



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

**Revised Action Memorandum
for the
Separations Process Research Unit (SPRU)
Disposition Project**

August 2009

Prepared by U.S. Department of Energy

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SPRU Field Office

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ACRONYMS

AEC	Atomic Energy Commission
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DOE	U.S. Department of Energy
EE/CA	engineering evaluation/cost analysis
EM	Office of Environmental Management
EPA	U.S. Environmental Protection Agency
HSA	historical site assessment
KAPL	Knolls Atomic Power Laboratory
LL	Lower Level
NPL	National Priorities List
NR	Office of Naval Reactors
NYSDEC	New York State Department of Environmental Conservation
SPRU	Separations Process Research Unit
UL	Upper Level

1. PURPOSE

The purpose of this action memorandum is to document selection of the actions for disposition of facilities, soil, and groundwater contamination for the Separations Process Research Unit (SPRU) Disposition Project nuclear facilities and land areas within the Knolls Atomic Power Laboratory (KAPL) site located in Niskayuna, New York. The U.S. Department of Energy (DOE), using its authority under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), is pursuing removal of the SPRU nuclear facilities and contaminated soil in the associated land areas using the non-time critical removal action process. The original Action Memorandum for the SPRU Disposition Project was signed by DOE in September 2007. The purpose of this revision is to document selection of the action for disposition of soils in the SPRU North Field area, which was deferred in the original Action Memorandum. For completeness, decisions made in the original Action Memorandum are repeated in this revision.

2. SITE DESCRIPTION AND BACKGROUND

SPRU occupies approximately 30 acres of the 170-acre KAPL site in eastern New York State. The Atomic Energy Commission (AEC) established KAPL in the mid-1940s to research the process to separate uranium and plutonium from irradiated materials and to conduct nuclear reactor research. AEC built the SPRU pilot-scale facility to research the chemical process. Figure 2-1 provides the layout of the KAPL site with the locations of the SPRU nuclear facilities and associated land areas.

The DOE Office of Environmental Management (EM) oversees the SPRU Disposition Project. The SPRU Disposition Project includes:

- Building G2;
- Building H2, including the H2 Tank Farm;
- Contaminated soil adjacent to or originating from Buildings G2 and H2 (Upper Level land area);
- Contaminated soil in the vicinity of the Former K5 retention basin, former K6 and K7 storage pads, and the railroad staging area (Lower Level land area);
- Contaminated soil associated with SPRU waste storage in the North Field area; and,
- Contaminated soil associated with SPRU used in the Lower Level Parking Lot as fill (Lower Level land area).

Attachment I provides figures and photos of the SPRU nuclear facilities and land areas. SPRU operated between February 1950 and October 1953. Decommissioning of the SPRU facilities began in October 1953 and continued through the 1990s. The SPRU nuclear facilities and associated land areas contain residual radioactive and chemical contaminants. In 1988, the Environmental Protection Agency (EPA) conducted a preliminary assessment at KAPL, including the SPRU facilities, and concluded that the site did not pose an imminent danger to human health or the environment. Therefore, SPRU was not

included on the CERCLA National Priorities List (NPL).



Figure 2-1. SPRU Nuclear Facilities and Land Areas

The *Nuclear Facility Historical Site Assessment for the Separations Process Research Unit (SPRU) Disposition Project* (Facility HSA, R-002266) and the *Land Areas Historical Site Assessment for the Separations Process Research Unit (SPRU) Disposition Project* (Land HSA, R-002255) present the history and current conditions, including the nature and extent of contamination and detailed property identification and description, of the SPRU nuclear facilities and land areas, respectively.

Prior to transfer to EM (completed in April 2009) KAPL safely managed the SPRU facilities; however, they were largely unused by DOE or the Office of Naval Reactors (NR). The existence of residual contamination and the specialized purpose for which AEC designed these facilities make them largely

non-usable. EM will transfer the areas occupied by the SPRU facilities to NR upon completion of decontamination and decommissioning. Implementation of the removal actions described in this action memorandum will restore the areas occupied by the SPRU facilities.

The objectives for the selected actions are:

- Ensure that site workers will not be exposed to more than an additional 25 milliRem from residual radioactive contamination left in the soil;
- Meet New York State Department of Environmental Conservation (NYSDEC) "No Further Action" requirements for residual chemical contamination in soil and groundwater; and,
- Remove sources of local groundwater contamination.

In their current state, the SPRU nuclear facilities and land areas do not pose a threat to public health or welfare or the offsite environment. However, action is needed to prevent risk to future site workers.

3. SELECTED ACTIONS AND ESTIMATED COSTS

3.1. SPRU NUCLEAR FACILITIES

The Facilities EE/CA (R-002272) evaluated four alternatives to address the SPRU nuclear facilities. DOE has selected Alternative 4, Removal of SPRU Facilities, as the action for disposition of the SPRU nuclear facilities. This action was selected because it best satisfies the evaluation criteria presented in the EE/CA (i.e., effectiveness, implementability, and cost). The selected alternative 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 (*Response to Public Comments, Nuclear Facility Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project*, R-002274). This effort started in 2008 and is scheduled to finish in 2011. Under this removal action, DOE will remove the buildings and residual radioactive contamination. This removal action will involve decontamination and removal of piping, tanks, and equipment from the SPRU facilities; removal of Building H2, the H2 Tank Farm, the G2-H2 Pipe Tunnels, and Building G2; decontamination of the E1 and G1 Pipe Tunnels; and excavation and removal of contaminated soil around the perimeter of the facilities.

Incidental contaminated soil above the tank vaults and soil in the footer drain around the perimeter of Buildings G2 and H2 will be removed. After verifying that the objectives for the selected actions have been achieved, the excavations will 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 will be characterized and segregated by waste type (e.g., transuranic, low-level radioactive, mixed low-level radioactive, hazardous, and non-hazardous). DOE will transport and dispose of the remaining contaminated soil, concrete, and demolition debris at approved offsite disposal facilities.

3.2 SPRU LAND AREAS

The Land EE/CA (R-002271) evaluated two alternatives to address the SPRU Upper Level (UL) land area, three alternatives to address the SPRU Lower Level (LL) land area, and two alternatives to address the SPRU North Field (NF) area. DOE selected

- Alternative UL-2, Upper Level Soil Removal, as the action for disposition of the SPRU Upper Level land area;
- Alternative LL-2, Lower Level Soil Removal, as the action for disposition of the SPRU Lower Level land area; and,
- Alternative NF-2, North Field Soil Removal, as the action for disposition of the North Field Area.

These actions were selected because they best satisfy the evaluation criteria presented in the EE/CA (i.e., effectiveness, implementability, and cost). The selected alternatives were also the alternatives most preferred by the public and regulatory authorities, as expressed during the December 22, 2006, to January 26, 2007, public comment period (*Response to Public Comments, Land Areas Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project*, R-002273). One additional comment was received regarding the North Field Soil Removal alternative during the public comment period held from July 1 to July 31, 2009. This comment and DOE's response appear in Attachment II. These efforts started in 2008; the Lower Level and north Field removal actions will finish in 2010, the Upper Level removal action will finish in 2011. The action for the Upper Level will be removal of contaminated soil that underlies the facilities so as to meet the objectives for the selected actions. (Note that removal of contaminated soil above the facilities or in association with the footer drains is part of the selected action for the SPRU nuclear facilities.) At this time, DOE does not have evidence that radioactive contamination extends below the buildings into the underlying soils. For planning purposes, DOE has included excavation of six feet of soil from beneath Building H2 and the Tank Farm. After verifying that the objectives for the selected actions have been achieved, the area will be restored.

The action for the Lower Level Parking Lot and Railroad Staging Area will be removal of contaminated soil so as to meet the objectives for the selected actions, followed by restoration of the areas. DOE assumes that soil will be removed to an average depth of four feet in the Lower Level Parking Lot. Residual contamination below four feet in this area is not expected to pose an exposure risk to future industrial users. However, confirmation sampling will be conducted to ensure that the objectives for the selected actions have been met before restoring the area. Soil removal in the Railroad Staging Area will extend to an assumed average depth of four feet with deeper localized excavation to remove continuing sources of strontium-90 to local groundwater in that area. Confirmation sampling will be conducted to verify that objectives for the selected actions have been met prior to restoration of the areas to grade. Wastes generated during implementation of these removal actions will be characterized and segregated by waste type (e.g., low-level radioactive, mixed low-level radioactive, hazardous, and non-hazardous). DOE will transport and dispose of contaminated soil and debris at an approved offsite disposal facility.

The action for the North Field Area will be removal of contaminated soil so as to meet the objectives for the selected actions, followed by restoration of the areas. DOE assumes that soil will be removed to an average depth of two feet. Existing trees, shrubs and other surface vegetation in the North Field will be removed to facilitate soil removal. Confirmation sampling will be conducted to verify that objectives

for the selected actions have been met prior to restoration of the areas. Wastes generated during implementation of these removal actions will be characterized and segregated by waste type (e.g., low-level radioactive, mixed low-level radioactive, hazardous, and non-hazardous). DOE will transport and dispose of contaminated soil and debris at an approved offsite disposal facility.

3.3 ESTIMATED COST

DOE's estimate for the selected actions for the SPRU nuclear facilities and the Upper Level, Lower Level and North Field land areas was approximately \$217 million, as documented in the Facility and Land EE/CAs (R-002272, R-002271). DOE's current estimate for the total of the selected actions is between \$155 million and \$156 million.

4. EXPECTED OUTCOMES OF THE SELECTED ACTIONS

When implemented, the selected actions for the SPRU Disposition Project are expected to have the following outcomes:

- Largely unused nuclear facilities, portions of which are contaminated with radioactive and hazardous materials, will be removed;
- Soils contaminated with radioactive and hazardous materials will be removed so as to meet the objectives for the selected actions;
- Radioactive and hazardous wastes (including transuranic waste) resulting from the removal of buildings and cleanup of soil will be appropriately classified, transported, and disposed of at offsite facilities;
- SPRU disposition project areas will be returned to NR for continuing mission use; and
- Surveillance and maintenance activities for the SPRU nuclear facilities and land areas will be discontinued

5. RESPONSIVENESS SUMMARY

The following documents and fact sheets have been made available to the public:

- Project Overview Fact Sheet, February 2006
- Nuclear Facility Historical Site Assessment for the Separations Process Research Unit (SPRU) Disposition Project, April 2006
- Nuclear Facility Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project, Final, July 2007 (draft made available May 2006)
- Facility Alternatives Fact Sheet, May 2006
- Response to Public Comments, Nuclear Facility Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project, November 2006
- Facility EE/CA Response to Comments Document Fact Sheet, December 2006
- Land Areas Historical Site Assessment for the Separations Process Research Unit (SPRU) Disposition Project, November 2003 (revised December 2006)
- Land Area Documents Fact Sheet, December 2006
- Land Areas Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project, Final, July 2007 (draft made available December 2006)

- Land Alternatives Fact Sheet, December 2006
- Response to Public Comments, Land Areas Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project, June 2007
- Land EE/CA Response to Comments Document Fact Sheet, July 2007
- Preferred Alternatives Fact Sheet, July 2007
- North Field Land Area Preferred Alternatives Fact Sheet, June 2009


Public comment periods were held May 15, 2006, through June 5, 2006; December 22, 2006, through January 26, 2007; and July 26, 2007, through August 25, 2007 for comments on the nuclear facilities alternatives, land area alternatives, and preferred alternatives, respectively. Newspaper ads were published in the Niskayuna Spotlight and the Schenectady Gazette to coincide with the first day of each public comment period.

A public comment period was held from July 1, 2009, through July 31, 2009, for comments regarding the North Field preferred alternative. Newspaper ads were placed in the Niskayuna Spotlight and Schenectady Gazette prior to and to coincide with the beginning of the public comment period.

Supporting SPRU documentation referenced in this action memorandum is located in the SPRU Disposition Project Information Repository at the Niskayuna Branch of the Schenectady County Public Library, 2400 Nott Street East, Niskayuna, New York 12309, and online at www.spru.doe.gov. Additional supporting documentation (e.g., sampling and characterization reports) is also available in the SPRU Disposition Project Information Repository.

6. AUTHORIZING SIGNATURE

This document represents the selected removal actions for the SPRU nuclear facilities and land areas within the KAPL site located in Niskayuna, New York, developed in accordance with CERCLA as amended, and consistent with the National Oil and Hazardous Substances Pollution Contingency Plan. This decision is based on the administrative record for the site.


John J. Rampe, Manager
SPRU Field Office

8-19-09
Date

7. REFERENCES

- R-002255 Environmental Resource Group, LLC. *Land Areas Historical Site Assessment for the Separations Process Research Unit (SPRU) Disposition Project*. December 2006.
- R-002266 Environmental Resource Group, LLC. *Nuclear Facility Historical Site Assessment for the Separations Process Research Unit (SPRU) Disposition Project*. April 2006.
- R-002271 Environmental Resource Group, LLC. *Land Areas Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project, Final*. July 2007.
- R-002272 Environmental Resource Group, LLC. *Nuclear Facility Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project, Final*. July 2007.
- R-002273 Environmental Resource Group, LLC. *Response to Public Comments, Land Areas Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project*, June 2007.
- R-002274 Environmental Resource Group, LLC. *Response to Public Comments, Nuclear Facility Engineering Evaluation/Cost Analysis for the Separations Process Research Unit (SPRU) Disposition Project*, November 2006.

Attachment I

**SPRU Nuclear Facilities and Land Areas
Figures and Photos**

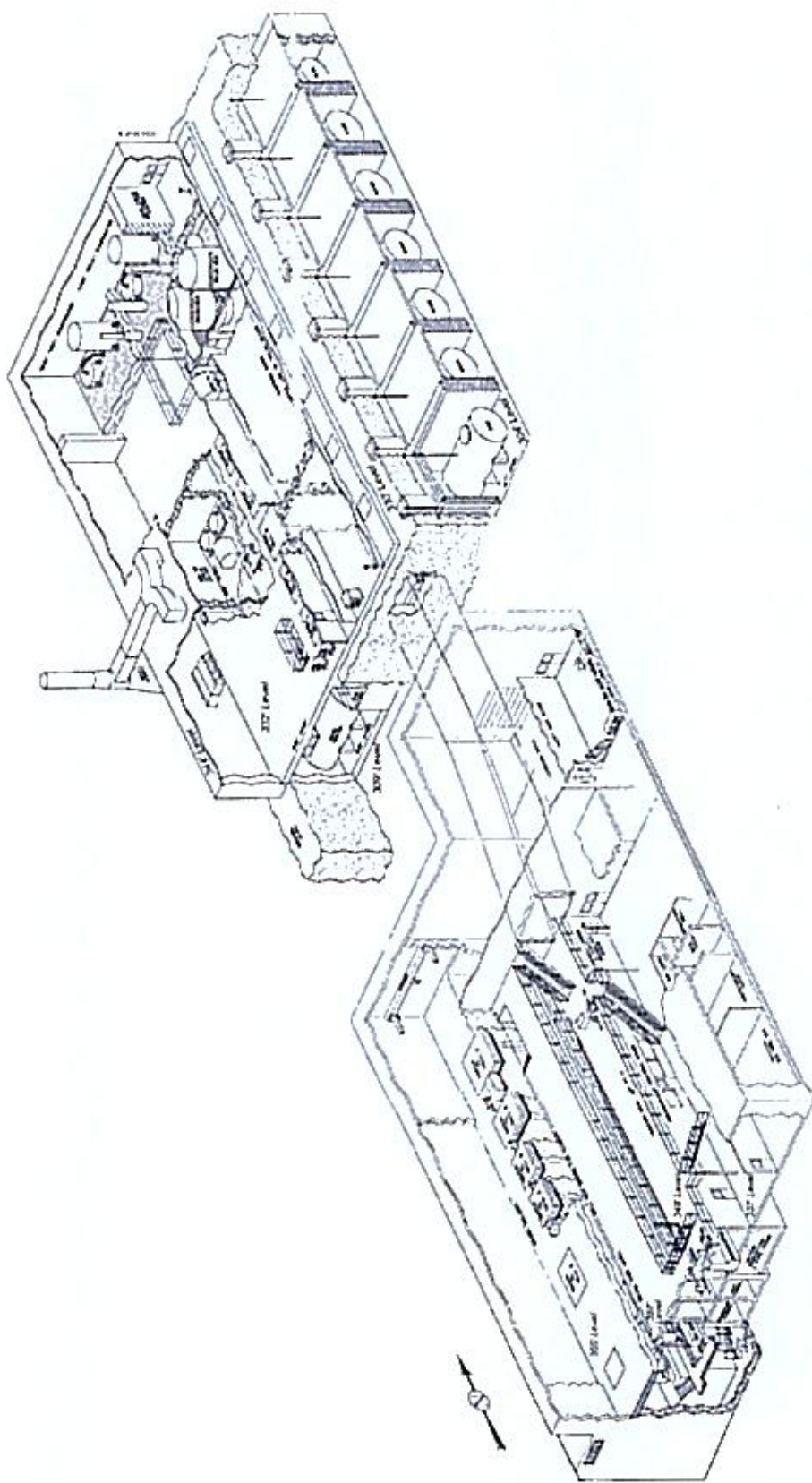
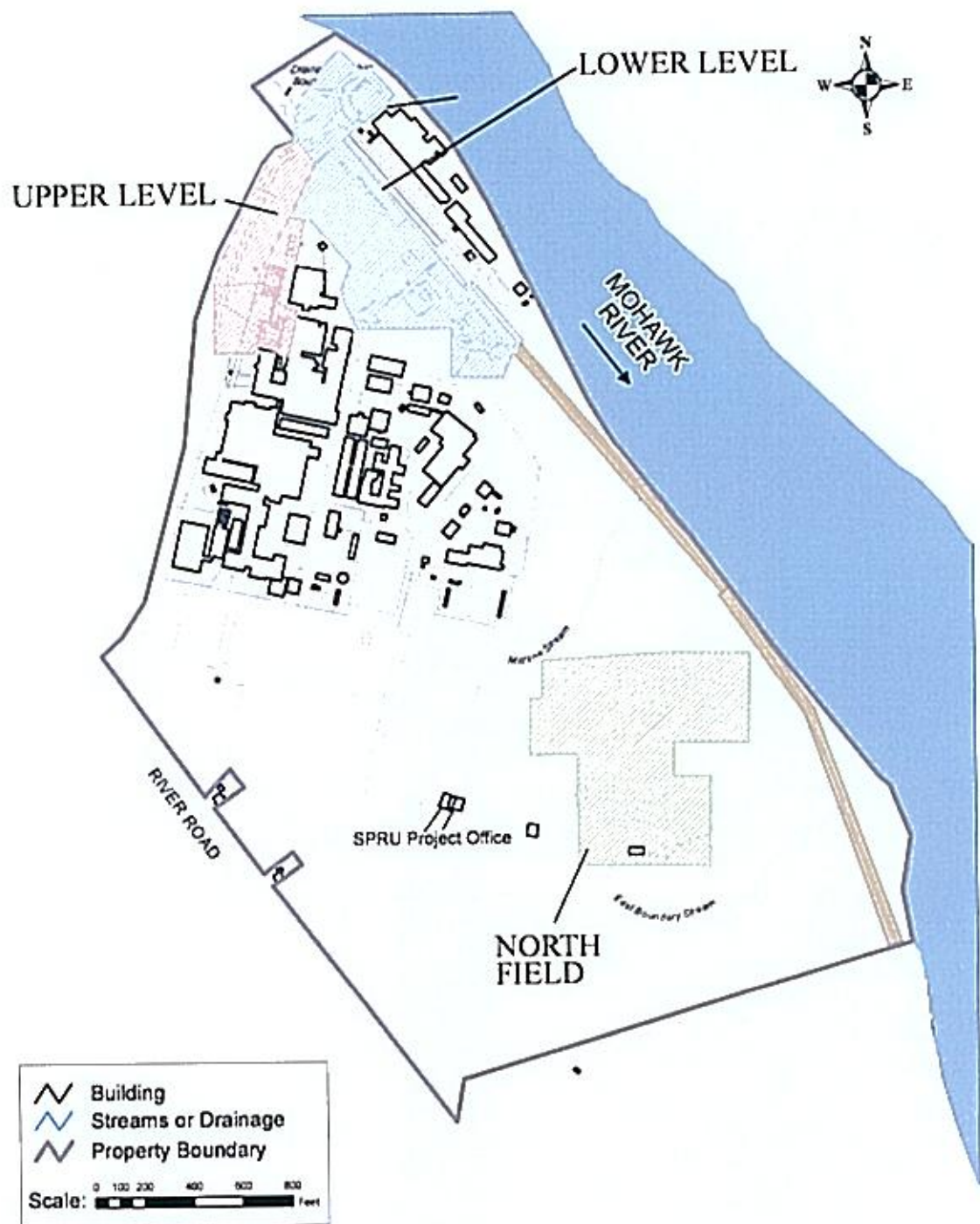


Figure 1. Isometric view of SPRU nuclear facilities



- Notes: 1) Basemap Reference Drawing: O'Brien & Gere Engineers, Inc., File No.: 10350.23931-001, Sept. 1999 as modified using Figure A-1 from the CH2M Hill, *Outside Characterization Plan*, TSM-08, Rev. 2, Separations Process Research Unit Project, March 2004 (R-000431).
- 2) Total SPRU Areas approximately 24 acres.

Figure 2. SPRU Land Areas

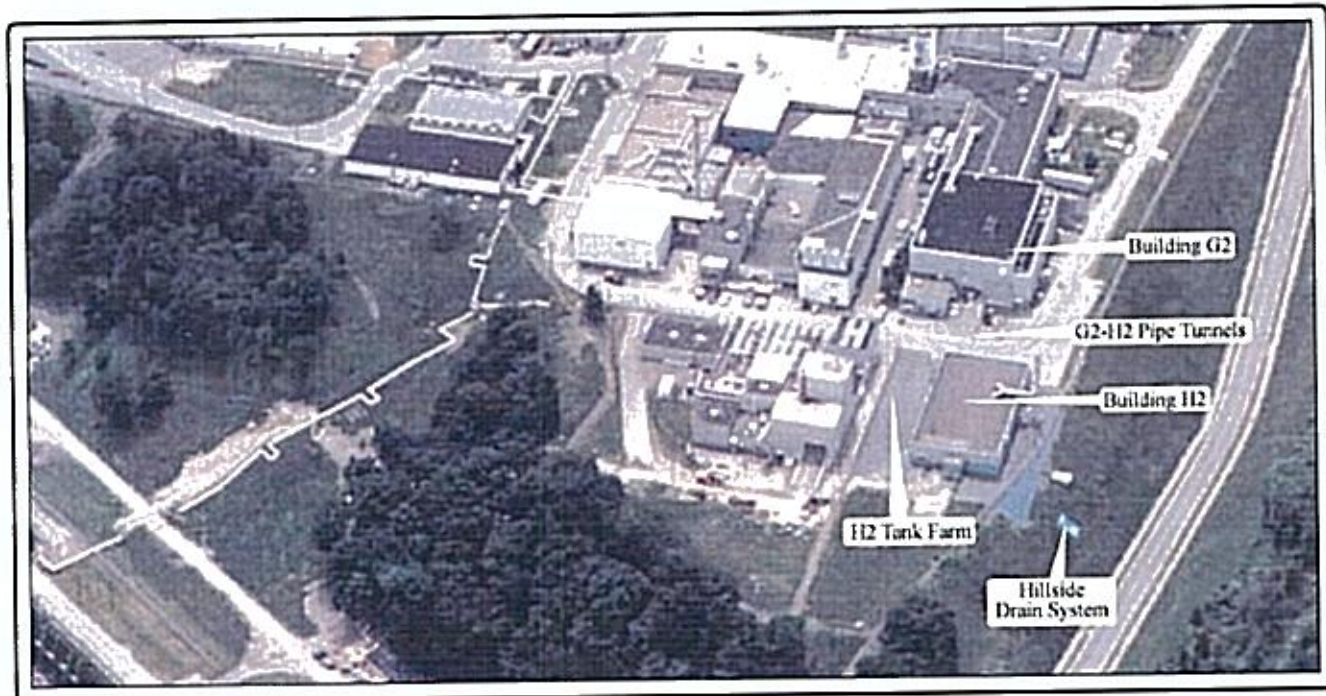


Figure 3. Upper Level

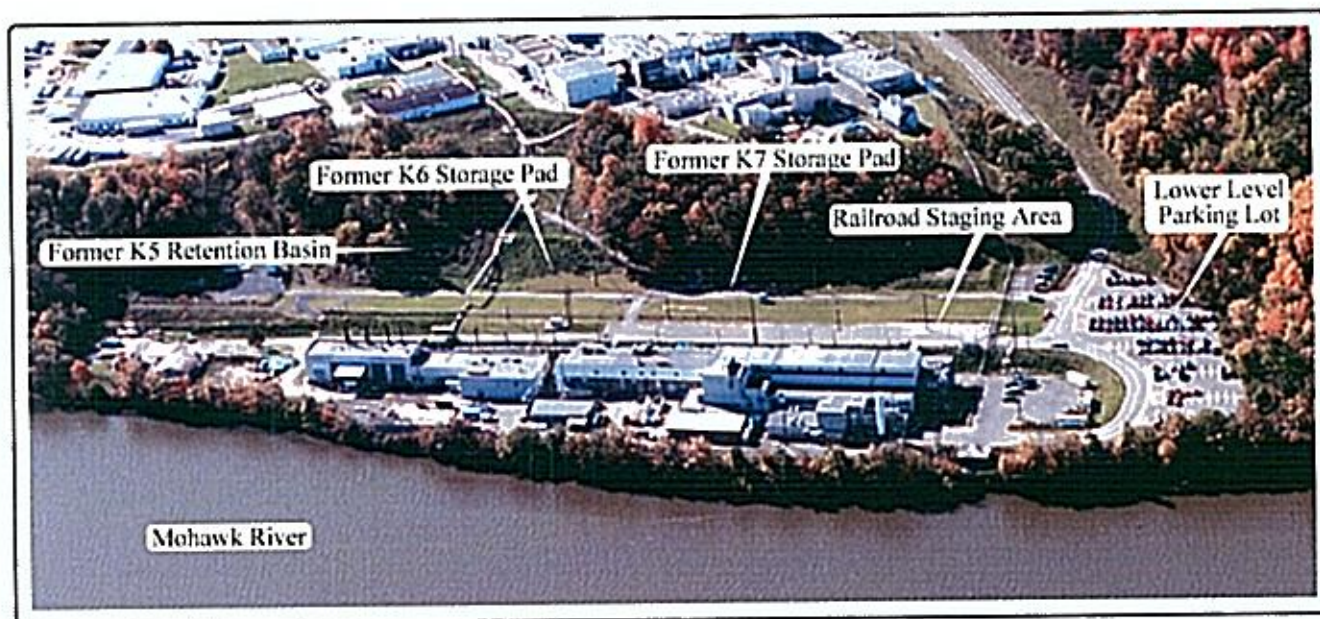


Figure 4. Lower Level

Attachment II

Response to Public Comment on SPRU Preferred Alternatives

Comment:

I was somewhat disappointed that an open public discussion was not scheduled for the subject option. Some of us who were active in past soil removal operations may have convinced USDOE that the estimated 15 Mil could better be allocated to known highly contaminated soil under Bldgs G-2,H-2 and Tunnels. The north field soil removal operations of early years probably eliminated more than 99.99% of SPRU related contamination. The small amount of residual radioactivity that remain is very likely spotty and deeper than 6 feet. Based on my personal work experience and KAPL documents, my own cost/benefit analysis would have chosen "NO ACTION" and reduced surveillance for the north field.

Response:

Since the public had previously been given the opportunity to comment on the removal alternative for North Field soils (during a public comment period that ran from December 22, 2006, to January 27, 2007), including a public meeting during that time period. DOE elected not to hold another public meeting specifically for the North Field soil removal alternative. DOE notes that public input received at that time was generally in favor of soil removal.

DOE agrees that previous actions in the North Field have removed substantial amounts of contamination there. However, cesium-137 remains in North Field in surface soil at levels up to 476 picoCuries per gram. These levels compromise the current and future use of the North Field, and necessitate ongoing surveillance and maintenance of the area. These considerations led to DOE's selection of removal as the alternative for the North Field.

The funding that will be applied to the North Field soil removal will not affect other portions of the SPRU Disposition Project. Contaminated soil in the vicinity of Buildings G2, H2 and the G2-H2 pipe tunnels will be removed as described in Section 3.1.1 of the Action Memorandum, using funding that has already been allocated to the SPRU Disposition Project.