Rocky Flats Site, Jefferson County, Colorado
Proposed Plan for Amendment of the Corrective Action Decision/Record of Decision

Purpose of this Proposed Plan

The Corrective Action Decision (CAD)/Record of Decision (ROD) for the Rocky Flats Site dated September 29, 2006 (DOE 2006a), was based on the Proposed Plan issued in June 2006 (DOE 2006b). The Central Operable Unit (OU) is the portion of Rocky Flats Site that was determined in the CAD/ROD to require additional response actions because of the presence of residual contamination. The Central OU boundary was drawn to form a single parcel for practical future land management. The response actions selected for the Central OU in the CAD/ROD are institutional controls (ICs), physical controls, and continued monitoring.

This Proposed Plan provides information supporting an amendment of the CAD/ROD to clarify the IC wording to more accurately reflect the objective and rationale of the ICs, as stated in the CAD/ROD. The objective and rationale for each IC is not proposed to change.

The proposed CAD/ROD amendment:

- Clarifies the description of certain ICs and provides a regulatory review and approval process to implement ICs.
- Requires amending the current environmental covenant or issuance of a restrictive notice to incorporate the CAD/ROD amendment ICs clarifications.
- Provides that any future modification or termination of ICs follow regulations and guidance in effect at that time.

A proposed modification to the Rocky Flats Legacy Management Agreement (CDPHE et al. 2011) (RFLMA) Attachment 2, "Legacy Management Requirements" to incorporate the proposed IC clarifications is included as Attachment 1 to this Proposed Plan for public review and comment during the Proposed Plan public comment period.

This Proposed Plan provides information so that the public has an opportunity to review and comment on the proposed CAD/ROD amendment and on the proposed modification to RFLMA Attachment 2.

This Proposed Plan includes the following sections:

- *Purpose of this Proposed Plan*
- *Site Background*
- *Regulatory Status*
- *Information Incorporated into this Proposed Plan*
- *Proposed CAD/ROD Amendment*
- *CERCLA Evaluation Criteria*
- *Additional Information Supporting the CAD/ROD Amendment*
  - *Overall Protection of Human Health and the Environment*
  - *Implementability*
  - *Public Acceptance*
- *References*
- *Glossary and Abbreviations*
- *Attachment* I *- Proposed Modification to RFLMA Attachment 2 to Incorporate the CAD/ROD Amendment*

The proposed CAD/ROD amendment follows relevant implementing regulations and guidance.[1]

[1] 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.

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Site Background

Rocky Flats is located in Jefferson County CO, approximately 16 miles northwest of Denver, CO. Figure 1 shows the Central OU location relative to the surrounding area. Rocky Flats is owned by the United States. The approximately 1,300 acre Central OU is under the jurisdiction and control of the U.S. Department of Energy (DOE) and is not open to the public. No trespassing signs are posted around the perimeter of the Central OU and serve as a physical control to preclude public access.

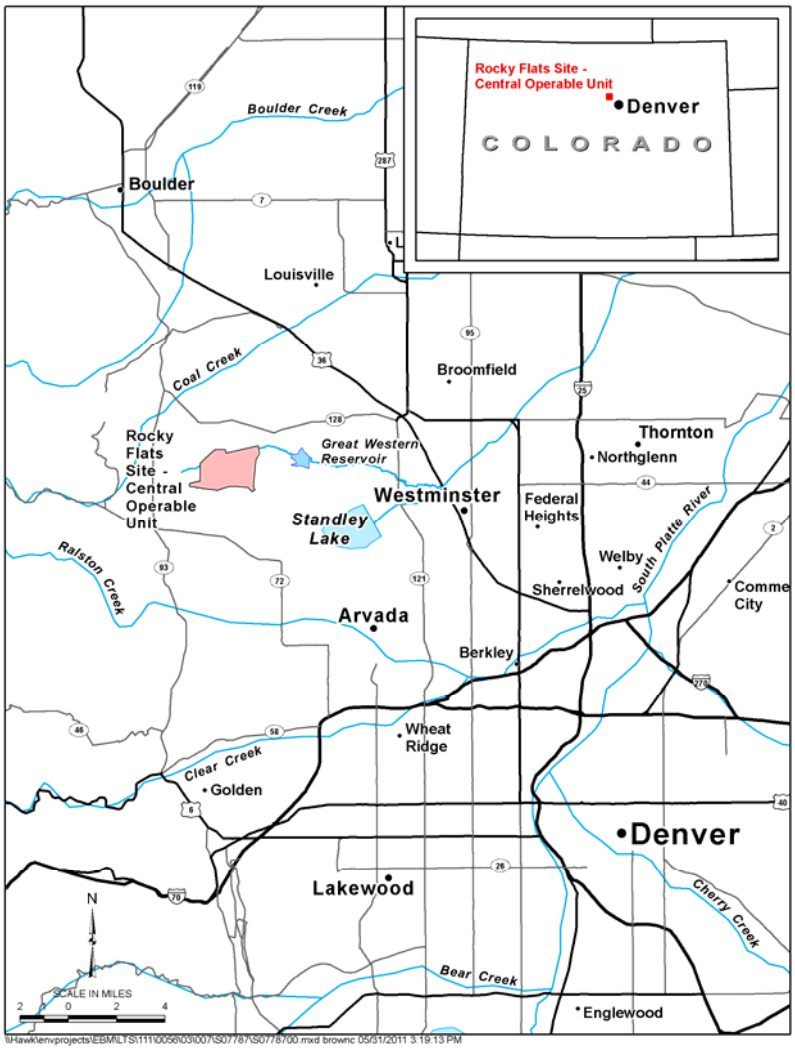

Figure 1. Central OU Location

The remaining Rocky Flats property, except for a small portion retained by DOE, comprises the Rocky Flats National Wildlife Refuge (refuge) under the jurisdiction and control of the U.S. Fish and Wildlife Service (FWS). While public access is currently prohibited in the refuge, FWS will eventually open the refuge to the public for activities compatible with refuge status.

Cleanup and closure of Rocky Flats was physically completed in 2005 and resulted in removal of all building structures in the Central OU (except for one equipment shed) and infrastructure. Some subsurface components of buildings and infrastructure remain. Among other things, the IC's related to soil disturbance and excavation restrict activities to prevent inadvertent intrusion into the subsurface where these features remain.

Regulatory Status

Cleanup and closure of Rocky Flats was completed under the Rocky Flats Cleanup Agreement (CDPHE et al. 1996) (RFCA). RFCA coordinated DOE's obligations and the U.S. Environmental Protection Agency's (EPA's) and the Colorado Department of Public Health and Environment's (CDPHE's) respective statutory authorities for planning, approving, and conducting cleanup work and for selecting and approving the final response action.

The remedy was selected under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986. The remedy is also the selected corrective action under the Colorado Hazardous Waste Act (CHWA) and the Resource Conservation and Recovery Act (RCRA). Colorado has been authorized to implement the CHWA in lieu of RCRA, through CDPHE.

The U.S. Department of Energy (DOE) Office of Legacy Management is responsible for implementing the remedy specified in the CAD/ROD. The implementation of the remedy is regulated under RFLMA among CDPHE, EPA and DOE.

As stipulated in the CAD/ROD, on December 4, 2006, DOE also granted an environmental covenant containing the ICs for the Central OU to Colorado, pursuant to the CHWA.[2] This modified the environmental covenant granted by DOE to CDPHE on May 22, 2006, prior to the CAD/ROD. The environmental covenant provides the state with jurisdiction to enforce the ICs independent of the CAD/ROD and RFLMA. The environmental covenant is recorded in the land records for Jefferson County, reception number 2006148295.

The RFLMA Parties have implemented the ICs to meet the objective and rationale for each IC stated in the CAD/ROD. Activities that have been reviewed for consistency with the ICs have included changes to the land or surface water configuration, erosion controls, vegetation management, water management and treatment, removal of unneeded wells and replacement of damaged wells.

Based on comments from some local governments in relation to IC implementation by the RFLMA Parties, as discussed in more detail in the "Public Acceptance" section below, the current ICs could be misinterpreted to mean that no excavations, soil disturbance, or changes to engineered components can be made, even if such activities are needed to properly manage and maintain the site. The

> The CAD/ROD amendment clarifies the description of the ICs pertaining to excavation and soil-disturbance to provide that regulatory review and approval are required for work that involves activities otherwise prohibited by ICs.
>
> This clarification is required to implement these ICs to meet the objective and rationale as intended in the original CAD/ROD. Regulatory review and approval will consider the objective and rationale of the IC.

[2] Section 25-15-317, *et seq.*, *Colorado Revised Statutes*.

proposed CAD/ROD amendment is intended to clarify the ICs to resolve possible misinterpretation of the ICs in the future.

The proposed CAD/ROD amendment does not alter the remedy and would not normally trigger a CAD/ROD amendment.[3] However, the CAD/ROD specifies that DOE may not modify or terminate ICs without the approval of EPA and CDPHE, and only by formal amendment of the CAD/ROD. The proposed CAD/ROD amendment revises this requirement so that future CAD/ROD changes affecting the ICs will be made consistent with then-existing CERCLA and CHWA requirements and guidance.

Information Incorporated into this Proposed Plan

Under EPA's ROD guidance, a ROD amendment entails the issuance of a revised Proposed Plan that highlights the proposed changes. In addition, the proposed amendment must be evaluated using the nine CERCLA evaluation criteria set forth in the NCP[4], but portions of the original ROD can be cross-referenced, where appropriate.

Because there is no change to the remedy, this Proposed Plan incorporates by reference the July 2006 Proposed Plan and the September 2006 CAD/ROD.

Also incorporated by reference is the June 2006 *Rocky Flats Site RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study* (RI/FS) (DOE 2006c), which includes a Comprehensive Risk Assessment (CRA), in RI/FS Appendix A. The RI/FS provides detailed information regarding released hazardous substances that remain on the site, feasible alternatives for responding to the release to provide a final remedy that is adequately protective of human health and the environment, and an evaluation of the feasible alternatives using the nine CERCLA criteria and the reasoning supporting the preferred alternative. The ICs were developed as a part of the feasible alternatives for the final remedy.

Documents incorporated by reference in this Proposed Plan are the June 2006 RI/FS, the July 2006 Proposed Plan, and the September 2006 CAD/ROD.

These documents are available on the Community Involvement page of the Rocky Flats Site website at http://www.LM.doe.gov/Rocky_Flats/Sites.aspx?view=5.

The 2006 CAD/ROD explains the basis for the selected remedy decision, using the information developed in the RI/FS and the Proposed Plan, and considering comments received from public review of the Proposed Plan. The CAD/ROD includes the objective and rationale statements for the ICs, consistent with recently-issued EPA IC guidance.[5]

The CRA was conducted in accordance with the CRA Work Plan and Methodology (DOE 2005). The CRA estimated the risks posed by the site if no additional actions were taken. It provided the

[3] See, NCP, 40 CFR 300.435 (c)(2).
[4] See, 40 CFR § 300.430.
[5] *Institutional Controls: A Guide to Planning, Implementing, Maintaining and Enforcing Institutional Controls at Contaminated Sites*, OSWER 9355.0-89, EPA-540-R-09-001, November 2010, Interim Final, Section 4.1, "Documentation of Use Restrictions and IC Instruments in Decision Documents," and Section 4.2, "Drafting IC Language in the Selected Instruments."

basis for taking additional action and identified the contaminants and exposure pathways that need to be addressed by the remedial action selected in the CAD/ROD.

Proposed CAD/ROD Amendment

The proposed CAD/ROD amendment clarifies the description of the ICs related to soil-disturbing activities. Requirements to implement the ICs are also being added to the CAD/ROD.

The proposed amendment also provides that future revisions to ICs will be made in accordance with then existing law and guidance. The amended ICs and the text explaining the objective and rationale for each IC will be incorporated into RFLMA Attachment 2 and the environmental covenant.

The proposed CAD/ROD amendment incorporates the amendment of the environmental covenant provisions in the CHWA by Senate Bill 08-037, effective July 1, 2008, to keep the enforcement of remedy-related land use restrictions flexible by providing for a Notice of Environmental Use Restriction (restrictive notice). The CAD/ROD amendment provides for the use of either an environmental covenant or a restrictive notice. The RFLMA Parties intend to modify the current environmental covenant but could replace it with a restrictive notice without future changes to the CAD/ROD.

Under Colorado law a restrictive notice can be used as an alternative to an environmental covenant. Restrictive notices are particularly useful when an environmental covenant might not provide an enforceable means to bind parties with prior interest in the land (in some instances, such parties may not even be identifiable) who do not subordinate their interest to the covenant.

A restrictive notice is an action by CDPHE based on the state's police power. It is binding on current and subsequent owners of the affected land and any person using or possessing interest in the land.

The ICs affected by this clarification are listed in Table 1. Consistent with EPA's IC guidance, Table 1 presents a side-by-side comparison of the original and proposed IC description. The original rationale and objective for each IC are not proposed to change, and are included after each IC description.

Table 2 lists the other remedy descriptions affected by the proposed CAD/ROD amendment. Table 2 also presents a side-by-side comparison of the original and proposed CAD/ROD amendment.

Table 1. Clarification of IC Descriptions

<table>
<tr><th>Original IC, Description of the Selected Remedy/Corrective Action (CAD/ROD pp. 69–70)</th><th>Proposed IC Description</th></tr>
<tr><td>IC 2—Excavation, drilling, and other intrusive activities below a depth of three feet are prohibited, except for remedy-related purposes and routine or emergency maintenance of existing utility easements, in accordance with pre-approved procedures.</td><td>IC 2—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 colspan="2">Objective: Prevent unacceptable exposure to residual subsurface contamination.
Rationale: 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.</td></tr>
<tr><th>Original IC, Description of the Selected Remedy/Corrective Action (CAD/ROD p. 70)</th><th>Proposed IC Description</th></tr>
<tr><td>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. Any such soil disturbance will restore the soil surface to preexisting grade.</td><td>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 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.</td></tr>
<tr><td colspan="2">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 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.</td></tr>
<tr><th>Original IC, Description of the Selected Remedy/Corrective Action (p. 70)</th><th>Proposed IC Description</th></tr>
<tr><td>IC 7—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.</td><td>IC 7—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.</td></tr>
<tr><td colspan="2">Objective: Ensure the continued proper functioning of engineered portions of the remedy.
Rationale: This restriction helps ensure the integrity of other engineered components of the remedy, including monitoring and survey points.</td></tr>
</table>

Table 2. Other Changes in CAD/ROD Amendment

Original CAD/ROD	Proposed CAD/ROD Amendment
***Description of the Selected Remedy/Corrective Action* (CAD/ROD p. 4)** The selected remedy/corrective action will be implemented through a modification to the Rocky Flats Environmental Covenant [the May 22, 2006 Environmental Covenant] to include all of the institutional controls required for the Central OU.	***Description of the Selected Remedy/Corrective Action*** Pursuant to the CHWA (§ 25-15-317, *et seq*. C.R.S.) the selected remedy/corrective action will be implemented through a modification to the Rocky Flats Environmental Covenant [the December 4, 2006, Environmental Covenant] (environmental covenant) or through an Environmental Use Restriction (restrictive notice) that replaces the environmental covenant to include all of the institutional controls required for the Central OU.
***Description of the Selected Remedy/Corrective Action* (CAD/ROD p. 66)** The requirements of this remedy will be implemented through RFLMA, as well as through an environmental covenant for the Central OU that will be granted by DOE to CDPHE.	***Description of the Selected Remedy/Corrective Action*** The requirements of this remedy will be implemented through RFLMA, as well as through an environmental covenant or a restrictive notice that replaces the environmental covenant for the Central OU.
***Description of the Selected Remedy/Corrective Action* (CAD/ROD p. 71)** These institutional controls will be contained in an environmental covenant for the Central OU that will be granted by DOE to CDPHE. DOE will notify easement holders at Rocky Flats of these controls when the covenant is granted. DOE will also record the covenant with Jefferson County, Colorado, incorporating these institutional controls.	***Description of the Selected Remedy/Corrective Action*** These institutional controls will be contained in an environmental covenant for the Central OU that will be granted by DOE to CDPHE or by a restrictive notice that replaces the environmental covenant for the Central OU. CDPHE may unilaterally issue a restrictive notice if an environmental covenant is not granted, or if CDPHE and DOE cannot agree on a restrictive notice. DOE will notify easement holders at Rocky Flats of these controls when the covenant is granted or when a restrictive notice that replaces the environmental covenant is issued. The covenant or restrictive notice incorporating these institutional controls will be recorded with Jefferson County, Colorado.
***Description of the Selected Remedy/Corrective Action* (CAD/ROD p. 72)** Any property transfer will take place consistent with the terms of the environmental covenant granted to CDPHE by DOE.	***Description of the Selected Remedy/Corrective Action*** Any property transfer will take place consistent with the terms of the environmental covenant granted to CDPHE by DOE or by a restrictive notice that replaces the environmental covenant for the Central OU.
***Description of the Selected Remedy/Corrective Action* (p. 74)** As a requirement of this CAD/ROD, DOE will grant an environmental covenant to CDPHE for the entire Central OU, pursuant to Section 25-15-321, Colorado Revised Statutes. The covenant will incorporate use restrictions for the Central OU, and will run with the Property in perpetuity and be binding on DOE and all parties having any right, title or interest in the Property, or any part thereof, their heirs, successors and assigns, and any persons using the land. The covenant granted by DOE to CDPHE for the Central OU will supersede the covenant already granted by DOE to CDPHE for the Present Landfill, and will subsume applicable requirements of the Present Landfill covenant. The Present Landfill covenant will remain in effect until DOE grants the covenant for the Central OU, at which time the Present Landfill covenant will be terminated.	***Description of the Selected Remedy/Corrective Action*** *This text will be deleted because the requirements have been met.*
***Description of the Selected Remedy/Corrective Action* (p. 71)** For the purposes of this CAD/ROD, DOE may not modify or terminate these institutional controls without the approval of EPA and CDPHE, by formal amendment to this CAD/ROD.	***Description of the Selected Remedy/Corrective Action*** For the purposes of this CAD/ROD, DOE may not modify or terminate the institutional controls without the approval of EPA and CDPHE. Institutional controls will be modified or terminated in accordance with the requirements of CERCLA and CHWA, including CERCLA and CHWA implementing regulations and guidance in effect at that time. The public will also be notified of the modification or termination and be given an opportunity to review and comment, pursuant to RFLMA requirements for public notification and public comment in effect at that time.

CERCLA Evaluation Criteria

A summary and an evaluation of the remedy alternatives in relation to the nine CERCLA evaluation criteria is provided in the July 2006 Proposed Plan. The 2006 RI/FS and the 2006 CAD/ROD describe the alternatives and the CERCLA criteria evaluation in full.

Table 3 shows the nine CERCLA evaluation criteria for the 2006 CAD/ROD selected remedy and explains the proposed changes for the CAD/ROD amendment. Additional discussion of some of the CERCLA evaluation criteria is in "Additional Information Supporting the CAD/ROD Amendment," below.

Table 3. Nine CERCLA Evaluation Criteria for CAD/ROD Amendment[6]

CERCLA Remedy Alternative Evaluation Criteria	CAD/ROD	CAD/ROD Amendment
	The CAD/ROD selected remedy Alternative 2, which incorporated Alternative 1, "No Action with Continued Monitoring," and added "Institutional and Physical Controls."	No change to the selected remedy.
Overall protection of human health and the environment	Protective in the current site land configuration because no unacceptable risks from residual contamination exist after completion of all planned accelerated actions. The CRA shows that the incremental risk to the site worker falls within the acceptable range of 1×10^{-6} to 1×10^{-4} cancer risks and below a hazard index of 1 for noncarcinogenic effects. ICs were added to increase the protectiveness of the remedy, because: • The CRA does not evaluate an unrestricted scenario but instead evaluates potential risk to the anticipated future user. The assumptions used in the CRA human health calculations need to be embodied in an IC. • If residual soil contamination is disturbed, erosion could cause the contamination to migrate to surface water, which could result in some surface water sample results above surface water standards at some surface water monitoring locations. • There are no prohibitions on affecting the engineered aspects of the remedy.	Remains protective because the IC description provides for regulatory review and approval of excavation and soil disturbance activities, and changes to engineered components, to ensure that the objective and rationale of the ICs are met.
Compliance with ARARs and Remedial Action Objectives	Alternative 2 complies with all ARARs and meets the remedial action objectives.	No change.

[6] Source: 2006 CAD/ROD Table 22, "Evaluation of Alternatives CERCLA Criteria."

Table 3 (continued). Nine CERCLA Criteria Evaluation for CAD/ROD Amendment

CERCLA Remedy Alternative Evaluation Criteria	CAD/ROD	CAD/ROD Amendment
Long-Term Effectiveness and Permanence	Accelerated actions (except the landfills) included the removal of contaminated structures and environmental media, providing a high degree of long-term effectiveness and permanence. Remaining building structures either meet free-release standards or have fixed contamination that is six feet or more below the ground surface. The landfills have been closed with required covers designed to isolate the wastes long-term. ICs are designed to provide the mechanisms that permanently maintain the completed actions consistent with the requirements in all accelerated action decision documents. In the very long term, ICs may fail. The environmental covenant will increase the long-term permanence of ICs.	Continues to provide long-term protection. The clarified IC description provides for regulatory review and approval of excavation and soil disturbance activities, and changes to engineered components, to ensure that the objective and rationale of the ICs are met.
Reduction of Toxicity, Mobility, or Volume Through Treatment	Groundwater treatment systems provide for a reduction of volatile organic compounds (VOCs) or uranium and nitrate, reducing the overall volume of contaminants in the groundwater and protecting the adjacent surface water. The Present Landfill seep treatment system provides treatment to remove the VOC contamination from the landfill seep.	No change.
Short-Term Effectiveness	ICs are effective immediately after the controls have been established.	The implementation requirements for regulatory review and approval of excavation and soil disturbance activities, and changes to engineered components will be incorporated into RFLMA and will be effective immediately upon the CAD/ROD amendment's approval.
Implementability	ICs and an environmental covenant are easily implemented.	The implementation requirements for regulatory review and approval of excavation and soil disturbance activities, and changes to engineered components will be incorporated into RFLMA and will be effective immediately upon the CAD/ROD amendment's approval. Colorado's environmental covenant law has been amended to provide for a restrictive notice. The use of either instrument is provided in the CAD/ROD amendment.
Cost	The present worth cost is $43,170,000 (which includes Alternatives 1 and 2). Capital costs are in 2005 dollars, and operations and maintenance costs are calculated for 30 years at a discount rate of 5 percent.	No change.
State Acceptance	Alternative 2 is acceptable and is the preferred alternative.	The proposed CAD/ROD amendment is acceptable to the state.
Community Acceptance	The public expressed substantial support for Alternative 2, though numerous comments were submitted on individual aspects of this alternative, including environmental monitoring, ICs and physical controls, and public involvement. The responsiveness summary to the public's comments appears as Section 20 of this CAD/ROD.	Comments received during the public comment period will be considered in the CAD/ROD amendment decision. The RFLMA Parties will respond to the public's comments in a comment responsiveness summary appended to the CAD/ROD amendment.

Additional Information Supporting the CAD/ROD Amendment

The following information provides additional details relevant to the proposed CAD/ROD amendment. The information is presented in relation to the particular CERCLA criterion being evaluated.

Overall Protection of Human Health and the Environment

To expedite remedial work and maximize early risk reduction, RFCA adopted an accelerated action approach to cleanup, equivalent to the removal authority found in CERCLA. DOE used accelerated actions to remove contaminated soils, decontaminate and demolish contaminated buildings, close two landfills, and install groundwater treatment systems. EPA and CDPHE approved all accelerated action decision documents after public review and comment.

The Central OU (as well as the entire Rocky Flats property) was thoroughly investigated and characterized during cleanup and closure under RFCA.

The risk from residual contamination levels in surface and subsurface soil and groundwater after completion of cleanup and closure under RFCA were evaluated in the CRA.

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. Appendix B of the RI/FS summarizes each IHSS and its disposition under RFCA.

The investigation and cleanup process also included the characterization of every building before its disposition and 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 CRA.

Portions of the basements of former Buildings 371, 373, 374, 771 and 774 have fixed contamination in the concrete. Based on consideration of effectiveness, Implementability and cost under RFCA protocols, the concrete that could not be completely decontaminated by approved decontamination techniques was left in place below 6 feet from the surface. This approach minimized risk to decontamination workers.

The remaining levels of residual contamination are documented in the CDPHE-approved completion reports for the buildings.

The soil disturbance and excavation ICs are intended to prevent exposure to the contaminated concrete.

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 a 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 six feet below the ground surface.

Also, some pits and trenches that were used to dispose of contaminated incinerator ash and construction debris did not require accelerated actions. This is because the low levels of contamination remaining and the subsurface depth of the disposed materials maintains adequate protection of human health and the environment pursuant to the RFCA accelerated action protocols.

The CRA was performed after completion of all RFCA accelerated actions. Details of the CRA are found in RI/FS Appendix A. The CRA Work Plan and Methodology developed screening-level preliminary remediation goals (PRGs) for surface and subsurface soil and groundwater from a human health and ecological perspective. The PRGs are contained in the CRA Work Plan and Methodology Appendix A. The PRGs were developed based on a Site Conceptual Model, including exposure scenarios, exposure pathways, and receptors. The wildlife refuge worker (WRW) receptor scenario was determined to result in the most conservative human health PRG. The PRGs are concentration levels corresponding to a lifetime excess cancer risk of 1×10^{-6} from exposure to carcinogenic compounds and/or a hazard quotient less than 0.1 for noncarcinogenic compounds.

Risk from exposure to residual contamination in surface and subsurface soil and groundwater was evaluated in the CRA, but the remaining concrete and subsurface infrastructure that were not fully decontaminated were not evaluated in the CRA because the exposure pathway for this contamination would occur only if the items were uncovered. Consequently, the remedy included IC's to prevent access to contaminated subsurface features. The remaining contamination levels are, however, documented by surveys included in the accelerated action closeout reports.

The proposed IC clarification is protective of human health and the environment because it ensures through the RFLMA regulatory review and approval process:

- Workers will not be inadvertently exposed to subsurface contaminated features without appropriate precautions.
- Subsurface contamination will not be mobilized and cause unintended exposure to humans or the environment.
- Sufficient soil cover over these features is maintained.
- Engineered components such as treatment systems and monitoring wells will not be damaged.

Thus, there is adequate information for CDPHE and EPA to evaluate in the review and approval process for soil disturbing and excavation activities to ensure the remedy will remain protective after these activities are conducted.

Implementability

The RFLMA Parties intend to modify the current environmental covenant to incorporate the IC clarifications but could also replace it with a restrictive notice without future changes to the CAD/ROD. Either instrument is easily implementable.

The following examples of work conducted to implement the remedy and to properly maintain the land in the Central OU are provided to illustrate how the ICs being clarified have been implemented by the RFLMA Parties to date. The RFLMA consultative 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/Sites.aspx?view=5.** Stakeholders are notified of the posting of contact records in accordance with RFLMA Appendix 3, "Public Involvement Plan."

1. In 2007, the eastern portion of the bottom of the soil borrow area that became Functional Channel-1 during grading for closure was excavated from three to five feet deep to provide additional fill material to fill some low spots around groundwater wells south of the former B371 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 Functional Channel-1 would flow across the bottom of the excavated area to promote the formation of additional wetlands. See, RFLMA CR 2007-03.

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.

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* (DOE 2004), 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 the notches with lower upstream pool levels. The excavations to accomplish the dam breach were in excess of 20 feet 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.

4. In 2007, road repairs and maintenance work included four areas where roadside drainage ditches and water bars were constructed to appropriately channel runoff. The center of the ditches is one foot below the pre-existing grade, and the water bar depressions are nine inches below the existing grade. See, RFLMA CR 2007-04.

The work in the four examples provided above did not restore soil to preexisting grade because by their very nature the surface elevation was designed to change. Some of the examples above included excavations deeper than 3 feet 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 objective 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).

The proposed CAD/ROD amendment provides that RFLMA shall include requirements for DOE to provide information in a RFLMA Soil Disturbance Plan to support the regulatory review and approval of excavation and soil-disturbing work. The RFLMA Soil Disturbance Plan will allow CDPHE, in consultation with EPA, to evaluate whether residual risks to the site user meet the CDPHE risk management policy. The information to be provided may subsequently be modified in accordance with RFLMA requirements without a CAD/ROD amendment.

The RFLMA Soil Disturbance Plan information is similar to the information submitted by DOE as part of the RFLMA consultative process described in the CRs for the soil disturbance and excavation work in the four examples given above. DOE provided the following information for consideration by CDPHE and EPA to obtain approval:

- 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.

Erosion controls for soil disturbance and excavation work are employed in accordance with the CDPHE- and EPA-approved *Erosion Control Plan for Rocky Flats Property Central Operable Unit* (DOE 2007) (which may be modified in the future as necessary to implement appropriate erosion controls, subject to CDPHE or EPA approval).

Based on experience to date, the proposed CAD/ROD amendment can be readily implemented.

Public Acceptance

CR 2010-02 documents the consultation regarding, and approval of, soil disturbance and excavation work related to DOE's proposed action to breach the 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 (Draft EA) pursuant to the requirements of the National Environmental Policy Act for the proposed action. DOE released the Draft EA for public review and comment on April 30, 2010. Some stakeholders expressed opposition to DOE's proposed action, commenting that because the proposed action is not remedy-related, the work would be precluded by the IC that prohibits excavation deeper than three feet 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 agree that the ICs as currently described in the CAD/ROD can be misinterpreted and that clarification is appropriate to document that the ICs are not intended to preclude DOE from appropriately managing the land comprising the Central OU.

The extent of public acceptance to the proposed CAD/ROD amendment will be evaluated after consideration of public-review comments. The RFLMA Parties will respond to the public's comments in a comment responsiveness summary that will be appended to the CAD/ROD amendment.

References

CDPHE (Colorado Department of Public Health and Environment) et al., 1996. *Final Rocky Flats Cleanup Agreement*, Federal Facility Agreement and Consent Order, CERCLA VIII-96-21 RCRA (3008[h]) VIII-96-01, State of Colorado Docket #96-07-19-01, July 19, and as amended.

CDPHE (Colorado Department of Public Health and Environment) et al., 2011. *Rocky Flats Legacy Management Agreement*, March.

DOE (U.S. Department of Energy), 2004. *Pond and Land Reconfiguration Environmental Assessment Comment Response, and Finding of No Significant Impact*, DOE/EA-1492, October.

DOE (U.S. Department of Energy), 2005. *Comprehensive Risk Assessment Work Plan and Methodology*, September).

DOE (U.S. Department of Energy), 2006a. *Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and Central Operable Unit*, September 29.

DOE (U.S. Department of Energy), 2006b. *Rocky Flats Environmental Technology Site Proposed Plan*, July.

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

DOE (U.S. Department of Energy), 2007. *Erosion Control Plan for the Rocky Flats Property Central Operable Unit*, DOE-LM/1497-2007, July.

Glossary and Abbreviations

Applicable or Relevant and Appropriate Requirement (ARAR)—Standards or other environmental protection requirements promulgated under federal or state law that address a hazardous substance, pollutant, contaminant, action, location, or other circumstance found at a CERCLA site. Section 121(d) of CERCLA requires that ARARs be met at CERCLA sites.

Colorado Hazardous Waste Act (CHWA)—Colorado statute that regulates the generation, transportation, and disposal of hazardous waste. See Sections 25-15-101 *et seq.*, *Colorado Revised Statutes*, as amended, and their implementing regulations.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)— Commonly called Superfund, this federal statute was enacted by Congress in 1980 and was amended several times thereafter. CERCLA was designed to respond to situations involving past disposal of hazardous substances. CERCLA gives the U.S. Environmental Protection Agency the authority to clean up hazardous substance sites under "response" or "remedial" provisions of the NCP and other implementing regulations. See 42 *United States Code* § 9601 *et seq*.

Corrective Action Decision (CAD)—Document, required under RFCA by CDPHE, RCRA, and CHWA, that documents the final cleanup decision for Rocky Flats.

Corrective Measures Study (CMS)—A study under RCRA and CHWA to identify and evaluate potential cleanup alternatives at a corrective action site. The CMS is usually done with the RCRA Facility Investigation Study. Together they are usually called the RFI/CMS.

Decontaminate—To remove or reduce radioactive or hazardous contamination from facilities, equipment, or soil by washing, heating, chemical action, or other technique.

Environmental Covenant—A mechanism created by Colorado law to implement and enforce land use restrictions that are required under an environmental cleanup. The covenant is recorded in the county land records. The covenant's restrictions may be enforced against current and subsequent owners and users of the affected property. See Sections 25-15-317, *et seq*., *Colorado Revised Statutes*.

Environmental Use Restriction (Restrictive Notice)—A mechanism created by Colorado law to implement and enforce land use restrictions that are required under an environmental cleanup. It is similar to the environmental covenant, but it is based on the state's police powers. The environmental use restrictions may be enforced against any users of the affected property, including those with prior interests. See Sections 25-15-317, *et seq*., *Colorado Revised Statutes*.

Feasibility Study (FS)—A study under CERCLA to identify and evaluate potential cleanup alternatives at a CERCLA site. The FS is usually done with the Remedial Investigation study. Together they are usually called the RI/FS.

Hazard Quotient—Noncancer health effects are calculated by dividing the exposure estimate (intake of a chemical) by the noncancer toxicity criterion (a chemical's reference dose for human receptors, or toxicity reference value for ecological receptors). The ratio between the two levels is called a hazard quotient. A hazard quotient less than 1.0 indicates that people are unlikely to have adverse effects. A hazard quotient is based on a single contaminant.

Individual Hazardous Substance Site (IHSS)—A discrete area of known or suspected contamination at Rocky Flats.

Institutional Control (IC)—A non-engineered instrument, such as an administrative or legal control, that minimizes the potential for human exposure to contamination by limiting land or resource use.

National Contingency Plan (NCP)—The federal regulation that guides the cleanup of sites under CERCLA. See Title 40 *Code of Federal Regulations* Part 300.

Operable Unit (OU)—A large areas of Rocky Flats where remediation may be focused by grouping IHSSs into a single management unit. Rocky Flats was originally divided into 16 OUs, and after completion of cleanup and closure only the Central OU requires response actions under the CAD/ROD.

Preliminary Remediation Goals (PRGs)—PRGs are chemical-specific concentration goals for individual chemicals for specific medium and land use combinations at CERCLA sites. At Rocky Flats, PRGs are risk-based calculations that set concentration limits using carcinogenic or noncarcinogenic toxicity values under specific exposure conditions.

RCRA Facility Investigation (RFI)—An investigation to collect data necessary to adequately characterize an RCRA or CHWA corrective action site, assess the risks to human health and the environment, and support the development of remedial alternatives. The RFI is usually done with the CMS. Together they are usually called the RFI/CMS.

Record of Decision (ROD)—Document required under RFCA by the U.S. Environmental Protection Agency and CERCLA to document the final cleanup decision for Rocky Flats.

Remedial Action Objective—Contaminant-specific goals for the final response action. Remedial action objectives are based on exposure pathway scenarios, ARARs, and target risk levels.

Remedial Investigation (RI)—An investigation to collect data necessary to adequately characterize a CERCLA site, assess the risks to human health and the environment, and support the development and evaluation of remedial alternatives. The RI is usually conducted with the FS. Together they are usually called the RI/FS.

Resource Conservation and Recovery Act (RCRA)—A federal law enacted in 1976 to address solid waste and the treatment, storage, and disposal of hazardous waste. See 42 *United States Code* §§ 6901–6992k.

Rocky Flats Cleanup Agreement (RFCA)—The legally binding agreement among the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the Colorado Department of Public Health and Environment to accomplish the required cleanup of radioactive and other hazardous substances at Rocky Flats. RFLMA superseded RFCA pursuant to the CAD/ROD.

Rocky Flats Legacy Management Agreement (RFLMA)—The legally binding agreement among the U.S. Department of Energy, the U.S. Environmental Protection Agency, and the Colorado Department of Public Health and Environment to implement the CAD/ROD in the Central OU to ensure that the remedy remains adequately protective of human health and the environment.

Wildlife Refuge Worker (WRW)—The person assumed most likely to represent the human receptor for the Comprehensive Risk Assessment. The exposure parameters to calculate PRGs are based on the type of work a WRW performs and the length of time he or she spends on a representative refuge.

Attachment 1

Proposed Modification to RFLMA Attachment 2, "Legacy Management Requirements"

The proposed modifications to relevant sections of RFLMA Attachment 2 are provided below. The current Attachment 2 language to be deleted is shown in strikethrough, and new language is underlined.

4.0 Institutional Controls

Institutional controls in the form of use restrictions are established in the ~~final~~ CAD/ROD. These controls are embodied in an environmental covenant granted by DOE to the CDPHE <u>or by a restrictive notice issued by CDPHE instead of an environmental covenant,</u> and are listed in Table 4. The <u>environmental</u> covenant <u>or restrictive notice</u> is recorded <u>in the land records</u> ~~by Reception Number 2006148295~~ in Jefferson County, Colorado. <u>DOE will annually verify the environmental covenant or the restrictive notice in accordance with Section 5.3.3.</u>

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

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 ensure~~ to prevent violation of the restrictions listed in Table 4. 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 land use restrictions in Table 4.

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 State of 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.

4.1 <u>Soil Disturbance Review Plan</u>

<u>Activities in the Central OU subject to IC-2 or IC-3 listed in Table 4 that are subject to regulatory review and approval will be reviewed and approved in accordance with this Soil Disturbance Review Plan:</u>

4.1.1 Information in 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 Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PACs), or other known or potential soil or groundwater contamination in the vicinity of the proposed project (or state that there is no known contamination).

CDPHE will review the information described above in consultation with EPA. 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. 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 activities that does not return soil surface to preexisting grade or higher in order to ensure that the minimum three-foot cover thickness above any contaminated structure is maintained.

5.3 Remedy Monitoring and Maintenance

5.3.6 Monitoring Institutional Controls

The effectiveness of the institutional controls described in Table 4 of this attachment and in the ~~Environmental Covenant~~ environmental covenant or restrictive notice required by Section 4.0 will be determined by inspecting the Central OU at least annually for any evidence of violations of those controls. DOE will also annually verify that the environmental covenant or restrictive notice ~~Environmental Covenant~~ for the Central OU remains in the Administrative Record and ~~on file with~~ is recorded with ~~the~~ Jefferson County ~~Planning and Zoning Department~~.

Table 4. Institutional Controls for the Central Operable Unit

Controls	Use Restrictions
1	The construction and use of buildings that will be occupied on a permanent or temporary basis (such as for residences or offices) is prohibited. The construction and use of storage sheds or other, non-occupied structures is permitted, consistent with the restrictions contained in controls 2 and 3 below, and provided such use does not impair any aspect of the response action at Rocky Flats.
	Objective: Prevent unacceptable exposures via the indoor air pathway. **Rationale**: The analysis of the indoor air pathway in the CRA indicated that subsurface VOCs were at levels in certain portions of the Central OU that could pose a risk of unacceptable exposure to the WRW if occupied structures were built in these areas.
2	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. ~~except for remedy-related purposes and routine or emergency maintenance of existing utility easements, in accordance with pre-approved procedures.~~
	Objective: Prevent unacceptable exposure to residual subsurface contamination. **Rationale:** 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.
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. ~~Any such soil disturbance will restore the soil surface to preexisting grade.~~
	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 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.
4	Surface water may not be used for drinking water or agricultural purposes.
	Objective: Prevent unacceptable exposure to local surface water contamination above the terminal ponds. **Rationale**: While the CRA did not evaluate the risks posed by the use of surface water for drinking or agricultural purposes, the nature and extent of contamination evaluation in the RI showed that certain contaminants were found at levels exceeding standards above the terminal ponds. This restriction reduces the possibility of unacceptable exposures to the future users from this source.
5	The construction or operation of groundwater wells is prohibited, except for remedy-related purposes.
	Objective: Prevent unacceptable exposure to contaminated groundwater. **Rationale**: While the CRA did not evaluate the risks posed by the use of groundwater for drinking or agricultural purposes, the nature and extent of contamination evaluation in the RI identified areas in the Central OU where groundwater contaminants exceeded water quality standards or MCLs. This restriction reduces the possibility of unacceptable exposures to future users from this source. Additionally, it prevents the disruption of groundwater flow paths so as to avoid impacts to groundwater collection and treatment systems.
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.
7	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. 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.
	Objective: Ensure the continued proper functioning of engineered portions of the remedy. **Rationale**: This restriction helps ensure the integrity of other engineered components of the remedy, including monitoring and survey points.