EM U.S. Department of Energy
Office of Environmental Management

Nuclear Facility Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project

FINAL

July 2007

Prepared for
U.S. Department of Energy
Environmental Management
SPRU Project Office

Prepared by
Environmental Resource Group, LLC

Contract Number: DE-AM09-03SR22289
Task Number: DE-AT09-03SR22377

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ACRONYMS AND GLOSSARY

ALARA	as low as reasonably achievable
ARAR(s)	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ERG	Environmental Resource Group, LLC
KAPL	Knolls Atomic Power Laboratory
NEPA	National Environmental Policy Act
NYCRR	Official Compilation of Codes, Rules and Regulations of the State of New York
NYSDEC	New York State Department of Environmental Conservation
PCB	polychlorinated biphenyls
RCRA	Resource Conservation and Recovery Act
SPRU	Separations Process Research Unit

cell. Generally, a room where hazardous processes can be remotely controlled and carried out. SPRU cells are typically constructed of thick concrete walls to isolate radioactive materials. Both Buildings G2 and H2 contain cells.

Curie. A Curie is a measure of radioactivity based on the observed decay rate of approximately 1 gram of radium in one minute. It is defined as the number of nuclear transformations occurring per minute. One Curie = 2.22×10^{12} disintegrations per minute.

decommissioning. The process of closing and securing a nuclear facility or nuclear materials storage facility to provide adequate protection from radiation exposure and to isolate radioactive contamination from the human environment.

decontamination. The removal of a chemical, biological, or radiological contaminant from, or neutralizing its potential effect on, a person, object, or environment by washing, chemical action, mechanical cleaning, or other techniques. Decontamination may also include treatment and disposal of wastes generated during decontamination efforts.

EE/CA (Engineering Evaluation/Cost Analysis). A document required for non-time-critical removal actions. It provides a framework for evaluating and selecting an alternative for removing hazardous materials from buildings or land. In doing so, the EE/CA identifies the objectives of the removal action and analyzes the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives.

footer drain. Foundation perimeter drains at the exterior base of a building's foundation wall. They are in place to drain water away from the foundation.

historical site assessment (HSA). A detailed investigation to collect existing information, primarily historical, on a site and its surroundings.

non-time-critical removal actions. Conducted when, based on a site evaluation, the removal of hazardous material from a building or land areas is appropriate, and a planning period of at least

six months is available before on-site activities must begin.

nuclear facility. A building that contains residual radioactive contamination or radioactive materials. Buildings G2 and H2 are nuclear facilities.

PUREX. PUREX is a uranium and plutonium extraction process using the solvent tributyl phosphate (TBP). SPRU was a PUREX pilot plant.

REDOX (reduction-oxidation). REDOX is a chemical extraction process for separating uranium and plutonium from mixed fission products. SPRU was a REDOX pilot plant.

slug. A slug is a lump, disk, or cylinder of metal containing uranium (smaller than 6 inches in diameter) and encased in aluminum. Prior to being shipped to SPRU, the slugs had been placed in a reactor to create plutonium.

surveillance and maintenance. Periodic inspections and maintenance of structures, systems, and equipment necessary for the satisfactory containment of contamination, and for the protection of the public, workers, and the environment.

tank heel. Residual material (liquid, sludge, or solid) that is not readily removable from a tank after it has been drained by installed equipment, which typically includes drain valves or pumps.

EXECUTIVE SUMMARY

This Engineering Evaluation/Cost Analysis (EE/CA) identifies, describes, and evaluates alternatives considered for the disposition of the formerly utilized Separations Process Research Unit (SPRU) at the United States Department of Energy (DOE) Knolls Atomic Power Laboratory (KAPL) site in Niskayuna, New York. The SPRU Disposition Project mission is to address cleanup of the SPRU facilities and land, including transfer of all property back to the DOE Office of Naval Reactors, Schenectady Naval Reactors, and their contractor, KAPL, Inc., a Lockheed Martin company, for reuse. This EE/CA addresses the SPRU facilities and contaminated soil immediately adjacent to the facilities. The soil and groundwater underlying the SPRU facilities, as well as contaminated soil or groundwater at other locations where SPRU waste containers were temporarily managed will be addressed in a separate document.

Site Description and Background

The SPRU facilities occupy about 5 acres of the 170-acre KAPL site. The SPRU facilities addressed in this EE/CA consist of the following:

- Building G2 – housed the laboratories, hot cells, separations process testing equipment, and the tunnel system beneath Building G2. Building G2 hot cells, equipment, and tunnels contain residual radioactive contamination.
- Building H2 – used for liquid and solid waste processing. All areas of this building contain residual radioactive contamination.
- H2 Tank Farm (also known as the tank vaults) – a series of underground concrete-enclosed stainless steel tanks along the eastern side of Building H2 used for storing liquid radioactive waste. The tanks have been drained but contain heels of radioactive sludge.
- Pipe Tunnels – concrete passageways connecting the H2 Tank Farm, Building H2 to Building G2, and Building G2 to Buildings G1 and E1. The Pipe Tunnels contain residual radioactive contamination.

These four facilities collectively are referred to as the "SPRU facilities" in this EE/CA. The SPRU facilities were constructed to research the chemical separation of plutonium and uranium from radioactive material encased in aluminum, known as slugs. SPRU operated between February 1950 and October 1953, after which research activities ceased following successful development of the reduction oxidation (REDOX), and plutonium uranium extraction (PUREX) process which were subsequently used by Hanford and the Savannah River Sites. The research was performed on a laboratory scale; SPRU was never a production plant. Decommissioning of SPRU began in October 1953 and continued through the 1990s. All SPRU facilities are under surveillance and maintenance.

In their decommissioned state, the SPRU facilities are inactive and can no longer be operated. According to DOE Order 430.1A, *Life Cycle Asset Management* (DOE, 1998), and DOE Order 430.1B, *Real Property Asset Management* (DOE, 2003), DOE property that is not used must be eliminated through reuse, demolition, disposal, transfer, or sale. The areas occupied by the SPRU facilities are to be transferred from the DOE Environmental Management to the DOE Office of Naval Reactors upon completion of their decontaminating and decommissioning. In their current state, the SPRU facilities are safely managed; however, they are of no further use to either DOE or Naval Reactors. The existence of residual contamination and the specialized purpose for which these facilities were designed make these facilities non-usable. Selection of one of the removal action alternatives described and analyzed in this EE/CA would reduce residual contamination or restore the areas occupied by the SPRU facilities.

This EE/CA fulfills Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements for documenting the removal action alternative selection process in accordance with the *Policy on Decommissioning Department of Energy Facilities Under CERCLA* (DOE and U.S. Environmental Protection Agency [EPA, 1995]), *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (EPA, 1993), and the *Decommissioning Implementation Guide* (DOE, 1999). As part of the CERCLA process, this document will be used as a means to communicate with and solicit input from regulatory agencies and public stakeholders on the proposed removal action alternatives.

A risk evaluation is included in this EE/CA. Radiological contamination is the primary contamination present in the SPRU facilities. The primary residual radiological contaminants of concern are cesium and strontium, with a much smaller amount of plutonium. Both strontium and cesium have half-lives of approximately 30 years. These will decay more quickly than the longer-lived plutonium, which has a 24,000-year half-life. Hazardous building materials (e.g., asbestos and lead) are also present, and equipment used in SPRU processes and operations contains some chemical residues.

In their current state, the SPRU facilities do not pose a risk to the public, on-site workers, or the environment. KAPL personnel continue surveillance and maintenance and capital improvements to maintain these buildings safely. However, it is not prudent to continue the surveillance and maintenance program activities indefinitely. DOE estimates that the current cost of the surveillance and maintenance program is between $1.25 and $1.75 million per year. Even with the surveillance and maintenance program activities, the SPRU facilities will continue to age, deteriorate, and require additional capital improvements to be adequately maintained. By performing a removal action and properly managing wastes generated, the future risk posed to the public, on-site workers, and the environment would be significantly reduced or eliminated if the residual contamination in the SPRU facilities is removed. A removal action would also allow the areas occupied by the SPRU facilities to be reused by KAPL.

Removal Action Objectives

Removal action objectives were developed based on the radiological and chemical hazards associated with the SPRU facilities. The objectives of the SPRU facilities removal action include:

- Restoring the property occupied by the SPRU facilities to a state that is suitable for government reuse, demolition, disposal, transfer, or sale
- Restoring the area occupied by the SPRU facilities to a state that meets the needs of KAPL and is consistent with a DOE continuing-mission site
- Reducing or eliminating the surveillance and maintenance program costs
- Reducing or eliminating the potential for future releases from SPRU facilities to the environment

Scope of Alternatives

Ten removal action alternatives were initially developed and screened. Of the ten, DOE selected four alternatives for further evaluation – the no action alternative (continue surveillance and maintenance activities) and three action alternatives. These are summarized below and in Table ES-1, Alternatives Scope Summary:

- Alternative 1 – No Action (Continue Surveillance and Maintenance)
- Alternative 2 – Cleanout of Tank Vaults and Gross Decontamination of Facilities
- Alternative 3 – Removal of H2 and Tank Vaults
- Alternative 4 – Removal of SPRU Facilities

Table ES-1. Alternatives Scope Summary

Scope Element	**Alternative 1** No Action (Continue Surveillance and Maintenance)	**Alternative 2** Cleanout of Tank Vaults and Gross Decontamination of Facilities	**Alternative 3** Removal of H2 and Tank Vaults	**Alternative 4** Removal of SPRU Facilities
Surveillance and maintenance	✓	✓	✓	Not required
Maintain and operate a groundwater monitoring treatment system	✓	✓*	✓*	✓*
Incidental soil removal		✓	✓	✓
Remove Tank Farm Vaults and Tanks		✓**	✓	✓
Remove H2			✓	✓
Remove G2 and Pipe Tunnels				✓

* Operate as needed.

** Decontaminated tank vaults will remain in place.

Analysis of Alternatives

The four alternatives are described and individually analyzed based on criteria presented in the U.S. Environmental Protection Agency's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA, August 1993:* effectiveness, implementability, and cost. The alternatives are compared relative to each other.

Effectiveness - Alternative 1 would be the least effective because it delays removal of contamination and reuse of the area. It would require the surveillance and maintenance program to continue indefinitely and prevent use of the areas occupied by the SPRU facilities. This alternative would not meet KAPL needs, is not as protective as removal action, and has the potential for increased cost over time.

Alternative 2 would be moderately effective, but does not meet all the removal action objectives. Under Alternative 2, areas with the highest levels of contamination would be decontaminated (i.e., the Tank Vaults). The SPRU facilities would remain. Alternative 2 would also require the surveillance and maintenance program to continue until the facilities are removed. Alternative 2 would prevent KAPL from reusing the areas occupied by the SPRU facilities.

Alternative 3 would be moderately effective because it would completely remove the structures with most residual radiological contamination (Building H2 and the Tank Vaults). Alternative 3 would not allow use of the area occupied by Building G2.

Alternative 4 is highly effective. It meets all the removal action objectives. Alternative 4 would completely remove the SPRU facilities, eliminating the need to continue the surveillance and maintenance program, and would restore the areas occupied by the SPRU facilities.

Implementability - Alternative 1 is the most technically and administratively feasible because there is no removal action, only continued surveillance and maintenance.

Alternatives 2, 3, and 4 are moderately implementable based on experience at other DOE sites.

Cost - As decontamination, demolition, excavation, and transportation activities increase, the cost increases.

Alternative 1, $60 million, is the least expensive alternative (assuming 30 years of surveillance and maintenance) because no decontamination, demolition, excavation, or transportation activities would take place.

Alternative 2, $90 million, includes decontamination of the areas with the highest residual radioactivity. The Tank Farm tanks would be removed. Surveillance and maintenance costs would be reduced.

Alternative 3, $130 million, involves demolishing and removing Building H2 and the Tank Farms. Surveillance and maintenance costs would be reduced.

Alternative 4, $160 million, is the most expensive alternative because the SPRU facilities would be completely demolished and removed. The costs for Alternatives 1, 2, and 3 do not consider future demolition costs associated with the remaining SPRU facilities.

NEPA Considerations - NEPA values were considered and incorporated in the development and analysis of each individual removal action alternative. Short-term impacts anticipated with Alternatives 2, 3, and 4 include limited negative impacts to air quality, noise, and local traffic and small positive impacts on local employment and local businesses that serve the construction trade. Long-term positive impacts anticipated with Alternatives 3 and 4 include reduction in surveillance and maintenance costs, reduction or elimination of the potential for release of contaminants, and the ability of KAPL to reuse the area once the SPRU facilities have been removed.

Conclusion

The selection of the preferred removal action alternative that satisfies the evaluation criteria will be based on comparative analysis, public and regulatory comments, and availability of congressional funding to DOE. A preferred alternative has not yet been selected. Community involvement is a key component of the CERCLA process. The public is encouraged to comment on the alternatives presented in this draft EE/CA. The DOE will provide the public an opportunity to comment on these alternatives; dates of the comment period will be published in local newspapers. All submitted comments will be reviewed and considered. Following the draft public comment period, an alternative will be selected for DOE approval and funding, and a final EE/CA will be prepared. An “Action Memorandum Documenting the Decision on the Selection of the EE/CA for the SPRU Facilities Decommissioning Alternative” will be prepared and transmitted to the public and to regulators by DOE. All responses to public comments will be included in the administrative record.

Copies of this EE/CA are, and the SPRU Administrative Record will be available at the following location:

Niskayuna Branch
Schenectady County Public Library
2400 Nott Street East
Niskayuna, New York 12309
(518) 386-2249

1 INTRODUCTION

The primary purpose of this Engineering Evaluation/Cost Analysis (EE/CA) is to evaluate alternatives for decontaminating and decommissioning the SPRU facilities. Appendix A describes the regulatory framework under which this EE/CA is prepared.

1.1 Site Description and Background

This EE/CA identifies, describes, and evaluates removal action alternatives for decommissioning the United States Department of Energy (DOE) Environmental Management Separations Process Research Unit (SPRU) nuclear facilities located within the Knolls Atomic Power Laboratory (KAPL) site in Niskayuna, New York. The SPRU facilities were constructed to research the chemical separation of plutonium and uranium from radioactive material encased in aluminum, known as slugs. SPRU operated between February 1950 and October 1953, after which research activities ceased following successful development of the reduction oxidation (REDOX) process, and the plutonium uranium extraction (PUREX) process that was subsequently used by Hanford and the Savannah River Sites. The research was performed on a laboratory scale; SPRU was never a production plant. Decommissioning of SPRU began in October 1953 and continued through the 1990s. All SPRU facilities are under surveillance and maintenance.

The KAPL site occupies approximately 170 acres, and the SPRU facilities occupy approximately 5 acres in the northwest corner of this site. KAPL is owned by the U.S. government and operated by the U.S. DOE Office of Naval Reactors, Schenectady Naval Reactors, and their contractor, KAPL, Inc., a Lockheed Martin company. The DOE Office of Environmental Management manages the SPRU Disposition Project and has established a project office on site. The KAPL site mission is to develop and design nuclear-powered reactors for naval propulsion, and is expected to continue indefinitely. The SPRU research and development activities were not associated with or used for the Naval Nuclear Propulsion Program.

The SPRU facilities that are addressed in this document are shown in Figure 1-1 and consist of the following four areas:

- Building G2 – housed the laboratories, hot cells, separations process testing equipment, and the tunnel system beneath Building G2. Building G2 hot cells, equipment, and tunnels contain residual radioactive contamination.
- Building H2 – used for liquid and solid waste processing. All areas of this building contain residual radioactive contamination.
- H2 Tank Farm (also known as the tank vaults) – a series of underground concrete-enclosed stainless steel tanks along the eastern side of Building H2 used for storing liquid radioactive waste. The tanks have been drained but contain heels of radioactive sludge.
- Pipe Tunnels – concrete passageways connecting the H2 Tank Farm, Building H2 to Building G2, and Building G2 to Buildings G1 and E1. The Pipe Tunnels contain residual radioactive contamination.

The KAPL site and SPRU facilities are located on a bluff overlooking the southern bank of the Mohawk River. The KAPL site is zoned for research and industrial land use. The land use south of the site is medium- to high-density residential in the Town of Niskayuna. To the south, the Town of Niskayuna recreational land consists of hiking trails and a bike path located over a former municipal landfill.

Niskayuna High School is located approximately two miles to the west. To the northwest, directly adjacent to the site, the land use is industrial research and development. Across the Mohawk River are low-density residences of the Town of Clifton Park.

This EE/CA specifically addresses the SPRU facilities, which include the two SPRU buildings, Tank Farm, and Pipe Tunnels. This EE/CA also addresses contaminated soil directly adjacent to the buildings. The soil and groundwater underlying the SPRU facilities, as well as contaminated soil or groundwater at other locations where SPRU waste containers were temporarily managed, will be addressed in a separate document.

In their current state, the SPRU facilities are not available for reuse because the facilities were designed for a very specific need to research a chemical process and because of their existing radiological condition. According to DOE Order 430.1A, *Life Cycle Asset Management* (DOE, 1998), and DOE Order 430.1B, *Real Property Asset Management* (DOE, 2003), DOE property no longer required for current or future programs must be dispositioned through reuse, demolition, disposal, transfer, or sale. The SPRU Disposition Project mission is to address cleanup of the SPRU facilities and land including transfer of all property back to the DOE Office of Naval Reactors, Schenectady Naval Reactors, and their contractor, KAPL, Inc., a Lockheed Martin company, for their continued mission use. In their current state, the areas occupied by the SPRU facilities are of no further use to DOE or Naval Reactors.

1.2 Deactivation After SPRU Shutdown

After SPRU was decommissioned in October 1953, deactivation activities such as flushing of storage tanks and draining pipelines and equipment occurred. In the mid-1960s, additional cleanup was performed in Buildings G2 and H2. Radioactive liquid waste placed in the underground Tank Farm tanks adjacent to H2 was removed and disposed of off site in 1964 and 1965. In 1966, additional cleanup in Buildings G2 and H2 consisted of removing loose contamination from accessible floor and equipment surfaces, further isolation of process lines, selected equipment removal, and removal of liquid and sludge from process tanks (KAPL, 1992).

In 1977, the KAPL Facilities Deactivation Program was initiated. Use of the SPRU Tank Farm tanks was discontinued, and routine entry into the SPRU facilities was no longer allowed. In the mid to late 1980s, the G3 pump house and scrubber stack were removed, and the radioactive laundry line between Building H2 and K4 (the radioactive laundry) was removed (KAPL, 1998). A comprehensive physical inspection and radiological survey of the SPRU buildings was performed, and a new Hillside Drain System was installed to collect groundwater from the footer drains under the SPRU buildings for treatment prior to discharge. Portions of Building H2 are still used for wastewater treatment.

In 1988, the EPA conducted a preliminary assessment of the KAPL site, including all the SPRU facilities. EPA concluded that the site did not pose an imminent danger to human health or the environment and, therefore, neither KAPL nor SPRU were included on the EPA's National Priorities List (EPA, 1994).

KAPL performed inspections and radiological surveys of the SPRU facilities in 1989 and 1998, and determined that ongoing surveillance and maintenance activities were sufficient to prevent releases from the SPRU facilities. KAPL also removed accumulated groundwater from the SPRU Tank Farm as part of these surveillance and maintenance activities.

In 1992, the H1 cooling tower located north of Building H2 was permanently shut down. The cooling tower was originally used for cooling the Building H2 equipment and later was converted to provide cooling water to the KAPL computer facility.

KAPL used Building G2 through 1999 and is using Building H2 to a limited extent. In 2000, the DOE Office of Environmental Management initiated a project to determine the appropriate disposition of the SPRU-impacted areas. During 2003, DOE contracted with an independent consulting firm to research KAPL archived documents, drawings, photos, and other documents. The resulting summary of historical activities and radiological and chemical contaminant surveys and investigations is documented in the *Nuclear Facility Historical Site Assessment for the SPRU Disposition Project*, April 2006 (ERG, 2006).

1.3 Sources, Nature, and Extent of Contamination

Radiological contamination is the primary type of contamination that is still present in the SPRU facilities. These facilities are shown in isometric view in Figure 1-1. The contamination resulted from research performed in the SPRU facilities during the development of the reduction oxidation and plutonium uranium extraction processes between 1950 and 1953. While past decommissioning activities removed significant amounts of radiological contamination, residual radiological contamination remains in equipment, pipes, tanks, and on walls, ceilings, and floors. The primary residual radiological contaminants of concern are cesium, strontium, and small amounts of plutonium. The media affected by the residual radiological contamination within the scope of this EE/CA are primarily the buildings, soil directly adjacent to the SPRU facilities, and groundwater collected in the footer drain collection system.

Asbestos, polychlorinated biphenyls (PCBs), and surveys for other chemicals have not been performed in the SPRU facility areas. However, these hazardous constituents were commonly contained in building materials typically used in the late 1940s and early 1950s, when the facilities were constructed. Chemicals were used extensively in the SPRU processes and operations and during subsequent cleanup activities. The SPRU processing systems were flushed and drained, but some residual chemicals likely remain inside of the equipment and pipes. Characterization sampling will be done during the decontamination and the removal actions to ensure proper handing of the waste materials. Potential hazardous chemical and radiological contaminants associated with the SPRU facilities are discussed in the *Nuclear Facility Historical Site Assessment for the SPRU Disposition Project*, April 2006 (ERG, 2006).

1.4 Risk Evaluation Summary

This section examines the potential for exposure to radiological and chemical constituents at the SPRU facilities. The purpose of this risk evaluation is to justify a removal action and to identify current or potential exposures that should be mitigated.

The SPRU facilities were decommissioned in 1953, and deactivation and cleanup activities were performed in the late 1950s to mid 1960s. The bulk of the radiological waste and product materials were removed, and the piping, tanks, and equipment were flushed and drained. However, based on information from previous investigations, historical inspections, and surveys, residual radiological and chemical contaminants are still present in the SPRU facilities.

Exposure to radiological contamination is the primary hazard in the SPRU facilities. Most of the residual radiological contamination is located in the tanks contained in the Tank Farm and on the floor of Tank Farm vaults. Smaller quantities of residual radiological contamination are present in the process cells, piping in the Pipe Tunnels, on the floors of the Pipe Tunnels, and in equipment rooms in the subsurface portions of Building G2. The primary residual radiological contaminants of concern are cesium, strontium, and plutonium.

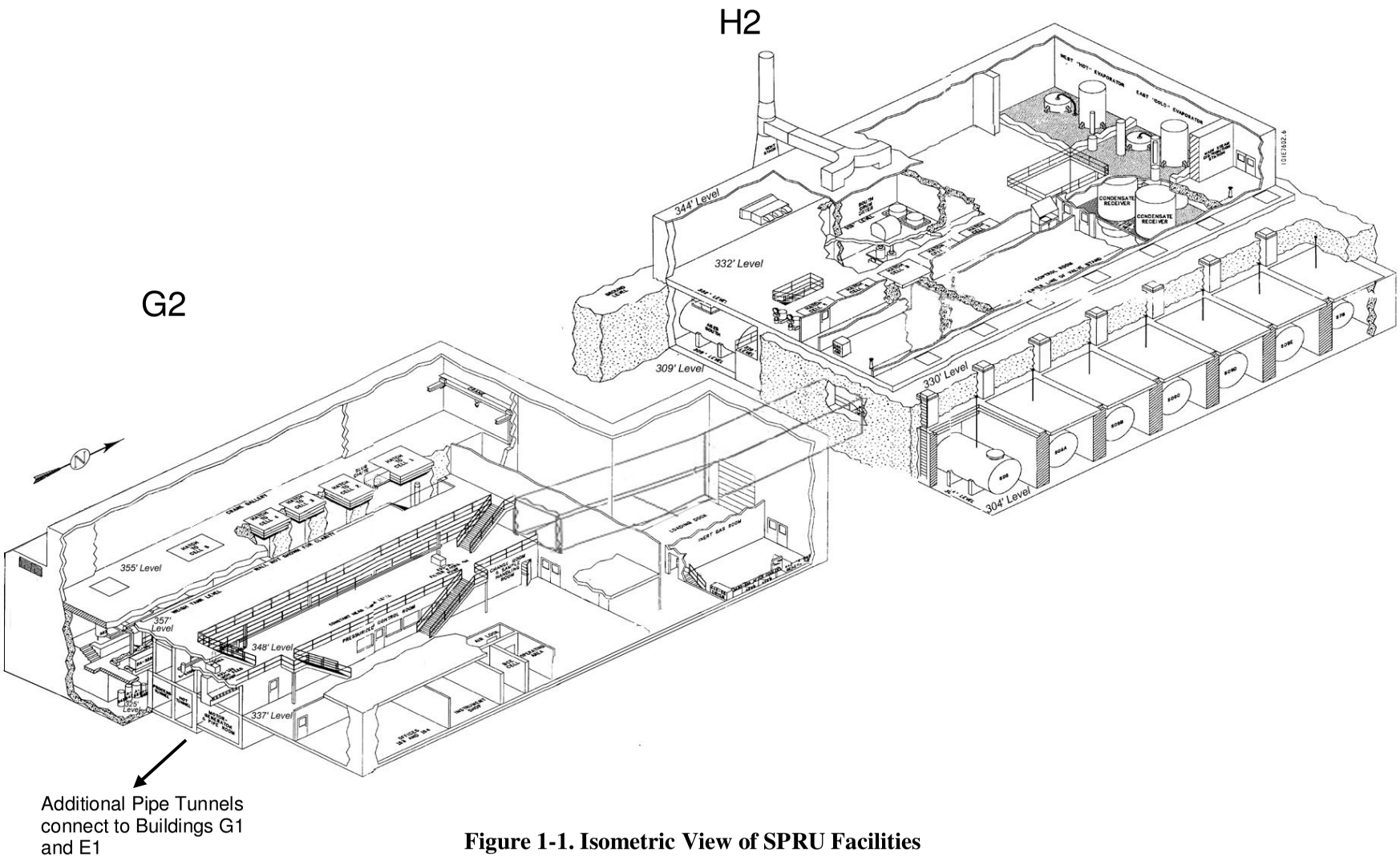

Figure 1-1. Isometric View of SPRU Facilities

Hazardous materials such as asbestos and heavy metals (e.g., mercury or lead) are expected to be present in the building materials used in the construction of the SPRU facilities. These were common materials used in construction of industrial facilities during the 1940s and 1950s. Chemicals were also used extensively in SPRU processes and operations, and during subsequent cleanup activities. The residual chemical contamination is not expected to drive the need for removal action.

The primary exposure pathway of concern for radiological contaminants is direct exposure. The inhalation and ingestion exposure pathways are also of concern for workers who enter the former SPRU process areas (cells and tunnels) where residual radiological contamination and hazardous substances such as asbestos and lead are located.

Currently, most of Building G2 is accessible with minimal radiological controls, having previously been used as office, laboratory, and library space. The process cells, tunnels, and subsurface equipment rooms are still contaminated and are isolated. Portions of Building H2 are still used for wastewater treatment purposes. Most of Building H2 areas can be entered with use of protective clothing and dosimetry. The waste processing cells, tunnels, and Tank Farm are isolated. The isolated areas cannot be entered without dosimetry, protective clothing, respirators, and in some cases, supplied air. Access to remaining parts of the SPRU facilities and supporting structures is controlled as part of the surveillance and maintenance program. The surveillance and maintenance program is in place to monitor and maintain the SPRU facilities so that they remain in a stable condition and continue to pose no risk to the public, on-site workers, or the environment. Included in the surveillance and maintenance program are a high-efficiency particulate air filtration system that maintains the SPRU facilities under negative pressure and a footer drain system to collect shallow groundwater underlying the SPRU facilities for treatment and radiological monitoring prior to discharge.

In their current state, the SPRU facilities do not pose a risk to the public, on-site workers, or the environment. However, it is not feasible to continue the surveillance and maintenance program activities indefinitely. Even with the surveillance and maintenance program in effect, the SPRU facilities continue to age and deteriorate and will require increasing costs and capital improvements to ensure that a release to the environment does not occur in the future. By performing a removal action and properly managing generated wastes, the future risk posed to the public, on-site workers, and the environment will be significantly reduced or eliminated.

1.5 Justification for the Proposed Action

The DOE is evaluating alternatives for the disposition of the SPRU facilities for the following reasons:

According to DOE Order 430.1A, *Life Cycle Asset Management* (DOE, 1998) and DOE Order 430.1B, *Real Property Asset Management* (DOE, 2003), DOE property that is not being used must be eliminated through reuse, demolition, disposal, transfer, or sale.

The areas occupied by the SPRU facilities cannot be reused by KAPL in their present state.

The surveillance and maintenance program will need to be funded and implemented for as long as the SPRU facilities remain.

As the SPRU facilities age and deteriorate, the potential for a release to the environment increases. The surveillance and maintenance program costs will also increase to prevent a release from occurring as time passes and the facilities continue to age.

The SPRU facilities continue to be maintained in a safe condition. Neither DOE nor Naval Reactors has a need for the SPRU facilities. This has caused DOE to evaluate the SPRU facilities to address residual contamination and develop removal action objectives.

2 REMOVAL ACTION OBJECTIVES

The selected alternative would be implemented in a manner that is protective of human health and the environment. Based on the discussion in Section 1 above, Table 2-1 summarizes the existing conditions of the SPRU facilities, the justification for removal action, and the removal action objectives.

Table 2-1. Removal Action Objectives

Existing Condition	Justification for Removal Action	Removal Action Objective
The SPRU facilities are inactive with no future use planned by KAPL because of their contaminated condition and the specialized nature of the facilities.	According to DOE Order 430.1B, *Real Property Asset Management*, real property that is not utilized by DOE must be eliminated through reuse, demolition, disposal, transfer, or sale.	Restore the property occupied by the SPRU facilities to a state that is suitable for reuse, demolition, disposal, transfer, or sale.
The area occupied by the inactive SPRU facilities is located within the KAPL site. The KAPL site is owned by the DOE Office of Naval Reactors/Schenectady Naval Reactors, whose mission is expected to continue indefinitely into the future.	Prior to transfer of the area occupied by the SPRU facilities back to KAPL, it must be suitable for use by a DOE continuing-mission site. Contamination that is present in the SPRU facilities must be reduced or eliminated to be consistent with a DOE continuing-mission site.	Restore the area occupied by the SPRU facilities to a state that meets the needs of KAPL and is consistent with a DOE continuing-mission site.
The SPRU facilities were shut down in 1953, and a surveillance and maintenance program was initiated to contain the radiological and chemical contaminants within the SPRU facilities. Included in the surveillance and maintenance program is the operation of a HEPA filtration system that maintains the SPRU facilities under negative pressure and the operation of a footer drain system to collect groundwater from beneath the SPRU facilities for treatment prior to discharge.	The surveillance and maintenance program currently costs approximately $1.25-1.75 million per year. The program will have to continue as long as the SPRU facilities remain. As the SPRU facilities age and deteriorate, surveillance and maintenance program costs will increase, and additional capital improvements will be required. Continuing the surveillance and maintenance program for an indefinite period of time and maintaining an unusable property is not prudent for DOE.	Reduce or eliminate the surveillance and maintenance program costs.
SPRU uses controls such as maintaining the facilities under negative pressure and shielding to minimize the likelihood of releases to the environment.	Residual radiological contamination in SPRU facilities can potentially release airborne radiological contamination from the former process areas to the environment.	Reduce or eliminate the potential for future releases from the SPRU facilities to the environment.

2.1 Scope and Purpose of Removal Action

Based on the potential radiological and chemical hazards identified in Section 1 and the removal action objectives outlined above, the scope of the SPRU facilities removal action (other than the no action alternative [continue surveillance and maintenance]) will include:

- Decontaminating and/or removing some or all identified facilities
- Safely managing wastes generated during the removal action to limit exposure to the public, on-site workers, and the environment
- Recycling and reusing clean soil, clean concrete, and reusing steel generated during the removal action
- Transporting and disposing of non-recyclable wastes generated during the removal action to off-site permitted waste disposal facilities

This EE/CA addresses the four areas of the SPRU facilities, which include the two SPRU buildings, supporting structures, and contaminated soil directly adjacent to the buildings. The soil and groundwater underlying the SPRU facilities will be addressed in a separate regulatory document specific to the SPRU land areas.

The purpose of a removal action is to decontaminate and/or remove the remaining SPRU facilities and to restore the areas occupied by the SPRU facilities to a state that is consistent with a DOE continuing-mission site and acceptable for use by KAPL.

2.2 Identification of Applicable or Relevant and Appropriate Requirements

In accordance with 40 CFR §300.415(j) of the National Contingency Plan (40 CFR 300), non-time-critical on-site removal actions conducted under CERCLA are required to attain applicable or relevant and appropriate requirements (ARARs) to the extent practicable, considering the scope and urgency of the situation (40 CFR 300). ARARs include Federal and State environmental or facility siting laws or regulations and action-specific ARARs such as occupational safety or worker radiation protection requirements. Additionally, per 40 CFR §300.405(g)(3), other advisories, criteria, or guidance may be considered in determining remedies (the “to be considered” guidance category).

ARARs are divided into three groups: (1) chemical-specific, (2) location-specific, and (3) action-specific. Chemical-specific ARARs establish an acceptable amount or concentration that may remain in or be discharged to the ambient environment. Location-specific ARARs include restrictions placed on the conduct of activities solely because they occur in special locations such as wetlands, floodplains, historic properties, or critical habitat. Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous substances or other particular circumstances at a site. Action-specific ARARS include requirements imposed on removal actions such as worker safety, dust control requirements, stormwater pollution plans and runoff control, transportation and disposal of hazardous and non-hazardous wastes, and control of air emissions.

State requirements are ARARs if they are promulgated, substantive laws or regulations that are consistently applied and are more stringent than Federal requirements. Federal and State ARARs identified by DOE for the SPRU nuclear facilities EE/CA are summarized in Appendix B and include NYSDEC regulations and permits to be issued to support the removal action. The ARARs are based on several key assumptions:

- Removal actions in this EE/CA will be conducted in a manner such that contamination will not reach the Mohawk River or the surrounding community, either by air, water, or accidental releases.
- Removal actions in this EE/CA will involve the SPRU facilities and incidental soil removal. Cleanup of underlying soils and groundwater will be discussed in a separate document.
- There are no endangered or sensitive species in the immediate area that may be affected by the removal action in this EE/CA.
- There are no wetlands, floodplains, historic structures, archaeological sites, or critical habitat that will be affected by the removal action in this EE/CA.
- Necessary NYSDEC permits will be issued.

ARARs will be updated as needed if these assumptions change.

3 IDENTIFICATION AND ANALYSIS OF ALTERNATIVES

A DOE team of subject matter experts prepared a preliminary list of alternatives to address the removal action objectives. A screening process was performed to identify alternatives that would meet the remedial action objectives, would be implementable and effective, and would meet Federal and State requirements and site needs. This process is discussed in more detail below.

The screening process was conducted to assess potentially viable and readily available technologies and approaches for removal actions at the SPRU facilities. These technologies and approaches were grouped and combined into the following categories:

- Containment or entombment
- Physical treatment (e.g., scabbling, crushing)
- Chemical treatment
- Removal

Treatment technologies were considered based on their ability to meet project-specific removal action objectives (see Section 2) and the National Contingency Plan threshold and balancing criteria, which include:

- Protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Short-term effectiveness
- Reduction of radiological contaminants
- Implementability
- Cost

To assist in determining whether an alternative meets the removal action objectives and the National Contingency Plan threshold and balancing criteria, DOE expanded the minimum criteria of CERCLA to consider the following questions:

- Will it protect the public?
- Will it protect against releases to the environment?
- Will it protect KAPL personnel?
- Will it protect personnel implementing the alternative?
- Will it be readily available?
- How long will it work after the alternative is implemented?
- Will it be technically feasible with current available technologies?
- What is the technical complexity of implementing the treatment technology?
- Will it be able to be used in compliance with ARARs?
- Will it support future missions?
- Will it meet KAPL's needs?

Based on these criteria, ten removal action alternatives were developed and screened by DOE. Of the ten alternatives, the following were selected for further evaluation in this EE/CA:

- Alternative 1 – No Action (Continue Surveillance and Maintenance)
- Alternative 2 – Cleanout of Tank Vaults and Gross Decontamination of Facilities
- Alternative 3 – Removal of H2 and Tank Vaults
- Alternative 4 – Removal of SPRU Facilities

For Alternatives 1, 2, and 3, institutional controls would be required as long as any SPRU facilities remain. It was assumed that the surveillance and maintenance program would be conducted for a period of 30 years for cost estimating purposes. The extent of the surveillance and maintenance program will vary depending on the removal action performed in each alternative. In general, the larger the amount of contaminated media removed, the less robust the surveillance and maintenance program is required to be, while still protecting the public, on-site workers, and the environment. Alternative 4 does not require continued surveillance and maintenance program activities for SPRU facilities, because the contaminated structures, appurtenances, equipment, and contaminated soil associated with the SPRU facilities would be removed, but the pump and treat system for groundwater would continue to operate if needed.

3.1 Alternative 1 - No Action (Continue Surveillance and Maintenance)

Under Alternative 1, all structures would remain in their current state, with continued surveillance and maintenance program activities (including operation of the footer drain system) until the site closes and the facilities are removed. For the purposes of this EE/CA, a 30-year duration was assumed for costing purposes. The No Action Alternative is included as required by CERCLA. It provides a baseline against which all of the alternatives can be compared. Alternative 1 is summarized in Figure 3-1.

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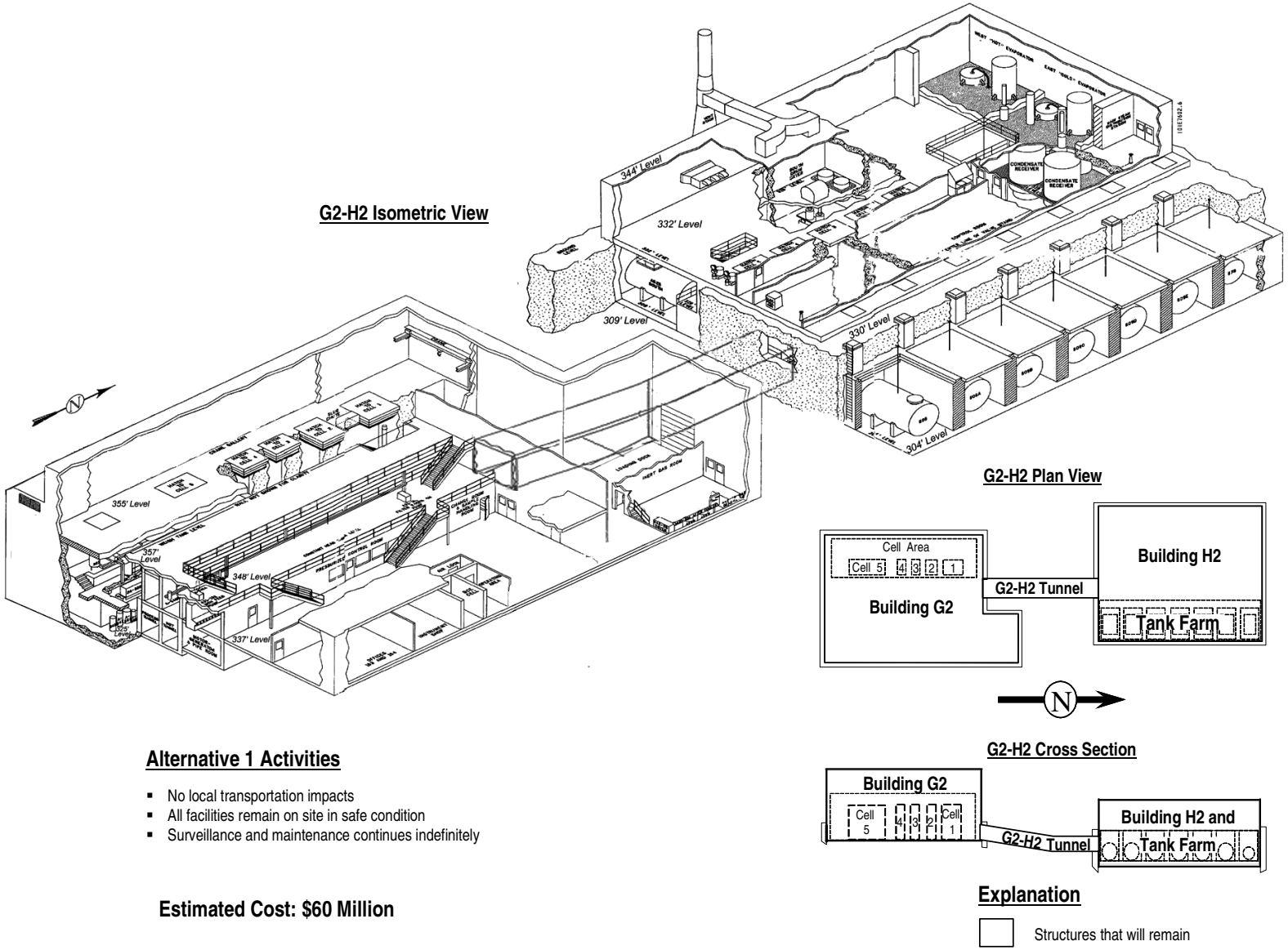


Figure 3-1. Alternative 1: No Action (Continue Surveillance and Maintenance)

3.2 Alternative 2 – Cleanout of Tank Vaults and Gross Decontamination of Facilities

Alternative 2 would result in removal of approximately 95% of the residual radioactive contamination and involve:

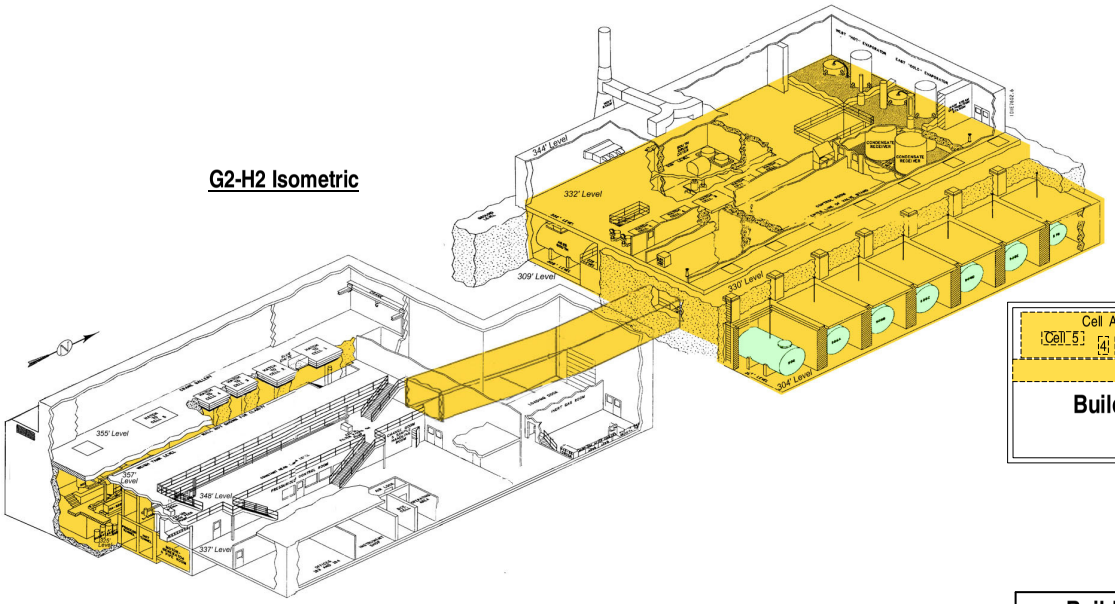
- Removal of tanks and decontamination of the tank vaults
- Gross decontamination of surfaces in Buildings H2 and G2
- Removal or shielding of equipment or piping that could expose workers to high doses of radiation during surveillance and maintenance activities
- Excavation and removal of contaminated soil directly adjacent to the SPRU facilities
- Disposal of wastes at off-site approved facilities
- Continuing surveillance and maintenance program activities (including operation of the footer drain system) for Buildings G2 and H2 until the site closes and removal action occurs

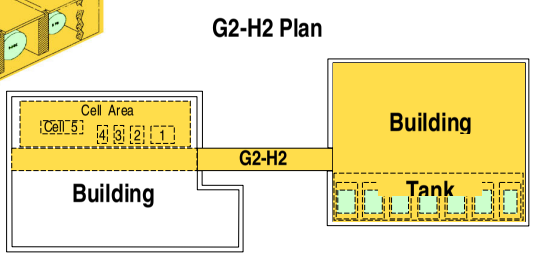
The removal activities for Alternative 2 are summarized in Figure 3-2.

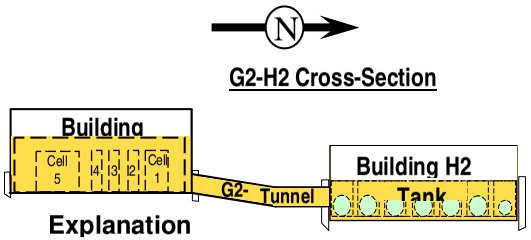
The soil removed under this alternative would include incidental contaminated soil above the tank vaults and soil in the footer drain around the perimeter of Buildings G2 and H2. Soil and groundwater underlying the SPRU facilities will be addressed in a separate document for the SPRU land areas.

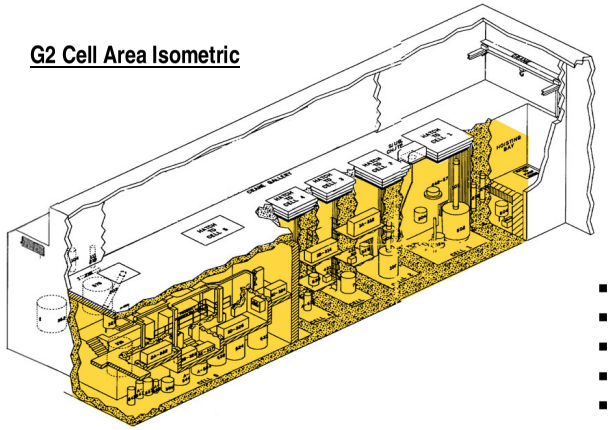
Wastes generated during this removal action alternative would be characterized and segregated by waste type (e.g., transuranic, low-level radioactive, mixed low-level radioactive, hazardous, and non-hazardous). Contaminated soil, concrete, and demolition debris wastes would be transported off site. Transport routes would be planned during the project to limit potential exposure to the public and the environment. All waste shipments would be containerized according to U.S. Department of Transportation requirements, and would be transported using established commercial truck routes. Use of commercial truck routes would also reduce noise-related impacts.

This alternative assumes that the surveillance and maintenance program activities (including operation of the footer drain system, as needed) for Buildings G2 and H2 would continue indefinitely. For costing purposes in this EE/CA, a duration of 30 years is assumed and at a reduced annual cost compared to Alternative 1. The reduced annual costs for surveillance and maintenance program activities are assumed because of the removal of 95% of the source of radioactivity. Demolition of the remaining SPRU facilities will still be required in the future, but these costs are not included here.









Estimated Cost: $90

Explanation

- Areas that will be decontaminated
- Structures that will remain
- Structures and equipment that will be removed

Alternative 2 Removal Action Activities

- Decontamination of Tank Farm
- Remove tanks from Tank Farm
- Decontamination of H2 processing facility
- Decontamination of G2 and H2 Pipe Tunnels
- Decontamination of G2 Cell Area
- Remove contaminated soil above Tank Farm
- Remove contaminated soil around H2
- Continue surveillance and maintenance activities for

Figure 3-2. Alternative 2: Cleanout of Tank Vaults and Gross Decontamination of Facilities

3.3 Alternative 3 – Removal of H2 and Tank Vaults

Alternative 3 would result in removal of approximately 98% of the residual radioactivity and involve:

- Cleanout (decontaminate and remove) of piping, tanks, and equipment from Building H2 and the H2 Tank Farm
- Demolishing and removal of Building H2 and the Tank Vaults
- Sealing off the Pipe Tunnels
- Removal of incidental soil around Building H2 and H2 Tank Farm (cleanup of underlying soils and groundwater will be discussed in a separate document)
- Disposal of waste off-site at approved facilities
- Continuing surveillance and maintenance program activities, including operation of the footer drain system, if needed

The removal activities for Alternative 3 are summarized in Figure 3-3.

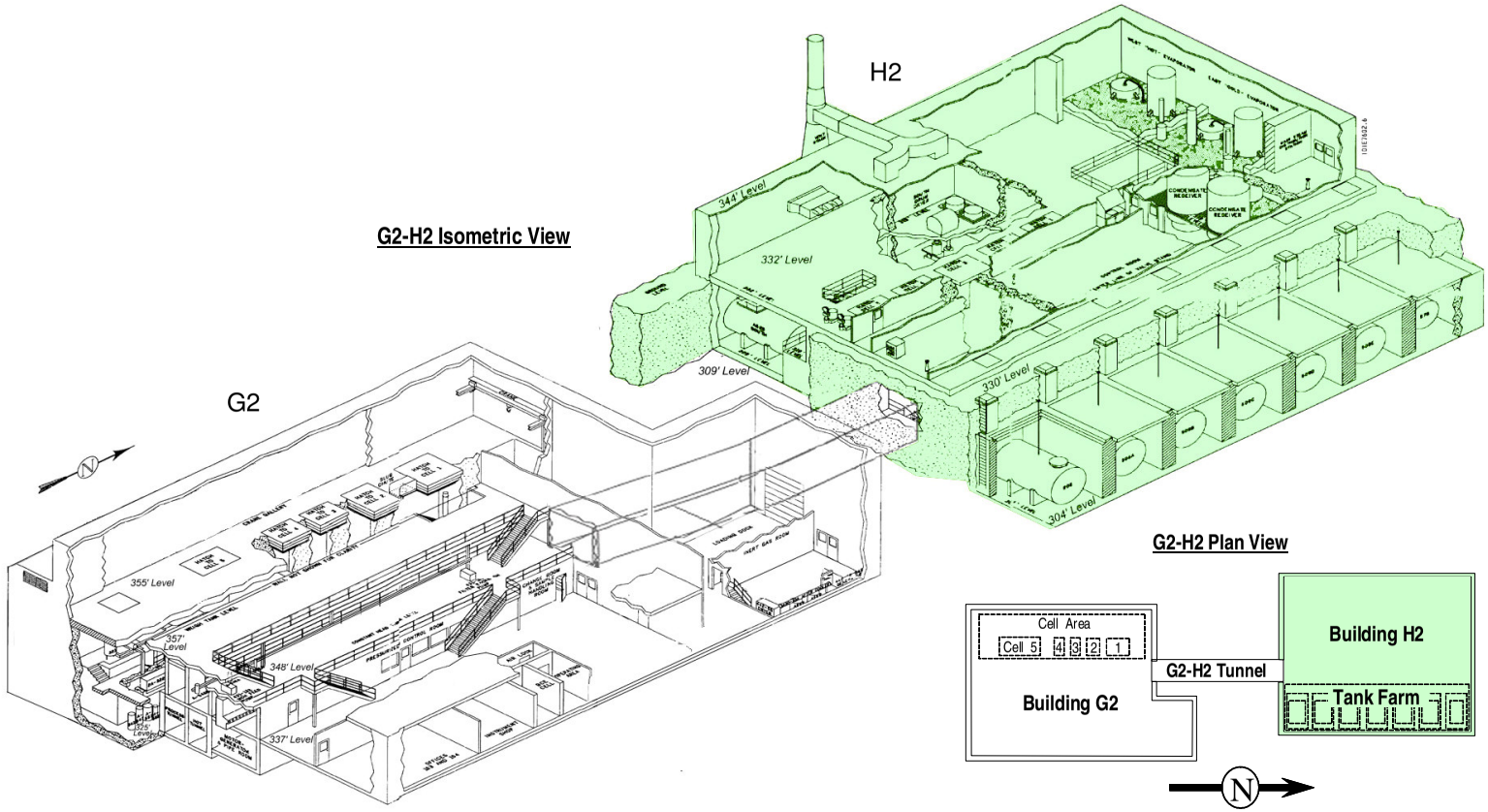
This alternative leaves Building G2, its surrounding soil, and the Pipe Tunnels in their current state. The rationale for this alternative is that 98% of the radioactivity would be removed, and the G2 facility would be left in a stable state and could continue to be maintained and removed at a later date.

The soil removed under this alternative would include incidental contaminated soil above the tank vaults and in the footer drain around the perimeter of Building H2 and within one foot of the foundation and floor slab. Soil and groundwater underlying the SPRU facilities will be addressed in a separate document for the SPRU land areas. After verifying cleanup has been successfully accomplished, the excavations would be backfilled with clean backfill material. Backfill material may include imported soil, excavated on-site soil, and crushed concrete.

Wastes generated during this removal action alternative would be characterized and segregated by waste type (e.g., transuranic, low-level radioactive, mixed low-level radioactive, hazardous and non-hazardous). In order to minimize the waste that would need to be transported off site, excavated on-site soil and crushed concrete that have been characterized as non-hazardous and clear of radiological activity may be reused as backfill material. Contaminated steel would be reused at other DOE facilities. Reuse and recycling of demolition waste materials (soil and concrete) on site would reduce the amount of waste that needs to be transported off site, as well as the volume of clean backfill material that will need to be imported to the site, thereby reducing the truck traffic to and from the site. The remaining contaminated soil, concrete, and demolition debris would be transported to and disposed of at an approved, permitted, off-site facility.

The soil, concrete, and demolition debris wastes would be transported off site in trucks and contained to prevent release of material during transport. Transport routes would be planned during the remedial design to limit potential exposure to the public and the environment. All waste shipments would be containerized according to U.S. Department of Transportation requirements, and would be transported using established truck routes.

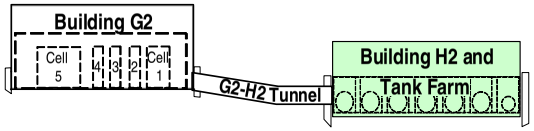
This alternative assumes that the surveillance and maintenance program activities for Building G2 would continue indefinitely. A duration of 30 years and a reduced annual cost (compared to Alternative 1) are assumed. Reduced annual costs for surveillance and maintenance activities are assumed because of the removal of Building H2 and the tank vaults in this alternative. Demolition of Building G2 and the pipe tunnel will still be required in the future, but these costs are not included here.



G2-H2 Isometric View

G2-H2 Plan View

G2-H2 Cross Section



Alternative 3 Removal Action Activities

- Remove tanks from Tank Farm
- Decontamination and removal of Tank Farm
- Decontamination and removal of H2
- Isolate and seal off Pipe Tunnels
- Remove contaminated soil above Tank Farm
- Remove soil around H2 to depth of footer drain
- Continue surveillance and maintenance activities for G2 and operation of footer drain system as needed

Estimated Cost: $130 Million

Explanation

Structures remaining

Structures and equipment removed

Figure 3-3. Alternative 3: Removal of H2 and Tank Vaults

3.4 Alternative 4 - Removal of SPRU Facilities

Alternative 4 would remove the buildings and is expected to result in removal of 100% of the residual radioactive contamination. It would involve:

- Cleanout (decontaminate and remove) piping, tanks, and equipment from the SPRU facilities
- Removal of Building H2, the H2 Tank Farm, the Pipe Tunnels, and Building G2
- Excavate and remove soil in the footer drains around the perimeter of the facilities
- Disposal of wastes off-site at approved facilities
- Continuing to operate the footer drain system if needed

The removal activities for Alternative 4 are summarized in Figure 3-4.

Decontamination and stabilization would be conducted under this alternative to clean highly contaminated areas, and those areas with the greatest potential for hazardous material becoming airborne prior to removal of the equipment and structures. In this alternative, it is expected that 100% of the residual radioactivity would be removed.

The soil removed under this alternative would include incidental contaminated soil above the tank vaults and soil in the footer drain around the perimeter of Buildings G2 and H2. Soil and groundwater underlying the SPRU facilities will be addressed in a separate document for the SPRU land areas. After verifying cleanup has been successfully accomplished, the excavations would be backfilled with clean backfill material and compacted. Backfill material could include imported soil, excavated on-site soil, and crushed concrete.

Wastes generated during this removal action alternative would be characterized and segregated by waste type (e.g., transuranic, low-level radioactive, mixed low-level radioactive, hazardous, and non-hazardous). In order to minimize the waste that would need to be transported off site, excavated on-site soil and crushed concrete that have been characterized as non-hazardous and clear of radiological activity may be reused as backfill material. Contaminated steel could be reused at other DOE facilities. Reuse and recycling of demolition waste materials (soil and concrete) on site would reduce the amount of waste that would need to be transported off site, as well as the volume of clean backfill material that would need to be imported to the site, thereby reducing the truck traffic to and from the site. The remaining contaminated soil, concrete, and demolition debris would be transported to and disposed of at an approved off-site facility.

The soil, concrete, and demolition debris wastes would be transported off site. Transport routes would be planned during the remedial design to limit potential exposure to the public and the environment. All waste shipments would be containerized according to U.S. Department of Transportation requirements, and would be transported using established commercial truck routes.

This alternative assumes for EE/CA cost-estimating purposes that a groundwater monitoring and treatment system would operate if needed.

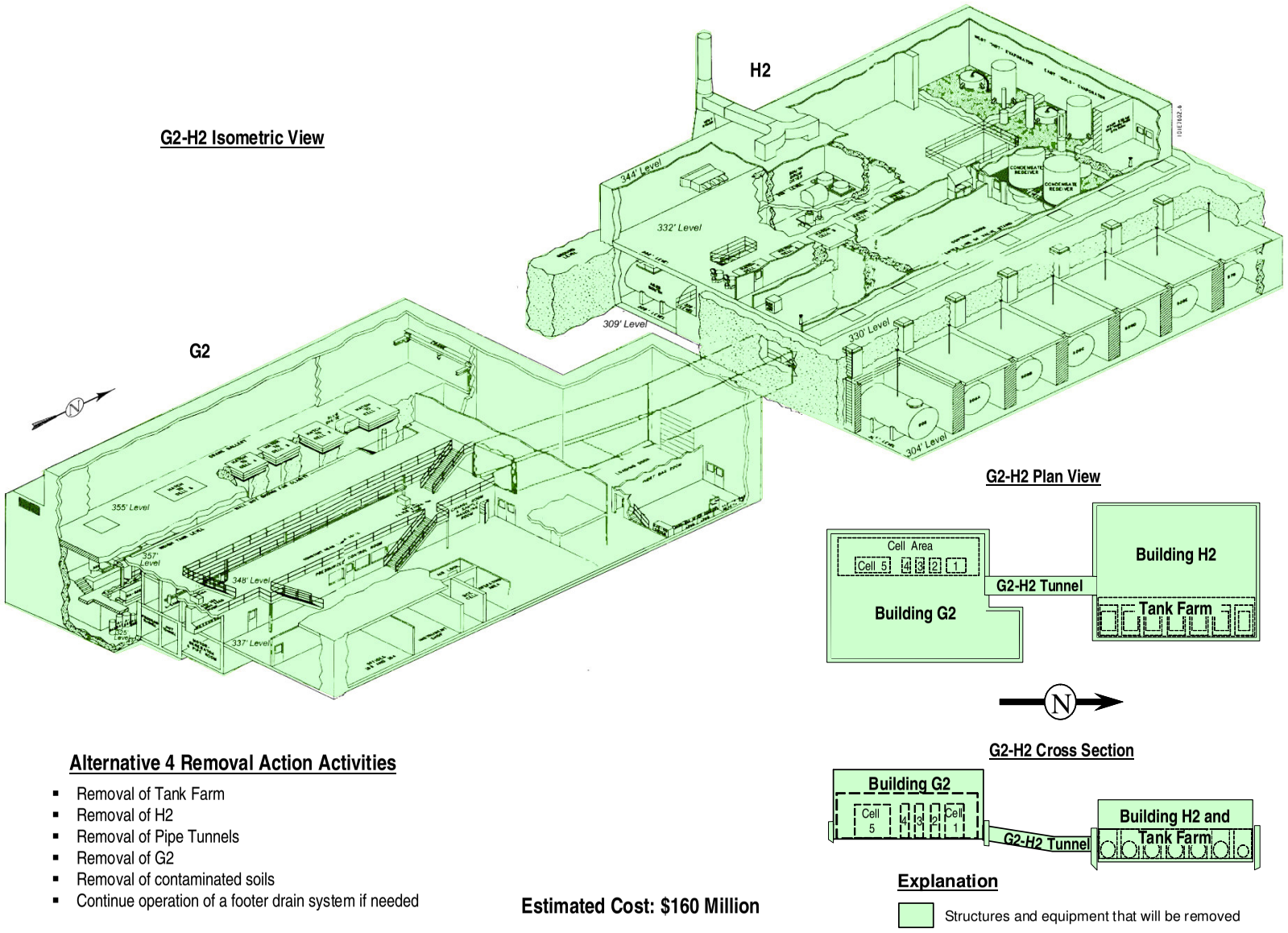


Figure 3-4. Alternative 4: Removal of SPRU Facilities

4 ANALYSIS OF ALTERNATIVES

EPA's *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (EPA, 1993) identifies three criteria for the evaluation of removal action alternatives: effectiveness, implementability, and cost. The four alternatives are evaluated in Section 4.1; they are intended to give decision makers a range of removal action alternatives for consideration.

4.1 Individual Analysis of Alternatives

This section presents an analysis of Alternatives 1 through 4 based on effectiveness, implementability, and cost.

4.1.1 EFFECTIVENESS

The four alternatives were evaluated relative to their effectiveness in meeting the removal action objectives in Section 2 and the following National Contingency Plan threshold and balancing criteria:

- Overall protection of human health and environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Short-term effectiveness
- Reduction of toxicity, mobility, and/or volume

In addition to the removal action objectives and these National Contingency Plan threshold and balancing criteria, the effectiveness of the removal action alternatives to address the following questions was considered:

- Will the alternative protect the public?
- Will the alternative protect against releases to the environment?
- Will the alternative protect personnel implementing the alternative?
- Will the alternative protect KAPL personnel?
- How long will the alternative work after the alternative is implemented?
- Will the alternative comply with ARARs?
- Will the alternative meet KAPL's needs?
- Will the alternative support future missions?

4.1.1.1 Effectiveness of Alternative 1: No Action (Continue Surveillance and Maintenance)

Under this alternative, surveillance and maintenance program activities would be assumed to continue until safe closure and removal of the facilities. There would be no source treatment or reduction of toxicity, mobility, or volume of contaminants, except as it may occur over time due to natural attenuation. Natural attenuation (decay) of the radiological contaminants would not be effective, however, because the

half-life of some isotopes (e.g., plutonium) is up to 24,000 years. This alternative would not meet the removal action objectives outlined in Table 2-1.

This alternative does not include costs for capital improvements that would be required during the next 30 years to maintain the SPRU facilities in their current state. In the short term, the surveillance and maintenance program activities are sufficiently protective of human health and the environment by containing the radiological and chemical contaminants within the SPRU facilities. However, in the long term, it is not realistic that surveillance and maintenance program activities costs would remain constant. As the SPRU facilities age, capital improvements would be necessary to continue to contain contaminants effectively. Eventually, demolition of the SPRU facilities would still be required (but is not included in this alternative).

There is no need to identify ARARs for this alternative because, according to CERCLA, ARARs apply to "any removal or remedial action conducted entirely on site" and "no action" is not a removal or remedial action (CERCLA, 2005).

Although safety of the public and environment is maintained, this alternative is not considered effective because the expected cost of surveillance and maintenance would continue to rise, and KAPL would not be able to reuse this area.

4.1.1.2 Effectiveness of Alternative 2: Cleanout of Tank Vaults and Gross Decontamination of Facilities

Under this alternative, removal of nearly 95% of the residual radioactive contamination would be accomplished by removing the tanks from the tank vaults (H2 Tank Farm), decontaminating the tank vaults and other areas with high levels of residual radioactivity, and removing the contaminated soil directly adjacent to the facilities and in the footer drain**.** This removal action would reduce the potential for exposure to the public and on-site workers and the potential for a future release of contaminants from the SPRU facilities to the environment. Surveillance and maintenance program activities would need to continue as long as the SPRU facilities remain, though at a reduced cost (compared to Alternative 1). The reduced cost is due to the removal of most of the contamination from the SPRU facilities. Because the SPRU facilities would be present, the area occupied by them could not be reused by KAPL, and the facilities would still need to be removed. This alternative would not meet all of the removal action objectives outlined in Table 2-1.

In the short term (during the removal action), decontamination and removal action activities would focus on removing radiological contamination from areas where a majority of the radioactivity is located. Because much of the decontamination activities would be performed within the SPRU facilities, the amount of contaminated dust that would be generated and released during decontamination would be minimized. Demolition activities would be controlled, and containment and control of dust would limit exposure to the public, on-site workers, and the environment. Additional precautions and personal protective equipment would be required for personnel performing the removal action. Potential exposure to workers engaged in decontamination and removal activities would be addressed in site-specific health and safety plans.

DOE may reuse the contaminated metal from piping, equipment, and building materials at other DOE facilities. Additionally, clean soil and clean crushed concrete meeting structural fill requirements generated during the removal action may be reused on site to minimize the amount of waste requiring transport off site.

In the long term (after the removal action is completed), the decontamination of the areas within the SPRU facilities with the highest radiological contamination (portions of Building H2, operating areas of

Building G2, pipe tunnels, tanks, and tank vaults) would protect human health and the environment by reducing contaminant levels and removing sources of residual contamination. Hazardous, radiological, and mixed wastes would be transported and disposed of off-site at approved waste facilities.

This alternative can be performed in compliance with the ARARs listed in Appendix B.

This alternative is not considered as effective as other alternatives because the expected cost of surveillance and maintenance will continue to rise, and KAPL would not be able to reuse this area.

4.1.1.3 Effectiveness of Alternative 3: Removal of H2 and Tank Vaults

Under this alternative, Building H2 and the tank vaults (H2 Tank Farm) would be completely demolished and removed.

This alternative would also include removal of incidental soil above the tank vaults and soil in the footer drain around the perimeter of Buildings G2 and H2. Soil and groundwater underlying the SPRU facilities will be addressed in a separate document for the SPRU land areas. Excavations would be backfilled with clean backfill material and compacted. Backfill material could include imported soil, excavated on-site soil, and/or crushed clean concrete meeting site requirements for structural fill.

These activities would result in a significant reduction of radiological contaminants by removing the residual radiological contamination located in these areas. Building G2 would remain in its current state, and the Pipe Tunnels would be sealed off. Removal of Building H2 and the tank vaults would eliminate most (98%) of the remaining residual radiological and chemical contamination associated with the SPRU facilities and would reduce the potential for exposure to the public, on-site workers, and the environment from the SPRU facilities. The land areas occupied by Building H2 and the tank vaults could likely be reused after the removal action was completed. However, surveillance and maintenance program activities would still have to continue for Building G2 and the Pipe Tunnels, although at a reduced cost (compared to Alternative 1). The reduced cost would be due to the removal of a large part of the SPRU facilities and most of the contamination. The areas of Building G2 and the Pipe Tunnels could not be fully reutilized, and decontamination and decommissioning of these areas would still be required. This alternative would not meet all the removal action objectives outlined in Section 2.1.

In the short term (during the removal action), decontamination and removal action activities would focus on removing radiological contamination from areas where most of the radioactivity is located. Because much of the decontamination activities would be performed within the SPRU facilities, the amount of contaminated dust that would be generated and released during decontamination would be minimized. Demolition activities would be controlled, and containment and control of dust would limit exposure to the public, on-site workers, and the environment. Additional precautions and personal protective equipment would be required for personnel performing the removal action. Potential exposure to workers engaged in decontamination and removal activities would be addressed in health and safety plans.

DOE may reuse the contaminated metal from piping, equipment, and building materials at other DOE facilities. Additionally, clean soil and clean crushed concrete meeting structural fill requirements generated during the removal action may be reused on site to minimize the amount of waste requiring transport off site.

In the long term (after the removal action is completed), removing Building H2 and the tank vaults would protect human health and the environment by reducing contaminant levels and sources. Hazardous, radiological, and mixed wastes would be transported and disposed of off-site at approved waste disposal facilities.

Removal of H2 and the Tank Vaults would eliminate the need for the surveillance and maintenance program in Building H2 and would also restore the areas previously occupied by Building H2 to a state that is consistent with a continuing-mission site.

This alternative can likely be performed in compliance with the ARARs listed in Appendix B.

This alternative is effective, but not as effective as Alternative 4. Surveillance and maintenance would still be needed for Building G2, and KAPL would not be able to reutilize this area.

4.1.1.4 Effectiveness of Alternative 4: Removal of SPRU Facilities

Under this alternative, all SPRU facilities (Buildings G2 and H2, the tank vaults, and the G2/H2 interconnecting tunnel) would be removed. The pipe tunnels beneath Buildings G1 and E1 would be decontaminated. Soil directly adjacent to the buildings and in the footer drain would be removed. Removal of all the SPRU facilities would eliminate the remaining residual radiological and chemical contamination associated with the SPRU facilities and eliminate the potential for exposure to the public, on-site workers, and the environment from the SPRU facilities. The areas occupied by the SPRU facilities could be reused by KAPL after the removal action was completed, and surveillance and maintenance program activities for the facilities could be discontinued. This alternative assumes that a groundwater monitoring and treatment system would operate if needed. This alternative would meet all of the removal action objectives outlined in Section 2.1.

In the short term (during the removal action), this alternative would generate the largest volume of waste and debris. This alternative would also potentially generate the largest amount of dust during the demolition and transportation activities. Containment and control of soil, demolition debris, and dust would require mitigation during removal and transportation activities in order to limit exposure to the public, on-site workers, and the environment.

Additional precaution and personal protective equipment would be required for personnel performing the removal action. Potential public and worker exposure during decontamination and removal activities would be addressed in health and safety plans and remedial design documents.

DOE may reuse the contaminated metal at other DOE facilities. Additionally, clean soil and clean crushed concrete meeting structural fill requirements generated during the removal action may be reused on site to minimize the amount of material requiring transport off site.

In the long term (after the removal action is completed), the removal of the SPRU facilities would protect human health and the environment by removing the contaminants and potential sources of the contaminants. Hazardous, radiological, and mixed wastes would be transported and disposed at approved, permitted, off-site waste facilities.

This alternative could be performed in compliance with the ARARs listed in Appendix B.

Removal of the SPRU facilities would eliminate the need for the surveillance and maintenance program and would also restore the areas occupied by the SPRU facilities to a state that is consistent with a continuing-mission site.

4.1.2 IMPLEMENTABILITY

When evaluating the implementability of the four alternatives, the following questions were considered:

- Is the alternative technically feasible with currently available technology?

- Is the alternative technically complex or difficult to implement?
- Is the alternative administratively feasible in terms of administrative or procedural requirements?
- Are there services and materials readily available for performing the alternative?

4.1.2.1 Implementability of Alternative 1: No Action (Continue Surveillance and Maintenance)

Alternative 1 is highly implementable because it requires no action other than continuing the surveillance and maintenance program activities. Services and materials are readily available on site to continue the surveillance and maintenance program activities.

4.1.2.2 Implementability of Alternative 2: Cleanout of Tank Vaults and Gross Decontamination of Facilities

Alternative 2 has a medium degree of implementability based on experience dispositioning other DOE facilities nationwide. Removal of the tank residue remaining in the bottom of tanks (also called tank heels) is a proven technology. Scabbling and wet decontamination methods are not technically complex and can be readily performed with the proper equipment, materials, and protective gear. This alternative is administratively feasible because administrative or procedural requirements, such as waste transportation, handling, and disposal requirements, could be met.

Services and materials are readily available for decontamination, demolition, excavation, and transportation activities. Conventional earthmoving equipment is available from contractors with experience working at radiological and hazardous waste sites. Personnel experienced with scabbling and wet decontamination techniques are available. Personnel will be available on site to monitor and perform surveillance and maintenance program activities after the removal action is completed.

4.1.2.3 Implementability of Alternative 3: Removal of H2 and Tank Vaults

Alternative 3 also has a medium degree of implementability based on experience dispositioning other DOE facilities nationwide. Decontamination, demolition, and excavation are not technically complex and could be readily performed with the proper equipment, materials, and protective gear. This alternative is administratively feasible because administrative or procedural requirements, such as waste transportation, handling, and disposal requirements, could be met.

Services and materials are readily available for decontamination, demolition, and excavation activities. Conventional earthmoving equipment is available from contractors with experience working at radiological and hazardous waste sites. Personnel experienced with decontamination techniques are available. Personnel would be available on site to monitor and perform surveillance and maintenance program activities after the removal action is completed.

4.1.2.4 Implementability of Alternative 4: Removal of SPRU Facilities

Alternative 4 also has a medium degree of implementability based on experience dispositioning other DOE facilities nationwide. Decontamination, demolition, and excavation are not technically complex and could be readily performed with the proper equipment, materials, and protective gear. This alternative is administratively feasible because administrative or procedural requirements, such as waste transportation, handling, and disposal requirements, could be met.

Services and materials are readily available for decontamination, demolition, and excavation activities. Conventional earthmoving equipment is available from contractors with experience working at radiological and hazardous waste sites. Personnel experienced with decontamination techniques are available. Personnel would be available on site to monitor and perform surveillance and maintenance program activities after the removal action is completed.

4.1.3 COST

In this section, costs of alternatives are presented for comparison purposes only. The basis for the cost estimate for Alternative 1 was the DOE *National Facility Deactivation Initiative SPRU Interim Planning for Surveillance and Maintenance* (DOE, 2002). The basis for the cost estimates for Alternatives 2, 3, and 4 was a DOE cost estimate for SPRU building decontaminating and decommissioning. In general, cost estimates include:

- Capital costs
- Labor costs
- Transportation and disposal costs
- Surveillance and maintenance costs (annual) (Alternatives 1, 2, and 3)

Cost estimates include assumptions that may have an impact on the actual costs of implementing the removal action alternative. Annual surveillance and maintenance program costs for alternatives 1, 2, and 3 assume the 30-year period of time as stated in the Section 3 descriptions for each alternative.

Estimated costs are for comparative purposes only. Examples of items that may affect the actual cost include:

- Changes in the anticipated characteristics of the wastes generated causing more costly disposal fees
- Discovery of unanticipated contamination
- Changes in the cost of labor, fuel, and regulations that are different from historical averages

Each of these factors may have a significant impact on the total life cycle cost for a given alternative.

4.1.3.1 Costs for Alternative 1: No Action (Continue Surveillance and Maintenance)

Comparative costs to implement Alternative 1 include an assumed duration of 30 years of continuing current surveillance and maintenance activities. The comparative cost estimate to implement Alternative 1 is $60 million. However, as the buildings continue to age, capital improvements (for example, new roofs) would be needed over time. Costs for any future removal actions (e.g., removal of SPRU facilities at a later date) are not included.

4.1.3.2 Costs for Alternative 2: Cleanout of Tank Vaults and Gross Decontamination of Facilities

The comparative cost estimate for this alternative is $90 million. The majority of these costs relate to the decontamination of facilities and continued surveillance and maintenance program activities (with an assumed duration of 30 years). Costs for any future removal actions (e.g., removal of SPRU facilities at a later date) are not included.

4.1.3.3 Costs for Alternative 3: Removal of H2 and Tank Vaults

The comparative cost estimate for this alternative is $130 million. The majority of these costs relate to demolition and disposal costs for the removal of Building H2 and the Tank Farm. Costs for any future removal actions (e.g., removal of SPRU facilities at a later date) are not included.

4.1.3.4 Costs for Alternative 4: Removal of SPRU Facilities

The comparative cost estimate for the complete removal alternative is $160 million. The majority of these costs relate to demolition and disposal costs for the removal of the SPRU facilities.

4.2 NEPA Considerations

This EE/CA fulfills CERCLA requirements for documentation of the removal action alternatives selection process in accordance with the *Policy on Decommissioning Department of Energy Facilities Under CERCLA* (DOE and EPA, 1995), *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA*, (EPA, 1993), and the *Decommissioning Implementation Guide* (DOE, 1999). As part of the CERCLA process, this document also considers National Environmental Policy Act (NEPA) values that largely overlap with the evaluation of removal action alternatives in Section 4 of the EE/CA. Consideration of NEPA values also includes cumulative impacts and mitigation measures that may be taken to avoid or reduce environmental impacts.

According to the DOE Secretarial Policy Statement on the NEPA, DOE CERCLA documents are required to incorporate NEPA values (e.g., analysis of cumulative, off-site, ecological, and socioeconomic impacts) to the extent practicable (DOE, 1994). It is the intent of DOE to integrate NEPA values into the CERCLA process for the decommissioning and decontaminating of the SPRU facilities in the EE/CA. While the CERCLA process contains elements that are also required by the NEPA process (e.g., community involvement, evaluation of alternatives, and consideration of environmental resources), a NEPA evaluation considers impacts to the entire human environment (e.g., socioeconomics, environmental justice, utilities, and infrastructure). Table 4-1 summarizes the review of NEPA values conducted for each of the four alternatives.

Table 4-1. National Environmental Policy Act Review Summary

NEPA Value	**Alternative 1** No Action (Continue Surveillance and Maintenance)	**Alternative 2** Cleanout of Tank Vaults and Gross Decontamination of Facilities	**Alternative 3** Removal of H2 and Tank Vaults	**Alternative 4** Removal of SPRU Facilities
Off-Site Impacts	Because the contamination sources would remain, potential off-site impacts could come from contamination entering the environment if surveillance and maintenance mitigation measures failed.	Potential off-site impacts due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. In the short term, off-site impacts may occur due to a temporary and minor degradation of aesthetics, air quality, noise, and traffic, with a potential short-term increase of exposure to hazardous materials from off-site waste disposal requirements. These potential impacts can be mitigated or minimized with proper planning of the removal action. In the long term, most of the hazards and hazardous materials associated with the SPRU facilities would be removed and would no longer pose a potential risk to the public and the environment.		
Biological and Ecological Resources	A review of available Federal, State, and local government databases was performed to identify potential threatened, endangered, and sensitive species and habitats that may be located within the vicinity of the SPRU facilities. No threatened, endangered, or sensitive habitats were identified within the vicinity of the SPRU facilities. However, the database review identified the Indiana Bat and Karner Blue Butterfly as endangered species that may be found in this part of New York State (EDR, 2005). A determination of potential impacts to biological resources will be made after a complete on-site biological survey has been completed.			
Socioeconomic Impacts (includes public services, recreation, and housing)	No socioeconomic impacts would be expected because no removal action would take place.	Potential socioeconomic impacts due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. The removal action would be performed within the KAPL site property boundaries. Some construction equipment and labor will come from the local market, and the associated increase in business to vendors who serve the construction trade, in amounts typical of a construction project of an equivalent size. There would be no impact to KAPL employment. Construction activities could result in the local rental of construction equipment, and if non-local labor forces are used, the resulting money spent on hotels, rental cars, and meals. In the long term, the removal action would not affect lifestyles, neighborhood character or stability, property values, local tax base, employment, industry, commerce, or require the displacement of businesses or farms. No socioeconomic impacts would be expected. The removal action would not be expected to impact public services such as police, fire, schools, parks, or other public facilities or the existing neighborhood and regional parks or other recreational facilities. In the long term, no impact to the population or housing would be expected.		

NEPA Value	**Alternative 1** No Action (Continue Surveillance and Maintenance)	**Alternative 2** Cleanout of Tank Vaults and Gross Decontamination of Facilities	**Alternative 3** Removal of H2 and Tank Vaults	**Alternative 4** Removal of SPRU Facilities
Environmental Justice	No environmental justice impacts would be expected because no removal action would take place.	Potential environmental justice impacts due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. No known minority or low-income populations live within the immediate vicinity of the site that may be impacted by the removal action nor would any one group be more adversely affected more than another along the transportation routes. There would not be any established communities that would be physically divided by the removal action. No environmental justice impacts would be expected.		
Cumulative Impacts	Because the contamination sources would remain, potential cumulative impacts to human health could occur from groundwater or soil that could become contaminated if surveillance and maintenance mitigation measures failed.	Potential cumulative impacts due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. On-site activities may potentially impact other KAPL on-site activities that involve construction or removal of structures or the land areas cleanup activities. On-site activities may also potentially contribute to cumulative impacts from projects of other business or government projects in the immediate area. Noise levels, traffic increases, labor use, utilities, and services could have cumulative impacts if multiple construction activities occur at or near the KAPL site. As the SPRU project planning moves forward, impacts will be mitigated through coordination with KAPL and nearby businesses and governments to schedule on-site activities. Long term cumulative impacts will include increased protection of human health and the environment from the reduction of contamination sources through removal actions.		
Aesthetics/Visual Impacts	No change in aesthetics would be expected because no removal action would take place.	In the short term, temporary degradation in aesthetics may occur during the removal action due to the presence of decontamination and excavation equipment. However, the SPRU facilities are located within the KAPL site boundaries and their visibility from the community is limited. It is not likely that they would be visible to the nearby community during or after the removal action. In the long term, no change in aesthetics would be expected.		
Air Quality	No change in air quality would be expected because no removal action would take place.	Potential impacts to air quality due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. In the short term, air quality may be degraded due to airborne dust and/or odors generated during the removal action. However, containment measures would reduce the potential for dust to migrate off site. No change in air quality would be expected in the long term.		
Cultural Resources	A review of available Federal, State, and local government databases was performed to identify potential historic places or Indian religious sites located within the vicinity of the SPRU facilities. No historic places or Indian religious sites were identified within the vicinity of the SPRU facilities by the database review (EDR, 2005). However, an evaluation of the historic significance of the SPRU facilities needs to be done.			

NEPA Value	**Alternative 1** No Action (Continue Surveillance and Maintenance)	**Alternative 2** Cleanout of Tank Vaults and Gross Decontamination of Facilities	**Alternative 3** Removal of H2 and Tank Vaults	**Alternative 4** Removal of SPRU Facilities
Soil	Because the contamination sources would remain, potential impacts to soil could occur if surveillance and maintenance mitigation measures failed.	Potential impacts to soil due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. The removal action would not be expected to change the geology in the area, result in soil erosion or loss of topsoil, or substantively change slope stability. Soil that is characterized as non-hazardous and clear of radiological activity would be reused on site and supplemented with reusable crushed concrete and clean imported soil. No impacts to geology and soil in the area would be expected.		
Human Health	Because the contamination sources would remain, potential impacts to human health could occur if surveillance and maintenance mitigation measures failed.	Potential human health impacts due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. In the short term, temporary and minor exposure to hazards and hazardous materials may occur for workers engaged in removal action activities; and exposure of the public, on-site workers, and the environment to hazardous materials due to airborne dust that may occur during the removal action. However, workers engaged in removal action activities would be properly trained and provided personal protective equipment. Dust control measures would be implemented to reduce the potential for dust to migrate off site, and trucks transporting waste off site would be decontaminated and waste properly packaged prior to leaving the site. In the long term, most of the hazards and hazardous materials would no longer be present at the site reducing the potential risk of a release or exposure.		
Water Quality	Because the contamination sources would remain, potential impacts to water quality could occur if surveillance and maintenance mitigation measures failed.	Potential impacts to water quality due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. There are no known aquifers suitable for development beneath the site. Any water that would be used during the removal action would be treated by the wastewater treatment system on the site prior to discharge. No change in drainage from the site would be expected. The site is not located in a 100-year floodplain. During demolition, excavated materials would be managed so that they would not be dispersed by precipitation and contribute to runoff. In the long term, the removal of the contamination would reduce or eliminate the potential future impact to groundwater in the area.		
Land Use	If the buildings are left in place, potential land use for other KAPL purposes is excluded.	Both buildings are left in place and potential land use for other KAPL purposes is excluded.	Only Building H2 is removed, creating a potential for the land to be used for other KAPL purposes. The land that would remain occupied by Building G2 would be excluded from other KAPL use.	The buildings are removed, creating a potential for the land to be used for other KAPL purposes.

NEPA Value	**Alternative 1** No Action (Continue Surveillance and Maintenance)	**Alternative 2** Cleanout of Tank Vaults and Gross Decontamination of Facilities	**Alternative 3** Removal of H2 and Tank Vaults	**Alternative 4** Removal of SPRU Facilities
Noise	No changes to on-site or off-site noise levels would be expected because no removal action would take place.	Potential noise impacts due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. In the short term, temporary and minor increases in on-site noise levels may occur during removal action due to decontamination, demolition, and/or excavation activities, and increases in off-site noise levels may occur due to increased truck traffic to and from the site. Truck traffic to and from the site and site work would be limited to weekday working hours to limit the off-site noise impact to nearby residences. In the long term, no changes to on-site and off-site noise levels would be expected.		
Transportation and Traffic	No changes to transportation and traffic would be expected because no removal action would take place.	Potential impacts to transportation and traffic due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. In the short term, a temporary increase of truck traffic to and from the site would be expected during the removal action. However, transportation routes would be planned to minimize the impact to the local community during peak traffic hours, and the amount of waste materials and clean imported soil required would be minimized to the extent practicable. Clean excavated soil and/or clean crushed concrete meeting requirements for structural fill would be used as backfill to minimize the number of truck trips. In the long term, no changes to transportation and traffic would be expected.		
Utilities and Service Systems	No impact to utilities and service systems would be expected because no removal action would take place.	Potential impacts on utilities and service systems due to Removal Action Alternatives 2, 3, and 4 are expected to be similar. In the short term, a temporary and minor increase in utilities such as electricity and water may be required for the removal action. In the long term, no impact to utilities and service systems are expected, and may potentially decrease with the reduced surveillance and maintenance program requirements.		

4.3 Summary Comparative Analysis of Alternatives

A summary of the comparison of alternatives is shown in Table 4-2.

Table 4-2. Comparison of Alternatives

Alternative	Comparative Ranking		
	Effectiveness	Implementability	Cost
Alternative 1 **No Action (Continue Surveillance and Maintenance)**	**Low** No removal action; surveillance and maintenance continues; does not meet removal action objectives; would not meet needs of continuing-mission site.	**High** Most technically and administratively feasible; services and materials available.	**Low** $60 Million (This alternative would require additional action in the future.)
Alternative 2 **Cleanout of Tank Vaults and Gross Decontamination of Facilities**	**Medium** This alternative would remove 95% of the contamination. Areas with majority of radiological contamination decontaminated and/or removed, but no removal of structures; would not meet all removal action objectives; would not meet needs of DOE continuing-mission site.	**Medium** Technically and administratively feasible; services and materials available.	**Medium** $90 Million (This alternative would require additional action in the future.)
Alternative 3 **Removal of H2 and Tank Vaults**	**Medium** This alternative would remove 98% of the contamination. Structures with a majority of the radiological contamination removed; would not meet all removal action objectives; would not meet needs of DOE continuing-mission site.	**Medium** Technically and administratively feasible; services and materials available.	**Medium** $130 Million (This alternative would require additional action in the future.)
Alternative 4 **Removal of SPRU Facilities**	**High** This alternative is expected to remove 100% of the contamination. Complete removal of structures and contamination; meets removal action objectives; meets requirements of DOE continuing-mission site.	**Medium** Technically and administratively feasible; services and materials available.	**High** $160 Million

5 RECOMMENDED REMOVAL ACTION ALTERNATIVE

The preferred alternative for cleanup of the SPRU facilities is Alternative 4, Removal of SPRU Facilities. Alternative 4 best satisfies the evaluation criteria presented in this EE/CA (i.e., effectiveness, implementability, and cost) and was also the alternative most preferred by the public and regulatory authorities as expressed during the May 15 to June 5, 2006 public comment period. This effort will start in 2008.

6 REFERENCES

10 CFR 1021 Title 10 Code of Federal Regulations Part 1021, National Environmental Policy Act Implementation Procedures.

40 CFR 300 Title 40 Code of Federal Regulations Part 300, National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan).

40 CFR 1500 Title 40 Code of Federal Regulations Part 1500, Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.

CERCLA Title 42 United States Code, *Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986*, §9621, Cleanup Standards, February 25, 2005.

DOE, 1994 U.S. Department of Energy, 1994. *Secretarial Policy on the National Environmental Policy Act*, June 13, 1994.

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KAPL, 1992 Preliminary Evaluation of the Status of the Separation Process Research Unit (SPRU), Draft. October 1992.

KAPL, 1998 Separations Process Research Unit (SPRU) History and Current Status, Rev. 1. April 1998.

NEPA, 1969 Title 42 United States Code 4321-4347, *The National Environmental Policy Act of 1969*, as amended. January 1, 1970.

Appendix A

SPRU Facilities Regulatory Framework

Resource Conservation and Recovery Act (RCRA)

The SPRU Project Office has submitted a Resource Conservation and Recovery Act (RCRA) Permit Application to NYSDEC. The permit application describes project activities that investigate potential chemical contamination on the site from SPRU-related activities. To support this activity, KAPL has also submitted a RCRA permit modification request to NYSDEC for the transfer of SPRU Solid Waste Management Units (SWMUs) to the SPRU Project. The transfer of the SWMUs will allow the primary responsible party, DOE Environmental Management, to perform the investigation and potential cleanup activities. In reviewing a permit application, NYSDEC will consider DOE planned activities and methodology to ensure that these activities comply with applicable New York State regulations and result in no adverse effect on the public or the environment. The SPRU Project will not be disposing of RCRA hazardous waste on site.

The SWMUs may be decontaminated and/or removed as part of the removal action associated with the SPRU facilities, depending on which alternative is selected. The soil and groundwater that may have been affected by the SWMUs will be subject to a removal action to be addressed in a separate regulatory document.

Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA)

Neither KAPL nor SPRU is included on the U.S. Environmental Protection Agency's (EPA's) National Priorities List. However, in accordance with the *Policy on Decommissioning of Department of Energy Facilities Under CERCLA* (DOE and EPA, 1995), the DOE will respond "…in a manner consistent with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan), regardless of whether or not the release or threatened release is from a site listed on the National Priorities List." Therefore, the decommissioning of the SPRU facilities is being planned as a non-time-critical removal action under CERCLA. Non-time-critical removal actions, as defined in the National Contingency Plan, are conducted under DOE lead-agency authority and typically have a planning horizon of six months or more.

This EE/CA fulfills CERCLA requirements for documenting the removal action alternative selection process in accordance with the *Policy on Decommissioning of Department of Energy Facilities Under CERCLA* (DOE and EPA, 1995), *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA* (EPA, 1993), and the *Decommissioning Implementation Guide* (DOE, 1999). As part of the CERCLA process, this document will be used as a means to communicate with and solicit input from regulatory agencies and public stakeholders on the proposed removal action alternatives.

National Environmental Policy Act (NEPA)

In conjunction with CERCLA and other Federal laws, the National Environmental Policy Act (NEPA) establishes policies and goals for protecting the quality of the environment. NEPA Section 102(2) requires that Federal agencies consider the possible effects (both adverse and beneficial) of proposed activities or actions. The NEPA regulations are promulgated by the Council on Environmental Quality established by NEPA. These regulations state that "Federal agencies shall to the fullest extent possible … integrate the requirements of NEPA with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively" (40 CFR 1500). These Council on Environmental Quality regulations provide the framework by which NEPA

values are to be considered and require that every Federal agency develop its own specific regulations or implementing procedures for complying with the intent of NEPA (40 CFR 1500). The DOE regulations for implementing NEPA are found in 10 CFR 1021.

In accordance with DOE Order 451.1B (DOE, 2001) and 10 CFR 1021, the considerations (values) of NEPA must be evaluated during the CERCLA process. The DOE issued a Secretarial Policy Statement on NEPA (DOE, 1994), supported by a Department of Justice memorandum on the applicability of NEPA to CERCLA cleanups (Department of Justice, 1995). These documents strengthen the NEPA procedural process within DOE and streamline the NEPA process in areas where duplication or inefficiencies have been identified. The policy states that, as a general practice, DOE will rely on the CERCLA process for review of actions taken under CERCLA and will address NEPA values and public involvement procedures by incorporating NEPA values into the CERCLA process. CERCLA documents will be made available to the public as early as possible.

There are similarities between the NEPA and CERCLA processes. Both processes:

- Require consideration of a No Action Alternative
- Require the identification and analysis of alternative courses of action
- Provide for public participation and receipt of oral and written comments
- Provide for the concurrent consideration of other environmental review and regulatory requirements
- Have a data collection phase
- Result in formally documented decisions

Appendix B

Applicable or Relevant and Appropriate Requirements

Table B-1. Chemical-Specific ARARs

Requirement	Citation	Description of Requirement	Type of Requirement	Reason for Inclusion
Clean Air Act - National Emission Standards for Hazardous Air Pollutants	40 CFR 61	Designates hazardous air pollutants and sets emission standards and radiological effluent limits for public: <10 milliRem per year (Total Effective Dose Equivalent).	Applicable	Removal activities may generate airborne radionuclides/asbestos.
New York Water Classifications and Quality Standards	6 NYCRR Parts 701-703	Lists classifications of surface water and groundwater, sets forth procedures for deriving standards, and identifies surface water and groundwater quality standards and groundwater effluent standards.	To be considered	Do not violate or exceed established maximum contaminant level or specific levels established for contaminants. Does not incorporate Federal standards.
New York State Pollutant Discharge Elimination System (SPDES) Program	6 NYCRR Parts 750-758	Regulates permitted releases into waters of the State.	Applicable	New York State recognizes DOE Order 231.1A for applicability to radiological discharges (nothing known to be leaving site).
New York Cleanup Guideline for Soil Contaminated with Radioactive Materials	TAGM[1] 4003	Remediation of sites contaminated with radioactive material.	To be considered	Recommends maximum dose of 10 millirems/year from residual radioactive material, under plausible use scenarios.
New York Determination of Soil Cleanup Objectives and Cleanup Levels	TAGM 4046	Contains method for determining cleanup levels.	To be considered	NYS guidelines for determining cleanup levels.
Project RCRA Corrective Action Permit	New York State Part 370 series (permit pending)	Requirements to investigate areas where waste is managed.	Applicable	Identifies investigation requirements and controls for areas where release of wastes occurred into the environment.
Radiological Protection of the Public and the Environment	DOE Order 231.1A (DOE Order 5400.5)	Contains derived concentration guides for radionuclides.	To be considered	New York State recognizes DOE Order 231.1A for applicability to radiological discharges.

1 Technical Administrative Guidance Memorandum

Table B-2. Action-Specific ARARs

Potential activities used to guide identification of action-specific areas are: soil removal, waste handling, stormwater runoff, erosion control.

Requirement	Citation	Description of Requirement	Type of Requirement	Reason for Inclusion
Occupational Safety and Health Act	29 CFR 1910 29 CFR 1926	Comply with established worker health and safety regulations and health and safety regulations for construction.	Applicable	DOE requirement.
Air Quality Standards	40 CFR 50	National primary and secondary ambient air quality standards.	Applicable	May be applicable, relevant, or appropriate if excavation equipment exhaust and fugitive dust contribute significantly to air quality ranking for region.
Clean Water Act – SPDES - Stormwater Management and Sediment Control, Small Municipal Separate Storm Sewer Systems (MS4s[2])	40 CFR 122 NYCCRR, Title 6 parts 750-758	Stormwater management and sediment control plan for land disturbances, general permit for discharges from MS4s.	Applicable	Removal activities may require an erosion control plan, MS4 permit, and State notifications.
Clean Water Act – Water Classification – National Pollutant Discharge Elimination System (NPDES)	40 CFR 122	Official classified water uses for all surface water and groundwater.	Applicable	Potential run off to waters of the State (Mohawk River).
Department of Transportation – Hazardous Materials Regulations	49 CFR	Regulates packaging, labeling, and transportation of hazardous material.	Applicable	These requirements are pertinent to the removal if waste is transported off site.
RCRA Part B Permit	40 CFR 260-264, 266, 268, 270, 124	Requirements for hazardous waste facilities/management/small quantity generators, also regulates clean closure, capping, and post-closure requirements.	Applicable	SPRU SWMUs are listed in Part B permit; provides pre-transport requirements through reference to U.S. Department of Transportation.
Occupational Radiation Protection	10 CFR 835	Radiation protection standards, limits, and program requirements, mandates as low as reasonably achievable (ALARA) principles. Criteria for	Applicable	Establishes dose limits for employees and public during direct on-site access; codified from DOE Order 5480.11/.15.

2 Municipal separate storm sewer system

Requirement	Citation	Description of Requirement	Type of Requirement	Reason for Inclusion
		radiation dosimetry programs.		
Environmental Protection Program	DOE Order 450.1 (DOE Order 5400.1)	DOE environmental protection standards and requirements.	To be considered	Meet/exceeds applicable laws, regulations, and DOE requirements.
Radiation Protection for Occupational Workers	10 CFR 835	ALARA, control and limitations on removal of material, labeling, posting, dosimetry, etc.	Applicable	
Radioactive Waste Mgmt	DOE Order 435.1 (DOE Order 5820.2A)	Criteria for radioactive waste activities.	To be considered	
Transportation of Hazardous Materials, Substances, and Wastes	DOE Order 5480.3	Specifies labeling and packaging of these substances in addition to 49 CFR 172.	To be considered	
Toxic Substances Control Act - Asbestos	40 CFR 763	Regulations governing abatement, transportation, and disposal of asbestos.	Applicable	Notification to State and approval prior to demolition. Worker training required.
Toxic Substances Control Act - PCBs	40 CFR 761	Identifies cleanup levels and disposal requirements for PCBs and materials containing PCBs.	Applicable	May generate PCB-containing demolition waste.
Environmental Protection, Safety, & Health Protection Standards	DOE Order 5480.4	Specifies regulations, standards, requirements, and guidance on environmental, safety, and health.	To be considered	
New York regulations – Official Compilation of Codes, Rules and Regulations of the State of New York (NYCRR)				
New York Air Pollution Control	6 NYCRR Parts 200, 211, 212	Establishes air pollution control regulations.	Applicable	May be applicable or relevant if excavation equipment exhaust and fugitive dust contribute significantly to air quality.
New York Ambient Air Quality Standards – Air Quality Classification System	6 NYCRR Parts 256-257	Specifies emissions and ambient air concentrations/standards from an emission source.	Applicable	May be applicable or relevant if excavation equipment exhaust and fugitive dust contribute significantly to air quality.
New York Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites	TAGM 4031	Identifies guidance for dust suppression and particulate monitoring.	To be considered	Soil removal activities may contribute to air quality.
New York Solid Waste Management Facility Rules	6 NYCRR Part 360	Regulates solid waste management facilities.	Applicable	Solid waste generated may require disposal.
New York Hazardous Waste Regulations – treatment, storage, and disposal requirements (permitting)	6 NYCRR Parts 370	Requirements for management of hazardous waste.	Applicable	SPRU is small quantity generator of hazardous material.

Table B-3. Location-Specific ARARs

Requirement	Citation	Description of Requirement	Type of Requirement	Reason for Inclusion
National Historical Preservation Act	36 CFR 60	Identifies criteria for determining whether facility/site has any historical significance.	Applicable	Determine if any historical areas exist and drop off of ARAR list, if necessary.
Canal Corporation property requirements			To be considered	To be considered if action goes off of the site boundary, nothing known to be leaving site.
General Electric Property requirements			To be considered	To be considered if action goes off of the site boundary, nothing known to be leaving site.