1221811

RL-F-1325.6 (02/98)

United States Government **Department of Energy**

memorandum

Richland Operations Office

DATE: OCT 01 2013

REPLY TO ATTN OF: AMRP:RFG/14-AMRP-0001

SUBJECT: CLOSEOUT DOCUMENTATION FOR THE PARTIAL REMOVAL OF SEDIMENTAL REMOVAL FROM THE FUEL TRANSFER AREA AT 105B, WASTE SITE 118-B-8

RECEIVED
OCT 07 2013
EDMC

TO: Memorandum to File

Background:

The Richland Operations Office (RL) tasked Washington Closure Hanford LLC (WCH) with the removal of sediment left behind in the transfer pits located in the transport bay of 105B. Inventory of these pits is part of the 118-B-8 WIDS site. Complete removal of the materials in the pit proved to be more difficult than anticipated without effecting operation of the B Reactor museum, so work was truncated with material in the pits. The U.S. Environmental Protection Agency (EPA) requested that the sediment pit completion status be documented in order to support the future 100B area Record of Decision (ROD) (see Attachment 6A).

Approval documents associated with sediment removal included:

- Approval to amend the Air Monitoring Plan for 100-B/C Area Burial Grounds and Remaining Sites Remedial Action Work Plan to support sediment removal (Attachment 1).
- Waste Management Plan for 105-B Reactor Building Fuel Transfer Area Sediment Removal and Disposal, November 2009 version (Attachment 1A) and October 2012 version (Attachment 1B).
- Sampling and Analysis Plan for the 105B Reactor Transfer Pit Sediment and Filter Press, WCH -353 (Attachment 2).
- Approval to treat the 105B Transfer Pit Lead Contaminated Soil in Accordance with the "Treatment Plan and Protocol for Treatment of Lead Contaminated Soils, WCH- 252, Rev. 2," (Attachment 3).

Status documents related to the sediment pit end state include:

- Initial Industrial Hygiene Review of 105B Fuel Storage Basin and Fuel Transfer Basin Data and Historical References Regarding Beryllium and Heavy Metal Contamination (Attachment 4).
- Discussion of end state of the sediment pits prior to grout introduction (Attachment 5).
- Request to put fillable flow grout in the sediment pits (Attachment 6) and EPA's approval of the approach (Attachment 6A).
- End state verification report after transfer pit work completed (Attachment 7).

100.BC.1

OCT 01 2013

If you have questions, please feel free to contact me at (509) 376-5494.

R. F. Guercia, Subproject Director
for the River Corridor Closure Project

cc w/attachs:
L. C. Buelow, EPA
L. M. Douglas, WCH
C. P. Strand, WCH
D. J. Warren, PNNL
Administrative Record, H3-04 (100-B/C-1 OU)

ATTACHMENT 1

Strand, Christopher P

From: Faulk.Dennis@epamail.epa.gov
Sent: Wednesday, May 13, 2009 3:43 PM
To: Guercia, Rudolph F; Buelow.Laura@epamail.epa.gov
Cc: Strand, Christopher P
Subject: Re: FW: 105B note to Dennis

Rudy,

That sounds fine, you can work the changes through Laura if I am not around.

DF

"Guercia, Rudolph F (Rudy)" <Rudolph_F_Rudy_Guercia@RL.gov>

05/08/2009 06:17 PM

To: Dennis Faulk/R10/USEPA/US@EPA

cc: "Strand, Christopher P" <cpstrand@wch-rcc.com>

Subject: FW: 105B note to Dennis

Dennis:

RL is planning to remove and dispose some of the source term in the 105B Fuel transfer area, currently planned for a contaminated filter press and sediment in the fuel pit.

As discussed on the telephone, page 37 of the remaining sites ROD (chron 0051443 from the A/R) authorizes removal of waste from inside the 105B reactor building.

The Air Monitoring Plan for the 100B/C Burial Grounds and Remaining Sites Remedial Action (103979 from the A/R) is silent on the buildings.

Proposed course of Action:

Submit an addendum to the existing Air Monitoring Plan (as amended) for 100-B/C Area Burial Grounds and Remaining sites Remedial Action Plan for EPA approval.

Submit a Waste Management Plan Addendum to The RDR/RA Work Plan for the 100 Area (DOE/RL-96-17) for EPA approval

Let me know if that is the correct course of action

Rudy
Fuel Supply System Shutdown
300/400 Area Surveillance, Demolition, and Remediation River Corridor Project
(509) 376-5494

ATTACHMENT 1A

WASTE MANAGEMENT PLAN FOR 105-B REACTOR BUILDING FUEL TRANSFER AREA SEDIMENT REMOVAL AND DISPOSAL

ADDENDUM TO DOE/RL-96-17

APPROVAL

RF Guercia
U.S. Department of Energy
Richland Operations Office

Signature

11/19/09
Date

LC Buelow
U.S. Environmental Protection Agency

Signature

11/20/09
Date

WASTE MANAGEMENT PLAN FOR 105-B REACTOR BUILDING FUEL TRANSFER AREA SEDIMENT REMOVAL AND DISPOSAL

ADDENDUM TO DOE/RL-96-17

1.0 BACKGROUND

Construction of the 105-B Reactor began in August 1943 with initial startup of the reactor on September 26, 1944. The reactor was shut down on February 13, 1968.

In the mid-1980s, as detailed in UNI-3958, *Fuel Storage Basins Cleanup and Stabilization Project Report*, the U.S. Department of Energy, Richland Operations Office (DOE-RL) authorized a project to clean up and stabilize the 105-B, 105-C, 105-D, and 105-DR fuel storage basins with the objective to leave the basins in an environmentally safe condition that would not affect the final disposition of the reactor buildings. The fuel storage basins contained water, sediment, material, and equipment left in the basins at the time the reactors were shut down. Because of unexpectedly high radiation levels coming from the sediment in the 105-B Basin, a decision was made to move the basin sediment directly into its fuel transfer pits for interim safe storage.

Two fuel transfer pits (labeled "North" and "South" at 105-B) measuring 6 ft 4 in. by 9 ft are located adjacent to one another at one corner of the fuel storage basin. The transfer pits are 5 ft deeper than the basin and are connected to the basin by a canal over which a monorail system ran.

The transfer of contaminated sediment was performed using a recirculating water system and fire hoses. As described in the project report (UNI-3958), a total of 600 ft^3 of sediment was flushed to the transfer pits and processed through a dewatering system. Approximately 30 ft^3 of the sediment from the transfer pits was collected on a filter press that was used for recirculation of washdown water during flushing. The liquid waste removed from the sediment in the dewatering process was transferred to disposal pond 116-B-15 outside the facility. The sediment collected from the filter press was packaged and removed for disposal at the 200 Area burial grounds. The remaining inventory was stabilized by covering the dewatered sediment in the transfer pits with a plywood cap. Residual contamination on the basin walls and the upper walls of the transfer pits was fixed in place with an asphalt emulsion.

The 105-B fuel storage basin cleanup project was completed in December 1985. The sediment remains in the transfer pits today and is the subject of the waste management plan described below. Also included in this plan is the disposition of the contaminated filter press that remains on the 105-B Basin decking (at grade) near the transfer pits.

2.0 INTRODUCTION

DOE-RL is planning the removal of contaminated filter press and sediment from the fuel transfer area within the 105-B Reactor Building. This action is to include the removal and disposal of

approximately 600 ft^3 of contaminated fuel storage basin sediment that has been stored in the fuel transfer pits since December 1985. This action also includes the disposition of a large metal filter press contaminated with residual fuel storage basin sediments and miscellaneous articles and used equipment (no longer has a substantial source term). The *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD) authorizes the removal and disposal of this waste:

> "Based on the evaluation of CERCLA criteria and NEPA values, the preferred alternative for 100 Area reactor building waste is removal, treatment as required, packaging, transport, and disposal of the waste at the ERDF." (EPA 1999, p. 37)

Washington Closure Hanford (WCH) will be performing the work. In preparation, and with DOE-RL approval, WCH is preparing this addendum to the existing waste management plan contained in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE/RL-96-17, Rev. 5) to address the specific requirements and activities associated with the management of the 105-B fuel transfer area waste for U.S. Environmental Protection Agency (EPA) approval.

In addition, an addendum to the existing air monitoring plan (AMP) contained in the 100-B/C Burial Grounds and Remaining Sites Remedial Action Plan (BHI 2002) will also be prepared and issued as a separate document for EPA approval.

3.0 EXPECTED WASTE STREAMS AND DISPOSITION

Waste will be generated as a result of the cleanup activities associated with the 105-B Reactor fuel transfer area. The expected waste streams include, but are not limited to, the following:

- Low-level radioactive waste (solid and liquid)
- Hazardous/dangerous and mixed wastes
- Nonhazardous solid waste.

3.1 LOW-LEVEL RADIOACTIVE WASTE

The radiological inventory for 105-B transfer pit sediment is shown in Table 1. These values were taken from Calculation No. 0100B-CA-V0321, *TEDE Calculation for Clean Out of the 105-B Fuel Transfer Pit.* The inventory for the fixed contamination on the basin walls is not included in this inventory since it should not be disturbed during the work activities.

Table 1. Radiological Inventory for the 105-B Fuel Transfer Pit.

Nuclide	Inventory (Ci)
Ni-59	5.00E-01
Ni-63	5.15E+01
Co-60	6.10E-01
Sr-90	8.24E+00
Cs-137	9.64E+00
Eu-152	4.54E-01
Eu-154	7.12E-01
U-238	9.00E-03
Pu-238	6.30E-02
Pu-239	1.60E+00
Am-241	4.83E-01
Ba-137m	9.12E+00
Y-90	8.24E+00

Sediment contaminated with these isotopes will be physically removed from the transfer pits, mixed with grout inside containers to immobilize the contaminants, packaged, transported, and disposed of as solid, low-level radioactive waste at the Environmental Restoration Disposal Facility (ERDF). The filter press will be wrapped, packaged, transported, and disposed of as solid, low-level radioactive waste at ERDF. Miscellaneous articles and used equipment will be packaged and disposed of at ERDF.

Water may be used to wash down the pits generating liquid, low-level radioactive waste. All liquid waste treated or disposed of at a location other than B Reactor or ERDF will first be approved by EPA. Possible disposal locations include the Effluent Treatment Facility (ETF) or a facility outside of the Hanford Site. Any remaining contamination in the transfer area/pits will be immobilized by applying fixatives.

3.2 HAZARDOUS/DANGEROUS AND MIXED WASTE

None of the materials associated with the sediment inventory are believed to be hazardous chemicals, solids, or liquids as defined by *Washington Administrative Code* (WAC) 173-303, "Dangerous Waste Regulations." However, hazardous and/or mixed waste may be generated through the cleanup process associated with other items in the fuel storage basing area (e.g., equipment oil/hydraulic fluids, lead shielding, etc.). As wastes are removed, they will be treated and disposed at ERDF in accordance with ERDF Waste Acceptance Criteria. Waste-specific storage and packaging requirements will be described in the contractor's work control documents, as appropriate, to address WAC and U.S. Department of Transportation (DOT) requirements.

3.3 NONHAZARDOUS SOLID WASTE

Miscellaneous solid waste (nonradioactive, nondangerous) may be generated during the cleanup process (e.g., filter paper, personal protective equipment, cloth, plastic, equipment, tools, pumps, wire, metal). This waste will be managed in accordance with WAC 173-350, with an emphasis on recycling. Recyclable materials that are subject to free release from radiologically controlled areas, should be managed in accordance with the Management Plan for Recyclable Materials administered by the Hanford Site Central Consolidated Recycle Center. Any waste containing CERCLA hazardous substances (unless present in de minimus concentrations) may only be transported to an offsite facility that has received approval from the EPA in accordance with 40 CFR 300.440.

4.0 WASTE MANAGEMENT REQUIREMENTS

4.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

40 CFR 300.415(j) requires that applicable or relevant and appropriate requirements (ARARs) be met (or waived) to the extent practicable during the course of removal actions. As outlined in the Remaining Sites ROD (EPA 1999), key ARARs for removal and disposition of 100 Area reactor building materials include substantive requirements from dangerous waste management standards. Waste management activities performed under this remedial action work plan (RAWP) (DOE/RL-96-17) addendum shall be in accordance with the following ARARs:

- The *Toxic Substances Control Act of 1976* (TSCA), as implemented by 40 CFR 761 and WAC 173-303-071(3)(k)
- *Resource Conservation and Recovery Act of 1976* (RCRA), as implemented by 40 CFR 260-268 and WAC 173-303 with regards to management of dangerous waste
- Low-level radioactive waste disposal requirements (10 CFR 61)
- The *Hazardous Material Transportation Act of 1974* (49 U.S.C. 1801 to 1813), as implemented by 49 CFR 100-179 with regards to offsite transportation of hazardous materials.

The requirements specified by the ARARs and other applicable guidance will be addressed in the contractor's procedures or work control documents, including a site-specific waste management instruction. The work control documents will address designation, waste minimization, packaging, handling, marking and labeling, storage, transportation, and treatment as they specifically apply to waste streams associated with this removal action.

4.2 WASTE CHARACTERIZATION AND DESIGNATION

The waste characterization requirements were developed as part of the data quality objectives process. Waste generated will be characterized in accordance with the contractor's procedures, the requirements of the receiving facility, and a waste sampling and analysis plan (WCH 2009).

Characterization will be conducted through process knowledge, sampling/analysis, and radiological and industrial hygiene surveys.

A team of select personnel will inspect the portions of the facilities as the removal action occurs. The inspection will identify suspect chemical/hazardous and radiological materials in order to confirm the waste streams for project planning.

Radiological surveys will be performed using hand-held and/or large-area detection equipment that may be augmented with data logging equipment for record keeping during surveys. Additional advanced characterization equipment (e.g., AIL GammaCam™ M31 gamma-ray/video imaging system, for locating hot spots, or a Canberra In Situ Object Counting System gamma-ray spectrometric system) may be deployed for the rapid, economical, and accurate characterization of materials for radiological contamination.

The data generated as part of waste characterization will be used to develop the following information (as applicable):

- Contaminant identification
- Contaminant concentrations
- Waste treatment requirements
- Waste packaging and disposal requirements
- Worker health and safety conditions
- Decontamination requirements
- Operational precautions
- Waste acceptance documents
- Transportation documents.

Additional characterization may be required based on disposal facility acceptance criteria.

4.3 WASTE MINIMIZATION AND RECYCLING

Waste minimization practices will be followed to the extent technically and economically feasible during all phases of waste management. Waste materials will be recycled, reused, or reclaimed when feasible. To be suitable for recycling or reuse, the materials in question must (1) be needed or in demand, (2) be able to meet the DOE and Hanford Site free release criteria, and (3) not result in an excessive cost to the government. The decision of whether or not the materials meet the criteria will be made by contractor management with input from technical personnel.

Introduction of clean materials into a contamination area and contamination of clean materials will be minimized to the extent practicable. During all phases of waste management, emphasis will be placed on source reduction to eliminate or minimize the volume of wastes that will be generated.

™ GammaCam is a trademark of AIL Systems, Inc., Deer Park, New York.

All materials released offsite for disposal/recycle must be certified free of radiological contamination in accordance with the WCH material release procedures. Waste materials with no or de minimis levels of CERCLA hazardous substances are not considered CERCLA waste and are therefore not subject to the 40 CFR 300.440 offsite acceptability determination.

4.4 BUILDING FOOTPRINT AREA AND ONSITE AREA

The building footprint area (BFA) for this removal action is defined to include the individual facility footprint and the surrounding area needed to support this removal action.

Any waste management locations outside of the BFA and within the onsite area must meet the substantive requirements of all ARARs. For waste management inside the BFA, safe and effective management practices shall be established to ensure protection of human health and the environment. Substantive provisions of waste management ARARs may be used, when appropriate, within the BFA in this regard. Standards for managing waste within and outside the BFA shall be documented in the contractor's work control documents.

For the 105-B Reactor Building fuel transfer area cleanup addressed under this addendum, the onsite area is defined as the 105B building proper and the fenced portion outside and adjacent to the fuel storage basin area. Within the onsite area only the substantive requirements of the ARARs apply.

4.4.1 Staging Piles

As an alternative to storage within the BFA, waste that is not immediately transported to ERDF or other EPA-approved disposal facility may be stored in staging piles. Staging piles used for the onsite management of RCRA hazardous or dangerous waste must be operated in accordance with the standards and design criteria prescribed in 40 CFR 264.554, paragraphs (d) through (k).

Approval of this RAWP Addendum by EPA constitutes general authorization to operate staging piles during the execution of this removal action. Specific staging pile locations will be identified in project drawings and approved by EPA in the unit managers meeting minutes. Field operation of staging piles within the referenced regulatory provisions will be accomplished compliant with the requirements described above.

Once the materials have been removed, to close out the staging pile, samples of the residual soil will be collected in accordance with the SAP. If the sample results exceed the cleanup levels, the area shall be further remediated or deferred to the Field Remediation work following lead regulator concurrence.

4.5 WASTE TREATMENT

Treatment of waste streams may be necessary to provide for safe transport or storage. Treatment may also be required prior to disposal or to meet the appropriate waste acceptance criteria. The type of treatment for RCRA hazardous or dangerous waste and the location of treatment will be determined by DOE and EPA on a case-by-case basis in accordance with the substantive requirements of RCRA and WAC 173-303. Upon EPA approval, solidification, encapsulation,

neutralization, and size reduction/compaction may be employed to treat various wastes. For wastes requiring treatment, the techniques will be documented in a treatment plan approved by EPA.

4.6 WASTE TRANSPORTATION AND SHIPPING

All shipments will be made in accordance with DOT regulations, 49 CFR 171-179, applicable sections of WAC 173-303, and the contractor's waste transportation procedures.

The removal action is expected to require offsite transportation of wastes and potentially contaminated samples. The offsite handling and shipping of wastes and potentially contaminated samples will be in accordance with the *Hazardous Materials Transportation Act of 1974*, as implemented through 49 CFR 100 through 179.

4.7 DISPOSAL

The ERDF is considered "onsite" for the management/disposal of waste resulting from this removal action, thus all waste will be evaluated to determine if the waste meets ERDF waste acceptance criteria for disposal. CERCLA waste disposed of at any disposal facility other than ERDF, including the Effluent Treatment System (ETF) and the Central Waste Facility (CWC), requires EPA approval prior to disposal in accordance with 40 CFR 300.440.

Solid waste may be sent for offsite disposal at a municipal/industrial landfill. Disposal of materials containing no or de minimis levels of CERCLA hazardous substances would not require an offsite acceptability determination per 40 CFR 300.440.

The *Hanford Site Solid Waste Acceptance Criteria* (HNF-0063) identifies criteria for acceptance of waste at the CWC. The *Liquid Waste Processing Facilities Waste Acceptance Criteria* (HNF-3172) identifies criteria for acceptance of waste at the ETF. The *Environmental Restoration Disposal Facility Waste Acceptance Criteria* (WCH-191) and ERDF supplemental waste acceptance criteria (0000X-DC-W0001) provide the waste acceptance criteria for ERDF.

5.0 REFERENCES

10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste," *Code of Federal Regulations*, as amended.

40 CFR 260, "Hazardous Waste Management System: General," *Code of Federal Regulations*, as amended.

40 CFR 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 262, "Standards Applicable to Generators of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste," *Code of Federal Regulations*, as amended.

40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 266, "Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities," *Code of Federal Regulations*, as amended.

40 CFR 267, "Standards for Owners and Operators of Hazardous Waste Facilities Operating Under a Standardized Permit," *Code of Federal Regulations*, as amended.

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.

40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations*, as amended.

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution In Commerce, and Use Prohibitions," *Code of Federal Regulations*, as amended.

49 CFR, "Transportation," *Code Of Federal Regulations*, as amended.

0000X-DC-W0001, 2008, *Supplemental Waste Acceptance Criteria for the Environmental Restoration Disposal Facility*, Rev. 10, Washington Closure Hanford, Richland, Washington.

0100B-CA-V0321, 2009, *TEDE Calculation for Clean Out of the 105-BFuel Transfer Pit*, Rev. 0, Washington Closure Hanford, Richland, Washington.

BHI, 2002, *Air Monitoring Plan for the 100-B/C Burial Grounds and Remaining Sites Remedial Action*, CCN 103979 dated November 25, 2002, Bechtel Hanford, Inc., Richland, Washington.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601, et seq.

DOE/RL-96-17, 2005, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2001-68, 2002, *Removal Action Work Plan and Surveillance and Maintenance Plan for the 105-B Reactor Facility*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1999, *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

Hazardous Materials Transportation Act of 1974, 46 U.S.C. 170, 49 U.S.C. 103, et seq.

HNF-0063, 2006, *Hanford Site Solid Waste Acceptance Criteria*, Rev. 13, Fluor Hanford, Inc., Richland, Washington.

HNF-3172, 2005, *Liquid Waste Processing Facilities Waste Acceptance Criteria*, Rev. 3, Fluor Hanford, Inc., Richland, Washington.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.

UNI-3958, 1986, *Fuel Storage Basins Cleanup and Stabilization Project Report*, UNC Nuclear Industries, Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

WCH-191, 2008, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, Rev. 0, Washington Closure Hanford, Richland, Washington.

ATTACHMENT 1B

WASTE MANAGEMENT PLAN FOR 105-B REACTOR BUILDING FUEL TRANSFER AREA SEDIMENT REMOVAL AND DISPOSAL, REVISION 1

ADDENDUM TO DOE/RL-96-17

APPROVAL

R. F. Guercia
U.S. Department of Energy, Richland Operations Office
Fuel Facilities Shutdown

Signature

10/25/12
Date

Laura Buelow
U.S. Environmental Protection Agency
B Reactor Project Manager

Signature

10/25/12
Date

WASTE MANAGEMENT PLAN FOR 105-B REACTOR BUILDING FUEL TRANSFER AREA SEDIMENT REMOVAL AND DISPOSAL, REVISION 1

ADDENDUM TO DOE/RL-96-17

1.0 BACKGROUND

Construction of the 105-B Reactor began in August 1943 with initial startup of the reactor on September 26, 1944. The reactor was shut down on February 13, 1968.

In the mid-1980s, as detailed in UNI-3958, *Fuel Storage Basins Cleanup and Stabilization Project Report*, the U.S. Department of Energy, Richland Operations Office (DOE-RL) authorized a project to clean up and stabilize the 105-B, 105-C, 105-D, and 105-DR fuel storage basins with the objective to leave the basins in an environmentally safe condition that would not affect the final disposition of the reactor buildings. The fuel storage basins contained water, sediment, material, and equipment left in the basins at the time the reactors were shut down. Because of unexpectedly high radiation levels coming from the sediment in the 105-B Basin, a decision was made to move the basin sediment directly into its fuel transfer pits for interim safe storage.

Two fuel transfer pits (labeled "North" and "South" at 105-B) measuring 6 ft 4 in. by 9 ft are located adjacent to one another at one corner of the fuel storage basin. The transfer pits are 5 ft deeper than the basin and are connected to the basin by a canal over which a monorail system ran.

The transfer of contaminated sediment was performed using a recirculating water system and fire hoses. As described in the project report (UNI-3958), a total of 600 ft^3 of sediment was flushed to the transfer pits and processed through a dewatering system. Approximately 30 ft^3 of the sediment from the transfer pits was collected on a filter press that was used for recirculation of washdown water during flushing. The liquid waste removed from the sediment in the dewatering process was transferred to disposal pond 116-B-15 outside the facility. The sediment collected from the filter press was packaged and removed for disposal at the 200 Area burial grounds. The remaining inventory was stabilized by covering the dewatered sediment in the transfer pits with a plywood cap. Residual contamination on the basin walls and the upper walls of the transfer pits was fixed in place with an asphalt emulsion.

The 105-B fuel storage basin cleanup project was completed in December 1985. The sediment remains in the transfer pits today and is the subject of the waste management plan described below.

2.0 INTRODUCTION

DOE-RL is planning the removal of sediment from the fuel transfer area within the 105-B Reactor Building. This action is to include the removal and disposal of approximately 600 ft^3 of contaminated fuel storage basin sediment that has been stored in the fuel transfer pits since December 1985. This action also includes the disposition of miscellaneous articles and used equipment (no longer has a substantial source term). The *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD) authorizes the removal and disposal of this waste:

> "Based on the evaluation of CERCLA criteria and NEPA values, the preferred alternative for 100 Area reactor building waste is removal, treatment as required, packaging, transport, and disposal of the waste at the ERDF." (EPA 1999, p. 37)

Washington Closure Hanford (WCH) will be performing the work. In preparation, and with DOE-RL approval, WCH is preparing this addendum to the existing waste management plan contained in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE/RL-96-17, Rev. 5) to address the specific requirements and activities associated with the management of the 105-B fuel transfer area waste for U.S. Environmental Protection Agency (EPA) approval.

In addition, an addendum to the existing air monitoring plan (AMP) contained in the 100-B/C Burial Grounds and Remaining Sites Remedial Action Plan (BHI 2002) will also be prepared and issued as a separate document for EPA approval.

3.0 EXPECTED WASTE STREAMS AND DISPOSITION

Waste will be generated as a result of the cleanup activities associated with the 105-B Reactor fuel transfer area. The expected waste streams include, but are not limited to, the following:

- Low-level radioactive waste (solid and liquid)
- Hazardous/dangerous and mixed wastes
- Nonhazardous solid waste.

3.1 LOW-LEVEL RADIOACTIVE WASTE

The radiological inventory for 105-B transfer pit sediment is shown in Table 1. These values were taken from Calculation No. 0100B-CA-V0321, *TEDE Calculation for Clean Out of the 105-B Fuel Transfer Pit*, Revision 1. The inventory for the fixed contamination on the basin walls is not included in this inventory since it should not be disturbed during the work activities.

Table 1. Radiological Inventory for the 105-B Fuel Transfer Pit.

Isotope	Inventory (Ci)
C-14	6.12E-03
Co-60	1.40E-01
Ni-63	6.37E+01
Sr-90	9.33E+00
Y-90 [2]	9.33E+00
Tc-99	9.91E-03
Cs-137	1.59E+01
Ba-137m	1.50E+01
Eu-152	7.47E-01
Eu-154	1.04E-01
Th-232	2.12E-05
U-233	5.11E-03
U-234	1.31E-02
U-235	5.78E-04
U-236	3.25E-04
U-238	1.40E-02
Pu-239/240	1.08E+00
Am-241	5.56E-01

Sediment contaminated with these isotopes will be physically removed from the transfer pits, packaged, transported to the Environmental Restoration Disposal Facility (ERDF), where it will be treated in accordance with *Treatment Plan and Protocol for Treatment of Lead Contaminated Soils* (WCH-252) to immobilize the contaminants (stabilized), and disposed of as solid, low-level radioactive waste. Miscellaneous articles and used equipment will be packaged and disposed of at ERDF.

Water may be used to wash down the pits generating liquid, low-level radioactive waste. All liquid waste treated or disposed of at a location other than B Reactor or ERDF will first be approved by EPA. Possible disposal locations include the Effluent Treatment Facility (ETF) or a facility outside of the Hanford Site. Any remaining contamination in the transfer area/pits will be immobilized by applying fixatives.

3.2 HAZARDOUS/DANGEROUS AND MIXED WASTE

None of the materials associated with the sediment inventory are believed to be hazardous chemicals, solids, or liquids as defined by *Washington Administrative Code* (WAC) 173-303, "Dangerous Waste Regulations." However, hazardous and/or mixed waste may be generated through the cleanup process associated with other items in the fuel storage basing area (e.g., equipment oil/hydraulic fluids, lead shielding, etc.). As wastes are removed, they will be treated

and disposed at ERDF in accordance with ERDF Waste Acceptance Criteria. Waste-specific storage and packaging requirements will be described in the contractor's work control documents, as appropriate, to address WAC and U.S. Department of Transportation (DOT) requirements.

3.3 NONHAZARDOUS SOLID WASTE

Miscellaneous solid waste (nonradioactive, nondangerous) may be generated during the cleanup process (e.g., filter paper, personal protective equipment, cloth, plastic, equipment, tools, pumps, wire, metal). This waste will be managed in accordance with WAC 173-350, with an emphasis on recycling. Recyclable materials that are subject to free release from radiologically controlled areas, should be managed in accordance with the Management Plan for Recyclable Materials administered by the Hanford Site Central Consolidated Recycle Center. Any waste containing CERCLA hazardous substances (unless present in de minimus concentrations) may only be transported to an offsite facility that has received approval from the EPA in accordance with 40 CFR 300.440.

4.0 WASTE MANAGEMENT REQUIREMENTS

4.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

40 CFR 300.415(j) requires that applicable or relevant and appropriate requirements (ARARs) be met (or waived) to the extent practicable during the course of removal actions. As outlined in the Remaining Sites ROD (EPA 1999), key ARARs for removal and disposition of 100 Area reactor building materials include substantive requirements from dangerous waste management standards. Waste management activities performed under this remedial action work plan (RAWP) (DOE/RL-96-17) addendum shall be in accordance with the following ARARs:

- The *Toxic Substances Control Act of 1976* (TSCA), as implemented by 40 CFR 761 and WAC 173-303-071(3)(k)
- *Resource Conservation and Recovery Act of 1976* (RCRA), as implemented by 40 CFR 260-268 and WAC 173-303 with regards to management of dangerous waste
- Low-level radioactive waste disposal requirements (10 CFR 61)
- The *Hazardous Material Transportation Act of 1974* (49 U.S.C. 1801 to 1813), as implemented by 49 CFR 100-179 with regards to offsite transportation of hazardous materials.

The requirements specified by the ARARs and other applicable guidance will be addressed in the contractor's procedures or work control documents, including a site-specific waste management instruction. The work control documents will address designation, waste minimization, packaging, handling, marking and labeling, storage, transportation, and treatment as they specifically apply to waste streams associated with this removal action.

4.2 WASTE CHARACTERIZATION AND DESIGNATION

The waste characterization requirements were developed as part of the data quality objectives process. Waste generated will be characterized in accordance with the contractor's procedures, the requirements of the receiving facility, and a waste sampling and analysis plan (WCH 2009). Characterization will be conducted through process knowledge, sampling/analysis, and radiological and industrial hygiene surveys.

A team of select personnel will inspect the portions of the facilities as the removal action occurs. The inspection will identify suspect chemical/hazardous and radiological materials in order to confirm the waste streams for project planning.

Radiological surveys will be performed using hand-held and/or large-area detection equipment that may be augmented with data logging equipment for record keeping during surveys. Additional advanced characterization equipment (e.g., AIL GammaCam™ M31 gamma-ray/video imaging system, for locating hot spots, or a Canberra In Situ Object Counting System gamma-ray spectrometric system) may be deployed for the rapid, economical, and accurate characterization of materials for radiological contamination.

The data generated as part of waste characterization will be used to develop the following information (as applicable):

- Contaminant identification
- Contaminant concentrations
- Waste treatment requirements
- Waste packaging and disposal requirements
- Worker health and safety conditions
- Decontamination requirements
- Operational precautions
- Waste acceptance documents
- Transportation documents.

Additional characterization may be required based on disposal facility acceptance criteria.

4.3 WASTE MINIMIZATION AND RECYCLING

Waste minimization practices will be followed to the extent technically and economically feasible during all phases of waste management. Waste materials will be recycled, reused, or reclaimed when feasible. To be suitable for recycling or reuse, the materials in question must (1) be needed or in demand, (2) be able to meet the DOE and Hanford Site free release criteria, and (3) not result in an excessive cost to the government. The decision of whether or not the materials meet the criteria will be made by contractor management with input from technical personnel.

™ GammaCam is a trademark of AIL Systems, Inc., Deer Park, New York.

Introduction of clean materials into a contamination area and contamination of clean materials will be minimized to the extent practicable. During all phases of waste management, emphasis will be placed on source reduction to eliminate or minimize the volume of wastes that will be generated.

All materials released offsite for disposal/recycle must be certified free of radiological contamination in accordance with the WCH material release procedures. Waste materials with no or de minimis levels of CERCLA hazardous substances are not considered CERCLA waste and are therefore not subject to the 40 CFR 300.440 offsite acceptability determination.

4.4 BUILDING FOOTPRINT AREA AND ONSITE AREA

The building footprint area (BFA) for this removal action is defined to include the individual facility footprint and the surrounding area needed to support this removal action.

Any waste management locations outside of the BFA and within the onsite area must meet the substantive requirements of all ARARs. For waste management inside the BFA, safe and effective management practices shall be established to ensure protection of human health and the environment. Substantive provisions of waste management ARARs may be used, when appropriate, within the BFA in this regard. Standards for managing waste within and outside the BFA shall be documented in the contractor's work control documents.

For the 105-B Reactor Building fuel transfer area cleanup addressed under this addendum, the onsite area is defined as the 105B building proper and the fenced portion outside and adjacent to the fuel storage basin area. Within the onsite area only the substantive requirements of the ARARs apply.

4.4.1 Staging Piles

As an alternative to storage within the BFA, waste that is not immediately transported to ERDF or other EPA-approved disposal facility may be stored in staging piles. Staging piles used for the onsite management of RCRA hazardous or dangerous waste must be operated in accordance with the standards and design criteria prescribed in 40 CFR 264.554, paragraphs (d) through (k).

Approval of this RAWP Addendum by EPA constitutes general authorization to operate staging piles during the execution of this removal action. Specific staging pile locations will be identified in project drawings and approved by EPA in the unit managers meeting minutes. Field operation of staging piles within the referenced regulatory provisions will be accomplished compliant with the requirements described above.

Once the materials have been removed, to close out the staging pile, samples of the residual soil will be collected in accordance with the SAP. If the sample results exceed the cleanup levels, the area shall be further remediated or deferred to the Field Remediation work following lead regulator concurrence.

4.5 WASTE TREATMENT

Treatment of waste streams may be necessary to provide for safe transport or storage. Treatment may also be required prior to disposal or to meet the appropriate waste acceptance criteria. The type of treatment for RCRA hazardous or dangerous waste and the location of treatment will be determined by DOE and EPA on a case-by-case basis in accordance with the substantive requirements of RCRA and WAC 173-303. Upon EPA approval, solidification, encapsulation, neutralization, and size reduction/compaction may be employed to treat various wastes. For wastes requiring treatment, the techniques will be documented in a treatment plan approved by EPA.

4.6 WASTE TRANSPORTATION AND SHIPPING

All shipments will be made in accordance with DOT regulations, 49 CFR 171-179, *Hanford Sitewide Transportation Safety Document* (DOE/RL-2001-36), applicable sections of WAC 173-303, and the contractor's waste transportation procedures.

The removal action is expected to require offsite transportation of wastes and potentially contaminated samples. The offsite handling and shipping of wastes and potentially contaminated samples will be in accordance with the *Hazardous Materials Transportation Act of 1974*, as implemented through 49 CFR 100 through 179.

4.7 DISPOSAL

The ERDF is considered "onsite" for the management/disposal of waste resulting from this removal action, thus all waste will be evaluated to determine if the waste meets ERDF waste acceptance criteria for disposal. CERCLA waste disposed of at any disposal facility other than ERDF, including the Effluent Treatment System (ETF) and the Central Waste Facility (CWC), requires EPA approval prior to disposal in accordance with 40 CFR 300.440.

Solid waste may be sent for offsite disposal at a municipal/industrial landfill. Disposal of materials containing no or de minimis levels of CERCLA hazardous substances would not require an offsite acceptability determination per 40 CFR 300.440.

The *Hanford Site Solid Waste Acceptance Criteria* (HNF-EP-0063) identifies criteria for acceptance of waste at the CWC. The *Liquid Waste Processing Facilities Waste Acceptance Criteria* (HNF-3172) identifies criteria for acceptance of waste at the ETF. The *Environmental Restoration Disposal Facility Waste Acceptance Criteria* (WCH-191) and ERDF supplemental waste acceptance criteria (0000X-DC-W0001) provide the waste acceptance criteria for ERDF.

5.0 REFERENCES

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40 CFR 260, "Hazardous Waste Management System: General," *Code of Federal Regulations*, as amended.

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40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste," *Code of Federal Regulations*, as amended.

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ATTACHMENT 2

WCH-353
Rev. 0

River Corridor Closure Contract

Sampling and Analysis Plan for the 105-B Reactor Transfer Pit Sediment and Filter Press

September 2009

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor

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The approval signatures on this page indicate that this document has been authorized for information release to the public through appropriate channels. No other forms or signatures are required to document this information release.

WCH-353
Rev. 0

River Corridor Closure Contract

Sampling and Analysis Plan for the 105-B Reactor Transfer Pit Sediment and Filter Press

September 2009

Author:
W. S. Thompson

Washington Closure Hanford

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Assistant Manager for River Corridor

EXECUTIVE SUMMARY

This sampling and analysis plan (SAP) presents the strategy and procedures for sampling and analysis activities to support waste management decisions associated with disposition of the filter press located at 105-B Reactor and removal and disposal of sediment located in the 105-B transfer pits.

Section 1.0 presents project background information, a description of the waste, and a summary of the data quality objectives for sampling. Section 2.0 presents the quality assurance project plan, as well as the procedures and guidelines needed to provide data of known and appropriate quality. Section 3.0 presents the field sampling plan to ensure collection of representative data of known quality. Section 4.0 discusses management of sampling-related waste, and Section 5.0 discusses health and safety requirements.

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ACRONYMS

D4	deactivation, decontamination, decommissioning, and demolition
COPC	contaminant of potential concern
DOE	U.S. Department of Energy
DQO	data quality objective
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
FR	*Federal Register*
FSB	fuel storage basin
QA	quality assurance
QC	quality control
QAPjP	quality assurance project plan
ROD	record of decision
S&M	surveillance and maintenance
SAF	sample authorization form
SAP	sampling and analysis plan
SM&U	Surveillance, Maintenance and Utilities
WCH	Washington Closure Hanford

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	millibecquerel	millibecquerels	0.027	picocuries

1.0 INTRODUCTION

This sampling and analysis plan (SAP) describes the rationale and strategy that will be used to characterize the sediment located in the transfer pits at the 105-B Reactor. The resulting data will be used to support development of the waste profile and evaluate engineering designs for removing the sediment from the transfer pits and packaging the sediment for final disposition. The requirements for characterization to support disposition of the filter press and several miscellaneous legacy waste items located in the 105-B Reactor Fuel Storage Basin (FSB) transfer area (room 410) are also provided. The sediment and filter press are scheduled for removal and disposal no later than September 2011, with current plans for disposal at the Environmental Restoration Disposal Facility (ERDF).

This section provides background information, a summary of the results from previous investigations, a list of contaminants of potential concern (COPCs), and a summary of data quality objectives (DQOs).

1.1 BACKGROUND INFORMATION

The 105-B Facility is located in the 100-B/C Area of the Hanford Site and was one of four areas that were placed on the U.S. Environmental Protection Agency's (EPA) National Priorities List in November 1989, under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980.* The 100-B/C Area contains two inactive reactors: the B Reactor and the C Reactor. The decommissioning alternative selected for the eight surplus reactors at the Hanford Site was safe storage of the reactors followed by deferred (approximately 70 to 75 years) one-piece removal of the reactor block and disposal at the Hanford Site's 200 West Area as documented in the Environmental Impact Statement (EIS) (DOE 1992). The C Reactor has undergone a removal action for Interim Safe Storage and now exists in a safe storage enclosure under the long-term surveillance and maintenance (S&M) program. The B Reactor is currently managed under the S&M program to ensure continued protection of the public and the environment during the safe storage period until decommissioning is initiated, as documented in the EIS (DOE 1992) and Record of Decision (ROD) (58 *Federal Register* [FR] 48509).

An engineering evaluation/cost analysis for the 105-B Reactor was prepared to evaluate removal action alternatives, including historic preservation, and to facilitate disposal of generated waste (DOE-RL 2001). The engineering evaluation/cost analysis resulted in a recommendation for mitigation of hazards to allow for public access to portions of the 105-B Facility while maintaining surveillance and maintenance for the remainder of the facility. The recommendation was approved in the action memorandum for the 105-B Reactor (EPA 2002a) signed by the EPA and the U.S. Department of Energy (DOE). The *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2005) supports implementation of the removal action scope, objectives, technical approach, and compliance with applicable regulatory and technical requirements, as necessary and appropriate. The *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Richland, Washington* (EPA 1999) identifies the selected alternative for disposal of hazardous and radioactive equipment and debris from the 105-B Reactor Building at ERDF.

1.1.1 Historical Significance of the 105-B Facility

Groundbreaking for construction of 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 end World War II. The reactor was fully constructed and operational in 16 months. The reactor achieved full power on February 4, 1945, and 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, which hastened the end of World War II five days later. The 105-B Facility operated until final shutdown on February 12, 1968. In addition to its legacy as a plutonium production reactor, the 105-B Facility produced tritium for weapons in America's nuclear arsenal.

Because of its historical significance, the 105-B Facility is listed in the National Register of Historic Places and is designated a national Historic Civil Engineering Landmark. Since the late 1980s, guided tours have been led through portions of the 105-B Facility. 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.

A decision to preserve some or all portions of the 105-B Facility for public access could ultimately conflict with the decision to remove the reactor block in approximately 70 to 75 years as determined in the EIS (DOE 1992) and ROD (58 FR 48509). Should such a historical preservation decision be made, the ROD for reactor block disposition would need to be revisited. Future reviews by the DOE will be required to define the final configuration of the B Reactor Museum.

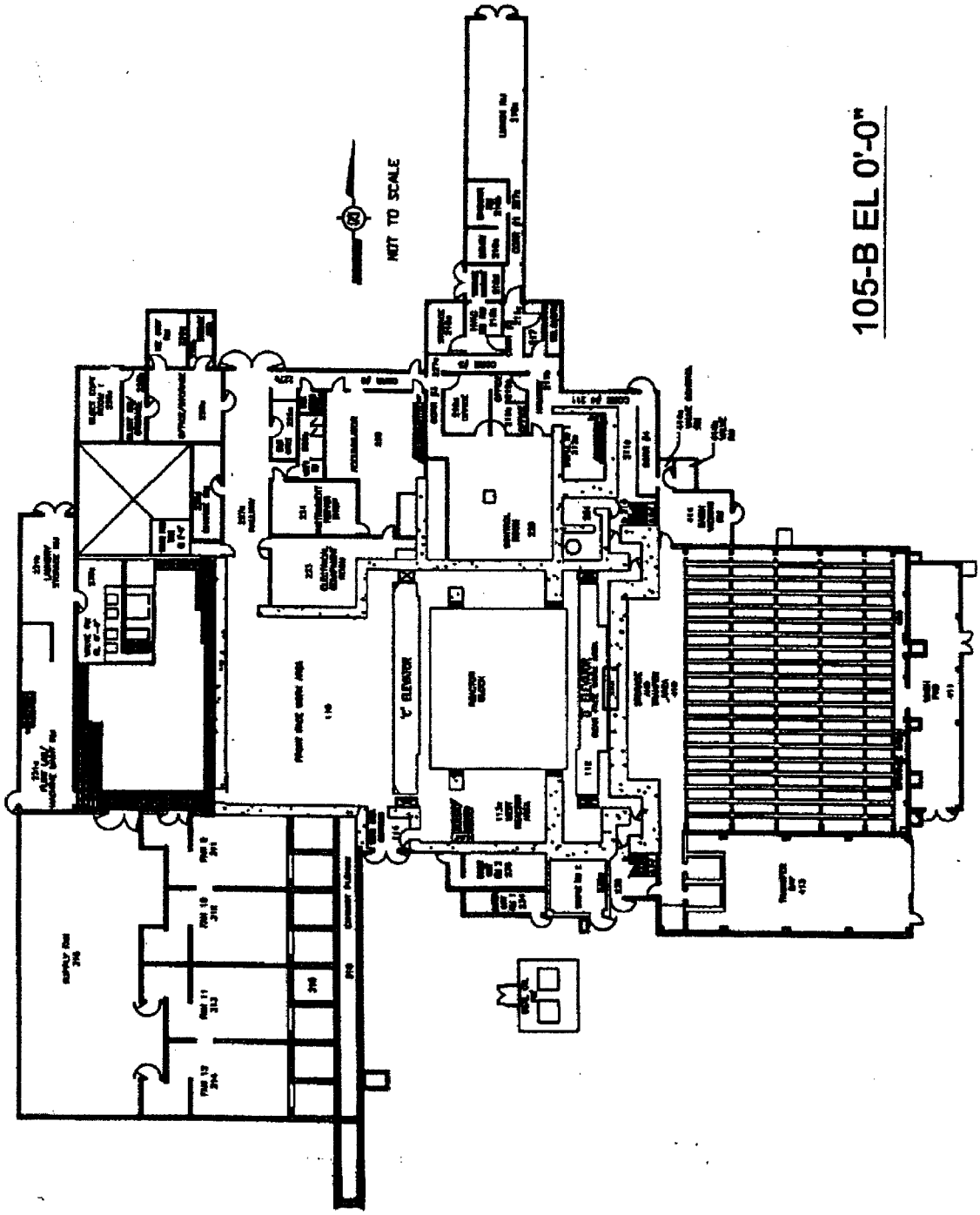
1.1.2 Facility Description

The 105-B Facility has been deactivated. Deactivation included de-energizing of nonessential electrical sources and equipment, preservation of tools and equipment, routine housekeeping, radiological surveys, and application of fixatives to many contaminated surfaces. The facility has not been fully decontaminated. The *105-B Reactor Facility Museum Phase 1 Feasibility Study Report* (BHI 1995) and the *Hanford B Reactor Building Hazard Assessment Report* (BHI 1999) document the status of these hazards within the facility.

The 105-B Facility contains a reactor block, a control room, a spent fuel discharge area, an FSB, fans and ducts for ventilation and recirculating inert gas systems, water-cooling systems, support offices, shops, and laboratories (Figure 1-1). The reactor facility is a steel reinforced concrete and concrete block structure. Within the reactor facility, massive reinforced concrete walls (0.9 to 1.5 m [3 to 5 ft] thick) extend upward to the height of the reactor block to provide shielding, with the upper sections constructed of concrete block. Asbestos, radiological, and hazardous material contamination exists in the building.

In recent years, guided public tours have been conducted on a tour route through a controlled portion of the building, which has been deemed safe for supervised public entry. Public access is restricted to the front-face work area, control room, and control room offices on the current tour route. Entry requirements are imposed because hazardous substances have been detected outside of the existing tour route during facility walkdowns and radiological surveys.

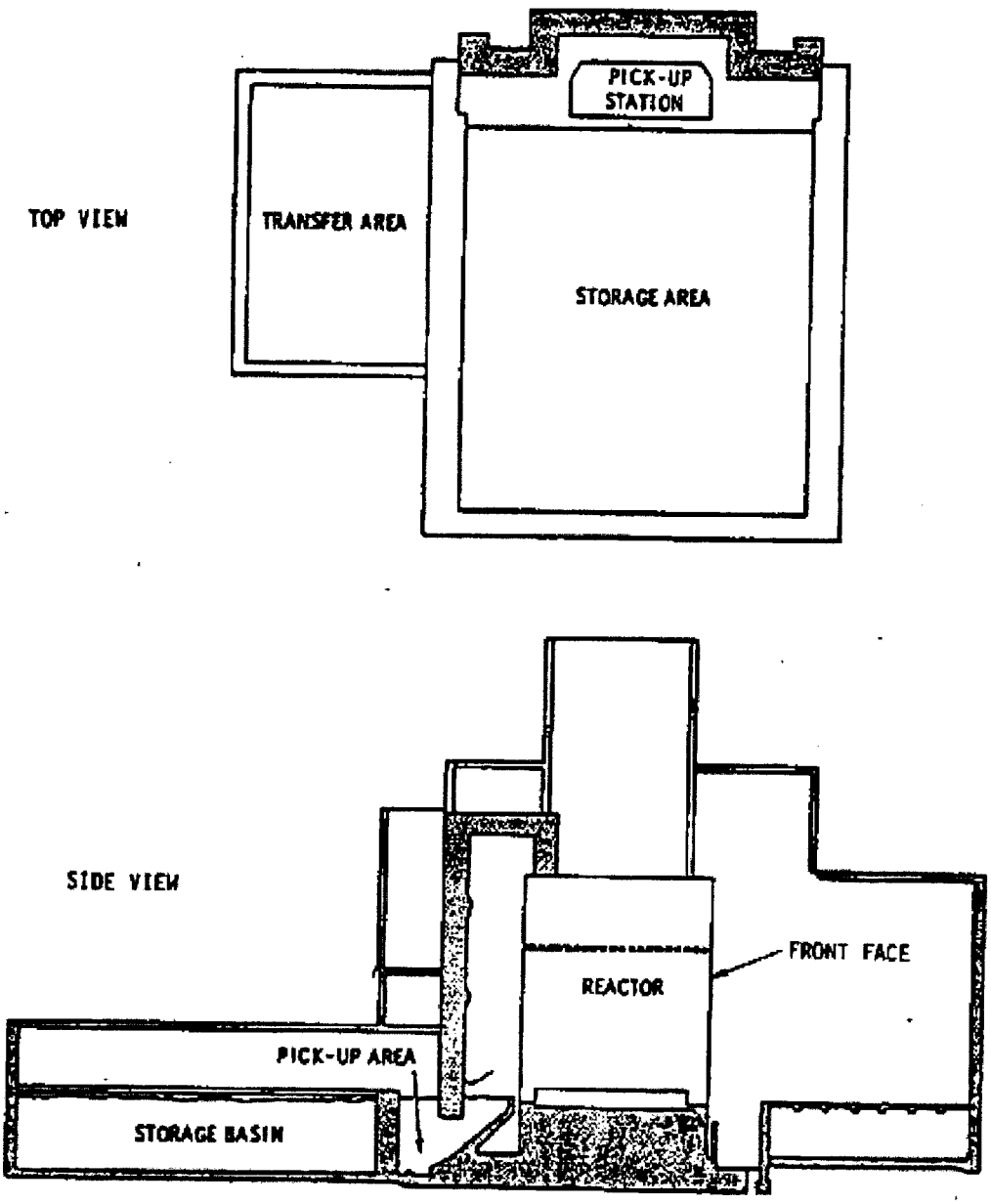
Figure 1-1. Ground Floor of the 105-B Reactor Facility.



1.1.3 Fuel Storage Basin and Transfer Area

The 105-B FSB and transfer area (room 410) is located east of the rear face of the reactor (Figure 1-1), separated from the reactor block by a 1.5-m (5-ft)-thick concrete wall. The FSB served as an underwater collection, storage, and transfer facility for the irradiated fuel elements discharged from the reactor. The water in the basin provided cooling and shielding for the spent fuel and a secure place to allow short-lived isotopes to decay. The FSB consisted of a fuel element pickup area, storage area, transfer area, and a wash pad area (Figure 1-2). The total floor area for these components averages between 650 and 930 m^2 (7,000 and 10,000 ft^2).

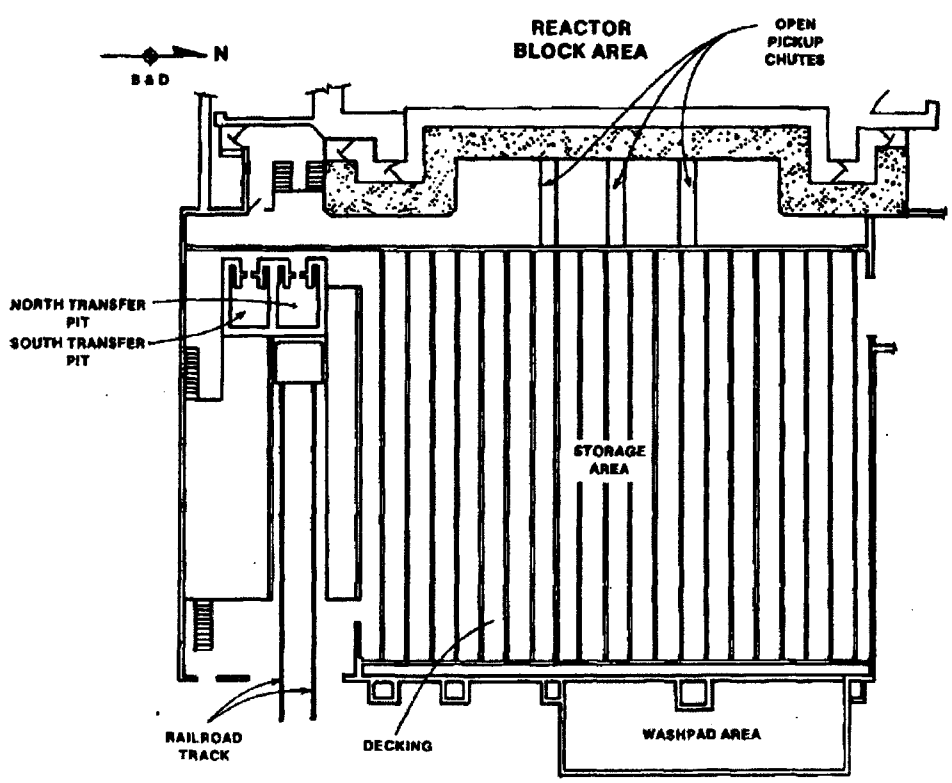
Figure 1-2. Layout of Reactor Fuel Storage Basin.



1.1.3.1 FSB Cleanup and Stabilization. In the mid-1980s, a decision was made to clean up and stabilize the 105-B, 105-C, 105-D, and 105-DR FSBs (UNI 1986). Contaminated water, sediment, materials, and equipment were removed to reduce the potential for a loss of contamination control and to minimize surveillance and maintenance of the facilities while waiting for final decommissioning. The objective was to leave the basins in a condition that would not affect final decommissioning for final disposition of the reactor buildings.

The 105-B FSB measured 22 by 29 by 6 m (72 by 94 by 20 ft) and had a water depth of 1.5 m (5 ft) (or about 946,353 L [250,000 gal]) at the time cleanup began (Figure 1-3). A heavy layer of scum from dust and algae had accumulated over the years. The transfer area contained a special railroad car that was removed outside to allow cleanup of the area. An inventory of the materials and equipment identified in the FSB included 41 fuel buckets, 60 perforated spacers (perfs), and 13 solid aluminum pieces. In addition, other miscellaneous debris was noted. A radiological survey of the basin area above the water prior to cleanup indicated dose rates of less than 100 mR/hr, with hot spots ranging between 400 to 800 mR/hr and up to several R/hr. An extreme hot spot of 150 R/hr was found near what appeared to be a ruptured fuel element inside an aluminum canister. The isolated canister read 500 R/hr on contact when removed from the water. Dose rates to personnel in working areas were less than 1 mR/hr due to shielding by the basin water and distance to the work platform. Sediment in the FSB was estimated at 2.5 to 5.1 cm (1 to 2 in.) and appeared to be mostly iron oxides and silt that varied in size from microscopic to 2.5 cm (1 in.) in diameter. The material was very fine grained and easily disturbed, which obscured visibility of underwater items.

Figure 1-3. Schematic of 105-B Reactor FSB Area.

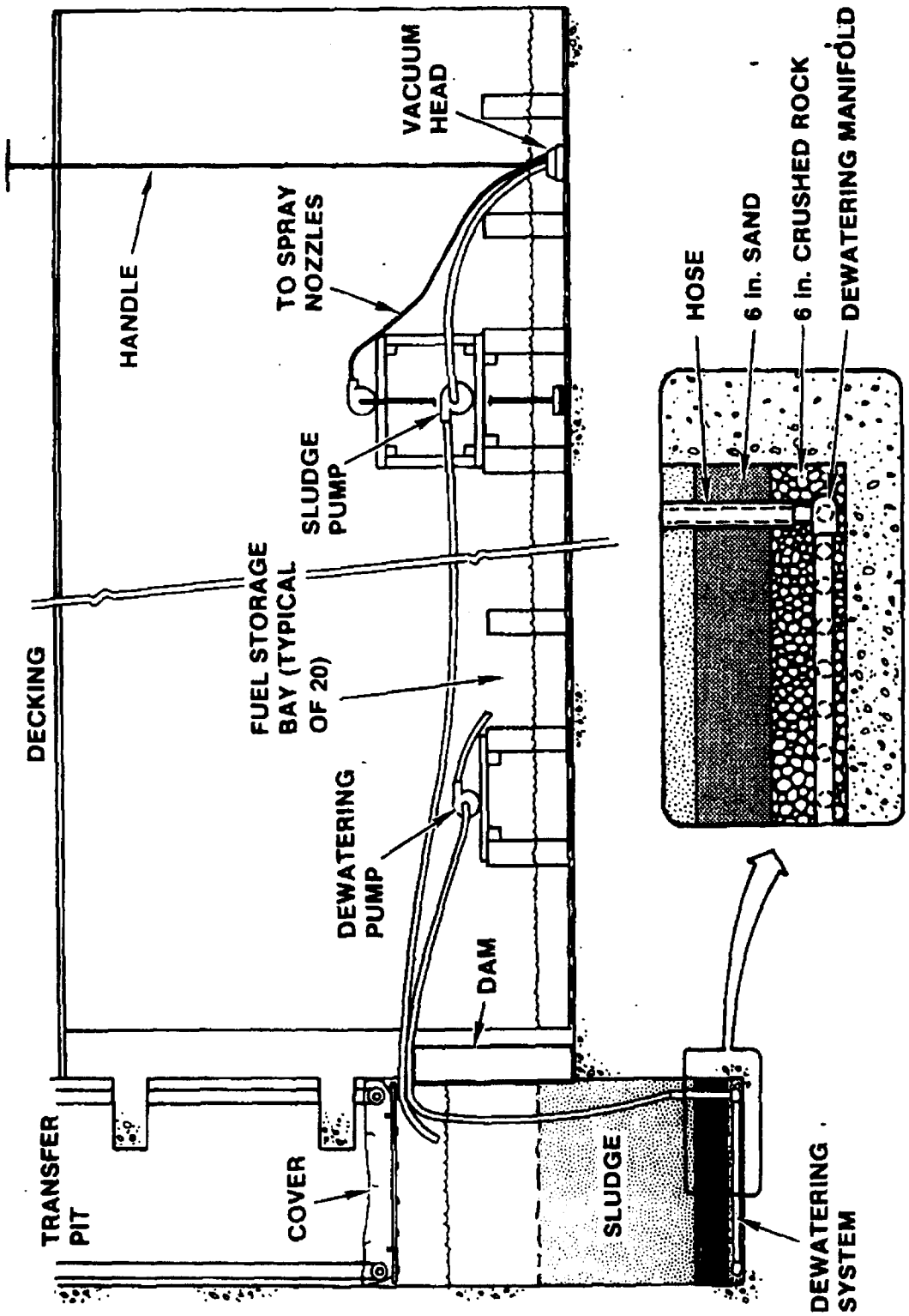


Small material/equipment removal began at the 105-B basin in early 1984 (UNI 1984). Equipment and hardware that would fit into the fuel storage buckets and having a dose rate less than 200 mR/hr was removed. In November 1984, during cleanout of the 105-B FSB, higher dose rates than expected were encountered and a decision was made to store the FSB sediment in the transfer pits (Figure 1-3) rather than package the material for shipment to the 200 Areas for burial. A dewatering system (Figure 1-4) that used ion-exchange columns was placed in the transfer pits prior to sediment transfer with the water returned to the FSB and eventually discharged to the 116-B-15 FSB Cleanout Percolation Pond. Before discharging the water to the percolation pond, composite samples were taken to ensure that radionuclide concentrations were below release criteria specified in Table II of DOE Order 5480.1. A filter press was used to collect sediment resulting from recirculation of wash-down water from the transfer pits. Approximately 1.7 m^3 (60 ft^3) of sediment was removed from the filter press and disposed at the 200 Area burial grounds. It is estimated that approximately 17 m^3 (600 ft^3) equivalent to 50,000 kg (55 tons) of sediment exists in the 105-B transfer pits. A layer of 0.3 to 0.9 m (1 to 3 ft) of sand was reportedly placed over the sediment in the transfer pits for shielding. Unshielded dose rates were reported to be 1 R/hr on contact at each pit. Plywood covers were then placed over the transfer pits. The work was completed in December 1985. Cleaning and sealing of the concrete surfaces of the 105-B FSB was completed on January 31, 1986. Photographs of the FSB and transfer pits taken during the sediment removal activities are provided in Figures A-1 though A-5 (Appendix A).

1.1.3.2 105-B Legacy Waste. From April to September 1999, legacy waste materials located in the 105-B Reactor Facility were inventoried, packaged, and prepared for disposal to support efforts to reduce surveillance and maintenance of the facility. This waste legacy waste was defined as any item present in the facility that was not permanently attached to the facility and easily removed without the aid of equipment larger than a standard forklift (DOE-RL 1999). Equipment that was bolted, welded, or otherwise permanently attached to structures or systems was not considered legacy waste. The contaminated filter press (located in the transfer bay), used in 1984 for dewatering of the sediment was included in the scope of items for disposal. On June 8, 1999, a work crew entered the transfer bay to unwrap the filter press for inspection and draining of the oil from the press. The work was suspended when removable contamination levels up to 750,000 dpm/100 cm^2 beta/gamma, exceeding the radiation work permit, were identified (DOE 2000). The contamination was fixed with yellow paint. The sediment has been previously removed from the filter press; however, oil if present in hydraulic systems will require draining and characterization for disposal. Figure A-6 shows the filter press as it currently exists in the 105-B transfer room.

A walkdown of the FSB and transfer room area was performed on August 17, 2009. Additional legacy waste items were observed staged within the area and will require disposal. These items include lead sheeting and bricks and a few miscellaneous equipment items and containers. Figures A-7 and A-8 are photographs showing lead bricks and container items that were identified during the walk down. The *Sampling and Analysis Plan for Disposition of the Standing Legacy Wastes in the 105-B, - D, -H, -KE, and –KW Reactor Buildings* (DOE-RL 1999) will be used to disposition these waste items.

Figure 1-4. Transfer Pit Containment Design.



1.2 PREVIOUS INVESTIGATIONS

Characterization samples of the sediment and water in the 105-B FSB were collected in April 1975 and indicated the presence of plutonium-238 and plutonium-239/240. A sediment sample was collected from the technical viewing pit, the elevation chute, the pickup chute, and the transfer area. A maximum of 9.5 x 10^4 pCi/g of plutonium-239/240 was detected in a sediment sample taken from the 105-B basin pickup chute. Average plutonium-239/240 concentrations for the 105-B basin sediment were approximately 3.0 x 10^4 pCi/g. The primary radionuclides present in the sediment were strontium-90, europium-152, europium-154, europium-155, cobalt-60, cesium-137, and nickel-63. Process knowledge for handling of the fuel in the FSB suggests that the pickup chute area (Figure 1-2) would have the highest radiological activity in sediment samples and this is indicated in the sample results. Table 1-1 provides a summary of the April 1975 sediment sample results.

Characterization samples of FSB sediment were collected at 105-C and 105-N to support waste removal and disposal. A grab sample from each of the two transfer pits at 105-C was collected in September 1994 (DOE-RL 1997, Palmquist 1997). Several sampling events for the 105-N FSB sediment have been performed. In 1987, multiple sediment samples were collected from across the floor of the 105-N FSB to support evaluation of sampling methodologies for FSB sediment (Subrahmanyam 1988). The 105-N FSB sediment was also sampled in 1997 to support engineering and waste management decisions (RFS 1997). These data provide additional information concerning the chemical and radiological composition for FBS sediment and are useful to support identification of COPCs final disposition of the 105-B sediment.

Table 1-1. 105-B Sediment Sample Results (April 1975).

Sample Location	Pu-238 (pCi/g)	Pu-239/240 (pCi/g)	Sr-90 (pCi/g)	H-3 (pCi/g)	Eu-155 (pCi/g)	Cs-137 (pCi/g)	Eu-154 (pCi/g)	Co-60 (pCi/g)	Eu-152 (pCi/g)	U (pCi/g)	Ni-63 (pCi/g)
Technical viewing pit	$8.0x10^2$	$1.7x10^4$	$4.3x10^4$	$1.2x10^2$	$5.7x10^4$	$3.6x10^5$	$2.6x10^5$	$8.7x10^5$	$4.1x10^3$	$1.3x10^2$	Not analyzed
Dummy elevator chute	$5.0x10^1$	$1.3x10^4$	$6.2x10^5$	$1.1x10^2$	$4.5x10^4$	$2.9x10^5$	$2.4x10^5$	$8.6x10^5$	$4.0x10^4$	$1.3x10^2$	Not analyzed
Pickup chute	$5.0x10^3$	$9.5x10^4$	$7.3x10^4$	$2.1x10^3$	$4.4x10^4$	$7.9x10^5$	$9.2x10^4$	$5.0x10^5$	$6.5x10^4$	$3.6x10^2$	Not analyzed
Transfer area	$1.9x10^2$	$4.0x10^3$	$2.2x10^4$	$6.1x10^1$	$1.8x10^4$	$1.1x10^5$	$1.6x10^5$	$9.5x10^5$	$7.8x10^4$	$9.4x10^1$	$1.2x10^6$

1.3 CONTAMINANTS OF POTENTIAL CONCERN

Process knowledge and historical information associated with sampling of the 105-B FSB sediment and other reactor FSB sediment was used to support development of the COPCs. Radionuclides in the sediment originated from process tube scale and from failed fuel elements that were discharged into the basin. The sediment accumulated on the floor of the basin over the years and is the primary source of the inventory in the transfer pits. Radionuclide COPCs were further identified using results of the ORIGEN2™ Code for reactor fuel. The COPCs for the 105-B sediment are provided in Table 1-2. These COPCs are also applicable to support

disposition of the filter press. With the exception of polychlorinated biphenyls, volatile and semi-volatile organic compounds are not COPCs for the FSB sediment, as they have not been identified in historical sampling of other reactor FSB sediment.

The COPCs for oil, if present in the filter press and miscellaneous waste items and containers in the FSB area, are identified in the 105-B legacy waste SAP (DOE-RL 1999).

Table 1-2. Contaminants of Potential Concern for the 105-B Sediment. (2 Pages)

COPC	Rationale for Inclusion
Radiological Constituents	
Americium-241	Known product of reactor operations.
Antimony-125	Known fission product.
Carbon-14	Known product of reactor operations.
Cesium-137	Known fission product.
Cobalt-60	Known activation product.
Europium-152	Known fission product.
Europium-154	Known fission product.
Europium-155	Known fission product.
Nickel-63	Known activation product.
Plutonium-238	Known product from fission reaction.
Plutonium-239/240	Known production from fission reaction.
Radium-226	Needed for waste designation.
Radium-228	Needed for waste designation.
Strontium-90	Known fission product. Analyzed as total radioactive strontium.
Technetium-99	Known fission product.
Thorium-232	Reactor fuel/target component.
Tritium	Known product of reactor operations.
Uranium-234	Reactor fuel component.
Uranium-235	Reactor fuel component.
Uranium-238	Reactor fuel component.
Nonradiological Constituents – Metals	
Arsenic	Needed for waste designation.
Barium	Needed for waste designation.
Beryllium	Needed for waste designation.
Boron	Needed for waste designation.
Cadmium	Needed for waste designation.
Chromium	Sodium dichromate used for water treatment.
Lead	Used for shielding; present in facility materials.
Mercury	Suspected to be present in facility components.
Selenium	Needed for waste designation.
Silver	Needed for waste designation.

Table 1-2. Contaminants of Potential Concern for the 105-B Sediment. (2 Pages)

COPC	Rationale for Inclusion
Nonradiological Constituents – General Inorganics	
Asbestos	May be present in building materials.
Organic Compounds	
PCBs	Contaminant found in other FSB sediment.
Waste Characteristics	
Corrosivity	May be needed for waste designation.
Physical Parameters	
Moisture content	Needed to support engineering design.
Density	Needed to support engineering design.

COPC = contaminant of potential concern
FSB = fuel storage basin
PCB = polychlorinated biphenyl

1.4 DATA QUALITY OJECTIVES

The *Guidance for Data Quality Objectives Process* (EPA 2000) was used to support development of this SAP. The DQO guidance provides a strategic planning approach using a systematic method for defining data collection and sampling design criteria. Using the DQO process ensures that the type, quantity, and quality of environmental data used in decision making will be appropriate for the intended application.

1.4.1 Problem Definition

The filter press and sediment located in the 105-B transfer pits require removal and disposal. Information concerning radionuclide activity and chemical contaminant concentrations is needed to support disposal. Information concerning the physical condition of the sediment is needed to support engineering designs for retrieval of the sediment from the transfer pits. Miscellaneous legacy waste items may require characterization on an individual basis to support disposal.

The primary disposal option for the waste is the ERDF. The ERDF waste acceptance criteria address the radiological, chemical, and physical forms of waste (WCH 2008).

1.4.2 Project Assumptions

1. The project has extensive process knowledge and historical characterization data associated with sediments in 100 Area reactor FSBs. Radiological and chemical data are available for FSB sediment that was sampled during removal at the 105-C and 105-N Reactors.

2. The sediment in the transfer pits should be relatively homogeneous horizontally because of the system used for transferring the material from the FSB into the transfer pits. However, vertical layers are likely present after settling of the particulates.

3. Previous radiological surveys of the filter press are adequate and will be used as needed for disposal of the filter press.

4. Miscellaneous legacy waste items (e.g., lead sheeting, lead bricks, containers) present in the transfer bay area will be characterized as needed using the legacy waste SAP (DOE-RL 1999).

1.4.3 Decision Statements

The following decision statements are associated with final disposition of the waste associated with this waste removal activity:

1. Estimate the volume of sediment remaining in each transfer pit requiring removal and disposal.

2. Determine the physical condition of the sediment to support engineering design for removal of the sediment.

3. Determine the chemical concentration and radionuclide activity of the sediment to support disposal of the sediment in the transfer pits.

4. Determine if the sediment is land disposal restricted and will require treatment to support disposal.

5. Verify that the sediment in the transfer pits is not transuranic.

6. Determine the chemical concentration and radionuclide activity of residual oil, if present in the filter press. Support disposal of the oil and the filter press.

7. Determine the chemical concentration and radionuclide activity to support disposal of legacy waste items located in the FSB area.

1.4.4 Required Inputs for Decision Making

The following inputs related to data collection are needed to resolve each decision statement identified in Section 1.4.3:

1. In order to estimate the volume of sediment remaining in each transfer pit, field observations and measurements of the depth of the sediment will be collected.

2. In order to determine the physical condition of the sediment to support engineering design for removal of the sediment, field observations during sampling will be recorded and samples of the sediment will be collected for moisture content and density analysis.

3. In order to support disposal of the sediment, a sample will be collected from within each of the two transfer pits and analyzed for the COPCs in Table 1-2.

4. In order to determine if the sediment is land disposal restricted and will require treatment to support disposal, samples of the sediment will be analyzed for toxicity characteristic leachable metals.

5. In order to verify that the sediment in the transfer pits is not transuranic, samples of the sediment will be analyzed for transuranic radionuclides.

6. In order to support disposal of the filter press oil, if present, will be drained and sampled. The press will be characterized using radiological field survey measurements.

7. In order to support disposal of miscellaneous legacy waste, the sampling and analysis specified in DOE-RL (1999) for legacy waste will be used to support disposal.

1.4.5 Sample Design Summary

1.4.5.1 Filter Press. Process knowledge and radiological survey information will be used to characterize the filter press for disposal. Oil, if present in hydraulic systems, will be drained and collected for sampling. One representative sample of the oil will be collected and analyzed as described in the legacy waste SAP (DOE-RL 1999).

1.4.5.2 Sediment. A focused (biased) sample design was selected to characterize the sediment in each of the two transfer pits. The sediment in the transfer pits should be relatively homogeneous horizontally because of the system used for transferring the material from the FSB into the transfer pits. However, vertical layers are likely present after settling of the particulates. Therefore, one vertical composite sample will be collected from within each transfer pit and submitted for analysis of the COPCs.

1.4.5.3 Miscellaneous Legacy Waste. Legacy waste items that require characterization to support disposal will be sampled as specified in the legacy waste SAP (DOE-RL 1999). It is anticipated that most waste items will not require sampling will be designated for disposal using process knowledge and radiological survey information.

2.0 QUALITY ASSURANCE PROJECT PLAN

This quality assurance project plan (QAPjP) identifies the policies, organizations, objectives, activities, methods, and quality assurance (QA)/quality control (QC) procedures for collecting and analyzing samples to support waste characterization.

This QAPjP follows the EPA guidelines contained in *EPA Guidance for Quality Assurance Project Plans* (EPA 2002b) and *EPA Requirements for Quality Assurance Project Plans* (EPA 2001).

Sampling and analysis activities will be performed in accordance with the following requirements:

- DOE O 414.1C, *Quality Assurance*
- *EPA Requirements for Quality Assurance Project Plans for Environmental Data Operations* (EPA 2001)
- *Hanford Analytical Services Quality Assurance Requirements Documents* (DOE-RL 1996).

2.1 PROJECT/TASK DESCRIPTION

The sampling and analysis strategy described in this SAP will be used to provide characterization data to safely and compliantly designate and dispose of the filter press, sediment in the 105-B transfer pits, and remaining legacy waste items in the FSB area.

2.2 PROJECT/TASK ORGANIZATION

Washington Closure Hanford (WCH) has overall responsibility for the sampling effort. The project management organization is depicted in Figure 2-1.

2.2.1 Project Management

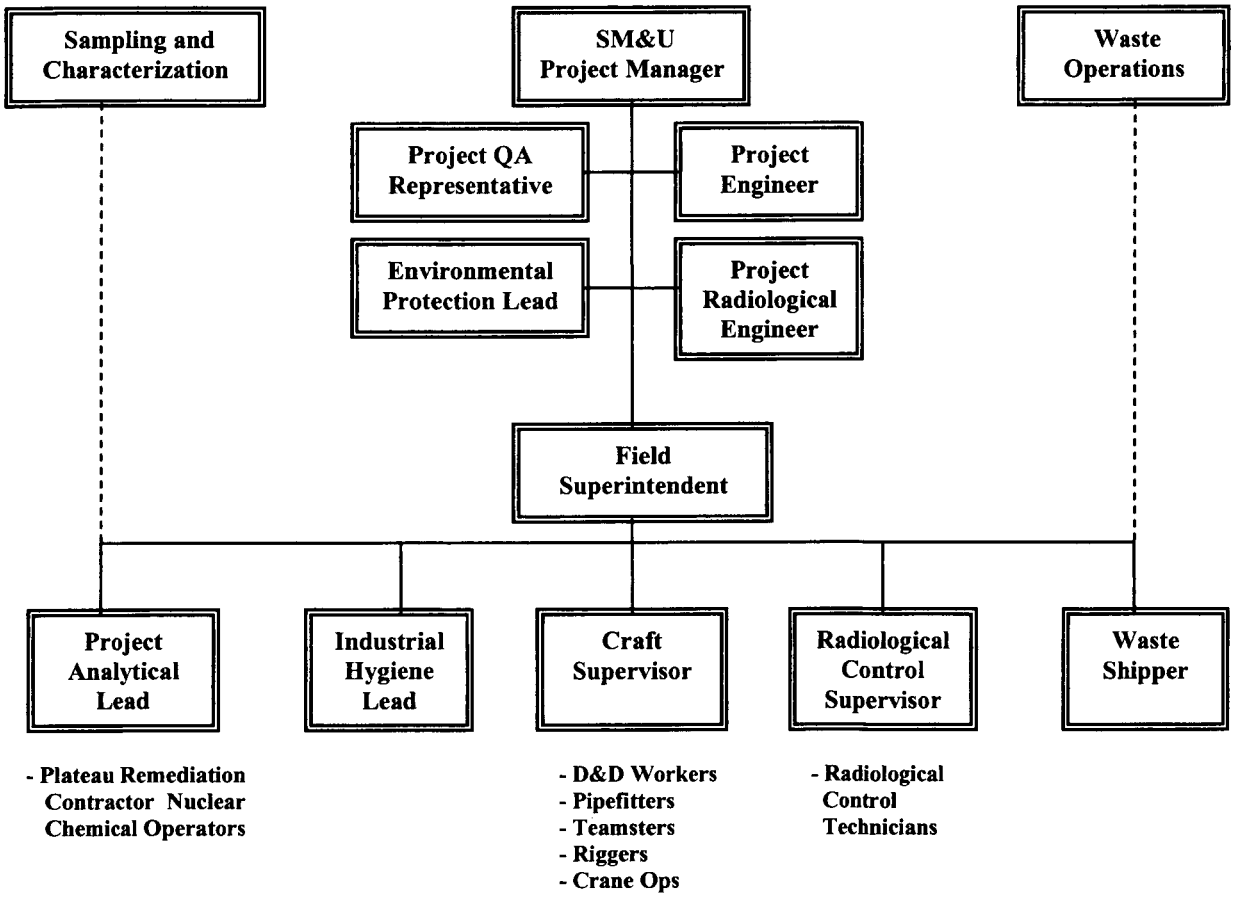
The Surveillance, Maintenance and Utilities (SM&U) Project will provide project management, project engineering, and coordination of field support functions to support implementation of this SAP. This SAP is implemented under the direction of the SM&U project task lead. Support will include the following:

- Provide project, task, and engineering management necessary to carry out tasks
- Act as a liaison to current contractor functional organizations, as required
- Provide radiological work permits
- Provide radiological surveys to support sample collection, packaging, and shipping
- Provide radiological survey packages to summarize survey results
- Prepare work packages to support the task team
- Conduct and document pre-job meetings when supporting the task team
- Provide field support to the task team
- Provide the approved job hazard analysis

- Provide industrial safety support and monitoring for the task team.

NOTE: Personal protective equipment to be worn during sampling shall be listed on the job-specific activity hazard analysis and the radiological work permit, as required.

Figure 2-1. Project Organization.



2.2.2 Waste Operations Organization

The Environmental Services Waste Operations organization will provide waste management and disposal support. Support will include the following:

- Provide waste designation
- Prepare waste profiles
- Prepare site specific waste management instruction
- Provide coordination with other Hanford Site organizations, as needed
- Provide waste transportation specialist.

2.2.3 Sampling and Characterization Organization

The Environmental Protection Sampling and Characterization organization will provide personnel to support field activities including sample collection, sample packaging, sample shipment, and data management. Support will include the following:

- Coordinate sampling and analysis activities
- Provide support for sampling, packaging, and shipping activities
- Arrange for nuclear chemical operator sampling services
- Arrange for laboratory analysis of samples
- Receive data packages from the laboratory
- Arrange for validation of data to the level identified in this SAP
- Provide laboratory data packages.

2.2.4 Quality Assurance

The Quality Assurance organization is responsible for performing independent QA assessments, as appropriate.

2.2.5 Data Users

- Waste Operations
- Engineering Services
- Environmental Protection
- Radiological Control
- Safety and Health
- Quality Assurance
- Washington State Department of Ecology, EPA, and the U.S. Department of Energy, Richland Operations Office.

2.3 TRAINING REQUIREMENTS/CERTIFICATIONS

Training or certification requirements needed by personnel are described in BSC-1, *Business Services and Communications*, Procedure BSC-1-2.4, "Training Requirements," and *Sampling and Characterization Quality Assurance Program Plan* (WCH 2009a). The WCH training program provides workers with the knowledge and skills necessary to execute assigned duties in a safe manner. A graded approach is used to ensure that workers receive a level of training commensurate with their responsibilities that complies with DOE orders and government regulations. Specialized employee training includes pre-job training, emergency preparedness, plan-of-the-day meetings, and facility/work site orientations.

2.4 DATA QUALITY

The QA objective of this plan is to provide data of known and appropriate quality for the needs identified through the DQO process. Data quality is determined by assessing precision, accuracy, representativeness, comparability, and completeness (i.e., PARCC parameters). Definitions of these terms, applicable procedures, and level of effort are described below:

- Precision is a measure of the data spread when more than one measurement has been taken on the same material. Precision can be expressed as the relative percent difference for duplicate measurements.

- Accuracy is an assessment of the closeness of the measured value to the true value. Accuracy of chemical/radiological test results is assessed by spiking samples with known standards, performing the analysis, and establishing the average recovery. For matrix spikes, known amounts of a standard compound (either the analyte of interest or a surrogate material expected to behave chemically the same as the analyte of interest) are added to the samples and carried through the analysis. For some radionuclide measurements, method calibrations against known standards are used to establish accuracy. Laboratory matrix spikes will be used to assess analytical accuracy.

- Representativeness is a measure of how closely the results reflect the actual concentration or distribution of the chemical compounds in the matrix samples. Documentation will be established to show that protocols have been followed and sample identification and integrity are ensured. Field duplicates may be used to assess field and transport contamination and method variation. Laboratory method blanks will be used to assess potential sample contamination from laboratory operations.

- Comparability expresses the confidence with which one data set can be compared to another. Data comparability will be maintained using defined procedures and consistent methods and units. Actual detection limits depend on the sample matrix and will be reported as defined for the specific samples.

- Completeness is a measure of the amount of valid data obtained from the analytical measurement system and the complete implementation of defined field procedures. Completeness is assessed during the data validation process.

2.5 FIELD DOCUMENTATION

Field documentation shall be maintained in accordance with ENV-1, *Environmental Monitoring & Management,* ENV-1-2.5, "Field Logbooks," and ENV-1-2.13, "Chain of Custody."

The standard fixed laboratory data packages shall be managed in accordance with ENV-1-2.11, "Sample Documentation Processing."

2.6 CHANGE CONTROL

To ensure efficient and timely completion of tasks, minor changes can be made to the original workscope (outlined in this SAP) in the field by the characterization lead (or designee), provided

the changes do not impact the technical adequacy of the job or negatively impact the work schedule. Such changes shall be documented with justification in a field logbook.

2.7 MEASUREMENT/ DATA ACQUISITION

The following subsections present quality objectives for measurement data and requirements for sampling methods, sample handling and custody, analytical methods, and field and laboratory QC. The requirements for instrument calibration, maintenance supply inspections, and data management are also discussed.

2.7.1 Analytical Performance Requirements

Applicable QA procedures, quantitative target limits, and data quality are dictated by the intended use of data and analytical methods used. Alignment of analytical parameters, applicable detection levels, analytical precision, and accuracy with the requirements identified in the DQO process are presented in Table 2-1. Analytical laboratories are contractually obligated to meet the current methodology required by regulatory agencies.

Detection limits shown in Table 2-1 meet or exceed the DQO requirements identified in Section 1.0. Actual laboratory reporting limits may be higher due to sample-specific matrix interference. Sample-specific limits will be reported for individual analytes.

Analytical parameters and methods are listed in Table 2-1. The QA/QC procedures, detection limit requirements, and documentation for individual methods will be in accordance with the specifications outlined in the *Statement of Work for Environmental and Work Characterization Analytical Services* (RFS 1999). Laboratory-specific standard operating procedures for individual analytical methods also will be implemented.

Table 2-1. Analytical Performance Requirements – Laboratory. (3 Pages)

Analyte	Analytical Method	Action Level	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
Radiological Constituents					
Americium-241	GEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Antimony-125	GEA	10 pCi/g	0.2 pCi/g	70-130[a]	±30[a]
Carbon-14	Liquid scintillation	50 pCi/g	50 pCi/g	70-130[a]	±30[a]
Cesium-137	GEA	10 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Cobalt-60	GEA	10 pCi/g	0.05 pCi/g	70-130[a]	±30[a]
Europium-152	GEA	10/pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Europium-154	GEA	10 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Europium-155	GEA	2 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Nickel-63	Liquid scintillation	30 pCi/g	30 pCi/g	70-130[a]	±30[a]
Plutonium-238	PuAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Plutonium-239/240	PuAEA	2 pCi/g	1pCi/g	70-130[a]	±30[a]

Table 2-1. Analytical Performance Requirements – Laboratory. (3 Pages)

Analyte	Analytical Method	Action Level	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
Radium-226	GEA	2 pCi/g	0.1 pCi/g	70-130[a]	±30[a]
Radium-228	GEA	2 pCi/g	0.2 pCi/g	70-130[a]	±30[a]
Strontium-90	Rad-Sr	10 pCi/g	1 pCi/g	70-130[a]	±30[a]
Technetium-99	Proportional counting	30 pCi/g	15 pCi/g	70-130[a]	±30[a]
Thorium-232	ThAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Tritium	Liquid scintillation	400 pCi/g	30 pCi/g	70-130[a]	±30[a]
Uranium-234	UAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Uranium-235	UAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Uranium-238	UAEA	2 pCi/g	1 pCi/g	70-130[a]	±30[a]
Nonradiological Constituents – Metals					
Arsenic	EPA Method 6010	100 mg/kg	10 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Barium	EPA Method 6010	2,000 mg/kg	2 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	100 mg/L[b]	10 mg/L	70-130[c]	±30[c]
Beryllium	EPA Method 6010	None	0.5 mg/kg	70-130[c]	±30[c]
Boron	EPA Method 6010	None	2 mg/kg	70-130[c]	±30[c]
Cadmium	EPA Method 6010	20 mg/kg	0.5 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	1.0 mg/L[b]	0.1 mg/L	70-130[c]	±30[c]
Chromium	EPA Method 6010	100 mg/kg	1.0 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Lead	EPA Method 6010	100 mg/kg	5 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Mercury	EPA Method 7471	4.0 mg/kg	0.2 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/7471	0.2 mg/L[b]	0.02 mg/L	70-130[c]	±30[c]
Selenium	EPA Method 6010	20 mg/kg	10 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	1.0 mg/L[b]	0.1 mg/L	70-130[c]	±30[c]
Silver	EPA Method 6010	100 mg/kg	1 mg/kg	70-130[c]	±30[c]
	EPA Method 1311/6010	5.0 mg/L[b]	0.5 mg/L	70-130[c]	±30[c]
Nonradiological Constituents – General Inorganics					
Asbestos	PLM	1 wt%	<1wt%	NA	NA
Organic Compounds					
Polychlorinated biphenyls	EPA Method 8082	50 mg/kg	0.017 mg/kg	70-130[e]	±30[e]
Waste Characteristics					
Corrosivity (pH)	EPA Method 9045 (pH)	2.0≤pH≤12.5	0.1 pH unit	70-130	±30

Table 2-1. Analytical Performance Requirements – Laboratory. (3 Pages)

Analyte	Analytical Method	Action Level	RDL Requirement	Accuracy (% Recovery)	Precision (% RPD)
Physical Properties					
Moisture content	ASTM D2216	NA	0.50%	NA	NA
Density (settled and centrifuged)	Gravimetric	NA	NA	NA	NA

[a] Accuracy criteria for associated batch laboratory control sample percent recoveries. With the exception of the GEA, additional analysis-specific evaluations also performed for matrix spikes, tracers, and carriers as appropriate to the method. Precision criteria for batch laboratory replicate sample analyses.

[b] Lower action level may needed to determine land disposal treatment requirements.

[c] Accuracy criteria for associated batch matrix spike percent recoveries. Evaluation based on statistical control of laboratory control samples also performed. Precision criteria for batch laboratory replicate matrix spike sample analyses or replicate sample analyses.

[d] Sulfide concentrations above the reactivity designation levels will be regulated.

[e] Accuracy criteria are the minimum for associated batch laboratory control sample percent recoveries. Laboratories must meet statistically based control if more stringent. Additional analyte-specific evaluations also performed for matrix spikes and surrogates as appropriate to the method. Precision criteria for batch laboratory replicate matrix spike sample analyses.

AEA = alpha energy analysis
ASTM = American Society for Testing and Materials
EPA = U.S. Environmental Protection Agency
GEA = gamma energy analysis
NA = not applicable
PLM = polarized light microscopy
RDL = required detection limit
RPD = relative percent difference

2.7.2 Radiological Survey Measurements

Alpha and beta/gamma radiological surveys will be performed in accordance with the QA/QC requirements provided in the *WCH Radiological Control Manual* (WCH 2009b). Radiological surveys of the filter press and miscellaneous legacy waste components will be surveyed as required by procedures in RC-200, *Radiological Control Field Procedures*, and RC-300, *Radiological Control Instrumentation Procedures.*

2.7.3 Laboratory Quality Control

The minimum QC sample requirements for the analytical laboratory are identified below. Additional method-specific QC samples are prescribed in the references provided in Section 2.7.1.

Laboratory QC requirements will meet the requirements identified in the *Hanford Analytical Services Quality Assurance Requirements Documents* (DOE-RL 1996). The requirements in this document are implemented through the analytical service statement of work (RFS 1999) and are as follows:

- One laboratory method blank for every 20 samples *(5%* of all samples), analytical batch, or sample delivery group (whichever is most frequent) will be carried through the complete

sample preparation and analytical procedure. The method blank will be used to document contamination resulting from the analytical process.

- One laboratory control sample or blank spike will be performed for every batch of samples for each analytical method criteria to monitor the effectiveness of the sample preparation process. The results from the analysis are used to assess laboratory performance.

- As appropriate, a matrix spike sample will be prepared and analyzed for every 20 samples of the same matrix or sample preparation batch, whichever is most frequent. The matrix spike results are used to document the bias of an analytical process in a given matrix.

- Laboratory duplicates or matrix spike duplicates will be used to assess precision and will be analyzed at the same frequency as the matrix spikes.

2.7.4 Field Quality Control

Field quality control samples are specified in Section 3.3.1.

2.7.5 Inspection/Acceptance Requirements for Supplies and Consumables

Procurement activities will meet current requirements found in BSC-300, *WCH Procurement.* Received items/reagents will be inspected for conformance with specifications set in the procurement requisition. If the item/reagents do not meet specifications, the item/reagents will be dispositioned through the nonconformance system.

2.7.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Equipment used in the field or laboratory that directly affects analytical data quality will be subject to preventive maintenance to ensure minimal measurement system downtime.

2.7.7 Instrument Calibration and Frequency

All onsite instruments used for sample analysis shall be calibrated in accordance with WCH (2009a). The results from all instrument calibration activities shall be recorded in a bound logbook in accordance with procedures outlined in ENV-1-2.5, "Field Logbooks," or as specified for radiological surveys. Where applicable, tags will be attached to field screening and onsite analytical instruments to note the date when the instrument was last calibrated and the calibration expiration date.

2.7.8 Data Management

Laboratory data will be managed and stored by the current contractor's sample management organization in accordance with ENV-1-2.10, "Sample Event Coordination."

All analytical data packages shall be subject to final technical review by qualified reviewers before submitting to regulatory agencies or inclusion in reports or technical memoranda, at the direction of the Deactivation, Decontamination, Decommissioning, and Demolition (D4) Closure Project project engineer. Electronic data access, when appropriate, shall be through computerized databases (e.g., Hanford Environmental Information System). Where electronic data are not available, hard copies will be provided in accordance with Section 9.6 of the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989).

2.8 ASSESSMENT/OVERSIGHT

2.8.1 Assessments and Response Actions

The WCH Quality Assurance organization may conduct random surveillance and assessments in accordance with QA-1, *Quality Assurance*, Procedure QA-1-1.5, "Self Assessments," to verify compliance with the requirements outlined in this SAP, project work packages, WCH procedures, and regulatory requirements.

Deficiencies identified by one of these assessments shall be reported in accordance with QA-1, Procedure QA-1-1.2, "Corrective Action Management." When appropriate, corrective actions will be taken by the project engineer in accordance with the *Hanford Analytical Services Quality Assurance Requirements Document*, Vol. 1, Section 4.0 (DOE-RL 1996), to minimize recurrence.

2.8.2 Reports to Management

Management shall be made aware of deficiencies identified by assessments or self-assessments. Corrective action required as a result of surveillance reports, nonconformance reports, or audit activities will be documented and dispositioned, as required by QA-1-1.2, "Corrective Action Management." Other measurement systems, procedures, or plan corrections required as a result of routine review processes will be resolved by governing procedures or will be referred to the technical lead for resolution. Findings from audits, surveillance, and assessments will be transmitted to the project manager and the current contractor QA department for program-related tracking and trending. Otherwise, the routine evaluation of data quality described throughout this QAPjP will be documented and filed with the data in the project file.

2.9 DATA VALIDATION AND USABILITY

2.9.1 Data Validation Requirements

Data verification and validation are performed on analytical data sets to confirm sampling and chain-of-custody documentation are complete, sample numbers can be tied to the specific sampling location, samples were analyzed within the required holding times, and analyses met the data quality requirements specified in this SAP. Data collected in accordance with this SAP will not be used to determine final closure decisions, and the potential for adverse impacts related to data quality issues is minimal. Therefore, the data will not undergo formal data validation. Routine verification of data packages will be conducted in accordance with ENV-1-2.11, "Sample Documentation Processing."

2.9.2 Data Validation Requirements

Data collected in accordance with this SAP are not intended to be used to determine final closure decisions; therefore, the data will not be required to undergo formal data validation. In addition, assessment of blank samples to determine low levels of potential contaminants is not needed for analytical data used for waste characterization. The potential for adverse impacts to the data quality is minimal and, if needed, opportunities to resample a particular material due to suspect data will likely exist.

2.10 FIELD SAMPLING PROCEDURES

2.10.1 Sample Collection Requirements

Field sampling methodology will be implemented in accordance with the requirements outlined In ENV-1, including the following procedures:

- ENV-1-2.16, "Soil and Sediment Sampling"
- ENV-1-2.19, "Environmental Multi-Media Sampling"
- ENV-1-2.20, "Sample Compositing."

2.10.2 Sample Management Requirements

Sample handling, shipping, and custody requirements will be implemented in accordance with the requirements outlined in ENV-1, including the following procedures:

- ENV-1-2.13 , "Chain of Custody"
- ENV-1-2.14, "Sample Packaging and Shipping"

The sample handling, shipping, and custody requirements shall consider waste codes listed in the *Resource Conservation and Recovery Act of1976.* These waste codes shall be recorded on the sample authorization form (SAF) and the chain-of-custody form.

2.10.3 Sample Volumes, Preservation, Container Requirements, and Holding Times

Sample volumes and bottle types depend on the laboratory and analytical methods used. Sample preservation, container types and sizes, analytical methods, and holding time requirements for the analysis to be performed will be established and documented in the project-specific SAFs in accordance with ENV-1-2.10, "Sample Event Coordination." Bottle types, preservation, and holding times are based wherever possible on established protocols (e.g., EPA SW-846) and/or industry standard practices. The allowable holding times will be identified on the SAF for unique sample events if holding times cannot be met. The reason for not meeting the holding times shall be documented in the field logbook or in the data package from the laboratory.

3.0 FIELD SAMPLING PLAN

This field sampling plan provides the sampling locations and methods that will be implemented to support characterization of the filter press, the sediment, and miscellaneous legacy waste located in the transfer room area.

3.1 SAMPLING PROCESS DESIGN

With the exception of the sediment and closed containers, most of the waste material is considered routine debris that can be designated for disposal using process knowledge and empirical data from previous sampling activities to address chemical and physical property designation concerns. If additional information is needed to designate anomalous waste materials, discrete samples of selected materials will be collected and analyzed to determine radiological and chemical contaminant concentrations as specified in the legacy waste SAP (DOE-RL 1999).

3.1.1 Sediment

One sample of the sediment from each of the two transfer pits will be collected. As shown in Figure 1-4, a dewatering system consisting of piping, crushed rock, and sand exists below the sediment in each pit. The sediment is believed to be approximately 1.5 m (5 ft) thick.

The sediment sample will be collected using a sampling device capable of collecting a relatively undisturbed vertical composite of the entire depth of the sediment in each transfer pit. If possible, the sample will incorporate the rock and sand components of the dewatering system underlying the sediment. A coring type sampler or similar device will be used to collect the sediment. ASTM D 6221-98, *Standard Guide for Selection of Sampling Equipment for Waste and Contaminated Media Data Collection Activities,* was used to evaluate potential sampling equipment. Final selection of sampling equipment will be based on field demonstration of the equipment and requirements for ensuring worker safety and protection of the environment during the sampling activity.

Dose rates will be measured on each core sample and recorded in the field logbook. If possible, dose rates should be determined at several locations along the length of the core, if the core is retrieved intact. The samples will be shipped to the 222-S Laboratory in the 200 West Area; however, dependent upon the dose rates and estimated activity of the sample, a decision may be made to ship the sample to an offsite commercial laboratory capable of handling radioactive samples as determined by the laboratory's license for handling radiological material. Final laboratory selection will be determined by the WCH Sample Management organization in consultation with the project and the project analytical lead.

3.1.2 Filter Press

Radiological surveys will be performed as needed to supplement existing information for the filter press. Oil, if present, will be drained and collected for disposal. One sample will be collected as required in Table 3-1 of the legacy waste SAP (DOE-RL 1999).

3.1.3 Miscellaneous Legacy Waste

Sampling of miscellaneous legacy waste located in the transfer room at 105-B will be performed (if needed) as specified in the legacy waste SAP (DOE-RL 1999). Process knowledge and historical information will be used for designation of this waste, with sampling performed as needed.

3.2 FIELD DOCUMENTATION AND SAMPLE MANAGEMENT

3.2.1 Field Documentation

Field documentation shall be kept in accordance with ENV-1, including the following procedures:

- Procedure ENV-1-2.5, "Field Logbooks"
- Procedure ENV-1.2.13, "Chain of Custody."

3.2.2 Sample Custody and Transport

All sample handling, shipping, and custody will be performed in accordance with ENV-1, including the following procedures:

- Procedure ENV-1.2.13, "Chain of Custody"
- Procedure ENV-1.2.14, "Sample Packaging and Shipping."

3.2.3 Sample Preservation, Containers, and Holding Times

The sample preservation, container, and holding time requirements for the analyses will be specified in the SAF.

3.3 QUALITY CONTROL REQUIREMENTS

The QC procedures must be followed in the field and laboratory to ensure that reliable data are obtained. When performing this field sampling effort, care shall be taken to prevent the cross-contamination of sampling equipment, sample bottles, and other equipment that could compromise sample integrity.

3.3.1 Field Quality Control

Field QC samples will consist of the following:

- One equipment blank will be collected to evaluate the adequacy of sampling equipment decontamination procedures. The project analytical lead may collect additional equipment blanks if deemed necessary. The equipment blank will consist of silica sand that is poured over the sampling equipment that will come in direct contact with the sample media submitted for laboratory analysis.

- In order to reduce exposures to sampling and laboratory personnel handling sediment samples, field duplicate samples and field split samples of the sediment will not be collected.

- Trip blanks are not required.

3.3.2 Laboratory Quality Control

Laboratory QC requirements will be performed as specified in the analytical services statement of work for the selected laboratory. Laboratory QC will consist of a laboratory method blank, laboratory control sample, matrix spike, and laboratory duplicate or matrix spike duplicate.

3.4 INSTRUMENT CALIBRATION AND MAINTENANCE

Analytical instrument calibration and maintenance is conducted in accordance with the QC requirements identified in each laboratory SOP and QA plan, and the manufacturer's instructions. Field instrumentation requirements specified in this section are applicable only to measurements performed as part of site characterization and pilot study data collection. Requirements for field instruments used for the purpose of health and safety monitoring are specified in health and safety plans and associated instrument procedures.

3.4.1 Field Measurement Instruments

All calibration procedures and measurements will be made in accordance with manufacturers' specifications and contractor standard operating procedures. Field instruments will be checked and calibrated before their use on site, and batteries will be charged and checked daily where applicable. Instrument calibration will be checked at the beginning of each workday and checked and recalibrated if necessary through the course of the day according to manufacturers' specifications or if deemed necessary by sampling personnel. Equipment that fails calibration and/or becomes otherwise inoperable during the field investigation will be removed and either repaired or replaced.

All documentation pertinent to the calibration and/or maintenance of field measurement equipment will be recorded in a field logbook. Logbook entries regarding the status of field equipment will contain, but will not necessarily be limited to, the following information:

- Date and time of calibration
- Name of person conducting calibration
- Type of equipment being calibrated (make and model)
- Reference standard used for calibration
- Other pertinent information.

3.4.2 Laboratory Instruments

Calibration of laboratory analytical instrumentation will be performed in accordance with the requirements specified in the contracted laboratory standard operating procedures and QA plan.

4.0 WASTE MANAGEMENT

Waste generated by sampling activities will be managed in accordance with the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 2005) and WMT-1, *Waste Management and Transportation*. Unused samples and associated laboratory waste from the analysis will be dispositioned in accordance with the laboratory contract.

Pursuant to 40 *Code of Federal Regulations* 300.440, Remedial Project Manager approval is required before returning unused samples or waste from offsite laboratories located off the Hanford Site. In addition, Remedial Project Manager approval must be obtained before shipping sample waste from laboratories on the Hanford Site back to the waste site of origination.

5.0 HEALTH AND SAFETY

All field operations will be performed in accordance with WCH health and safety requirements, which are outlined in SH-1, *Safety and Health*, and RC-1, *Radiation Protection Procedures*. A site-specific health and safety plan and job safety analysis for drilling operations will be prepared by the drilling subcontractor.

Work planning, hazards analysis, and contingency planning will be conducted in accordance with the work control process as described in PAS-2, *Integrated Work Control Program.* The project work packages will include a job hazard analysis, site-specific health and safety plan, and applicable radiological work permits.

The sampling procedures and associated activities will consider exposure reduction and contamination control techniques that will minimize the radiation exposure to the sampling team as required by RC-1 and QA-1, *Quality Assurance*, and SH-1.

6.0 REFERENCES

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APPENDIX A

PHOTOGRAPHS

Figure A-1. 105-B Transfer Pit During Dewatering Activities (February 26, 1985).

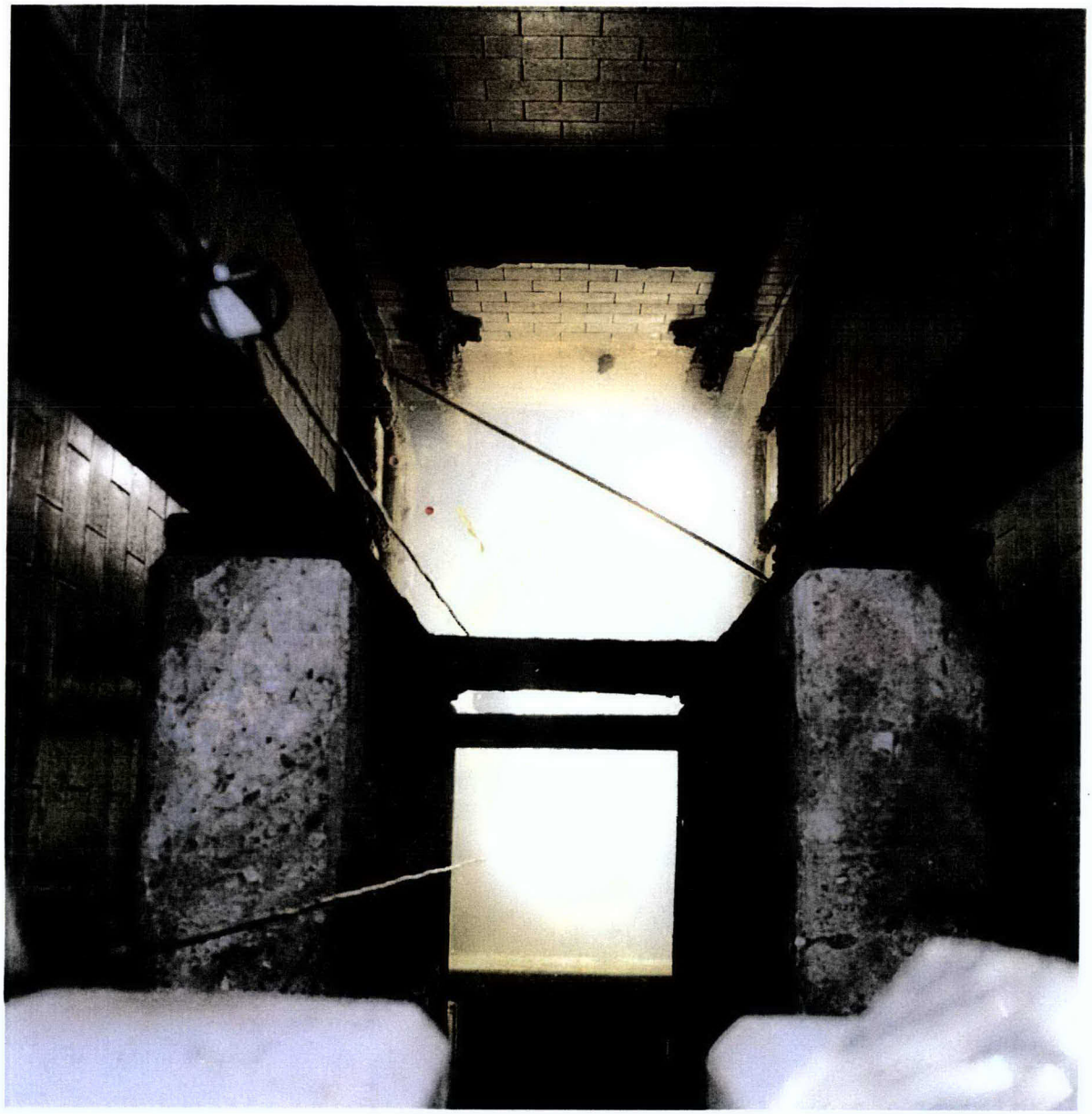

Figure A-2. 105-B Transfer Pit (December 19, 1985).

Figure A-3. 105-B Transfer Pit (December 19, 1985).

Figure A-4. 105-B Transfer Pit (December 19, 1985).

Figure A-5. 105-B Fuel Storage Basin Cleanout (December 19, 1985).

Figure A-6. Photograph of Filter Press Located at 105-B (2009).

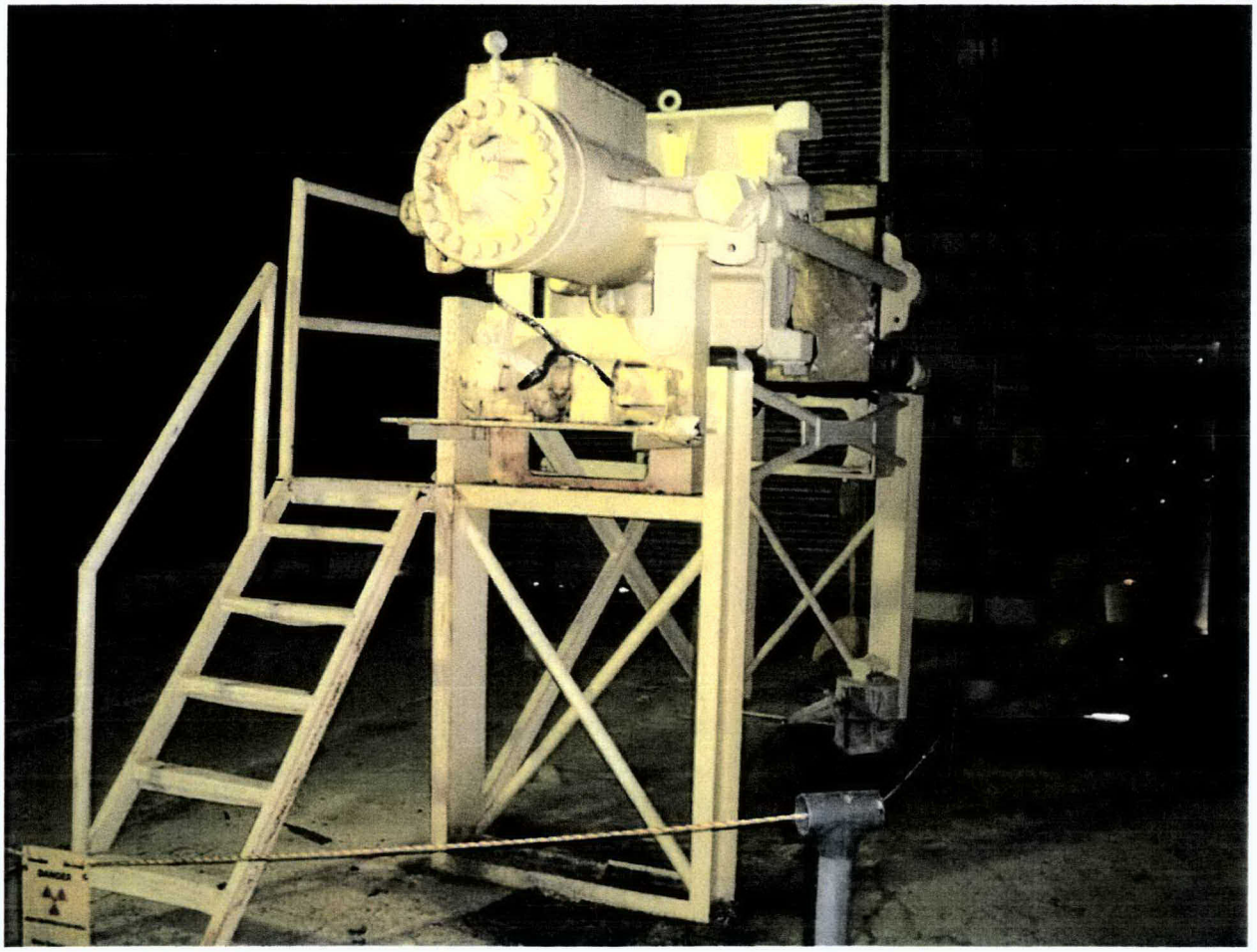

Figure A-7. Miscellaneous Waste Items (August 27, 2009).

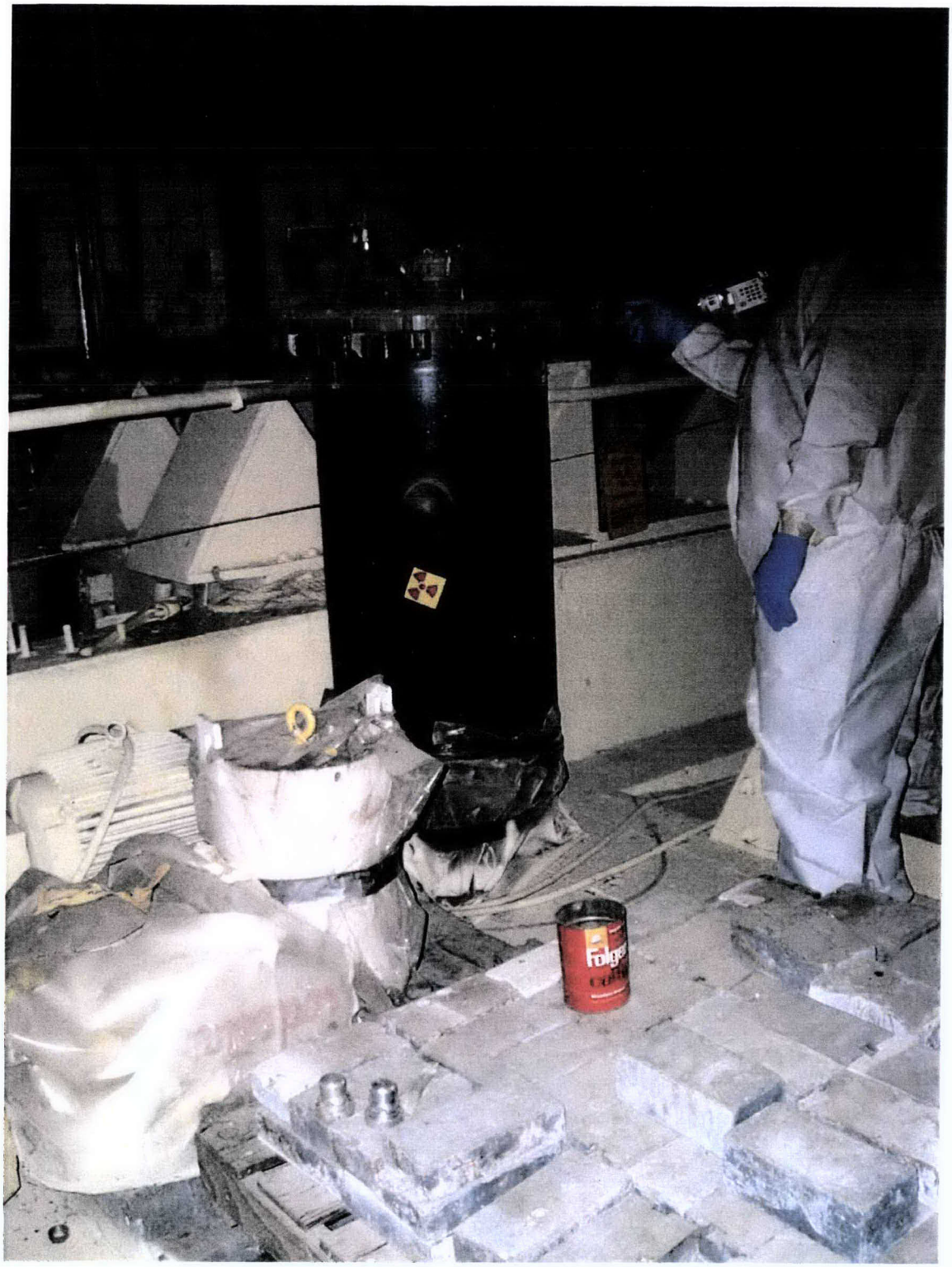

Figure A-8. Miscellaneous Waste Items (August 17, 2009).

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ATTACHMENT 3

Approval to Treat the 105-B Transfer Pit Lead Contaminated Soil in Accordance with the "TREATMENT PLAN AND PROTOCOL FOR TREATMENT OF LEAD CONTAMINATED SOILS, WCH-252, Rev. 2"

This approval applies to lead contaminated soil from removed from the bottom of two 105-B fuel storage basin transfer pits as described under waste profile, WP 105BFTP001. The waste matrix consists primarily of soil and some gravel. Of two samples taken (one in each pit), Sample# J19V31 had a high of 2330 mg/kg Total Lead and 29.9 mg/L TCLP Lead.

The waste is similar to the material treated in "*TREATMENT PLAN AND PROTOCOL FOR TREATMENT OF LEAD CONTAMINATED SOILS, WCH-252, Rev. 2*".

This approval allows treatment of this waste using the recipe described in Table 1, *Bench-Scale Test Results (Including Results and Reduction Ratios)* of the treatment plan under Mixture 2, which limits the Total Lead to 2136 mg/kg and TCLP Lead to 23.6 mg/L. Although this mixture was tested at the above specified limits, the reduction ratio of 649:1 would conservatively treat lead concentrations of up to several times the tested concentration.

Laura Buelow
U.S. Environmental Protection Agency

8/23/10
Date

Rudy Guercia
U.S. Department of Energy

8/19/10
Date

ATTACHMENT 4

WCH Washington Closure Hanford

Interoffice Memorandum

TO:	Distribution	DATE:	July 08, 2010
COPIES:	See Below Records and Document Control H4-11	FROM:	Cliff Stephan, MS, CHP, CIH Project Industrial Hygienist, L7-10 / 509-554-1280

SUBJECT: **Industrial Hygiene Review of Building 105B Fuel Storage Basin and Fuel Transfer Basin Data and Historical References Regarding Beryllium and Heavy Metal Contamination**

Introduction

The Washington Closure Hanford (WCH) 105B Fuel Storage Basin and Fuel Transfer Basin are scheduled for maintenance. Based on the requirement described in Standing Order # SO-SITE-2010-003, a review of the 105B Fuel Storage Basin and Fuel Transfer Basin sampling data for beryllium, cadmium, chromium, and lead (Be, Cd, Cr, Pb) has been conducted. This Inner Office Memorandum (IOM) is intended to document the review of the previous Industrial Hygiene (IH) data characterization, investigation, and assessment activities of the building hazards due to beryllium, cadmium, chromium, and lead.

History

In accordance with the Chronic Beryllium Disease Prevention Program (CBDPP) IH sampling data and historical documentation, listed in Table 1 below, was collected and assessed for the characterization of the 105B Fuel Storage Basin and Fuel Transfer Basin. That documentation was then reviewed and a Beryllium Facility Assessment Form was completed (also identified in Table 1 below). A re-review of these documents has been conducted and the conclusions and recommendations are noted below.

Table 1

Document	Author or Reviewer	Date	Subject	CCN
Beryllium FAF	H. W. Ruby, CIH	02/20/2010	105B Reactor Museum	
IOM	H. W. Ruby, CIH	11/17/2009	Industrial Hygiene Baseline Survey and Beryllium Characterization Report for the 105B Fuel Storage Basin and Fuel Transfer Basin	147644
Report	R. L. Miller and J. M. Steffes	06/06/1986	Radionuclide Inventory and Source Term for the Surplus Production Reactors at Hanford	UNI-3714
Report	R. L. Miller and J. M. Steffes	07/11/1986	Fuel Storage Basin Cleanup and Stabilization Project Report	UNI-3958

CIH: Certified Industrial Hygienist

FAF: Facility Assessment Form

IOM: Inter Office Memo

Conclusions

A review of previous documentation and IH sampling data noted in the above table indicates and confirms that there are no beryllium concentrations that exceed the allowable CBDPP criteria of 2μg/g. In addition, while there are no regulatory limits for surface metal contamination (lead, cadmium, and chromium), WCH IH assigns 5000 μg/g (0.5% of the dust) as a gauge for taking action. This review did not reveal any potential concerns for the metals analyzed, as none were at or above this action level.

Recommendations

The following recommendations are based on a review of the previous sampling results and characterization assessments presented in the documents listed in Table 1, as well as interviews with project personnel.

1. Preparation for maintenance activities for the 105B Fuel Storage Basin and Fuel Transfer Basin can proceed without an IHWP or BWP.

2. This IOM concurs with the conclusions stated in the November 17, 2009, IOM, CCN# 147644. The 105B Fuel Storage Basin and Fuel Transfer Basin can remain classified as non-beryllium contaminated. As such, no controls are required to protect employees from beryllium, and no postings, warnings, special PPE (such as respiratory protection), medicals, training, etc. are required due to the potential for Be exposure.

Attachment(s): No attachments are provided; however, the documents listed above in Table 1 are included in the basis criteria for the conclusions presented in this IOM.

Copies:
D.E. Reese, X5-50
M.E. Allen, X5-50
M.D. Flannery, X5-50
W.A Hoober, N3-10
A.V. Gutmanis, N3-10
R.S. Hobson, X5-50
C.J. Stephan, L7-10
R.G. Gothard, X5-50
D. Dunaway, X5-50
W.L. Brasker, X5-50
K.J. Koegler, L7-11
B.D. Smith, L7-11
D.J. Gothard, L1-06

ATTACHMENT S

Washington Closure Hanford

MAY 2 1 2013

171183

U.S. Department of Energy
Richland Operations Office
J. J. Short, Contracting Officer
Procurement Services Division
P.O. Box 550, MSIN A7-80
Richland, Washington 99352

Subject: Contract No. DE-AC06-05RL14655
NOTICE OF DIFFERING SITE CONDITIONS – IMPACTS ON RETRIEVAL OF SEDIMENT FROM 105B TRANSFER PITS DUE TO LARGE QUANTITY OF DEBRIS

Reference: Letter, S. L. Feaster, WCH, to J. J. Short, RL, "Request for Equitable Adjustment WCH-REA-074, Revision 0, Cost Impact to B Reactor Partial Interim Safe Storage/Hazardous Material Reduction due to Changed Conditions," CCN 147524, dated November 9, 2009

Dear Mr. Short:

In accordance with the subject contract Clause I-63, 52.236-2 *Differing Site Conditions*, specifically paragraph (a) (2), this letter provides written notification of the large quantities of unanticipated debris discovered within the sediment at 105B. These differing conditions are of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

Washington Closure Hanford (WCH) initiated sediment removal activities in accordance with the above reference. The sediment retrieval approach was based on the basin cleanout process described in the 1986 United Nuclear Company report, UNI-3958, "*Fuel Storage Basins Cleanup and Stabilization Project Report*". This report states:

- "Removal of all visible small items from 105B basin was completed..."
- "When all visible hardware (small and large) was removed and packaged, the basin floors were raked to uncover any remaining items that may have been covered with sediment."

These statements along with other descriptions of the cleanout process indicated that the material in the transfer pits would consist of sediment and gravel.

RECEIVED
MAY 2 3 2013
DOE-RLCC

171183

MAY 2 1 2013

Within the first week of operations, it became apparent that the transfer pits contained unknown quantities of unanticipated debris (steel pipes, wood, angle iron, tools, etc.). As the sediment removal progressed, the concentration of debris appeared to be increasing. Retrieval of these items has caused significant delay in the sediment removal process and has damaged retrieval equipment. Continued removal of the sediment and the discovered items will result in cost and schedule impacts.

WCH is currently evaluating the impact of this differing site condition. WCH reserves the right to renegotiate the 105B Scope as defined in the Schedule Performance Incentive Fee. We will provide additional data in a subsequent letter, when it becomes available.

Should you have any questions or require additional information, please contact Mike Douglas at (509) 420-6206. For questions of a contractual nature, please contact me at (509) 372-9213.

Sincerely,

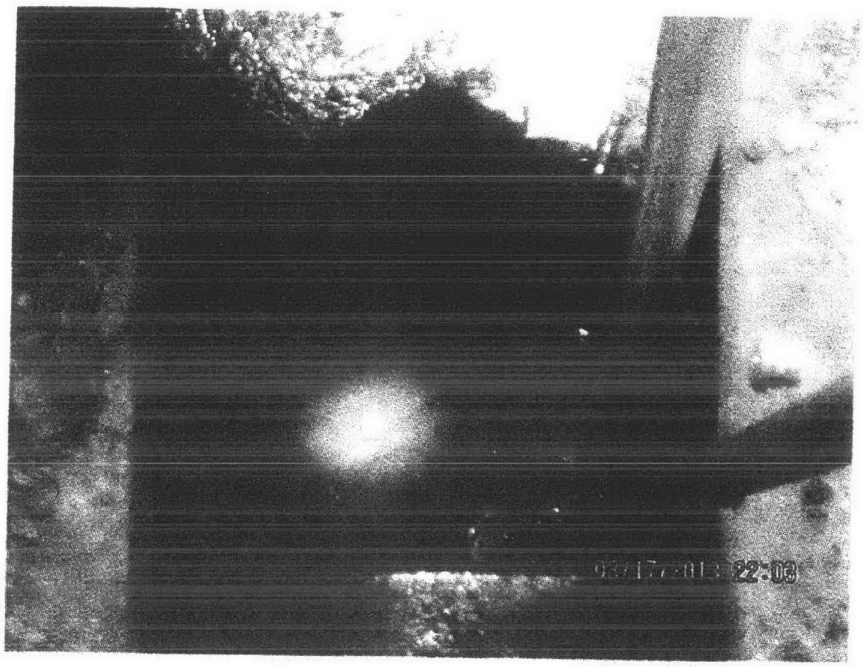
S. L. Feaster
Manager, Contracts & Procurement

LMD:rlh

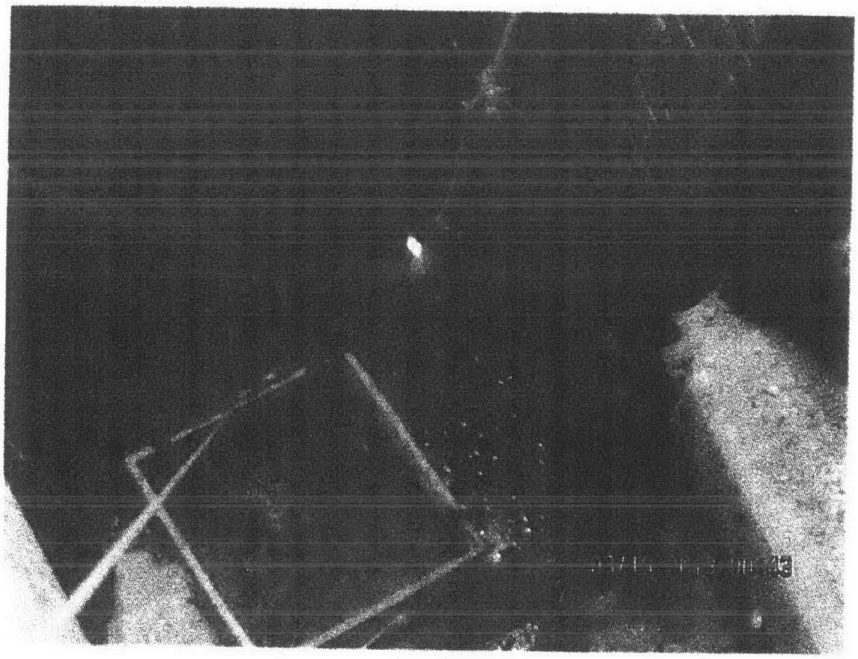
Attachment: Photos of Typical Debris Found in Pits

cc: J. A. Dowell (RL) A5-11, w/o
M. S. French (RL) A3-04, w/a
R. F. Guercia (RL) A3-04, w/a
T. K. Teynor (RL) A3-04, w/a

Attachment



Quantity of debris increasing as sediment removal continues.



Typical debris items collected from the transfer pits.

ATTACHMENT 6

Guercia, Rudolph F (Rudy)

From: Guercia, Rudolph F (Rudy)
Sent: Tuesday, June 18, 2013 12:36 PM
To: 'Buelow.Laura@epamail.epa.gov'
Subject: 105B transfer pits

RL has made the decision to not remove any more sediment from the B Reactor Fuel Storage Basin Transfer Bay. Per an allowance that can be read into the circled part of pg 2 of the attached WMP (addendum to DOE/RL 96-17) I would like to fill the opening of the transfer pits with a flowable fill (300 psi strength) after absorbing any free liquids that we may encounter in the bottom of the pits. This is strong enough to walk on, and can be readily removed at a later date. The transfer pit area is outside the RAWP description, so the work will be completed per the WMP of the RDR. Can you bounce this off Dennis and see what objections that he may have.

Thanks.

[redacted]

2.0 INTRODUCTION

DOE-RL is planning the removal of sediment from the fuel transfer area within the 105-B Reactor Building. This action is to include the removal and disposal of approximately 600 ft^3 of contaminated fuel storage basin sediment that has been stored in the fuel transfer pits since December 1985. This action also includes the disposition of miscellaneous articles and used equipment (no longer has a substantial source term). The *Interim Action Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-1, 100-FR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-IU-2, 100-IU-6, and 200-CW-3 Operable Units, Hanford Site, Benton County, Washington* (Remaining Sites ROD) authorizes the removal and disposal of this waste:

> "Based on the evaluation of CERCLA criteria and NEPA values, the preferred alternative for 100 Area reactor building waste is removal, treatment as required, packaging, transport, and disposal of the waste at the ERDF." (EPA 1999, p. 37)

Washington Closure Hanford (WCH) will be performing the work. In preparation, and with DOE-RL approval, WCH is preparing this addendum to the existing waste management plan contained in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE/RL-96-17, Rev. 5) to address the specific requirements and activities associated with the management of the 105-B fuel transfer area waste for U.S. Environmental Protection Agency (EPA) approval.

In addition, an addendum to the existing air monitoring plan (AMP) contained in the 100-B/C Burial Grounds and Remaining Sites Remedial Action Plan (BHI 2002) will also be prepared and issued as a separate document for EPA approval.

3.0 EXPECTED WASTE STREAMS AND DISPOSITION

Waste will be generated as a result of the cleanup activities associated with the 105-B Reactor fuel transfer area. The expected waste streams include, but are not limited to, the following:

- Low-level radioactive waste (solid and liquid)
- Hazardous/dangerous and mixed wastes
- Nonhazardous solid waste.

3.1 LOW-LEVEL RADIOACTIVE WASTE

The radiological inventory for 105-B transfer pit sediment is shown in Table 1. These values were taken from Calculation No. 0100B-CA-V0321, *TEDE Calculation for Clean Out of the 105-B Fuel Transfer Pit*, Revision 1. The inventory for the fixed contamination on the basin walls is not included in this inventory since it should not be disturbed during the work activities.

Table 1. Radiological Inventory for the 105-B Fuel Transfer Pit.

Isotope	Inventory (Ci)
C-14	6.12E-03
Co-60	1.40E-01
Ni-63	6.37E+01
Sr-90	9.33E+00
Y-90 [2]	9.33E+00
Tc-99	9.91E-03
Cs-137	1.59E+01
Ba-137m	1.50E+01
Eu-152	7.47E-01
Eu-154	1.04E-01
Th-232	2.12E-05
U-233	5.11E-03
U-234	1.31E-02
U-235	5.78E-04
U-236	3.25E-04
U-238	1.40E-02
Pu-239/240	1.08E+00
Am-241	5.56E-01

Sediment contaminated with these isotopes will be physically removed from the transfer pits, packaged, transported to the Environmental Restoration Disposal Facility (ERDF), where it will be treated in accordance with *Treatment Plan and Protocol for Treatment of Lead Contaminated Soils* (WCH-252) to immobilize the contaminants (stabilized), and disposed of as solid, low-level radioactive waste. Miscellaneous articles and used equipment will be packaged and disposed of at ERDF.

Water may be used to wash down the pits generating liquid, low-level radioactive waste. All liquid waste treated or disposed of at a location other than B Reactor or ERDF will first be approved by EPA. Possible disposal locations include the Effluent Treatment Facility (ETF) or a facility outside of the Hanford Site. Any remaining contamination in the transfer area/pits will be immobilized by applying fixatives.

3.2 HAZARDOUS/DANGEROUS AND MIXED WASTE

None of the materials associated with the sediment inventory are believed to be hazardous chemicals, solids, or liquids as defined by *Washington Administrative Code* (WAC) 173-303, "Dangerous Waste Regulations." However, hazardous and/or mixed waste may be generated through the cleanup process associated with other items in the fuel storage basing area (e.g., equipment oil/hydraulic fluids, lead shielding, etc.). As wastes are removed, they will be treated

Guercia, Rudolph F (Rudy)

ATTACHMENT 6A

From: Buelow, Laura <Buelow.Laura@epa.gov>
Sent: Tuesday, June 18, 2013 3:35 PM
To: Guercia, Rudolph F (Rudy)
Subject: RE: 105B transfer pits

Rudy- This works for EPA. We will likely need to document it somehow when we get to the B Area ROD in 3-4 years from now...

Laura

From: Guercia, Rudolph F (Rudy) [mailto:rudolph.guercia@rl.doe.gov]
Sent: Tuesday, June 18, 2013 12:36 PM
To: Buelow, Laura
Subject: 105B transfer pits

RL has made the decision to not remove any more sediment from the B Reactor Fuel Storage Basin Transfer Bay. Per an allowance that can be read into the circled part of pg 2 of the attached WMP (addendum to DOE/RL 96-17) I would like to fill the opening of the transfer pits with a flowable fill (300 psi strength) after absorbing any free liquids that we may encounter in the bottom of the pits. This is strong enough to walk on, and can be readily removed at a later date. The transfer pit area is outside the RAWP description, so the work will be completed per the WMP of the RDR. Can you bounce this off Dennis and see what objections that he may have.

Thanks.

ATTACHMENT 7

WCH Washington Closure Hanford

172823

Interoffice Memorandum

TO: G. B. Snow
D4 Closure Director
L4-45 / 539-9202

DATE: September 30, 2013

COPIES: See Below
Document Control, H4-11

FROM: M. E. Allen (signed per telecom)
100 Area Project Engineer
X9-08/ 308-5375

SUBJECT: **END-STATE CRITERIA VERIFICATION REPORT FOR SEDIMENT REMOVAL AT 105-B FUEL STORAGE BASIN, FUEL TRANSFER PITS**

The attached report provides verification that Washington Closure Hanford (WCH) has satisfied the end-state criteria for removal of sedimentation from the 105-B Fuel Storage Basin, Fuel Transfer Pits.

Attachment:
105-B Fuel Transfer Pit Sediment Removal End-State Criteria Verification Report

MA:wjf

Copies:
M. E. Allen X9-08
L. M. Douglas X9-08
D. A. Elkins L4-45
K. A. Maki L4-30
D. J. McBride L4-45
G.B. Snow L4-45

105-B Fuel Transfer Pit Sediment Removal
End-State Criteria Verification Report

This document provides verification that Washington Closure Hanford (WCH) has satisfied the end-state criteria for removal of sedimentation from the 105-B Fuel Storage Basin, Fuel Transfer Pits (ref. Hanford Dwgs W-70481, W-70829, W-70833 and W-70838). The original end-point criteria were amended after receipt of letter 171183. The scope of the completed work includes: planning the work, designing the sediment retrieval system, procuring and mobilizing a subcontractor expert, retrieving the sediment, shipping the sediment and ancillary waste to ERDF, placing a grout-cap over un-removed sediment, applying fixative over transfer pit walls and grout-cap, demobilizing subcontractor, and site clean-up. Planning activities for this work scope commenced in August 2012; and, site demobilization and clean up completed in September 2013.

End-State Criteria

The end-state criteria for the sediment removal were presented to Washington Closure Hanford by the Department of Energy, Richland Operations Office, in DOE LETTER 13-AMRP-0175, *Change to B Reactor Interim Safe Storage End State Criteria* (Attachment 1). The end-state criteria presented on page 2 is as follows:

"*End-State Criteria for Sediment Removal* – sediment retrieval operations will be considered complete when:

1. **Accessible sediment has been removed to an average approximated depth of two feet below the Fuel Storage Basin Floor (FSB) level.**
2. **Grout cap has been placed over remaining sediment to the approximate depth of the FSB floor.**
3. **Remove the newly installed temporary dam/ventilation ports that extend above the original dam installed during the placement of the sediment.**

The horizontal and vertical surfaces of the transfer pits that were exposed to contaminated sediment will be sealed using durable fixative (e.g., Soil Sement) to prevent migration of any residual contamination from the concrete and tiled surfaces. Per Waste Management Plan (addendum to DOE/RL 96-17), the opening of the transfer pits will be filled with a flowable fill (nominal 300 psi strength). The retrieval equipment will be removed and package for transport to the Environmental Restoration disposal Facility (ERDF) and the work areas cleaned and demobilized. Remaining operation wastes will be transferred to an ERDF can for disposal at ERDF, and outside support areas will be demobilized. The cask guide rails will be placed in the Transfer Bay adjacent to the Transfer Pits in safe configuration."

Additionally, clarification was provided by R. F. Guercia, Field Engineer, Department of Energy, Richland Operations Office, for documentation completion of retrieval, grout capping, site clean-up, and demobilization activities (Attachment 1 e-mail).

Five (5) IWCP (Integrate Work Control Program) work packages (Table 1) were prepared and utilized to provide direction to complete the work scope for removing the Fuel Transfer Pit sediment and grout capping.

Table 1 – 105-B Sediment Retrieval Work Packages

WP Number	WP Type	WP Title
SMU 12 09 13 001	Craft	105-B Sediment Retrieval Support Activities
SMU 12 10 01 001	Type 1	Install Coffer Dams at 105-B Transfer Pits
SMU 12 10 10 001	Type 1	Sediment Removal From 105-B Transfer Pits
SMU 13 03 26 001	Type 1	Place Grout in 105-B Transfer Pits, Remove Coffer Dams, and Apply Fixative
SMU 12 12 12 001	Craft	105-B Sediment Retrieval Project Demobilization

Verification of End-State Criteria 1 - Accessible sediment has been removed to an average approximated depth of two feet below the Fuel Storage Basin Floor (FSB) level.
Initially, sediment in both transfer pits was approximately 24-in. above the Fuel Storage Basin floor (-22-ft El.). Following design and installation of the sediment retrieval equipment (Attachment 2) and coffer dams, water was introduced into the north pit and pumping activities commenced. Debris, discovered in the top layer of the sediment, adversely affected pumping activities, which forced operations to be moved to the south pit. Operations efforts in the south pit progressed until sediment had been removed to approximately 6-in. – 12in. below the floor opening into the south transfer pit, when debris in the sediment again began plugging the retrieval equipment. Following removal of debris in the north pit utilizing long handled tools, retrieval activities reconvened in the north pit until the sediment had been removed to approximately 24-in. below the floor opening into the transfer pit. Retrieval activities reconvened in the south transfer pit. Debris in the sediment continually plugged the retrieval equipment requiring regular pump back-flushing efforts, and removal of pumping equipment from the pit for cleaning and repair. The south pit required several weeks to complete sediment removal due to the extensive amount of debris in the sediment. Upon completion, the sediment in the south pit had been removed to approximately 24-in. below the floor opening into the transfer pit. Prior to releasing the work crewmembers, due to a HAMTC "bump and roll", the retrieval equipment was placed into a safe configuration.

Verification of End-State Criteria 2 - Grout cap has been placed over remaining sediment to the approximate depth of the FSB floor, and End-State Criteria 3 – Remove the newly install temporary dam/ventilation ports that extend above the original dam installed during the placement of the sediment.
DOE granted approval to place a grout cap on the remaining Fuel Transfer Pit sediment in May 2013, and the U.S. Environmental Protection Agency (EPA) approved the approach (Attachment 3). WCH procured a subcontractor for pumping grout into the north and south transfer pits. A pre-approved mix design (Attachment 4) for the grout was used to meet the nominal 300 psi strength. Grout was pumped into both pits to the approximate depth of the fuel storage basin floor. Once the grout was dry, a durable fixative, ABC Asbestos Binding Compound (Attachment 5), was applied on top of the grout and up the vertical surfaces to the level of the old sediment line on the pit walls (Photo 1- 2). After the fixative was dry, the coffer dams and the ventilation ports were removed (Photo 3).

Photo 1 - North Pit with Grout and Fixative

Photo 2 - South Pit with Grout and Fixative

Photo 3 - Coffer Dams/Vent Ports Removed and Fixative Applied

The sediment retrieval equipment has been removed from the Transfer Bay, and packaged for transportation and disposal at ERDF (Photos 4-5). The cask guide rails have been placed adjacent to the transfer pits in a safe configuration (Photo 5). Plywood and plastic sheeting covering much of the Fuel Storage Basin floor, to minimize contamination spread, has been removed (Photo 6). The original roll-up door has been reinstalled, the HEPA air movers have been removed, and plywood installed over the electrical access into the building (Photos 7-8). All work areas are cleaned up and the site has been demobilized (Photo 9).

Photo 4 – Transfer Bay with Sediment Removal Equipment

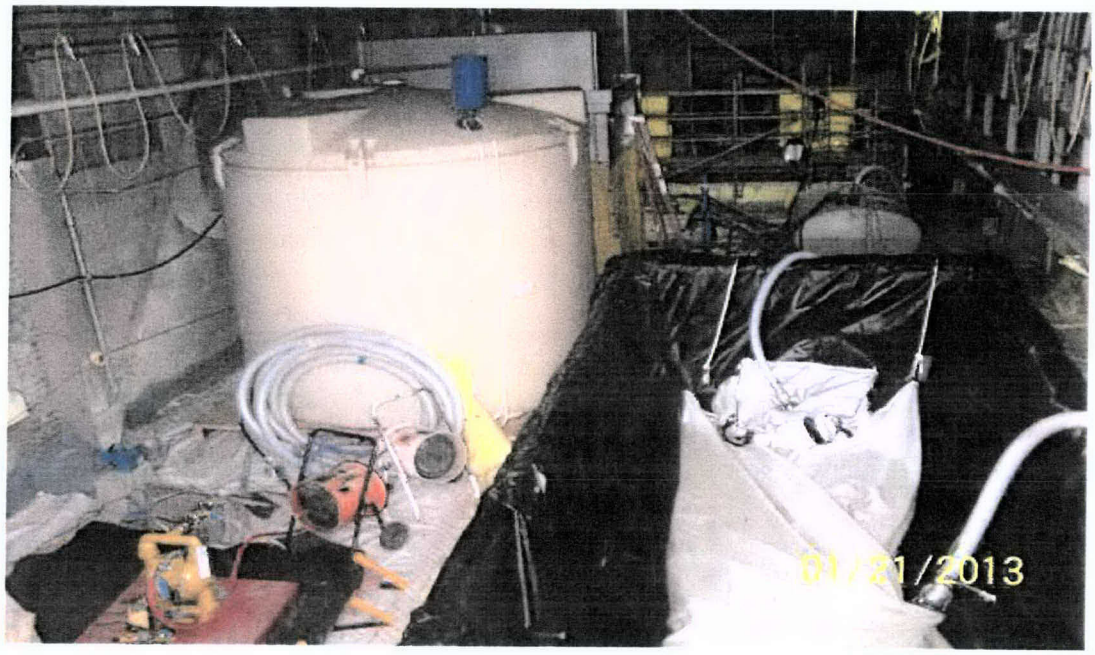


Photo 5 – Transfer Bay without Sediment Removal Equip and With Cask Guides

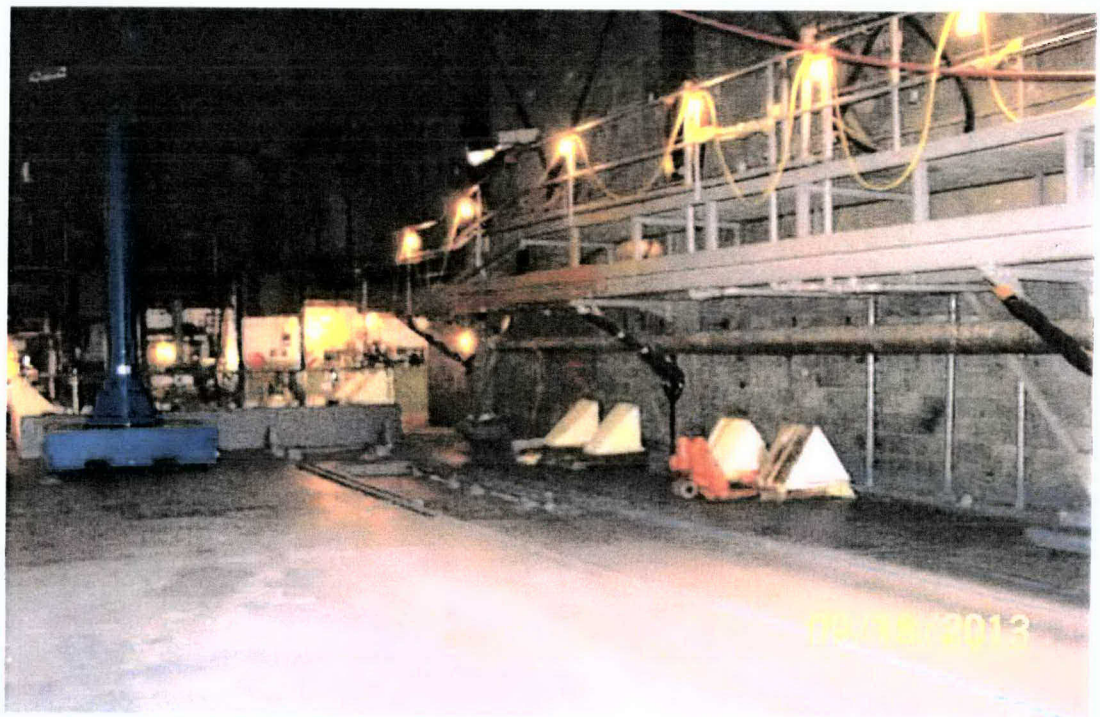


Photo 6 - Fuel Storage Basin Area

Photo 7 - Roll-up Door

Photo 8 - HEPA Units Removed, Door Installed, and Plywood to Bldg Access

Photo 9 – Equipment Yard Cleared, Fencing Removed and Fencing Stacked (Left Side in Photo)

Per clarification by R. F. Guercia, approval by DOE Contractor, Mission Support Alliance, to retain equipment for future work evolutions has been documented in Attachments 6 and 7. The equipment includes:

Wave Man Lift (Down in the FSB)
Jib Crane
String Lights
240V Heaters
Rain Tarp & 55 Gallon Drum
30 Foot Extension Ladder
Temporary Fencing Materials

The final radcon surveys of the transfer pits, access area to the transfer pits, and the -22-ft El., as well as the Transfer Bay 0-ft El., are documented in Attachments 8 and 9, and the final Industrial Hygiene reports is documented in Attachment 10.

Attachments

1. Change to B-Reactor Interim Safe Storage End-State Criteria
2. 105-B Sediment Retrieval System Design Schematic
3. EPA Concurrence to New End-State Criteria
4. Concrete Mix Design Certificate
5. ABC Asbestos Binding Compound Material Safety Data Sheet
6. MSA Concurrence to Receive Equipment – E-mail #1
7. MSA Concurrence to Receive Equipment – E-mail #2
8. WCH 105-B Rad Survey – Below Grade
9. WCH 105-B Rad Survey – 0-ft El. Fuel Transfer Bay & Fuel Storage Basin
10. WCH Industrial Hygiene Final Reports

Attachment 1

Change to B-Reactor Interim Safe Storage End-State Criteria

From: Guercia, Rudolph F (Rudy) [rudolph.guercia@rl.doe.gov]
Sent: Thursday, September 05, 2013 6:40 AM
To: Douglas, L M (Michael); McBride, Donald J; Garnett, Steven B; Allen, Mark E; Winterhalder, John A; Strand, Christopher P; Maki, Keith A
Cc: Elkins, Dan A; Howell, Theresa Q
Subject: RE: 105B Completion Documentation--partial remediation of the 118-B-8 waste site

Attachments: 13-AMRP-0175_-_Letter_1307031955_-_1.pdf; 118-B-8.pdf; Mod 189.pdf

The approach below is an acceptable interpretation completion criterion for the work of Modification 189 of the RCCC with, with a few caveats

1. Any equipment left behind should include the documentation from MSA management that it is acceptable to leave it for them—in other words, please transfer "title" of the equipment to MSA
2. I am planning to place this email (which is almost going to be a letter report) in the admin record to support the 118-B-8 waste site documentation, as well as send it to EPA. It does not need to be pretty, but it does need to be complete.
3. Any other sample results or other information that you may be taking as you back out (1H, Be, etc) would probably be useful to include.
4. Please reference the procedure number of the technical work documents used as part of this activity, so someone who completes remediation of this waste site in the future will have access to them.
5. No WSRF or CVP is required, as we have not completed the remediation of the subject waste site. Theresa's people have no action on this activity, even though it was FR work.
6. If it is too big to email in your system, you can plant mail it to me (A3-04), and I will take care of it.

R. F. Guercia, Field Engineering
U.S. Dept. of Energy, Richland Operations Office
PH: (509) 376-5494
Fax: (509) 373-0726

13-AMRP-0175_-_Letter_13070319... 118-B-8.pdf (107 KB) Mod 189.pdf (295 KB)

From: Douglas, L M (Michael) [mailto:lmdougla@wch-rcc.com]
Sent: Wednesday, September 04, 2013 4:14 PM
To: McBride, Donald J; Garnett, Steven B; Allen, Mark E; Winterhalder, John A; Strand, Christopher P; Guercia, Rudolph F (Rudy); Maki, Keith A
Cc: Elkins, Dan A
Subject: 105B Completion Documentation

I spoke with Rudy today regarding documentation for completion of 105B sediment removal. I know we had discussions in the past and decided that a Post Demolition Summary Report could

Change to B-Reactor Interim Safe Storage End-State Criteria

be used as a modified method to document completion. We currently show this on our schedule (item S2200 with a 20 day duration).
Per the conversation with Rudy, he does not think this is appropriate since this is not a demolition. He said he would be satisfied with an email from Keith with bullet points (and as much narrative as he wants to provide) that describes how we met the criteria in the attached direction (1. Sediment removed to 2 ft. below FSB, 2. Sediment capped with grout, 3. Dam removed above the old existing one), along with photographs that show the completed action. He would also like the final surveys attached to the email.
<< File: 13-AMRP-0175_-_Letter_1307031955_-_1.pdf >>
Rudy, can you please concur that this captures our discussion to document completion?

Thanks,
Mike

L. Michael Douglas
D4 100 Area Project Manager
Washington Closure Hanford, LLC.
509-420-6206

Attachment 1

Change to B-Reactor Interim Safe Storage End-State Criteria

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

13-AMRP-0175

JUL 03 2013

Ms. C. A. Johnson
Washington Closure Hanford LLC
Richland, Washington 99354

Dear Ms. Johnson:

CONTRACT NO. DE-AC06-05RL14655 – CHANGE TO B REACTOR INTERIM SAFE STORAGE END STATE CRITERIA

References:

(1) WCH ltr. to J. J. Short, RL, from S. L. Feaster, "Notice of Differing Site Conditions – Impacts on Retrieval of Sediment from 105B Transfer Pits due to Large Quantity of Debris," 171183, dtd. May 21, 2013.

(2) Contract Modification No. 189, "Definititization of REA 074," dtd. April 26, 2010.

(3) WCH ltr. to J. J. Short, RL, from S. L. Feaster, "Request for Equitable Adjustment WCH-REA-074, Revision 0, Cost Impact to B Reactor Partial Interim Safe Storage/Hazardous Material Reduction due to Changed Conditions," 147524, dtd. November 9, 2009.

(4) RL ltr. to C. G. Spencer, WCH, from J. J. Short, "Washington Closure Hanford LLC (WCH) – 105-B Interim Safe Storage (ISS) – Contract Modification 122," 09-PRO-0518, dtd. July 16, 2009.

(5) RL ltr. to C. G. Spencer, WCH, from A. H. Wirkkala, "105-B Interim Safe Storage (ISS)," 09-AMRC-0115, dtd. July 3, 2009.

The purpose of this letter is to provide additional direction related to end state criteria for the fuel storage basin area of the 105-B Reactor.

Based on requests from your staff, the U.S. Department of Energy Richland Operations Office (RL) reviewed Washington Closure Hanford LLC (WCH) progress in removing source term material from the transfer bay section of 105-B fuel storage basin. RL agrees with WCH that the end state criteria for sediment removal should be modified. The end state criteria are set forth on Page 2 of the attachment to Reference (3), within the section titled, "Transfer Pit Sediment Removal," under the sub-heading "End-State Criteria for Sediment Removal."

Attachment 1

Change to B-Reactor Interim Safe Storage End-State Criteria

Accordingly, the language under the sub-heading "End-State Criteria for Sediment Removal" shall now read as follows:

> "*End-State Criteria for Sediment Removal* – sediment retrieval operations will be considered complete when:
>
> 1. Accessible sediment has been removed to an average approximate depth of two feet below the Fuel Storage Basin Floor (FSB) level.
> 2. Grout cap has been placed over remaining sediment to the approximate depth of the FSB floor.
> 3. Remove the newly installed temporary dam/ventilation ports that extend above the original dam installed during the placement of the sediment.
>
> The horizontal and vertical surfaces of the transfer pits that were exposed to contaminated sediment will be sealed using a durable fixative (e.g., Soil Sement®) to prevent migration of any residual contamination from the concrete and tiled surfaces. Per Waste Management Plant (addendum to DOE/RL 96-17), the opening of the transfer pits will be filled with a flowable fill (nominal 300 psi strength). The retrieval equipment will be removed and packaged for transport to the Environmental Restoration Disposal Facility (ERDF) and the work areas cleaned and demobilized. Remaining operational wastes will be transferred to and ERDF can for disposal at ERDF, and outside support areas will be demobilized. The cask guide rails will be placed in the Transfer Bay adjacent to the Transfer Pits in a safe configuration."

If you have questions, please contact me or your staff may contact R. F. Guercia, of the River Corridor Closure Project, at (509) 376-5494.

Sincerely,

Jewel J. Short
Contracting Officer

AMRP:RFG

cc: S. L. Feaster, WCH
D. L. Plung, WCH
G. B. Snow, WCH

Attachment 1

Change to B-Reactor Interim Safe Storage End-State Criteria

9/5/2013

Waste Information Data System
General Summary Report

Site Code: 118-B-8 **Site Classification: Accepted** Page 1

Site Names: 118-B-8; B Reactor; 105-B Reactor Building

Site Type:	Reactor	**Start Date:**	1/1/1944
Status:	Inactive	**End Date:**	1/1/1968
Hanford Area:	100B	**Pipe Type:**	Not Specified
OU/WMA:	TBD		

Site Description:

The waste site consists of the 105-B Reactor Building complex, which originally included the inactive plutonium production reactor block with associated shielding and controls, an irradiated fuel storage basin, and contaminated portions of the reactor building. See the subsites for detailed information.

Process Description:

Water from the Columbia River was extensively treated before passing through the reactor. The water was then circulated in a single pass through the reactor process tubes, cooling tubes imbedded in the thermal shield, and reactor horizontal control rods. After exiting the reactor, the cooling water passed through a retention basin and was then discharged to the river. During reactor operations, fuel cladding failures sometimes occurred while the fuel element were in the process tubes. Over the operational lifetime of the reactor, there were several hundred such cladding failures. When fuel cladding failed, the cooling water in the affected process tubes became highly contaminated and elevated radiation levels were observed in the cooling water exiting the reactor core. This highly contaminated water was diverted to a trench for ground disposal rather than to the Columbia River. During reactor operations and reactor shutdowns, large quantities of decontamination solutions were used routinely to remove radionuclides from reactor equipment and facility surfaces. Decontamination activities took place at the dummy decontamination facility wash pad, which was adjacent to the fuel storage basin. Known decontamination solutions included chromic acid, citric acid, oxalic acid, nitric acid, sulfamic acid, sulfuric acid, and sodium fluoride. Other chemicals, including organic solvents were also used for some decontamination processes. The reactor had many safety and control mechanisms. The function of the horizontal control rods (HCRs) was to control the equilibrium and transient power levels of the reactor during routine operations and to maintain the desired neutron flux distribution. The HCRs were each about 11.0 meters (36 feet) long, with the poison (neutron absorbing) segment being about 8.96 meters (29.4 feet) long. Two of the rods were electrically driven and seven were hydraulically driven. The latter were known as shim rods and were used to achieve ongoing operation control and desired fluctuations. The vertical safety rods (VSRs) were 11.9 meter (39 foot) long, stainless steel sleeves with 0.74 millimeter (3/16 inch) thick boron stainless steel sleeves inside. Each VSR was inserted and withdrawn from the reactor via two separate cables wound around a winch located 12.2 meters (40 feet) above the top of the reactor. In cases of automatic shutdown ("scram") of the reactor, the electromagnetic clutch holding each rod would be deenergized (demagnetized), and the rods would free fall by gravity into channels penetrating the reactor. A "last ditch" safety system, a boric acid solution, was held in a large pedestal tank at the top of each reactor and connected to each of the 29 VSR channels via 1.27-centimeter (0.5-inch) pipes. The liquid boron system was later replaced by a system that used solid boron steel and carbon steel balls (Ball 3X System). The normal method for reactor refueling was displacement charge-discharge during reactor shutdown. During a refueling operation, the tubes to be discharged had their rear nozzle caps removed. New fuel elements were pushed into the process tube by a charging machine which caused the irradiated fuel elements in the tube to be displaced. The displaced irradiated fuel elements dropped into a water filled discharge chute and slid down into the metal pickup area at the end of the storage basin. The 6.1 meters (20 feet) of water in the chute area provided shielding as the elements accumulated and were sorted into buckets using long, hand-operated tongs. The buckets were then transferred by an overhead monorail system to the storage aisles where they were held for a time to allow the decay of short-lived radionuclides. Following the storage period, the buckets of fuel elements were moved by the overhead monorail system to the transfer area. At the transfer area, the irradiated

Change to B-Reactor Interim Safe Storage End-State Criteria

Site Code: 118-B-8 **Site Classification: Accepted** Page 2

fuel was loaded into casks, then raised by a crane and placed in special railroad cars for shipment to the chemical reprocessing facilities in the 200 Area.

Site Comment:

B Reactor is currently a controlled-access museum. As the world's first full-scale nuclear reactor that has been placed on the National Register of Historic Places. There is support throughout the nuclear community to preserve the reactor as a museum. Preliminary steps have begun towards preservation through the installation of visitor displays and conducting controlled tours throughout portions of the reactor working areas. Areas of residual radioactive contamination are not accessible to the general public. The basin was drained, cleaned, and surface contamination was fixed. Two 750 KVA transformers and several pieces of miscellaneous switchgear have been removed, along with the building air compressors and receivers. Roof leaks have been repaired. No dichromate staining was found during a pre-demolition walkdown of the water tunnels to the 105-B Building. The tunnels were demolished to the 105-B Building security fence line. This included cracking the bottoms of the tunnels to prevent standing water, demolishing the tops of the tunnels into the tunnels themselves, and backfilling with clean gravel. The tunnels were sealed at the fence line with a combination of steel bracing and railroad ties (discussion with S. G. Marske, September 2004). The 105-B Reactor was transferred from Washington Closure Hanford (WCH) to Fluor Hanford (FH) on 3/16/2009. WCH is still responble for managing nuclear materials within the transfer pit and reactor core.

Release Description:

It is suspected that the irradiated fuel storage basin leaked for a number of years prior to deactivation. The leak rate was small, and the location of the leak was never identified. The soil has not been characterized, but the radionuclide inventory is estimated to be low when compared to the total inventory in the reactor.

SubSites:

SubSite Code: 118-B-8:1
SubSite Names: 118-B-8:1; 105-B Reactor Building
Classification: Accepted
ReClassification: None

Description:

The reactor rests on a 7.0-meter (23-foot) thick concrete foundation topped with cast iron blocks that served as a thermal shield. The building walls consists of reinforced concrete in the lower portions and concrete blocks in the upper portions with thickness varying from 0.9 to 1.5 meters (3 to 5 feet). The roof is composed of precast concrete roof tiles, except for the discharge area enclosure and inner horizontal rod room where the roof was composed of 1.8-meter (6-foot) thick reinforced concrete.

The reactor core consisted of a graphite "stack" that measured 8.5 meters (28 feet) from front to rear, 11.0 meters (36 feet) from side to side, and 11.0 meters (36 feet) from top to bottom. The stack was pierced front to rear by 2,004 process channels that held the fuel elements. Nine horizontal channels for control rods entered from the left side and 29 vertical channels for safety rods entered from the top. Six test holes labeled A through F, leading from the right, existed for irradiation of experiments, foils, counters, ionization chambers, and special samples. The horizontal control rod (HCR) and vertical safety rod (VSR) channels, as well as the test holes, were lined with a thin sheet of aluminum known as a "thimble".

The graphite core is surrounded by a cast iron thermal shield layer. Cooling for the top, side, and bottom shields were provided by circulating water tubes imbedded in the blocks. The entire reactor block was then enclosed in a welded steel box that functioned to confine the inert gas atmosphere within the reactor. Expansion joints were placed on the corners of the block to allow for thermal expansion and expansion bellows were located at each process tube opening. The bellows served as gas seals as the process tubes expanded and contracted with temperature and with the distortions of the graphite.

The fuel storage basin is located at the rear of the reactor. The concrete basin area served as a collection, storage, and transfer facility for the irradiated fuel elements discharged from the reactor. The water in the basins served both as coolant and as shielding. The basin consisted of a discharge chute and fuel element pickup area, a storage area, a transfer area, and a wash pad area.

Change to B-Reactor Interim Safe Storage End-State Criteria

Site Code: 118-B-8 **Site Classification: Accepted** **Page 3**

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
2. Hanford B Reactor Building Hazard Assessment Report, BHI-01282, Rev 0.
3. 105-B Reactor Facility Museum Phase I Feasibility Study Report, BHI-00076, Rev 01.
4. 8/1/2000, Field Logbook for 100-F Orphan Sites Evaluation, EL-1583-1 through EL-1583-5.

SubSite Code: 118-B-8:2
SubSite Names: 118-B-8:2; 105-B French Drains
Classification: Accepted
ReClassification: None

Description:

The subsite consists of fourteen French drains around the periphery of the 105-B Reactor Building. During two walk downs in September 2004, the 14 suspect French drain locations were recorded using global positioning system (GPS) instrumentation and were photographed.
No information could be found to corroborate what liquid waste streams from the building were discharged to each of these suspect drains. Because B Reactor was a first-of-a-kind operation and a national priority, it is prudent to assume that any of these suspect drains could have received unplanned and/or unrecorded releases of both radioactive and nonradioactive CERCLA wastes. It should be noted that the soil associated with some of the French drains at both D Reactor and F Reactor have tested positive for heavy metals and fission products. (See sites 100-F-10, 116-D-6 and 116-F-11.)
French drains were designed to receive nonradioactive liquids from the 105-B Reactor Building, via over-ground and/or underground piping. The discharges included steam condensate and floor drain wastes. The liquids would percolate through the gravel/soil fill, and out the open end at the bottom of the drain into the native soil. Because of variables, each of the suspect drain sites will require further investigation prior to cleanup activities, including removal of covers and visual inspection and sampling of drain fill material and surrounding native soil.
During walkdowns on 9/7/04 by M. R. Schwab and J. C. Womack and 9/13/04 by J. P. Kiesler and W. Coffin around the periphery of the 105-B Building, 14 suspect French drain locations were recorded using global positioning system (GPS) instrumentation and were photographed. Most of the suspect drains had protective covers, and no visual inspection was attempted beneath those covers. Some of the covers had been penetrated by over-ground piping, and others had holes that suggested previous discharge points. Other French drains may have received discharges from underground piping.
Contaminants of potential concern (COPCs) for the French Drains included gamma emission analysis (GEA), gross alpha, gross beta, hexavalent chrome, inductively coupled plasma (ICP) metals, and polychlorinated biphenyls (PCBs). Several of these are methods for determining general fission products; however, the statement is consistent with current cleanup practices as listed in the sampling and analysis plans (SAPs).

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.

SubSite Code: 118-B-8:3
SubSite Names: 118-B-8:3; 105-B Miscellaneous Pipeline Segments
Classification: Accepted
ReClassification: None

Description:

The subsite consists of pipeline segments (DS-100BC-013, 014, 017, and 018, 024, 025, 026, 027, 028, 035, 041 and 043), that were deferred from 100-B-21. Documentation states that the segments were within the 7.6 meter (25 foot) buffer zone, but had been identified during removal of effluent pipelines and site characterization in the 100-B/C Area. Pipelines that went toward the reactor were cut approximately 15.2 meters (50 feet) from the reactor footprint so as not to disturb the 105-B Reactor structure. The numbering system for the segments was created and assigned by the subcontractor as they were recorded in the field.

Change to B-Reactor Interim Safe Storage End-State Criteria

Site Code: 118-B-8 **Site Classification: Accepted** Page 4

There were two pipelines associated with the 120-B-1 Battery Acid Sump inlet and outlet pipelines that were also left in place. They were cut off and grouted at the edge of the 120-B-1 remediation footprint. These have been assigned to the 118-B-8:3 subsite (per RSVP-2006-057). Other pipelines in this subsite include the southern most part of the 1607-B2 septic system collection lines. They were not remediated with the 1607-B2 site because of their proximity to the reactor facility. They will be addressed with disposition of the 105-B facility (per RSVP-2006-055).

References:

1. 6/6/2007, Reconfiguration of pipeline discovery segments originally assigned to 100-B-21. Deferred segments went to 118-B-8, 100-B-14, and 100-B-7., 100-B-21 Pipeline segments.
2. 9/25/2006, REMAINING SITES VERIFICATION PACKAGE FOR THE 120-B-1, 105-B BATTERY ACID SUMP (Attachment to Waste Site Reclassification Form 2006-057), RSVP-2006-057, Rev 0.
3. REMAINING SITES VERIFICATION PACKAGE FOR THE 1607-B2 SEPTIC SYSTEM AND 100-B-14:2 SANITARY SEWER SYSTEM (Attachment to Waste Site Reclassification Form 2006-055), RSVP-2006-055, Rev 0.

Waste Information:

Type:	Equipment	**Amount:**	
Category:	Mixed	**Units:**	Not Specified
Physical State:	Solid	**Reported Date:**	

Description:

This Reactor building contained an estimated 23,500 curies of radionuclides, 79,800 kilograms (88 tons) of lead, and 227 kilograms (500 pounds) of cadmium.

References:

1. KH Cramer, Hanford Site Waste Management Units Report, May 1987.

Type:	Asbestos (friable)	**Amount:**	
Category:	Hazardous/Dangerous	**Units:**	Not Specified
Physical State:	Solid	**Reported Date:**	

Description:

The Reactor Building is estimated to contain 85.0 cubic meters (3000 cubic feet) of asbestos.

References:

1. KH Cramer, Hanford Site Waste Management Units Report, May 1987.

Dimensions:

Sq. Area:	3,948.38	Square Meters	42499.96	Square Feet
Site Shape:	Not Specified			

Comments:

These dimensions are for the Reactor Building.

References:

1. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588

Regulatory Information:

Change to B-Reactor Interim Safe Storage End-State Criteria

Site Code: 118-B-8 **Site Classification: Accepted** Page 5

Programmatic Responsibility

Responsible Contractor/Subcontractor:	MSA	Mission Support Alliance
Reclassifying Contractor/Subcontractor:		None
Responsible Project:		Not Specified

Site Evaluation

Solid Waste Management Unit:	No
TPA Waste Management Unit Type:	Inactive Contaminated Structure

Permitting

RCRA Part B Permit:	No	**TSD Number:**	
RCRA Part A Permit:	No	**Closure Plan:**	No
RCRA Permit Status:	Not Specified		
Septic Permit:	No	**216/218 Permit:**	
Inert LandFill:	No	**NPDES:**	
Air Operating Permit:	No	**State Waste Discharge Permit:**	
Air Operating Permit Number(s):			

Tri-Party Agreement

Lead Regulatory Agency:	EPA
Unit Category:	CERCLA Remedial/Removal Action
TPA Appendix:	None

Remediation and Closure

Decision Document:	None
Decision Document Status:	None
Closure Document:	None
Closure Type:	Not Specified

Post Closure Requirments:

Images:

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_01.gif **Date Taken:** 4/1/1963

Description:

A figure from HW-74094 showing a cross-section of the reactor confinement system. The date provided is the date of the document. The figure also has a number of G-132-456

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_02.gif **Date Taken:** 4/1/1963

Description:

A high resolution scan of the previous image. A figure from HW-74094 showing a cross-section of the reactor confinement system. The date provided is the date of the document The figure also has a number of G-132-456.

Change to B-Reactor Interim Safe Storage End-State Criteria

Site Code: 118-B-8 **Site Classification: Accepted** Page 6

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_03.jpg **Date Taken:** 9/1/2004
Description:
Photo taken during walkdown is of Drain #1.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_04.jpg **Date Taken:** 9/1/2004
Description:
105-B French Drain #18 has a rusted metal cover.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_05.jpg **Date Taken:** 9/1/2004
Description:
French Drain #19 located along the west wall of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_06.jpg **Date Taken:** 9/1/2004
Description:
French Drain #20 located near southwest corner of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_07.jpg **Date Taken:** 9/1/2004
Description:
French Drain #21 located along south wall of 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_08.jpg **Date Taken:** 9/1/2004
Description:
French Drain labeled 22 by walkdown team located along south wall of 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_09.jpg **Date Taken:** 9/1/2004
Description:
French Drain identified as #23 is the white-painted, isolated pipe that directly enters the soil.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_10.jpg **Date Taken:** 9/1/2004
Description:
French Drain #4 is adjacent to the southeast corner of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_12.jpg **Date Taken:** 9/1/2004
Description:
This French Drain #11 is located about 5 meters from the northeast corner of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_13.jpg **Date Taken:** 9/1/2004
Description:
French Drain #12 is a confined space near a northeast corner of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_14.jpg **Date Taken:** 9/1/2004
Description:
French Drain #13 photo shows a clay or concrete pipe adjacent to a northeast corner of the 105-B Building.

Change to B-Reactor Interim Safe Storage End-State Criteria

Site Code: 118-B-8 **Site Classification: Accepted** Page 7

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_15.jpg **Date Taken:** 9/1/2004

Description:

French Drain #14 is located approximately 2.5 meters from the northeast corner of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_16.jpg **Date Taken:** 9/1/2004

Description:

French Drain #15 is a clay pipe on the northwest corner of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_17.jpg **Date Taken:** 9/1/2004

Description:

French Drain #16 is located near the northwest corner of the 105-B Building.

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_20.jpg **Date Taken:** 9/3/2003

Description:

Pipeline on left is a concrete pipeline that continues south and into the 105-B Reactor. DS-100BC-027, 118-B-8:3

Pathname: //mapweb.rl.gov/widsimg/100b/0110/0110_21.jpg **Date Taken:** 9/3/2003

Description:

Inside pipeline. DS-100BC-027 or 028, 118-B-8:3

References:

1. L.A. Dietz, 12/21/2004, WIDS Submissions - references for 100-B-18, 100-B-19, 100-B-19, 100-B-20, 100-B-21, 100-B-22, 100-B-23, 118-C-3:3 and 126-B-2, 118203.
2. 6/6/2007, Reconfiguration of pipeline discovery segments originally assigned to 100-B-21. Deferred segments went to 118-B-8, 100-B-14, and 100-B-7., 100-B-21 Pipeline segments.
3. Hanford B Reactor Building Hazard Assessment Report, BHI-01282, Rev 0.
4. 105-B Reactor Facility Museum Phase I Feasibility Study Report, BHI-00076, Rev 01.
5. KH Cramer, Hanford Site Waste Management Units Report, May 1987.
6. Mike Hughes, 11/11/1991, Comments on the 1992 Hanford Site Waste Management Units Report Draft.
7. Linda Dietz, 1/21/2004, Subsite information for 100-B-14, 100-B Area Process and Sanitary Sewer Underground Pipelines.
8. K. M. Harmon, et al, Resource Book - Decommissioning of Contaminated Facilities at Hanford (Waste Management Facilities) App. XI (Draft), PNL-MA-588.
9. R. W. Carpenter, 5/18/1994, 100-B Area Technical Baseline Report, WHC-SD-EN-TI-220.
10. 8/1/2000, Field Logbook for 100-F Orphan Sites Evaluation, EL-1583-1 through EL-1583-5.

Attachment 1

Change to B-Reactor Interim Safe Storage End-State Criteria

NOT SPECIFIED /OTHER

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE

PAGE 1 OF 3 PAGES

2. AMENDMENT/MODIFICATION NO.: 189

3. EFFECTIVE DATE: See Block 16C

4. REQUISITION/PURCHASE REQ. NO.: 10EM001969

5. PROJECT NO. (If applicable)

6. ISSUED BY — CODE 00601

Richland Operations Office
U.S. Department of Energy
Richland Operations Office
P.O. Box 550, MSIN A7-80
Richland WA 99352

7. ADMINISTERED BY (If other than Item 6) — CODE 00601

Richland Operations Office
U.S. Department of Energy
Richland Operations Office
P.O. Box 550, MSIN A7-80
Richland WA 99352

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)

WASHINGTON CLOSURE HANFORD, LLC
Attn: Neil Brosee, President
2620 Fermi Avenue
Richland WA 99354

CODE 167280762 — FACILITY CODE

(x) 9A. AMENDMENT OF SOLICITATION NO.

9B. DATED (SEE ITEM 11)

X 10A. MODIFICATION OF CONTRACT/ORDER NO. DE-AC06-05RL14655

10B. DATED (SEE ITEM 13) 03/23/2005

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.
Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

CHECK ONE

A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).

C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

X FAR 52.243-2-Changes-Cost Reim (8/87)-Alt I and Mutual Agreement of the Parties

D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor ☐ is not, ☒ is required to sign this document and return 1 copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Tax ID Number: 94-1381538
DUNS Number: 167280762
Subj to Retent: N
The purpose of this modification is to:

A. Definitize the following Request for Equitable Adjustment (REA), which was submitted to RL by WCH on November 9, 2009 (WCH CCN 147524): WCH-REA-074, Revision 0, "Cost Impact to B Reactor Partial Interim Safe Storage/Hazardous Material Reduction Due to Changed Conditions."

Continued ...

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print): M.N. Brosee, President

16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print): Jewel J. Short

15B. CONTRACTOR/OFFEROR (Signature of person authorized to sign) — 15C. DATE SIGNED 04/22/10

16B. UNITED STATES OF AMERICA (Signature of Contracting Officer) — 16C. DATE SIGNED 4-26-10

NSN 7540-01-152-8070
Previous edition unusable

STANDARD FORM 30 (REV. 10-83)
Prescribed by GSA
FAR (48 CFR) 53.243

NOT SPECIFIED /OTHER

Attachment 1

Change to B-Reactor Interim Safe Storage End-State Criteria

NOT SPECIFIED /OTHER

CONTINUATION SHEET	REFERENCE NO. OF DOCUMENT BEING CONTINUED	PAGE	OF
	DE-AC06-05RL14655/189	2	3

NAME OF OFFEROR OR CONTRACTOR
WASHINGTON CLOSURE HANFORD, LLC

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	B. The following summarizes the cost and fee negotiated for WCH-REA-074: Cost: $2,645,702 Fee: $ 184,267 Total: $2,829,969 C. The amounts negotiated above are subject to downward adjustment based on the results of the forthcoming Defense Contract Audit Agency (DCAA) audit of the Contractor's proposed waste operations cost rates. D. Non-Site Specific Support (NSSS) costs which are allocable to this work will be negotiated at a later date after completion of the DCAA audit of the Contractor's proposed NSSS cost rates. E. This modification does not add additional funds to the contract. Accordingly, work under the contract, such as that described herein, must be performed within the amount of funds which have been incrementally allotted to the contract in accordance with Clause I.57 - FAR 52.232-22 - Limitation of Funds (Apr 1984). F. Contractor Statement of Release: In consideration of the modification agreed to herein as complete equitable adjustment for WCH-REA-074, the Contractor hereby releases the Government from any and all liability under this contract for further equitable adjustments attributable to such facts or circumstances giving rise to WCH-REA-074. The only exception to this release is the following: the Contractor reserves the right to submit a future REA for schedule impact and escalation releted to WCH-REA-074. G. The following will be updated in a separate bilateral modification (as applicable): Section B, Table B.1, "Incentive Fee Structure," Table B.2, "Schedule of Quantities and Target Cost," Section C, Table C.1, "River Corridor Work Summary," and Section J, Attachment J-1, "River Corridor Closure Contract Work Scope." There are no other changes to the terms and conditions of the contract. Continued ...				

NSN 7540-01-152-8067

OPTIONAL FORM 336 (4-86)
Sponsored by GSA
FAR (48 CFR) 53.110

NOT SPECIFIED /OTHER

Attachment 1

Change to B-Reactor Interim Safe Storage End-State Criteria

NOT SPECIFIED /OTHER

CONTINUATION SHEET	REFERENCE NO OF DOCUMENT BEING CONTINUED	PAGE	OF
	DE-AC06-05RL14655/189	3	3

NAME OF OFFEROR OR CONTRACTOR
WASHINGTON CLOSURE HANFORD, LLC

ITEM NO (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	End of Modification 189 Period of Performance: 03/23/2005 to 09/30/2015				

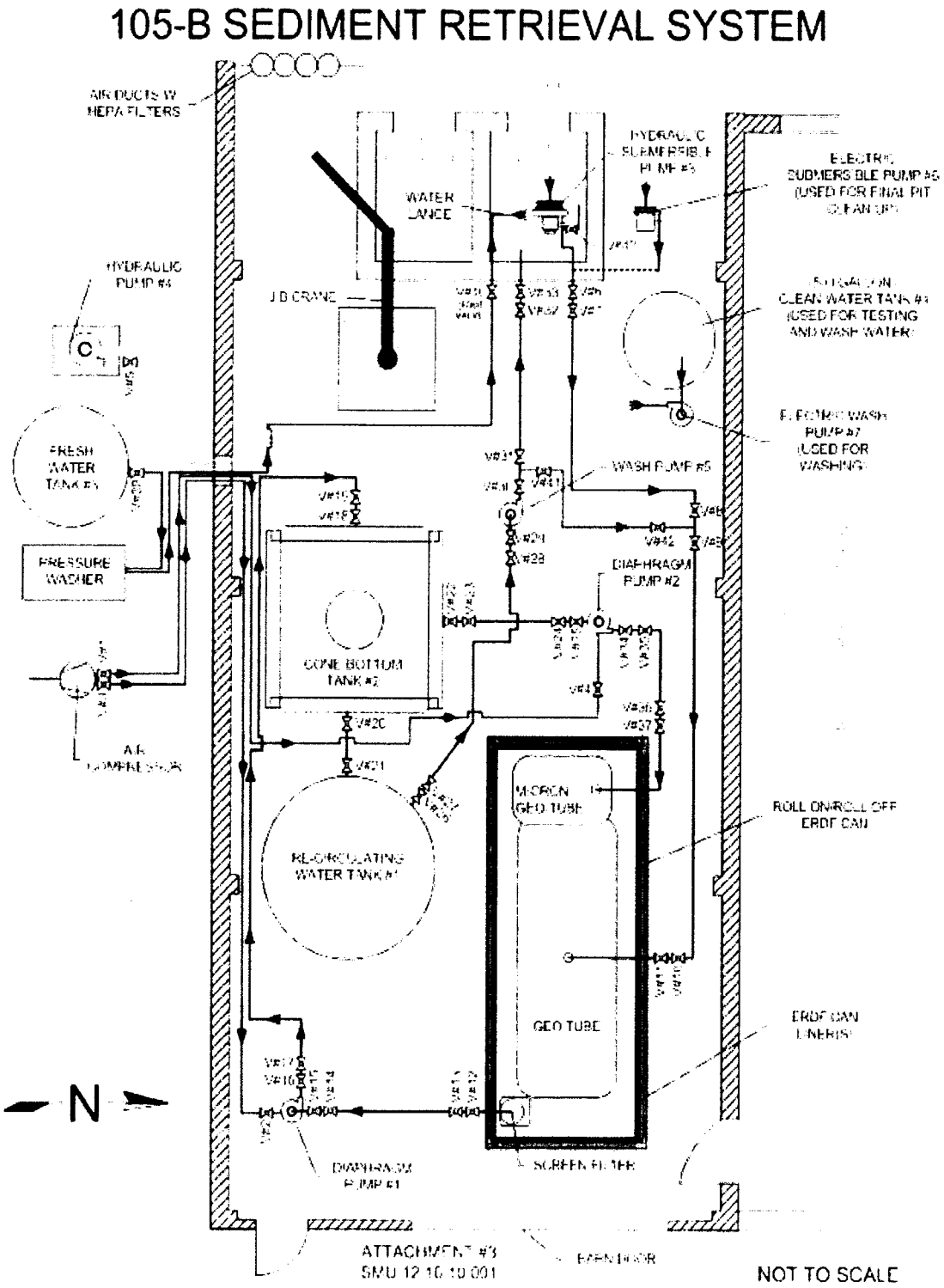
NSN 7540-01-152-8067

OPTIONAL FORM 336 (4-86)
Sponsored by GSA
FAR (48 CFR) 53.110

NOT SPECIFIED /OTHER

Attachment 2

105-B Sediment Retrieval System Design Schematic



Attachment 3

EPA Concurrence to New End-State Criteria

From: Douglas, L M (Michael)
Sent: Monday, September 30, 2013 6:50 AM
To: Allen, Mark E
Subject: FW: Grout Cap of Remaining Material in the 105B Fuel Transfer Pit

The email from Mr. Faulk below granted EPA concurrence to grout.

md

L Michael Douglas
D4 100 Area Project Manager
Washington Closure Hanford, LLC.
509-420-6208

From: Strand, Christopher P
Sent: Tuesday, August 13, 2013 9:49 AM
To: Snow, Gary B; Douglas, L M (Michael); Allen, Mark E; Winterhalder, John A; Saueressig, Daniel G; Garnett, Steven B
Subject: FW: Grout Cap of Remaining Material in the 105B Fuel Transfer Pit

Gentlemen

EPA has approved clarification to the 105B Air Monitoring Plan and Off Site Dose Calculation for placement of the grout in the 105B fuel transfer pit. Feel free to proceed as planned

Thanks

Chris
554-2720

1

From: Faulk, Dennis [mailto:Faulk.Dennis@epa.gov]
Sent: Tuesday, August 13, 2013 8:58 AM
To: Strand, Christopher P; Gadbois, Larry E; Guzzetti, Christopher; Buelow, Laura; Guercia, Rudolph F
Subject: RE: Grout Cap of Remaining Material in the 105B Fuel Transfer Pit

Chris,

EPA concurs with the approch outlined below for grouting the remaining sediment in place in the 105B fuel transfer pit. Please attached this email to the current air monitoring plan as the record copy.

Dennis

From: Strand, Christopher P <cpstrand@wch-rcc.com>
Sent: Tuesday, August 13, 2013 8:25 AM
To: Faulk, Dennis; Gadbois, Larry; Guzzetti, Christopher; Buelow, Laura; Guercia, Rudolph F
Subject: Grout Cap of Remaining Material in the 105B Fuel Transfer Pit

Dennis, Larry, Chris,
With Laura out of the office this week I wish to submit the following information on DOE's behalf to complete work in the 105B fuel transfer pit This information serves as a clarification to the Revision 1 of the Air Monitoring Plan (AMP) for the 105B Reactor Building and Revision 1 of the 105B Total Effective Dose Equivalent Calculation (TEDE) originally approved by DOE and EPA in November of 2012
The 105B AMP, Revision 1 and the TEDE Revision 1 were developed to support a modification to the removal technique for fuel storage basin sediment and materials that were deposited in the fuel transfer pit Removal of this material and majority of the radiological inventory has been completed to the limits of the retrieval technology used The remainder of debris will be left in place and long-term stabilized with a grout cap Because placement of a grout cap is not an activity described in the AMP and TEDE this information serves as clarification Best Available Radionuclide Control Technology (BARCT) techniques and air monitoring described in the current AMP will be performed during grout placement. BARCT and Air Monitoring are discussed in Sections 5 0 and 6 0 respectively of the AMP, which is attached for your reference EPA's concurrence is requested for this clarification it is planned to place the grout cap in the fuel transfer pit this Thursday, August 15th EPA's consideration is greatly appreciated and do not hesitate to call if there are any questions
Thank you
Chris
554-2720
<<B Reactor AMP Rev 1 Final pdf>>

Attachment 4

Concrete Mix Design Certificate

CENTRAL PRE-MIX CONCRETE CO.

QA-100

CONCRETE MIX DESIGN CERTIFICATE

11919 Harris Rd. - Pasco, Wa. 99301 (509) 545-8510

Project:	Hanford D-4 Project	Date:	April 1, 2010
Contractor:	George Grant	Design Efflux:	< 20 Seconds
Project Location:	Hanford, WA	Air Content:	1.0%
Mix / Description:	354250 Internal Void Fill	Water/Cement Ratio:	525 / 800 = 0.66
Strength Required:	2500 PSI @ 28 DAYS	Cement / Type:	ASTM C-150 Type I - II

	Aggregates	Bulk Specific Gravity
Gravel	1-1/2" TO 3/4"	2.70
	3/4" TO #4	2.70
	3/8" TO #8	2.74
Sand	ASTM Concrete Sand	2.69
	ASTM Mortar Sand	2.67

Source of Aggregates: Central Pre-Mix Concrete Co. Pasco Pit #FN-50 / Richland Pit #R-101

Material	Description	Absolute Volume	Saturated Surface Dry Weights
Fly Ash Type "F"	3.2 SACK	2.35	300
Cement	5.3 SACK	2.55	500
Water	63.0 GALLONS	8.42	525
Gravel			
	1-1/2" TO 3/4"	0.00	0
	3/4" TO #4	0.00	0
	3/8" TO #8	0.00	0
Sand	Concrete Sand	13.42	2250
	Mortar Sand	0.00	0
Air Content	1.00%	0.27	
Retarder			15 oz/yd
	TOTAL:	27.00	3575

Admixtures: All admixtures to be used according to manufacturers specifications.
Use WR GRACE RECOVER at 15 ounces per yard for retardation.

Remarks: Efflux time measured per ASTM C939.

S005691A00-05-01Q-001

Signed: Michael Liniger

Title: South Region Lead Quality Control Technician

RECEIVED
MAR 31 2010
WCH - DOCUMENT CONTROL

Attachment 5

ABC Asbestos Binding Compound Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET

ABC® ASBESTOS BINDING COMPOUND

MSDS DATE: 03/14/12

HANFORD MSDS#064434A

Per OSHA-recommended ANSI Z400 1-2004 standard format & in accordance with European standard format

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

Product Name: ABC® Asbestos Binding Compound
Product Description: Asbestos Binding Compound - Clear
Product Code: 6422

Manufacturer: Fiberlock Technologies, Inc.
Address:
Fiberlock Technologies
150 Dascomb Road
Andover MA, 01810

Contact Info
Tel: (800) 342-3755
Fax: (978) 475-6205

INTERNATIONAL 24 HOUR EMERGENCY Phone: 813-248-0585

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Non-hazardous
Latex emulsion coating comprised of water, fillers, additives, and latex emulsion resin

Hazardous

Chemical Name	CAS#	Percent	Exposure Limits
No hazardous ingredients			

Note: Per 29CFR 1910.1200 (g) (2) (i) (C) (2), only hazardous substances present in excess of 1.0% by weight (or 0.1% for carcinogens) must be listed on an MSDS.

SECTION 3: HAZARDS IDENTIFICATION

Emergency Overview:

Product Description: This product is a pigmented liquid

Health Hazards:
Eyes: May cause slight irritation.
Skin: Substance may cause slight skin irritation
Inhalation: May cause irritation of respiratory tract
Ingestion: Ingestion may cause gastrointestinal irritation, nausea, and vomiting.

Flammability Hazards: This product is not flammable. If this product is involved in a fire, the decomposition products generated will include irritating vapors and gases and some carbon monoxide

Reactivity Hazards: This product is not reactive.

Environmental Hazards: Although release of this product to the environment is not expected to cause significant adverse effect, all releases should be avoided

SECTION 4: FIRST AID MEASURES

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes and consult physician

Skin: Wash skin thoroughly with soap and water. If drenched with product, remove and wash clothing before reuse.

Ingestion: Ingestion If victim is conscious give 2 glasses of water. Call a physician

Inhalation: N/A

SECTION 5: FIRE-FIGHTING MEASURES

Product is non-combustible

Flash point:	Autoignition Temperature
F: Not flammable	F: Not Established
C: Not flammable	C: Not Established

Extinguishing Media

Use extinguishing media appropriate for surrounding fire

Water Spray	OK
Carbon Dioxide	OK
Foam	OK
Dry Chemical	OK
Halon	OK
Other	Any "ABC" Class

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures:

Personal Precautions: Do not get in eyes. Do not take internally. Avoid skin contact. Prevent prolonged or repeated breathing of vapor or spray mists. Keep unnecessary people away. Floor may be slippery, use care to avoid falling. Ventilate the area. Remove with inert absorbent

Environmental Precautions: Keep spills and cleaning run-offs out of municipal sewers and open bodies of water. Comply with local, state and national regulations.

SECTION 7: HANDLING AND STORAGE

Handling and Storage:

Storage: Store in a cool, dry place
Keep closure tight and containers upright to prevent leakage

Precautionary labeling: "KEEP FROM FREEZING"

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Precautions:
Use only with adequate ventilation
Avoid contact with skin and eyes. Avoid breathing vapor and spray mist
Wash hands after using

Work Hygienic Practices: Avoid contact with skin. Do not get in eyes. Do not take internally. Avoid breathing vapors or spray mists

Ventilation: Use in well-ventilated areas. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

Respiratory Protection: If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2. When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive

Eye Protection: Use approved safety eyewear including side shields, chemical goggles or face shields

Skin Protection: Wear neoprene or rubber gloves to prevent skin contact if prolonged skin contact is likely. Wash hands before eating, smoking or using the wash room

Page 1 MSDS for Fiberlock Technologies ABC® Asbestos Binding Compound No. 6422 Clear

ABC Asbestos Binding Compound Material Safety Data Sheet

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Viscous liquid	**Viscosity @ 77°F:**	60-75 Kreb Units ± 5.0
Odor:	Slight odor	**Percent Solids By Weight:**	51.4% ± 2.0
Boiling Point:	212°F	**Solubility in Water:**	Total
Freezing Point:	32°F	**Vapor Density @ 68°F:**	Heavier than air
Vapor Pressure (mmHg) @ 68°F:	17	**Specific Gravity (H2O = 1) @ 68°F:**	1.1 ± 0.1
Weight Per Gallon:	9.0 lbs/gal ± 0.5	**Evaporation Rate:**	Slower than ether

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable

Incompatibility: (Material to Avoid). Avoid contact with strong oxidizing agents (e.g. nitric acid, permanganates), etc

Hazardous Decomposition or By-Products: Some carbon monoxide.

Hazardous Polymerization: Will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological Information:

No Data Available

SECTION 12: ECOLOGICAL INFORMATION

Ecological Information:

No Data Available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Waste from this product is not hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261. If incinerating, do so in an approved facility, and do not incinerate closed container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14: TRANSPORT INFORMATION

U.S. Department of Transportation

Proper Shipping Name: Non-Hazardous Water-Based Paint
Hazard Class: "Not Regulated"
Label Statement: "Keep From Freezing"
Class 55 Non-Hazardous Water-Based Paint

Canada (TDG)
Not Regulated for Transportation

IMO
Not Regulated for Transportation.

SECTION 15: REGULATORY INFORMATION

U.S. Federal Regulations:

TSCA (TOXIC SUBSTANCE CONTROL ACT): All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): Releases of this material to air, land, or water are not reportable to the National Response Center under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or to state and local emergency planning committees under the Superfund Amendments and Reauthorization Act (SARA) Title III Section 304.

SARA TITLE III: No ingredients in this product are subject to SARA 313 (40 CFR 372.65C) Supplier Notification.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No Components of this product are on the California Proposition 65 lists.

CANADA DSL: All components are listed or exempt.

SECTION 16: OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

To comply with New Jersey DOH Right-To-Know labeling law (NJAC 8:59 – 5:1 & 5:2)

CAS. No..	CHEMICAL INGREDIENTS
7732-18-5	Water
25265-77-4	2, 2, 4-Trimethyl-1-3, pentanediol monoisobutyrate
Not Available +	Proprietary surfactant
Not Available +	Latex resin solids
(+) Contents Partially Unknown	

HMIS HAZARD RATING			
Health 1	Flammability 0	Physical Hazard 0	Personal Protection A
HAZARD INDEX: 0=Minimal, 1=Slight, 2=Moderate, 3=Serious, 4=Severe			
PERSONAL PROTECTION CODE:			
A=Safety glasses			

Warning! If you scrape, sand or remove old paint, you may release lead dust. LEAD IS TOXIC. EXPOSURE TO LEAD DUST CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a NIOSH-approved respirator to control lead exposure. Clean up carefully with a HEPA vacuum and wet mop. Before you start, find out how to protect yourself and your family by contacting the National Lead Information Hot line at 1-800-424-LEAD (5323) or log on to: www.epa.gov/lead

HANFORD

MSDS#064434A

Attachment 6

MSA Concurrence to Receive Equipment – E-mail #1

Allen, Mark E

From: Christensen, Kirk D [Kirk_D_Christensen@rl.gov]
Sent: Monday, September 09, 2013 10:00 AM
To: Maki, Keith A
Cc: Haggerty, Kevin D
Subject: RE: materials at 105B

Sounds good ... use this email as your approval to leave the items listed below. Thanks

Kirk Christensen
Manager
B Reactor Preservation Project
373-4510/430-5564

From: Maki, Keith A [mailto:kamaki@wch-rcc.com]
Sent: Monday, September 09, 2013 10:00 AM
To: Haggerty, Kevin D; Christensen, Kirk D
Cc: Douglas, L M (Michael); Garnett, Steven B
Subject: RE: materials at 105B

Kirk & Kevin,

Below is a list of the items that we will be leaving in the fuel storage basin (FSB) and in the transfer bay.

Wave Man Lift (Down in the FSB)
Jib Crane
String Lights
240V Heaters
30 foot extension ladder

These items will be very helpful in supporting basin work at a later date.

Please respond to this email stating the this is acceptable.

Thanks,

Keith Maki
WCH Subcontract Technical Rep
509-539-9495

From: Haggerty, Kevin D [mailto:Kevin_D_Haggerty@rl.gov]
Sent: Monday, August 26, 2013 8:10 AM
To: Maki, Keith A
Subject: materials

Keith,

You can leave whatever you think our project would need to support work in the basin at a later date, ladders, light stands, heaters, etc

9/27/2013

Kevin D Haggerty
105 B Reactor
376-9135/430-3156

Attachment 7

MSA Concurrence to Receive Equipment – E-mail #2

Allen, Mark E

From: Christensen, Kirk D [Kirk_D_Christensen@rl.gov]
Sent: Tuesday, September 24, 2013 7:04 AM
To: Maki, Keith A; Haggerty, Kevin D
Subject: RE: Look About at 105B Today

Keith,

I agree to the message below.

Kirk Christensen
Manager
B Reactor Preservation Project
373-4510/430-5564

From: Maki, Keith A [mailto:kamaki@wch-rcc.com]
Sent: Monday, September 23, 2013 4:59 PM
To: Christensen, Kirk D; Haggerty, Kevin D
Subject: Look About at 105B Today

Kirk,

Just wanting to confirm on what we talked about during our walk around today on the sediment removal project demob. We will move the extension ladder over into the transfer bay area and we smoothed out some of the gravel today. We will be leaving the rain tarp and the drum in the transfer bay to capture the rain water. We are also leaving the tritium exit signs and the carboy that has the brown liquid in it in the southeast corner of the fuel storage basin. These two items were there before we started the project. I showed you where we painted over the fixed contamination in front of the transfer bay roll-up door and we giving MSA all the temporary fencing and will stack it just southeast of the transfer bay in the area that we agreed too.

Please respond to this email stating the this is acceptable.

Thanks,

Keith Maki
WCH Subcontract Technical Rep
509-539-9495

Attachment 8

WCH 105-B Rad Survey – Below Grade

Allen, Mark E

From:	Cuevas, Ronald K
Sent:	Monday, September 09, 2013 3:29 PM
To:	Maki, Keith A
Subject:	Emailing: 105B below Grade final survey
Attachments:	105B below Grade final survey.pdf

105B below Grade final survey....

The message is ready to be sent with the following file or link attachments:

105B below Grade final survey

Note: To protect against computer viruses, e-mail programs may prevent sending or receiving certain types of file attachments. Check your e-mail security settings to determine how attachments are handled.

Attachment 8

WCH 105-B Rad Survey – Below Grade

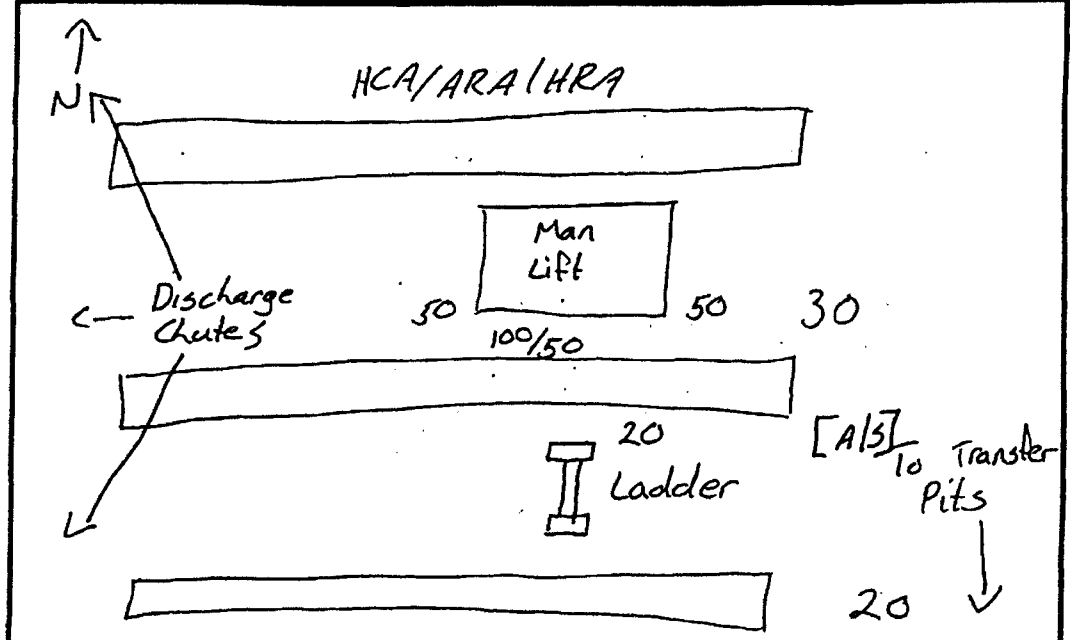
RADIOLOGICAL SURVEY RECORD

Page 1 of 5

Type of Survey			Survey #
☐ Routine	☒ Work Progress		RSR – IFSM-13-0925
RWP # / Rev. #	Date	Time	Location
IFSM-12-001 /02	9-6-13	1100	IFSM/100B/105B

Description: Below Grade Final Survey

References: (e.g., SRTA, ASER, LASER, RSP, Work Package) TA-08-SR-01 Rev 1



CA Contamination Area	HCA High Contamination Area	RBA Radiological Buffer Area	ARA Airborne Radioactivity Area	[AS] Air Sample Location	RMA Radioactive Materials Area	RA Radiation Area	HRA High Radiation Area	VHRA Very High Radiation Area

○ Technical Smear	# Direct	M Large Area Wipe	T Transferable	General Area Dose Rates =Uncorrected Meter Reading (mR/hr)	All radiation readings are γ dose rates in units of mR/hr unless otherwise indicated	Contact 30 cm	N Neutrons (mRem/hr)	Δ Micro Rem (μR/hr)	SCA Soil Contamination Area	Radiological Boundary

Instruments

Model	ID #	Cal Due Date	Model	ID #	Cal Due Date
2360	0015	2-27-14	2224-3	0107	3-16-14
43-93	0161	2-27-14	43-93	0133	3-16-14
N/A			N/A		

RCT Name/Signature/Date:	RCT Supervisor Name/Signature/Date:
M.Groff / [signature] / 9-6-13	RON CUDMS [signature]

WCH-TM-R006a (06/30/2009)

RCT signature indicates portable instruments checked IAW RC-300-2.1

Attachment 8

WCH 105-B Rad Survey – Below Grade

RADIOLOGICAL SURVEY RECORD

Page: 2 of 5
Survey # RSR - IFSM-13-0925

Contamination Measurement Information[1]
Circled values indicate Removable β contamination in mrad/hr β

No.	Description of Item or Location	Removable (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F	Total (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F
1	Wall	<20	7	<1000	10				
2	Wall	<20	7	<1000	10				
3	Wall	90	7	3000	10				
4	Wall	<20	7	3000	10				
5	Wall	360	7	10,000	10				
6	Floor	100	7	3500	10				
7	Floor	20	7	1200	10				
8	Keyway Wall	200	7	7000	10				
9	Keyway Wall	140	7	4000	10				
10	Top of Dam	<20	7	1000	10				
11	Wall	20	7	1500	10				
12	Wall	28	7	<1000	10				
13	Wall	<20	7	<1000	10				

N/A

[1] Unless stated otherwise in the "References" section, exempted β-γ (i.e., C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, Eu-155) contamination levels are ≤ 10 times the β-γ contamination levels shown above.

Corrected Dose Rate Calculations
Show all work. CF = 1 unless noted.

Location	Contact Readings β (mrad/hr) (WO-WC) X CF = DR	Contact Readings γ (mR/hr) WC X CF = DR	30 cm Readings β (mrad/hr) (WO-WC) X CF = DR	30 cm Readings γ (mR/hr) WC X CF = DR

N/A

WCH-TM-R006a (06/30/2009)

Attachment 8

WCH 105-B Rad Survey – Below Grade

RADIOLOGICAL SURVEY RECORD (continuation)
Contamination

Page 3 of 4 5 9-6-13
Survey # 105B 115M-13-0426

Contamination Measurement Information[1]
Circled values indicate Removable β-γ contamination to underlying β

No	Description of Item or Location	Removable (dpm/100 cm²) α	Removable β-γ	Removable β/γ	Removable β/γ	Total (dpm/100 cm²) α	Total β-γ	Total β/γ	Total β/γ
14	Wall	<20	7	<1000	10				
15	Wall	210	7	4000	10				
16	Floor	40	7	6700	10				
17	Floor	70	7	11,000	10				
18	Keyway Wall	60	7	6700	10				
19	Keyway Wall	<20	7	<1000	10				
20	Top of Dam	<20	7	<1000	10				
21	Wall	<20	7	<1000	10				
22	Wall	21	7	2500	10				
23	Wall	21	7	2700	10				
24	Wall	<20	7	2000	10				
25	Wall	<20	7	1600	10				
26	Wall	21	7	1500	10				
27	Wall	<20	7	2000	10				
28	Wall	<20	7	2500	10				
29	Wall	21	7	1700	10				
30	Wall	<20	7	1800	10				
31	Floor	21	7	3000	10				
32	Floor	21	7	2800	10				
33	Floor	21	7	2500	10				
34	Floor	<20	7	3000	10				
35	Floor	42	7	6200	10				
36	Floor	21	7	3000	10				
37	Floor	21	7	1000	10				
38	Floor	<20	7	3600	10				

[1]Unless stated otherwise in the "References" section, exempted β-γ (i.e., C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, Eu-155) contamination levels are ≤ 10 times the β-γ contamination levels shown above.

WCH-TM-R0061 (06/30/2009)

Attachment 8

WCH 105-B Rad Survey – Below Grade

4 of 5

RADIOLOGICAL SURVEY RECORD (continuation)
Contamination

Page: ~~3 of 4~~ MG 9-6-13

Survey # RSR IFSM-13-0925

Contamination Measurement Information[1]
Circled values indicate Removable β contamination in mrad/hr β

No.	Description of Item or Location	Removable (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F	Total (dpm/100 cm²) α	α C-F	β-γ	β-γ C-F
39	Floor	<20	7	1000	10				
40	Floor	21	7	1200	10				
41	Wash pit Floor	<20	7	<1000	10				
42	Wash Pit Floor	<20	7	<1000	10				

[1]Unless stated otherwise in the "References" section, exempted β-γ (i.e., C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, Eu-155) contamination levels are ≤ 10 times the β-γ contamination levels shown above.

WCH-TM-R006f (06/30/2009)

Attachment 8

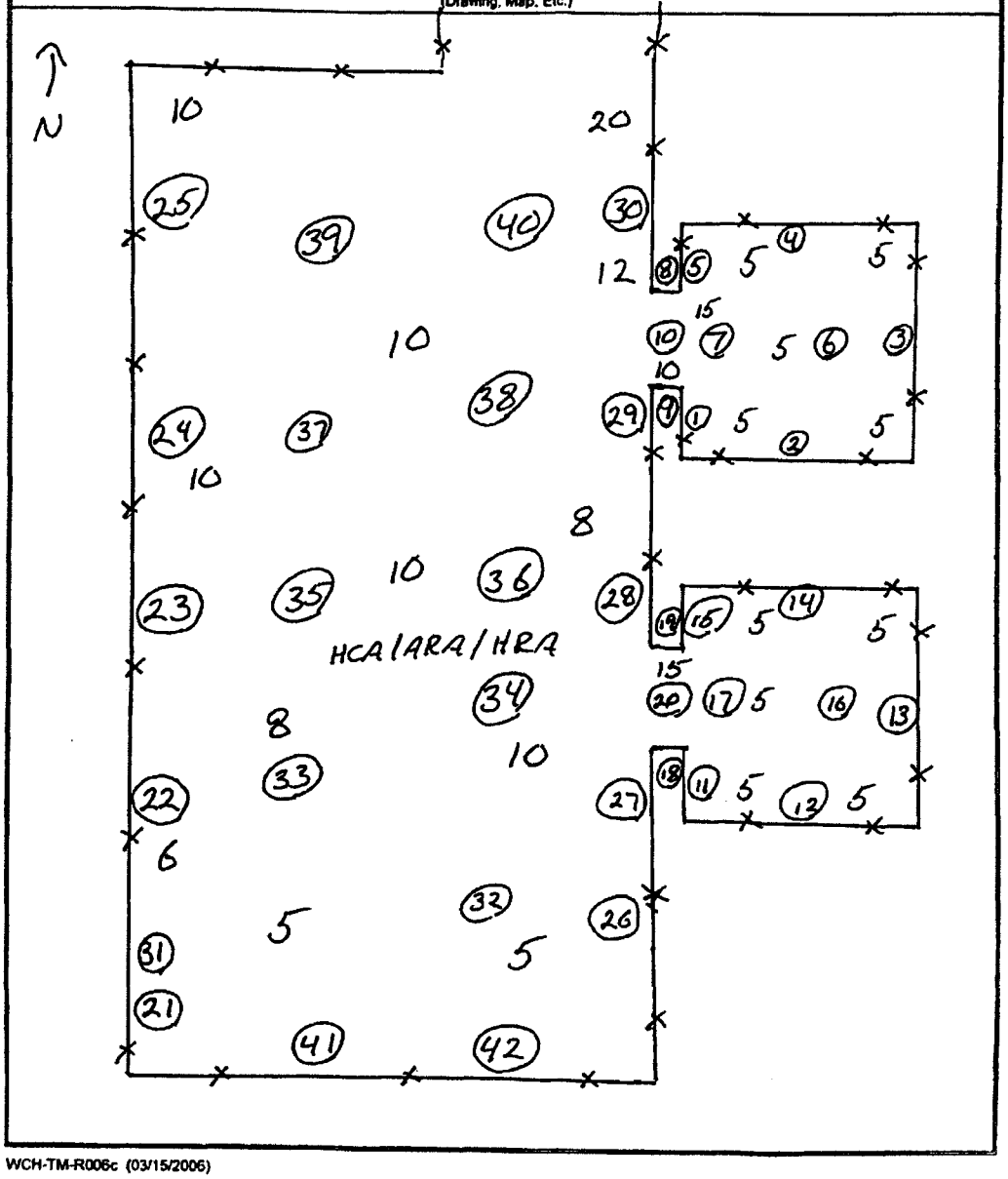
WCH 105-B Rad Survey – Below Grade

RADIOLOGICAL SURVEY RECORD (continuation)

Page: 5 of 5

Survey # RSR IFSM-13-0925

Additional Information
(Drawing, Map, Etc.)



WCH-TM-R006c (03/15/2006)

Attachment 9

WCH 105-B Rad Survey – 0-ft El. Fuel Transfer Bay & Fuel Storage Basin

Allen, Mark E

From:	Cuevas, Ronald K
Sent:	Wednesday, September 25, 2013 12:56 PM
To:	Maki, Keith A
Subject:	Final for 0 foot Fuel transfer bay and Fuel Storage Basin
Attachments:	Final for 0 foot Fuel transfer bay and Fuel Storage Basin.pdf

Final for 0 foot Fuel transfer...

Attachment 9

WCH 105-B Rad Survey – 0-ft El. Fuel Transfer Bay & Fuel Storage Basin

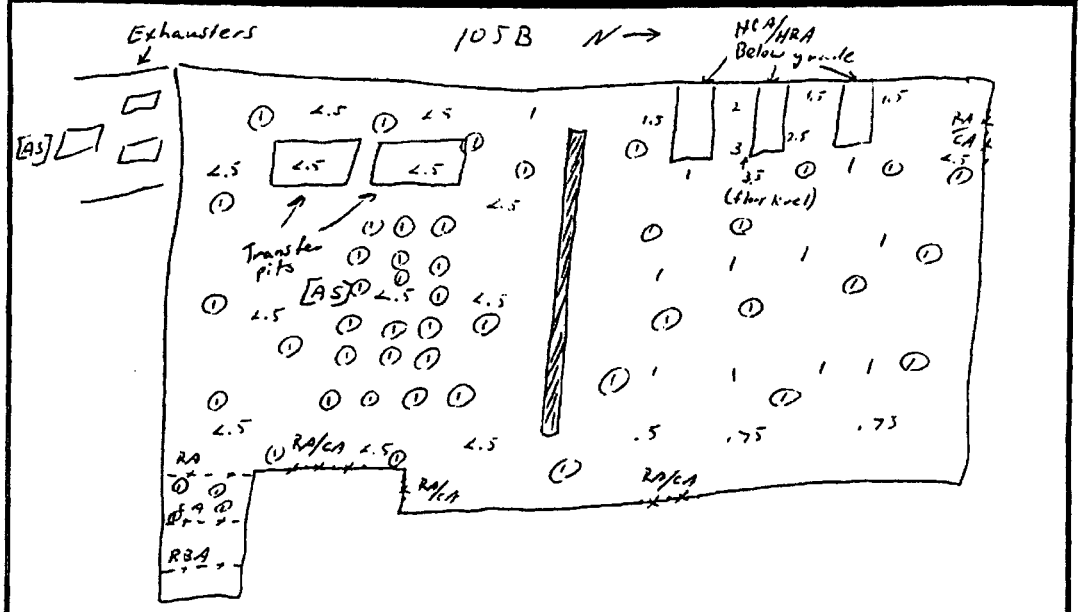
RADIOLOGICAL SURVEY RECORD

Page 1 of 2

Type of Survey			Survey #
☒ Routine W6, W15	☒ Work Progress		RSR – JFSM-13-0935
RWP # / Rev. #	**Date**	**Time**	**Location**
IFSM-13-001/2	9-9-13	1500	IFSM/1008/1058/transfer bay

Description
Routines Demobe in transfer bay. Lots of smears in train trucks/Downpost RA

References: (e.g., SRTA, ASER, LASER, RSP, Work Package)
TA-08-SR-0111



CA Contamination Area	HCA High Contamination Area	RBA Radiological Buffer Area	ARA Airborne Radioactivity Area	[AS] Air Sample Location	RMA Radioactive Materials Area	RA Radiation Area	HRA High Radiation Area	VHRA Very High Radiation Area

○ Technical Smear	# Direct	M Large Area Wipe	T Transferable	General Area Dose Rates =Uncorrected Meter Reading (mR/hr)	All radiation readings are γ dose rates in units of mR/hr unless otherwise indicated	Contact / 30 cm	N Neutrons (mRem/hr)	Δ Micro Rem (μR/hr)	SCA Soil Contamination Area	Radiological Boundary

Instruments

Model	ID #	Cal Due Date	Model	ID #	Cal Due Date
2360	SCLL8-0687	2-10-14	43-93	PTLLP-0079	2-10-14
R020	ICEB4-0095	3-1-14	NA	NA	NA
NA					NA

RCT Name/Signature/Date:	RCT Supervisor Name/Signature/Date:
Ken Kuhns / Ken Kuhns / 9-9-13	RON CUEVAS 9-9-13

WCH-TM-R006a (06/30/2009) RCT signature indicates portable instruments checked IAW RC-300-2.1

WCH 105-B Rad Survey – 0-ft El. Fuel Transfer Bay & Fuel Storage Basin

RADIOLOGICAL SURVEY RECORD

Page: 2 of 2

Survey # RSR - IFSM-13-0935

Contamination Measurement Information[1]

Circled values indicate Removable β contamination in mrad/hr β

No.	Description of Item or Location	Removable (dpm/100 cm²)				Total (dpm/100 cm²)			
		α	α C-F	β-γ	β-γ C-F	α	α C-F	β-γ	β-γ C-F
1	All smears	<30	7	<1000	10	NA	NA	NA	NA
				NA					

[1] Unless stated otherwise in the "References" section, exempted β-γ (i.e., C-14, Fe-55, Ni-59, Ni-63, Se-79, Tc-99, Pd-107, Eu-155) contamination levels are ≤ 10 times the β-γ contamination levels shown above.

Corrected Dose Rate Calculations

Show all work. CF = 1 unless noted.

Location	Contact Readings		30 cm Readings	
	β (mrad/hr) (WO-WC) X CF = DR	γ (mR/hr) WC X CF = DR	β (mrad/hr) (WO-WC) X CF = DR	γ (mR/hr) WC X CF = DR
All dose rates on map				
			NA	
NA				

WCH-TM-R006a (06/30/2009)

Attachment 10

WCH Industrial Hygiene Final Reports

Allen, Mark E

From: Maki, Keith A
Sent: Friday, September 20, 2013 3:50 PM
To: Maki, Keith A
Subject: 105B IH Reports

Attachments: 105B_IH_Reports.PDF

Attached are the 105B IH reports

105B_IH_Reports.PDF (367 KB)

Keith Maki
WCH Subcontract Technical Rep
509-539-9495

1

105B SMU Transfer Pit / Coffer Dam

Survey Date	Sample Number	Title	Location	Specific Location	Agent	Total Time	UOM	Range	Result	Air Conc UOM	Sample Plan	Sample Type
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit.	Beryllium	131	minutes	<	0.016	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit.	Cadmium	131	minutes	<	0.127	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit.	Chromium	131	minutes	<	1.519	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit.	Lead	131	minutes	<	0.899	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-2008	100912-100-SMU-TDN	100 Area	Perimeter sample north side of Fuel Starage Basin Step Off Pad.	airborne fiber	125	minutes		0.01	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-2745	100912-100-SMU-TDN	100 Area	Perimeter on the south side of Fuel Transfer Pit	airborne fiber	125	minutes		0.015	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-2755	100912-100-SMU-TDN	100 Area	Perimeter Sample on the north side of the Fuel Starage Basin Step Off Pad	Beryllium	128	minutes	<	0.016	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-2755	100912-100-SMU-TDN	100 Area	Perimeter Sample on the north side of the Fuel Starage Basin Step Off Pad	Cadmium	128	minutes	<	0.123	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-2755	100912-100-SMU-TDN	100 Area	Perimeter Sample on the north side of the Fuel Starage Basin Step Off Pad	Chromium	128	minutes	<	1.472	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-2755	100912-100-SMU-TDN	100 Area	Perimeter Sample on the north side of the Fuel Starage Basin Step Off Pad	Lead	128	minutes	<	0.871	ug/m3	IHSP-105B-12-001	Perimeter
10/9/2012	12-40802-1-2792	100912-100-SMU-TDN	100 Area	Perimeter at the exhausters on the south side of 105B.	airborne fiber	147	minutes		0.006	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40889-1-Basin	101112-100-105B-JMA	100 Area	Fuel Storage Basin Perimeter	airborne fiber	120	minutes		0.01	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40889-1-Exhauster	101112-100-105B-JMA	100 Area	Outside at the Exhauster Perimeter	airborne fiber	179	minutes	<	0.006	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40889-1-Transpit	101112-100-105B-JMA	100 Area	Transfer Pit Perimeter	airborne fiber	120	minutes	<	0.006	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-3	101112-100-105B-RDE	100 Area	105B pit	Beryllium	230	minutes	<	0.008	ug/m3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-3	101112-100-105B-RDE	100 Area	105B pit	Cadmium	230	minutes	<	0.061	ug/m3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-3	101112-100-105B-RDE	100 Area	105B pit	Chromium	230	minutes		1.079	ug/m3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-3	101112-100-105B-RDE	100 Area	105B pit	Lead	230	minutes	<	0.43	ug/m3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-4	101112-100-105B-RDE	100 Area	105B pit	Beryllium	120	minutes	<	0.015	ug/m3	IHSP-105B-12-001	Perimeter

Survey Date	Sample Number	Title	Location	Specific Location	Agent	Total Time	UOM	Range	Result	Air Conc UOM	Sample Plan	Sample Type
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit	Beryllium	131	minutes	<	0.016	ug/m3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-4	101112-100-105B-RDE	100 Area	105B pit	Cadmium	120	minutes	<	0.118	ug/m3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-4	101112-100-105B-RDE	100 Area	105B pit	Chromium	120	minutes		2.13	ug/m3	IHSP-105B-12-001	Perimeter
10/11/2012	12-40891-1-4	101112-100-105B-RDE	100 Area	105B pit	Lead	120	minutes	<	0.835	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-0507	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	airborne fiber	126	minutes		0.007	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-0951	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	airborne fiber	63	minutes	<	0.013	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-1780	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Beryllium	69	minutes	<	0.027	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-1780	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Cadmium	69	minutes	<	0.204	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-1780	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Chromium	69	minutes	<	2.449	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-1780	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Lead	69	minutes	<	1.449	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-2743	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	airborne fiber	67	minutes	<	0.013	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-2859	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Beryllium	66	minutes	<	0.028	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-2859	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Cadmium	66	minutes	<	0.214	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-2859	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Chromium	66	minutes	<	2.569	ug/m3	IHSP-105B-12-001	Perimeter
10/23/2012	12-41003-1-2859	102312-100-SMU-TDN	100 Area	Removing plywood caps from Transfer Pits	Lead	66	minutes	<	1.52	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-1782	103112-100-SMU-TDN	100 Area	Fuel Staorage Basin	airborne fiber	82	minutes		0.01	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-1998	103112-100-SMU-TDN	100 Area	Exhauster	airborne fiber	144	minutes		0.005	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2743	103112-100-SMU-TDN	100 Area	Rim of Fuel Transfer Bay	Beryllium	99	minutes	<	0.02	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2743	103112-100-SMU-TDN	100 Area	Rim of Fuel Transfer Bay	Cadmium	99	minutes	<	0.157	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2743	103112-100-SMU-TDN	100 Area	Rim of Fuel Transfer Bay	Chromium	99	minutes	<	1.879	ug/m3	IHSP-105B-12-001	Perimeter

Survey Date	Sample Number	Title	Location	Specific Location	Agent	Total Time	UOM	Range	Result	Air Conc UOM	Sample Plan	Sample Type
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit	Beryllium	131	minutes	<	0.016	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2743	103112-100-SMU-TDN	100 Area	Rim of Fuel Transfer Bay	Lead	99	minutes	<	1.112	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2747	103112-100-SMU-TDN	100 Area	Fuel Transfer Bay	airborne fiber	99	minutes		0.008	Fibers/cm3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2858	103112-100-SMU-TDN	100 Area	Entry point of Fuel Storage Basin	Beryllium	82	minutes	<	0.024	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2858	103112-100-SMU-TDN	100 Area	Entry point of Fuel Storage Basin	Cadmium	82	minutes	<	0.181	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2858	103112-100-SMU-TDN	100 Area	Entry point of Fuel Storage Basin	Chromium	82	minutes	<	2.171	ug/m3	IHSP-105B-12-001	Perimeter
10/31/2012	12-41088-1-2858	103112-100-SMU-TDN	100 Area	Entry point of Fuel Storage Basin	Lead	82	minutes	<	1.285	ug/m3	IHSP-105B-12-001	Perimeter
2/4/2013	13-40213-1-1781	020413-100-SMU-TDN	100 Area	North Pit	airborne fiber	253	minutes		0.003	Fibers/cm3	IHSP-105B-12-005	Area
2/4/2013	13-40213-1-2858	020413-100-SMU-TDN	100 Area	South Pit	airborne fiber	253	minutes		0.004	Fibers/cm3	IHSP-105B-12-005	Area
2/5/2013	13-40224-1-1781	020513-100-SMU-TDN	100 Area	North Pit	Beryllium	143	minutes	<	0.015	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/5/2013	13-40224-1-1781	020513-100-SMU-TDN	100 Area	North Pit	Cadmium	143	minutes	<	0.113	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/5/2013	13-40224-1-1781	020513-100-SMU-TDN	100 Area	North Pit	Chromium	143	minutes	<	1.356	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/5/2013	13-40224-1-1781	020513-100-SMU-TDN	100 Area	North Pit	Lead	143	minutes	<	0.802	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/5/2013	13-40224-1-2858	020513-100-SMU-TDN	100 Area	South Pit	Beryllium	141	minutes	<	0.015	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/5/2013	13-40224-1-2858	020513-100-SMU-TDN	100 Area	South Pit	Cadmium	141	minutes	<	0.114	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/5/2013	13-40224-1-2858	020513-100-SMU-TDN	100 Area	South Pit	Chromium	141	minutes	<	1.37	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/5/2013	13-40224-1-2858	020513-100-SMU-TDN	100 Area	South Pit	Lead	141	minutes	<	0.611	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-0951	021313-100-SMU-TDN	100 Area	North Pit	airborne fiber	257	minutes		0.005	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-1781	021313-100-SMU-TDN	100 Area	North Pit	Beryllium	252	minutes	<	0.008	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-1781	021313-100-SMU-TDN	100 Area	North Pit	Cadmium	252	minutes	<	0.064	ug/m3	IHSP-105B-12-005 Rev 1	Area

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Survey Date	Sample Number	Title	Location	Specific Location	Agent	Total Time	UOM	Range	Result	Air Conc UOM	Sample Plan	Sample Type
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit.	Beryllium	131	minutes	<	0.016	ug/m3	IHSP-105B-12-001	Perimeter
2/13/2013	13-40267-1-1781	021313-100-SMU-TDN	100 Area	North Pit	Chromium	252	minutes	<	0.771	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-1781	021313-100-SMU-TDN	100 Area	North Pit	Lead	252	minutes	<	0.456	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-2849	021313-100-SMU-TDN	100 Area	South Pit	airborne fiber	254	minutes	<	0.003	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-2858	021313-100-SMU-TDN	100 Area	South Pit	Beryllium	250	minutes	<	0.008	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-2858	021313-100-SMU-TDN	100 Area	South Pit	Cadmium	250	minutes	<	0.065	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-2858	021313-100-SMU-TDN	100 Area	South Pit	Chromium	250	minutes	<	0.775	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/13/2013	13-40267-1-2858	021313-100-SMU-TDN	100 Area	South Pit	Lead	250	minutes	<	0.459	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-0951	022013-100-SMU-TDN	100 Area	North Pit	airborne fiber	399	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-1781	022013-100-SMU-TDN	100 Area	North Pit	Beryllium	401	minutes	<	0.005	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-1781	022013-100-SMU-TDN	100 Area	North Pit	Cadmium	401	minutes	<	0.04	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-1781	022013-100-SMU-TDN	100 Area	North Pit	Chromium	401	minutes	<	0.485	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-1781	022013-100-SMU-TDN	100 Area	North Pit	Lead	401	minutes	<	0.287	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-2849	022013-100-SMU-TDN	100 Area	South Pit	airborne fiber	402	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-2858	022013-100-SMU-TDN	100 Area	South Pit	Beryllium	400	minutes	<	0.005	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-2858	022013-100-SMU-TDN	100 Area	South Pit	Cadmium	400	minutes	<	0.04	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-2858	022013-100-SMU-TDN	100 Area	South Pit	Chromium	400	minutes	<	0.481	ug/m3	IHSP-105B-12-005 Rev 1	Area
2/20/2013	13-40300-1-2858	022013-100-SMU-TDN	100 Area	South Pit	Lead	400	minutes	<	0.284	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/1/2013	13-40350-1-0951	030113-100-SMU-TDN	100 Area	North Pit	airborne fiber	405	minutes		0.003	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
3/1/2013	13-40350-1-2858	030113-100-SMU-TDN	100 Area	South Pit	airborne fiber	406	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area

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Survey Date	Sample Number	Title	Location	Specific Location	Agent	Total Time	UOM	Range	Result	Air Conc UOM	Sample Plan	Sample Type
10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit.	Beryllium	131	minutes	<	0.016	ug/m3	IHSP-105B-12-001	Perimeter
3/8/2013	13-40399-1-0951	030813-100-SMU-TDN	100 Area	North Pit	airborne fiber	387	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2757	030813-100-SMU-TDN	100 Area	South Pit	airborne fiber	387	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2858	030813-100-SMU-TDN	100 Area	South Pit	Beryllium	390	minutes	<	0.005	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2858	030813-100-SMU-TDN	100 Area	South Pit	Cadmium	390	minutes	<	0.039	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2858	030813-100-SMU-TDN	100 Area	South Pit	Chromium	390	minutes		0.557	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2858	030813-100-SMU-TDN	100 Area	South Pit	Lead	390	minutes	<	0.278	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2859	030813-100-SMU-TDN	100 Area	North Pit	Beryllium	390	minutes	<	0.005	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2859	030813-100-SMU-TDN	100 Area	North Pit	Cadmium	390	minutes	<	0.039	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2859	030813-100-SMU-TDN	100 Area	North Pit	Chromium	390	minutes	<	0.473	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/8/2013	13-40399-1-2859	030813-100-SMU-TDN	100 Area	North Pit	Lead	390	minutes	<	0.28	ug/m3	IHSP-105B-12-005 Rev 1	Area
3/16/2013	13-40452-1-002	031613-100-SMU-GS	100 Area	North side of fuel transfer pit	airborne fiber	368	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Perimeter
3/16/2013	13-40452-1-004	031613-100-SMU-GS	100 Area	South side of fuel transfer pit	airborne fiber	368	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Perimeter
3/22/2013	13-40494-1-0951	032213-100-SMU-TDN	100 Area	North Pit	airborne fiber	410	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
3/22/2013	13-40494-1-2750	032213-100-SMU-TDN	100 Area	South Pit	airborne fiber	410	minutes	<	0.002	Fibers/cm3	IHSP-105B-12-005 Rev 1	Area
9/3/2013	* 13-42344-1-2772	090313-100-SMU-DJB	100 Area	Area Asb	Beryllium	318	minutes	<	0.006	ug/m3	IHSP-105B-13-001 Rev 1	Area
9/3/2013	* 13-42344-1-2772	090313-100-SMU-DJB	100 Area	Area Asb	Cadmium	318	minutes	<	0.043	ug/m3	IHSP-105B-13-001 Rev 1	Area
9/3/2013	* 13-42344-1-2772	090313-100-SMU-DJB	100 Area	Area Asb	Chromium	318	minutes	<	0.516	ug/m3	IHSP-105B-13-001 Rev 1	Area
9/3/2013	* 13-42344-1-2772	090313-100-SMU-DJB	100 Area	Area Asb	Lead	318	minutes	<	0.305	ug/m3	IHSP-105B-13-001 Rev 1	Area
9/3/2013	* 13-42344-1-2782	090313-100-SMU-DJB	100 Area	SOP Asb	airborne fiber	318	minutes		0.002	Fibers/cm3	IHSP-105B-13-001 Rev 1	Perimeter

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10/9/2012	12-40802-1-1999	100912-100-SMU-TDN	100 Area	Perimeter adjacent to south transfer pit.	Beryllium	131	minutes	<	0.016	ug/m3	IHSP-105B-12-001	Perimeter
9/4/2013	13-42364-1-CLR1	090413-100-SMU-DJB	100 Area	East side of FTB near railcar bay doors	airborne fiber	102	minutes		0.003	Fibers/cm3	IHSP-105B-13-001 Rev 1	Clearance
9/4/2013	13-42364-1-CLR2	090413-100-SMU-DJB	100 Area	North side of FTB near area where asbestos spill took place	airborne fiber	102	minutes	<	0.002	Fibers/cm3	IHSP-105B-13-001 Rev 1	Clearance
9/4/2013	13-42364-1-CLR3	090413-100-SMU-DJB	100 Area	West side of FTB near viewing room window	airborne fiber	102	minutes	<	0.002	Fibers/cm3	IHSP-105B-13-001 Rev 1	Clearance

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