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

00-ERD-069

FEB 24 2000

Ms. Jane A. Hedges
Clean-up Section Manager
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336-6018

Mr. Douglas R. Sherwood
Hanford Project Manager
U.S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352

Dear Ms. Hedges and Mr. Sherwood:

TRANSMITTAL OF THE TECHNICAL MEMORANDUM FOR THE 100-N AREA INNOVATIVE TREATMENT REMEDIATION DEMONSTRATION (ITRD) BANK STABILITY EVALUATION, BHI-01324, REV. 0

Attached is a copy of the subject document for your information. The technical memorandum was prepared for the ITRD project addressing Sr-90 contamination in the 100-N Area. The memorandum contains an evaluation of potential effects of the Columbia River flow velocities and associated water elevations on riverbank stability under current conditions. This evaluation includes a review of the erosion potential, current site conditions, and anticipated river elevations for 10-year, 20-year, 100-year, and 500-year flood events. Information regarding the stability of the bank after an uncontrolled (i.e., pre-dam) storm that occurred in 1896 is also included.

If you have any questions, please contact me at (509) 373-9631.

Sincerely,

Arlene C. Tortoso

Arlene C. Tortoso, Project Manager
Environmental Restoration Division

ERD:ACT

Attachment

cc w/attach:
R. Bond, Ecology
D. A. Faulk, EPA
M. Harmon, EM-43

cc w/o attach:
G. A. Day, BHI
G. C. Henckel, BHI

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DOE/RL-2000-17
Draft A

Waste Management Plan for the 105-D and 105-H Standing Legacy Waste Remediation Project

United States
Department of Energy

DOE/RL-2000-17
Draft A

Waste Management Plan for the 105-D and 105-H Standing Legacy Waste Remediation Project

February 2000

United States Department of Energy

P.O. Box 550, Richland, Washington 99352

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ACRONYMS AND ABBREVIATIONS

ARAR	applicable relevant and appropriate requirements
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
COPC	contaminants of potential concern
CWC	Central Waste Complex
Ecology	Washington State Department of Ecology
ERC	Environmental Restoration Contractor
ERDF	Environmental Restoration Disposal Facility
EPA	U.S. Environmental Protection Agency
ETF	effluent treatment facility
RAWD	Remedial Action and Waste Disposal
RCF	Radiological Counting Facility
RCRA	*Resource Conservation and Recovery Act of 1976*
ROD	record of decision
SSWMI	site specific waste management instructions
WAC	Washington Administrative Code

1.0 INTRODUCTION

This plan identifies guiding documents for waste management activities and requirements for the removal, staging, characterization, and disposal of standing legacy waste contained in the 105-D and 105-H reactors as authorized by the Remaining Sites Record of Decision (ROD) (EPA 1999). The legacy waste project will include the following: (1) evaluate legacy waste components for recycle, reuse, and/or clean landfill disposal; (2) characterize legacy waste components, oils, greases, and aqueous liquids using radiological surveys and sample characterization necessary for waste disposition; (3) remove uncontaminated furniture, tools, and other salvageable materials; and (4) remove and dispose radiologically contaminated furniture, tools, and other materials. Lead bricks and sheets will be segregated and stored for later disposition or possible reuse if that potential exists. The various waste streams include:

- Solid waste
- Low-level radioactive waste
- Mixed waste (waste that is both low-level radioactive waste and hazardous waste)
- Used oil
- Hazardous, dangerous, and polychlorinated biphenyls (PCB) wastes.

2.0 WASTE CHARACTERIZATION, DESIGNATION, AND MANAGEMENT

Waste management Applicable Relevant and Appropriate Requirements (ARAR) include the waste characterization, designation, and disposal requirements of the *Resource Conservation and Recovery Act of 1976* (RCRA), *Washington Administrative Code* (WAC) 173-303, and 40 *Code of Federal Regulations* (CFR) 761. Transportation ARARs for offsite disposal of hazardous materials include the requirements of the U.S. Department of Transportation regulations (49 CFR 171 through 179). These requirements will be addressed in a Site Specific Waste Management Instruction (SSWMI) prepared in accordance with BHI-FS-03, *Field Support Waste Management Instructions*, Procedure W-006, "Site Specific Waste Management Instructions." The SSWMI will address all waste management aspects as they specifically apply to anticipated waste streams at the 105-D and 105-H.

The primary staging areas for the legacy waste from the 105-D and 105-H reactors, area of contamination, and transportation queue are shown in Figures 1 and 2. Interim staging areas will be established for each reactor. Coordination of the staging and container queue areas has been completed with the Environmental Restoration Contractor (ERC) Remedial Action and Waste Disposal (RAWD) Project. Waste will be staged at the reactor front face door, adjacent to the reactor front face, and outside the front face door. The transportation container queues will be located outside the front entrance of the 105-D and 105-H reactor. The areas where waste will be staged will be cordoned off and denoted by signs on stanchions or hung on rope stating "CERCLA WASTE MANAGEMENT AREA."

Figure 1. Locations of Waste Storage Areas, Area of Contamination, and Transportation Queues at 105-D.

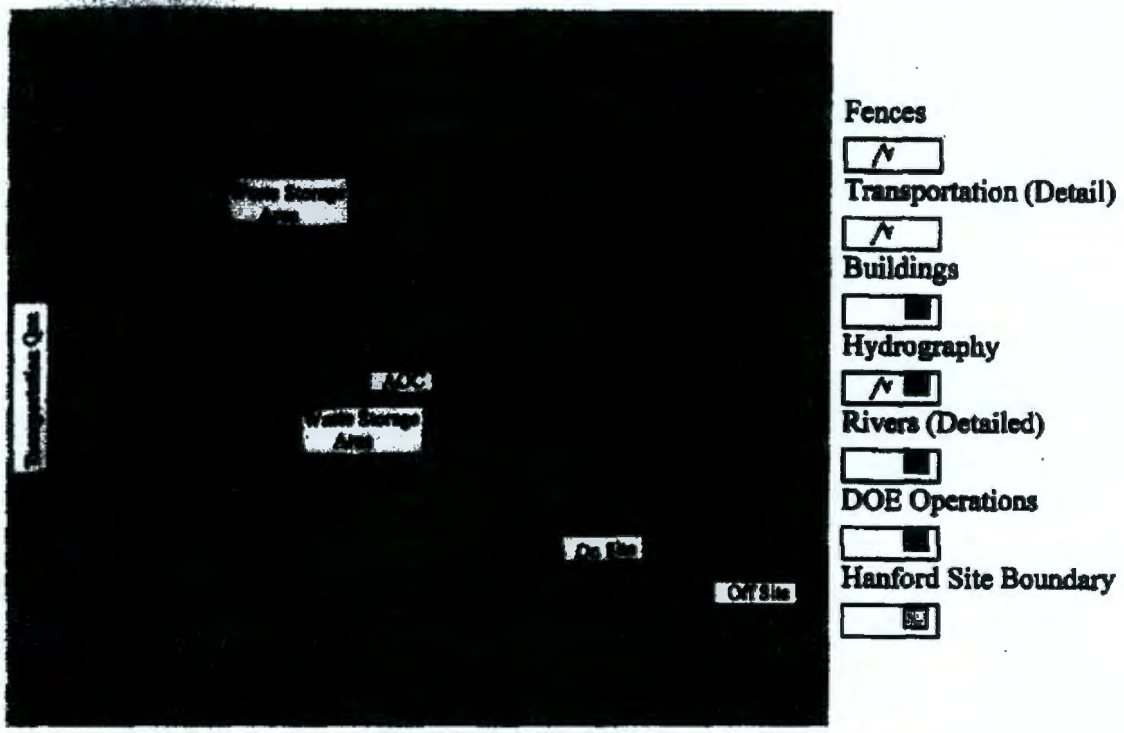
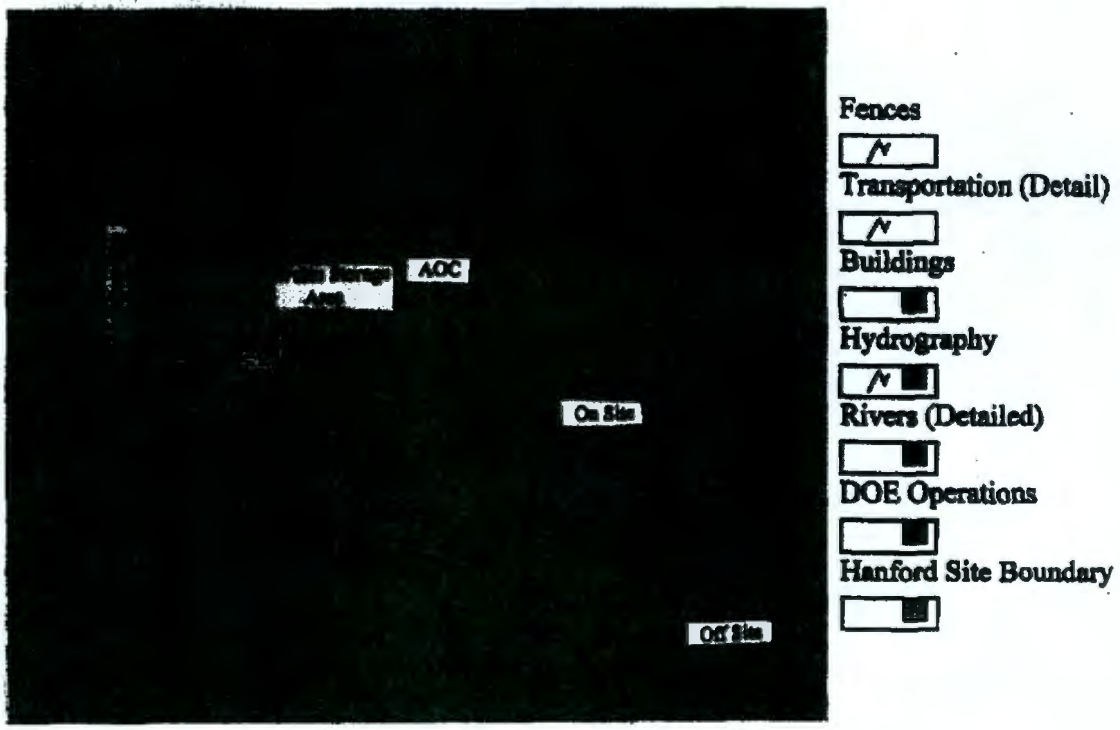


Figure 2. Locations of Waste Storage Areas, Area of Contamination, and Transportation Queues at 105-H.



The Washington State Department of Ecology (Ecology) has already approved DOE/RL-99-12, *Sampling and Analysis Plan for Disposition of the Standing Legacy Wastes in the 105-B, -D, -H, -KE, and –KW Reactor Buildings* and its attached air monitoring plan (DOE-RL 1999), the Hanford Site 100 Area Remaining Sites Record of Decision (EPA 1999), and DOE/RL-96-17 *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (DOE-RL 1998). All activities will be performed in accordance with waste management ARARs identified in the 100 Area Remaining Sites ROD. Contaminants of potential concern (COPC) are noted in document DOE/RL-99-12, pages 1-2 through 1-7 (see Appendix A).

All waste generated that has the potential to be regulated will be characterized and designated in accordance with BHI-EE-10, *Waste Management Plan*, and BHI-FS-03, and the requirements of the receiving facility. Waste will be destined for the Environmental Restoration Disposal Facility (ERDF) per the Remaining Sites ROD. No other waste disposal shall be utilized without notification to Ecology and obtaining an offsite determination by the U.S. Environmental Protection Agency (EPA).

Any waste, if approved by an offsite determination, that is destined for the Central Waste Complex (CWC), will be designated and characterized in accordance with BHI-EE-10, Procedure 2, "Waste Identification," and HNF-EP-0063-4, *Hanford Site Solid Waste Acceptance Criteria* (FDH 1998), and the 100 Area Remaining Sites ROD. Sampling will be consistent with the sampling and analysis plan (DOE-RL 1999). When samples are sent to an offsite laboratory, preliminary radiological counting and isotopic analysis will be done by the ERC Radiological Counting Facility (RCF). The RCF samples shall be returned to the appropriate reactor waste staging areas and disposed of with the remaining reactor legacy waste in accordance with the disposal facility waste acceptance criteria.

2.1 WASTE TRANSPORTATION AND SHIPPING

The transportation services for waste generated during the 105-D and 105-H facility removal action will be provided by a subcontractor who will be responsible for using and maintaining appropriate transport motor vehicles and providing qualified commercial drivers. Shipments will be in compliance with EPA regulations and 49 CFR 171 through 179.

2.2 WASTE DISPOSAL

Disposal requirements to ERDF will be met through compliance with BHI-00139, *Environmental Restoration Disposal Facility Waste Acceptance Criteria* (BHI 1998), for wastes bound for that disposal facility. If any onsite or offsite disposal, including ERDF, Effluent Treatment Facility (ETF), or the CWC is utilized, approval by the lead regulator must be obtained *prior to* disposal.

It is anticipated that most of the low-level and mixed low-level waste and debris from the removal action will be disposed at the ERDF, which is designed to meet RCRA minimum technical requirements for land disposal. The ERDF can also accept some asbestos and PCB

waste. While the waste generated during the removal action is eligible to be sent to ERDF, some waste may not meet ERDF waste acceptance criteria, or may not be able to be treated to meet the criteria. Specifically, both low-level radioactive and non-radioactive liquid wastes could be encountered or generated during removal of reactor standing legacy waste.

If regulatorily-approved by an offsite determination, radioactive liquids will be sent to the Hanford ETF provided the waste meets ETF acceptance standards and treatment to satisfy ARARs. The type of treatment and the location for performing the regulator-approved treatment will be predetermined by the U.S. Department of Energy, Richland Operations Office, Ecology, and EPA (Tri-Parties) on a case-by-case basis. Also, if transuranic (TRU) waste is encountered and if approved, it will be sent to the Hanford CWC for storage. The ERDF, ETF, CWC and the 100 Area National Priorities Listings are considered to be a single site for the purposes of disposal of waste from removal action. As such, there is no requirement to obtain a permit to dispose of wastes at these facilities. However, if any waste is encountered that must be sent offsite, EPA will make a determination as to the acceptability of the proposed disposal site for receiving *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) removal action waste.

2.3 WASTE TREATMENT

Treatment of waste streams may be necessary to provide for safe transport or effective disposal. The type of treatment, and the location where treatment will be accomplished, will be determined by the Tri-Parties on a case-by-case basis, in accordance with the substantive requirements of WAC 173-303. Upon regulatory agency approval, solidification, encapsulation, neutralization, and size reduction/compaction may be employed to treat various wastes.

2.4 WASTE MANAGEMENT STRATEGY

Based on site walkdowns, the following waste streams have been identified. Basic management strategies are discussed below. Throughout the project, material will be recycled whenever possible and if economically feasible.

- **Low-level radioactive waste:** Low-level radioactive waste that meets the waste acceptance criteria at ERDF will be disposed at ERDF.

- **Solid waste:** Any non-regulated and non-radiologically contaminated solid waste will be managed in accordance with WAC 173-304 with an emphasis on recycling or reuse to the maximum extent possible. This type of waste will primarily go to inert demolition waste landfills or offsite disposal to a municipal/industrial landfill if proven volumetrically free of residual contamination.

- **Mixed waste:** Mixed waste will be managed in compliance with the requirements for both hazardous/dangerous wastes (WAC 173-303) and radioactive waste under *the Atomic Energy Act of 1954*. If possible, mixed wastes will be treated to meet applicable land disposal restrictions and waste acceptance criteria at ERDF.

- **Used oil:** Only radioactive contaminated oils will be treated and disposed to ERDF in accordance with the ERDF waste acceptance criteria (BHI 1998). The preferred management strategy is to handle any non-radioactive oil (except for PCB oils) in accordance with WAC 173-303-515 "Special Requirements For Used Oil Burned For Energy Recovery."

- **Hazardous, dangerous, and PCB wastes:** If any of these wastes are found they will be treated and disposed at any EPA-approved waste disposal site, and will meet the waste acceptance criteria of that particular disposal site.

3.0 REFERENCES

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

49 CFR 171, "General Information, Regulations, and Definitions," *Code of Federal Regulations*, as amended.

49 CFR 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements," *Code of Federal Regulations*, as amended.

49 CFR 173, "Shipper's — General Requirements for Shipments and Packaging," *Code of Federal Regulations*, as amended.

49 CFR 174, "Carriage by Rail," *Code of Federal Regulations*, as amended.

49 CFR 175, "Carriage by Aircraft," *Code of Federal Regulations*, as amended.

49 CFR 176, "Carriage by Vessel," *Code of Federal Regulations*, as amended.

49 CFR 177, "Carriage by Public Highway," *Code of Federal Regulations*, as amended.

49 CFR 178, "Specifications for Packagings," *Code of Federal Regulations*, as amended.

49 CFR 179, "Specifications for Tank Cars," *Code of Federal Regulations*, as amended.

Atomic Energy Act of 1954, 42 U.S.C. 2011, et seq., as amended.

BHI, 1998, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, BHI-00139, as amended, Bechtel Hanford, Inc., Richland, Washington.

BHI-EE-10, *Waste Management Plan*, Bechtel Hanford Inc., Richland, Washington.

BHI-FS-03, *Field Support Waste Management Instructions*, Bechtel Hanford Inc., Richland, Washington.

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

DOE-RL, 1998, *Remedial Design Report/Remedial Action Work Plan for the 100 Area*, DOE/RL-96-17, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1999, *Sampling and Analysis Plan for Disposition of the Standing Legacy Wastes in the 105-B, -D, -H, -KE, and –KW Reactors*, DOE/RL-99-12, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1999, *Interim Action Record of Decision — 100 and 200 Areas*, Hanford Site, Benton County, Washington, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

FDH, 1998, *Hanford Site Solid Waste Acceptance Criteria*, HNF-EP-0063, as amended, Fluor Daniel Hanford, Inc., Richland, Washington.

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

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

WAC 173-303-515, "Special Requirements for Used Oil Burned for Energy Recovery," *Washington Administrative Code*, as amended.

WAC 173-304, "Minimum Functional Standards for Solid Waste Handling," *Washington Administrative Code*," as amended.

APPENDIX A

CONTAMINANTS OF POTENTIAL CONCERN

CONTAMINANTS OF POTENTIAL CONCERN

Contaminants of Potential Concern

The 105-D and 105-H Reactor buildings are potentially contaminated with radioactive and hazardous substances used in or generated during reactor operations. Historical and process knowledge, knowledge of construction material, and room surveys were used to assist in identifying the substances that may be present. Table 1-1 provides a master list of the contaminants of potential concern (COPC).

The radionuclides identified in Table A1-1 were determined from the 105-F/105-DR Reactor building sampling results, which are analogous to the 105 Reactor buildings within the scope of the legacy waste remediation. The chemical COPCs are associated with the individual legacy waste components (e.g., lighting and electrical equipment, lead-based paint, and oils and greases in plant equipment) and a contingency category for anomalous waste media.

Several of the legacy waste streams are standard waste forms that will be designated by process knowledge or visual inspection. These are typically dispositioned through a site-specific waste management instruction (SSWMI). These waste streams have therefore been excluded from further consideration because sampling and analysis is not required for the chemical constituents. Radiological surveys will be performed; however, for all waste forms prior to removal and disposition. Table 1-2 provides the relevant information for the waste forms that will be dispositioned under the SSWMI in accordance with existing plant procedures.

Table 1-3 lists the COPCs excluded due to physical properties, process knowledge evaluations, and the results of computer analyses.

The elimination of the waste streams in Table 1-2 and the COPCs excluded in Table 1-3 results in a final list of waste streams and associated contaminants of concern. The final list and associated rationale for inclusion are summarized in Table 1-4.

Table A-1. Master List of Contaminants of Potential Concern for Each Component or Waste Stream.
Page 1 of 2

1	Asbestos-containing materials	Floor tiles, ceiling tiles, and asbestos gaskets on work benches and shelves	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U, asbestos fibers
2	Facility piping (not installed)	Aqueous liquids	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U, Ag, As, Ba, Cd, Cr, Hg, Pb, Se, cyanide, sulfide, SVOA, VOA, inorganic ions, PCBs, pH
3	Office areas	Drinking fountain (not installed)	Freon
4	Facility lighting	Fluorescent light ballast (not installed)	PCBs
5	Facility lighting	Fluorescent light tubes (not installed)	Hg
6	Non-recyclable plant equipment	Lubricating greases and oils, hydraulic oils (includes door actuators)	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U, Ag, As, Ba, Cd, Cr, Hg, Pb, Se, PCBs, SVOA, VOA, ignitability
7	Facility piping (not installed)	Lead packing	Pb
8	Facility electrical components (not installed)	Mercury switches	Hg
9	Facility electrical components (not installed)	Incandescent light bulbs (lead tips)	Pb

Ag	silver	Cs	cesium	Se	selenium
Am	americium	Eu	europium	Sm	samarium
As	arsenic	H	hydrogen	Sr	strontium
Ba	barium	Hg	mercury	SVOA	semivolatile organic analysis
C	carbon	I	iodine	Tc	technetium
Cd	cadmium	Ni	nickel	U	uranium
Co	cobalt	Pb	lead	VOA	volatile organic analysis
COPC	contaminants of potential concern	PCB	polychlorinated biphenyl	WS	waste stream
Cr	chromium	Pu	plutonium		

Table A-1. Master List of Contaminants of Potential Concern for Each Component or Waste Stream.
Page 2 of 2

10	Radiological shielding materials	Lead bricks and sheets	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U, Pb
11	Facility equipment or containers	Anomalous media	Unknown
12	Facility room contents	Furniture and other non-process plant equipment and components (not installed)	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U
13	Facility hardware	Miscellaneous tools	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U, Ag, As, Ba, Cd, Cr, Hg, Pb, Se, PCBs, SVOA, VOA
14	Facility equipment and components (not installed)	Process plant equipment and components (e.g., pumps, motors, valves)	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U, Ag, As, Ba, Cd, Cr, Hg, Pb, Se, PCBs, SVOA, VOA
15	Facility parts	Graphite blocks	^{241}Am, ^{133}Ba, ^{14}C, ^{60}Co, ^{134}Cs, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{129}I, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{79}Se, ^{151}Sm, ^{90}Sr, ^{99}Tc, $^{233/234}U$, ^{235}U, ^{238}U
16	Specialized fuel equipment	Fuels refabrication and development equipment	^{228}Th, ^{232}Th, $^{233/234}U$, ^{235}U, ^{238}U
17	All functional areas	Miscellaneous trash	COPCs on a case-by-case basis
18	All functional areas	Residual facility chemicals	Oxalic acid; others on a case-by-case basis

Ag	silver	Cs	cesium	Sm	samarium
Am	americium	Eu	europium	Sr	strontium
As	arsenic	H	hydrogen	SVOA	semivolatile organic analysis
Ba	barium	Hg	mercury	Tc	technetium
C	carbon	I	iodine	Th	thorium
Cd	cadmium	Ni	nickel	U	uranium
Co	cobalt	Pb	lead	VOA	volatile organic analysis
COPC	contaminants of potential concern	PCB	polychlorinated biphenyl	WS	waste stream
Cr	chromium	Pu	plutonium		
		Se	selenium		

Table A-2. Contaminants of Potential Concerns/Waste Streams Dispositioned by Site Specific Waste Management Instructions.

1	Asbestos-containing materials	Floor tiles, ceiling tiles, and asbestos gaskets	These affected media are standard waste streams that are routinely removed/disposed. Material will be double bagged and wetted. Managed as radioactive waste and shipped to the ERDF
3	Freon	Drinking fountain chiller systems	Refrigerated systems are standard waste streams that are routinely removed/disposed. Freon is captured by certified Craft personnel and is packaged in an appropriate container for the material (gas). This material is not considered radioactively contaminated because the system is closed. The material is incorporated into the tracking system and is reclaimed for recycling.
4	PCBs	Fluorescent light ballasts	These affected media are standard waste streams that are routinely removed/disposed. WS #4 will be managed as radioactively contaminated material and will be packaged in leak-proof containers and shipped to the ERDF for disposal.
5	Hg	Fluorescent light tubes	WS #5 will be crushed into 55-gallon drums and shipped to the centralized consolidation recycling center for recycling.
7	Pb	Lead packing (piping end connections)	WS #7 is mixed radioactive waste that will be appropriately packaged, and disposal will require a case-by-case approval for disposal by the lead regulatory agency.
8	Hg	Mercury-activated switchgear	If WS #8 is not contaminated, the waste will be sent to an offsite disposal facility on a case-by-case basis per approval by the lead regulatory agency. The waste will be packaged in plastic-compatible containers, unbroken, with packing material to avoid breakage during shipment. If WS #8 is contaminated, disposal will be made as approved by EPA.
9	Pb	Incandescent light bulbs	If WS #9 is not contaminated, the waste will be recycled through the CCRC. If WS #9 is contaminated, it will be appropriately packaged, and disposal will require a case-by-case basis approval for disposal by the lead regulatory agency.

COPC	contaminants of potential concern	Hg	mercury
CCRC	centralized consolidated recycling center	Pb	lead
EPA	U.S. Environmental Protection Agency	PCB	polychlorinated biphenyl
ERDF	Environmental Restoration Disposal Facility	WS	waste stream

Table A-3. Rationale for Contaminants of Potential Concern Exclusions.

2, 6, 11, 12, 13, and 14	Aqueous liquids, plant equipment lubricating grease and oils, miscellaneous tools, anomalous media, room contents and plant process equipment, components, and furniture.	^{133}Ba	^{133}Ba was included in Dorian and Richards (1978), but not predicted as a COPC in the ORIGIN[a] computer runs; therefore, it is excluded.
		^{134}Cs	^{134}Cs is a short half-life isotope that has decayed to concentrations below concern.
		^{129}I	Predicted in ORIGIN[a] computer analysis at < 0.04% of the radioactive inventory and is, therefore, dismissed from consideration.
		^{79}Se	
		^{151}Sm	No detection method available for ^{151}Sm with contracted laboratories.
		^{99}Tc	Because ^{99}Tc is predicted in the ORIGIN[a] computer analysis to contribute less than 0.04% of the radioactive inventory, it is not a significant curie contribution, and is therefore dismissed from further consideration.

[a] The ORIGIN computer code is used to predict the fission product inventory in nuclear reactors based on fuel properties, power levels, and period of operation. The results of the 105-C Reactor ORIGIN analysis were judged to be applicable to the 105 Reactors because the reactor types are the same, the fuel was the same, and the burnup was similar.

Dorian, J. J. and V. R. Richards, 1978, *Radiological Characterization of the Retired 100 Areas*, UNI-946, United Nuclear Industries, Richland, Washington.

Ba barium
COPC contaminants of potential concern
I iodine
Se selenium
Sm samarium
Tc technetium
WS waste stream

Table A-4. Final Contaminants of Concern.

2, 6, 11, 12, 13, 14, 15, 17, and 18	Aqueous liquids, plant equipment lubricating grease and oils, anomalous media, furniture and room contents, miscellaneous tools, plant process equipment and components, graphite blocks, miscellaneous trash, residual chemicals	^{241}Am, ^{14}C, ^{60}Co, ^{137}Cs, ^{152}Eu, ^{154}Eu, ^{155}Eu, ^{3}H, ^{63}Ni, ^{238}Pu, $^{239/240}Pu$, ^{90}Sr, $^{233/234}U$, ^{235}U, ^{238}U	Surface contamination COPCs
16	Fuels refabrication and development equipment	^{228}Th, ^{232}Th, $^{233/234}U$, ^{235}U, ^{238}U	Residual fuel powder from the batch fuel-weighing system
2	Aqueous liquids from piping	Ag, As, Ba, Cd, Cr, Hg, Pb, Se, cyanide, sulfide, SVOA, VOA, inorganic ions, PCBs, pH	State and Federally regulated waste
6	Lubricating grease and oil, hydraulic oils and door actuators	Ag, As, Ba, Cd, Cr, Hg, Pb, Se, SVOA, VOA, PCBs, ignitability	State and Federally regulated waste
11	Anomalous media in equipment or containers	Unknown	Unknown
13	Miscellaneous tools	Ag, As, Ba, Cd, Cr, Hg, Pb, Se, PCBs, SVOA, VOA	State and Federally regulated waste
14	Process facility equipment and components (not installed)	Ag, As, Ba, Cd, Cr, Hg, Pb, Se, PCBs, SVOA, VOA	State and Federally regulated waste
16	Fuels refabrication and development equipment	PCBs, VOA, SVOA	Potential for regulated wastes in the lubricating oils and greases
17	Miscellaneous trash	On a case-by-case basis	May contain regulated waste
18	Residual facility chemicals	Oxalic acid; others on a case-by-case basis	

[a] The ORIGIN analysis predicted a low yield for the uranium isotopes but they were retained as COPCs at the request of Waste Management.

Ag	silver	COPC	contaminants of potential concern	PCB	polychlorinated biphenyl
Am	americium	Cr	chromium	Pu	plutonium
As	arsenic	Cs	cesium	Se	selenium
Ba	barium	Eu	europium	SVOA	semivolatile organic analysis
C	carbon	H	hydrogen	Th	thorium
Cd	cadmium	Hg	mercury	U	uranium
Co	cobalt	Ni	nickel	VOA	volatile organic analysis
COC	contaminants of concern	Pb	lead	WS	waste stream

ATTACHMENT 2

DOE/RL-2000-17
Revision 0

WASTE MANAGEMENT PLAN FOR THE 105-D AND 105-H STANDING LEGACY WASTE REMEDIATION PROJECT

CONCURRENCE:

T. W. Ferns, Project Manager
U.S. Department of Energy
Richland Operations Office

Date

D. C. Smith, Project Manager
U.S. Department of Energy
Richland Operations Office

Date

APPROVED BY:

Alex Stone, Project Manager
State of Washington
Department of Ecology

Date