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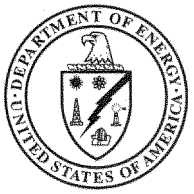
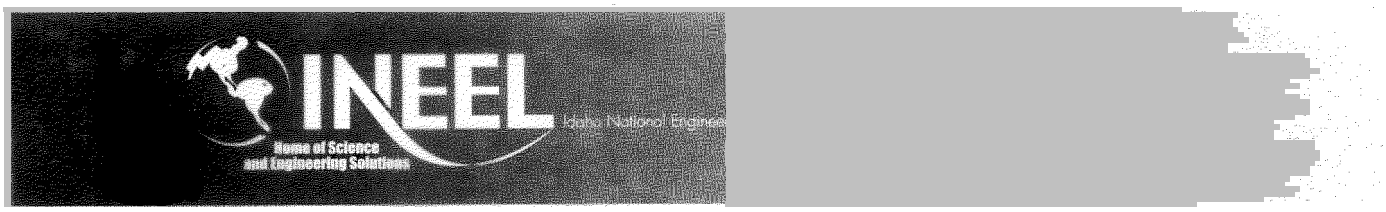


U.S. Department of Energy
Idaho Operations Office

Engineering Evaluation/Cost Analysis for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility

This revision contains the same technical information as Revision 0 with clarifications.



DOE/NE-ID-11157
Revision 1
Project No. 24057

Engineering Evaluation/Cost Analysis for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility

April 2004

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

ABSTRACT

This Engineering Evaluation/Cost Analysis document is being prepared for public comment. This document evaluates two options and recommends removing Building CPP-627 located at the Idaho Nuclear Technology and Engineering Center within the Idaho National Engineering and Environmental Laboratory. This proposed Removal Action Alternative will reduce the risks to human health, the environment, and Site workers by minimizing the potential for release of hazardous and radioactive substances through removal of the structure and its components. This removal action is subject to and is consistent with remedial action objectives established in the Operable Unit 3-13 Record of Decision.

This action is being proposed under a non-time critical removal action. Under a non-time critical removal action, a removal action can be taken to abate, prevent, minimize, stabilize, mitigate, or reduce the release or threat of release of contaminants. An engineering evaluation and cost analysis is required under the *Code of Federal Regulations* Title 40, Section 300.415(b)(4)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan for all non-time critical removal actions.

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFA	Central Facilities Area
DOE	U.S. Department of Energy
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
HCL	Hot Chemistry Laboratory
HWMA	Hazardous Waste Management Act
ICDF	INEEL CERCLA Disposal Facility
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
MCC	Multi-Curie Cell
NCP	National Contingency Plan
NTCRA	non-time critical removal actions
OSL	Old Shift Laboratory
OU	operable unit
PCB	polychlorinated biphenyl
PEW	Process Equipment Waste
RAF	Remote Analytical Facility
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RWMC	Radioactive Waste Management Complex
S&M	surveillance and maintenance
TSD	treatment, storage, disposal

WIR	Waste Incidental to Reprocessing
WAG	waste area group

Engineering Evaluation/Cost Analysis for the Decontamination and Decommissioning of Building CPP-627, the Remote Analytical Facility

1. INTRODUCTION

The purpose of this Engineering Evaluation/Cost Analysis (EE/CA) is to assist the U.S. Department of Energy (DOE) Idaho Operations Office in identifying the preferred response alternative to reduce releases from the CPP-627 building. This building is a part of the Fuel Reprocessing Complex at the Idaho Nuclear Technology and Engineering Center (INTEC) at the DOE's Idaho National Engineering and Environmental Laboratory (INEEL). The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Operable Unit (OU) 3-13 Record of Decision (ROD) (DOE-ID 1999) governs CERCLA sites within the INTEC facility designated as Waste Area Group (WAG) 3. This CERCLA removal action is therefore subject to the remedial action objectives established in the OU 3-13 ROD.

This EE/CA has been developed in accordance with the *Comprehensive Environmental Response, Compensation and Liability Act of 1980*, as amended by the *Superfund Amendments and Reauthorization Act of 1986*, and in accordance with the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP) (40 CFR 300).

This proposed removal action is consistent with the CERCLA OU 3-13 ROD for WAG 3, thus supporting the overall remediation goals at WAG 3. Accelerated cleanup of contaminated soil sites at the INEEL this year makes it possible to dispose of CPP-627 debris at the INEEL CERCLA Disposal Facility (ICDF), taking advantage of the available soil volume for compaction. Depending on the type of debris, the soil-to-debris ratios range from 2:1 to 6:1. To facilitate the management of debris, the ICDF Remedial Design/Construction Work Plan for the landfill recommends "that debris be disposed during periods when significant volumes of contaminated soils are also available" (EDF-ER-277). Additionally, by conducting this removal action this year, completion of disposal activities is anticipated before the seasonal closure of the ICDF.

This proposed removal action will reduce the risks to human health, the environment, and Site workers by minimizing the potential for release of hazardous and radioactive substances through removal of the waste and disposal of Building CPP-627 down to its concrete slab. The concrete slab varies in thickness from 6 in. to 1 ft 6 in., except under the Multi-Curie Cell (MCC), where the thickness is 5 ft. The concrete thickness estimates do not include the concrete footings. The waste generated through the demolition of Building CPP-627 will comprise CERCLA radioactive, hazardous, or mixed radioactive and hazardous wastes, which will be disposed of primarily at the ICDF. Some waste, such as piping from Hazardous Waste Management Act (HWMA)/Resource Conservation and Recovery Act (RCRA)-regulated systems, will be disposed of at an off-Site RCRA-compliant Treatment, Storage, and Disposal (TSD) Facility. Though not expected to be encountered, any waste potentially requiring a review under the evaluation method for making Waste Incidental to Reprocessing (WIR) determinations under DOE O 435.1 will be stored pending resolution of the legal uncertainty regarding certain reprocessing wastes arising from ongoing litigation concerning DOE O 435.1.

1.1 Purpose

Under the NCP (40 CFR 300) and CERCLA (42 USC § 9601 et seq.), an engineering evaluation and cost analysis must be prepared for all non-time critical removal actions (NTCRA). This report fulfills that requirement for a NTCRA.

1.2 Scope

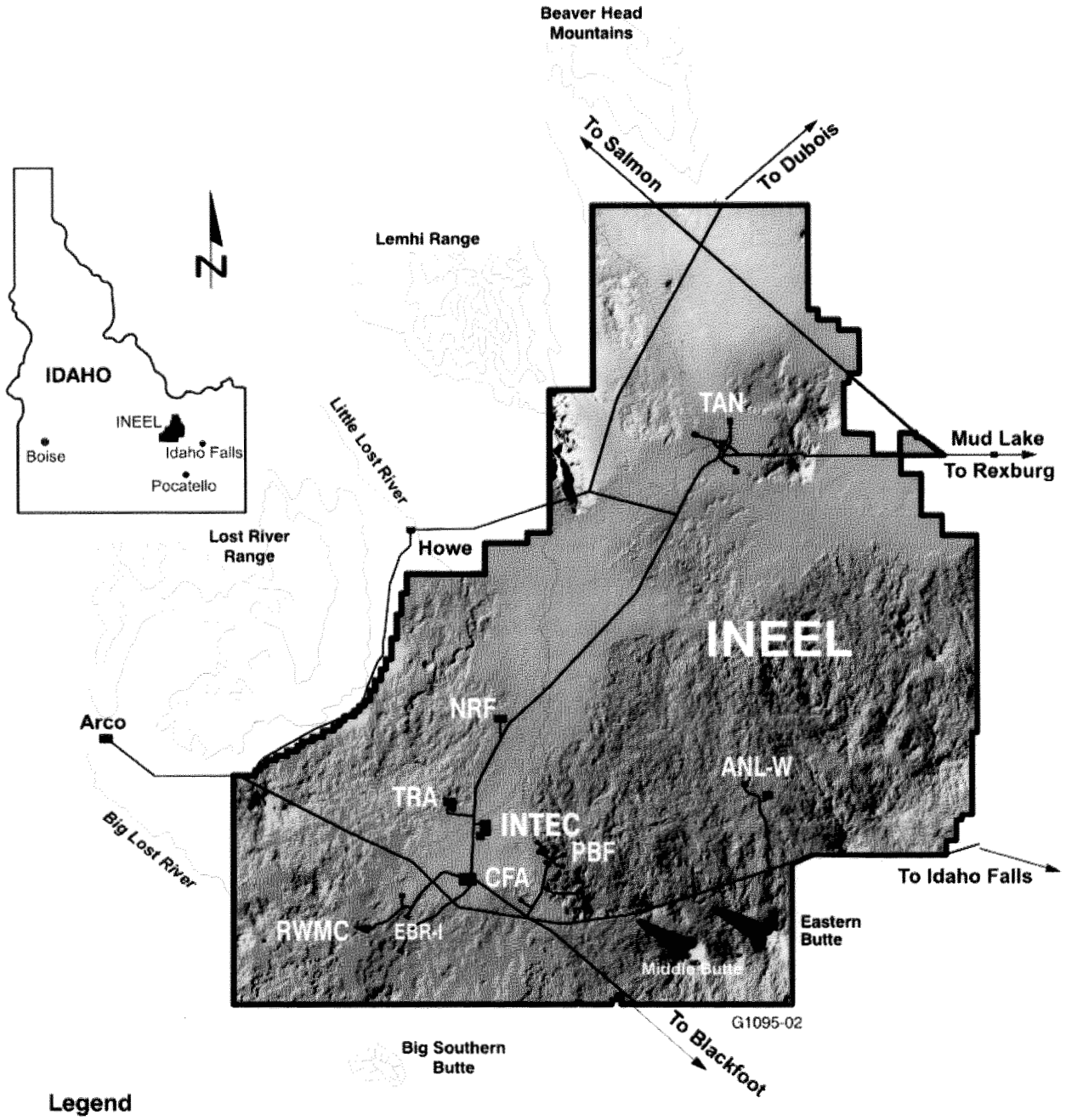
This document provides the information necessary to show that a potential threat of release of hazardous substances exists and, without action, adverse impacts to human health and the environment could occur. Two alternatives are also presented so that a decision can be made as to the appropriate action necessary to mitigate the release of hazardous substances from the CPP-627 facility. The DOE, as the lead agency, has determined that a removal action is appropriate, and the planning for the action must begin. Both the Idaho Department of Environmental Quality and the U.S. Environmental Protection Agency (EPA) agree that a NTCRA action is warranted to protect human health and the environment. Through the NTCRA process, the risks presented in this document will be mitigated in a much more timely manner.

1.3 Site Background and Facility Description

The INTEC, located in the south-central area of the INEEL (Figures 1-1 and 1-2), began operations in 1952. Historically, spent nuclear fuel from defense projects was reprocessed to separate reusable uranium from spent nuclear fuel. In 1992, DOE discontinued reprocessing.

Building CPP-627 is part of the Fuel Reprocessing Complex, which includes Buildings CPP-627, -640, and -601. It provided support to reprocessing activities, including experimentation, sampling and analysis, and unique head-end dissolution. CPP-627 is a 14,727-ft^2 facility entirely aboveground and is adjacent to and attached to CPP-601 (Wagner 1999). Other buildings attached to the Fuel Reprocessing Complex include CPP-602, a laboratory and office building, and CPP-630, the Safety/Spectrometry building. CPP-627 was constructed in 1955 to house analytical, experimental, and decontamination facilities. Utilities and waste collection were provided through the CPP-601 facility. While active use of the CPP-627 building ceased in 1997, the building still contains unknown quantities of various radiological and chemical hazardous substances; and the structure is aging and continues to degrade more rapidly each year. These hazardous substances include various radionuclides, lead, mercury, used oil, asbestos, cadmium, chromium, and other chemical residues. Two CERCLA sites are also located beneath the Fuel Reprocessing Complex. These sites, CPP-80 and CPP-86, are identified as Group 2 sites in the OU 3-13 ROD. Site CPP-80 resulted from a hazardous, radioactive liquid condensate leak from the Building CPP-601 vent tunnel drain. Site CPP-86 is a waste trench that runs beneath CPP-602 and collects liquid waste for transfer to the Process Equipment Waste (PEW) evaporator from various CPP-602 operations. As buildings associated with Group 2 sites are removed, the OU 3-13 ROD identifies that the Agencies will perform an evaluation to determine if the soils beneath the buildings contain contaminants exceeding the OU 3-13 action levels and identify any follow-on actions that need to be performed.

The northern third of the building housed radiochemical analytical facilities. The Remote Analytical Facility (RAF), consisting of two lines of shielded gloveboxes for remote sample preparation and analysis, was on the ground floor. The Old Shift Laboratory (OSL), on the second floor, provided bench and hood space for chemical analysis of nuclear reactor fuel. The OSL operated in conjunction with the RAF to supply 24-hour analytical services in support of CPP-601 and calciner operations. Liquid



Legend

ANL-W	=	Argonne National Laboratory-West
CFA	=	Central Facilities Area
EBR-I	=	Experimental Breeder Reactor I
INEEL	=	Idaho National Engineering and Environmental Laboratory
INTEC	=	Idaho Nuclear Technology and Engineering Center
NRF	=	Naval Reactors Facility
PBF	=	Power Burst Facility
RWMC	=	Radioactive Waste Management Complex
TAN	=	Test Area North
TRA	=	Test Reactor Area

Figure 1-1. Location of the Idaho Nuclear Technology and Engineering Center on the Idaho National Engineering and Environmental Laboratory Site.

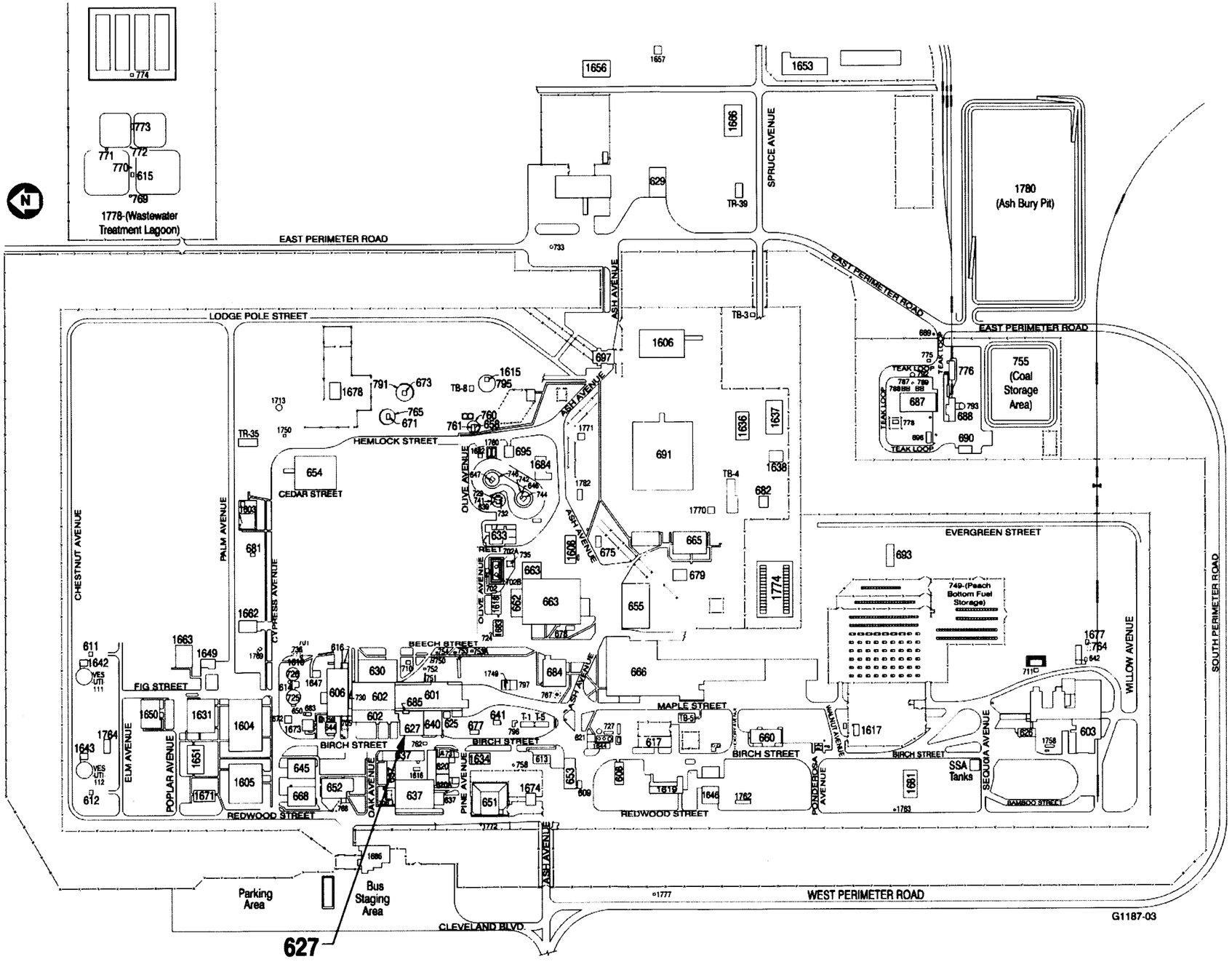


Figure 1-2. Plan view of the Idaho Nuclear Technology and Engineering Center.

wastes from the RAF and OSL were routed to the PEW collection system in CPP-601. Sample residues containing uranium could be routed to the CPP-601 uranium salvage system.

As a result, access to the two lines of gloveboxes in the RAF is restricted because of significant levels of radioactive and residual chemical contamination from analysis of samples of dissolved fuel. Much of this contamination is shielded, using about 120 tons of radiologically contaminated lead (a toxic metal) in various shapes, sizes, and contamination levels (Wagner 1999). The OSL contained gloveboxes and fume hoods to perform analysis of samples with low-to-moderate radioactivity and still remains significantly contaminated with radionuclides and hazardous constituents similar to those in the RAF.

The middle third of Building CPP-627 was a high bay decontamination facility, providing space for water and chemical cleaning of radiologically contaminated equipment. Liquid wastes were routed to the CPP-601 PEW system. In 1980, the decontamination facility was removed and the area was rebuilt into the Emission Spectroscopy Laboratory and the Decon Development Laboratory. Both facilities saw very limited use. The second story provided a fan and filter loft for air handling from some radioactively contaminated portions of the building.

The southern third of Building CPP-627 contained two experimental facilities, the Hot Chemistry Laboratory (HCL) and the MCC. The HCL consisted of lab benches, hoods, shielded gloveboxes, and a large walk-in hood used for the Custom Dissolution Process. The MCC was designed for experiments using fully irradiated fuel (including transuranic elements such as plutonium). The MCC was shielded to allow remote experiments on irradiated fuel or calcine. The MCC was also used as part of the Custom Dissolution Process. As in the rest of CPP-627, liquid wastes from the HCL and MCC were routed to the CPP-601 PEW, and uranium solutions were transferred to the CPP-601 uranium salvage system. All the Custom Dissolution Process equipment was previously removed by the early 1990s. The Chemical Dissolution Process precedes the first step in an extraction process and therefore any wastes from the Chemical Dissolution Process are not potentially high-level wastes and are not subject to the WIR process.

Radiological and hazardous material contamination remains in the building's ventilation ducting and high-efficiency particulate air filter banks. Repairs were successfully made to the roof over the second-floor OSL, because previous precipitation events caused the roof to leak, allowing radiological and hazardous substances to migrate within the building.

Through the years, waste piping at CPP-627 has been upgraded. Old lines were drained and capped during the CPP-601 buried line replacement project. Some of the lines, such as the piping installed in 1991 in the HCL and the MCC, were never put into service (Wagner 1999).

Building CPP-627 was taken out of service in 1997. Currently, the building is undergoing regular surveillance and maintenance (S&M) to ensure that contaminants remaining in the building do not spread or expose workers.

2. SOURCE, NATURE, AND EXTENT OF CONTAMINATION

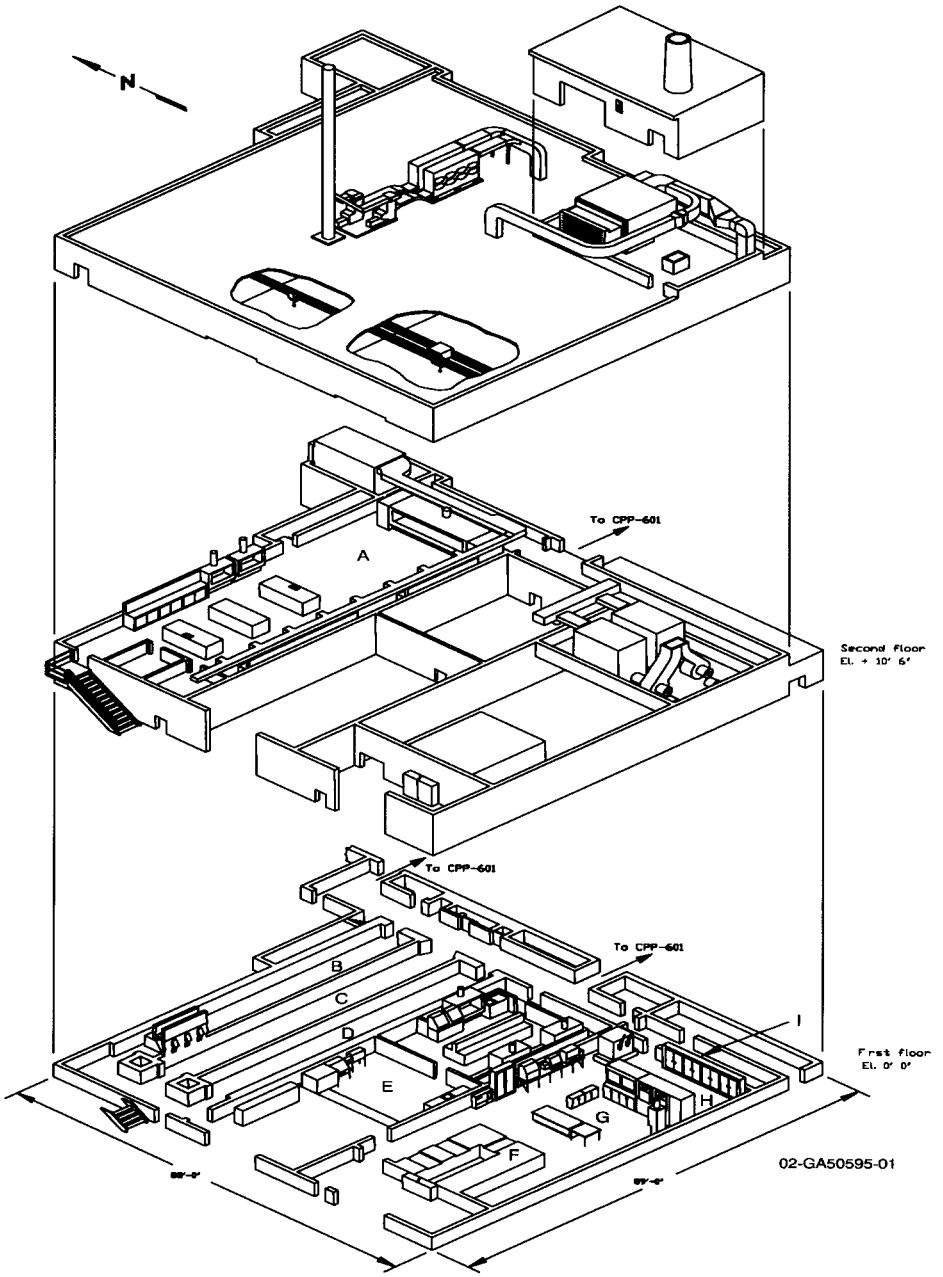
The CPP-627 building is contaminated with hazardous substances, including radionuclides. Figure 2-1 provides the isometric view of the CPP-627 facility. Radiological and hazardous substance contamination remains in the building's ventilation ducting and high-efficiency particulate air filter banks. Other building components and equipment also contain radiological and hazardous substances. Table 2-1 lists the expected waste streams and estimated waste volumes based on historical operations, process knowledge, and previous characterization. As the building and components are further characterized under this action, more detailed information concerning the levels and extent of contamination will be available. Radiological surveys of the building are being performed. These surveys are progressing from areas with lower levels of contamination to the areas with significantly higher levels of contamination (i.e., sample analysis laboratory areas). Contamination levels in the cleaner areas range from no contamination to 0.2-0.3 mR.

Continued S&M does not reduce future risks to workers, public health and welfare, or the environment. The inspection activities expose workers to hazards associated with the contaminants in CPP-627 and, over time, pose cumulative risk to workers. Without the existing operational controls, workers could be directly exposed to contaminants through skin contact, ingestion, or inhalation. Radionuclides are known carcinogens, and the nonradioactive contaminants present the potential for both carcinogenic and noncarcinogenic risks.

Another concern is the potential risk to groundwater posed by a possible future release of contaminants to the subsurface. As the building continues to deteriorate, the threat of a potential release to the subsurface increases each year. The underlying Snake River Plain Aquifer is the sole source of drinking water for many citizens of Idaho.

Although the CPP-627 building is maintained in compliance with regulations, as the building continues to age and deteriorate, the threat of a potential release increases and could present a risk to human health and the environment.

No wastes are expected to be encountered or generated that would be subject to the evaluation WIR process in DOE O 435.1. A citation WIR was issued in October 2001 (DOE-ID 2001) that determined that no high-level waste was expected to result from activities in CPP-627. If unexpected wastes are encountered, such as containerized samples of high-level waste (such as calcine) or similar sample material that may potentially require a review under the evaluation method for making WIR determinations under DOE O 435.1, they will be stored pending resolution of the legal uncertainty concerning certain reprocessing wastes.



Legend

A	Special analysis laboratory (Shift Lab or Room 201)
B, C, D	Remote Analytical Facility (Room 102)
B	A-Line shielded analytical boxes
D	B-Line shielded analytical boxes
E	Decon Development Laboratory and Emission Spectroscopy Laboratory (Room 103)
F, G, H	Hot Chemistry Laboratory and Multi-Curie Cell
F	Multi-Curie Cell (Rooms 104 and 106)
G, H	Hot Chemistry Laboratory (Room 104)
I	Mass Criticality Control Area (Room 105)

Figure 2-1. Isometric view of CPP-627.

Table 2-1. Expected waste streams and volumes for CPP-627.

Waste Type	Estimated Volume	Comments
Mixed low-level waste debris	520 yd^3 120 tons (lead)	This includes the A/B lines in the RAF, pipes and valves associated with the PEW system, lead used for shielding, gloveboxes/hoods, and electrical components/equipment. A portion of this waste stream is HWMA/RCRA-regulated.
Low-level waste debris	1,000 yd^3	This includes the structure, metal items, lab benches, conduit, non-PEW pipes, gloveboxes/hoods.
Industrial debris	300 yd^3	This includes structural concrete, roofing, and other items determined to be nonhazardous and nonradioactive.
Toxic Substances Control Act-regulated	25 yd^3	This is polychlorinated biphenyl (PCB) waste from light fixtures and debris with paint containing PCBs. This may have radioactive contamination.
Low-level waste (asbestos)	Under evaluation	Asbestos is located on pipes throughout facility and radiological contamination is expected.
Potential recyclable materials	Under evaluation	Includes oil and lead/acid batteries.

3. SUMMARIZED RISK EVALUATION

This removal action entails decontaminating and demolishing Building CPP-627 to the concrete slab and managing the wastes at on-INEEL and off-INEEL storage facilities and landfills; therefore, no contaminant inventory is expected to be left behind. This action will remove the contaminant sources within the building that could contribute to potential future risk. As CPP-627 is attached to a complex of buildings with Group 2 CERCLA sites located beneath the remaining buildings, there is a potential that contamination has migrated beneath the CPP-627 concrete floor slab. Following removal of the structure, the concrete slab will be surveyed for any remaining radioactive contamination and, if necessary, controls will be implemented to put the site in a stable condition that would preclude infiltration of water and migration of the contaminants below the slab. As needed, institutional controls, such as site access restrictions, warning signs, and periodic inspections of infiltration barriers, will be implemented. Consistent with the OU 3-13 Group 2, Soils Under Buildings sites, the soil beneath the slab will be evaluated during characterization of the Fuel Reprocessing Complex. If contamination is found, it will be addressed during the end-state planning for the CPP-601 and -640 and adjoining buildings.

By carrying out this removal action and properly managing any wastes generated, the future risk posed to workers is substantially less than the risks posed by continued S&M activities as the building deteriorates. Since the contamination would be left in place with the No Action Alternative (see Section 5), the risk of exposure and release would remain.

4. REMOVAL ACTION OBJECTIVES AND CONTRIBUTION TO REMEDIAL PERFORMANCE

The removal action objectives are as follows:

- Remove and dispose of the Building CPP-627 structure and contents down to the concrete slab floor, thereby reducing the potential for worker exposure and the risk of a release of hazardous and/or radioactive contaminants to the air or to the subsurface.

- Reduce the risk of contaminant migration to the underlying Snake River Plain Aquifer by removing the contaminant source in the CPP-627 structure.

- Prevent worker exposure through new or continued engineering and institutional controls to potential contaminants remaining in and under the CPP-627 concrete slab floor, after completion of the removal action, until the final remedial action is implemented.

- Prevent migration of contaminants remaining in and under the CPP-627 concrete slab floor to the Snake River Plain Aquifer, through new or continued engineering and institutional controls, after completion of the removal action and until the final remedial action is implemented.

These removal action goals are consistent with the remedial action objectives established in the *Final Record of Decision Idaho Nuclear Technology and Engineering Center, Operable Unit 3-13,* (DOE-ID 1999). As such, the removal action will be consistent with and will contribute to the overall remediation of the INTEC under CERCLA.

5. IDENTIFICATION OF ALTERNATIVES

Two alternatives are addressed in this section: No Action and Removal Action Alternative (removal of the building and its contents).

5.1 No Action (Continued S&M)

The No Action Alternative with S&M provides an environmental baseline against which impacts of the recommended removal action can be compared. Taking no action includes S&M being carried out until the eventual deactivation and demolition of the building, assumed to occur by 2020 pursuant to the INTEC Completion Life-Cycle Baseline (INEEL 2003). This alternative would be unacceptable because contaminants in the building would eventually be released to the environment. No actions would be taken to reduce the contaminant mobility, toxicity, or volume. Although the No Action Alternative could be easily implemented and would have only minor costs, it would not satisfy the removal action objectives and is, therefore, unacceptable. Annual S&M cost for the CPP-627 building is estimated to be $15,000, and over the estimated 15-year monitoring period would amount to $225,000. The annual O&M costs are estimated at $320,000, and over the 15-year monitoring period would amount to $4.8 million. The longer action is delayed, the higher the cleanup cost would be. Finally, this alternative would simply delay the final action for CPP-627, increasing the length of time over which the threat of release is not addressed.

5.2 Complete Removal of the CPP-627 Facility to Slab on Grade

The proposed Removal Action Alternative consists of the physical removal of the CPP-627 building and its contents with the disposal of the generated wastes in suitable disposal facilities. Waste disposal facilities are available at the INEEL to accommodate the wastes generated during removal of the building contents and demolition of the building. The waste is anticipated to meet the Waste Acceptance Criteria for the ICDF landfill (DOE-ID 2003), and disposal can be coordinated with upcoming soil disposal activities from other INEEL contaminated sites. Other on-INEEL facilities that may be used for management of the waste include the Landfill Complex at the Central Facilities Area (CFA) and the Radioactive Waste Management Complex (RWMC). HWMA/RCRA-regulated systems that are a hazardous waste will be managed in a RCRA-compliant TSD Facility. Wastes not complying with the ICDF Waste Acceptance Criteria will be staged/stored for disposal at an on-INEEL or off-INEEL facility, subject to meeting their Waste Acceptance Criteria. Building materials or contents will be recycled to the extent possible.

After the building has been removed down to the concrete slab floor, it will be surveyed for any remaining radioactive contamination and, if necessary, controls will be implemented (e.g., engineered cover) to put the site in a stable condition that would preclude infiltration of water and migration of the contaminants below the slab to the aquifer. Institutional controls, such as site access restrictions, warning signs, and periodic inspections of infiltration barriers, will be implemented, as necessary. Consistent with the OU 3-13 Group 2, Soils Under Buildings sites, the soil beneath the slab will be evaluated during the characterization of the Fuel Reprocessing Complex. If contamination is found, it will be addressed during the end-state planning for the CPP-601 and -640 and adjoining buildings.

Criteria used to evaluate this alternative include

- Demolition and removal of the building is the most effective action to reduce worker exposure and eliminate the threat of a release to the environment.

- Disposal at the ICDF or other INEEL disposal facilities is readily available, requiring minimal handling and transporting of the wastes. Staging/storing of waste, as necessary, will be performed in an environmentally compliant manner, as specified in the applicable or relevant and appropriate requirements (ARARs).

- This removal action is consistent with the CERCLA OU 3-13 ROD for WAG 3. As such, it supports the overall remediation at WAG 3.

- This removal action is consistent with and will contribute to the overall remediation of the INTEC under CERCLA.

The estimated cost of the proposed removal action is approximately $4.6 million and discussed in Section 7 (Table 7-1). DOE is responsible for removal action costs and the funds are available to implement the action. The project cost estimate is available in the Administrative Record for this action.

6. APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The CPP-627 NTCRA will comply with the substantive applicable or relevant and appropriate requirements (ARARs). Action-specific ARARs restrict specific types of activities or technologies. Chemical-specific ARARs are generally health- or risk-based requirements that establish numerical limits on the amounts or concentrations of a particular hazardous substance that may be discharged to or be present in the environment. Location-specific ARARs restrict specific activities occurring in particular locations.

Table 6-1 lists the ARARs that have been identified for this removal action. These ARARs are a compilation and expansion of the ARARs identified in the OU 3-13 ROD. The ARARs list is based on several key assumptions:

- Management of CERCLA wastes will be subject to meeting the Waste Acceptance Criteria of the receiving facility, whether that facility is an on-INEEL facility, such as the ICDF, RWMC, Landfill Complex at CFA, or an off-INEEL facility. The ICDF is the preferred location for disposal of contaminated CERCLA wastes and is located within the WAG 3 area of contamination (DOE-ID 1999).

- CERCLA wastes that will be generated during implementation of the removal action will be handled in accordance with the ARARs identified in Table 6-1.

- Waste, such as piping, that would be generated by removal of portions of a HWMA/RCRA -regulated system at CPP-627 will be managed at an on-INEEL HWMA/RCRA storage facility and disposed of at an off-INEEL RCRA TSD Facility.

- As the wastes will be CERCLA wastes generated within the WAG 3 area of contamination, land disposal restrictions are not applicable unless placement is triggered or treatment is performed, except as otherwise noted within this document.

- Though not expected to be encountered, waste generated during the CPP-627 removal action that has the potential to be considered evaluation method WIR will be placed in the category of "evaluation waste." Such waste will be appropriately staged/stored pending resolution of the legal uncertainty regarding certain reprocessing wastes.

- If decontamination liquids are generated, they may be transferred, using the existing waste lines where possible, to the CPP-601 WG/WH Cells Storage and Treatment Tanks. These tanks are HWMA/RCRA-regulated, and any wastes sent to them would be required to meet the Waste Acceptance Criteria prior to transfer.

- Debris generated during demolition of CPP-627 may have paint that has PCBs. If encountered, such wastes may trigger substantive requirements of the Toxic Substances Control Act. Lead-contaminated paint may be generated during demolition, which will be subject to the substantive requirements of RCRA hazardous waste regulations. These wastes are planned for disposal at the ICDF, unless it can be demonstrated that they are eligible for disposal as solid waste at the Landfill Complex at CFA.

- Asbestos-containing material will be encountered during demolition. These wastes will be subject to certain asbestos regulations and will be acceptable for disposal at the ICDF or, if not radiologically contaminated, at the Landfill Complex at CFA.

- Approximately 120 tons of lead shielding, in various forms, will be generated as a waste during demolition. This lead will be recycled to the extent possible but otherwise disposed of at the ICDF.

- Mercury may be discovered in electrical switching equipment during demolition and will be recycled, to the extent possible. Otherwise, this waste will be disposed of at an off-INEEL RCRA TSD Facility.

Table 6-1. Summary of applicable or relevant and appropriate requirements for the CPP-627 non-time critical removal action.

Requirement (Citation)	ARAR Type			Comments
	Action Specific	Chemical Specific	Location Specific	
Clean Air Act and Idaho Air Regulations				
"Toxic Substances," IDAPA 58.01.01.161		A		Applies to the building demolition and waste handling activities.
"National Emission Standards for Hazardous Air Pollutants," <10 mrem/yr 40 CFR 61.92, "Standard"		A		Applies to the building demolition and waste handling activities.
"National Emission Standards for Hazardous Air Pollutants," 40 CFR 61.93, "Emission Monitoring and Test Procedures"	A			Applies to the building demolition and waste handling activities.
"National Emission Standards for Hazardous Air Pollutants," 40 CFR 61.94(a), "Compliance and Reporting"	A			Applies to the building demolition and waste handling activities.
"National Emission Standards for Hazardous Air Pollutants," 40 CFR 61.145, "Standards for Demolition and Renovation"	A	A		Applies to asbestos-containing materials encountered during demolition.
"Rules for Control of Fugitive Dust," and "General Rules," IDAPA 58.01.01.650 and .651	A			Applies to the building demolition and waste handling activities.
RCRA and Idaho Hazardous Waste Management Act				
Generator Standards:				
"Standards Applicable to Generators of Hazardous Waste," IDAPA 58.01.05.006, and the following, as cited in it:				
"Hazardous Waste Determination," 40 CFR 262.11	A	A		Applies to waste that will be generated during the removal action and disposed of outside the WAG 3 area of contamination.
General Facility Standards:				
IDAPA 58.01.05.008, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," and the following, as cited in it:				
"Temporary Units," 40 CFR 264.553	A			Wastes may be treated or temporarily stored in a temporary unit prior to disposal.
"Remediation Waste Staging Piles," 40 CFR 264.554	A			Wastes may be temporarily staged prior to disposal without triggering land disposal restrictions.
"General Waste Analysis," 40 CFR 264.13 (a)(1-3)	A			If waste treatment is determined to be necessary, applies to hazardous waste generated during demolition.

Table 6-1. (continued).

Requirement (Citation)	ARAR Type: Action Specific	ARAR Type: Chemical Specific	ARAR Type: Location Specific	Comments
"General Inspections Requirements," 40 CFR 264.15	A			Applies to a facility staging, storing, or treating hazardous waste prior to transfer to the ICDF or an off-Site facility.
"Preparedness and Prevention," 40 CFR 264, Subpart C	A			Applies to a facility staging, storing, or treating hazardous waste prior to transfer to the ICDF or an off-Site facility.
"Contingency Plan and Emergency Procedures," 40 CFR 264, Subpart D	A			Applies to a facility staging, storing, or treating hazardous waste prior to transfer to the ICDF or an off-Site facility.
"Disposal or Decontamination of Equipment, Structures, Soils," 40 CFR 264.114	A			Applies to contaminated equipment used to remove, treat, or transport hazardous waste.
"Use and Management of Containers," 40 CFR 264.171–178	A			Applies to containers used during the removal and treatment of hazardous waste at the demolition site.
Land Disposal Restrictions:				
IDAPA 58.01.05.011, "Land Disposal Restrictions," and the following, as cited in it:				
"Applicability of Treatment Standards," 40 CFR 268.40(a)(b)(e)	A			Applies to hazardous waste and secondary wastes, if treatment is necessary to meet the disposal facility Waste Acceptance Criteria or if treatment is required due to placement.
"Treatment Standards for Hazardous Debris," 40 CFR 268.45	A			Applies to CPP-627 debris, if treatment is necessary to meet the disposal facility Waste Acceptance Criteria or if treatment is required due to placement.
"Universal Treatment Standards," 40 CFR 268.48(a)	A			Applies to nondebris hazardous waste and secondary wastes, if treatment is necessary to meet the disposal facility Waste Acceptance Criteria or if treatment is required due to placement.
"Alternative LDR Treatment Standards for Contaminated Soil," 40 CFR 268.49	A			Applies to contaminated soil, if treatment is necessary to meet the disposal facility Waste Acceptance Criteria or if treatment is required due to placement.
Toxic Substance Control Act (TSCA)				
"PCB Decontamination Standards and Procedures: Decontamination Standards," 40 CFR 761.79(b)(1)	A	A		Applicable to decontamination of equipment with PCB contamination, if PCB wastes are generated.

Table 6-1. (continued).

Requirement (Citation)	ARAR Type: Action Specific	ARAR Type: Chemical Specific	ARAR Type: Location Specific	Comments
"Decontamination Standards and Procedures: Self-Implementing Decontamination Procedures," 40 CFR 761.79(c)(1) and (2)	A	A		Applicable to decontamination of equipment with PCB contamination, if PCB wastes are generated.
"Decontamination Solvents," 40 CFR 761.79(d)	A	A		Applicable to decontamination of equipment used to manage PCB-contaminated waste, if PCB wastes are generated.
"Limitation of Exposure and Control of Releases," 40 CFR 761.79(e)	A	A		Applicable to decontamination activities of equipment with PCB-contaminated waste, if decontamination is performed.
"Decontamination Waste and Residues," 40 CFR 761.79(g)	A	A		Applicable to management of decontaminated wastes and residuals from PCB-contaminated equipment, if PCB wastes are generated.
To-Be-Considered Requirements				
"Radiation Protection of the Public and the Environment," DOE Order 5400.5, Chapter II(1)(a,b)	TBC			Applies to the CPP-627 building before, during, and after the removal action. Substantive design and construction requirements will be met to keep public exposures as low as reasonably achievable.
"Radioactive Waste Management," DOE Order 435.1	TBC			Applies to the CPP-627 building before, during, and after the removal action. Substantive design and construction requirements will be met to protect workers.
EPA Region 10 Final Policy on Institutional Controls at Federal Facilities	TBC			Applies if contamination is left in place after removal of the CPP-627 building.
"Off-Site Rule," 40 CFR 300.440	TBC			Applies if wastes are shipped off-Site for storage, treatment, or disposal.

Key:
A = applicable requirement; R = relevant and appropriate requirement; TBC = to be considered.
ARAR = applicable or relevant and appropriate requirement.
CFR = Code of Federal Regulations.
DOE = U.S. Department of Energy.
EPA = U.S. Environmental Protection Agency.
IDAPA = Idaho Administrative Procedures Act.
PCB = polychlorinated biphenyl.
RCRA = Resource Conservation and Recovery Act.
WAG = waste area group.

7. ANALYSIS AND COMPARISON OF ALTERNATIVES

Section 300.415(b)(4)(i) of the NCP (40 CFR 300) requires an engineering evaluation and cost analysis for all NTCRAs. Guidance from EPA (1993) identifies three criteria to be used in the analysis of NTCRA alternatives. This section presents the analysis of two alternatives: No Action and Removal Action (building removal via decontamination and decommissioning). The three criteria by which the two alternatives were compared are

- Effectiveness
- Implementability
- Cost.

7.1 Effectiveness

The effectiveness criterion assesses whether the alternatives leave an unacceptable risk after the conclusion of the actions, and it evaluates whether the alternative achieves adequate overall elimination, reduction, or control of risks to human health and the environment posed by the probable exposure pathways. Another consideration to be addressed in this section is to determine whether the alternative provides protection to human health and the environment during the action, and how long it will take to achieve the established objectives.

Under the No Action Alternative, S&M would be carried out until the eventual deactivation and demolition of the building, assumed to occur by 2020 pursuant to the INTEC Completion Life-Cycle Baseline (INEEL 2003). Therefore, the No Action Alternative would be protective of human health and the environment, but at a steadily increasing cost as the CPP-627 building continues to age and degrade. Therefore, over the long term, effectiveness of this alternative to remain protective may actually diminish.

The Removal Action Alternative is protective of human health and the environment for the long term and provides a permanent remedy for CPP-627 approximately 15 years earlier than the No Action Alternative. All of the known contamination and contaminated structure to concrete slab elevation would be removed and disposed, thereby creating an effective and permanent remedy. Although risk to workers would probably be greater with this alternative in the short term, once the contaminated facility is decontaminated and demolished, the potential exposure for a release is significantly reduced. In addition, this alternative has fewer uncertainties with respect to its ability to ultimately achieve protectiveness than are associated with the No Action Alternative.

7.2 Implementability

The implementability criterion assesses whether the alternatives are technically and administratively feasible, including the availability of materials and services needed to implement the selected solution. Additionally, the question and concerns about public and Agency (i.e., Idaho Department of Environmental Quality and the EPA) acceptance criteria, and whether the alternatives will address those concerns, must be determined. The main purpose and scope of the Agencies are protection of citizens and the environment. Public acceptance of an alternative will be determined by examining the alternatives and determining which one best mitigates damage to the public health or welfare or to the environment.

The No Action Alternative is easily implementable because it requires minimal immediate expenditure of time or resources and, technically, no engineering or development is necessary. However, in the interim and through the INTEC Life-Cycle Baseline planning horizon of 2020, S&M will require an expenditure of resources. As time goes by, the primary deterrent to the implementation would be subjecting S&M workers to contamination in increasingly deteriorated facilities. Therefore, if no action is taken, a potential threat to human health and welfare will still exist. Administratively, a removal action of the type described by this alternative is achievable from a management, cost, schedule, and programmatic point of view. However, the timeframe suggested by this alternative is contrary to the Environmental Management Performance Management Plan for Accelerating Cleanup at the INEEL (DOE-ID 2002) and Strategic Initiative 4.9, "Accelerate Consolidation of INEEL Facilities and Reduce Footprint."

The Removal Action Alternative is implementable, though only through immediate expenditure of time, resources, and technical capability necessary to carry out the action and minimize risk to the public, environment, or project workers. The INEEL possesses the human, technical, and engineering resources required to implement this alternative. If the Removal Action Alternative is implemented, a potential threat to human health and welfare will be eliminated. Administratively, a removal action of the type described by this alternative is achievable from a management, cost, schedule, and programmatic point of view and is consistent with the Environmental Management Performance Management Plan for Accelerating Cleanup at the INEEL (DOE-ID 2002) and Strategic Initiative 4.9, "Accelerate Consolidation of INEEL Facilities and Reduce Footprint." In terms of waste disposal, the ICDF has been designated by a ROD (DOE-ID 1999) to receive CERCLA waste meeting its Waste Acceptance Criteria within the WAG 3 area of contamination.

7.3 Cost

The cost criterion evaluates the cost of the alternatives and includes capital, operation and maintenance, and monitoring costs. The costs represented are in net present value terms and an escalation factor has not been applied.

The cost estimate for the No Action Alternative is shown in Table 7-1. The cost for the No Action Alternative includes interim monitoring and management of the monitoring system. Surveillance operations and routine maintenance will be necessary until implementation of the final remedy, around 2020. For these reasons, a 15-year monitoring duration is used. This portion of the costs is estimated at about $5 million. Management and oversight are required for monitoring and are included in the S&M figure. The cost to maintain the facilities to ensure protection of human health and the environment cannot be accurately predicted, but a percentage of the annual life-cycle baseline estimate for the Fuel Reprocessing Complex was used. If the facility deteriorated at a significantly rapid rate, decontamination and decommissioning of the facility might actually have to be performed before 2020. Also, because the cost of major repairs cannot be predicted, the estimated cost for the S&M portion probably represents a minimum.

The cost estimate for the Removal Action Alternative is shown in Table 7-1, reflecting a total of approximately $4.6 million. Included in the estimate are management and oversight, engineering, construction, and decontamination and demolition of Building CPP-627. The cost estimate is based on performing the work in this current calendar year.

Table 7-1. Cost estimates for No Action and Removal Action Alternatives.

Cost Element	No Action Alternative ($)	Removal Action Alternative ($)
Management and oversight	—	407K
Engineering	—	780K
Construction	—	152K
Operation and maintenance support	4,800K[a]	—
Surveillance and maintenance	225K[b]	—
Decontamination	—	1,730K
Demolition	—	1,550K
Subtotal (15-year S&M monitoring period)	5,025K	—
Subtotal (building removal)	4,619K	4,619K
Total (net present value)	9,644K	4,619K

a. From the life-cycle baseline estimate for the Fuel Reprocessing Complex, which includes CPP-601, -640, and -627, of $3.2 million annually, approximately 10% of the amount was attributed to this building, or $320,000. This figure represents the total over the 15-year monitoring period.
b. The surveillance and maintenance costs were estimated at $15,000 annually and are the total over the 15-year monitoring period.

Some additional differences should be noted aside from the cost differential between the two alternatives. For example, the timing of expenditures would be significantly different. Under the No Action Alternative, the annual expenditures that would be incurred over the 15-year period would continually increase as the S&M program became more aggressive. At the end of that period, or some undetermined time before then, another large expenditure would occur for the decontamination and decommissioning function. Contrarily, with the Removal Action Alternative, the majority of the expenditure would occur early in the cycle. Given the uncertainties associated with estimating decontamination and decommissioning costs in the out-years, the Removal Action Alternative estimate is more adequately predicted. Given these differences, the Removal Action Alternative is better at achieving the cost objectives than the No Action Alternative and is better at satisfying the removal action objectives relating to reducing or eliminating the potential exposure or migration of contaminants and the need for future S&M activities.

8. RECOMMENDED EARLY ACTION ALTERNATIVE

The proposed removal action consists of the physical removal of the CPP-627 building and its contents with the disposal of the generated wastes in suitable disposal facilities. Waste disposal facilities are available at the INEEL to accommodate the wastes generated during removal of the building contents and demolition of the building. Most waste will meet the Waste Acceptance Criteria for the ICDF landfill, and disposal can be coordinated with upcoming soil disposal activities from other INEEL contaminated sites. Other on-INEEL facilities that may be used for management of the waste include the Landfill Complex at the CFA and the RWMC. HWMA/RCRA-regulated systems that are a hazardous waste will be managed in a RCRA-compliant TSD Facility. Wastes not complying with the ICDF Waste Acceptance Criteria will be staged/stored for disposal at an on-INEEL or off-INEEL facility, subject to meeting their Waste Acceptance Criteria. Building materials or contents will be recycled to the extent possible. Though not expected to be encountered, all wastes generated that may potentially be subject to an evaluation WIR under DOE O 435.1 will be staged/stored pending resolution of the legal uncertainty regarding certain reprocessing wastes.

CPP-627 is attached to a complex of buildings with Group 2 CERCLA sites located beneath the remaining buildings, and there is a potential that contamination has migrated beneath the CPP-627 concrete floor slab. Following removal of the structure, radiological surveys will be conducted to identify any remaining radioactive contamination. If necessary, controls will be implemented to put the site in a stable condition that would preclude infiltration of water and migration of the contaminants below the slab. Institutional controls, such as site access restrictions, warning signs, and periodic inspections of infiltration barriers, will be implemented, as necessary. Consistent with the OU 3-13 Group 2, Soils Under Buildings sites, the soil beneath the slab will be evaluated during characterization of the Fuel Reprocessing Complex. If contamination is found, it will be addressed during the end-state planning for the CPP-601 and -640 and adjoining buildings.

9. PROJECT SCHEDULE

This removal action is expected to begin onsite activities in June 2004 with anticipated completion by April 2005 as shown in Figure 9-1. The building demolition and waste disposal are anticipated to be completed by January 2005.

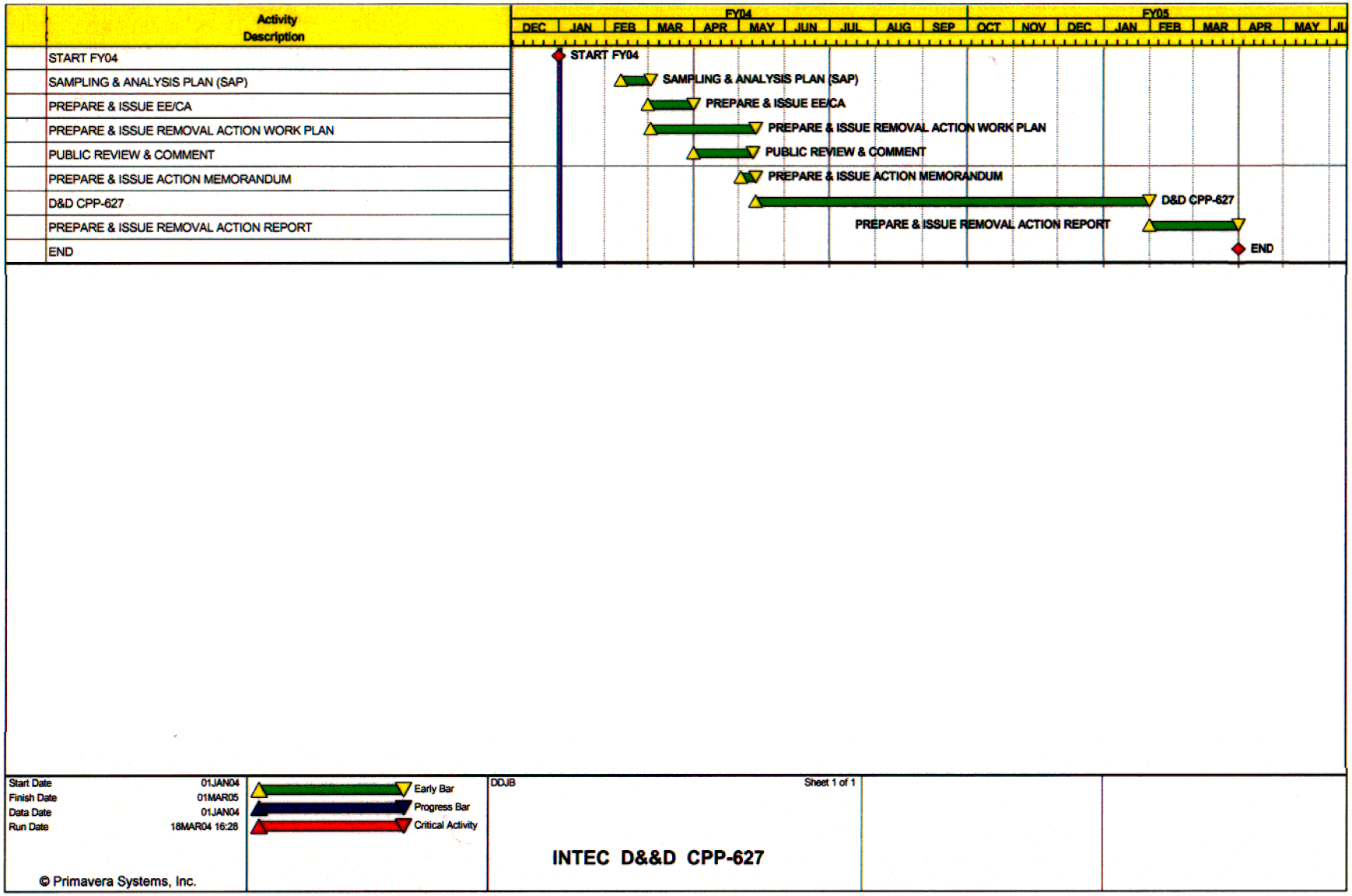


Figure 9-1. Decontamination and decommissioning of CPP-627 project schedule.

10. REFERENCES

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