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ACTION MEMORANDUM

SITE NAME AND LOCATION

U.S. Department of Energy
Hanford 100 Area National Priorities List (NPL)
105-B Reactor Facility
Hanford Site
Benton County, Washington

This Action Memorandum constitutes approval of the U.S. Department of Energy's (DOE) proposed removal action as described herein for hazard mitigation at the 105-B Reactor Facility.

A 30-day public comment period was held from June 18, 2001, through July 17, 2001. In addition, a public meeting was held in Richland, Washington, on June 26, 2001, to receive comments. Overall, comments received supported taking this action. Response letters were sent to all members of the public who commented on this action.

This removal action reduces the potential for a release of hazardous substances that could adversely affect public health or welfare or the environment, and is protective of worker personnel.

I. PURPOSE

The purpose of this non-time-critical removal action is to take appropriate action to mitigate the threat to Site workers, public health or welfare or the environment by removing hazardous substances from the facility.

II. BACKGROUND AND FACILITY DESCRIPTION

A. Background

Pursuant to the *Comprehensive Environmental Response Compensation and Liability Act of 1980* (CERCLA), the United States Environmental Protection Agency (EPA) recommended the 100 Area of the DOE-operated Hanford Site for inclusion on the National Priorities List (NPL) on June 24, 1988. In November 1989 the 100 Area was added to the NPL. The 100 Area is located in the northern part of the Hanford Site along the shore of the Columbia River. The B Reactor Facility is located in the 100 B/C Reactor Area. The EPA has been designated as lead regulatory agency for this project.

Key Word - B Reactor

100-BC-2

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B. Facility Description and Contaminants of Concern

Groundbreaking for the 105-B Facility began in October 1943 by the U.S. Army Corps of Engineers as a part of the Manhattan Project effort to bring an end to World War II. In only 16 months the reactor was fully constructed and operational. The first indications of radioactivity were observed on September 26, 1944, with the reactor achieving full power on February 4, 1945.

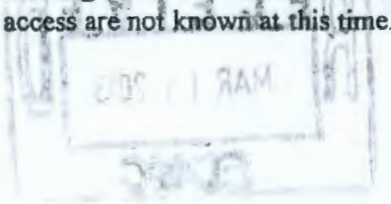
The 105-B Facility was the world's first full-scale production reactor. The reactor produced plutonium fuel for the world's first nuclear device, detonated at the Trinity test site in Alamogordo, New Mexico, on July 16, 1945. The facility also produced the plutonium fuel used in the atomic bomb detonated at Nagasaki, Japan, on August 8, 1945.

Final shutdown of the reactor occurred on February 12, 1968. In the 12 years following the initial shutdown order, the 105-B Facility was held in standby status, with a restart capability of 18 to 24 months duration. The reactor support facilities, including the 115-B Gas Purification Building, 181-B River Pumphouse, 182-B Reservoir and Pumphouse, and the 184-B Powerhouse, were left in service to support the C Reactor until it was finally shut down in 1969. The 105-B Facility was finally declared excess property in the early 1980s. In 1998, portions of the C Reactor were demolished, and the reactor block was encapsulated in an interim safe storage enclosure awaiting final disposal of the reactor block. Support facilities for the B and C Reactors, with the exception of the 181-B River Pumphouse and the 182-B Reservoir and Pumphouse, have been demolished.

The historical significance of the 105-B Facility has entitled it to numerous declarations, including National Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers in 1976 and the Nuclear Historic Landmark Award. Because of its historical significance, the 105-B Facility has been listed in the National Register of Historic Places and was designated a National Historic Civil Engineering Landmark in 1993. Since the late 1980s, guided tours have been led through portions of the 105-B Facility. Interpretive items and historical displays are exhibited in the facility along the current tour route.

In recognition of the need to preserve the physical legacy of the Manhattan Project, the DOE has declared in the "Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)" (64 FR 61615) designated land use for the 105-B Facility as high-intensity recreation to support visitor-serving activities and facilities development.

Long-term removal actions at the 105-B Facility are not proposed at this time. Instead, removal action alternatives are analyzed for a 10-year time period. It is anticipated that within this time frame, two important DOE determinations will be made to support the final removal action. First, it is expected that a decision as to the final configuration of the facility will occur within this time frame. Until such a decision is made, a final removal action cannot be defined without jeopardizing potential end-state uses of the facility. Second, because the 105-B Facility has exceeded its expected original design life, major structural upgrades are expected to be necessary for long-term use. Actions and associated costs for structural upgrades to allow sustained public access are not known at this time. This information will need to be gathered during this interim



time period to adequately assess the feasibility and cost of sustained public use and risks to human health and the environment from remaining hazardous substances. The 10-year time period is also consistent with the DOE's Columbia River Corridor Initiative, the goal of which is to complete many cleanup and access decisions by the year 2012 and restore the river corridor.

Although the DOE has stated that the 105-B Facility will be preserved for historical interpretation, the configuration of the interpretive center has yet to be determined. Options, ranging from preservation of information to retention of the physical structure, could include one or more of the following:

- Recordation by photographs, drawings, models, and exhibits
- Written histories
- Preservation of some portions of the 105-B Facility for display on or near its present location
- Preservation of some portions of the 105-B Facility for display at a location other than the 105-B Facility
- Preservation of the complete 105-B Facility in place with guided public access.

Contaminants of concern located within the facility include the following:

- Radioactive contaminants (e.g., Sr-90, Cs-137, C-14, Co-60, Pu-239, Am-241)
- Lead (shielding, oxides, switches, and drains)
- Mercury (gauges, switches, and drains)
- PCBs (light ballasts and gear oil)
- Heavy metals (cadmium, chromium)
- Asbestos (pipe lagging, insulation, and transite)
- Oils/greases

III. THREAT TO PUBLIC HEALTH, WELFARE, OR ENVIRONMENT

The 105-B Reactor Facility is known to be contaminated with hazardous substances. A potential threat exists to public health or welfare or the environment through the deterioration of the facility that could result in the release of hazardous substances to the air or soil.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances, pollutants, or contaminants from this site may present an imminent and substantial endangerment to the public health or welfare or the environment.

V. PROPOSED ACTION AND ESTIMATED COSTS

A. Alternatives

An EE/CA was prepared in order to develop removal alternatives that were appropriate for the cleanup of the B Reactor Facility. The EE/CA proposed three alternatives. They are described as follows:

1. NO ACTION

With Alternative One, no activities would be performed and current surveillance and maintenance (S&M) activities would be discontinued. However, Hanford Site institutional controls would be maintained to help minimize personnel, worker, and public entry to the facilities and warn of hazards. No other specific controls would be established for the facility. Because the facility would not be decontaminated and no action would be taken to prevent the facility from deteriorating, there would be an increased threat and likelihood that a release would occur, potentially exposing the workers, public, or the environment to hazardous substances.

2. CONTINUED SURVEILLANCE AND MAINTENANCE (S&M)

Alternative Two consists of S&M of the 105-B Facility for the purposes of maintaining minimum safe conditions of the facility. This alternative would include no public access of the facility during the interim removal action. The S&M measures would include routine radiological and hazard monitoring of the facility and safety inspections, as required. The S&M activities would be adjusted based on the specific condition of the facility. Activities would be balanced to reduce hazards to workers while reducing the potential for releases of contaminants. Major repairs such as re-roofing and shoring structural components would be necessary. These major repairs would be required to ensure the integrity of the facility, which is necessary to contain contaminants within the structure. It is anticipated that a new roof would be required for the reactor once during the 10-year interim action. Roofs typically have a 20-year service life and, based on the present age of the roof cover, 3 to 5 years would be the maximum remaining life of the current cover. Other major repairs would be performed on an as-needed basis.

In general, as facilities age and deteriorate, S&M must become more aggressive over time, and worker safety is a critical factor. Without an increasingly aggressive S&M program, the threats associated with unplanned releases to the environment and injury to workers would increase. Conversely, an aggressive S&M program would require workers to enter the facility more often, and workers may be required to perform more invasive procedures to maintain the facility, which would increase the potential for exposure to workers. Additionally, personal protection requirements to maintain the more aggressive program continually increase, which would add to the cost. Because this interim action is for a 10-year period, the level of S&M activities required is expected to initially remain constant, but may require an increase in the later years of the action.

A variety of waste streams would be generated in the performance of S&M that would be stored, characterized, packaged, and disposed. Waste that meets the ERDF waste acceptance criteria would be disposed at the ERDF, and other wastes would be managed to comply with identified Applicable or Relevant and Appropriate Requirements (ARARs).

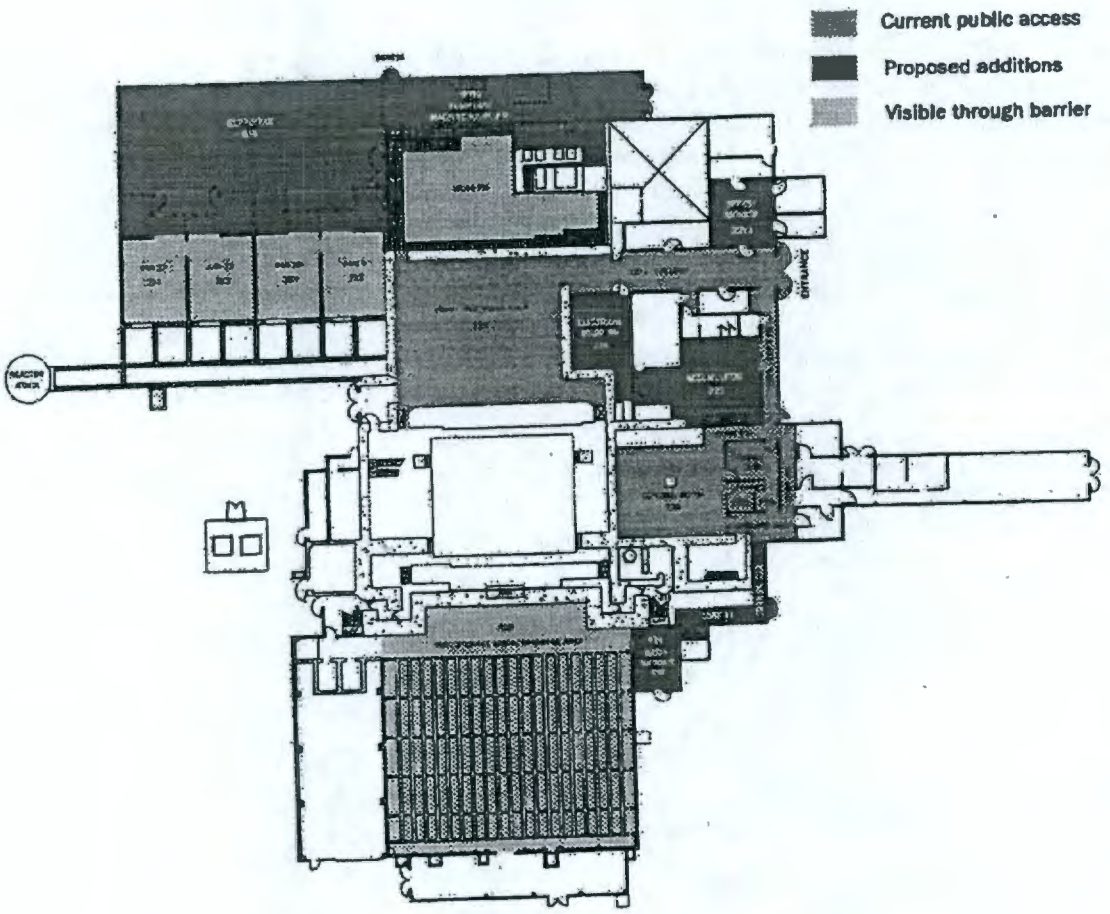
Cost for this alternative is estimated at $1,652,000 over a 10-year period.

3. HAZARD MITIGATION FOR PUBLIC ACCESS

Alternative Three would remove hazardous substances from the 105-B Facility, while maintaining S&M activities similar to Alternative Two. The front-face work area (room 110), control room (room 220), control room offices (rooms 219a, 219b, and 219c), and associated hallways are currently accessible on guided tours. Alternative Three would remove hazardous substances from the office/storage room (room 228a), the at-grade portion of the valve pit, the supply fan room (room 315), the flow lab/ maintenance room (room 231a), the accumulator room (room 222), the electrical equipment room (room 223), the fuel storage basin viewing room (room 414), and their associated access hallways and corridors. These portions of the facility were selected based on their historical interpretation value and the feasibility of mitigating and releasing them for managed public access and to prevent releases of hazardous substances to the environment. A major activity will be to remove radioactive contaminants from the facility and remove or seal radioactive and other hazardous materials in floor drains to prevent release into the environment. Figure 1 illustrates the current and proposed access and viewing areas, which are as follows.

- Front-face work area (room 110) and hallway 227a
- Control room (room 220)
- Accumulator room (room 222)
- Electrical equipment room (room 223)
- Supply fan room (room 315)
- Basin viewing room (room 414), corridor no. 4, and hallway 211
- Offices 219a, 219b, and 219c
- Office/storage room (room 228a)
- Corridors 227a, 227b, and 227c
- Valve pit
- Valve pit (4.6 m [15 ft] below grade)
- Flow lab/machine maintenance room (room 231a).

Cost for this alternative is estimated at $2,900,000.


Current public access
Proposed additions
Visible through barrier

B. Compliance with ARARs

The selected removal action will comply with the federal and state ARARs listed below. No waiver of any ARAR is being sought. The ARARs for the 105-B Reactor Facility removal work are as follows:

- MTCA (WAC 173-340) risk-based cleanup levels are applicable for establishing cleanup levels for soil, structures and debris.

- "National Emission Standards for Hazardous Air Pollutants" (40 CFR 61), are applicable for radionuclide emissions from facilities owned and operated by DOE. Radionuclides are present in structures, and debris that will be excavated, treated, transported, and disposed under this action.

- State of Washington "Dangerous Waste Regulations," (WAC 173-303), are applicable for the identification, treatment, storage, and land disposal of hazardous and dangerous wastes.

- RCRA Subtitle C (40 CFR 261, 264, 268) is applicable for the identification, treatment, storage, and land disposal of hazardous wastes.

- "U.S. Department of Transportation Requirements for the Transportation of Hazardous Materials" (49 CFR 100 to 179), will be applicable for any wastes that are transported offsite.

- *Hazardous Materials Transportation Act* (49 U.S.C. 1801-1813) is applicable for transportation of potentially hazardous materials, including samples and wastes.

- *Toxic Substances Control Act* (15 U.S.C. 2601, implemented via 40 CFR 761) is applicable to the management and disposal of remediation waste containing regulated concentrations of *PCBs*, including specific requirements for PCB remediation waste.

- State of Washington, "Department of Health" (WAC 246-247) is applicable to the release of airborne radionuclides.

- *National Archeological and Historical Preservation Act* (16 U.S.C. 469) 36 CFR 65) is applicable to recover and preserve artifacts in areas where an action may cause irreparable harm, loss, or destruction of significant artifacts.

- *National Historic Preservation Act* (16 U.S.C. 470; 36 CFR 800) is applicable to actions in order to preserve historic properties controlled by a Federal agency.

- *Endangered Species Act of 1973* (16 U.S.C. 1531; 50 CFR 200; 50 CFR 402) is relevant and appropriate to conserve critical habitat upon which endangered or threatened species depend. Consultation with the Department of the Interior is required.

Other Criteria, Advisories, or Guidance to be Considered for this Remedial Action (TBC's)

- The ERDF waste acceptance criteria (Rev. 3) delineate primary requirements, including regulatory requirements, specific isotopic constituents and contamination levels, the dangerous/hazardous constituents and concentrations, and the physical/chemical waste characteristics that are acceptable for disposal of wastes at the ERDF.

- The EPA's Office of Solid Waste and Emergency Response (OWSER) Directive 9200.4-31P, "Radiation and Risk Assessment at CERCLA Sites: Q&A, December 1999" provides clarification for establishing protective cleanup levels and establishes that dose assessments should only be conducted under CERCLA where necessary to demonstrate ARAR compliance.

C. Project Schedule

The non-time-critical removal action to address the 105-B Reactor Facility hazard mitigation is scheduled to begin with issuance of this action memorandum and approval of the removal action work plan and continue for a period of 10 years. DOE shall submit the removal action work plan to EPA by March 29, 2002 which shall include in detail the work to be done and the performance standards to be met. It shall also include an implementation schedule which shall identify completion dates for major tasks and deliverables as interim milestones. A change package shall be submitted with the work plan which identifies the interim milestones.

VI. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues regarding the work outlined under this removal action. However, DOE has still not resolved the policy issue regarding whether the B Reactor Facility will be used as a museum in the long term.

VII. SELECTED ALTERNATIVE

The recommended interim removal action alternative for 10 years at the 105-B Facility is Alternative Three. Alternative Three would afford the best balance between providing protection of human health and the environment, meeting removal action objectives, achieving cost effectiveness, and providing an end state that supports and is consistent with DOE's intent to preserve the facility for historical interpretation. Alternative Three allows interim use of the 105-B Facility for this purpose while a decision is made regarding its final configuration.

Alternative Three would involve continued S&M of the 105-B Facility and mitigation of hazardous substances to allow public access into the portions of the facility identified in Figure 1. Waste generated during the removal action would be disposed at the Hanford Site's ERDF, which provides an engineered disposal facility that is protective of the environment.

This decision document represents the selected removal action for the B Reactor site in the 100 B/C Reactor Area, 100 Area NPL Site, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site.

Signature sheet for the DOE Hanford Action Memorandum covering the 105-B Reactor Facility.

Michael H. Schlender for

Keith A. Klein
Manager, Richland Operations Office
United States Department of Energy

12/27/01
Date

Concurrence sheet for the DOE Hanford Action Memorandum covering the 105-B Reactor Facility.

Michael F. Gearheard
Director, Environmental Cleanup Office, Region 10
United States Environmental Protection Agency

1 Nov '01
Date

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