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U.S. Department of Energy
Idaho Operations Office

Operations and Maintenance Plan for the Final Selected Remedies and Institutional Controls at Central Facilities Area, Operable Unit 4-13

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Approved by

Stephen G. Wilkinson
WAG 4 Project Manager

3/28/02
Date

Christie M Hasing for Doug Preussner
Doug Preussner
WAG 4 Project Engineer

3/28/02
Date

ABSTRACT

This Operations and Maintenance Plan describes the long-term operations and maintenance activities that will be conducted at Waste Area Group 4, Operable Unit 4-13, to ensure that the selected remedies identified in the Record of Decision remain protective of human health and the environment. The following five sites are discussed further as part of the Operations and Maintenance Plan and the attached Institutional Control Plan:

- Central Facilities Area (CFA) Landfill I—CFA-01
- CFA Landfill II—CFA-02
- CFA Landfill III—CFA-03
- The CFA-07 French Drains
- The CFA-08 Sewage Plant Drainfield.

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ACRONYMS

CFA	Central Facilities Area
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
EPA	Environmental Protection Agency
FY	fiscal year
IC	institutional control
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
M&O	management and operating
O&M	operations and maintenance
ROD	Record of Decision
WAG	waste area group

Operations and Maintenance Plan for the Final Selected Remedies and Institutional Controls at Central Facilities Area, Operable Unit 4-13

1. INTRODUCTION AND PURPOSE

This site-specific Operations and Maintenance (O&M) Plan describes the long-term activities and procedures required to satisfy requirements of the *Final Comprehensive Record of Decision (ROD) for Central Facilities Area Operable Unit 4-13* (Department of Energy Idaho Operations Office [DOE-ID] 2000a) concerning ways to remain protective of human health and the environment at the following areas:

- Central Facilities Area (CFA) Landfill I—CFA-01
- CFA Landfill II—CFA-02
- CFA Landfill III—CFA-03
- The CFA-07 French Drains
- The CFA-08 Sewage Plant Drainfield
- Spreading Area A Borrow Source.

As part of the remediation of the CFA-08 site, a portion of Spreading Area A was disturbed and used as a borrow source. As such, this O&M Plan addresses the monitoring of reclamation activities at Spreading Area A to ensure that they are protective of the environment.

Inspection of institutional controls, specific site inspection, radiation survey, maintenance, reporting, and record keeping comprise the scope of anticipated activities. The basic elements of this O&M Plan are as follows:

- Section 2— Background on the nature of the contamination at each site and description of the current controls.
- Sections 3—A description of the requirements for environmental monitoring, site-specific operations and maintenance, and 5-year reviews.
- Section 4—A description of operations and maintenance implementation including organization and responsibilities and requirements for conducting monitoring, maintenance, inspections, and repairs.
- Sections 5—A summary of reporting requirements for institutional controls, environmental monitoring, site-specific operations and maintenance, and 5-year reviews.
- Appendix A—Waste Area Group (WAG) 4 Institutional Control Plan, which documents how the Idaho National Engineering and Environmental Laboratory (INEEL) will comply with the ROD-mandated institutional control for WAG 4 sites including CFA-01 (Landfill I), CFA-02 (Landfill II), CFA-03 (Landfill III), CFA-07, and CFA-08.

- Appendix B—The WAG 4 Institutional Control Field Inspection Checklist, including the Site Inspection Photo Log, both of which are used to record results of annual inspections performed at each of the sites.

Following completion of WAG 4 O&M activities and per the *Federal Facility Agreement and Consent Order* (DOE-ID 1991), the Department of Energy (DOE) will prepare and submit an O&M report to the Environmental Protection Agency (EPA) and the Idaho Department of Environmental Quality (IDEQ) at the completion of O&M activities. This document will include the following elements:

- Description of the O&M activities performed
- Results of site monitoring verifying that the remedy meets the performance criteria
- Explanation of additional O&M (including monitoring) to be undertaken at the site.

2. INEEL BACKGROUND

The INEEL is a government-owned/contractor-operated facility managed by the DOE-ID (Figure 2-1) and located 51 km (32 mi) west of Idaho Falls, Idaho. The INEEL encompasses portions of five Idaho counties—(1) Butte, (2) Jefferson, (3) Bonneville, (4) Clark, and (5) Bingham—occupying 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Snake River Plain.

The facilities at the INEEL have historically been dedicated to the development and testing of peaceful applications for nuclear power. Throughout the 50 years of INEEL operations, disposal practices have been implemented in compliance with state, federal, and DOE requirements. Contaminated structures and environmental media, such as soil and water, are the legacies of some of the historical disposal practices. In keeping with the emphasis on environmental issues, the focus of INEEL research is on environmental restoration to address contaminated media and waste management issues with the expectation to minimize and/or eliminate additional contamination from current and future operations. Programs dealing with spent nuclear fuel management; hazardous and mixed waste management/minimization; cultural resources preservation; and environmental engineering, protection, and remediation have been developed to address challenges in these areas.

2.1 Facility Background

The CFA, designated WAG 4, is located at the INEEL as shown in Figure 2-1. The CFA includes buildings constructed in the 1940s and 1950s to house Navy gunnery range personnel, administration offices, shops, and warehouse space. The facilities have been modified over the years to fit changing needs. Presently, the CFA provides four major types of functional space: (1) crafts, (2) administrative offices, (3) maintenance services, and (4) a laboratory. Figure 2-2 delineates the locations of the sites requiring institutional controls at WAG 4. Sections 2.1.1–2.1.5 provide a historical synopsis of the sites addressed by this O&M Plan, and Figures 2-3 through 2-7 show each site in its current condition. Detailed descriptions of each site are provided in the ROD (DOE-ID 2000a).

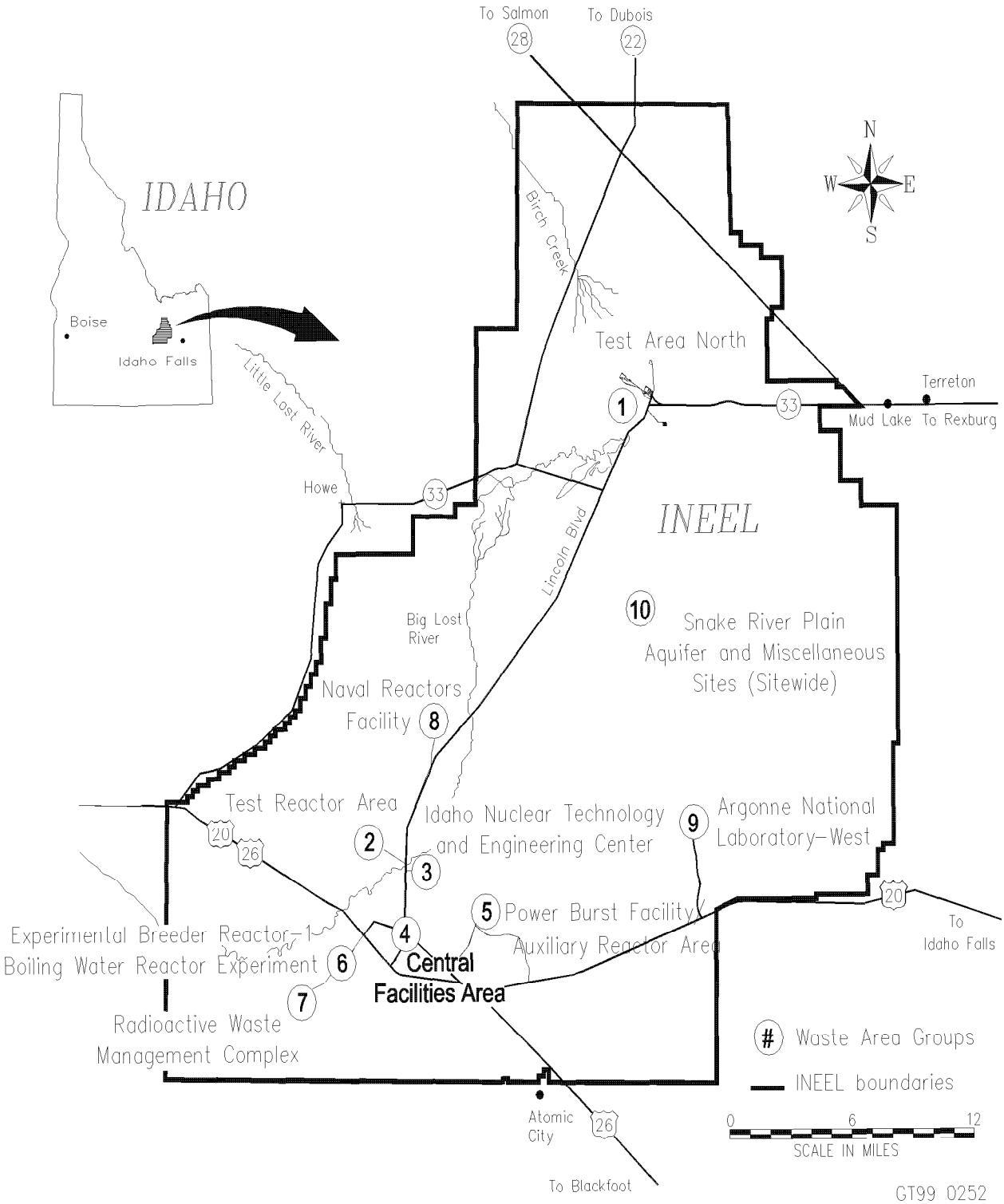

Figure 2-1. INEEL WAGs including the Central Facilities Area (WAG 4).

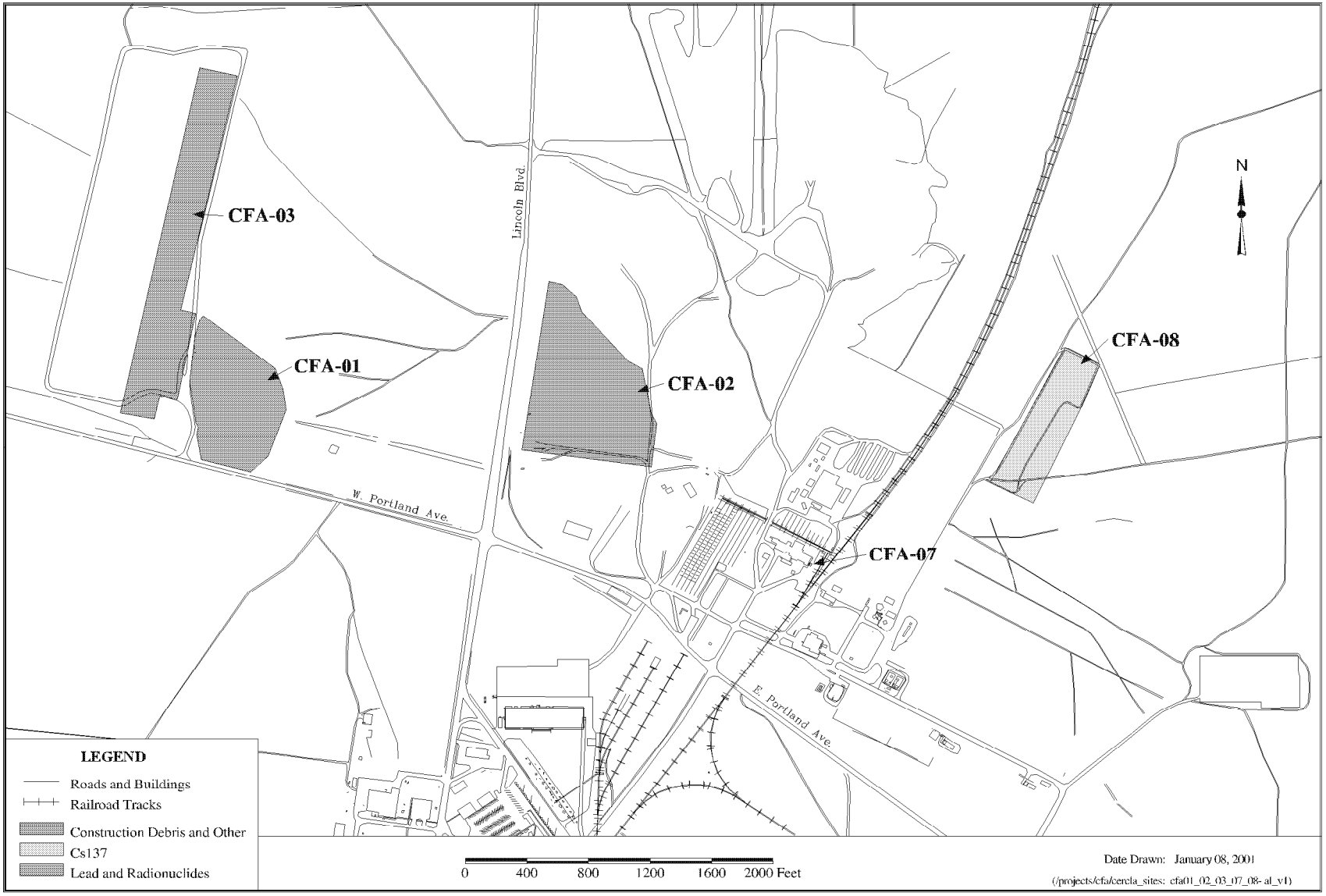

Figure 2-2. Location of WAG 4 institutional control sites at CFA.

Figure 2-3. CFA-01: Central Facilities Area Landfill I (Photo File: PD000472-01).

2.1.1 CFA-01: Central Facilities Area Landfill I

History: CFA Landfill I encompasses approximately 3.33 hectares (8.25 acres). This landfill is composed of three major units, which are commonly referred to as the rubble landfill, the western waste trench, and the northern waste trench. The landfill was mainly filled with trash, cafeteria garbage, wood, masonry, scrap metal, weeds, gravel, asphalt, and asbestos. Landfill I was operated as a disposal facility from the early 1950s until the mid-1980s.

Contaminant of Concern: Co-60 and various chemicals including beryllium, benzo(a)pyrene, cadmium, and zinc are potentially present at levels that may pose a risk.

ROD Requirements: The ROD-selected remedy is native soil cover and institutional controls. Even though the risk assessment indicated the CFA landfills did not present an unacceptable risk to human health, a remedial action was warranted at the site due to the uncertainty associated with the waste regarding the types and amounts of potentially hazardous waste disposed of. The cover was installed in 1996.

Figure 2-4. CFA-02: Central Facilities Area Landfill II (Photo File: PD000472-06).

2.1.2 CFA-02: Central Facilities Area Landfill II

History: Landfill II covers approximately 6 hectares (15 acres). This landfill contains trash, cafeteria garbage, wood, masonry, gravel, scrap metal, asphalt, asbestos, and various chemicals. The landfill received disposal of various chemicals such as chlorinated organic compounds, petroleum products, and ketones. It was used from 1970 until 1982. In addition to the native soil cap, CFA-02 had a rock armor area to prevent erosion of steeper slopes.

Contaminant of Concern: Benzo(a)pyrene, beryllium, cadmium, and zinc are potentially present at levels that may pose a risk.

ROD Requirements: The ROD-selected remedy is native soil cover and institutional controls. Even though the risk assessment indicated the CFA landfills did not present an unacceptable risk to human health, a remedial action was warranted at the site due to the uncertainty associated with the waste regarding the types and amounts of potentially hazardous waste disposed of. The cover was installed in 1996.

Figure 2-5. CFA-03: Central Facilities Area Landfill III (Photo File: PD000472-02).

2.1.3 CFA-03: Central Facilities Area Landfill III

History: Landfill III covers approximately 5 hectares (12 acres). Landfill III was used as a cut-and-fill operation until December 1984. This landfill contains trash, cafeteria garbage, wood, masonry, scrap metal, gravel, asphalt, asbestos, and various chemicals. The landfill surface is also gently undulating due to differential settling of the waste. The landfill maintains a stand of crested wheatgrass.

Contaminant of Concern: Cadmium and zinc are potentially present at levels that may pose a risk.

ROD Requirements: The ROD-selected remedy is native soil cover and institutional controls. Even though the risk assessment indicated the CFA landfills did not present an unacceptable risk to human health, a remedial action was warranted at the site due to the uncertainty associated with the waste regarding the types and amounts of potentially hazardous waste disposed of. The cover was installed in 1996.

Figure 2-6. CFA-07: French Drains (Photo File: PDd000472_07).

2.1.4 CFA-07: French Drains

History: Two French Drains, north and east, received acids and bases with enough water to neutralize the acids and the bases. The drains that received the acids and bases were unlined, concrete-block cylinders approximately 4 ft in diameter and 8 ft deep closed at the surface. The drains have been removed.

Contaminant of Concern: Lead and radionuclides at levels below risk.

ROD Requirements: The ROD-selected remedy is institutional controls and restriction of land use at depths greater than 10 ft below ground surface.

Figure 2-7. CFA-08: Sewage Plant Drainfield (Photo File: PD000472-13).

2.1.5 CFA-08: Sewage Plant Drainfield

History: The CFA-08 Sewage Plant Drainfield was determined to pose a threat to humans from cesium-137. Radioactive decay will reduce the cesium-137 concentration to below the 1E-04 future resident risk-based level in 189 years.

Contaminant of Concern: Cesium-137

ROD Requirements: Engineered evapotranspiration soil cover and institutional controls

2.1.6 Spreading Area A

History: Spreading Area A does not contain any contamination and does not pose a threat to human health or the environment. This area was identified as the primary earthen material borrow area necessary to construct the toe of the engineered soil cover over the former CFA drainfield. This area is included in this section due to the reclamation and monitoring requirements that must be completed following the removal of earthen materials.

Contaminant of Concern: None

ROD Requirements: None

3. DESCRIPTION OF OPERATIONS AND MAINTENANCE

3.1 Institutional Controls

Institutional controls have been implemented and will be maintained by DOE at any Comprehensive Environmental Response, Compensation, and Liability Act site at the INEEL where residual contamination precludes unrestricted land use. The DOE ensures that administrative and physical institutional controls will be in effect for the next 100 years, unless a 5-year review concludes that unrestricted land use is allowable and institutional controls will no longer be required. After 100 years, DOE may no longer manage the land within the current INEEL boundary; therefore, control will take the form of land use restrictions. Though land use after 100 years is uncertain, it is likely that industrial operation will continue at the WAG 4 facilities. Institutional controls will not be required if all contaminated media are removed, if contaminant concentrations are comparable to local background values, or if residual concentrations are less than or equal to a 1E-04 risk-based soil concentration for a hypothetical current or future residential or industrial scenario. For the CFA-08 drainfield, the year 2187 is when the Cs-137 contamination at the site will decay to a concentration equal to the 1E-04 risk-based concentration.

All administrative and physical institutional control requirements—including implementation, maintenance, inspection, and reporting—are addressed in the WAG 4 Institutional Control Plan in Appendix A. Appendix B contains the Institutional Control Field Inspection Checklist.

3.2 Landfills Monitoring

The three landfills—CFA-01, CFA-02, and CFA-03—have been monitored under a program that integrates groundwater monitoring, soil gas monitoring in the vadose zone near the landfills, and monitoring of moisture infiltration through the landfill covers. This monitoring is performed in accordance with the *Post Record of Decision Monitoring Work Plan, Central Facilities Area Landfills I, II, and III Operable Unit 4-12* (INEL 1997a).

3.3 Site-Specific Operations and Maintenance

Institutional controls at WAG 4 have been implemented. One of the five institutional control sites in this plan (CFA-07 French Drains) has undergone remedial action and requires ongoing inspection and maintenance of institutional controls. The CFA-01, CFA-02, and CFA-03 landfills have also been remediated and require ongoing inspection and maintenance through routine soil cover and soil moisture monitoring, soil gas monitoring, equipment inspections, and inspection of institutional controls. Soil moisture monitoring, soil gas monitoring, equipment inspections, and inspection of institutional controls. CFA-08 is currently undergoing remediation with the construction of an engineered evapotranspiration soil cover, which will require routine inspections and maintenance of institutional controls.

3.3.1 CFA Landfill I, II, and III

The soil covers at the three landfills (CFA Landfills I, II, and III) were inspected annually for the first five years. Inspections were performed at these sites in accordance with the *Operations and Maintenance Plan for the Central Facilities Area Landfills I, II, and III Native Soil Cover Project Operable Unit 4-12* (INEL 1997b) The first 5-year review is scheduled for 2002. Factors evaluated during the inspections include vegetative cover, erosion, effectiveness of water run-off, topographical survey, signs of animal intrusion, and condition of the rock armor on CFA-02. Additionally, annual inspection of the neutron access probes and time domain reflectometers and associated equipment is required. The scope of the inspection activities at CFA-01, -02, and -03 may be reduced following the 5-year review.

Institutional control measures at CFA-01, -02, and -03 must be inspected and reported annually, per EPA guidance. The second 5-year review for the landfills will be rolled into the comprehensive WAG 4 5-year review in 2007.

3.3.2 CFA-07 French Drains

The annual inspection of CFA-07 will verify the condition of the institutional control measures. The frequency of inspections may be adjusted following the first comprehensive WAG 4 5-year review in 2007.

3.3.3 CFA-08 Sewage Plant Drainfield

Following the completion of the engineered soil cover, inspections will be performed annually at CFA-08 to verify the integrity of the cover. The inspections will evaluate erosion, vegetation, animal intrusion, radiological conditions, and the condition of the institutional control measures. The frequency of inspections may be adjusted following the first 5-year review in 2007.

3.3.4 Spreading Area A Borrow Source

Following the completion of the engineered soil cover at CFA-08, a monitoring program for the reclamation of the on-INEEL borrow source (Spreading Area A) will be developed and initiated. The purpose of this monitoring program is the following:

- Assess the progress made toward specified reclamation objectives
- Provide recommendations for mitigation options if reclamation is not progressing as planned
- Provide recommendations to ensure that the objectives will be met, to enhance reclamation efforts, and reduce costs associated with this and future reclamation activities on the INEEL.

The monitoring program will be initiated after placement and final grading of topsoil have occurred. Final revegetation will only occur after re-contouring and topsoil objectives have been met for the disturbed area(s). Monitoring of the vegetation recovery will begin in the first growing season. Measurements will include germination success, composition, percent cover, and density. Following the second growing season, a determination will be made as to whether the revegetation effort was successful. If the revegetation is determined to be successful, the monitoring program will continue at a reduced level until the revegetation cover objectives have been met. If following 5 years, the reclamation plan objectives have not been achieved, additional actions will be taken.

It is recognized that Spreading Area A may be used for other activities subsequent to the Operable Unit 4-13 borrow/reclamation activities. At that time, responsibility for reclamation and monitoring activities in Spreading Area A will become the responsibility of the most recent user of the borrow source.

3.3.5 Post-ROD Monitoring

Nitrate concentrations exceeding the 10-mg/L maximum contaminant level were identified in two groundwater monitoring wells near CFA. Subsequent to the Operable Unit 4-13 Comprehensive Remedial Investigation/Feasibility Study (DOE-ID 2000b), information was gathered regarding the source and extent of nitrate in monitoring wells at CFA. The most likely source was identified as the CFA-08 Sewage Plant Drainfield (EDF-ER-224). Although nitrates were not identified as a risk driver, and limited modeling shows that there is a statistically significant decreasing trend in the nitrate data, nitrate concentrations will be monitored and evaluated annually under the Operable Unit 4-12 Post-ROD

Monitoring Work Plan (DOE-ID 1997). The Operable Unit 4-12 Post-ROD Monitoring Work Plan included a cost estimate for 30 years of groundwater monitoring at WAG 4; the wells have been monitored for five years to date. Nitrate concentrations will continue to be monitored and trend analyses will be conducted annually and reported to the Agencies per 40 CFR 141.11 until the nitrate concentration in Well CFA-MON-002 falls below 10 mg/L. At that time, annual reporting will cease, but groundwater monitoring will continue until such time as a 5-year review shows, and the Agencies agree, that it is no longer necessary.

3.4 Five-Year Reviews

Five-year reviews will be conducted to evaluate the effectiveness of the remedies at those sites with risks remaining above 1E-04. The 5-year reviews will determine whether the selected remedy for each site remains protective and will assess the need for additional institutional controls or environmental monitoring. The CFA landfills are scheduled for a 5-year review in 2002. The three landfills will be rolled into the comprehensive WAG 4 5-year review with CFA-07 and CFA-08 in fiscal year (FY) 2007 (2007 is 5 years after the start of remedial activities at CFA-08). Subsequent 5-year reviews will be completed within 5 years of the previous 5-year review, if the Agencies decide to continue the O&M activities at a given site.

4. OPERATIONS AND MAINTENANCE IMPLEMENTATION

This section summarizes the activities needed to implement the O&M and Institutional Control (IC) Plan requirements and outlines the organizational practices that will drive the O&M activities. The activities include inspection, maintenance, and repairs. There are no planned operations or scheduled maintenance activities at the 5 IC sites discussed in this document; however, based on inspections performed in support of maintaining institutional controls and remedial action sites, it may be necessary to perform unscheduled maintenance and repairs. Inspection activities are summarized in Table 4-1.

4.1 Organization and Responsibilities

4.1.1 DOE Project Manager

The DOE-ID WAG 4 remediation project manager is responsible for the following:

- Ensuring that the O&M activities are performed in accordance with this approved plan
- Coordinating the activities of the INEEL management and operating (M&O) contractor at WAG 4.

4.1.2 INEEL M&O Contractor

As a point of contact for O&M activities, the INEEL M&O contractor WAG 4 remediation project manager will be responsible for the following:

- Document control of inspection reports, including their placement in the project records file
- Administration of subcontracts for performing required repairs
- Reporting of activities to DOE-ID, EPA, and IDEQ.

Table 4-1. Summary of inspection schedule at WAG 4.

Site	O&M Requirement	Action
CFA Landfill I (CFA-01)	Periodic topographical surveys and maintenance of soil cover's slope and contours; inspection for animal intrusion, vegetative growth, and cover erosion to verify cover integrity and surface drainage away from cover. Periodic inspection of soil monitoring equipment. Periodic inspection of institutional control measures.	Topographical survey conducted in concurrence with 5-year reviews. Inspection of soil monitoring equipment. Annual inspection and maintenance of soil cover to verify and ensure cover integrity. Annual inspection and maintenance of institutional controls.[a]
CFA Landfill II (CFA-02)	Periodic topographical surveys and maintenance of soil cover's slope and contours; inspection for animal intrusion, vegetative growth, and cover erosion to verify integrity and surface drainage away from cover. Periodic inspection of soil monitoring equipment. Periodic inspection and corrective maintenance of rock armoring. Periodic inspection of institutional control measures.	Topographical survey conducted in concurrence with 5-year reviews. Inspection of soil monitoring equipment. Annual inspection and maintenance of soil cover to verify and ensure cover integrity. Annual inspection and maintenance of rock armoring. Annual inspection and maintenance of institutional controls.[a]
CFA Landfill III (CFA-03)	Periodic topographical surveys and maintenance of soil cover's slope and contours; inspection for animal intrusion, vegetative growth, and cover erosion to verify cover integrity and surface drainage away from cover. Periodic inspection of soil monitoring equipment. Periodic inspection of institutional control measures.	Topographical survey conducted in concurrence with 5-year reviews. Inspection of soil monitoring equipment. Annual inspection and maintenance of soil cover to verify and ensure cover integrity. Annual inspection and maintenance of institutional controls.[a]
CFA-07	Periodic inspection of institutional controls.[1]	Annual inspection of institutional controls will be performed.[a]
CFA-08 Sewage Plant Drainfield	Periodic inspection and maintenance of soil cover's slope; inspection for animal intrusion, vegetative growth, and cover erosion to verify cover integrity and surface drainage away from cover. Periodic survey of radiation levels. Periodic inspection of institutional control measures.	Annual inspection and maintenance of soil cover to verify and ensure cover integrity. Annual survey of radiation levels. Annual inspection and maintenance of institutional controls.[a]
Spreading Area A	Periodic inspection and maintenance, following the completion of borrow activities, on the slope, contours, and revegetation.	Annual inspections of the reclaimed borrow source will be performed.

a. See Appendix A for details on the Institutional Control Plan and Appendix B for the institutional control inspection checklist.

4.2 Conducting Maintenance, Inspections, and Repairs

The WAG 4 M&O contractor will provide qualified personnel to perform the O&M activities described in this plan. Personnel will be trained on the requirements of the approved plan prior to performing O&M activities. Annual inspections will be performed and completed by the end of October each year; subsequently, inspection reports will be submitted to the Agencies for review by the end of December. Annual inspections will be performed for the first WAG 4 5-year review in 2007. After 5 years, O&M activities, including inspection and reporting, will be continued as required by the Agencies. Inspections of institutional controls will continue to be performed annually unless discontinued by the Agencies. An Inspection Report Form and associated Site Inspection Photo Log are included in Appendix C.

4.2.1 Institutional Control

Requirements and frequency for institutional control inspections and maintenance are addressed in the WAG 4 Institutional Control Plan in Appendix A. The inspections will address institutional control measures at each site, such as identification and warning signs, visible access restrictions, and administrative controls. Long-term land-use issues will be addressed in the Comprehensive Facility and Land Use Plan or alternate document at the time when control of the facility may be transferred from DOE ownership.

4.2.2 Soil Cover Erosion, Subsidence, and Intrusion

The soil covers at the three landfills and CFA-08 drainfield will be inspected annually for erosion. Contingency inspections may also be conducted as needed after severe rainstorms, floods, tornadoes, earthquakes, or vandalism. Visual inspection will identify areas on the cover affected by erosion and/or subsidence. Area of the covers that exhibit (1) erosion rills in excess of 5 cm (2 in.) in depth or 15 cm (6 in.) in width, for a distance of over 3 m (10 ft); (2) areas of the covers showing signs of ponding or localized subsidence in excess of 15 cm (6 in.); and (3) all animal intrusions into the top of the cover will be documented, photographed, and repaired with additional soil to return to the required grade and then reseeded. The frequency of the soil cover inspection will be evaluated during the 5-year review.

4.2.3 Topographic Survey

A topographic survey will be conducted for subsequent 5-year reviews for the three landfills and the rock armoring on the north end of Landfill II to check for subsidence in excess of 15 cm (6 in.) and 30 cm (12 in.), respectively, for the three landfills and the rock armor. A 30.5 × 30.5-m (100 × 100-ft) grid has been established at the three landfills, and a 9 × 9-m (30 × 30-ft) grid has been established for the rock armoring on the north end of Landfill II. Areas of concern demonstrating excess subsidence will be documented, and subsequent annual topographical surveys will be conducted for a minimum of three years. Should continual movement or subsidence over a period of 3 years indicate failure, the slopes will be evaluated to determine the cause of the movement. Evaluation of cover failure will consist of:

- Determining the type of slope failure that occurred (circular slope failure, subsidence, block/sliding failure) based on visual inspection of the area by a qualified engineer
- Determining the cause of the failure.

The nature and extent of repairs will be determined by DOE-ID with concurrence from IDEQ and EPA. The frequency of topographic surveys will be evaluated during the 5-year review.

4.2.4 Soil Cover Vegetation

The vegetation on soil covers at the three landfills, CFA-08 drainfield, and Spreading Area A will be inspected annually to ensure proper growth. Success of vegetation shall be determined by comparing seeded areas with undisturbed areas in the vicinity of the cover, while factoring in length of time since seeding. Areas experiencing seeding failure—as evidenced by lack of perennial grass established, invasions by weeds (primarily Russian thistle, wheatgrass, and tumble mustard), or encroachment of shrubs (sagebrush and rabbitbrush)—will be documented and photographed. Any area larger than 3 × 3 m (10 × 10 ft) that exhibits seeding failure will be reseeded and fertilized. The reseeded areas will require follow-up inspections to ensure successful reseeding. The frequency of inspection of the vegetation on the covers will be evaluated during the 5-year review.

4.2.5 Rock Armor

The rock armor on the north end of CFA-02, Landfill II, will be visually inspected annually to ensure there are no signs of subsidence or erosion. Where rock has eroded (identified as erosion rills or rock movement) or where rock surface has settled 30 cm (12 in.) in depth below the design grade, the underlying soil will be repaired. The rock will be removed, additional soil will be placed on the slope, and the rock will be replaced. Follow-up inspections will be performed if repairs are required on the rock armor. The frequency of rock armor inspection will be evaluated during the 5-year review.

4.2.6 Radiological Monitoring

Upon completion of cap construction activities, including revegetation, a baseline radiological survey will be performed. The survey will be performed with an in situ high-purity germanium gamma-ray spectrometer positioned at a fixed height of 1 m (3.3 ft) above the ground. The system will be capable of reporting the Cs-137 concentration in the soil in terms of pCi/g and will have an *a priori* method detection limit of 0.1 pCi/g in a 15-minute count. Measurements will be made at each corner of the fence surrounding the drainfield cover and at a maximum of 15.2-m (50-ft) intervals along the outside of the fence between the corners. Additionally, upon completion of the cover, a 15.2 × 15.2-m (50 × 50-ft) grid will be defined for the surface of the cover immediately above the drainfield, and in situ measurements will be made at each grid. Measurements will also be made at the midpoint around the toe of the cover at a maximum of 15.2-m (50-ft) intervals. The results of the measurements from this baseline survey will be compiled into a map showing the Cs-137 distribution if any is detected.

Subsequent radiological surveys will be performed in 2005, the third year following the remedial action, after the vegetation has been allowed to become established on the cover. A third radiological survey will be performed in 2007 in conjunction with the 5-year review. Results of these surveys will be compared with the baseline survey obtained in 2002, and any anomalies will be investigated to determine the nature and extent of the contamination. Based upon the investigation findings, and with Agency concurrence, corrective measures will be determined and acted upon. The frequency and intensity of the radiological surveys will be re-evaluated during each 5-year review.

4.2.7 Operations and Maintenance

Inspection of the WAG 4 sites will generally fall into three types:

- Annual scheduled inspections
- Follow-up inspections
- Contingency inspections.

No routine maintenance is planned for the WAG 4 sites. Maintenance and repairs of the sites will be performed, as necessary, based on the inspection results. Follow-up inspections will be performed to verify the adequacy of maintenance and repairs.

Contingency inspections are unscheduled inspections ordered by DOE-ID. Events that may trigger a contingency inspection may include unusual events, such as severe rainstorms, floods, tornadoes, or earthquakes.

5. REPORTING REQUIREMENTS

Reporting requirements related to institutional controls, operations and maintenance, and 5-year reviews are summarized in the following sections. The purpose of these reporting requirements is to ensure that all activities are adequately documented and that related data and information are provided to the Agencies for review and decision making. Annual inspections will be performed and completed by the end of October each year; subsequently, inspection results will be reported and submitted to the Agencies for review by the end of December. A single report will be used to document institutional controls and operations and maintenance activities associated with this O&M Plan including results of the annual nitrate monitoring and trend analysis. The frequency of all the reporting, identified in the following sections, will be reviewed by the Agencies during the first WAG 4 5-year review and the reporting frequency may be changed by the Agencies.

5.1 Institutional Control Reporting

Reporting requirements for institutional controls are specified in the WAG 4 Institutional Control Plan in Appendix A. Inspections and maintenance of institutional controls will be reported to the Agencies annually through the first 5-year review cycle and thereafter as required by the Agencies.

5.2 Operations and Maintenance Reporting

Data and results from annual O&M activities will be compiled and addressed in an annual report, along with the inspection and maintenance of institutional controls, and submitted to the Agencies. The report will contain documentation of scheduled inspection, follow-up, and contingency inspections and maintenance activities. It will include:

- General operable unit description and operational history
- A summary of the inspection
- A summary of maintenance activities to date
- An estimate of maintenance activities required in the next year
- An assessment of cover inspection data and applicable photos
- A copy of the appropriate inspection report forms.

5.3 Five-Year Review Reporting

Data and results from the annual reports for institutional controls and operations and maintenance will be summarized and addressed in a 5-year review report. The first 5-year report for the CFA Landfills (CFA-01, -02, and -03) will occur in FY 2002. The 5-year report for all WAG 4 sites (CFA-07, CFA-08, and the three landfills) will be submitted in 2007.

6. REFERENCES

DOE-ID, 1991, *Federal Facility Agreement and Consent Order and Action Plan*, Department of Energy Idaho Operations Office, Environmental Protection Agency Region 10, and State of Idaho Department of Health and Welfare.

DOE-ID, 2000a, *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13*, Department of Energy Idaho Operations Office, DOE/ID-10719, Revision 2, July 2000.

DOE-ID, 2000b, *Comprehensive Remedial Investigation/Feasibility Study for Central Facilities Area Operable Unit 4-13 at the INEEL,* Department of Energy Idaho Operations Office, DOE/ID-10680, Rev. 1, July 2000.

EDF-ER-224, September 2000, "Summary of Nitrate Evaluation, Waste Area Group 4," Idaho National Engineering and Environmental Laboratory, Rev. A, Environmental Restoration.

INEL, 1997a, *Post Record of Decision Monitoring Work Plan, Central Facilities Area Landfills I, II, and III Operable Unit 4-12*, Idaho National Engineering Laboratory, INEL-95/0579, Revision 4, June 1997.

INEL, 1997b, *Operations and Maintenance Plan for the Central Facilities Area Landfills I, II, and III Native Soil Cover Project Operable Unit 4-12*, Idaho National Engineering Laboratory, INEL-95/0606, Revision 3, September 1997.

Appendix A

Institutional Control Plan for the Central Facilities Area, Operable Unit 4-13

A-1. INTRODUCTION AND PURPOSE

In accordance with the *Federal Facility Agreement and Consent Order* (Department of Energy Idaho Operations Office [DOE-ID] 1991) between the Department of Energy (DOE), the Environmental Protection Agency (EPA), and the Idaho Department of Environmental Quality, hereafter referred to as the Agencies, DOE submits this Institutional Control Plan (ICP) for the Central Facilities Area (CFA), Waste Area Group (WAG) 4. The purpose of this ICP is to document current activities and planned future programs for implementing Record of Decision (ROD)-mandated institutional controls (ICs) for sites within WAG 4. The ROD identified 5 sites as requiring institutional controls.

This plan was developed in accordance with EPA Region 10 Policy (EPA 1999) and provides a comprehensive approach for establishing, implementing, enforcing, and monitoring institutional controls at WAG 4.

A-1.1 INEEL Comprehensive Facility and Land Use Plan

In accordance with EPA Region 10 requirements, the Comprehensive Facility and Land Use Plan (CFLUP) is used to document the use of ICs at the Idaho National Engineering and Environmental Laboratory (INEEL) (DOE-ID 2000). The CFLUP provides guidance on facility and land use at the INEEL through the 100-year scenario, including specific land use information about CFA.

The preferred future land uses were identified through a stakeholder process that included a public participation forum, a public comment period, and the Citizen's Advisory Board. The public participation forum was established to discuss and review development of the long-term land use scenarios and to identify regional planning issues that could affect the scenarios. The forum membership included members from local counties and cities, the Shoshone-Bannock Tribes, the Bureau of Land Management, the DOE, the U.S. Forest Service, the U.S. Park Service, the Idaho Departments of Transportation and Fish and Game, and eight business, educational, and citizens' organizations. The report was subject to a 30-day public comment period.

Establishment of new projects and/or major land use changes at the INEEL will be coordinated with affected neighboring federal land management agencies, state resource management agencies, tribal agencies, private land owners, and the public. Currently, the CFLUP shows information about the five institutional control sites at WAG 4 including historical information, site description, coordinates, current and future status of institutional controls and restriction. Should the CFA be released from DOE/INEEL ownership in the future, the issues of deed and activity restrictions regarding contamination or potential contamination remaining at specific sites will be determined in accordance with the Agencies and stakeholders at that time.

A-2. WAG 4 SITES REQUIRING INSTITUTIONAL CONTROLS

The Operable Unit (OU) 4-13 ROD has identified 5 sites requiring institutional controls. Four of those sites—CFA-01, CFA-02, CFA-03, and CFA-07—have been remediated. One site, CFA-08, is currently being remediated to reduce the risk posed to human health and the environment. All five sites require institutional controls in order to limit land use. The survey coordinates for these sites are listed in Table A2-1.

Table A2-1. OU 4-13 sites requiring institutional control.

			Survey Coordinates NAD27	
Site Code	Site Name	ROD Determination	Easting	Northing
CFA-01	CFA Landfill I	Institutional Controls	291902.7	683248.4
			291879.1	683414.0
			291887.4	683514.2
			291912.2	683724.4
			291941.6	683848.4
			291964.7	683877.9
			292432.1	683511.4
			292482.5	683366.2
			292504.6	683225.7
			292384.9	682906.1
			292275.2	682792.7
			291950.9	682881.1
			291924.1	683052.0
			291931.7	683103.6
			291918.2	683141.3
			291904.6	683238.0
CFA-02	CFA Landfill II	Institutional Controls	294423.7	683904.5
			294391.7	684011.5
			294299.2	684091.3
			294209.2	684114.3
			294036.7	682944.6
			294855.3	682832.3
			294865.7	682830.9
			294875.5	682829.3
			294902.1	683005.3
			294913.2	683130.6
			294875.5	683198.8
			294836.8	683418.4

Table A2-1. (continued).

Site Code	Site Name	ROD Determination	Survey Coordinates NAD27	
			Easting	Northing
			294817.4	683508.3
			294721.5	683567.3
CFA-03	CFA Landfill III	Institutional Controls	291817.8	683917.5
			292185.8	685546.8
			290941.5	685603.2
CFA-07	French Drains	Institutional Controls	295894.1	682140.0
			295905.5	682156.7
			295918.7	682149.9
CFA-08	Sewage Plant Drainfield	Remedial Action and Institutional Controls	297565.9	683657.9
			297790.7	683537.8
			297666.2	683230.4
			297357.6	682577.0
			297074.5	682719.1

A-3. INSTITUTIONAL CONTROLS

Institutional controls will be maintained by the DOE at any Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site at the INEEL where residual contamination precludes unrestricted land use. Five sites at WAG 4 have been identified as requiring ICs. Controls will remain in place for at least 100 years or until the site is released for unrestricted use in a 5-year review.

The ICs will consist of engineering and administrative controls to restrict land use until the sites can be released for unrestricted residential activity. None of the five IC sites at WAG 4 are in a state of current operation. The INEEL remains under DOE control. At some future time, should DOE control cease at the INEEL, the ownership and administration of the institutionally controlled areas may fall to some other government entity. At that time, the issues of deed and activity restrictions, ownership, and maintenance requirements will be resolved with the Agencies, county governments, and various stakeholders, such as the Bureau of Land Management, General Services Agency, U.S. Fish and Wildlife Service, and the Shoshone-Bannock government.

A-3.1 Institutional Control Components

Table A3-1 presents the required ICs and their individual components.

Table A3-1. WAG 4 institutional controls.

Institutional Control	Control Components
Visible Access Restrictions	1. Warning signs
	2. Fencing
Control of Activities	1. Management control procedures
	2. Public notices
	3. DOE orders
	4. DOE-ID directives on institutional controls
	5. Publication of surveyed boundaries in the INEEL Land Use Plan
Prevention of Unauthorized Access	1. Warning signs
	2. Fencing
	3. Management control procedures
Land Use Restrictions	1. Deed restrictions
	2. Restrictive covenants
	3. Property lease or transfer restrictions
	4. Zoning ordinances
Notice to affected stakeholders such as county governments, Bureau of Land Management, General Services Agency, United States Fish and Wildlife Services, and the Shoshone-Bannock government.	1. A process to promptly notify the stakeholders before any anticipated change in land use designations, restrictions, land users, or activities for any institutional control required by a decision document. This notification may include written documentation, public announcements, or another type of information dissemination.
Regulatory Restrictions	1. Idaho Department of Water Resources well drilling restrictions

A-3.1.1 Visible Access Restrictions

Visible access restrictions are those ICs that deal with restricting personnel access to a specific waste site. In the case of WAG 4 OU 4-13, these restrictions will be warning signs and/or permanent markers. Warning signs will clearly identify the risk-based concerns at the waste site; contain a map of the waste site; identify the Warning Communications Center, 526-1515, as the point of contact; and be visible from all avenues of approach.

A-3.1.2 Control of Activities

Activities on a waste site are subject to ICs that deal with administrative measures. These ICs will cover all entities and persons that access a controlled waste site including, but not limited to, employees, contractors, lessees, and visitors. The ICs will cover all activities and reasonably anticipated future activities including, but not limited to, any future soil disturbance, routine and nonroutine utility activities, construction, or other activities that might occur at a waste site. These controls include, but are not limited to, the following items:

- INEEL CFLUP
- Management control procedures including construction activities
- Public Notices
- DOE-ID directives
- Radiological work permits
- Personnel training.

A-3.1.3 Unauthorized Access

Unauthorized access refers to those institutional controls that prevent the unauthorized entry of personnel and vehicles on or into a waste site. At the INEEL, identification badges are required for an individual to enter the site unescorted. Any member of the general public that visits the INEEL must pass through visitor control and be escorted by authorized personnel.

A-3.1.4 INEEL Comprehensive Facility and Land Use Plan

The institutional control sites at the INEEL are published in the CFLUP. A map of each WAG, the point of contact, the survey coordinates, historical information, and specifics on institutional controls for each site are included. The CFLUP will function as a tracking mechanism for changes to land use and land use controls. Internal procedures will require current updating of the CFLUP.

A-3.1.5 Regulatory Restrictions

Regulatory restrictions are those institutional controls that limit the manner in which normal work activities may be performed at CFA. While future operational activities are not planned at the institutional control site at CFA, work activities at the adjacent area may affect the institutional control sites.

A-3.1.6 Notice to Affected Stakeholders

Changes in land use designation, land use restrictions, or land user require that shareholders be given specific notification. The shareholders include, but are not limited to, the following:

- Bureau of Land Management
- Shoshone-Bannock Tribal Council
- U.S. Fish and Wildlife Service
- Local county governments
- State of Idaho
- EPA.

A-3.2 WAG 4 Institutional Controls

Institutional controls are in place at all five WAG 4 IC sites to prevent human contact with any of the wastes associated with the sites. As stated in the OU 4-13 ROD (DOE-ID 2000), the objectives for the institutional controls are as follows:

- CFA-01, CFA-02, CFA-03—maintain integrity of soil cover at the three landfills to prevent exposure to buried waste
- CFA-07—limit residential land use at depths greater than 3 m (10 ft) to prevent exposure to potential lead concentrations above 400 mg/kg and low levels of radionuclides
- CFA-08—maintain integrity of the containment barrier to prevent exposure to radiologically contaminated soil.

Warning signs are located at approach zones on each site. Permanent markers are also in place at several sites. While permanent markers are not specifically for institutional control measures, they provide permanent identification. Brass corner markers currently exist at the CFA-01, -02, and -03 landfills. Upon completion of the remedial action, two permanent markers will be placed at two ends of CFA-08.

Institutional controls at WAG 4 will be maintained until the next 5-year review. At such time, the Agencies may elect to retain the site under the ICP. Table A3-2 presents the ICs for the 5 sites. See Figure A-1 for a drawing of the permanent markers at CFA-08.

Concrete Marker Construction Schematic

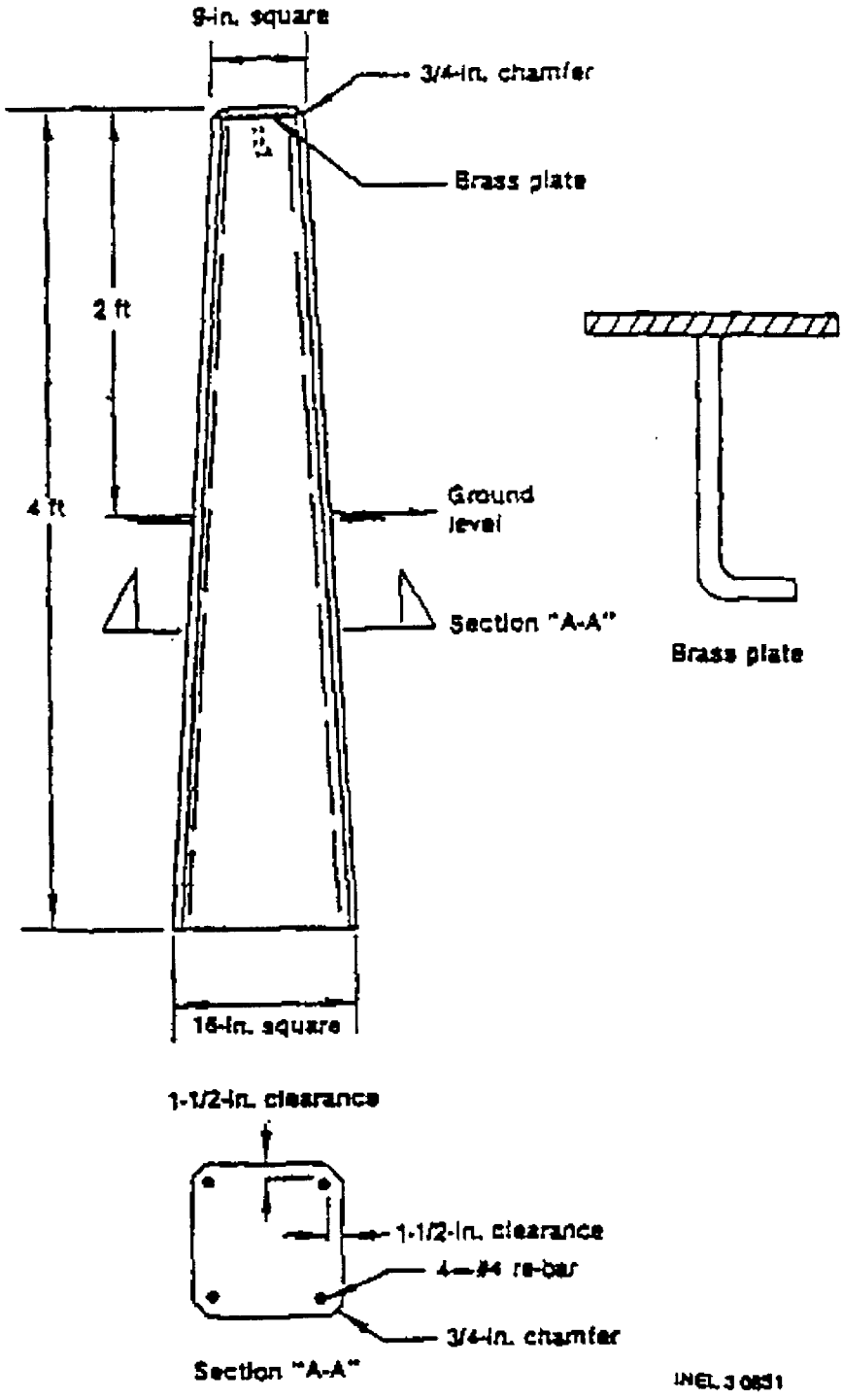

Figure A-1. Permanent markers at CFA-08.

Table A3-2. WAG 4 institutional control sites.

Site Code	Site Name	Visible Access Restriction	Control of Activities	Prevention of Unauthorized Access	Land Use Restrictions
CFA-01	CFA Landfill I	1. CERCLA Sign 2. Permanent Marker	1. Management control procedures 2. Publication of surveyed boundaries in CFLUP	1. INEEL security gate 2. Fence around landfill 3. CERCLA warning sign	Land use restrictions will accompany land transfer, if applicable.
CFA-02	CFA Landfill II	1. CERCLA Sign 2. Permanent Marker	1. Management control procedures 2. Publication of surveyed boundaries in CFLUP	1. INEEL security gate 2. Fence around landfill 3. CERCLA warning sign	Land use restrictions will accompany land transfer, if applicable.
CFA-03	CFA Landfill III	1. CERCLA Sign 2. Permanent Marker	1. Management control procedures 2. Publication of surveyed boundaries in CFLUP	1. INEEL security gate 2. Fence around landfill 3. CERCLA warning sign	Land use restrictions will accompany land transfer, if applicable.
CFA-07	French Drains E/S (CFA-633)	1. CERCLA Sign	1. Management control procedures 2. Publication of surveyed boundaries in CFLUP	1. INEEL security gate 2. CERCLA warning sign	Land use restrictions will accompany land transfer, if applicable.
CFA-08	Sewage Plant Drainfield	1. CERCLA Sign 2. Permanent Marker	1. Management control procedures 2. Publication of surveyed boundaries in CFLUP	1. INEEL security fence 2. Fence around drainfield 3. CERCLA warning sign 4. Permanent markers	Land use restrictions will accompany land transfer, if applicable.

A-4. INSPECTION

In accordance with INEEL land use plans (DOE-ID 1997), DOE will provide ICs for sites subject to land use restrictions over the next 100 years, unless a 5-year review concludes that unrestricted land use is allowable. To facilitate the 5-year reviews, a detailed assessment of the ICs for WAG 4 will be performed using the Institutional Control Field Inspection Checklist unless another means of documentation develops and is approved by the Agencies. A draft of the inspection checklist is provided in Appendix B.

A-5. LEASING OR TRANSFER OF PROPERTY

The DOE will notify the EPA and the State of Idaho at least 6 months prior to any WAG 4 transfer, sale, or lease of property subject to IC, as required by the OU 4-13 ROD (DOE-ID 2000). The EPA and the State of Idaho can then be involved in discussion to ensure that appropriate provisions are included in the conveyance documents needed to maintain effective ICs. If it is not possible for the DOE to notify the EPA and the State of Idaho at least 6 months prior to any transfer, sale or lease of any property subject to ICs, the DOE will notify the EPA and the State of Idaho as soon as possible, but no later than 60 days prior to the transfer.

It is not anticipated that the land in WAG 4 will be subject to leasing or property transfer for a period of at least 100 years. The Hall Amendment of the National Defense Authorization Act of 1994 (42 USC § 9620 et seq.) requires concurrence from the EPA on the lease of any National Priorities List sites during the period of DOE control, and CERCLA (42 USC 9620 [h] [3]) requires that the state be notified of a lease involving contamination. When DOE no longer manages INEEL activities and controls are needed as prescribed by 42 USC 9620(h)(3), DOE is required to indicate the presence of contamination in any restrictions in the property transfer documentation.

A-6. REPORTING

An institutional control monitoring report will be included with the operations and maintenance report and submitted annually to the Agencies. The results of the annual inspection of institutional control sites at WAG 4 will be included.

The institutional control monitoring report will also contain at a minimum:

- A description of how DOE is meeting the facility-wide institutional control requirements at WAG 4
- A description of how DOE is meeting WAG 4's specific objectives, including results of visual inspection of all areas subject to WAG 4-specific restrictions
- An evaluation of whether all the WAG-specific and facility-wide institutional control requirements are being met
- A description of any deficiencies and the efforts or measures that have been or will be taken to correct problems.

After the facility's comprehensive facility-wide approach is well established and the facility has demonstrated its effectiveness, the frequency of future monitoring reports may be modified subject to approval by the EPA and the State of Idaho.

A-7. RECORDKEEPING

The recordkeeping procedures for documenting the annual inspections will include maintaining a project file including the Institutional Control Field Inspection Checklist and the Site Inspection Photo Log from each annual inspection. Records of maintenance activities will also be included in this file. This file will be available to the Agencies, if requested.

A-8. RESPONSE TO FAILED CONTROLS AND CORRECTIVE ACTION

The DOE will notify the EPA and the State of Idaho within 48 hours upon discovery of any activity that is inconsistent with the OU-specific IC objectives for a site, or of any change in the land use or land use designation of a site addressed in the ROD. Examples of reportable items include unauthorized intrusion, excavation, or well drilling. The DOE will work with the EPA and the State of Idaho to determine a plan of action to rectify the situation, except in the case where the DOE believes the activity creates an emergency situation. In those cases, the DOE can respond to the emergency immediately upon notification to the EPA and the State of Idaho and need not wait for the EPA or State of Idaho's input to determine a plan of action.

A-9. REFERENCES

42 USC 9620 et seq., 1980, "Comprehensive Environmental Response, Compensation, and Liability Act of 1980," *United States Code*, December 1980.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order*, Department of Energy Idaho Operations Office, Idaho Department of Health and Welfare, and the Environmental Protection Agency.

DOE-ID, 1997, *Idaho National Engineering and Environmental Laboratory Comprehensive Facility and Land Use Plan*, Department of Energy Idaho Operations Office, DOE/ID-10154, December 1997.

DOE-ID, 2000, *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13*, Department of Energy Idaho Operations Office, DOE/ID-10719, July 2000.

DOE-ID, 2001, *2001 Status of Operable Unit 4-13 Comprehensive Record of Decision Institutional Controls Sites and Final Documentation for No Action Sites*, Department of Energy Idaho Operations Office, DOE/ID-10830, Rev. 0, March 2001.

EPA, 1999, "Region 10 Final Policy on the Use of Institutional Controls at Federal Facilities," United Stated Environmental Protection Agency, Region 10, Memorandum, May 3.

Appendix B

Inspection Report Forms for CFA OU 4-13 Annual Inspections

ANNUAL INSPECTION REPORT FORM FOR WAG 4

INSTITUTIONAL CONTROL PLAN AND OPERATION AND MAINTENANCE PLAN

Date _____ **CFA-01, -02, and –03 Landfills** **Inspector**_____

INSPECTION ACTIVITY AT LANDFILLS	CFA-01	CFA-02	CFA-03	COMMENTS/RECOMMENDED REPAIR
INSTITUTIONAL CONTROLS				
1. Document signs/markers are in place.				
2. Document fences/barriers restrict access.				
VEGETATIVE COVER				
1. Inspect for non-growth areas.				
2. Inspect for sparse growth areas.				
3. Inspect for weed encroachment.				
SOIL COVER				
1. Inspect for erosion areas.				
2. Inspect for subsidence areas or slope movement.				
3. Inspect for animal intrusion.				
4. Conduct topographical survey.				
TIME DOMAIN REFLECTOMETER (TDR)				
1. Inspect cabinet interior for unusual dirt or debris.				
2. Inspect exterior and interior of cabinet for deterioration and presence of moisture or water.				
3. Inspect solar collector barrel for condition/function.				
4. Inspect and verify presence of guard post.				

Printed Name of Inspector _____ Photographs Taken ? ☐ **Yes** ☐ **No**

Signature _____

ANNUAL INSPECTION REPORT FORM FOR WAG 4

INSTITUTIONAL CONTROL PLAN AND OPERATION AND MAINTENANCE PLAN

Date _____ **Page 2** **Inspector**_____

NEUTRON PROBE ACCESS TUBES (NPATs)

1. Inspect for integrity.				
2. Inspect for cleanliness.				
3. Inspect operating condition of lock, rust on cover, well casing damage.				
4. Inspect guard posts around well cover to verify they are stable.				

ROCK ARMOR

1. Inspect to verify no more than 12 inches of subsidence of rock armor.				
2. Conduct topographical survey.				

Printed Name of Inspector _____ Photographs Taken ? ☐ **Yes** ☐ **No**

Signature _____

ANNUAL INSPECTION REPORT FORM FOR WAG 4

INSTITUTIONAL CONTROL PLAN AND OPERATION AND MAINTENANCE PLAN

Date _____ **CFA-08 Sewage Plant Drainfield and Spreading Area A** **Inspector**_____

CFA DRAINFIELD CFA-08		
1. Document signs are in-place.		
2. Document No Excavations or Drilling.		
3. Inspect vegetation for sparse growth.		
4. Inspect vegetation for weed encroachment.		
5. Inspect vegetation for non-growth.		
6. Inspect for erosion.		
7. Inspect for subsidence.		
8. Inspect for animal intrusion.		
9. Inspect permanent markers.		
10. Conduct radiological survey.		

Additional Comments or Notes:

Printed Name of Inspector _____ Photographs Taken ? ☐ **Yes** ☐ **No**

Signature _____

Appendix C

Inspection Photo Log Form
for
WAG 4 Annual Inspections

SITE INSPECTION PHOTO LOG

WASTE AREA GROUP 4 CENTRAL FACILITIES AREA

DATE: _____ TIME OF DAY (if applicable): _____

WEATHER CONDITIONS: _____

FILM TYPE: _____

PHOTO NUMBER	LOCATION AND DIRECTION	DESCRIPTION