DOE/NE-ID-11162
Revision 0
July 2004

U.S. Department of Energy
Idaho Operations Office

Action Memorandum for the OU 7-13/14 Early Actions Beryllium Encapsulation Project

INEEL
Home of Science and Engineering Solutions
Idaho National Engineering and Environmental Laboratory

DOE/NE-ID-11162
Revision 0
Project No. 24059

Action Memorandum for the OU 7-13/14 Early Actions Beryllium Encapsulation Project

Steve L. Lopez

July 2004

Prepared for the
U.S. Department of Energy
DOE Idaho Operations Office

This is the signature sheet for the action memorandum covering the Operable Unit 7-13/14 Early Actions Beryllium Encapsulation Project at the U.S. Department of Energy Idaho National Engineering and Environmental Laboratory. This action is conducted by the U.S. Department of Energy, with the concurrence of the U.S. Environmental Protection Agency and the Idaho Department of Environmental Quality.

Richard B. Provencher
Deputy Manager
U.S. Department of Energy Idaho Operations Office

Date 6/30/04

This is the signature sheet for the action memorandum covering the Operable Unit 7-13/14 Early Actions Beryllium Encapsulation Project at the U.S. Department of Energy Idaho National Engineering and Environmental Laboratory. This action is conducted by the U.S. Department of Energy, with the concurrence of the U.S. Environmental Protection Agency and the Idaho Department of Environmental Quality.

Nicholas Ceto

Nicholas Ceto, Program Manager
Idaho National Engineering and Environmental Laboratory
Region 10
U.S. Environmental Protection Agency

1 July 2004
Date

This is the signature sheet for the action memorandum covering the Operable Unit 7-13/14 Early Actions Beryllium Encapsulation Project at the U.S. Department of Energy Idaho National Engineering and Environmental Laboratory. This action is conducted by the U.S. Department of Energy, with the concurrence of the U.S. Environmental Protection Agency and the Idaho Department of Environmental Quality.

Daryl F. Koch

6-30-04

Daryl F. Koch
Acting Remediation Manager
Waste Management and Remediation Division
Idaho Department of Environmental Quality

Date

ABSTRACT

This report is the decision document for a non-time-critical removal action to encapsulate irradiated beryllium reflector blocks and outer shim control cylinders using in situ grouting. Reflector blocks and shim control cylinders are buried in the Subsurface Disposal Area, a radioactive waste landfill within the Radioactive Waste Management Complex, part of the Idaho National Engineering and Environmental Laboratory.

This action is being initiated because field-monitoring data and modeling of contaminant fate and transport from the *Ancillary Basis for Risk Analysis of the Subsurface Disposal Area* and the *Preliminary Evaluation of Remedial Alternatives for the Subsurface Disposal Area* suggest that release and migration of mobile fission and activation products (including carbon-14) are occurring. Corrosion of the reflector blocks and subsequent documented release of carbon-14 into the surrounding environment indicate that, if no response action is taken, migration of these contaminants from the Subsurface Disposal Area to the Snake River Plain Aquifer will occur in less than 100 years.

In situ grouting has been identified in the *Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study* as part of the assembled alternatives for final remediation of the Subsurface Disposal Area and does not preclude final remedies. Completing this action can significantly reduce beryllium corrosion and infiltration of water through areas where the beryllium reflector blocks and shim control cylinders are buried.

CONTENTS

FIGURES

TABLES

ACRONYMS

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U.S. Department of Energy
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
FFA/CO	Federal Facility Agreement and Consent Order
INEEL	Idaho National Engineering and Environmental Laboratory
ISG	in situ grouting
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTCRA	non-time-critical removal action
OSCC	outer shim control cylinder
SDA	Subsurface Disposal Area

Action Memorandum for the OU 7-13/14 Early Actions Beryllium Encapsulation Project

1. PURPOSE

This action memorandum documents selection of the non-time-critical removal action (NTCRA) recommended in the *Engineering Evaluation/Cost Analysis for the OU 7-13/14 Early Actions Beryllium Project* (Lopez and Schultz 2004). This action is for specific locations in the Subsurface Disposal Area (SDA) within the Radioactive Waste Management Complex at the Idaho National Engineering and Environmental Laboratory (INEEL) (see Figure 1 for the location of the INEEL and major facilities). The INEEL is a federal facility under the U.S. Department of Energy (DOE). This NTCRA comprises in situ grouting (ISG) to reduce release and migration of carbon-14 by isolating irradiated beryllium reflector blocks buried at the SDA. Outer shim control cylinders (OSCC) are components that are used to control the neutron flux within the reactor and contain a large amount of beryllium that would have been activated to some extent.

Field-monitoring data and modeling of contaminant fate and transport from the *Ancillary Basis for Risk Analysis of the Subsurface Disposal Area* (Holdren et al. 2002) and the *Preliminary Evaluation of Remedial Alternatives for the Subsurface Disposal Area* (Zitnik et al. 2002) suggest that mobile, long-lived C-14 (5,715-year half-life) may be released and migrate to the Snake River Plain Aquifer beneath the SDA if no action is taken to mitigate this release. In situ grouting is part of the assembled alternatives in the *Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study* (Holdren and Broomfield 2003).

This NTCRA will isolate the beryllium reflector blocks and reduce the infiltration of water through areas where they are buried in the SDA, therefore reducing corrosion and corresponding release and migration of C-14. This action is consistent with assembled alternatives and does not preclude final remedies for the SDA. The final remedial alternatives currently under consideration are No Action (as a baseline), an engineered surface barrier cap (a cap is an element of all alternatives), ISG, and retrieval (with treatment and disposal). Also, grouting the beryllium blocks will not hinder future retrievals, should they be necessary.

2. BACKGROUND AND SITE DESCRIPTION

The following sections provide historical background of the Site and the beryllium reflector blocks. Table 1 (adapted from Mullen et al. 2003) summarizes the irradiated beryllium reflector block and OSCC waste in the SDA and identifies burial locations. The Engineering Evaluation/Cost Analysis (EE/CA) (Lopez and Schultz 2004), Section 2, contains further descriptions and details of this removal action.

2.1 Site Description

Contaminants in the SDA radioactive waste landfill include elements resulting from weapons manufactured at the Rocky Flats Plant, fission and activation products resulting from on- and off-INEEL reactor operations, and hazardous chemicals associated with all waste sources. Currently, the Radioactive Waste Management Complex covers 71.6 ha (177 acre) in the southwestern quadrant of the INEEL. In 1952, the SDA was established at 5.26 ha (13 acre) for disposal of solid radioactive waste. Burial of defense waste with transuranic elements from the Rocky Flats Plant began in 1954; by 1957 the original SDA was nearly full. In 1958, the SDA was expanded to 35.6 ha (88 acre), which remained the same until 1988, when the security fence was relocated outside the dike surrounding the SDA, and the current size of 39.3 ha (97.14 acre) was established. Radioactive waste was buried in pits, trenches, and soil vault rows excavated into a veneer of surficial sediment. This sediment is underlain by a thick series of basaltic lavas intercalated with sedimentary deposits.

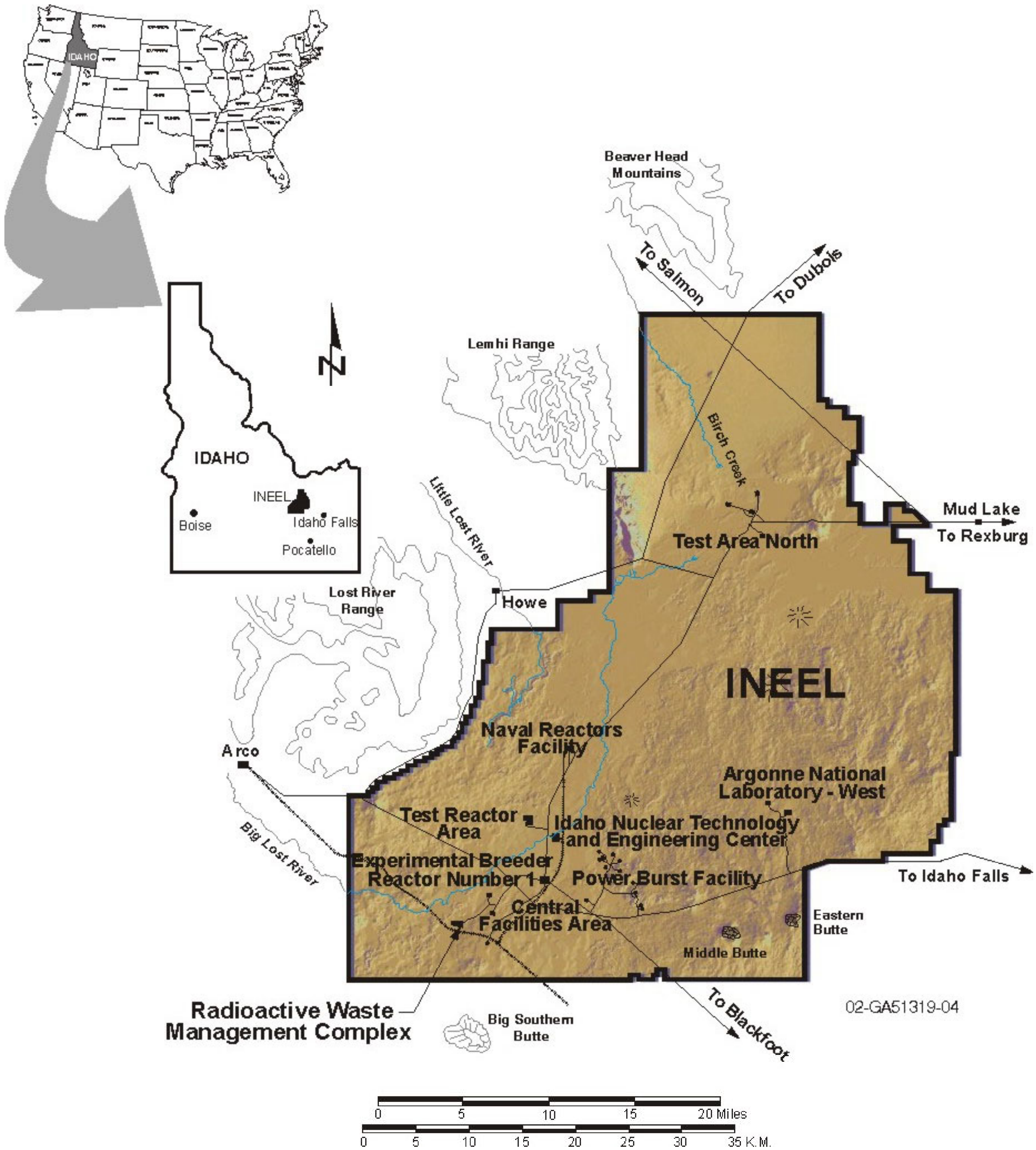

Figure 1. Map of the Idaho National Engineering and Environmental Laboratory showing locations of the Radioactive Waste Management Complex and other major facilities.

Table 1. Summary of irradiated beryllium reflector waste from Test Reactor Area disposed of in the Subsurface Disposal Area.

Reactor and Beryllium Waste Disposed of by Serial Number or Core Position	Beryllium Metal Mass (g)	Metal Volume (m^3)	Disposal Location[a,b]	Total Carbon-14 (Ci)	Carbon-14 Concentration (Ci/m^3)
Materials Test Reactor	~2,000,000	~1.08	Trench 54	29.2	27.00
Advanced Test Reactor	—	—	—	—	—
Block NW-L	81,420	0.044	Trench 58	0.9997	22.72
NW-R	81,420	0.044	Trench 58	0.9997	22.72
NE-L	81,420	0.044	Trench 58	0.9679	22.00
NE-R	81,420	0.044	Trench 58	0.9679	22.00
SW-L	81,420	0.044	Trench 58	0.9683	22.01
SW-R	81,420	0.044	Trench 58	0.9683	22.01
SE-L	81,420	0.044	Trench 58	0.9696	22.04
SE-R	81,420	0.044	Trench 58	0.9696	22.04
Block NE-L	81,420	0.044	Trench 58	0.8189	18.61
NE-R	81,420	0.044	Trench 58	0.8189	18.61
SW-L	81,420	0.044	Trench 58	1.2540	28.50
SW-R	81,420	0.044	Trench 58	1.2540	28.50
SE-L	81,420	0.044	Trench 58	0.8441	19.18
SE-R	81,420	0.044	Trench 58	0.8441	19.18
Block 018L	81,420	0.044	Soil Vault Row 20	1.8530	42.11
013R	81,420	0.044	Soil Vault Row 20	1.8530	42.11
015L	81,420	0.044	Soil Vault Row 20	1.6270	36.98
019L	81,420	0.044	Soil Vault Row 20	2.0660	46.95
014R	81,420	0.044	Soil Vault Row 20	2.0660	46.95
011R	81,420	0.044	Soil Vault Row 20	2.4970	56.75
Nine outer shim control cylinders	489,881	0.2648	Soil Vault Row 17	15.9100	60.08
Total	4,742,281	2.562	N/A	92.4170	N/A

This table is adapted from Mullen et al. (2003).
a. Shipping records show beryllium with a high curie load in Trench 54, which may be indicative of reflectors or other core components.
b. Shipping records show additional beryllium disposals from the Advanced Test Reactor and Engineering Test Reactor. These disposals may be included after verification and validation of the location.

The major contribution of beryllium reflector waste to the SDA came from the Test Reactor Area. At the Test Reactor Area, the Advanced Test Reactor, Engineering Test Reactor, and Materials Test Reactor contributed beryllium reflectors and other irradiated components that were buried in pits and soil vaults in the SDA between 1970 and 1993. The beryllium had been used as a neutron reflector in these nuclear test reactors. The buried waste includes 20 beryllium blocks from Advanced Test Reactor Cores 1, 2, and 3, nine OSCCs from Advanced Test Reactor Cores 1 and 2, and one beryllium reflector assembly each from the Materials Test Reactor and Engineering Test Reactor. Results of monitoring from functioning probes at two of the beryllium burial locations indicate that specific activity of C-14 in samples is approximately two to five orders of magnitude above the typical background concentration of C-14, which is 6.5 pCi/g (Olson et al. 2003; Koeppen et al. 2004).

2.2 Location

Irradiated beryllium reflector blocks were disposed of in the SDA during three major disposals in 1976, 1977, and 1993. A total of 4,742 kg (10,454 lb) of beryllium was disposed of from the Test Reactor Area (Mullen et al. 2003). Under this NTCRA, encapsulation is recommended for beryllium reflector blocks and OSCC disposed of in Soil Vault Rows 17 and 20 and Trenches 52, 54, and 58 (see Figure 2). An additional location may be included in this NTCRA pending verification and validation of beryllium reflector blocks within Trench 57.

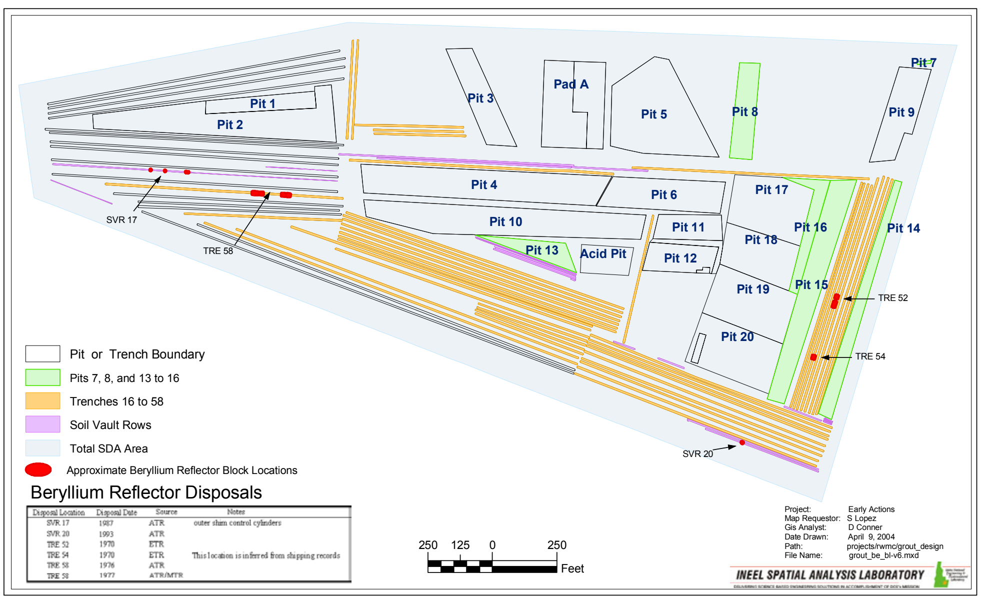

Figure 2. Map of pits, trenches, and soil vault rows in the Subsurface Disposal Area showing burial areas of beryllium reflector blocks and outer shim control cylinders.

2.3 Other Actions to Date

Previous actions include:

- Fencing around the perimeter of the SDA to keep intruders out
- Monitoring of shallow subsurface vapor and soil moisture around specific beryllium blocks; concentrations of C-14 have been increasing since 1999 (Holdren et al. 2002)

- Monitoring of vadose zone for contaminant releases has detected C-14 in unsaturated subsurface; concentration is increasing in soil moisture and perched water (Holdren et al. 2002)

- Two previous studies that have:

  - Analyzed the estimated cumulative human health and ecological risks of the SDA (Holdren et al. 2002)

  - Evaluated alternatives to identify and screen potential technologies and process options for remediating the SDA (Zitnik et al. 2002).

Current actions include:

- Rope barriers isolating Soil Vault Row 20 to keep out unauthorized personnel

- Maintenance activities contouring the surface; this ensures cover and controls drainage to reduce moisture infiltration.

3. THREATS TO THE ENVIRONMENT

Under this NTCRA, beryllium reflector blocks will be encapsulated using ISG in specific areas at the SDA. This response action is based, in part, on five previous documents:

- The Ancillary Basis for Risk Analysis of the Subsurface Disposal Area (Holdren et al. 2002) estimated cumulative human health and ecological risks associated with the SDA

- The Preliminary Evaluation of Remedial Alternatives for the Subsurface Disposal Area (Zitnik et al. 2002) evaluated remedial alternatives to mitigate unacceptable risks

- The Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study (Holdren and Broomfield 2003) identified ISG as part of all assembled alternatives for final remediation of the SDA

- Two reports, FY 2002 Environmental Monitoring Report for the Radioactive Waste Management Complex (Olson et al. 2003) and Fiscal Year 2003 Environmental Monitoring Report for the Radioactive Waste Management Complex (Koeppen et al. 2004), identify presence of contaminants of potential concern in both the vadose zone and the aquifer.

These studies provided updated supporting information to identify radionuclides and waste forms that are candidates for early action and a method to reduce risk from these waste forms. Carbon-14 in activated beryllium reflector blocks was identified as an important cause of near-term risk. It was concluded from these reports that near-term risk and hazards may exist, and, if not addressed in a timely manner by implementing the response action selected in this action memorandum, the risk and hazards may be realized.

An early action that implements ISG at the SDA could significantly reduce source release and contaminant mobility and is consistent with implementing the final remedial action. The *Ancillary Basis for Risk Analysis of the Subsurface Disposal Area* (Holdren et al. 2002) estimates groundwater ingestion risk greater than 1E–04 from C-14 from all sources, and 19% of the C-14 risk is attributable to the beryllium reflector blocks. In situ grouting was selected in accordance with "National Oil and Hazardous Substances Pollution Contingency Plan" (NCP) (40 CFR 300) regulations promulgated by the U.S.

Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq., 1980), as amended by the Superfund Amendments and Reauthorization Act.

4. ENDANGERMENT DETERMINATION

Based on existing site characterization and risk information, it is concluded that beryllium located within the SDA contains hazardous substances that have been released to the surrounding environment and that the source materials present a risk of future release, and therefore, there is a basis for undertaking response action under authority of CERCLA Section 104(a)(1). The corrosion of beryllium and subsequent release of C-14 from this site pose a threat to the environment if the response action selected in this action memorandum is not implemented. The proposed NTCRA is consistent with relevant NCP criteria for determining the appropriateness of a removal action because the area contains “hazardous substances or pollutants or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release” (40 CFR 300.415[b][2][iii]).

5. PROPOSED ACTIONS AND ESTIMATED COST

5.1 Proposed Actions

The in situ encapsulation will be accomplished by using a high-pressure (300–500 bars [4,500–7,500 psi]) nondisplacement jet-grouting method (DOE-ID 1999; Loomis, Zdinak, and Bishop 1997). The injection of a specially formulated grout (e.g., Waxfix) will be completed with a drill rig, which inserts and pushes a removable drill stem to the bottom of the waste zone (i.e., bedrock), injecting the specially formulated grout while the drill stem is removed. During the injection process, grout returns to the surface along the outside of the drill stem will confirm filling the void space.

In situ grouting has been approved by regulating agencies and implemented on small-scale sites at the Oak Ridge National Laboratory, the Savannah River Site, the Brookhaven National Laboratory, and the Acid Pit within the SDA. An evaluation of the technology and application to the SDA conditions, including a summary of ISG case histories, is provided in the *Evaluation of In Situ Grouting for Operable Unit 7-13/14* (Armstrong, Arrenholz, and Weidner 2002). This action is consistent with the final remedy.

The objective of using ISG is to encapsulate buried waste in contiguous grout columns to stabilize C-14 resulting from corrosion of the beryllium reflector blocks buried in soil vaults and trenches. This proposed action will encapsulate beryllium reflector waste in Soil Vault Rows 17 and 20 and Trenches 52, 54, and 58 (see Figure 2 for map of locations). This ISG technology will limit:

- Metallic corrosion and nonmetallic dissolution by minimizing the amount of water that can reach the waste and by insulating dissimilar metals to mitigate galvanic corrosion
- Diffusion of released radionuclides into surrounding soil
- The chemical environment that promotes leaching of contaminants.

Table 1 presents a tabulation of information specific to beryllium reflector blocks and OSCC for which this action is recommended. At this time, the beryllium identified in Table 1 is all of the beryllium reflector blocks that records identify as being disposed of in the SDA. All known locations will be surveyed using geophysical methods, through tritium sampling and inventory updates, before initiation of any action proposed in this document.

5.2 Removal Action Objectives

This removal action contributes to overall remediation of the SDA under CERCLA and is consistent with assembled alternatives in the *Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study* (Holdren and Broomfield 2003). The objectives of the removal action are to:

- Reduce the risk of contaminant migration toward the Snake River Plain Aquifer by grouting the contaminant source (i.e., beryllium blocks)

- Inhibit further corrosion of the beryllium blocks and thus the release and subsequent migration of contaminants

- Prevent worker exposure through engineering and institutional controls to potential contaminants released during the grouting activity.

5.3 Estimated Cost

This section provides the estimated cost for ISG as detailed in the EE/CA (Lopez and Schultz 2004). The record of decision for Operable Unit 7-13/14 will specify CERCLA monitoring requirements for the entire Radioactive Waste Management Complex.

Costs for grouting are presented as entire project costs, from start to finish. Development of the grouting alternative for beryllium reflector blocks has a proposed duration of 1 year.

Table 2 summarizes the initial cost estimate for ISG.

Table 2. Total estimated costs for in situ grouting.

Cost Element	In Situ Grouting ($)
Management and oversight	1,000K
Engineering	100K
Procurement	50K
Construction	3,000K
Operation and maintenance support	250K
Surveillance and monitoring	100K
Total	4,500K

5.4 Project Schedule

This removal action is projected to be completed within Fiscal Year 2004. The tentative schedule for grouting shows mobilization in May 2004, with grouting starting in June, and completion of the grouting action by October 2004. A final report on the NTCRA will be produced by Bechtel BWXT Idaho, LLC, upon completion of the project; the grouting contactor also will produce a final report. The final reports will be delivered to EPA and Idaho Department of Environmental Quality. Below is a high-level schedule for the project:

- Grouting demonstration ` 06/14/04–06/19/04
- Mobilize to test area 06/14/04-06/30/04
- Management self-assessment 06/21/04-07/06/04
- Perform grouting 07/07/04-08/31/04
- Project close-out and final operations 09/02/04-09/30/04
- Final report 09/17/04-09/30/04.

5.5 Applicable or Relevant and Appropriate Requirements

Table 3 summarizes the evaluation of regulatory compliance and applicable or relevant and appropriate requirements (ARARs). Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies that result in the establishment of numerical values when applied to site-specific conditions. Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in specific locations.

The selected response action will be protective of human health and the environment and will be performed in a cost-effective manner. The removal action complies with those federal and state ARARs as identified for the scope of this action. The following subsections discuss chemical-specific, action-specific, and location-specific ARARs pertinent to this removal action. The removal action ARARs are shown in Table 3.

Table 3. Regulatory compliance evaluation summary for the In Situ Grouting alternative.

Applicable or Relevant and Appropriate Requirements or to Be Considered	Type	Relevancy[a]	Citation
Idaho toxic air pollutants	Chemical	A	(IDAPA 58.01.01.585 and .586)
Idaho ambient air quality standards for specific air pollutants	Chemical	A	(IDAPA 58.01.01.577)
National emission standards for emissions of radionuclides other than radon from U.S. Department of Energy facilities	Chemical/ Action	A	(40 CFR 61.92, .93, .94[a])
National ambient air quality standards	Chemical	A	(40 CFR 50)
Idaho control of fugitive dust emissions	Action	A	(IDAPA 58.01.01.650 and .651)
Hazardous waste determination	Action	A	(IDAPA 58.01.05.006) (40 CFR 262.11)
Standards for owners and operators of treatment, storage, and disposal facilities—use and management of containers	Action	R	(IDAPA 58.01.05.008) (40 CFR 264.171–177)
Radioactive waste management	Action	TBC	(DOE O 435.1)
Radiation protection of the public and the environment	Chemical and action	TBC	(DOE O 5400.5)
Decontamination of equipment	Action	TBC	(DOE O 5400.5[IV][4][d])

a. A = applicable requirement, R = relevant and appropriate requirement, TBC = to-be-considered requirement

5.5.1 Chemical-Specific Applicable or Relevant and Appropriate Requirements

It is anticipated that chemical-specific provisions of the Idaho groundwater quality rules and associated maximum contaminant levels (IDAPA 58.01.11) will be ARARS for the comprehensive Operable Unit 7-13/14 remedy but are not applicable or relevant to the limited scope of the NTCRA. Since the removal action only constitutes partial control, chemical-specific ARARS for groundwater restoration are not being considered (EPA 1988).

5.5.2 Action-Specific Applicable or Relevant and Appropriate Requirements

Substantive Resource Conservation and Recovery Act requirements for generators to identify and manage hazardous waste (40 CFR 261; 40 CFR 262) would be applicable to ISG if hazardous waste was generated during these activities. Requirements for storage (40 CFR 264.171–177) are identified as ARARs to address this possibility. The decision to implement Resource Conservation and Recovery Act ARARs will be based on the hazardous waste determination that will be completed before implementation of the response action.

Construction and remediation would meet state and federal requirements for air quality standards. Requirements for the State of Idaho include controlling toxic air pollutants (IDAPA 58.01.01.585 and .586), "Ambient Air Quality Standards for Specific Air Pollutants" (e.g., particulate matter [IDAPA 58.01.01.577]), and "Rules for Control of Fugitive Dust" (IDAPA 58.01.01.650). Federal requirements include "National Emission Standards for Hazardous Air Pollutants" (e.g., radionuclides) (40 CFR 61) and "National Primary and Secondary Ambient Air Quality Standards" (e.g., particulate matter) (40 CFR 50). These requirements would be met by using appropriate engineering controls.

Relevant substantive requirements of "Radiation Protection of the Public and the Environment" (DOE O 5400.5) and "Radioactive Waste Management" (DOE O 435.1), which specify DOE radiation protection and management requirements, would be met as to-be-considered requirements.

5.5.3 Location-Specific Applicable or Relevant and Appropriate Requirements

Because the SDA is a previously disturbed area and because of the limited scope of this NTCRA, no location-specific requirements are identified.

6. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delaying the removal action may result in future risk to health and safety of the public and to the environment. Accepting the No Action alternative at this time will allow corrosion of the beryllium blocks to continue, causing release of C-14 and ultimate contamination of the Snake River Plain Aquifer.

7. STATUTORY AND REGULATORY AUTHORITY

In 1989—under the authority of CERCLA (42 USC § 9601 et seq., 1980)—the EPA listed the INEEL on the National Priorities List (54 FR 48184). In 1991, the DOE, EPA, and Idaho Department of Health and Welfare—now the Idaho Department of Environmental Quality—signed a Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991) outlining the process and schedule to facilitate cleanup of areas at the INEEL. The process and schedule are identified in the FFA/CO Action Plan in accordance with CERCLA, the Resource Conservation and Recovery Act (42 USC § 6901 et seq., 1976), and the State of Idaho Hazardous Waste Management Act (Idaho Code § 39-4401 et seq., 1983).

The lead agency for this NTCRA decision is DOE. The EPA and Idaho Department of Environmental Quality participate by reviewing the EE/CA and reviewing and concurring on this action memorandum. After completion of the NTCRA, the effect of this NTCRA and the remaining contaminants will be reviewed by the agencies under the FFA/CO process as part of the remedial action process. This action will comply with the state and federal ARARs. See Section 5.5 for a detailed statement of ARARs. An action implementing ISG at the SDA could significantly reduce source release and contaminant mobility and is consistent with implementing the final remedial action.

The DOE Idaho Operations Office, in line with the commitment to solicit public participation on remedial action in the *Community Relations Plan: A Guide to CERCLA Public Involvement in the Cleanup Program at the INEEL* (DOE-ID 2004), has made the EE/CA (Lopez and Schultz 2004) available in the Administrative Record file for Operable Unit 7-13/14 and on the Internet. The Administrative Record is located at the DOE Reading Room of the Technical Library in Idaho Falls; copies also were available at Albertsons Library at Boise State University. The EE/CA was available on the Internet at *http://ar.inel.gov*. In addition to public availability of the EE/CA, two briefings requested by citizens' groups were held on April 6 and 9, 2004. A total of 27 comments was received through the public availability of the EE/CA and the two briefings. These comments and responses have been added to the Administrative Record file and are attached as Appendix A. The comments did not require any changes in the early action.

The DOE Idaho Operations Office has concluded that an NTCRA is warranted to reduce risk caused by corroding beryllium reflector blocks and subsequent release of C-14, which poses a threat to the environment. The decision is consistent with regulations from the NCP [40 CFR 300.415(b)(4)(i)]. The NCP lists actual or threatened releases of pollutants and contaminants as factors for concluding that an appropriate removal action is warranted.

8. OUTSTANDING POLICY ISSUES

No outstanding policy issues are associated with this action.

The activities covered by this action memorandum will be consistent with the requirements of the INEEL FFA/CO (DOE-ID 1991). The FFA/CO ensures that the DOE Idaho Operations Office and its contractors comply with federal and state environmental regulations for cleanup at each waste area. Based on agreements with EPA and Idaho Department of Environmental Quality, DOE Idaho Operations Office is conducting this action to remove a hazard caused by corrosion of beryllium and subsequent release of C-14. A summary report of activities completed under this action will be made available to the public in compliance with the *Community Relations Plan: A Guide to CERCLA Public Involvement in the Cleanup Program at the INEEL* (DOE-ID 2004), which applies to all CERCLA activities at the INEEL.

9. ENFORCEMENT

The DOE Idaho Operations Office is conducting this removal action as the lead agency under the authority of the NCP (40 CFR 300).

10. RECOMMENDATION

This decision document provides for encapsulating buried beryllium reflector blocks and OSCCs by ISG, therefore mitigating release of C-14 to the environment from the SDA. It was developed in accordance with CERCLA and is consistent with NCP (40 CFR 300).

An action implementing ISG at the SDA could significantly reduce source release and contaminant mobility and is consistent with implementing the final remedial action. Grouting will meet the objective of this action, which is to reduce release and mobility of C-14 from beryllium reflector blocks buried in the SDA. This approval to grout beryllium reflector blocks is consistent with:

- The *Preliminary Evaluation of Remedial Alternatives for the Subsurface Disposal Area* (Zitnik et al. 2002)

- The *Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study* (Holdren and Broomfield 2003)

- All potential final remedies for the SDA

- The EE/CA (Lopez and Schultz 2004).

The ISG response action is expected to encapsulate and stabilize C-14. By implementing grouting now, the risk to human health will be substantially reduced.

11. REFERENCES

40 CFR 50, 2003, "National Primary and Secondary Ambient Air Quality Standards," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 61, 2004, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 261, 2004, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 262, 2004, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 264 2002, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 300, 2004, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations*, Office of the Federal Register.

42 USC § 6901 et seq., 1976, "Resource Conservation and Recovery Act of 1976 (Solid Waste Disposal Act)," *United States Code*.

42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code*.

54 FR 48184, 1989, "National Priorities List of Uncontrolled Hazardous Waste Sites; Final Rule," *Federal Register*, U.S. Environmental Protection Agency.

Armstrong, Aran T., Daniel A. Arrenholz, and Jerry R. Weidner, 2002, *Evaluation of In Situ Grouting for Operable Unit 7-13/14*, INEEL/EXT-01-00278, CH2MHILL and North Wind Environmental for the Idaho National Engineering and Environmental Laboratory.

DOE O 435.1, 2001, "Radioactive Waste Management," Change 1, U.S. Department of Energy.

DOE O 5400.5, 1993, “Radiation Protection of the Public and the Environment,” Change 2, U.S. Department of Energy.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory,* Administrative Record No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare.

DOE-ID, 1999, *Operable Unit 7-13/14 In Situ Grouting Treatability Study Work Plan*, DOE/ID-10690, Rev. 0, U.S. Department of Energy Idaho Operations Office.

DOE-ID, 2004, *Community Relations Plan: A Guide to CERCLA Public Involvement in the Cleanup Program at the INEEL*, DOE/NE-ID-11149, Idaho National Engineering and Environmental Laboratory.

EPA, 1988, *CERCLA Compliance with Other Laws Manual: Interim Final*, EPA/540/G-89/006, U.S. Environmental Protection Agency.

Holdren, K. Jean, Bruce H. Becker, Nancy L. Hampton, L. Don Koeppen, Swen O. Magnuson, T. J. Meyer, Gail L. Olson, and A. Jeffrey Sondrup, 2002, *Ancillary Basis for Risk Analysis of the Subsurface Disposal Area,* INEEL/EXT-02-01125, Rev. 0, Idaho National Engineering and Environmental Laboratory.

Holdren, K. Jean and Barbara J. Broomfield, 2003, *Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study*, INEL-95/0253, Rev. 2, Idaho National Engineering and Environmental Laboratory.

Idaho Code § 39-4401 et seq., 1983, “Hazardous Waste Management Act of 1983,” State of Idaho, Boise, Idaho.

IDAPA 58.01.01.577, 1994, “Ambient Air Quality Standards for Specific Air Pollutants,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

IDAPA 58.01.01.585, 1995, “Toxic Air Pollutants Non-Carcinogenic Increments,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

IDAPA 58.01.01.586, 2001, “Toxic Air Pollutants Carcinogenic Increments,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

IDAPA 58.01.01.650, 1994, “Rules for Control of Fugitive Dust,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

IDAPA 58.01.01.651, 1994, “General Rules,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

IDAPA 58.01.05.006, 2004, “Standards Applicable to Generators of Hazardous Waste,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

IDAPA 58.01.05.008, 2004, “Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

IDAPA 58.01.11, 1997, “Ground Water Quality Rule,” Idaho Administrative Procedures Act, Idaho Department of Environmental Quality.

Koeppen, L. Don, Alva M. Parsons, A. Jeffrey Sondrup, Paul D. Ritter, and Gail L. Olson, 2004, *Fiscal Year 2003 Environmental Monitoring Report for the Radioactive Waste Management Complex*, ICP/EXT-04-00259, Rev. 0, Idaho Completion Project.

Loomis, G. G., A. P. Zdinak, and C. W. Bishop, 1997, *Innovative Subsurface Stabilization Project - Final Report*, INEL-96/0439, Rev. 1, Idaho National Engineering and Environmental Laboratory.

Lopez, Steve L. and Vivian G. Schultz, 2004, *Engineering Evaluation/Cost Analysis for the OU 7-13/14 Early Actions Beryllium Project*, DOE/NE-ID-11144, Rev. 0, U.S. Department of Energy Idaho Operations Office.

Mullen, Carlen K., Glen R. Longhurst, Michael L. Carboneau, and James W. Sterbentz, 2003, *Beryllium Waste Transuranic Inventory in the Subsurface Disposal Area Operable Unit 7-13/14*, INEEL/EXT-01-01678, Rev. 2, Idaho National Engineering and Environmental Laboratory.

Olson, Gail L., L. Don Koeppen, Alva M. Parsons, Paul D. Ritter, and A. Jeffrey Sondrup, 2003, *FY 2002 Environmental Monitoring Report for the Radioactive Waste Management Complex*, INEEL/EXT-03-00055, Rev. 0, Idaho National Engineering and Environmental Laboratory.

Zitnik, James F., Aran T. Armstrong, Brian K. Corb, Mark H. Edens, Douglas B. Holsten, Patricia M. O'Flaherty, Janet Rodriguez, Tamara N. Thomas, Russell L. Treat, Wayne Schofield, and Kira L. Sykes, 2002, *Preliminary Evaluation of Remedial Alternatives for the Subsurface Disposal Area,* INEEL/EXT-02-01258, prepared by CH2MHILL for the Idaho National Engineering and Environmental Laboratory.

Appendix A

Comments and Resolutions from Public Availability of the Engineering Evaluation/Cost Analysis

Date	Commenter	Affiliation	Comment #	Comment	Response
3/15/2004	John McCray	INEEL Employee	1	A quick review of CRC and other chemical handbooks show beryllium to be insoluble in water, but soluble in alkaline solutions. This supports the higher than expected corrosion to date (alkaline soil), and strongly suggests that further corrosion of the beryllium will be enhanced, rather than hindered, by using an alkaline grout. If a grout must be used, formulation and other steps could be taken to minimize any increased corrosivity (i.e., high pozzolan [low alkaline activator] content, increased distance between the beryllium and the grout, etc.), but none are mentioned in the "analysis". In light of the above comments, has any real testing been performed that shows this technique actually works with beryllium?	Testing of in situ grouting using WAXFIX took place in 1996 in the Subsurface Disposal Area (SDA) Cold Test Pit. Results from the 1996 tests are in *Final Results Report, In Situ Grouting Technology for Application in Buried Transuranic Waste Sites*, Volumes 1 and 2 (INEEL/EXT-02-00233). Although these tests did not directly address the beryllium blocks, subsequent evaluation and testing have considered the issue of alkalinity. This consideration resulted in choice of the paraffin-based grout WAXFIX, which has shown that it will be an effective medium to isolate the beryllium blocks from moisture and alkaline soil and thus reduce release of carbon-14. The evaluation and analysis of grout for this project are in "Grout Selection Criteria and Recommendation for the OU 7-13/14 In Situ Grouting Early Action Project" (EDF-4397). This file is available at **http://ar.inel.gov/owa/getimage**. Your question about alkalinity is addressed also in Evaluation of the Durability of WAXFIX for Subsurface Applications (ICP/EXT-04-00300) due for publication in June 2004.
3/29/2004	Ray Daniels	Defense Nuclear Facilities Safety Board	2	The only alternatives considered are in situ grouting or no action. No reference to how the grouting alternative was selected. The paper does state that they think retrieval would be slow and dangerous, and they have no where to dispose of the blocks if retrieved, but no reference as to how they came to those conclusions. The PERA also does not do so. Have you considered the potential for radiolysis of the wax grout or whether they can actually inject it such that it will effectively surround the Be blocks?	(1) In response to the issue of a lack references for the selection of in situ grouting, evaluation of the technique of in situ grouting is in the *Preliminary Evaluation of Remedial Alternatives for the Subsurface Disposal Area* (PERA) (INEEL/EXT-02-01258). An evaluation of grouting is included in the assembled alternatives in the *Second Revision to the Scope of Work for the Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study* (INEL-95/0253). The purpose of this early action is to stabilize a near-term risk before a final remedy is chosen using a non-time-critical removal action under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Grouting now does not preclude using any of the other alternatives, including retrieval, should they become part of the record of decision. The problems with retrieval include: Risk of worker exposure to retrieve would be very high, given that the radiation field at the time of disposal was over 600 R/hour at contact. Aboveground storage presents even more risk to human health and the environment; no facility for aboveground storage is available at the Radioactive Waste Management Complex (RWMC). No transportation cask is currently certified; curie content of shipments limits transportation and would require modifying the certification of compliance for the Nuclear-Regulatory-Commission-approved 72B cask. No disposal facility currently exists. Even at the Waste Isolation Pilot Plant facility, the beryllium waste does not meet the waste acceptance criteria. With retrieval not possible at this time, the remaining option is in situ treatment of some kind. In line with the references listed above, in situ grouting was therefore selected. (2) Specific evaluation of WAXFIX grout, including the effect of radiolysis, is reported in Evaluation of the Durability of WAXFIX for Subsurface Applications (ICP/EXT-04-00300), due

Date	Commenter	Affiliation	Comment #	Comment	Response
					for publication in June 2004. Studies show that the crystalline structure of paraffin is not as sensitive to radiation damage as are other hydrocarbons, such as plastics. Conservative calculations for the blocks with the highest activity indicate that WAXFIX should not reach a level of significant radiation damage (i.e., 10^9 R or more) for several hundred years. In terms of injecting it in a way that will effectively surround the blocks, demonstrations of WAXFIX at the Idaho National Engineering and Environmental Laboratory (INEEL) and Hanford have produced a solid monolith in areas grouted. Dissection after injection showed a coating on almost all surfaces exposed to grouting; for example, a closed binder with multiple pages had coating on individual pages. The pattern for injection will narrow in on the blocks to facilitate grout movement toward the blocks and into any void spaces. The nozzle of the grout stem allows for a 1-ft spread from the casing (2 ft in diameter).
4/26/2004	John Tanner	Coalition 21	3	In a recent workshop (INEEL/EXT-02-00785) it was stated that the US may be soon be dependent on foreign sources for a part of its beryllium needs. The recommendation was made that DOE evaluate the costs and benefits of recovering and recycling the buried beryllium. We support this recommendation, and propose that for now DOE base its grouting decision on whether grouting would help or hinder recycling the beryllium. Later, if the cost/benefit evaluation of recycling indicates that recycling is not desirable, then DOE could proceed with grouting, if it had not already done so. Fortunately, the estimated cost of grouting is low.	Although a practical means for recycling the beryllium blocks is not now available, the WAXFIX grouting process is reversible and would not hinder recovery of the beryllium should recycling and a means of retrieval become available in the future.
4/27/2004	Jeremy Maxand	Snake River Alliance	4	DOE has explained that the process that limited worker exposure when the beryllium blocks were buried cannot be reversed to allow the blocks to be removed. The primary reasons seemed to be that 1) the apparatus surrounding the blocks has corroded, and 2) there is no designated disposal site for this type of material. Is corrosion such a controlling factor for the most recently buried blocks?	The blocks themselves are corroding, not the supporting “baskets” or containers, and the length of time the blocks have been buried is not an issue. The issues that complicate retrieval are: Risk of worker exposure to retrieve would be very high, given that the radiation field at the time of disposal was over 600 R/hour at contact. Aboveground storage presents even more risk to human health and the environment; no facility for aboveground storage is available at RWMC. No transportation cask is currently certified; curie content of shipments limits transportation and would require modifying the certification of compliance for the Nuclear-Regulatory-Commission-approved 72B cask. No disposal facility currently exists. Even at the Waste Isolation Pilot Plant facility, the beryllium waste does not meet the waste acceptance criteria.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/27/2004	Jeremy Maxand	Snake River Alliance	5	Based particularly on the Engineering Design File, there seem to be a number of outstanding uncertainties/issues/risks. How and when will these be addressed? How will the new information be made available to the public?	An engineering design file (EDF) is part of a rigorous planning process, and the nature of an EDF is identification of these uncertainties, issues, and risks, so they can be resolved before beginning any work. The EDF for this project is "Grout Selection Criteria and Recommendation for the OU 7-13/14 In Situ Grouting Early Action Project" (EDF-4397). Experts in the field of each of the areas of uncertainty or risk have been consulted and have determined that the risks are manageable through rigorous health and safety standards, extensive management oversight, constant monitoring during operations, long-term monitoring, and engineering evaluations. Numerous documents are produced to address the risks and uncertainties: health and safety plans, design specifications, procedures, and hazards analysis documents. The project relies on these documents to handle and address the uncertainties. As an example of making new information available to the public, one of the original uncertainties was the performance of WAXFIX. WAXFIX has now been analyzed and evaluated; results are reported in Evaluation of the Durability of WAXFIX for Subsurface Applications (ICP/EXT-04-00300) due for publication and available to the public in June 2004.
4/27/2004	Jeremy Maxand	Snake River Alliance	6	What protocol is in place to detect any problems that might dictate modification or cessation of the project?	Reviews by management, project reviews, and checks will be in place to allow identification of potential problems. Specific project controls include: worker safety controls, onsite direct monitoring, active oversight by environmental health and safety experts, monitoring by instruments, and continuing management assessment. If any problems arise, the correct response, whether modification or cessation, will be determined and communicated to the public through INEEL protocol. For example, if the quantity of grout being used or the penetration of the drill appears to be outside the anticipated parameters defined in the subcontract, the project will be placed on standby in order to evaluate acceptability or to define a path forward. It is the purpose of the rigorous planning process used and documents, such as the EDF, to anticipate and solve problems before they occur. However, the project to grout beryllium blocks also has developed plans to deal with the following types of problems: • Technical (performance) • Contamination • Health and Safety • Financial. In addition, this action will continue to be monitored after completion.
4/27/2004	Jeremy Maxand	Snake River Alliance	7	How wide spread is the problem of "enhanced corrosion" at the burial ground from magnesium chloride that was used as a dust suppressant? More specifically, now that the DOE knows magnesium chloride caused unanticipated corrosion, what action is being done to assess where, exactly, the dust suppressant was used and what additional corrosion may be occurring that could pose a contamination risk?	The evaluation of use of magnesium chloride is reported in *Fate of Magnesium Chloride Brine Applied to Suppress Dust from Unpaved Roads at the INEEL Subsurface Disposal Area* (INEEL/EXT-01-01173) and is available to the public through the Administrative Record. The assessment that identified the potential release of C-14 from the beryllium blocks also addressed corrosion of other waste forms using very conservative corrosion rates. Contaminants in the beryllium released by corrosion are the contaminants posing the risk of concern and are being addressed through this action. Because modeling shows that corrosion of other metals is at a lesser rate than corrosion of beryllium, other issues and problems associated with corrosion will be addressed as part of the final remedy. Even without the effects of magnesium chloride, the beryllium would have followed the natural progression of corrosion in the environment of the SDA.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/27/2004	Jeremy Maxand	Snake River Alliance	8	There has not been much experience with Waxfix, but one of the criteria it met was that it does not seem to migrate into undisturbed ground when it is injected. Is that advantage lost, though, when dealing with beryllium blocks that were disposed of in trenches rather than vaults?	In terms of WAXFIX migrating, the major difference between grouting the trenches and the soil vaults is simply that more grout will be used in the trenches. The trenches contain more disturbed ground and have greater void areas and, therefore, will "soak up" more grout. A small amount of grout will move into the undisturbed ground, but the lower density and void spaces in the disturbed ground will encourage the grout to move in that direction rather than into the undisturbed ground. This difference has been anticipated and taken into consideration in the design and grouting process.
4/27/2004	Jeremy Maxand	Snake River Alliance	9	Will the planned in-situ grouting produce hazardous or radioactive waste? If so, how will the next waste be dealt with?	As with all industrial operations, waste will be generated, but it is an important part of the planning process to ensure that waste is minimized with the greatest possible rigor. Low-level radioactive waste will be generated in the form of equipment used to protect personnel (e.g., gloves and coveralls) and the contaminated drill stem that penetrates the area to be grouted. Disposal of any low-level radioactive waste will be in the low-level waste pit at the RWMC. Hazardous waste is not expected to be generated, but the drill rig will use oil, hydraulic fluid, and gasoline. If generated, hazardous waste will be disposed of according to approved methods through the INEEL contract with Chemical Waste Management.
4/25/04	"Christina"	Anonymous	10	DOE should identify and fully analyze substantive alternatives besides those presented in this document	The U.S. Department of Energy (DOE) is determined to take quick action to reduce risk. Additional substantive alternatives that can be readily implemented to achieve rapid risk reduction are not available for beryllium blocks (PERA [INEEL/EXT-02-01258]). Capping alone is not sufficient remediation for beryllium blocks. Retrieval cannot be readily implemented (see response to Comment 40). Therefore, DOE has identified and fully analyzed the only remediation that satisfies the objective of immediate risk reduction. The Idaho Department of Environmental Quality (DEQ) and U.S. Environmental Protection Agency (EPA) reviewed the *Engineering Evaluation/Cost Analysis for the OU 7-13/14 Early Actions Beryllium Project* (EE/CA) (DOE/NE-ID-11144) and concurred.
4/25/04	"Christina"	Anonymous	11	The EE/CA repeatedly makes the bald statement that in-situ grouting is consistent with the final remedy at the RWMC, yet fails to identify that final remedy, or the various potential final remedies. It is well known that DOE strongly favors simply capping the burial pits and trenches, leaving toxic chemicals and deadly radionuclides in place. It is also known that the DEQ disagrees with this approach. So which remedy is grouting consistent with? DOE should identify the range of alternative remedies.	The final remedy has not been identified. Remedial alternatives under consideration by DOE, DEQ, and EPA include (1) capping with an engineered surface barrier, (2) in situ grouting, and (3) retrieval, treatment, and disposal (*Second Revision to the Scope of Work* [INEL-95/0253]). Final risk management decisions are likely to contain elements of all three approaches. Grouting is consistent with all of these remedies. For the cap, grouting provides additional safeguards against contaminant migration. For retrieval, grouting expedites retrieval by encapsulating the waste and reducing potential airborne contamination. A cap is an element of all alternatives. The DEQ has been and will continue to be an active participant in reaching decisions for the RWMC and participated in developing the range of remedial alternatives presented in the *Second Revision to the Scope of Work* (INEL-95/0253) and the subject EE/CA.
4/25/04	"Christina"	Anonymous	12	DOE claims this action is necessary to reduce risk, yet it does not identify the exact amount of risk reduction expected through this action. Only 19% of the carbon-14 in the RWMC exists in the blocks. They have been leaching for some time. The remainder of the carbon-14 will remain available for leaching. A remedial action under a ROD will supposedly address the risk of all sources of carbon-14. This EE/CA states the risk from carbon-14, driving a	Nearly all of the C-14 in beryllium blocks, approximately 92 Ci (about 18.5% of the total C-14 in the SDA), will be stabilized. This percentage of the C-14 (18.5%) makes up approximately 90% of the mobile C-14. The remaining approximately 82% of the total C-14 is in stainless steel and other alloys, which corrode at a much slower rate; thus, this action is targeted at the near-term C-14 risk from beryllium. The risk model shows 6E–04, but the model is not precise. What can be said is that the estimated peak risk attributable to all C-14 in the SDA is 6E-04 in the year 2278. That means six people in 10,000 might (remember, risk is expressed as a probability) develop cancer if nothing is done. The risk is lower before the peak in 2278 and diminishes after 2278, according to the model. Though only part of the identified risk is attributable to C-14 from beryllium, the beryllium waste form is releasing contaminants more rapidly than other

Date	Commenter	Affiliation	Comment #	Comment	Response
				Removal action, is 6E-4. Yet the FFA/CO agencies have sometimes declined to conduct active remediation at risk levels marginally lower than this, about 1E-4. The EE/CA states the results of the Removal will reduce risk, but that a final remediation will still be required. This indicates the risk from carbon-14 after the Removal will still be above 1E-4. So how much risk reduction will be achieved for an expenditure of several million dollars? Please clearly identify the reduction in risk that this Removal action will achieve. Please state why this is the best way to spend several million dollars of scarce cleanup funds.	activated metals, and monitoring clearly indicates that the C-14 seen in the environment is coming from beryllium blocks. Knowing it is a serious future threat, the INEEL must act responsibly to address this problem while it is relatively easy to fix. That is, stop the migration before C-14 becomes widespread. Once substantial quantities of C-14 are in the environment, it would be extremely difficult and much more expensive to remediate.
4/25/04	"Christina"	Anonymous	13	Please state why grouting with a waxy material, a material full of carbon, is expected to contain carbon-14. What is the ability of carbon-14 to be absorbed into the wax and move through it, finally being released to the environment after all? What proof is there that wax will be stable over the thousands of years the carbon-14 will take to decay? Wax is known to become brittle and crack with cold and age; it becomes soft and slumps with heat.	(1) The source of C-14 is carbon present in beryllium metal that became activated when the beryllium was irradiated. The C-14 is released as the beryllium metal corrodes. Water is a key ingredient in the corrosion process. The approach is to use WAXFIX to coat the beryllium and to fill all surrounding voids to minimize access of water to beryllium, thereby reducing the rate of corrosion and the rate of release of C-14. Because encapsulating the blocks will effectively stop corrosion by keeping water out, the rate of transmission will be near zero. In addition, since WAXFIX is also carbon based, if by some remote possibility C-14 would be absorbed into WAXFIX, it would readily displace a hydrogen atom and bind to the existing carbon chain. (2) Radiolysis, biodegradation, and temperature affect the long-term performance of WAXFIX. A combination of literature searches, experiments, and modeling is being used to estimate the magnitude of the radiolysis processes for WAXFIX (Evaluation of the Durability of WAXFIX for Subsurface Applications [ICP/EXT-04-00300] due for publication in June 2004). The initial results of these efforts indicate that WAXFIX would not reach levels of radiation that would cause substantial damage (i.e., 10^9 R or more) for a very long time, i.e., many hundreds of years or longer. Available literature indicates that paraffin can be biodegraded by several organisms under certain conditions. Aqueous solutions, neutral pH, relatively warm temperatures (i.e., 20 to 40°C), the presence of nutrients (oxygen, nitrogen, and phosphorous), and high surface-area-to-volume ratios favor biodegradation of paraffin. However, at the SDA, conditions are not conducive to biodegradation of paraffin. The SDA conditions include unsaturated conditions, low nutrient levels, suboptimal temperatures (4–15°C), and low surface-area-to-volume ratios. Biodegradation of WAXFIX is expected to be slower than that observed under optimal conditions in the literature. Temperature affects the compressive strength of WAXFIX. Waste is located about 1 m below the surface (it will be deeper once the cap is installed) and forms a layer 1–5 m thick. Compressive strength testing was done at temperatures representative of the SDA in Operable Unit (OU) 7-13/14 bench-scale tests. Compressive strength values for all but one specimen, a specimen loaded with 30% organics (not relevant to beryllium blocks), were above the minimum of 0.41 MPa (60 psi) recommended by the Nuclear Regulatory Commission ("Technical Position on Waste Form," Low-Level Waste Management Branch, Nuclear Regulatory Commission, Rev. 1, pp. 20, January 1991).

Date	Commenter	Affiliation	Comment #	Comment	Response
4/25/04	"Christina"	Anonymous	14	Please address the other hazards associated with the blocks. What is the concentration of transuranic isotopes in the blocks? Are the blocks hazardous waste? What is the data upon which these determinations have been made? Is the data representative of all of the blocks, or only one of the blocks from ATR? I hope the DOE is not using this as smoke-screen to permanently dispose of high concentrations of transuranic isotopes.	For detailed information on this subject, please see *Beryllium Waste Transuranic Inventory* (INEEL/EXT-01-01678), which is available in the Administrative Record. Estimated transuranic concentrations in beryllium blocks are based on samples from stored beryllium blocks, information about impurities in the beryllium, and computer modeling. For the Engineering Test Reactor and the Advanced Test Reactor, estimated transuranic concentrations range from approximately 200 to 400 nCi/g. Blocks from the Materials Test Reactor may contain transuranic concentrations as high almost as 1,400 nCi/g. Combined, beryllium blocks contain about 3.6 Ci of transuranic radioisotopes, a very small fraction of the total transuranic activity in the landfill. A hazardous waste determination completed for blocks from ATR concluded that the blocks are nonhazardous. Based on elemental composition of the blocks and reactor operating histories, Advanced Test Reactor blocks are sufficiently representative to use their data for estimating characteristics of all blocks.
4/25/04	"Christina"	Anonymous	15	Executive Summary: "The risk to human health can be greatly reduced through early action to stabilize this waste and reduce infiltration." Please identify how much reduction is expected. Please specify how much additional C-14 is expected to be released over the next 15 years, compared to that already released, if this action is not taken, and the resultant additional risk.	In the *Ancillary Basis for Risk Analysis of the Subsurface Disposal Area* (ABRA) (INEEL/EXT-02-01125), a total of 500 Ci of C-14 was identified in the SDA, of which 92.6 Ci (18.5%) is in beryllium blocks, 22.3 Ci (4.5%) is in resins and other surface-contaminated trash, and 385.1 Ci (77%) is activated stainless steel. Ongoing inventory evaluations could affect the total C-14 inventory that will be evaluated in the future remedial investigation/feasibility study (RI/FS), but inventory in beryllium blocks is estimated with confidence and is not likely to change. Contaminants from resins and surface-contaminated trash would be already released and in the vadose zone where remediation is extremely difficult. Further migration toward the aquifer will be mitigated in a remedy, which will be selected as part of the final record of decision. Activated stainless steel corrodes and releases C-14 very slowly, over about 84,000 years. At an estimated release rate of 0.0046 Ci/year, C-14 in stainless steel does not pose a risk to human health or the environment. Conversely, beryllium corrodes relatively quickly, releasing its C-14 over 377 years at an approximate rate of 0.25 Ci/year, and poses a groundwater concern. Every year of delay before remediating the beryllium blocks may mean another 0.25 Ci of C-14 is released into the environment. Based on simulations reported in the ABRA, about 13 Ci has been released (from 1952 through 2004) and almost 4 Ci will be released over the next 15 years (2005 through 2020). Please see the response to Comment 12 regarding risk.
4/25/04	"Christina"	Anonymous	16	Section 1 - How much of the carbon represents "the majority" that will be stabilized? Please identify the "final remedy for the entire SDA".	Nearly all of the C-14 in beryllium blocks, approximately 92 Ci (about 18.5% of the total C-14 in the SDA), will be stabilized. This percentage of C-14 (18.5%) makes up approximately 90% of the mobile C-14. The remaining approximately 82% of the total C-14 is in stainless steel and other alloys, which corrode at a much slower rate. Please see the response to Comment 15. The final remedy for the SDA has not been determined. However, some elements of the probable final remedy are known and accepted by the agencies. These elements include long-term monitoring, maintenance, and institutional controls; selected grouting to immobilize fission and activation products; retrieval of Pad A; and a cap (*Second Revision to the Scope of Work for Operable Unit 7-13/14* [INEL-95/0253]).
4/25/04	"Christina"	Anonymous	17	Section 1.2 - This document fails to "...provide(s) the information to show that a potential threat of C-14 exists ..." Rather, it makes general statements that are unsupported by facts.	Soil gas around beryllium locations is monitored to identify tritium and C-14 being released from the blocks. Release of tritium directly correlates to release of C-14 (*Progress Report: Tritium and Carbon-14 Sampling at the Radioactive Waste Management Complex* [INEEL/EXT-98-00669] and *Performance Assessment and Composite Analysis Monitoring Program* [INEEL/EXT-01-00449]). The technical level of detail in the EE/CA is appropriate for the general public. If additional information is needed beyond the responses to comments, please contact Bruce Byram at 526-3127.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/25/04	“Christina”	Anonymous	18	Please clearly state why this removal action is ‘appropriate’ given the minimal risk reduction that will be achieved, the paucity of evidence presented to support it’s need, and the cost of action.	In the ABRA (INEEL/EXT-02-01125), C-14 release from beryllium blocks is a primary contributor to predicted groundwater pathway risk now and for several hundred years. Data that have been gathered show that blocks are corroding and that they are releasing C-14. Nearly all of the C-14 in beryllium blocks, approximately 92 Ci (about 18.5% of the total C-14 in the SDA), will be stabilized. This percentage of the C-14 (18.5%) makes up approximately 90% of the mobile C-14. The remaining approximately 82% of total C-14 is in stainless steel and other alloys, which corrode at a much slower rate; thus, this action is targeted at the near-term C-14 risk from beryllium. Grouting with WAXFIX will reduce risk resulting from release of mobile contaminants associated with corrosion by encapsulating the blocks and inhibiting contact with infiltrating water. This barrier will prevent the further corrosion of the block, which is the root cause of the contaminant release from beryllium.
4/25/04	“Christina”	Anonymous	19	Please include a copy of the document(s) that express approval of this action by both the DEQ and EPA. These letters do not seem to [be] listed in the Reference section, nor do they seem to be included in the on-line Administrative Record.	The agencies approved by participating in the development of the EE/CA. Both DEQ and EPA reviewed the EE/CA and helped to develop the language that indicates their approval. They agree that the action promoted by the EE/CA is warranted. Both DEQ and the EPA will be asked to concur on the Action Memorandum for this non-time-critical removal action.
4/25/04	“Christina”	Anonymous	20	Section 1.3.3 - Why are RCRA and HWMA cited as regulatory drivers for this action if the only hazard is a by-product material, not regulated under RCRA? What hazards are not being discussed in this document? Or is the DOE making references to make the document appear more important, bamboozling an unsuspecting public? Or is the DOE simply ignorant of the regulations?	These regulations are cited because the Federal Facility Agreement/Consent Order (FFA/CO) (Administrative Docket No. 1088-06-29-120) “…integrates CERCLA response obligations and RCRA and HWMA corrective action obligations …which relate to the releases(s) of hazardous substances covered by [the FFA/CO].”
4/25/04	“Christina”	Anonymous	21	The final RI/FS remains under construction since the FFA/CO Agencies rejected DOE’S first attempt. What remedial alternatives are being considered in this latest round? Demonstrate that this removal will be consistent with those alternatives.	Please see the response to Comment 11. Also, note that the agencies have extended the OU 7-13/14 schedule several times. Hence, a RI/FS for the SDA never has been submitted by DOE or rejected by DEQ and EPA. However, the *Interim Risk Assessment and Contaminant Screening for the Waste Area Group 7 Remedial Investigation* (DOE/ID-10569) and the ABRA (INEEL/EXT-02-01125) were originally prepared as remedial investigations (RIs), and the PERA (INEEL/EXT-02-01258) was originally prepared as a feasibility study. Publication of the ABRA (INEEL/EXT-02-01125) as a remedial investigation was imminent when the agencies decided it was desirable to extend the schedule to allow completion of the retrieval demonstration in Pit 9. The ABRA and PERA were subsequently published (though not as a RI/FS) in order to preserve the substantial amount of work that had been completed. Remedial alternatives currently under consideration are No Action (as a baseline), an engineered surface barrier (cap), in situ grouting, and retrieval (with treatment and disposal).
4/25/04	“Christina”	Anonymous	22	Section 2.1 - Why is DOE using a document that has not been approved, the ABRA, as the basis for initiating this ill-conceived and relatively useless action?	Though the ABRA (INEEL/EXT-02-01125) has no formal standing under the FFA/CO, it was initially prepared as a remedial investigation and was reviewed by DEQ and EPA. Based on relevant parts of the ABRA, DEQ, and EPA concur that this non-time-critical removal action is appropriate.
4/25/04	“Christina”	Anonymous	23	“Carbon-14 in activated beryllium ...” Please explain the significance of the term “activated”.	Beryllium blocks, as manufactured, are not radioactive. The blocks are activated, meaning they become radioactive, when exposed to neutron flux in a reactor. Stainless steel and other materials also become activated when exposed to nuclear reactions. Transformations in the metal produce radioactive isotopes.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/25/04	"Christina"	Anonymous	24	"Any technology or process option not applicable to the SDA was removed from further consideration." What was the basis for making this important decision? Who made it? Who concurred? Please provide details.	Technology and process options were evaluated in the PERA (INEEL/EXT-02-01258). According to the *Second Revision to the Scope of Work* (INEL-95/0253), which was developed through consensus with DEQ and EPA, screening of technology and process options was completed in the PERA. Future development of the feasibility study will focus on refining the detailed and comparative analysis of assembled alternatives in the PERA.
4/25/04	"Christina"	Anonymous	25	The PERA may present a set of remedial alternatives, but the document has not been approved by all of the FFA/CO Agencies. Why does DOE think it appropriate to use it to make important decisions? Have the Agencies approved of these unfounded decisions?	The PERA (INEEL/EXT-02-01258), though it has no formal standing for making decisions, presents a solid basis for the future feasibility study for the SDA. The agencies find it useful. Please see response to Comment 19 regarding approval.
4/25/04	"Christina"	Anonymous	26	Section 2.2.1 - This section states that modeling shows that C-14 is mobile as carbon dioxide. Yet the rest of the document seems to indicate the primary mode of transport is via water. Please explain this discrepancy. Does DOE know what it's talking about? Prove it!	Please see response to Comment 35.
4/25/04	"Christina"	Anonymous	27	Section 2.2.1.1 - What is the TRU concentration in the blocks from each reactor? Not unfounded guesses, not rosy estimates, and how has this determination been made?	Please see the response to Comment 14.
4/25/04	"Christina"	Anonymous	28	This section dwells on the blocks from ATR. What was the fate of the blocks from the other reactors? What is their contribution to the problem? "...samples were taken from irradiated ... blocks stored at the Test Reactor Area." In other words, we have no idea of the characterization of blocks from the other reactors? If the ATR samples are to be taken as representative, why is this assumption valid?	Blocks from the other reactors are buried in the SDA and also are targets for this removal action. Table 1 in the EE/CA lists the C-14 curie loads associated with beryllium blocks from each reactor. Approximately 29 Ci are from the Materials Test Reactor, and approximately 22 Ci are from the Engineering Test Reactor. The rest, about 42 Ci, came from the Advanced Test Reactor. Though the blocks were sampled from the Advanced Test Reactor, there is adequate similarity to develop credible estimates for the other two reactors through nuclear calculations based on operational histories and characteristics of the reactor fuel. See *Beryllium Waste Transuranic Inventory in the Subsurface Disposal Area Operable Unit 7-13/14* (INEEL/EXT-01-01678) for complete details.
4/25/04	"Christina"	Anonymous	29	Please identify what "...key radionuclides were overestimated." What is DOE keeping secret?	The primary key radionuclide was C-14. Several INEEL waste generators produce activated metal, which is metal that has become radioactive through exposure to nuclear reactions. Most of this waste is carbon steel, stainless steel, and steel alloys. The disposals were not subject to waste acceptance criteria. However, the 1994 performance assessment (*Radioactive Waste Management Complex Low-Level Waste Radiological Performance Assessment* [INEEL/EXT-97-00462; formerly EGG-WM-8773]) indicated C-14 could exceed landfill performance limits. Modeling for the performance assessment was based on several bounding assumptions. This is a common technique to develop estimates known to be biased high. If performance is acceptable even with bounding assumptions, no concerns are identified. If not acceptable, then additional work is performed to develop more refined estimates. In the case of C-14, the bounding assumptions produced estimates approaching dose limits for the SDA. This was a significant conclusion. If these waste metals could not be disposed of at the SDA, it would be necessary to develop expensive alternative disposal options.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/25/04	"Christina"	Anonymous	30	Figure 3 - Will the grouting process disrupt the containers in which the blocks are stored? Will the process break-up the blocks, thus enhancing the surface area and potentially enhancing the rate at which C-14 could be released? If the containers and blocks will be broken-up and made part of a huge monolith (allegedly) please explain how this is consistent with a remedial action that might require retrieving the blocks.	The blocks are not in containers. They were discharged into the landfill from a bottom-discharge transport container. Grouting will not break up the solid metal beryllium blocks. If retrieval is ultimately determined, the grout will act as a protective layer over the blocks, effectively controlling any loose contamination that could spread or become airborne.
4/25/04	"Christina"	Anonymous	31	What is the anticipated radius of the grouted column? What is the rate of transmission of C-14 through this carbon-rich matrix?	Each grout column will have an approximate 2-ft diameter. Multiple columns on 2-ft centers will be required to ensure complete coverage. The C-14 is released through corrosion. Because encapsulating the blocks will effectively stop corrosion by keeping water out, the rate of transmission will be near zero.
4/25/04	"Christina"	Anonymous	32	"All known locations and numbers of beryllium disposals will be verified ..." This implies there may be unknown burials and unverified locations. How was the current risk accurately estimated without already performing this step? What other information is DOE withholding from the public?	The total mass of beryllium blocks in the SDA is well known because it can be verified through checking reactor operations histories. The radioactivity associated with that well-known mass was used to estimate risk. One disposal location is in question. Old records indicate an approximate location, and this location will be verified. All other locations are already in the process of being verified to produce precise coordinates before grouting. Until verification is complete, locations are known to roughly within 10 ft. Verification includes tritium sampling, geophysical analysis, and 2-ft core sampling.
4/25/04	"Christina"	Anonymous	33	Table 1 - Please provide an inventory of the other radionuclides and hazardous substances present in the blocks.	Inventory estimates have been developed based on samples of stored beryllium, reactor operating histories, and computer modeling. Estimates include quantities of tritium, C-14, Co-60, Cs-137, Pu-239, Pu-240, and Am-241. Please see *Beryllium Waste Transuranic Inventory in the Subsurface Disposal Area Operable Unit 7-13/14* (INEEL/EXT-01-01678) for a complete description of methodology that was used to develop estimates and the resulting approximations.
4/25/04	"Christina"	Anonymous	34	Section 2.3 - Please state the expected risk reduction achieved by this ill-conceived action.	Please see the response to Comment 12.
4/25/04	"Christina"	Anonymous	35	Section 3 - Specify whether the primary method of release and migration of C-14 is via the gas phase or dissolved in water and why this action will minimize the problem.	The primary method of release is through corrosion. Corrosion is enhanced by moisture. Carbon-14 is known as a dual-phase contaminant, meaning that it exhibits two types of physical characteristics. One is a gas phase, also called a vapor phase. The other is a dissolved phase in water. After corrosion releases C-14 from the beryllium metal, some of it stays dissolved in water while the rest becomes vapor. However, dissolved C-14 is not necessarily stable and can transform to vapor, depending on chemical and physical conditions under ground. Typically, C-14 in vapor is attached to oxygen, forming radioactive carbon dioxide ($^{14}CO_2$). Both forms migrate. Unlike dissolved C-14 in water, which tends to move downward, $^{14}CO_2$ can move upward and sideways as well as downward.
4/25/04	"Christina"	Anonymous	36	Again, prove this action is consistent with a final remedy that has not yet been identified.	See responses to Comment 11 and Comment 16.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/25/04	"Christina"	Anonymous	37	If this action is "...an effective long-term remedy ..." then why will a final remedial action still be required? What is the "...immediate health risk to human health from the SDA" when this document states the maximum risk does not occur until 2278? And the risk lies primarily at the SDA, a location expected to be in perpetual care by DOE in the so-called Risk-Based End State? Lies from DOE? Or simple incompetence? Or unthinking and poor justification for an otherwise unnecessary project?	Final remedial action will address all of the SDA, whereas this non-time-critical removal action focuses strictly on beryllium blocks. The final remedial action will be documented in the future record of decision for OU 7-13/14, which is the comprehensive RI/FS for all of Waste Area Group 7. The comprehensive RI/FS must consider all sources within the waste area group, even if remedial action has been taken. Beryllium block grouting, retrievals, vapor extraction, and the Pad A cap will be considered in the analysis to determine if those actions are consistent with the final remedy. This approach was defined in the FFA/CO to ensure that combined impacts from all potential sources of risk will be appropriately addressed. Though modeling indicates the peak risk will occur in 2278, risk is growing. As with a machine with low oil pressure or a patient with a rising temperature, quick action is prudent to minimize long-term impacts.
4/25/04	"Christina"	Anonymous	38	Why is completion in FY04 a Remedial Action Objective? What risk reduction is dependent on FY04? Or is it simply a matter of BBWI receiving a fee from DOE that is driving this action? DOE should be honest with the public - for a change.	The DOE Idaho Operations Office is working hard to achieve risk reduction by implementing several removal actions and accelerating schedules for planned work. As with any contractor or business, of course Bechtel BWXT Idaho, LLC, is receiving a fee for doing this work. Because the INEEL contract will soon be split into separate cleanup and laboratory contracts, DOE offered Bechtel BWXT Idaho, LLC, incentives to complete the fieldwork before the end of the fiscal year so associated reports could be completed before the current contract expires. Certainly, small delays beyond the end of the year would not significantly impact the degree of risk reduction that would be achieved, but DOE wants to get the work done quickly. Speed is desirable both to avoid the possibility that the work would be substantially delayed by contract changeover and to keep 0.25 Ci/year of C-14 from migrating away from the waste and into the environment (see the response to Comment 15).
4/25/04	"Christina"	Anonymous	39	Section 4.1 - A Section is devoted to discussing alternatives that aren't real alternatives.	The No Action alternative represents the worst-case scenario with no remediation to reduce risk. The expected risk reduction for other alternatives can then be measured against a meaningful starting place.
4/25/04	"Christina"	Anonymous	40	If there is no place to dispose of beryllium blocks, why should they be left in Idaho? Surely, storage in a way that is protective of human health and removed from the environment is preferable to allowing continued release.	Continued release is not acceptable. For this reason, DOE is taking immediate steps that are protective of human health. Long-term solutions will be developed in accordance with the CERCLA and the FFA/CO with DEQ and EPA. Probable alternatives will be to leave the grouted blocks in place and add a cap, apply additional in situ treatment (such as additional isolation) and add a cap, and retrieval followed by adding a cap. Retrieval is not a likely selection for the same reasons it is not a current option. Reasons include: (1) the blocks are extremely radioactive, requiring remote-handling operations that would have to be designed, tested, and permitted; (2) a storage facility with sufficient capacity is not available at the INEEL and would have to be constructed; (3) if a storage facility were available elsewhere, special transport would have to be developed; and (4) permanent disposal does not currently exist and would have to be designed and constructed.
4/25/04	"Christina"	Anonymous	41	Section 4.1.1 - This section seems to state that a reduced monitoring program for the SDA will be implemented after grouting. Surely this is not true! Please explain why the costs for monitoring go down after this action.	Costs associated with monitoring ($3.3 million over 15 years) will be incurred regardless of whether the non-time-critical removal action is deployed. Costs include specific monitoring associated with grouting ($150,000) as part of the non-time-critical removal action and additional monitoring for 15 years ($3.3 million) as part of the OU 7-13/14 project cost. Because the $3.3 million over 15 years will be part of the project cost and not directly related to the grouting action, it was not included in the cost estimate for the action.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/25/04	"Christina"	Anonymous	42	This section seems to state that "monitoring" is a fix for the problem. It is not! How dare DOE suggest that monitoring simple monitoring is an "interim measure"! Neither is long-term monitoring a fix for the problem, despite what DOE would like to think (and despite the recent decisions regarding 1-129). Substituting monitoring for action is typical of DOE'S new approach to remediation: spend less and clean up less	Monitoring under the No Action alternative is not a fix; for that reason, grouting is proposed, followed by monitoring, monitor after grouting, and then continued monitoring over the long term. That also is why Section 4.1 concludes with the statement, "…the No Action alternative does not satisfy the remedial action objectives" and is not the recommended remedy in the EE/CA. The No Action alternative represents the worst-case scenario with no remediation to reduce risk and is used for comparison only.
4/25/04	"Christina"	Anonymous	43	"Grouting is accomplished without displacing contaminants or debris ..." Is this just a cut-and paste from some advertising brochure? Or will the process really leave the blocks intact? Will the grouting process simply fill the soil vault? Please be honest with the public by providing a complete description of the expected process.	Grouting will leave the blocks intact. Void space around the blocks will be filled with grout, and surfaces of the blocks will be coated.
4/25/04	"Christina"	Anonymous	44	"In situ grouting has been approved by regulating agencies ..." Does this mean the Idaho DEQ and Region X EPA have approved the technology? Or is DOE telling half-truths	Please see the response to Comment 19.
4/25/04	"Christina"	Anonymous	45	The three bulleted objectives of ISG appear to be the same objective restated in three different ways.	The primary objective is to encapsulate waste in a hydrophobic (water-repelling) material to achieve the three purposes stated in the EE/CA. Though these three are closely related, there are subtle differences. The first purpose is to isolate the blocks from infiltrating water. The second is to contain contamination within the grout. The third is to inhibit further chemical changes that promote release.
4/25/04	"Christina"	Anonymous	46	Table 2 - DOE Order 5400.5 is listed twice.	The last listing should have been deleted. The corrected, final applicable or relevant and appropriate requirements will be contained in the Action Memorandum.
4/25/04	"Christina"	Anonymous	47	If 40 CFR 264 Subpart I is listed, then also list the other requirements for managing hazardous waste. These might be paragraphs from Subparts B, C, and D or 264.1(j). Is this an intentional attempt on the part of DOE to fail to identify and comply with ARARs, or is it something less intentional, such as incompetence?	The potential for hazardous waste generation associated with beryllium block grouting is viewed as limited, although final waste stream assessments and hazardous waste determinations have not been completed. The potential hazardous waste storage scenario identified in the EE/CA is consequently anticipated to involve very limited volumes of waste and be of a short duration. Internal INEEL management control procedures that are routinely implemented for temporary hazardous waste storage address requirements for appropriate treatment, storage, and a disposal facility, including requirements of "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," (40 CFR Part 264, Subparts B and C). In addition, the contingency plan and emergency procedures of Subpart D are implemented at the RWMC facility, including appropriate emergency response measures for CERCLA projects conducted at RWMC under the umbrella of the RWMC facility program.

Date	Commenter	Affiliation	Comment #	Comment	Response
4/25/04	"Christina"	Anonymous	48	Section 4.2.3 - Is "...hazardous types of waste ..." the same as "hazardous waste"? (Maybe incompetence is at work here ....) Please be specific about why ISG might generate hazardous waste since disposed waste will not be brought to the surface.	The intent of the language "...hazardous types of waste..." does refer to potential hazardous waste streams. The project has not completed development of detailed waste management planning. This planning is required and will be completed before project implementation. Hazardous waste applicable or relevant and appropriate requirements for container storage were identified primarily because of a potential for generation of hazardous debris (e.g., drill-related equipment and personal protective equipment) that could result from potential cross contamination of listed waste streams buried in the SDA. Whether this situation actually occurs is still to be determined and will be addressed during the course of project implementation and preparation of the final hazardous waste streams resulting from the project.
4/25/04	"Christina"	Anonymous	49	Please specify what radionuclides are expected to be emitted to the atmosphere, thus prompting citation of 40 CFR 6 1 Subpart H as an ARAR.	Final emissions calculations will be completed before implementation of the removal action. Preliminary evaluation indicates that the primary radionuclide that could be released through implementation of grouting is tritium in the form of tritiated water vapor.
4/25/04	"Christina"	Anonymous	50	Section 5.1 - "The In Situ Grouting (ISG) alternative would not, by itself, achieve long-term effectiveness ... for the C- 14 contamination." Please contrast this against Section 3: "Implement an action that provides an effective long-term remedy...", and Section 4.1.2: "The grouting will ... stop the migration of contaminants resulting from corrosion of the blocks." Please identify which statements are lies.	Beryllium blocks are not the only source of C-14 in the SDA (see the response to Comment 15), and additional action will be required for the SDA (see response to Comment 37). Grouting will be an effective long-term remedy for beryllium blocks, but additional action, such as a cap, is likely to be selected in the final remedy for the entire SDA.
4/25/04	"Christina"	Anonymous	51	Table 4, Cost - "Note: These costs will be incurred regardless ..." This statement is not reflected in Table 3 or the related text. Which is the lie?	See the response to Comment 41.
4/25/04	"Christina"	Anonymous	52	Letter - I am writing to offer comments on the EE/CA describing a proposed CERCLA Removal Action at the RWMC. I have not commented on DOE Removal Actions at the INEEL for some time, since the time DOE was breaking the law by conducting Removal Actions and calling them "maintenance actions" and "best management practices" without public notice and comment. These actions were not taken to reduce risk, but to covertly conduct remediation without documentation, simply because funds were available at the end of the fiscal year. Ask [the Department of Energy Idaho Cleanup Project Assistant Deputy Manager] about them. Most CERCLA RODs at the INEEL continue to ignore those actions when describing CERCLA sites where No Further Action is required. Now it seems the DOE, and it's lapdog BBWI,	As the lead agency for this removal action, DOE developed responses; the DEQ and the EPA have reviewed and provided input to the responses. Beryllium blocks were used in three reactors at the Test Reactor Area. Beryllium becomes activated, meaning radioactive in this context, when subjected to neutron bombardment in a reactor. Because the blocks tend to swell over time, they are replaced when they become too deformed. Traditionally, used beryllium blocks were classified as remote-handled low-level waste. Once removed from a reactor, they were stored in water for several years to allow short-lived radioisotopes to decay and then disposed of in a landfill. Authorization for disposal is granted by DOE through a rigorous process involving modeling followed by review and approval of the national Defense Nuclear Facility Safety Board. Through this modeling and review process, DOE determined that it might be necessary to impose more stringent limits on quantities of C-14 in waste sent to the landfill (*Radioactive Waste Management Complex Low-Level Waste Radiological Performance Assessment* [INEEL/EXT-97-00462; formerly EGG-WM-8773]). Special monitoring was immediately installed in 1994 around the most recently buried beryllium blocks to corroborate modeling results. Monitoring yielded concentrations of C-14 (in carbon dioxide) and tritium (hydrogen-3) (*Progress Report: Tritium and Carbon-14 Sampling at the Radioactive Waste Management Complex* [INEEL/EXT-98-00669] and *Performance Assessment and Composite Analysis Monitoring Program* [INEEL/EXT-01-00449]). In addition, blocks stored at the Test Reactor Area were sampled. Unexpectedly, concentrations of transuranic

Date	Commenter	Affiliation	Comment #	Comment	Response
				recognizes the necessity to create a fiction they choose to call an EE/CA in an attempt to justify their untimely or unnecessary actions. The EE/CA produced to justify in-situ grouting of beryllium blocks at the RWMC is a remarkable document, filled with double-speak, half-speak, no-speak, obfuscation, prevarication and outright lies. I am hard-pressed to determine if a document this poor is a product of conscious effort or the inevitable product of a system that can't do any better. First, it appears DOE has taken lessons in writing EE/CAs from those who write DOE's NEPA documents. Like DOE NEPA, this document fails to offer any real choices. It seems the DOE, like in NEPA, has made a decision and then written a document to justify that decision. This EE/CA provides no reasonable alternatives except the selected action and No Action. There is no serious discussion of other alternatives and why they are unacceptable.	elements, along with C-14, tritium, and other low-level radioisotopes, were detected in the stored blocks. Subsequent computer modeling implied activated beryllium contains transuranic concentrations sufficient to classify the blocks as transuranic waste (*Beryllium Waste Transuranic Inventory in the Subsurface Disposal Area Operable Unit 7-13/14* [INEEL/EXT-01-01678]). Based on data, additional beryllium block disposals in the landfill were not authorized. Removal actions are conducted to remove risk. The fact that funding scenarios might facilitate accomplishing a removal action should not detract from its usefulness and in this case, the DOE is convinced that taking immediate action to address potential risk from beryllium blocks is the right and responsible thing to do. Real choices that can be implemented quickly are not available (see the response to Comment 10). Both DEQ and EPA concur with the selected action and with implementing beryllium block grouting as a non-time-critical removal action. Other regulatory vehicles, such as an interim action and the OU 7-13/14 record of decision, would take longer to implement. The DOE must maintain a balance between giving too much technical detail and not giving enough information. Responses to these general and specific comments include supplemental information for guidance in finding further details about beryllium blocks and decision-making for the SDA. Referenced documents are available in the Administrative Record at the DOE Reading Room of the INEEL Technical Library in Idaho Falls and are accessible online at http://ar.inel.gov/. Copies of the referenced documents are also located in the Albertsons Library at Boise State University. Please call Bruce Byram at 526-3127 to arrange a special briefing as has been done for the Citizens Advisory Board, the Snake River Alliance, Coalition 21, and other organizations.