normally trigger a CAD/ROD amendment<sup>4</sup>, the 2006 CAD/ROD

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<sup>2</sup> A final Environmental Assessment for this action was issued in 2011[7].

<sup>3</sup> The National Contingency Plan (NCP), Title 40 *Code of Federal Regulations* Part 300 et seq., Section 300.435; and *A Guide to Preparing Superfund Proposed Plans, Record of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23P, EPA 540-R98-031, July, 1999, Section 7.0, "Documenting Post-ROD Changes; Minor Changes, Explanation of Significant Differences and ROD Amendments."

<sup>4</sup> See NCP, 40 CFR 300.435 (c)(2).



specified that DOE may not modify or terminate ICs without the approval of EPA and CDPHE, and only by formal amendment of the CAD/ROD.

Since the proposed IC clarification would modify the IC description, the RFLMA parties agreed that the CAD/ROD amendment process should be used, since this would also serve to facilitate stakeholder participation. The CAD/ROD amendment process would also provide the opportunity to change the requirement that ICs may only be modified or terminated by a CAD/ROD amendment, so that future changes affecting the ICs would be made consistent with then-existing CERCLA and CHWA requirements and guidance.

The *Proposed Plan for Amendment of the Corrective Action Decision/Record of Decision* (Proposed Plan)[8] was issued for public review and comment on June 3, 2011. The CAD/ROD amendment was approved by EPA and CDPHE on September 21, 2011.

The IC descriptions were subsequently clarified as shown in Table II. No changes were proposed for the objective and rationale for each IC, and those are not included in the table.

The Proposed Plan included a proposed modification to RFLMA Attachment 2 to include the requirements for the Soil Disturbance Review Plan. RFLMA Attachment 2 was modified accordingly on the same date as the CAD/ROD amendment.

Table II. IC Clarification

<b>Original IC Description</b>	<b>Clarified IC Description</b>
<b>IC 2</b> —Excavation, drilling, and other intrusive activities below a depth of three feet [0.9 m] are prohibited, except for remedy-related purposes and routine or emergency maintenance of existing utility easements, in accordance with pre-approved procedures.	<b>IC 2</b> —Excavation, drilling, and other intrusive activities below a depth of three feet [0.9 m] are prohibited, without prior regulatory review and approval pursuant to the Soil Disturbance Review Plan in RFLMA Attachment 2.
<b>IC 3</b> —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. Any such soil disturbance will restore the soil surface to preexisting grade.	<b>IC 3</b> —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 disturbances 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.
<b>IC 7</b> —Activities that may damage or impair the proper functioning of any engineered component of the response action, including but not limited to any treatment system, monitoring well, landfill cap, or surveyed benchmark, are prohibited.	<b>IC 7</b> —Activities that may damage or impair the proper functioning of any engineered component of the response action, including but not limited to any groundwater treatment system, monitoring well, landfill cap, or surveyed benchmark, are prohibited. The preceding sentence shall not be construed to prohibit the modification, removal, replacement or relocation of any engineered component of the response action in accordance with the action determinations in RFLMA Attachment 2.

### SOIL DISTURBANCE REVIEW PLAN

For proposed work prior to the CAD/ROD amendment, DOE provided the following minimum information to CDPHE and EPA to consider for approving work involving soil disturbance and/or excavation subject to the ICs:

- Information about any remaining subsurface structures in the vicinity so that the minimum cover assumption will not be violated (or stated that there are none if that was the case).
- Information about any former IHSSs or other known soil or groundwater contamination in the vicinity (or stated that there was no known contamination if that was the case).

- A commitment to survey any new surface established in subsurface soil, unless sufficient existing data were available to describe the new surface.

However, this information was not formally required, and the purpose of the information and criteria for approval was not explicit in RFLMA. Also, to keep stakeholders informed regarding these types of activities, the final modification included a requirement that the approved work could not begin sooner than 10 days after posting of the CR with the Soil Disturbance Review Plan (unless the work addressed an emergency situation).

The following process is now contained in RFLMA Attachment 2, Section 4.0, “Institutional Controls”:

... The [IC] use restrictions shall be implemented to meet the objective and rationale of the institutional control as provided in the CAD/ROD. DOE shall follow the RFLMA consultative process pursuant to Part 5 of RFLMA for any regulatory determination required regarding activities subject to the institutional control.

Results of consultation will be documented in contact records or written correspondence. Except for situations where immediate action is warranted, DOE will not implement the activity for which the regulatory determination is required until 10 calendar days after the contact record or written correspondence approving the activity is posted on the Rocky Flats website and notification of the posting is made to stakeholders in accordance with the RFLMA Public Involvement Plan.

DOE will employ administrative procedures to control all site modification, maintenance, or other activities requiring excavation within the Central OU in accordance with the institutional controls to prevent violation of the [IC] restrictions ... DOE shall ensure that all such site activities will not compromise the integrity or function of the remedy or result in uncontrolled releases of or exposures to subsurface contamination, in accordance with the ... [IC restrictions].

DOE will utilize work control procedures to help maintain the use restrictions and ensure protection of the integrity of the institutional controls. These procedures derive from [EPA and Colorado] ... regulation and guidance and DOE Orders and guidance. The DOE Integrated Safety Management System (ISMS) utilizes processes such as the job hazard analysis (JHA) to identify and mediate environmental, health and safety risks to ensure all work is done in a safe and environmentally protective manner.

The Soil Disturbance Review Plan requirement is in RFLMA Attachment 2, Section 4.1:

...Activities in the Central OU subject to [IC] 2 or 3 ... that are subject to regulatory review and approval will be reviewed and approved in accordance with this Soil Disturbance Review Plan:

Prior to conducting any activity that is subject to this plan, DOE will submit the following information to CDPHE and EPA:

1. A description of the proposed project, including the purpose, the location, and the lateral and vertical extent of excavation.
2. Information about any remaining subsurface structures in the vicinity of the proposed project (or state that there are none if that is the case).
3. Information about any former [IHSSs] or other known or potential soil or groundwater contamination in the vicinity of the proposed project (or state that there is no known contamination).

In consultation with EPA, CDPHE will review the information described above. CDPHE will approve the proposed activity only if it determines that the proposed activity will not result in an unacceptable release or exposure to residual subsurface contamination, and will not damage any component of the remedy. In making such determinations, CDPHE will ensure that the proposed project meets the rationale and objectives of the institutional controls.

Subsurface soils disturbed by activities implemented in areas that, based on the results of the [RI/FS], are or may be contaminated must be characterized. Characterization may rely on existing data, and be sufficient to implement the DOE work control procedures to establish controls for worker health and safety, potential migration of contamination and other project specific items identified through the evaluation of information in the Soil Disturbance Review Plan. Contaminated soils may be returned to the excavation, provided the rationale and objectives of the institutional controls are still met. Contaminated soils not returned to the excavation must be managed in accordance with regulatory requirements.

If an onsite or offsite borrow source is needed to fill an excavation, the source must be identified. This Soil Disturbance Review Plan also applies to any onsite borrow source.

DOE will document the elevation created by any soil-disturbing activity that does not return the soil surface to preexisting grade or higher, in order to ensure that the minimum 3-foot [0.9 m] cover thickness above any contaminated subsurface feature ... is maintained.

## **RECENT EXPERIENCE USING THE SOIL DISTURBANCE REVIEW PLAN**

The following are examples of major and minor construction work that required submittal and approval of Soil Disturbance Review Plans prior to conducting work.

1. The Pond A-3 and Present Landfill (PLF) Pond dam breach project, originally proposed in 2010 and addressed in CR 2010-02, became the impetus for the CAD/ROD amendment. The Soil Disturbance Review Plan was documented in CR 2011-07, approved

December 5, 2011. By comparison to CR 2010-02, under the new protocol several aspects of the work covered in CR 2011-07 were more extensively documented based on the description of the disposition of the A-3 and PLF Pond IHSSs covered in RI/FS Appendix B.

The new protocol includes the characterization information for subsurface soils disturbed by activities planned for areas that may have residual contamination. This characterization relied on existing data in the RI/FS and was determined sufficient to plan and implement work control procedures for worker health and safety, potential migration of contamination, and other project-specific items, including waste management of excavated soils and debris from the dam outlet works to be removed (see RFLMA CR 2010-02 and RFLMA CR 2011-07, [http://www.lm.doe.gov/Rocky\\_Flats/ContactRecords.aspx](http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx)).

2. Routine maintenance and minor repairs to portions of the Central OU gravel roads conducted in June 2012. As part of the project, the gravel road that leads to the former A-3 Pond was converted from a truck access road to a two-track vehicle (e.g., an all-terrain vehicle) access road. The regrading involved excavation deeper than 0.9 m (3 ft) below the existing grade, and the surface was not returned to the preexisting grade. The Soil Disturbance Review Plan was documented in CR 2012-01, approved May 31, 2012 (see RFLMA CR 2012-01 [http://www.lm.doe.gov/Rocky\\_Flats/ContactRecords.aspx](http://www.lm.doe.gov/Rocky_Flats/ContactRecords.aspx)).

## CONCLUSIONS

This new formal Soil Disturbance Review Plan protocol has worked well and also appears to be a good way to keep stakeholders informed of site work that involves soil disturbance and excavation.

While the new protocol was based on the protocol implemented immediately following the approval of the CAD/ROD and RFLMA, it required significant time and staff resources to complete the CAD/ROD amendment.

This experience highlights the importance of documenting the rationale and objective of ICs, as was done in the 2006 CAD/ROD, but also in establishing a framework to allow appropriate land management in the post-closure period.

## REFERENCES

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3. DOE (U.S. Department of Energy), 2006c. *Rocky Flats Site RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study*, June.
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