DOE/RL-2005-64
Revision 0

# Proposed Plan for the 200-CS-1 Chemical Sewers Group Operable Unit

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

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# PROPOSED PLAN FOR THE 200-CS-1 CHEMICAL SEWERS GROUP OPERABLE UNIT

**Hanford Site, Richland, Washington**

## INTRODUCTION

This **Proposed Plan** is being issued for the 200-CS-1 Chemical Sewers Group (200-CS-1) **Operable Unit** (OU) at the Hanford Site (Figure 1) to fulfill the requirements of the ***Comprehensive Environmental Response, Compensation, and Liability Act of 1980*** (CERCLA) (also known as Superfund) Section 117(a) and 40 *Code of Federal Regulations* (CFR) 300.430(f)(2), "The Proposed Plan." As an integral step of the remedy selection process (Figure 2), this document is being issued by the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA) as part of the public participation responsibilities under 40 CFR 300.430(f)(2) of 40 CFR 300.430, **"National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**." The NCP directs the lead agency, in this case DOE, to identify a **preferred alternative** and present that alternative to the public in a Proposed Plan.

In addition, this Plan identifies how the closure of three *Resource Conservation and Recovery Act of 1976* (RCRA) **treatment, storage, and/or disposal** (TSD) units will be conducted in coordination with the proposed CERCLA remedial action. The closure performance standards can be found in *Washington Administrative Code* (WAC) 173-303-610(2), "Dangerous Waste Regulations," "Closure and Post Closure," "Closure Performance Standard." These TSD units are also considered waste sites within the 200-CS-1 OU. The three TSD unit closure plans will undergo a public review and comment period in coordination with the Proposed Plan and be included into the Hanford Facility RCRA Permit (WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste*) by a Permit modification.

The DOE and EPA will select final remedies for these sites after reviewing and considering all information submitted during the 45-day public comment period. Selection of an alternate remedy or modification to the preferred alternative may result from new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives presented in this Proposed Plan.

A review of the **remedial investigation** (RI) (DOE/RL-2004-17, *Remedial Investigation Report for the 200-CS-1 Chemical Sewer Group Operable Unit* [RI Report]) and the **feasibility study** (FS) (DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Cooling Water Operable Unit* [FS Report]) reports will provide a greater understanding of this OU and **CERCLA** activities that have been conducted at these waste sites. These documents can be obtained from the **Administrative Record** file for the 200-CS-1 OU or by calling the Hanford Cleanup Line at 1-800-321-2008.

**MARK YOUR CALENDAR**

**Public Comment Period:** This Proposed Plan is being issued by the Tri-Parties for public comment. The Tribal nations, stakeholders, and the general public are encouraged to comment during the public comment period that will run from (start date) to (end date). A remedy will be selected only after the public comment period has ended and comments received have been reviewed and considered. Responses to significant comments will be presented in a Responsiveness Summary that will be part of the Record of Decision.

Written comments on the Proposed Plan will be accepted through (date). Comments should be sent to:

John Price
Washington State Department of Ecology
3100 Port of Benton Blvd
Richland, WA 99354-1670
email: jpri461@ecy.wa.gov
fax: (509) 372-7971

Copies of this Proposed Plan can be obtained from the Information Repositories (identified at the end of this document) by calling the Hanford Cleanup Line at 1-800-321-2008, or from the website http://www2.hanford.gov/ARPIR/.

No specific format for the comments is necessary. All comments must be submitted either electronically before midnight (deadline date) or, if comments are submitted by mail, must bear a postmark of no later than (deadline date). Oral and written comments also will be accepted at the public meeting scheduled to be held (date) at:

Richland Public Library
955 Northgate Drive
Richland, WA 99352

**Overview of Proposed Plan**

This plan presents the proposed **remedial action** for the 200-CS-1 OU waste sites located on the Central Plateau of the Hanford Site. These waste sites include two ditches, a trench, and two ponds used for waste disposal that pose a potential risk to human health and the environment. To reduce the potential for risk, the waste sites will be cleaned up and/or isolated and controlled (i.e., remedial actions will be implemented). The 200-CS-1 OU waste sites received primarily liquid effluents with low concentrations of contaminants from Hanford Site processing operations in the 200 East and 200 West Areas (shown in Figure 1). The 200-CS-1 OU addresses the following five waste sites make:

- 216-A-29 Ditch
- 216-B-63 Trench
- 216-S-10 Ditch
- 216-S-10 Pond
- 216-S-11 Pond.

Figure 1. The Hanford Site and Location of the 200-CS-1 Operable Unit Sites.

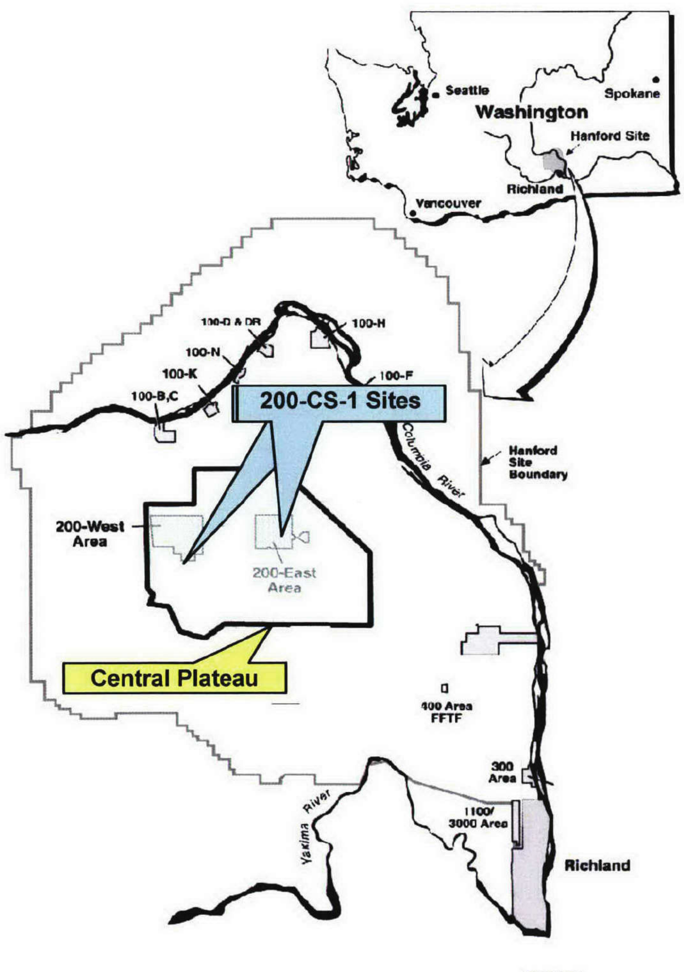
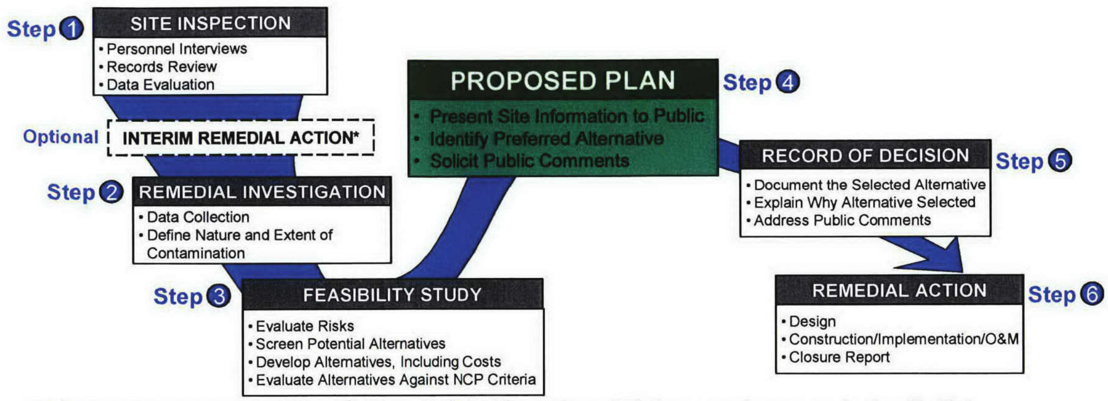


Figure 2 describes the steps involved in the CERCLA Process.

Figure 2. The CERCLA Process.




*Interim Remedial Action normally occurs after Site Inspection, but could occur at any point in the process when a concern has been identified.

NCP = "National Oil and Hazardous Substances Pollution Contingency Plan" (40 CFR 300).

O&M = Operations and Maintenance.

**Step 1. Site Inspection.** "Site inspection" includes interviewing site personnel regarding the history of the site, reviewing waste disposal records, and evaluating existing data.

**Step 2. Remedial Investigation.** "Remedial investigation" consists of conducting an environmental study to identify the nature and extent of contamination and performing a preliminary evaluation of the risks posed to human health and the environment.

**Step 3. Feasibility Study.** The "feasibility study" includes the details of a remedial alternatives evaluation, which includes a complete risk assessment of current conditions and an evaluation of the potential risk reduction presented for each of the remedial alternatives that are considered.

**Step 4. Proposed Plan.** The "Proposed Plan" (this document) is based on previous field investigations and reports that are completed in the first three steps of the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* process described above. The Proposed Plan summarizes the remedial alternative evaluations and presents the preferred alternative recommended in the FS to the public for comments.

**Step 5. Record of Decision.** The "Record of Decision" formally documents the cleanup alternatives that are selected after the Tri-Parties (U.S. Department of Energy, U.S. Environmental Protection Agency, and Washington State Department of Ecology) review and respond to public comments on the Proposed Plan.

**Step 6. Remedial Action.** "Remedial action" consists of the actual implementation of the remedy selected through the above process. When implementation is completed, a final report is written that describes the remedial actions implemented, the result of the actions, and the conclusion of the CERCLA process.

Of the alternatives evaluated in the 200-CS-1 OU FS Report (DOE/RL-2005-63), the preferred alternative as selected by the DOE, the EPA and the Washington State Department of Ecology (Ecology) (the Tri-Parties) is to mitigate the source of the contamination as follows:

- 216-A-29 Ditch – Removal, Treatment, and Disposal
- 216-B-63 Trench – No Action
- 216-S-10 Ditch – Removal, Treatment, and Disposal
- 216-S-10 Pond – No Action
- 216-S-11 Pond – No Action.

It is anticipated that implementation of the preferred alternative will allow for clean closure of the TSD units being addressed in the 200-CS-1 OU. Additional details on the preferred alternative selection and estimated costs are included in Table 1.

**Table 1. Preferred Alternatives for 200-CS-1 Operable Unit Waste Sites. (1 Page)**

| Waste Site | Alternative | | | | Estimated cost* ($ in thousands) | Justification for Preferred Alternative |
|---|---|---|---|---|---|---|
| | ① No Action | ② MESC/ MNA/IC | ③ RTD | ④ Engineered Barrier | | |
| 216-A-29 Ditch | | | ☑ | | $3,500 | The RTD alternative is as protective of human health and the environment as the engineered barrier alternative and provides greater assurance of long-term effectiveness and permanence. The contamination is within the top 4.6 m (15 ft). Removal and disposal in the Environmental Restoration Disposal Facility represent an effective use of resources. |
| 216-B-63 Trench | ☑ | | | | $550 | The no-action alternative meets the threshold and balancing criteria for overall protection of human health and the environment. No COCs or COECs were identified at this waste site. The no-action alternative is readily implementable and includes verification sampling. |
| 216-S-10 Ditch | | | ☑ | | $2,800 | The RTD alternative is as protective of direct contact exposure of human and ecological receptors and protection of groundwater as the engineered barrier alternative and provides greater assurance of long-term effectiveness and permanence. The contamination is within the top 4.6 m (15 ft). Removal and disposal in the Environmental Restoration Disposal Facility represent an effective use of resources. |
| 216-S-10 Pond and 216-S-11 Pond | ☑ | | | | $550 and $550 | The no-action alternative meets the threshold and balancing criteria for overall protection of human health and the environment. No COCs or COECs were identified at this waste site. The no-action alternative is readily implementable and includes verification sampling. |

*Present-worth (discounted) estimates are a rough order of magnitude and can be 30% under or 50% over due to uncertainties.

COC = contaminant of concern
COEC = contaminant of ecological concern
MESC = maintain existing soil cover.
MNA = monitored natural attenuation
IC = institutional controls.
RTD = removal, treatment, and disposal.

The combined **total present worth** for implementation of the preferred alternatives is estimated at approximately $7.9 million. This estimate is based on an FS Report level estimate at a +50 to -30 percent range as required by CERCLA. Refined cost estimates will be prepared based on the results of additional sampling and the remedial design and are included in the **remedial design/remedial action work plan** to be generated later in the CERCLA remedial action process.

Four of the five waste sites, 216-A-29 Ditch, 216-B-63 Trench, 216-S-10 Ditch, and 216-S-10 Pond, are RCRA TSD units. The 216-S-10 Ditch and Pond are considered one TSD unit. Closure plans that meet or exceed the requirements of WAC 173-303-610, "Dangerous Waste Regulations," "Closure and Post-Closure," have been developed for each TSD unit and are attached as appendices to the FS. These RCRA closure activities and the CERCLA remedial activities will be coordinated to optimize timing for implementation of all requirements and improve efficiency. Coordination of these activities is consistent with the provisions contained in the *Hanford Federal Facility Agreement and Consent Order* (**Tri-Party Agreement**). This Plan and TSD unit closure plans are based on key information that can be found in detail in the FS (DOE/RL-2005-63) and documents contained in the Administrative Record for the 200-CS-1 OU and the TSD units. These documents provide a comprehensive record of the history, previous studies, and site descriptions considered in the evaluation of remedial alternatives and selection of preferred remedies.

The Proposed Plan provides more information regarding the following for the 200-CS-1 OU:

- Site background, including CERCLA remedial action process and the history
- Site characteristics, including nature and extent of contamination
- Scope and role of remedial action
- Summary of site risks
- Remedial Action Objectives
- Remedial Alternatives: Summary, Evaluation and the Preferred Alterative
- Coordination with National Environmental Policy Act and RCRA TSD clean closure and corrective action standards
- Community participation.

## SITE BACKGROUND

The Hanford Site, managed by DOE, encompasses approximately 1,517 $km^2$ (586 $mi^2$) in the Columbia Basin in south-central Washington State (Figure 1). From 1943 to 1990, the primary mission of the Hanford Site was the production of nuclear materials for national defense. In July 1989, the EPA placed the 100, 200, 300, and 1100 Areas of the Hanford Site on the **National Priorities List** pursuant to CERCLA. In anticipation of the National Priorities List listing, DOE, EPA, and Ecology entered into the Tri-Party Agreement in May 1989. This agreement established a procedural framework and schedule for developing, implementing, and monitoring both CERCLA and RCRA corrective action response actions at the Hanford Site through a single process. The agreement also addresses TSD unit permitting and closure. Certain TSD unit closures are coordinated with 200-CS-1 OU work in accordance with the Tri-Party Agreement

The 200 Areas have been divided into **source** and **groundwater** OUs. Source OUs, including the 200-CS-1 OU, were developed based on common geographic areas or waste-generating processes. These OUs are prioritized and scheduled for remediation in accordance with the Tri-Party Agreement, Part Three, and the associated Tri-Party Agreement Action Plan.

***What media are contaminated at the 200-CS-1 OU?*** Soil is the media of concern that has been contaminated at the 200-CS-1 OU waste sites.

***What caused the current contamination at the 200-CS-1 OU?*** The 200-CS-1 OU chemical sewer waste sites received discharges from the Reduction-Oxidation Plant (S Plant), the Plutonium-Uranium Extraction (PUREX) Plant, and the 1970s cesium/strontium recovery operations at the B Plant. Chemical sewer streams were designed to serve nonradioactive operations in areas such as operating galleries, service areas, aqueous makeup galleries, and maintenance areas of these facilities.

The plants discharged out-of-specification chemical batches, noncontaminated floor drain waste liquids, nonradiological process wastes, non-process steam condensates, and noncontaminated vessel coil wastes, as well as raw water to dilute chemical additions. These streams became contaminated with generally low levels of radionuclides resulting from unspecified process upsets.

Very low levels of fission products, plutonium, and small quantities of uranium were discharged to these sites, except for the 216-S-10 Ditch system where more than 215 kg (474 lb) of uranium were reportedly discharged. Chemical discharges reported to the 200-CS-1 OU waste sites included chemicals used in the various plant processes, such as aluminum nitrate, hydrazine, sodium nitrate, sodium hydroxide, sodium phosphate, sodium fluoride, sodium carbonate, potassium chromate, potassium permanganate, potassium hydroxide, sulfuric acid, oxalic acid, nitric acid, hydrogen peroxide, and calcium nitrate. Various organic process chemicals were discharged into the sewer stream, although in small amounts.

***Who has investigated site contamination, and with what results?*** The DOE has conducted a remedial investigation for the 200-CS-1 OU, as specified in the RI/FS work plan and associated sampling and analysis plan approved by EPA. During the remedial investigation phase, four of the five waste sites (216-A-29 Ditch, 216-B-63 Trench, 216-S-10 Ditch, and 216-S-10 Pond) were chosen for field investigation. One of these four sites, the 216-S-10 Pond, is very similar to the remaining site, 216-S-11 Pond. The 216-S-10 Pond serves as a representative site for the 216-S-11 Pond for the purposes of alternative evaluation and remedy selection.

***What was the investigative approach to determine the extent of contamination?*** Waste sites within the 200-CS-1 OU were grouped as either representative waste sites or analogous waste sites based on individual site characteristics. Of the five waste sites in the 200-CS-1 OU, four were representative waste sites and one is an analogous waste site. The representative sites were investigated to determine contamination levels. The four representatives sites for the 200-CS-1 OU—216-A-29 Ditch, 216-B-63 Trench, 216-S-10 Ditch, and 216-S-10 Pond—were identified in DOE/RL-96-81, *Waste Site Grouping for 200 Areas Soil Investigations*, and DOE/RL-98-28, *200 Areas Remedial Investigation/Feasibility Study Implementation Plan - Environmental Restoration Program*. The investigative approach also gathered data to meet RCRA closure standards. The 216-S-10 Pond is representative of the remaining site, 216-S-11 Pond, because it served the same function, is similar geologically, and received waste from the same source. Characteristics of the 216-S-10 Pond, as well as the impact on human health and the environment, are considered representative of the characteristics and impact of the 216-S-11 Pond. Findings and conclusions from the investigation of this representative site are used to evaluate remedial action alternatives for the similar, or analogous, waste site. As discussed in the Implementation Plan (DOE/RL-98-28), this analogous site approach streamlines the investigation process by grouping similar sites together.

***What has been done to remediate the contamination?*** There have been no prior CERCLA remedial or removal actions at the 200-CS-1 OU. Upon retirement, each waste site was backfilled to grade with clean soil, with the exception of the 216-S-10 Ditch. DOE has performed routine stabilization to prevent the spread of contamination at the surface from these waste sites.

***What previous efforts have been made to involve the public?*** No drafts of this Proposed Plan have been made available to the public. However, drafts of this Proposed Plan have been shared with members of the **Hanford Advisory Board** and Native American tribes for their consideration.

## SITE CHARACTERISTICS

This section helps identify the nature and extent of the contamination and the unique aspects of the OU where these waste sites are located. The four waste sites that are RCRA TSD units were characterized to meet or exceed the requirements for RCRA TSD unit closure.

***What are the physical characteristics of the operable unit?*** The 200-CS-1 OU is a process-based source OU associated with waste sites that generally managed wastewater from the processing plants. The two ponds covered several acres, allowing large volumes of liquid effluent to collect and gradually percolate into the soil column. The ditches were long, narrow channels used to convey large volumes of liquid effluent to one of the ponds or another soil-based liquid disposal site. The trench operated similarly to a long, narrow, and relatively shallow pond.

***What geographic or topographical factors have a major impact on remedy selection?*** These waste sites are located in the Pasco Basin, one of several structural and topographic basins of the Columbia Plateau in south-central Washington State. Basalts of the Columbia River Basalt Group and a sequence of younger sediments underlie the waste sites. The contamination is located in shallow, already disturbed soils. The site is topographically flat and readily accessible for remedial actions. Consequently, no geographical or topographical characteristics have a major impact on remedy selection.

***How much and what type of contamination is present?*** Table 2 provides a summary of the key contaminant information pertaining to the waste sites in this Plan, such as contaminants above risk-based concerns and vertical distribution below ground surface (bgs). The full evaluation of key contaminants for the waste sites is provided in Chapter 3.0 of the FS (DOE/RL-2005-63).

**Table 2. Summary of Types of Contamination (1 Page)**

| Site | Contaminants Greater than Groundwater Protection Cleanup Levels, WAC 173-340-747 | Depth Below Ground Surface, meters (feet) | Contaminants that are Greater than Human Health Cleanup Levels | Depth Below Ground Surface, meters (feet) | Contaminants that are Greater than Ecological Screening Levels | Depth Below Ground Surface, meters (feet) |
|---|---|---|---|---|---|---|
| 216-A-29 Ditch | None | Not Applicable | Cesium-137 | 1.2 (4) – 1.5 (5) | Cadmium, Silver | 1.2 (4) – 1.5 (5) |
| | None | Not Applicable | None | Not Applicable | Cadmium | 2.3 (7.5) – 2.6 (8.5) |
| 216-B-63 Trench | None | Not Applicable | None | Not Applicable | None | Not Applicable |
| 216-S-10 Ditch | Aroclor-1254 | 0.0 (0) – 0.46 (1.5) | Benzo(a)pyrene, | 0.0 (0) – 0.46 (1.5) | Chromium (total), Copper, Mercury, Zinc, | 0.0 (0) – 0.46 (1.5) |
| | Aroclor-1254 | 0.46 (1.5) – 0.91 (3) | None | | Chromium (total), Copper, Mercury, Zinc, | 0.46 (1.5) – 0.91 (3) |
| 216-S-10 Pond(representative site and analogous site 216-S-11 Pond) | None | Not Applicable | None | Not Applicable | None | Not Applicable |



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## SCOPE AND ROLE OF REMEDIAL ACTION

Remedial action is needed at two of the five 200-CS-1 OU waste sites. The action is necessary to reduce risks to human health and the environment that are posed by contaminated soil with both chemicals and radionuclides. This Proposed Plan presents recommended remedial actions for contaminated soil of the 200-CS-1 OU that reduce potential threats to human health and the environment. The scope of this plan does not include remediation of groundwater that may be beneath these waste sites. Remediation of the groundwater under the 200-CS-1 OU is being conducted by the 200-BP-5, 200-PO-1, 200-UP-1, and 200-ZP-1 Groundwater OUs RI/FS process. The key elements of the scope and role of the remedial action include identifying strategies and determining the requirements, limits, and goals for cleanup. These elements are discussed in the sections below.

## SUMMARY OF SITE RISKS

The human health and ecological risks posed by these waste sites determine whether a remedial action is warranted. This section of the Proposed Plan briefly summarizes information in the **baseline risk assessment** to describe the nature and extent of the risks posed to human health and the environment by the contamination at the site. This discussion is divided into two subsections: human-health risks and ecological risks. This section also includes land-use information used when performing the baseline risk assessment.

### Land Use

The 216-A-29 Ditch and 216-B-63 Trench waste sites are located within the **industrial-exclusive land-use area** as designated in **DOE/EIS-0222-F,** ***Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement,*** and the associated 64 FR 61615, "Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)" (**ROD**)." In DOE/EIS-0222-F, "industrial-exclusive" is defined as "land areas suitable and desirable for treatment, storage, and disposal of hazardous, dangerous, radioactive, nonradioactive wastes...Includes related activities consistent with Industrial-Exclusive uses" Three of the waste sites, 216-S-10 Ditch, 216-S-10 Pond and 216-S-11 Pond are located outside the industrial-exclusive land use boundary. The land use outside the Central Plateau boundary is considered conservation/mining. The ROD identifies conservation (mining) as an area reserved for the management and protection of archeological, cultural, ecological, and natural resources. Limited and managed mining (e.g., quarrying for sand, gravel, basalt, and topsoil for governmental purposes only) could occur as a special use (i.e., a permit [issued by the DOE Realty Officer] would be required) within appropriate areas.

The DOE is expected to continue these land-use activities for the foreseeable future, in accordance with DOE/EIS-0222-F and the ROD. Active **institutional controls** (similar to those used onsite today) are assumed for industrial-exclusive land-use areas for approximately another 100 years following termination of operations. Because the 216-A-29 Ditch and 216-B-63 Trench waste sites are located within an area that is anticipated to remain industrial-exclusive with existing institutional controls for the foreseeable future, the remediation goals and preferred remedial alternative were developed based on industrial land-use exposures and worker risks. For the 216-S-10 Ditch, 216-S-10 Pond, and 216-S-11 Pond that lie outside the industrial-exclusive boundary, residential land-use exposures and worker risk scenarios were conducted to evaluate the unit for clean closure.

### Site Risks

Site risks for the 200-CS-1 OU were determined through a baseline risk assessment as part of the CERCLA RI/FS process. Key findings of the baseline risk assessment follow.

- ***Major radionuclide and chemical contaminants of concern*** – The major contaminants of concern for the 200-CS-1 OU consist of chemicals, such as Arolor-1254 and silver, and radionuclides, such as Cesium-137.
- ***Land and groundwater use assumptions*** **–** In then industrial land-use scenario, groundwater will be restricted from use for the foreseeable future or until Federal drinking water standards are achieved. For waste sites that lie outside the industrial- exclusive land-use boundary, a conservation (mining)

land-use is assumed. Since there are no exposure parameters identified for conservation (mining) land-use, unrestricted land use parameters were used.

- ***Potentially exposed human populations in current and future risk scenarios*** – The current potentially exposed populations are DOE industrial workers and in the future will be non-DOE industrial workers through the direct-contact industrial-exposure scenario for waste sites within the industrial exclusive land-use boundary. For waste sites outside the boundary where unrestricted use exposures were used, the primary contributors to potential adverse health affects are direct contact exposure of ecological receptors to metals and Aroclor-1254, direct contact exposure of humans to benzo(a)pyrene, and potential impacts to groundwater by Aroclor-1254. Assessment of impacts to future inadvertent intruders was performed to help decision makers evaluate the proposed alternatives with consideration for these unlikely events.
- ***Exposure pathways affecting the populations groups*** – The direct-contact exposure pathway potentially affects future industrial workers and ecological receptors. The routes for this exposure pathway include external gamma radiation, incidental soil ingestion, and inhalation of dust particles.
- ***Summary of human health risk assessment*** – Findings of the risk assessment indicate the following:
  - The 200-CS-1 OU sites are not highly contaminated. Contamination is not widespread, concentrations are not particularly elevated, and concentrations that are elevated are in localized areas.
  - Significant portions of the sites are not affected or exhibit contaminant concentrations comparable to background.
  - Aroclor-1254 and benzo(a)pyrene were identified for the direct-contact pathway under an assumption of unrestricted land-use in the risk assessment.
  - The risk assessment found that Aroclor-1254 at the 216-S-10 Ditch poses a potential impact to groundwater.
  - Cesium-137 was identified for the direct-contact pathway, if in the future the existing stabilization cover were not maintained.
- ***Summary of the ecological risk assessment*** – Findings of the ecological risk assessment indicate the following:
  - Aroclor-1254 and metals were identified for the direct-contact pathway under an assumption of industrial land-use in the risk assessment

Table 3 provides a summary of site risks identified during the risk assessment using site-specific fate and transport analysis and provides a basis for action under CERCLA.

**Table 3. Summary of Site Risks from 200-CS-1 Operable Unit Sites.**

| Waste Site | Risk-Based Concern | Summary of Risk Drivers | Basis for Action |
|---|---|---|---|
| 216-A-29 Ditch | Human and Ecological Receptors | Cadmium, Cesium-137, Silver<br>(1.2 - 1.5 m [4 - 5 ft]) bgs<br><br>Cadmium<br>(2.3 – 2.6 m [7.5 – 8.5 ft]) bgs | Yes |
| 216-B-63 Trench* | None | N/A | No |
| 216-S-10 Ditch | Human and Ecological Receptors & Impact to Groundwater | Aroclor-1254, Benzo(a)pyrene, Chromium (total), Copper, Mercury, Zinc<br>(0 – 0.46 m [0 – 1.5 ft]) bgs<br><br>Aroclor-1254, Chromium (total) Copper, Mercury, Zinc<br>(0.46 – 0.91 m [1.5 – 3 ft]) bgs | Yes |
| Representative Site 216-S-10 Pond and analogous site 216-S-11 Pond* | None | N/A | No |

*Level of risk associated with direct exposure to chemicals is less than regulatory criteria.
bgs = below ground surface.
N/A = not applicable.

Based on land use and current site risks, the EPA and DOE currently believe that the preferred alternative identified in this Proposed Plan is necessary to protect public health and the environment from actual or threatened releases of hazardous substances into the environment from the 200-CS-1 OU waste sites.

## REMEDIAL ACTION OBJECTIVES

The following remedial action objectives (RAOs) were developed taking into consideration information currently available for the 200-CS-1 OU and the Central Plateau. The RAOs identified for the waste sites are based on the evaluation of reasonably anticipated future land uses, exposure pathways, applicable or relevant and appropriate requirement (ARARs), and 'to-be-considered' (TBC) criteria. RAOs are general statements describing what the remedial action is expected to accomplish while protecting human health and the environment. RAOs are defined as specifically as possible and consider the following variables:

- Media of interest (e.g., contaminated soil, solid waste)
- Types of contaminants (e.g., radionuclides, inorganic and organic chemicals)
- Potential receptors (e.g., humans, animals, plants)
- Possible exposure routes (e.g., external radiation, ingestion)
- Levels of residual contaminants that may remain following remediation (i.e., contaminant levels below cleanup standards or below a range of levels for different exposure routes).

Development of preliminary remediation goals (PRGs) for the 200-CS-1 OU will be based on the following RAOs, which encompass the remediation objectives for the Central Plateau, 200 Areas.

- **RAO 1.** Prevent unacceptable risk to human health and ecological receptors from direct exposure to soils and/or debris contaminated with nonradiological constituents at concentrations above the industrial-use criteria, as defined in WAC 173-340-745(5)(b), "Soil Cleanup Standards for Industrial Properties," "Method C Industrial Soil Cleanup Levels," "Standard Method C Industrial Soil Cleanup Levels," for human health, or the evaluation criteria in WAC 173-340-7493, "Site-Specific Terrestrial Ecological Evaluation Procedures," for ecological receptors.
- **RAO 2.** Prevent unacceptable risk to human and ecological receptors from direct exposure to soils and/or debris contaminated with nonradiological constituents at concentrations above the unrestricted-use criteria, as defined in WAC 173-340-740(3)(b) ("Unrestricted land use soil cleanup standards," "Method B Soil Cleanup Levels for Unrestricted Land Use," "Standard Method B Soil Cleanup Levels") for human health, or the evaluation criteria in WAC 173-340-7493 for ecological receptors
- **RAO 3.** Prevent unacceptable risk to human health and ecological receptors from exposure to soils and/or debris contaminated with radiological constituents by:
  - Preventing exposure to radiological constituents at concentrations that will cause a dose rate limit of 15 mrem/yr above background for residents or industrial workers (EPA/540/R-99/006). A dose rate limit of 15 mrem/yr above background generally achieves the EPA excess lifetime cancer risk threshold, which ranges from $10^{-6}$ to $10^{-4}$.
  - Protecting ecological receptors based on a dose rate limit of 1.0 rad/d for aquatic animals and terrestrial plants and 0.1 rad/d for terrestrial animals (DOE-STD-1153-2002), which is a TBC criterion.
- **RAO 4.** Prevent migration of nonradiological hazardous chemicals through the soil column to groundwater, reduce soil concentrations below WAC 173-340-747 groundwater protection criteria, so that no further degradation of the groundwater results from contaminant leaching from the soil.
- **RAO 5.** Prevent migration of radioactive contaminants through the soil column to groundwater based on protection criteria in 40 CFR 141.66, "Maximum Contaminant Levels for Radionuclides," so that no further degradation of the groundwater results from contaminant leaching from the soil.
- **RAO 6.** Prevent adverse impacts to cultural resources and threatened or endangered species, and minimize wildlife habitat disruption.
- **RAO 7.** Prevent or reduce occupational health risks to workers performing remedial actions.
- **RAO 8.** Ensure that appropriate institutional controls and monitoring requirements are established to protect future users of the remediated waste sites.

Based on the COCs and COECs present at the 216-A-29 Ditch and 216-B-63 Trench, RAOs 2 and 4 are not relevant to these sites as they are located in an industrial use area and their contaminates, or lack of contaminates, are not expected to impact groundwater. For the 216-S-10 Ditch, 216-S-10 Pond, and 216-S-11 Pond, RAOs 1 and 3 are not relevant as these sites are located in an unrestricted use area and no radiological contaminates were identified. Furthermore, the remaining RAOs for the 216-B-63 Trench, 216-S-10 Pond and 216-S-11 Pond are met because there are no COCs or COECs identified and no remedial actions will be conducted at these waste sites.

**Preliminary Remediation Goals**

PRGs are developed for each of the COCs/COECs to establish residual soil concentrations for individual contaminants that are protective of human health and the environment, to guide remedial action, and to demonstrate that the RAOs have been met. PRGs were developed in the Feasibility Study (DOE/RL-2005-63) screening process, which compared the observed constituent concentrations at the waste sites to the following concentrations:

- Naturally occurring levels
- Radiological dose exposure limits
- Cleanup levels consistent with the RAOs.

Table 4 summarizes the PRGs developed for the 200-CS-1 OU to address protection of human health and ecological receptors. Each contaminant listed in Table 4 is considered COC/COEC for justification of a remedial action at the 216-A-29 and 216-S-10 Ditches. Cleanup levels will be finalized in the record of decision.

**Table 4. Preliminary Remediation Goals for the 200-CS-1 Operable Unit.**

| Contaminant | $PRG_{soil}$ | Basis |
|---|---|---|
| Aroclor-1254 | 260 mg/kg | Protection of ecological receptors |
| Aroclor-1254 | 0.5 mg/kg | Protection of human health |
| Aroclor-1254 | 0.41 mg/kg | Protection of groundwater |
| Benzo(a)pyrene | 0.14 mg/kg | Protection of human health |
| Cadmium | 14 mg/kg | Protection of ecological receptors |
| Cesium-137 | 19 pCi/g | Protection of human health |
| Chromium (total) | 42 mg/kg | Protection of ecological receptors |
| Copper | 50 mg/kg | Protection of ecological receptors |
| Mercury | 0.33 mg/kg | Protection of ecological receptors |
| Silver | 4.2 (mg/kg) | Protection of ecological receptors |
| Zinc | 86 (m/kg) | Protection of ecological receptors |

## REMEDIAL ALTERNATIVES: SUMMARY, EVALUATION AND THE PREFERRED ALTERATIVE FOR EACH 200-CS-1 OU WASTE SITE

Sufficient information now exists to support the remedial alternative selection process. As discussed in the FS Report, remedial technologies were identified and evaluated based on their ability to reduce potential risks to human health and the environment at the 200-CS-1 OU waste sites. The alternatives evaluated consist of the following:

- **Alternative 1.** No Action
- **Alternative 2.** Maintain Existing Soil Cover, Monitored Natural Attenuation, and Institutional Controls (MESC/MNA/IC)

- **Alternative 3.** Removal, Treatment, and Disposal (RTD)
- **Alternative 4.** Engineered Barrier.

These alternatives were evaluated based on CERCLA-specified criteria and are described in here. This Plan presents a preferred remedy for each waste site based on this evaluation. Table 2 provides an overview of the selected alternative for each site along with estimated present-worth costs. The preferred alternative reduces or manages the identified risks associated with each site: potential risk to human and ecological receptors were identified for the 216-A-29 Ditch and protection of human and ecological receptors and protection of groundwater were identified for the 216-S-10 Ditch and no risks are identified for the 216-B-63 Trench, 216-S-10 Pond and 216-S-11 Pond. The combined present-worth cost for implementing the 200-CS-1 OU preferred alternatives is estimated to be approximately $7.9 million, based on the CERCLA requirement of +50%/-30% accuracy.

Additional information about these sites is contained in Table 3 of this Plan and in Chapter 2.0 of the FS (DOE/RL-2005-63).

## Summary of Remedial Alternatives

This section briefly describes the key remedy components of the four alternatives studied in the detailed analysis phase of the FS Report. Significant analyses and evaluations have contributed to defining applicable technologies and process options to address the waste sites associated with the 200-CS-1 OU. The contaminants, waste form, and waste location were considered as part of this process. Technologies and process options were identified and evaluated based on their ability to reduce potential risks to human health and the environment at the waste sites. The remedial alternative are:

- **Alternative 1, No Action.** The no-action alternative represents a situation where no legal restrictions, access controls, or active remedial measures are applied to the site. In the no-action alternative, any existing contaminated soil remains in place. No action implies "walking away" from the waste site. Confirmation sampling is performed to corroborate that the no-action decision is protective. The no-action alternative generally is not selected unless a site poses no unacceptable risk to human health and the environment.
- **Alternative 2, MESC/MNA/IC.** Existing soil covers (e.g., the clean fill placed over the waste site to stabilize it) are maintained as needed to provide protection from intrusion by plants and burrowing animals (e.g., badgers). In addition, institutional controls (e.g., deed restrictions, land-use zoning, and excavation permits) are put in place to prevent human access to the site. The existing soil cover is relied upon to break the exposure pathway until monitored natural attenuation reduces contaminant levels in place by physical, biological, and/or chemical processes such as radioactive decay. Monitoring would be conducted to demonstrate that natural attenuation is occurring and that contamination is remaining in place as concentrations decrease. Active institutional controls will be maintained for up to 150 years (operational years plus 100 years following termination of operations), or the time at which radioactivity decay and natural attenuation to levels that comply with the RAOs.
- **Alternative 3, RTD.** Structures and soils with contaminant concentrations greater than the RAOs are excavated, using available data and the observational approach, followed by verification sampling to validate remedy implementation is complete, treated as necessary and disposed of in an approved disposal facility such as the Environmental Restoration Disposal Facility (ERDF) in accordance with established waste acceptance criteria. Some materials (e.g., non-hazardous debris) may be disposed of off the Hanford Site, as appropriate. Any material that is greater than the disposal facility waste acceptance criteria would be stored on the Hanford Site (consistent with storage requirements) until the material is treated to meet appropriate waste acceptance criteria. As the contaminated soil is excavated, it is characterized and segregated before being transported for disposal. Excavation would continue until contaminated soil that is greater than the RAOs is removed. The waste site is then backfilled with clean material. The surface would be recontoured and revegetated to be compatible with surrounding natural areas or other features.
- **Alternative 4, Engineered Barrier.** This alternative consists of constructing engineered surface barriers over contaminated waste sites to control the amount of water that infiltrates into the site to reduce or eliminate contaminant leaching to groundwater. In addition to their hydrological

performance, engineered barriers also can function as physical obstacles to prevent intrusion by human and ecological receptors, limit wind and water erosion, and provide radiation shielding. Site-specific engineered barrier designs will be developed as part of the remedial design process and will consider the RAOs and other requirements defined in the ROD, regulatory design and performance standards, material availability, cost effectiveness, current surface barrier technology information, and site-specific hydrologic and physical performance requirements to ensure waste containment and to inhibit human and biotic intrusion if necessary. The selected engineered barrier will be monitored to evaluate its performance. The engineered barrier alternative includes provisions for groundwater monitoring for those waste sites with contamination predicted to impact groundwater. Institutional controls (e.g., deed restrictions, land-use zoning, and excavation permits) will be required to minimize the potential for exposure to contamination or compromising the effectiveness of the engineered barrier. It will be necessary to maintain institutional controls for 150 years or longer to ensure that human and biological intruders do not breach the barriers to create pathways for contamination.

Confirmatory sampling and analysis are conducted through the remedial design/remedial action to confirm remedy selection. Confirmatory samples will be taken at the analogous site, 216-S-11 Pond, where the remedy was selected based on conclusions drawn from the evaluation of the 216-S-10 Pond.

For those waste sites where No Action (Alternative 1) or MESC/MNA/IC (Alternative 2) is the preferred remedy, confirmatory data typically will be collected to confirm remedy selection. Site-specific data needs will be specified in the sampling and analysis plan.

For those waste sites where RTD (Alternative 3) is the preferred remedy, data will be collected to support remedial design/remedial action activities prior to the removal and verification samples will be collected at the proposed end of excavation and remainder of the waste site.

For those waste sites where an Engineered Barrier (Alternative 4) is the preferred remedy, data will be collected to support remedial design/remedial action activities prior to placement of the barrier, and verification samples will be collected at the proposed end of the barrier.

## Evaluation of Alternatives and the Preferred Alternative for each Waste Site

### CERCLA Evaluation Criteria and Process

As a critical part of the evaluation process, the alternatives are evaluated against nine CERCLA criteria (Figure 3).

The first two criteria, overall protection of human health and the environment and compliance with ARARs, are threshold criteria. Alternatives that either do not protect human health and the environment or that do not comply with ARARs (or justify a waiver), do not meet the CERCLA statutory requirements and are eliminated from further consideration.

The next five criteria (long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost) are balancing criteria on which the remedy selection is based.

The final two criteria, state and community acceptance, are the modifying criteria. In the case of this Proposed Plan, the state would concur with the proposed alternatives outlined, and the plan identifies the preferred remedy accepted by the **Tri-Parties**. A preferred remedy's ability to meet the criterion of community acceptance, however, can be evaluated only after the public review and comment period for this Proposed Plan.

In addition to the CERCLA criteria, ***National Environmental Policy Act of 1969*** (NEPA) values (e.g., analysis of cumulative off-site ecological and socioeconomic impacts) also are considered. The NEPA values are discussed in the FS Report and summarized at the end of this plan.

**Figure 3. Explanation of the Nine CERCLA Evaluation Criteria**

**Threshold Criteria**

1. ***Overall Protection of Human Health and the Environment*** is the primary objective of a remedial action and addresses whether a remedial action provides adequate overall protection of human health and the environment. This criterion must be met for a remedial alternative to be eligible for consideration.
2. ***Compliance with Applicable or Relevant and Appropriate Requirements*** addresses whether a remedial action will meet all of the applicable or relevant and appropriate requirements and other Federal and state environmental statutes, or provides grounds for invoking a waiver of the requirements. This criterion must be met for a remedial alternative to be eligible for consideration.

**Primary Balancing Criteria**

3. ***Long-Term Effectiveness and Permanence*** refers to the magnitude of residual risk and the ability of a remedial action to maintain long-term reliable protection of human health and the environment after remedial goals are met.
4. ***Reduction of Toxicity, Mobility, or Volume Through Treatment*** refers to an evaluation of the anticipated performance of treatment technologies that may be employed in a remedy. Reduction of toxicity, mobility, and/or volume contributes toward overall protectiveness.
5. ***Short-Term Effectiveness*** refers to evaluation of the speed with which the remedy achieves protection. It also refers to any potential adverse effects on human health and the environment during the construction and implementation phases of a remedial action.
6. ***Implementability*** refers to the technical and administrative feasibility of a remedial action, including the availability of materials and services needed to implement the selected solution.
7. ***Cost*** refers to an evaluation of the capital, operation and maintenance, and monitoring costs for each alternative.

**Modifying Criteria**

(These two criteria are applied after state and other public comments on the Proposed Plan are received and compiled.)

8. ***State Acceptance*** indicates whether the state concurs with, opposes, or has no comment on the preferred alternative based on review of the FS and the Proposed Plan.
9. ***Community Acceptance*** assesses the general public response to the Proposed Plan, following a review of public comments that are received during the public comment period and open community meetings. The remedial action is selected only after consideration of this criterion.

CERCLA typically requires evaluation of a no-action alternative as a baseline for comparison to other alternatives where site contamination would require remedial action.

The following provides a summary of the alternative evaluations for each waste site specific to each CERCLA criterion, followed by a discussion of the preferred alternative.

Waste Site 216-A-29 Ditch

The 216-A-29 Ditch is the longest of all the waste sites, approximately 1220 m (4,000 ft) in length. Based on the results of the risk assessment, human health COCs and ecological COECs are present in the 216-A-29 Ditch. Radioactive dose and risk modeling was performed for the 216-A-29 Ditch to determine the dose to industrial workers if the radiological contamination were exposed. Based on the results of this analysis, the dose to industrial workers would be greater than 15 mrem/yr for approximately 40 years at the 216-A-29 Ditch. The risk drivers for the 216-A-29 Ditch include cadmium, cesium-137, and silver.

216-A-29 Ditch - Alternative Evaluations

The no-action alternative (Alternative 1) at the 216-A-29 Ditch is not protective of human and ecological receptors. Radioactive dose and risk modeling for the 216-A-29 Ditch demonstrated that radiological contaminants are present at this site. Therefore, the no-action alternative for the 216-A-29 Ditch does not meet the long-term effectiveness balancing criterion under CERCLA so no further evaluation of the balancing criteria is needed to eliminate this alternative as a final remedial decision for the 216-A-29 Ditch.

Under the MESC/MNA/IC alternative (Alternative 2), existing soil covers would be maintained to provide protection from intrusion by human and/or ecological receptors. A minimum soil cover of 4.6 m (15 ft) is required to provide a sufficient obstacle to be protective of human and/or ecological receptors. Existing soil covers at the 216-A-29 Ditch are approximately 1 m (3 ft) thick and do not meet this thickness requirement to be protective. As a result, this alternative would not meet the ARARs identified for this waste site. Thus, the MESC/MNA/IC does not meet the threshold criteria; therefore, no further evaluation of the balancing criteria is needed to eliminate this alternative as a final remedial decision for the 216-A-29 Ditch.

In the RTD alternative (Alternative 3), removal of the contaminated soil would provide overall protection of human health and the environment by eliminating the risks. Included in this activity would be the need for borrow material for backfill. The 216-A-29 Ditch will require 2,156 $m^3$ (2820 $yd^3$) additional backfill to bring the low areas level with the surrounding topography. In addition, the RTD alternative does achieve the next threshold criteria by complying with ARARs. This alternative meets the long-term effectiveness and permanence criterion because it removes the contaminants from the vadose zone and eliminates the potential risk to human and ecological receptors. No specific treatment has been identified for contaminated soils from the 216-A-29 Ditch. The surface area disturbed during excavation and construction activities at the 216-A-29 Ditch will be approximately 1 ha (2.5 acres). Design activities and remediation would take approximately 3 months and remove approximately 3,418 $m^3$ (4,471 $yd^3$) of contaminated soil. Once completed, all long-term RAOs will be met, reducing or eliminating risk to human and ecological receptors. The total project cost for implementation of the RTD alternative for the 216-A-29 Ditch is $3,500,000. Details of the cost estimates are presented in Appendix J of the FS (DOE/RL-2005-63).

In the engineered barrier alternative (Alternative 4), placement of an engineered barrier would break potential exposure pathways to human and ecological receptors and would be protective of human health and the environment. The barrier would limit migration of COCs and provide additional distance between potential human and ecological receptors beyond the existing soil cover. Therefore, the use of an engineered barrier would be appropriate and would provide overall protection. The estimated barrier dimensions for the 216-A-29 Ditch include an approximate length of 989 m (3,246 ft) and a width of 26 m (85 ft).

This alternative would comply with all ARARs and would be protective of human health and the environment by breaking the direct contact exposure pathways for human and ecological receptors and emplacing barriers that meet the intent of the regulations. In addition, this alternative would meet the long-term effectiveness and permanence criterion by physically separating COCs and COECs from human and ecological receptors. In this alternative, the engineered ET Monofill barrier cover would extend beyond the estimated extent of soil contamination at the 216-A-29 Ditch on all sides to ensure that contaminated soil is adequately covered. Reduction of toxicity, mobility, or volume through treatment would be achieved by natural attenuation of contaminants. For this alternative, only moderate short-term risks are expected. The barrier alternative would not require excavation of contaminated soils, so the risks to industrial workers primarily would be associated with general construction activities at the borrow sites and placement of the barrier. Short-term impacts to vegetation and animals at this site would be low. This alternative is considered readily implementable.

Remedial design and construction of the barrier for this waste site would take approximately 3.5 months with a final barrier area of approximately 2.6 ha (6.3 acres). The total project cost for this alternative at the 216-A-29 Ditch is $7,000,000 and includes placement of the ET monofill barrier and at least 150 years of long-term operations and maintenance consisting of site inspection/surveillance, periodic radiation site surveys of surface soil, biotic control, maintenance of signs and markers, cover maintenance, and site reviews. Details of the cost estimates are presented in Appendix J of the FS (DOE/RL-2005-63).

216-A-29 Ditch – Preferred Alternatives Selection Rationale

The preferred alternative for the 216-A-29 Ditch is Alternative 3, RTD, to mitigate risks associated with contaminants that are greater than cleanup levels for protection of groundwater pathway and ecological receptors. The RTD alternative will provide the same level of protection to human and ecological receptors as the engineered barrier alternative because the excavated material will be disposed in ERDF, an approved land disposal facility. The no-action and MESC/MNA/IC alternatives do not meet threshold criteria for overall protection of human health and the environment or compliance with ARARs. In addition, these two alternatives also would not achieve the site-specific RAOs 1 and 3. The RTD alternative provides greater long-term effectiveness and permanence of the remedy to the barrier alternative as the contaminated soil is removed from the waste site. Excavation to the depth of the contaminants at this site (<4.6 m [15 ft]) is readily achievable with minimal risk to remediation workers. The RTD alternative also is the most cost-effective of the alternatives that meet the threshold criteria. Additionally, the RTD alternative will satisfy the provisions for achieving clean closure of the 216-a-29 Ditch TSD unit. Table 5 summarizes the analysis of alternatives supporting the selection of the preferred alternatives.

**Table 5. Comparison of Alternatives for the 216-A-29 Ditch.**

| CERCLA Criteria for Evaluation | Alternatives | | | |
|---|---|---|---|---|
| | ① No Action | ② MESC/MNA/IC | ③ RTD | ④ Engineered Barrier |
| 216-A-29 Ditch | | | ☑ | |
| Threshold Criteria | | | | |
| Overall protection | ☐ | ☐ | ☑ | ☑ |
| Compliance with ARARs | ☐ | ☐ | ☑ | ☑ |
| Balancing Criteria | | | | |
| Long-term effectiveness | N/A | N/A | ◆ | ◈ |
| Reduction in toxicity, mobility, or volume | N/A | N/A | ◈ | ◈ |
| Short-term effectiveness | N/A | N/A | ◈ | ◆ |
| Implementability | N/A | N/A | ◈ | ◈ |
| Cost | | | | |
| Capital costs | N/A | N/A | $3,500,000 | $2,600,000 |
| Non-discounted costs | N/A | N/A | $3,500,000 | $21,300,000 |
| Total present worth | N/A | N/A | $3,500,000 | $7,000,000 |

The choice of the preferred alternative is based on information in DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit*, and this Plan and may be revised if new information becomes available.

☑ = Indicates the preferred alternative.
☑ = Yes, meets criterion.
☐ = No, does not meet criterion.
◆ = High: best satisfies evaluation guidelines.
◈ = Moderate: partially satisfies evaluation guidelines.
◇ = Low: least satisfies evaluation guidelines.

ARAR = applicable or relevant and appropriate requirement.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
IC = institutional controls.
MESC = maintain existing soil cover.
MNA = monitored natural attenuation.
N/A = not applicable.
RTD = removal, treatment, and disposal.

Waste Site 216-B-63 Trench

The 216-B-63 Trench is approximately 427 m (1,400 ft) in length. Based on the risk assessment and the condition of the soil covers as they currently exist, no contaminants were identified at the 216-B-63 Trench that require remedial action. Radioactive dose and risk modeling was performed for the 216-B-63 Trench with the soil cover removed to evaluate the risk to industrial workers from radiological contaminants present at this site. Based on the results of this analysis, there was no dose present for industrial workers.

216-B-63 Trench—Alternative Evaluations

The no-action alternative (Alternative 1) at the 216-B-63 Trench would provide overall protection of human health and the groundwater pathway because no COCs were identified from the risk assessment that require remedial action. In addition, the no-action alternative is protective of ecological receptors because no COECs were identified in the ecological risk assessment that require remedial action. Therefore, this alternative meets both threshold criteria of overall protection of human health and the environment, and compliance with ARARs. Radioactive dose and risk modeling for the 216-B-63 Trench demonstrated that the soil cover is not needed to protect industrial workers as there are no COCs or COECs present at this site. Therefore, the no-action alternative for the 216-B-63 Trench meets the long-term effectiveness balancing criterion under CERCLA.

Reduction of toxicity, mobility, or volume through treatment would not occur at this waste site as no contaminants needing remedial action were identified. There would be no short-term risks to the public or workers and no impact on the environment from the no-action alternative because remedial activities would not be conducted. This alternative meets the short-term effectiveness balancing criterion under CERCLA. This alternative could be implemented immediately and would not present any technical problems. In addition, other than confirmation sampling estimated at $550, 000, the no-action alternative would involve no other direct cost because there will be no remedial activities for this alternative at these sites.

Under the MESC/MNA/IC alternative (Alternative 2), the existing soil cover would be maintained to provide protection from intrusion by human and/or ecological receptors. Because there are no COCs or COECs at the 216-B-63 Trench that require remedial action, the MESC/MNA/IC alternative at this waste site is not justified.

Under the RTD alternative (Alternative 3), contaminated soil and debris (e.g., concrete associated with the sites) would be removed, treated as necessary to meet disposal facility waste acceptance criteria, and transported for disposal at an approved waste disposal facility. Because there are no COCs or COECs at the 216-B-63 Trench that require remedial action, removal of soil from this waste site is not justified.

Alternative 4, Engineered Barrier, uses engineered barriers to (1) cover the contaminated waste sites, (2) control the amount of water that infiltrates into the contaminated media as a means of protecting groundwater, (3) prevent intrusion by human and ecological receptors as a means of protecting human health and the environment, and (4) limit wind and water erosion. The type of engineered barrier used for a waste site is dependent on the risks present at the site. Because there are no COCs or COECs at the 216-B-63 Trench that require remedial action, the use of an engineered barrier for this waste site is not justified.

216-B-63 Trench—Preferred Alternative Selection Rationale

The preferred alternative for the 216-B-63 Trench is Alternative 1, No Action. The no-action alternative meets the threshold criteria for overall protection of human health and the environment. In addition, the no-action alternative would comply with all ARARs for this waste site. The no-action alternative for the 216-B-63 Trench is implemented easily. Additionally, the no action alternative will satisfy the provisions for clean closure of the 2216-B-63 Trench TSD unit. Table 6 summarizes the analysis of alternatives supporting the selection of the preferred alternative.

**Table 6. Comparison of Alternatives for the 216-B-63 Trench. (1 Page)**

| CERCLA Criteria for Evaluation | Alternatives | | | |
|---|---|---|---|---|
| | ① No Action | ② MESC/MNA/IC | ③ RTD | ④ Engineered Barrier |
| 216-B-63 Trench | ☑ | | | |
| Threshold Criteria | | | | |
| Overall protection | ☑ | N/A | N/A | N/A |
| Compliance with ARARs | ☑ | N/A | N/A | N/A |
| Balancing Criteria | | | | |
| Long-term effectiveness | ◆ | N/A | N/A | N/A |
| Reduction in toxicity, mobility, or volume | ◆ | N/A | N/A | N/A |
| Short-term effectiveness | ◆ | N/A | N/A | N/A |
| Implementability | ◆ | N/A | N/A | N/A |
| Cost | | N/A | | |
| Capital costs | $550,000 | N/A | N/A | N/A |
| Non-discounted costs | $550 | N/A | N/A | N/A |
| Total present worth | $550 | N/A | N/A | N/A |

The choice of the preferred alternative is based on information in DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit*, and this Plan and may be revised if new information becomes available in the future.

☑ = Indicates the preferred alternative.
☑ = Yes, meets criterion.
☐ = No, does not meet criterion.
◆ = High: best satisfies evaluation guidelines.
⬖ = Moderate: partially satisfies evaluation guidelines.
◇ = Low: least satisfies evaluation guidelines.

ARAR = applicable or relevant and appropriate requirement.
CERCLA = *Comprehensive Environmental Response, Compensation, and Liability Act of 1980.*
IC = institutional controls.
MESC = maintain existing soil cover.
MNA = monitored natural attenuation.
N/A = not applicable.
RTD = removal, treatment, and disposal.

Waste Site 216-S-10 Ditch

Based on the results of the risk assessment, human health COCs, groundwater impact COCs, and ecological COECs are present at the 216-S-10 Ditch. The risk drivers for the 216-S-10 Ditch include aroclor-1254, benzo(a)pyrene, chromium (total), copper, mercury, and zinc.

Waste Site 216-S-10 Ditch Alternative Evaluations

The no-action alternative is not protective of human and ecological receptors or the groundwater protection pathway at 216-S-10 Ditch. An ecological risk assessment was performed to identify COECs, which suggests the potential for adverse ecological health effects. Under the no-action alternative, one COC is predicted to reach the groundwater at levels greater than maximum contaminant levels or are greater than WAC 173-340-747 groundwater protection cleanup levels; therefore, the no-action alternative would not provide long-term effectiveness and permanence for groundwater protection. In addition, this alternative would not meet the ARARs identified for this waste site. As a result, the no-action alternative does not meet the threshold criteria so no further evaluation of the balancing criteria is needed to eliminate this alternative as a final remedial decision for the 216-S-10 Ditch.

Under the MESC/MNA/IC alternative (Alternative 2), existing soil covers would be maintained to provide protection from intrusion by human and/or ecological receptors. A minimum soil cover of 4.6 m (15 ft) is required to provide a sufficient obstacle to be protective of human and/or ecological receptors. Existing soil covers at the 216-S-10 Ditch are approximately 1 m (3 ft) thick and do not meet this thickness requirement to be protective. As a result, this alternative would not meet the ARARs identified for this waste site. In addition, the MESC/MNA/IC alternative would not provide long-term effectiveness because contaminants are predicted to reach the groundwater at levels greater than maximum contaminant levels or are greater than WAC 173-340-747 groundwater protection cleanup levels. Thus, the MESC/MNA/IC does not meet the threshold criteria so no further evaluation of the balancing criteria is needed to eliminate this alternative as a final remedial decision for the 216-S-10 Ditch.

In the RTD alternative (Alternative 3), removal of the contaminated soil would provide overall protection of human health and the environment and of groundwater. Risk analysis showed that contaminants in excess of the ecological, human health, and groundwater impacts extend to a maximum depth of approximately 0.9 m (3 ft).

By removing the contaminated soil and using uncontaminated soils to backfill the excavations, contaminants would be minimized and/or eliminated to the extent necessary to meet human, ecological, and groundwater pathway cleanup levels. Thus, overall protection of human health and the environment threshold criteria would be achieved and exposure pathways to contaminants would be controlled. In addition, the RTD alternative achieves the threshold criteria by complying with ARARs. This alternative meets the long-term effectiveness and permanence criterion because it removes contaminants from the surface and eliminates the potential impacts to groundwater and the direct contact exposure pathway for human and ecological receptors. No specific treatment has been identified for contaminated soils from the 216-S-10 Ditch. Included in this activity would be the need for borrow material for backfill. The 216-S-10 Ditch will require 4,299 $m^3$ (5623 $yd^3$) additional backfill to bring the ditch level with the surrounding topography. The surface area disturbed during excavation and construction activities will be approximately 0.5 ha (1.2 acres). Design activities and remediation would take approximately 2 months and remove approximately 2,651 $m^3$ (3,467 $yd^3$) of contaminated soil. Once completed, all long-term RAOs will be met, protecting groundwater and reducing or eliminating risk to human and ecological receptors. The total project cost for implementation of the RTD alternative at the 216-S-10 Ditch is $2,700,000. Details of the cost estimates are presented in Appendix J of the FS (DOE/RL-2005-63).

In the engineered barrier alternative (Alternative 4), placement of an engineered barrier would break potential exposure pathways to human and ecological receptors and would be protective of human health and the environment. The cap would limit migration of COCs to the groundwater and provide additional distance between potential human and ecological receptors beyond the existing soil cover. Therefore, the use of an engineered barrier would be appropriate and would provide overall protection. The estimated barrier dimensions for this site include an approximate length of 341 m (1,119 ft) and a width of 26 m (85 ft).

This alternative would comply with all ARARs and would be protective of human health and the environment by breaking the pathways for human and ecological receptor exposure and for protection of groundwater, and emplacing barrier that meet the intent of the regulations. In addition, this alternative would meet the long-term effectiveness and permanence criterion by reducing the ability of COCs to move from the shallow zone to the groundwater and by physically separating COCs and COECs from human and ecological receptors. In this alternative, the engineered ET Monofill barrier cover would extend beyond the estimated extent of soil contamination at the 216-S-10 Ditch on all sides to ensure that contaminated soil is adequately covered. Reduction of toxicity, mobility, or volume through treatment would be achieved by natural attenuation of contaminants. For this alternative, only moderate short-term risks are expected. The barrier alternative would not require excavation of contaminated soils, so the risks to industrial workers primarily would be associated with general construction activities at the borrow sites and placement of the barrier. Short-term impacts to vegetation and animals at this site would be low. This alternative is considered readily implementable.

Remedial design and construction of the barrier for this waste site would take approximately 2 months with a final cap area of approximately 0.89 ha (2.2 acres). The total project cost for the 216-S-10 Ditch is $3,200,000 and includes placement of the engineered ET Monofill Barrier and at least 150 years of long-term operations and maintenance consisting of site inspection/surveillance, periodic radiation site surveys of surface soil, biotic control, maintenance of signs and markers, cover maintenance, and site reviews. Details of the cost estimates are presented in Appendix J of the FS (DOE/RL-2005-63).

216-S-10 Ditch – Preferred Alternative Selection Rationale

The preferred alternative for the 216-S-10 Ditch is Alternative 3, RTD, to mitigate risks associated with contaminants that are greater than cleanup levels for protection of groundwater and human and ecological receptors. The no-action and MESC/MNA/IC alternatives do not meet threshold criteria for overall protection of human health and the environment or compliance with ARARs. In addition, these two alternatives also would not achieve the site-specific RAOs 2 and 4. The RTD alternative will provide the same level of protection to the groundwater pathway and human and ecological receptors as the barrier alternative because the excavated material will be disposed of in ERDF, an approved land disposal facility. The RTD alternative provides greater long-term effectiveness and permanence of the remedy to the barrier alternative as the contaminated soil is removed from the waste site. Excavation to the depth of the contaminants at this site (<4.6 m [15 ft]) is readily achievable with minimal risk to remediation workers. The RTD alternative also is the most cost-effective of the alternatives that meet the threshold criteria. Additionally, implementation of the RTD alternative will satisfy the provisions for achieving closure of the 216-S-10 Ditch TSD unit with groundwater monitoring. Table 7 summarizes the analysis of alternatives supporting the selection of the preferred alternative.

**Table 7. Comparison of Alternatives for the 216-S-10 Ditch.**

| CERCLA Criteria for Evaluation | Alternatives | | | |
|---|---|---|---|---|
| | ① No Action | ② MESC/MNA/IC | ③ RTD | ④ Engineered Barrier |
| 216-S-10 Ditch | | | ☑ | |
| Threshold Criteria | | | | |
| Overall protection | ☐ | ☐ | ☑ | ☑ |
| Compliance with ARARs | ☐ | ☐ | ☑ | ☑ |
| Balancing Criteria | | | | |
| Long-term effectiveness | N/A | N/A | ◆ | ◈ |
| Reduction in toxicity, mobility, or volume | N/A | N/A | ◈ | ◈ |
| Short-term effectiveness | N/A | N/A | ◈ | ◆ |
| Implementability | N/A | N/A | ◈ | ◈ |
| Cost | | | | |
| Capital costs | N/A | N/A | $2,700,000 | $1,500,000 |
| Non-discounted costs | N/A | N/A | $2,700,000 | $9,400,000 |
| Total present worth | N/A | N/A | $2,700,000 | $3,200,000 |

The choice of the preferred alternative is based on information in DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit*, and this Plan and may be revised if new information becomes available in the future.

☑ = Indicates the preferred alternative.
☑ = Yes, meets criterion.
☐ = No, does not meet criterion.
◆ = High: best satisfies evaluation guidelines.
◈ = Moderate: partially satisfies evaluation guidelines.
◇ = Low: least satisfies evaluation guidelines.

ARAR = applicable or relevant and appropriate requirement.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
MESC = maintain existing soil cover.
MNA = monitored natural attenuation.
IC = institutional controls.
RTD = removal, treatment, and disposal.

Representative Waste Site 216-S-10 Pond and Analogous Site 216-S-11 Pond

Based on the risk assessment and the condition of the soil covers as they currently exist, no COCs or COECs were identified at the 216-S-10 and 216-S-11 Ponds that require remedial action. Radioactive dose and risk modeling was performed for the 216-S-10 Pond with the soil cover removed to evaluate the risk to industrial workers from radiological contaminants present at this site. Based on the results of this analysis, there was no dose present for industrial workers. The radioactive dose and risk modeling for the 216-S-10 Pond and its analogous site (216-S-11 Pond) demonstrated that the soil cover is not needed for unrestricted use.

216-S-10/216-S-11 Ponds—Alternatives Evaluation

The no-action alternative (Alternative 1) at the 216-S-10 and 216-S-11 Ponds would provide overall protection of human health and the groundwater pathway because no COCs were identified from the risk assessment that require remedial action. In addition, the no-action alternative is protective of ecological receptors because no COECs were identified in the ecological risk assessment that requires remedial action. Therefore, this alternative meets both threshold criteria of overall protection of human health and the environment, and compliance with ARARs. Radioactive dose and risk modeling for the 216-S-10 Pond and its analogous site (216-S-11 Pond) demonstrated that the soil cover is not needed for unrestricted use. Therefore, the no-action alternative for the 216-S-10 and 216-S-11 Ponds meets the long-term effectiveness balancing criterion under CERCLA.

Reduction of toxicity, mobility, or volume through treatment would not occur at these waste sites as no contaminants needing remedial action were identified. There would be no short-term risks to the public or workers and no impact on the environment from the no-action alternative because remedial activities would not be conducted. This alternative meets the short-term effectiveness balancing criterion under CERCLA. This alternative could be implemented immediately and would not present any technical problems. In addition, other than confirmation sampling estimated at $550, 000, the no-action alternative would involve no other direct cost because there will be no remedial activities for this alternative at these sites.

Under the MESC/MNA/IC alternative (Alternative 2), existing soil cover would be maintained to provide protection from intrusion by human and/or ecological receptors and of groundwater. Several ARARs were identified as applicable to this alternative and were evaluated. Because there are no COCs or COECs at the 216-S-10 Pond and 216-S-11 Pond that require remedial action, the MESC/MNA/IC alternative at these waste sites is not justified.

Under the RTD alternative (Alternative 3), contaminated soil and debris (e.g., concrete associated with the sites) would be removed, treated as necessary to meet disposal facility waste acceptance criteria, and transported for disposal at an approved waste disposal facility. Because there are no COCs or COECs at the 216-S-10 and 216-S-11 Ponds that require remedial action, removal of soil from these waste sites is not justified.

Alternative 4, Engineered Barrier, uses engineered barriers or caps to (1) cover the contaminated waste sites, (2) control the amount of water that infiltrates into the contaminated media as a means of protecting groundwater, (3) prevent intrusion by human and ecological receptors as a means of protecting human health and the environment, and (4) limit wind and water erosion. The type of engineered barrier used for a waste site is dependent on the risks present at the site. Because there are no COCs or COECs at the 216-S-10 and 216-S-11 Ponds that require remedial action, the use of an engineered barrier for these waste sites is not justified.

216-S-10/216-S-11 Ponds—Preferred Alternative Selection Rationale

The preferred alternative for the representative site 216-S-10 Pond and analogous site 216-S-11 Pond is Alternative 1, No Action. The no-action alternative meets the threshold criteria for overall protection of human health and the environment. In addition, the no-action alternative would comply with all ARARs for both the waste sites. The no-action alternative for the 216-S-10 and 216-S-11 Ponds is implemented easily. Additionally, implementation of the no action alternative will satisfy the provisions for achieving closure of the 216-S-10 Pond TSD unit with groundwater monitoring. Tables 8 and 9 summarize the analysis of alternatives supporting the selection of the preferred alternative.

**Table 8. Comparison of Alternatives for the 216-S-10 Pond.**

| CERCLA Criteria for Evaluation | Alternatives | | | |
|---|---|---|---|---|
| | ① No Action | ② MESC/MNA/IC | ③ RTD | ④ Engineered Barrier |
| Representative Site 216-S-10 Pond | ☑ | | | |
| Threshold Criteria | | | | |
| Overall protection | ☑ | N/A | N/A | N/A |
| Compliance with ARARs | ☑ | N/A | N/A | N/A |
| Balancing Criteria | | | | |
| Long-term effectiveness | ◆ | N/A | N/A | N/A |
| Reduction in toxicity, mobility, or volume | ◆ | N/A | N/A | N/A |
| Short-term effectiveness | ◆ | N/A | N/A | N/A |
| | | N/A | N/A | N/A |
| Implementability | ◆ | N/A | | |
| Cost | | | | |
| Capital costs | $550,000 | N/A | N/A | N/A |
| Non-discounted costs | $550 | N/A | N/A | N/A |
| Total present worth | $550 | N/A | N/A | N/A |

The choice of the preferred alternative is based on information in DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit*, and this Plan and may be revised if new information becomes available in the future.

☑ = Indicates the preferred alternative.
☑ = Yes, meets criterion.
☐ = No, does not meet criterion.
◆ = High: best satisfies evaluation guidelines.
⟐ = Moderate: partially satisfies evaluation guidelines.
◇ = Low: least satisfies evaluation guidelines.

ARAR = applicable or relevant and appropriate requirement.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
MESC = maintain existing soil cover.
MNA = monitored natural attenuation.
IC = institutional controls.
N/A = not applicable.
RTD = removal, treatment, and disposal.

**Table 9. Comparison of Alternatives for the 216-11 Pond. (2 Pages)**

| CERCLA Criteria for Evaluation | Alternatives | | | |
|---|---|---|---|---|
| | ① No Action | ② MESC/MNA/IC | ③ RTD | ④ Engineered Barrier |
| Analogous Site 216-S-11 Pond | ☑ | | | |
| Threshold Criteria | | | | |
| Overall protection | ☑ | N/A | N/A | N/A |
| Compliance with ARARs | ☑ | N/A | N/A | N/A |
| Balancing Criteria | | | | |
| Long-term effectiveness | ◆ | N/A | N/A | N/A |
| Reduction in toxicity, mobility, or volume | ◆ | N/A | N/A | N/A |
| Short-term effectiveness | ◆ | N/A | N/A | N/A |
| Implementability | ◆ | N/A | N/A | N/A |
| Cost | | | | |
| Capital costs | $550,000 | N/A | N/A | N/A |
| Non-discounted costs | $550 | N/A | N/A | N/A |
| Total present worth | $550 | N/A | N/A | N/A |

The choice of the preferred alternative is based on information in DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit*. The preferred alternative may be revised based on future characterization efforts at the analogous sites.

☑ = Indicates the preferred alternative.
☑ = Yes, meets criterion.
☐ = No, does not meet criterion.
◆ = High: best satisfies evaluation guidelines.
◈ = Moderate: satisfies evaluation guidelines.
◇ = Low: least satisfies evaluation guidelines.

ARAR = applicable or relevant and appropriate requirement.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980.
IC = institutional controls.
MESC = maintain existing soil cover.
MNA = monitored natural attenuation.
N/A = not applicable.
RTD = removal, treatment, and disposal.

## PLUG-IN FOR FUTURE 200-CS-1 OPERABLE UNIT SOIL WASTE SITES

The plug-in approach is a process that will help the Tri-Parties make remedial action decisions for waste sites that have not been addressed in this Plan, using these existing CERCLA evaluations. The Tri-Parties propose that the plug-in approach be used in future remedy decisions for three types of waste sites:

- Unknown waste sites similar to those evaluated in this Plan that are discovered in the future
- Known waste sites that could be reassigned from another OU
- Waste sites for which confirmatory sampling indicates that the selected alternative is no longer protective and a different alternative must be selected.

The benefit of a plug-in approach is to expeditiously cleanup waste sites within the Central Plateau. The traditional CERCLA approach for remedy selection requires the development of many proposed plans and RODs. The proposed plug-in approach would allow analyses, evaluations, and selection of preferred alternatives identified in the FS (DOE/RL-2005-63) and this Plan to be applied to similar waste sites. Building off existing work allows remedial actions to begin earlier and streamlines a costly and often redundant remedy selection process. While the likelihood is slight that this approach will be used to plug-in waste sites to the 200-CS-1 OU, the concept and process are explained below.

Three elements/criteria are required to successfully use a plug-in approach:

- **Establish the Conceptual Site Model.** Multiple analogous waste sites must be identified that share common physical and contaminant characteristics. These characteristics are known as the conceptual site model (CSM).
- **Establish the Standard Remedy.** A remedial (cleanup) alternative, or standard remedy, must be established that has been shown to be protective and cost-effective for sites that share the common CSM.

- **Establish Need for Remedial Action.** Sites sharing a common CSM must be shown to require remedial action because of contaminant concentrations that pose a risk to human health and the environment.

To use the plug-in approach for a waste site not evaluated in the FS (DOE/RL-2005-63), the site must fit the defined CSM and must be shown to require remedial action. The site then can be "plugged in" to the standard remedy. Establishing the Conceptual Site Model

The CSM provides the current understanding of the nature and extent of contamination for the waste site. The types of information used to develop this understanding are based on the following site characteristics:

- Type of contaminant at the waste site (e.g., radionuclides, nonradionuclides)
- Concentration of contaminant at the waste site
- Types of contaminated environmental media (e.g., soil) or material (e.g., concrete, metal, wood)
- Extent of contamination within the environment (i.e., the depth of discharge, the expected contaminant distributions [both lateral and vertical], and the potential for contaminant to impact groundwater).

Exposures that could result under the CSM conditions and from reasonably anticipated potential future uses for the sites and the surrounding areas, are captured in exposure models. The purpose of the exposure model is to describe how each receptor (human or ecological) can come into contact with the contamination of the CSM. Using standards provided in specific sections of EPA guidance, professional judgment, and current understanding of site conditions, the CSM identified contaminant sources, release mechanisms, routes of migration, potential exposure points, potential routes of exposure, and potential population groups associated with the 200-CS-1 OU, exposure models for human and ecological receptors were developed and are provided in Figures 3-1 and 3-2 of the FS (DOE/RL-2005-63)

**Public Involvement in the Plug-in Approach**

To ensure that the public is involved meaningfully when the plug-in approach is used, the Tri-Parties propose to publish these post-ROD changes as explanations of significant differences (ESD), consistent with EPA guidance. The ESD includes a 30-day public comment period. The ESD must describe the nature of the significant changes, summarize the information that leads to making the changes, and affirm that the revised remedy complies with CERCLA and 40 CFR 300 (including ARARs).

These post-ROD changes will be evaluated at the following points in the plug-in process:

- When newly discovered waste sites are proven through sampling and analysis to be above remediation goals and can plug in to a standard remedy
- When confirmatory sampling indicates variations from the defined CSM such that the selected alternative is no longer protective and a different standard remedy must be selected.

## INTERFACE WITH RCRA TSD UNIT CLOSURE PERFORMANCE STANDARDS AND CLOSURE STRATEGY

The RCRA TSD units within the 200-CS-1 OU include the 216-A-29 Ditch, the 216-B-63 Trench, and the 216-S-10 Pond and Ditch (the two waste sites are combined into one TSD unit). These TSD units will undergo closure following the requirements of the Tri-Party Agreement; WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste*; and WAC 173-303-610. Characterization sampling of these TSD units occurred in conjunction with the CERCLA remedial action investigation for the 200-CS-1 OU.

The closure approach for the TSD units was based on characterization results coupled with the remedy chosen under this Plan. As a preferred approach to closure, clean closure was evaluated and is proposed for the 216-A-29 Ditch and the 216-B-63 Trench. If data do not support clean closure, landfill closure will be pursued using a combination of the alternative requirement allowance in WAC 173-303-610(1)(e) and/or WAC 173-303-645(1)(e). In the case of the 216-S-10 Ditch, soils are addressed to meet clean closure standards, while groundwater monitoring proceeds into post-closure.

## INTERFACE WITH NATIONAL ENVIRONMENTAL POLICY ACT

The NEPA values are evaluated as part of DOE's responsibility. DOE's NEPA Policy (DOE O 451.1B, *National Environmental Policy Act Compliance Program*, and DOE Memorandum 2002, *DOE Policies on Application of NEPA to Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and Resource Conservation and Recovery Act of 1976 (RCRA) Actions*) and DOE guidance for decommissioning (DOE G 430.1-4, *Decommissioning Implementation Guide*) require that NEPA values be incorporated into decisions and documents as part of the CERCLA process. These values include, but are not limited to, cumulative, ecological, cultural, historical, and socioeconomic impacts and irreversible and irretrievable statements in lieu of preparing separate NEPA documentation. The impacts of these aspects of the human environment usually are not otherwise addressed within the CERCLA process. This integration provides a more comprehensive analysis of potential impacts resulting from the proposed remediation activities in the 200-CS-1 OU. To support the CERCLA decision-making process, the NEPA value analysis was included in the FS and will be included as appropriate as the CERCLA remedial action process continues (Figure 4).

**Figure 4. NEPA Values Encompass a Range of Environmental Concerns:**

Transportation impacts

Air quality

Natural, cultural, and historical resources

Noise, visual, and aesthetic effects

Socioeconomic impacts

Environmental justice

Cumulative impacts (direct and indirect)

Mitigation

Irreversible and irretrievable commitment of resources

The NEPA process is intended to help Federal agencies with the following:

- Make decisions that are based on understanding environmental consequences
- Take actions that protect, restore, and enhance the environment.

The NEPA-related resources and values considered for the 200-CS-1 OU waste sites support the CERCLA decision-making processes.

Irreversible and irretrievable impacts from an RTD and/or barrier alternative would result from the use of natural resource materials (sand, gravel, silty loam, basalt) during construction. An evaluation of available NEPA documentation concerning these natural resource materials from on- or off-site sources will be conducted before implementation. The necessary NEPA documentation for the use of these natural resource materials will be described in the remedial design/remedial action work plan.

Short-term disturbances identified for the remedies evaluated include increased traffic, noise levels, and fugitive dust. Long-term impacts identified for the remedies evaluated include potential aesthetic and visual impacts, should the barriers or backfilled areas not be adequately contoured and vegetated to blend with the surrounding area. Minimal or no impacts are expected for air quality; natural, cultural, and historical resources; transportation; socioeconomics; environmental justice; or cumulative impacts.

## INTERFACE WITH RCRA CORRECTIVE ACTION

In accordance with the Tri-Party Agreement, Parts Three and Four, and the Action Plan, Sections 5.4, 5.6, and 7.0, past-practice cleanup (remediation) is intended to satisfy both CERCLA remedial action and RCRA corrective action requirements. In addition to fulfilling CERCLA requirements, this preferred remedial action is intended to fulfill DOE's RCRA corrective action obligations under RCW 70.105, "Hazardous Waste Management Act," for the units identified herein. The Tri-Parties agree that the selected preferred alternative is sufficiently comprehensive to satisfy the technical requirements of both statutory authorities and the respective regulations.

The DOE's corrective action obligation for work performed under CERCLA is addressed in the Hanford Facility RCRA Permit (WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8, for the Treatment, Storage, and Disposal of Dangerous Waste*), Condition II.Y.2.a. Specifically, Condition II.Y.2.a provides that DOE corrective action obligations are met through adherence to the Tri-Party Agreement and the resulting ROD, subject to the reservations and requirements of Condition II.Y.2.a.i through Condition II.Y.2.a.iv.

## COMMUNITY PARTICIPATION

### Public Involvement

Tribal nations, stakeholders, and the public are encouraged to review and provide comments on this Plan during the 45-day public comment period that runs from TBD through TBD.

### Public Meeting

If requested, a public meeting will be held to answer questions and take comments. To request a public meeting, contact John Price before TBD. The public meeting will be held during the public comment period and will be announced in the *Tri-City Herald.*

### Submitting Comments

The Tri-Parties will accept written comments on this Plan from TBD through TBD. Comments should be sent to John Price at the Washington State Department of Ecology via:

- mail: ATTN: Mr. John Price, 3100 Port of Benton Blvd., Richland, WA 99354-1670
- fax: (509) 372-7971
- email: jpri461@ecy.wa.gov

### Hanford Public Information Repository Locations

Copies of this Plan are available at the Hanford Public Information Repositories located at the University of Washington in Seattle, Washington; Gonzaga University in Spokane, Washington; Portland State University in Portland, Oregon; and Washington State University in Richland, Washington.

This Plan also is available electronically at http://www.hanford.gov/public/calendar/ under the Public Comment Period section.

The Administrative Record also contains copies of this Plan and supporting documents. The Administrative Record is located at 2440 Stevens Center Place, Room 1101; Richland, Washington 99352. This information can be accessed electronically at http://www2.hanford.gov/arpir.

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