

1244126

[0071232H]

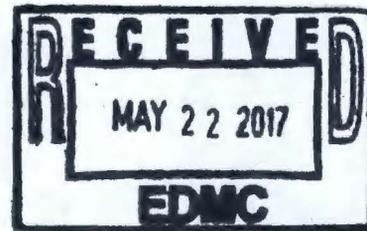


OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

MAY 16 2017

17-TF-0046

Ms. Alexandra K. Smith, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354



Ms. Smith:

THE U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION SUBMITS THE *TIER 2 RESOURCE CONSERVATION AND RECOVERY ACT CLOSURE ACTION PLAN FOR WASTE MANAGEMENT AREA C*, IN COMPLETION OF *HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER MILESTONE M-045-82*, AND *TIER 3 RESOURCE CONSERVATION AND RECOVERY ACT COMPONENT CLOSURE ACTIVITY PLAN FOR 241-C-200 SERIES TANKS* IN COMPLETION OF *HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER MILESTONE M-045-82A*

This letter is being reissued to correct a spelling error in the subject.

This letter transmits RPP-RPT-59389, *Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C*, Rev. 0, as required by *Hanford Federal Facilities Agreement and Consent Order (HFFACO) Milestone M-045-82*, "Submit to Ecology for review, in accordance with HFFACO Action Section 9.2.2, the draft Tier 2 closure plan for WMA C." It also transmits RPP-RPT-59390, *Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Activity Plan for 241-C-200 Series Tanks*, Rev. 0, as required by HFFACO Milestone M-045-82A, "Submit to Ecology for review, in accordance with HFFACO Action Section 9.2.2, and the draft Tier 3 closure plans for the C-200 tanks (C-201, C-202, C-203, and C-204)." According to Change Control Form M-45-16-01, both of the aforementioned HFFACO Milestones require the closure plan documents attached to this letter to be submitted to the Washington State Department of Ecology by May 15, 2017. Per our discussion, the purpose of these documents is to further define the appropriate contents for Resource Conservation and Recovery Act single-shell tank system Tier 2 and Tier 3 closure plans.

149

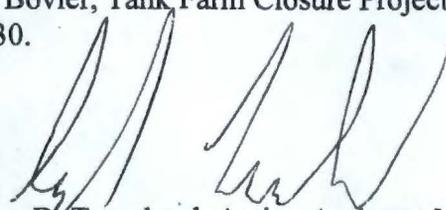
MAY 16 2017

Ms. Alexandra K. Smith
17-TF-0046

-2-

This letter also includes Change Control Form Draft M-45-17-01, which identifies Tier 3 submittal dates for Waste Management Area C, and proposed target dates to initiate Tier 3 closure activities.

If you have any questions, please contact Jan B. Bovier, Tank Farm Closure Project Manager for the Tank Farm Program Division, (509) 376-9630.



Glyn D. Trenchard, Acting Assistant Manager
Tank Farms Project

TPD:JBB

Attachments

cc w/attachs:

J.J. Lyons, Ecology
D.A. Faulk, EPA
Environmental Portal, LMSI
TPA Administrative Record WMA C
WRPS Correspondence

cc w/o attach:

R.S. Skeen, CTUIR
J.M. Alzheimer, Ecology
M. Burns, Ecology
J.B. Price, Ecology
C.L. Whalen, Ecology
S.E. Hudson, HAB
R.E. Piippo, MSA
G. Bohnee, NPT
K. Niles, ODOE
R. Buck, Wanapum
A.M. Hopkins, WRPS
J.A. Joyner, WRPS
D.L. Parker, WRPS
P.L. Rutland, WRPS
C.L. Tabor, WRPS
R. Jim, YN
D. Rowland, YN

ATTACHMENT 1

17-TF-0046

RPP-RPT-59389

***Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan
for Waste Management Area C***

Rev. 0

DOCUMENT RELEASE AND CHANGE FORM

Release Stamp

Prepared For the U.S. Department of Energy, Assistant Secretary for Environmental Management
 By Washington River Protection Solutions, LLC., PO Box 850, Richland, WA 99352
 Contractor For U.S. Department of Energy, Office of River Protection, under Contract DE-AC27-08RV14800

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1. Doc No: RPP-RPT-59389 Rev. 00

2. Title:
 Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C

3. Project Number: N/A
 T2R26

4. Design Verification Required:
 Yes No

5. USQ Number: N/A
 RPP-27195

6. PrHA Number Rev. N/A

Clearance Review Restriction Type:
 public

7. Approvals

| Title | Name | Signature | Date |
|---------------------------|------------------------|------------------------|------------|
| Clearance Review | AARDAL, JANIS D | AARDAL, JANIS D | 05/08/2017 |
| Document Control Approval | WASHINGTON, MARGUERITE | WASHINGTON, MARGUERITE | 05/08/2017 |
| Originator | HOPKINS, ANDREA M | HOPKINS, ANDREA M | 05/03/2017 |
| Responsible Manager | RUTLAND, PAUL L | RUTLAND, PAUL L | 05/03/2017 |

8. Description of Change and Justification

Initial release.

9. TBDs or Holds N/A

10. Related Structures, Systems, and Components

a. Related Building/Facilities N/A b. Related Systems N/A c. Related Equipment ID Nos. (EIN) N/A

11. Impacted Documents -- Engineering N/A

| Document Number | Rev. | Title |
|-----------------|------|-------|
| | | |

12. Impacted Documents (Outside SPF):

N/A

13. Related Documents N/A

| Document Number | Rev. | Title |
|-----------------|------|-------|
| | | |

14. Distribution

| Name | Organization |
|-------------------|--------------------------------|
| ENGLISH, MO D | ONE SYSTEM/CTO |
| HOPKINS, ANDREA M | ENV PROG REPRTG & TECH SUPPORT |
| JOYNER, JESSICA A | ENVIRONMENTAL PROTECTION |
| PARKER, DAN | CLOSURE & CORRECTIVE MEASURES |
| RUTLAND, PAUL L | ONE SYSTEM/CTO |

INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

Part I: Background Information

| | |
|---|---|
| Title: Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C | Information Category: <input type="checkbox"/> Abstract <input type="checkbox"/> Journal Article <input type="checkbox"/> Summary <input type="checkbox"/> Internet <input type="checkbox"/> Visual Aid <input type="checkbox"/> Software <input type="checkbox"/> Full Paper <input type="checkbox"/> Report <input checked="" type="checkbox"/> Other Closure Action Plan |
| Publish to OSTI? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Trademark/Copyright "Right to Use" Information or Permission Documentation Yes NA <input type="checkbox"/> <input checked="" type="checkbox"/> |
| Document Number: RPP-RPT-59389 Revision 0 | Date: March 2017 |
| Author: Mesford, Timothy B | |

Part II: External/Public Presentation Information

| | |
|--|--|
| Conference Name: | |
| Sponsoring Organization(s): WRPS | |
| Date of Conference: | Conference Location: |
| Will Material be Handed Out? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Will Information be Published? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>(If Yes, attach copy of Conference format instructions/guidance.)</i> |

Part III: WRPS Document Originator Checklist

| Description | Yes | N/A | Print/Sign/Date |
|--|-------------------------------------|-------------------------------------|---|
| Information Product meets requirements in TFC-BSM-AD-C-01? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Document Release Criteria in TFC-ENG-DESIGN-C-25 completed? (Attach checklist) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| If product contains pictures, safety review completed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Lawrence, Hugh K Email Pg. 3/IDMS Data File att. |

Part IV: WRPS Internal Review

| Function | Organization | Date | Print Name/Signature/Date |
|-----------------------|--------------|------------|---|
| Subject Matter Expert | WRPS | 05/08/2017 | Mesford, Timothy B IDMS Data File att. |
| Responsible Manager | WRPS | 03/01/2017 | Rutland, Paul L IDMS Data File att. |
| Other: | | | |

Part V: IRM Clearance Services Review

| Description | Yes | No | Print Name/Signature |
|---|--------------------------|-------------------------------------|---|
| Document Contains Classified Information? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | If Answer is "Yes," ADC Approval Required _____ Print Name/Signature/Date |
| Document Contains Information Restricted by DOE Operational Security Guidelines? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Reviewer Signature: _____ Print Name/Signature/Date |
| Document is Subject to Release Restrictions? <i>If the answer is "Yes," please mark category at right and describe limitation or responsible organization below:</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Document contains: <input type="checkbox"/> Applied Technology <input type="checkbox"/> Protected CRADA <input type="checkbox"/> Personal/Private <input type="checkbox"/> Export Controlled <input type="checkbox"/> Proprietary <input type="checkbox"/> Procurement – Sensitive <input type="checkbox"/> Patentable Info. <input type="checkbox"/> OOU <input type="checkbox"/> Predecisional Info. <input type="checkbox"/> UCNI <input type="checkbox"/> Restricted by Operational Security Guidelines <input type="checkbox"/> Other (Specify) _____ |
| Additional Comments from Information Clearance Specialist Review? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Information Clearance Specialist Approval <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 5px;"> APPROVED By Janis Aardal at 12:27 pm, May 08, 2017 </div> _____ Print Name/Signature/Date |

When IRM Clearance Review is Complete – Return to WRPS Originator for Final Signature Routing (Part VI)

INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

Part VI: Final Review and Approvals

| Description | Approved for Release | | Print Name/Signature |
|---|-------------------------------------|--------------------------|---|
| | Yes | N/A | |
| WRPS External Affairs | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.4/IDMS Data Britton, John C |
| WRPS Office of Chief Counsel | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.5/IDMS Data Roden, Mari L |
| DOE – ORP Public Affairs/Communications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.6/IDMS Data Marshall, Richard A |
| Other: ORP SME | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P. 6 Bovier, Jan B |
| Other: DOE OCC | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.7 Zelen, Benjamin J |

Comments Required for WRPS-Indicate Purpose of Document:

This "Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C" (Closure Action Plan) gives an overview of Waste Management Area (WMA) C closure activities. This Closure Action Plan is one of multiple RCRA Tier 2 closure action plans that will support closure of the Hanford Site single-shell tank WMAs as described in RPP-RPT-58858, "Tier 1 Closure Plan Single-Shell Tank System." This Closure Action Plan includes information about closure actions and requirements that apply to WMA C as a whole, and general information about closure of individual tank farm components.

APPROVED

By Janis Aardal at 12:27 pm, May 08, 2017

**Approved for Public Release;
Further Dissemination Unlimited**

Information Release Station

Was/Is Information Product Approved for Release? Yes No

If Yes, what is the Level of Releaser? Public/Unrestricted Other (Specify) _____

Date Information Product Stamped/Marked for Release: 05/08/2017

Was/Is Information Product Transferred to OSTI? Yes No

Forward Copies of Completed Form to WRPS Originator

From: [Lawrence, Hugh K](#)
To: [^Information Clearance](#)
Subject: RE: RPP-RPT-59389 Ready to Review
Date: Wednesday, May 03, 2017 3:15:39 PM

Julia,

I have reviewed the changes to *RPP-RPT-59389 Rev.0*, as requested, from an industrial safety point of view. Based on that review *RPP-RPT-59389 Rev. 0* is **approved** for use. Any question or comment, please ask.

Hugh Lawrence
WRPS Safety Programs

From: ^Information Clearance
Sent: Wednesday, May 03, 2017 1:47 PM
To: Britton, John C <John_C_Britton@rl.gov>; Roden, Mari L <Mari_L_RODEN@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>
Cc: Mesford, Timothy B <Timothy_B_Mesford@rl.gov>; ^Information Clearance <InformationClearance@rl.gov>
Subject: FW: RPP-RPT-59389 Ready to Review

Good Afternoon,

Your approvals have been obtained for RPP-RPT-59389, Rev. 0, in the IDMS Clearance workflow but the author made some additional changes to the document after your review had taken place. An e-mail listing those changes is attached. Could you please review the attached file that has the changes incorporated and send me an e-mail approval for public release if the file looks acceptable? Thank you and I appreciate your time.

Sincerely,

Julia Raymer

Information Clearance
509.373.0230 (office)



From: ^Information Clearance
Sent: Wednesday, March 01, 2017 7:53 AM
To: Rutland, Paul L <Paul_L_Rutland@rl.gov>; Mesford, Timothy B <Timothy_B_Mesford@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>; Bengtson, Peter J <Peter_J_Bengtson@rl.gov>; Britton, John C <John_C_Britton@rl.gov>; Cherry, Stephen B <Stephen_B_Cherry@rl.gov>; Kent,

From: [Britton, John C](#)
To: [^Information Clearance](#)
Subject: RE: URGENT DELIVERABLE TO DOE: RPP-RPT-59389 Ready to Review - Tier 2 Closure
Date: Monday, May 08, 2017 11:46:56 AM

Approved for public release.

John Britton
Communications and Public Relations

From: ^Information Clearance
Sent: Monday, May 08, 2017 11:10 AM
To: Britton, John C <John_C_Britton@rl.gov>
Cc: Mesford, Timothy B <Timothy_B_Mesford@rl.gov>; Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>; ^Information Clearance <InformationClearance@rl.gov>
Subject: URGENT DELIVERABLE TO DOE: RPP-RPT-59389 Ready to Review - Tier 2 Closure
Importance: High

Hi John, Please provide your email approval of the updated version that's been approved by WRPS Legal & ORP (attached). Thanks! Janis Aardal, Information Clearance Lead

From: ^Information Clearance
Sent: Wednesday, May 03, 2017 1:47 PM
To: Britton, John C <John_C_Britton@rl.gov>; Roden, Mari L <Mari_L_RODEN@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>
Cc: Mesford, Timothy B <Timothy_B_Mesford@rl.gov>; ^Information Clearance <InformationClearance@rl.gov>
Subject: FW: RPP-RPT-59389 Ready to Review

Good Afternoon,

Your approvals have been obtained for RPP-RPT-59389, Rev. 0, in the IDMS Clearance workflow but the author made some additional changes to the document after your review had taken place. An e-mail listing those changes is attached. Could you please review the attached file that has the changes incorporated and send me an e-mail approval for public release if the file looks acceptable? Thank you and I appreciate your time.

Sincerely,

Julia Raymer

Information Clearance
509.373.0230 (office)



From: [Roden, Mari L](#)
To: [^Information Clearance](#); [Britton, John C](#); [Lawrence, Hugh K](#)
Cc: [Mesford, Timothy B](#); [Cherry, Stephen B](#); [Mcperson, Robert B](#)
Subject: RE: RPP-RPT-59389 Ready to Review
Date: Monday, May 08, 2017 6:43:00 AM

Approve with the following comments:

1. Ensure proper use of quotation within quotes. For example, inside quotes should be single quote marks and outside quotation marks should be double.
2. Recommend eliminate dates when citing all statutes, with the exception of CERCLA.
3. RCRA does not appear to be cited in the references section. Please correct.

Thanks,
 Mari

From: ^Information Clearance
Sent: Wednesday, May 3, 2017 1:47 PM
To: Britton, John C <John_C_Britton@rl.gov>; Roden, Mari L <Mari_L_RODEN@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>
Cc: Mesford, Timothy B <Timothy_B_Mesford@rl.gov>; ^Information Clearance <InformationClearance@rl.gov>
Subject: FW: RPP-RPT-59389 Ready to Review

Good Afternoon,

Your approvals have been obtained for RPP-RPT-59389, Rev. 0, in the IDMS Clearance workflow but the author made some additional changes to the document after your review had taken place. An e-mail listing those changes is attached. Could you please review the attached file that has the changes incorporated and send me an e-mail approval for public release if the file looks acceptable? Thank you and I appreciate your time.

Sincerely,

Julia Raymer

Information Clearance
 509.373.0230 (office)



From: ^Information Clearance
Sent: Wednesday, March 01, 2017 7:53 AM
To: Rutland, Paul L <Paul_L_Rutland@rl.gov>; Mesford, Timothy B <Timothy_B_Mesford@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>; Bengtson, Peter J <Peter_J_Bengtson@rl.gov>; Britton, John C <John_C_Britton@rl.gov>; Cherry, Stephen B <Stephen_B_Cherry@rl.gov>; Kent, Sandra H <Sandra_H_Kent@rl.gov>; Marshall, Richard A <Richard_A_Marshall@orp.doe.gov>;

From: [Marshall, Richard A](#)
To: [^Information Clearance](#)
Cc: [Bovier, Jan B](#); [Zelen, Benjamin J](#); [Raymer, Julia R](#); [Aardal, Janis D](#); [Garcia, JoLynn M](#)
Subject: DOCUMENT REVIEW REQUESTED: comments for RPP-RPT-59389 -- Tier 2 edit summary
Date: Monday, May 08, 2017 10:29:53 AM

ORP Approvals for RPP-RPT-59389.

Rich Marshall

Public Involvement Specialist
North Wind Solutions
Contractor to the Office of River Protection
United States Department of Energy
Office: 509.376.9767
Cell: 509.619.3137
Richard_A_Marshall@orp.doe.gov

From: Zelen, Benjamin J
Sent: Monday, May 01, 2017 10:01 AM
To: Bovier, Jan B <Jan_B_Bovier@orp.doe.gov>; King, Grace J <Grace.King@rl.doe.gov>
Cc: Sondag, Joseph M <Joseph_Sondag@orp.doe.gov>; Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>; Kemp, Christopher J <Christopher_J_Kemp@orp.doe.gov>; Mattlin, Ellen M <ellen_m_mattlin@orp.doe.gov>
Subject: RE: WMA C Tier 2 and Tier 3 Closure Report Comments

We don't have any additional comments

Benjamin Zelen
Assistant Chief Counsel for Environmental
Office of Chief Counsel
U.S. Department of Energy
(509) 376-0815

The information contained in this e-mail message may be privileged, confidential and protected from disclosure under the attorney-client privilege or work product doctrine. Please limit dissemination in order to preserve its privileged and confidential nature. If you are not the intended recipient, any dissemination, distribution or copying is strictly prohibited.

From: Bovier, Jan B
Sent: Thursday, May 04, 2017 2:15 PM
To: Marshall, Richard A <Richard_A_Marshall@orp.doe.gov>; Zelen, Benjamin J <benjamin.zelen@rl.doe.gov>
Cc: Garcia, JoLynn M <JoLynn_M_Garcia@orp.doe.gov>; Raymer, Julia R <Julia_R_Raymer@rl.gov>
Subject: RE: DOCUMENT REVIEW REQUESTED: comments for RPP-RPT-59389 -- Tier 2 edit summary

Richard:

I have reviewed the document and I have "No Comments" At this time.

VR

Jan B. Bovier, P.E.

Tank Closure Program Manager

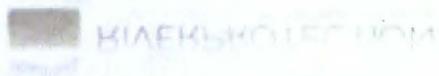
Tank Farms Programs Division

Department of Energy – Office of River Protection (DOE-ORP)

Phone # 509-376-9630

Cell # 315-767-8886

Email: Jan_B_Bovier@orp.doe.gov



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  0230</comments>
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Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C

Author Name:

A. M. Hopkins – Washington River Protection Solutions, LLC
K. M. Davis, J. V. Szecsody – Freestone Environmental Services, Inc.
J. C. Henderson – Columbia Energy and Environmental Services, Inc.
Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-08RV14800

EDT/ECN: DRCF UC: N/A
Cost Center: N/A Charge Code: N/A
B&R Code: N/A Total Pages: 78 86 mw 5/8/2017

Key Words: Appendix I, Closure, Closure Action Plan, Single-Shell Tank System, SST, Tier 2, Tier 2 Closure Plan, Tier 2 RCRA Closure Action Plan, Waste Management Area C, WMA C

Abstract: This Waste Management Area C Closure Action Plan is the second tier of a three-tiered hierarchy of closure plans for the Single-Shell Tank System as defined by the Hanford Federal Facility Agreement and Consent Order Action Plan, Appendix I. This Tier 2 Closure Action Plan provides an overview of Waste Management Area C closure activities. It includes information about closure actions and requirements that apply to Waste Management Area C as a whole, and general information about closure of individual tank farm components.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

APPROVED
By Janis Aardal at 1:26 pm, May 08, 2017

Release Approval

Date

DATE:
May 08, 2017



**HANFORD
RELEASE**

Release Stamp

Approved For Public Release

Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C

A. M. Hopkins

Washington River Protection Solutions, LLC

K. M. Davis

J. V. Szecsody

Freestone Environmental Services, Inc.

J. C. Henderson

Columbia-Energy and Environmental Services, Inc.

Date Published

May 2017



**P.O. Box 850
Richland, Washington**

RPP-RPT-59389, Rev. 0

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EXECUTIVE SUMMARY

This "Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C" (RCRA Tier 2 Plan) provides an overview of Waste Management Area (WMA) C closure activities. The *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989) (HFFACO) Action Plan, Appendix I establishes a process for closing individual components and the WMAs, as contributory actions to closing the single-shell tank system. This process is described in the HFFACO Action Plan, Appendix I, Section 2.2. The process involves a three-tiered structure of documentation to integrate the various closure actions within a WMA into WA7 89000 8967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion for the Treatment, Storage, and Disposal of Dangerous Waste* as revised (Hanford Site-Wide Permit). The documents in the three-tiered structure include:

- Tier 1 – Framework (single-shell tank system-wide) closure plan
- Tier 2 – WMA closure action plans
- Tier 3 – Component closure activity plans.

This RCRA Tier 2 Plan is one of multiple RCRA Tier 2 closure action plans that will support closure of the Hanford Site single-shell tank WMAs as described in RPP-RPT-58858, "*Tier 1 Closure Plan Single-Shell Tank System.*" This RCRA Tier 2 Plan includes information about closure actions and requirements that apply to WMA C as a whole, and general information about closure of individual tank farm components. Details with a higher degree of specificity regarding individual component closure will be included in Tier 3 RCRA component closure activity plans for WMA C.

WMA C encompasses the Hanford Site 241-C Tank Farm, a single-shell tank farm. The 241-C Tank Farm includes twelve 100-series single-shell tanks and four 200-series single-shell tanks. The tanks were constructed between 1943 and 1946, to receive Hanford operations waste. These tanks received operations waste until they were removed from service, between 1970 and 1980.

Sixteen unplanned releases have occurred at or adjacent to WMA C. Potentially contaminated soil is not discussed in this RCRA Tier 2 Plan, but will be addressed in accordance with the corrective action process underway at WMA C and integrated with tank closure activities.

Groundwater will be monitored during WMA C closure activities. Final remedial action decisions regarding groundwater will be made through Comprehensive Environmental Response, Compensation, and Liability Act of 1980 records of decision specific to the relevant groundwater operable units. These records of decision will be incorporated into the WMA C corrective action and closure process.

This RCRA Tier 2 Plan is based on a landfill closure approach for WMA C in accordance with the applicable provisions of RCRA and the *Hazardous Waste Management Act (Revised Code of Washington 70.105, "Hazardous Waste Management")* and consistent with 78 FR 75913, "Record of Decision: Final Tank Closure of Waste Management and Environmental Impact

1 Statement for the Hanford Site, Richland, Washington,” pursuant to the HFFACO Action Plan,
2 Appendix I. This RCRA Tier 2 Plan discusses hazardous and dangerous wastes only (as defined
3 by RCRA and the Hazardous Waste Management Act). This RCRA Tier 2 Plan does not discuss
4 waste classification determinations and radioactive waste-specific closure actions that the
5 U.S. Department of Energy may take under the *Atomic Energy Act of 1954*. Where this RCRA
6 Tier 2 Plan provides data or discussions about materials regulated under the *Atomic Energy Act*
7 *of 1954*, that information is provided for informational purposes only. Additional information is
8 provided regarding the engineered surface barrier that will be constructed to cover WMA C and
9 adjacent tank farms following completion of component closure actions and soil corrective
10 measures. A closure schedule is discussed, and post-closure care is described in this RCRA
11 Tier 2 Plan.

12
13

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TERMS

| | | |
|----|---------|--|
| 1 | | |
| 2 | | |
| 3 | AEA | <i>Atomic Energy Act of 1954</i> |
| 4 | AM | action memorandum |
| 5 | AOP | air operating permit |
| 6 | BBI | Best-Basis Inventory |
| 7 | BCAA | Benton Clean Air Agency |
| 8 | BRA | Baseline Risk Assessment |
| 9 | CAA | <i>Federal Clean Air Act</i> |
| 10 | CERCLA | <i>Comprehensive Environmental Response, Compensation, and Liability Act</i> |
| 11 | | <i>of 1980</i> |
| 12 | CFR | <i>Code of Federal Regulations</i> |
| 13 | C Farm | 241-C Tank Farm |
| 14 | CMS | corrective measures study |
| 15 | d | day |
| 16 | D4 | decontamination, deactivation, decommissioning, & demolition |
| 17 | DOE | U.S. Department of Energy |
| 18 | DST | double-shell tank |
| 19 | DW | dangerous waste |
| 20 | Ecology | Washington State Department of Ecology |
| 21 | EIS | environmental impact statement |
| 22 | EPA | U.S. Environmental Protection Agency |
| 23 | Federal | United States of America Federal Government |
| 24 | ft | foot |
| 25 | FS | feasibility study |
| 26 | HFFACO | <i>Hanford Federal Facility Agreement and Consent Order</i> |
| 27 | HIHTL | hose-in-hose transfer lines |
| 28 | HWMA | <i>Hazardous Waste Management Act</i> |
| 29 | IPA | Appendix I Performance Assessment |
| 30 | km/hr | kilometer per hour |
| 31 | L | liter |

| | | |
|----|-----------|--|
| 1 | m | meter |
| 2 | MOU | Memorandum of Understanding |
| 3 | mrem | millirem |
| 4 | NEPA | <i>National Environmental Policy Act of 1969</i> |
| 5 | NESHAP | National Emission Standards for Hazardous Air Pollutants |
| 6 | NTCRA | non-time-critical removal action |
| 7 | OU | operable unit |
| 8 | PCB | polychlorinated biphenyl |
| 9 | PUREX | Plutonium Uranium Extraction (Plant) |
| 10 | RAEL | Radioactive Air Emission License |
| 11 | RAWP | removal action work plan |
| 12 | RBDA | risk-based disposal approval |
| 13 | RCRA | <i>Resource Conservation and Recovery Act of 1976</i> |
| 14 | RCW | <i>Revised Code of Washington</i> |
| 15 | REDOX | Reduction-Oxidation (S Plant) |
| 16 | RFI | RCRA facility investigation |
| 17 | RI | remedial investigation |
| 18 | ROD | record of decision |
| 19 | SEPA | <i>State Environmental Policy Act</i> |
| 20 | SST | single-shell tank |
| 21 | TC&WM EIS | Tank Closure and Waste Management Environmental Impact Statement |
| 22 | State | State of Washington |
| 23 | TPA | Tri Party Agreement |
| 24 | TSCA | <i>Toxic Substances Control Act of 1976</i> |
| 25 | TSD | treatment, storage, and disposal |
| 26 | UPR | unplanned release |
| 27 | WAC | <i>Washington Administrative Code</i> |
| 28 | WMA | waste management area |
| 29 | yr | year |

30

1.0 INTRODUCTION

1
2
3 The Hanford Site single-shell tank (SST) system is grouped into seven geographically-based
4 areas called “waste management areas” (WMAs) for purposes of corrective action. This closure
5 plan describes closure actions that will be taken at the Hanford Site geographic area 241-C Tank
6 Farm (C Farm), an SST farm designated as WMA C. The boundaries of the SST WMAs are
7 generally coincident with the associated tank farm area fence line; however, WMA closure
8 actions are anticipated to include components and areas of contamination outside the tank farm
9 fence line. WMA C is composed of dangerous waste management components within the
10 Hanford Site SST system, and includes tanks, pits, transfer piping, diversion boxes, and vaults.
11 Section 2.0 of this closure plan describes WMA C and its associated components in detail. In
12 addition, soil and groundwater contamination caused by C Farm operations has been identified.
13

14 The U.S. Department of Energy (DOE) will conduct closure activities for single components or
15 groups of components within WMA C in accordance with the framework provided in the
16 *Hanford Federal Facility Agreement and Consent Order* (HFFACO), also publicly known as the
17 Tri-Party Agreement (Ecology et al. 1989), or TPA. The HFFACO Action Plan, Appendix I
18 establishes a process for closing individual components and the WMAs, as contributory actions
19 to closing the SST system. This process is described in the HFFACO Action Plan, Appendix I,
20 Section 2.2. The process involves a three-tiered structure of documentation to integrate the
21 various closure actions within a WMA into WA7 89000 8967, *Hanford Facility Resource*
22 *Conservation and Recovery Act Permit, Dangerous Waste Portion for the Treatment, Storage,*
23 *and Disposal of Dangerous Waste*, as revised (Hanford Site-Wide Permit). The documents in
24 the three-tiered structure include:
25

- 26 • Tier 1 – Framework (SST system-wide) closure plan
- 27 • Tier 2 – WMA closure action plans
- 28 • Tier 3 – Component closure activity plans.

29
30 RPP-RPT-58858, “*Tier 1 Closure Plan Single-Shell Tank System*” (RCRA Tier 1 Plan) was
31 submitted to the Washington State Department of Ecology (Ecology) in September 2015,
32 (Letter 15-ECD-0042, “Submittal of the Tier 1 Closure Plan for the Single-Shell Tank System”)
33 pursuant to HFFACO Milestone M-045-82. The RCRA Tier 1 Plan addresses closure actions
34 and issues pertaining to the entire Hanford Site SST system. Ecology comments on
35 RPP-RPT-58858, Rev. 1 were submitted to DOE in April 2016.
36

37 This document is the *Resource Conservation and Recovery Act of 1976* (RCRA) Tier 2 Closure
38 Action Plan for WMA C (RCRA Tier 2 Plan), which describes closure actions that will be taken
39 at WMA C. This RCRA Tier 2 Plan supports completion of HFFACO Milestone M-045-82. It
40 is anticipated that DOE will also prepare multiple RCRA Tier 3 component closure activity plans
41 (RCRA Tier 3 plans) to address actions that will be taken to close individual components within
42 WMA C. Together, the RCRA Tier 1 Plan, this RCRA Tier 2 Plan, and the various WMA C
43 RCRA Tier 3 plans describe the closure processes and actions required for closure of WMA C
44 tanks and equipment in accordance with RCRA, as amended by Hazardous and Solid Waste
45 Amendments of 1984, and the State of Washington *Hazardous Waste Management Act*
46 (HWMA), *Revised Code of Washington* (RCW) 70.105, “Hazardous Waste Management.”

1 The inclusion of information subject to regulation under the *Atomic Energy Act of 1954* (AEA)
2 in the closure plan documents does not confer authority to Ecology under RCRA or RCW 70.105
3 over otherwise exempt spent, byproduct, and special nuclear material regulated under the AEA.
4

5 Closure activities to reach final closure for WMA C will be established through the combined
6 elements of the RCRA Tier 1 Plan; this RCRA Tier 2 Plan (the closure approach and the closure
7 barrier); the individual RCRA Tier 3 plans (closure of individual components, such as the tanks);
8 the RCRA corrective action process for soils; *Comprehensive Environmental Response,*
9 *Compensation, and Liability Act of 1980* (CERCLA) records of decision (RODs) for interfacing
10 operable units (OUs) and non-time-critical removal action (NTCRA) process for WMA C
11 out-of-service facilities; the DOE Order 435.1, *Radioactive Waste Management* (DOE O 435.1)
12 closure plan process; and other documents. See Section 1.2 of this RCRA Tier 2 Plan for further
13 discussion.
14
15

16 1.1 GENERAL LOCATION AND BACKGROUND INFORMATION

17

18 This section describes the physical location and extent of WMA C and the closure approach for
19 WMA C.
20

21 1.1.1 Physical Location and Extent of Waste Management Area C

22

23 WMA C is located in the east-central portion of the 200 East Area within the Central Plateau of
24 the Hanford Site (Figure 1-1), and encompasses C Farm. In general, WMA C is coincident with
25 the C Farm fence line; however, some components extend beyond the fence line or are located
26 outside the fence line. Figure 1-1 shows the general layout of C Farm.
27

28 The C Farm contains twelve 100-series SSTs, four 200-series SSTs, a catch tank, diversion
29 boxes, a vault, and interconnecting pipelines. Additional descriptive information about WMA C
30 is provided in Section 2.0 of this RCRA Tier 2 Plan.
31

32 1.1.2 Closure Approach

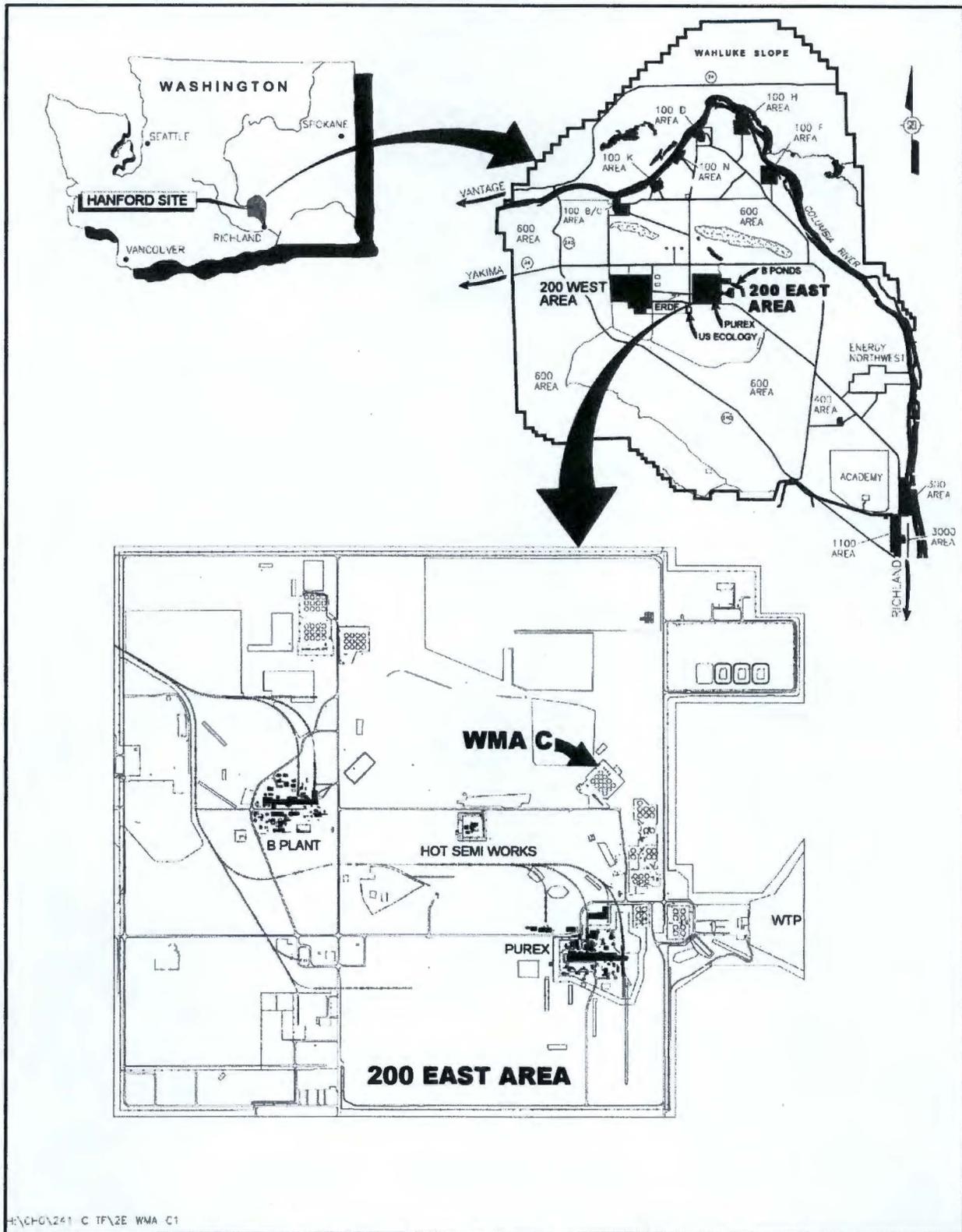
33

34 As discussed in the RCRA Tier 1 Plan, consistent with the DOE *National Environmental Policy*
35 *Act of 1969* (NEPA) environmental impact statement (EIS) for the closure of Hanford Site tanks
36 (DOE/EIS-0391, *Final Tank Closure and Waste Management Environmental Impact Statement*
37 *for the Hanford Site, Richland, Washington* [TC&WM EIS]) and subsequent TC&WM EIS ROD
38 (78 FR 75913, "Record of Decision: Final Tank Closure and Waste Management Environmental
39 Impact Statement for the Hanford Site, Richland, Washington"), this RCRA Tier 2 Plan is based
40 on a landfill closure approach for the WMA C tank system in accordance with *Washington*
41 *Administrative Code* (WAC) 173-303-665, "Landfills," subsection (6) "Closure and post-closure
42 care," item (a).
43
44

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1
2

Figure 1-1. Location Map of Waste Management Area C in the 200 East Area.



H:\CH01\241 C 1\F\2E WMA C1

3
4
5

| | |
|--|---|
| ERDF = Environmental Restoration Disposal Facility | WTP = Hanford Tank Waste Treatment and Immobilization Plant |
| PUREX = Plutonium Uranium Extraction (Plant) | WMA = waste management area |

1 Following issuance of the TC&WM EIS ROD, U.S. DOE prepared and submitted a clean closure
2 practicability evaluation (DOE/ORP-2014-02, *Clean Closure Practicability Demonstration for*
3 *Single-Shell Tanks*) to Ecology for approval, which concluded that clean closure of any portion
4 of the SST system is impracticable. DOE/ORP-2014-02 presents an overview of the clean
5 closure process for the tank farms. DOE/ORP-2014-02 also analyzed the potential impacts and
6 short-term environmental consequences of clean closure to human health and the environment
7 are analyzed as applicable to each WMA, with summaries and cost analyses presented.
8 DOE/ORP-2014-02 determined that clean closure of the SST system in accordance with
9 WAC 173-303-610, "Closure and Post-Closure," subsection (2) "Closure performance standard,"
10 item (b) and WAC 173-303-640, "Tank Systems," subsection (8), "Closure and post-closure
11 care," item (a) is impracticable, as defined by WAC 173-340-200, "Definitions," and using the
12 applicable procedures and criteria of WAC 173-340-360, "Selection of Cleanup Actions,"
13 subsection (3), items (e) and (f), including a disproportionate cost analysis test
14 [WAC 173-340-360(3), items (e) and (i)].

15
16 Consequently, in accordance with WAC 173-303-640(8), item (b) and the TC&WM EIS ROD,
17 closure plans for WMA C will be submitted as landfill closure plans. Therefore, a plan that
18 defines closure activities to achieve clean closure in accordance with WAC 173-303-640(8)(a) is
19 not presented in this RCRA Tier 2 Plan.

20
21 The general closure approach for WMA C includes the planned actions listed below:

- 22
23 • Stabilization of tanks and below-grade structures to the extent necessary to prevent
24 long-term subsidence
- 25
26 • Removal of above-grade equipment, as necessary to support surface barrier installation
- 27
28 • Decontamination, deactivation, decommissioning, and demolition (D4) of past-practice
29 facilities
- 30
31 • Coordination of closure activities with soil cleanup actions that will be defined through
32 the corrective action process
- 33
34 • Evaluation, through the corrective action process, of the need for an interim closure cap
35 for transition to a final cap
- 36
37 • Construction of an approved final closure cap
- 38
39 • Performance of post-closure monitoring and maintenance.

40
41 This RCRA Tier 2 Plan will be subject to public comment as part of the closure permitting
42 process.
43
44

1.2 REGULATORY FRAMEWORK

Closure actions at WMA C are subject to the requirements of RCRA/HWMA as implemented through WAC 173-303, "Dangerous Waste Regulations" and the HFFACO. The HFFACO describes how closure activities driven by requirements of CERCLA, RCRA/HWMA and the AEA will be integrated for application to Hanford Site closure activities. The overall framework for the integration of WMA C closure requirements is described in the HFFACO Action Plan, Appendix I. This section of this RCRA Tier 2 Plan builds on the Appendix I framework and includes discussion of other regulatory requirements applicable to, and opportunities for, integration related to WMA C closure.

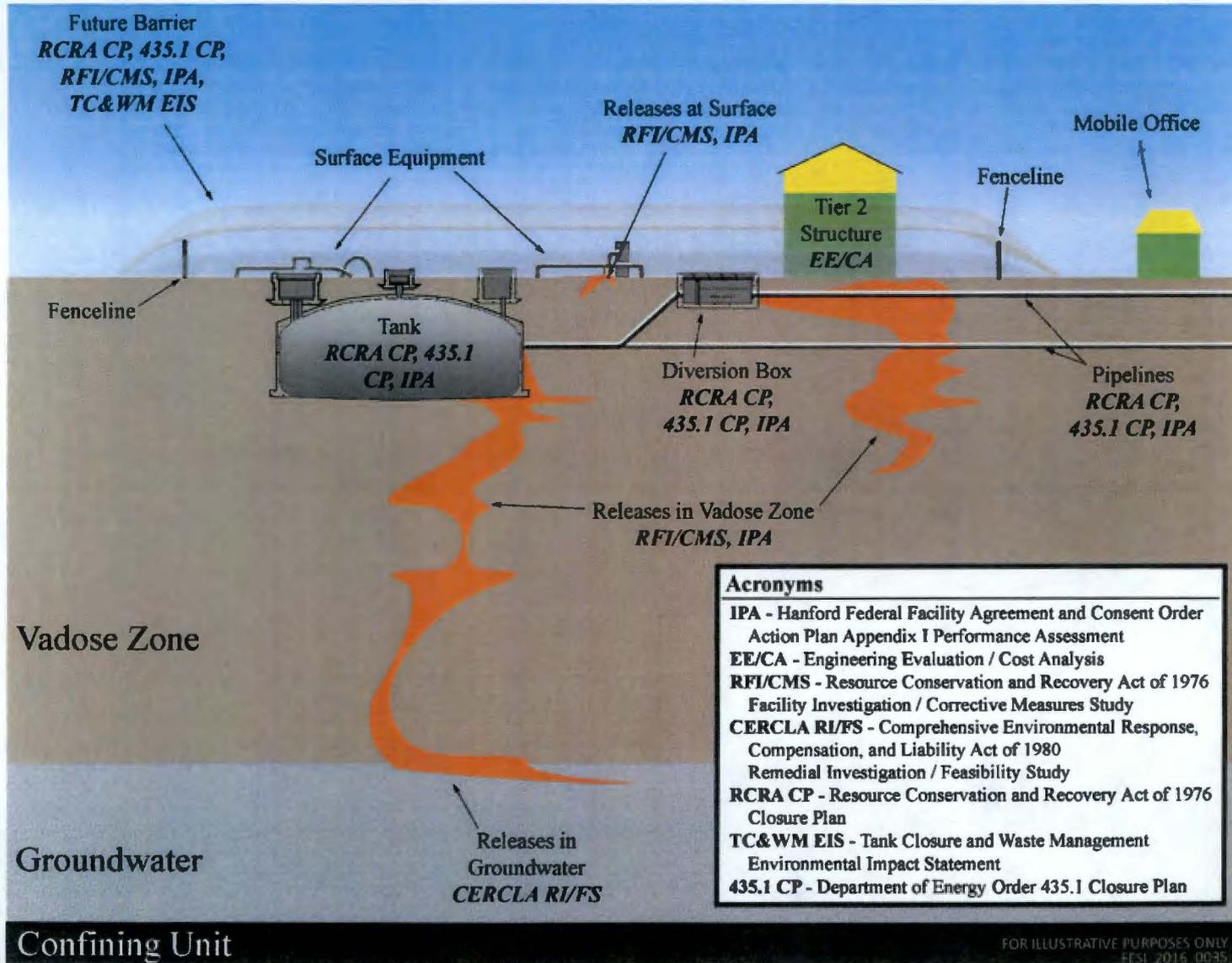
As further discussed in the following subsections (Sections 1.2.1 through 1.2.8), the closure of WMA C requires the integration of many remedial and corrective actions pursuant to the requirements of NEPA, *Washington State Environmental Policy Act* (SEPA) (RCW 43.21C, "State Environmental Policy"), RCRA, CERCLA, DOE O 435.1, and other regulations and DOE Orders. Tank waste retrieval, soil corrective measures, and groundwater remediation are being addressed in documents developed separately from, but in concert with, the WMA C RCRA Tier 1 Plan, RCRA Tier 2 Plan, RCRA Tier 3 plans, and the Hanford Site-Wide Permit. This Section 1.2 of this RCRA Tier 2 Plan briefly addresses some of the other documents and processes required to accomplish the WMA C closure. Figure 1-2 depicts the major WMA C closure-related documents as they relate to the components of WMA C.

1.2.1 *National Environmental Policy Act of 1969/State Environmental Policy Act*

In March, 2003, Ecology entered a Memorandum of Understanding (MOU) with DOE in which it agreed to act as a cooperating agency in preparation of the "Tank Closure EIS" (*Memorandum of Understanding Between the United States Department of Energy, Office of River Protection, and Washington State Department of Ecology*, March 25 [DOE and Ecology 2003]). In January 2006, the "Tank Closure EIS" scope was revised, and the document renamed the TC&WM EIS. Subsequently, in 2006, the 2003 MOU was revised so that Ecology remained a cooperating agency in the TC&WM EIS. In March 2006, Ecology and DOE entered into this revised MOU in which the parties agreed that "the most effective relationship shall be one in which DOE serves as the 'Lead Agency' and Ecology serves as the 'Cooperating Agency' As [*sic*] defined in the CEQ Regulations (40 C.F.R. Part 1508)" (*Memorandum of Understanding Between the United States Department of Energy and the Washington State Department of Ecology for Development of the Hanford Site Tank Closure and Waste Management EIS* ("TC&WM EIS"), January 6 [DOE and Ecology 2006]). In December 2012, DOE published the TC&WM EIS. Ecology's statement in the Foreword of the TC&WM EIS identifies the closure plan and permit modification process as a mechanism through which landfill decisions can be implemented, explaining that "While DOE has identified the Preferred Alternative for tank closure as including landfill closure, it is important to point out that the specific details of how a tank farm will be closed will be identified in each tank farm closure plan permit. These closure plans will be subject to public comment and agency response before landfill decisions can be implemented."

1
2

Figure 1-2. Waste Management Area C Component Closure Evaluation Documents.



1-6

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4

Reference: DOE O 435.1, *Radioactive Waste Management*.

1 The TC&WM EIS analyzed SST system closure alternatives, including clean, landfill, and
2 hybrid clean/landfill closure. The TC&WM EIS ROD, published in 78 FR 75913 on
3 December 13, 2013, states “The tanks will be grouted and contaminated soil may be removed.
4 The SSTs will be landfill-closed, which means they will be stabilized, and an engineered
5 modified RCRA Subtitle C barrier put in place followed by post-closure care.” The Basis for the
6 Decision of the TC&WM EIS ROD states, “DOE has determined landfill closure of the SST
7 system, which could include corrective/mitigation actions that may require soil removal or
8 treatment of the vadose zone, is a more appropriate approach for SST system closure than clean
9 closure.”

10
11 It is possible that closure of some components may require undertaking actions that are not
12 addressed in the TC&WM EIS ROD and that do not individually or cumulatively have a
13 significant effect on the human environment (e.g., removal of support equipment and structures).
14 In accordance with 75 FR 75628, “Final Guidance for Federal Departments and Agencies on
15 Establishing, Applying, and Revising Categorical Exclusions Under the National Environmental
16 Policy Act,” DOE has established a series of NEPA categorical exclusions that may be invoked
17 to achieve NEPA requirements for such actions.

18
19 State agencies consider environmental values during decision-making through the process
20 established by SEPA. SEPA requires decision-making agencies like Ecology to conduct an
21 evaluation of proposals in accordance with WAC 197-11, “SEPA Rules,” to determine the
22 potential significance of impacts to the environment and public health. In lieu of preparing a
23 separate SEPA EIS, Ecology may adopt the NEPA TC&WM EIS, if the requirements in
24 WAC 197-11-610, “Use of NEPA Documents,” subsection (3) are met. As indicated in the
25 Foreword by Ecology, Ecology is a cooperating agency for the TC&WM EIS and provided
26 advice and assistance in developing the TC&WM EIS. Ecology stated in the preface to the
27 TC&WM EIS that “[w]hen Ecology makes decisions through its permitting process, Ecology
28 will look to this *Final TC&WM EIS* and, if appropriate, adopt portions.”

30 **1.2.2 Hanford Federal Facility Agreement and Consent Order**

31
32 The HFFACO Action Plan Milestone M-045-00 requires that closure of the SST system will
33 occur in accordance with the RCRA-authorized dangerous waste regulations contained in
34 WAC 173-303-610. In addition, the HFFACO requires that all work completed under the
35 Milestone M-045 series proceeds according to the HFFACO Action Plan, Appendix I,
36 “Single-Shell Tank System Waste Retrieval and Closure Process.” The HFFACO
37 Milestone M-045-83 currently specifies completion of closure actions at WMA C by June 30,
38 2019. However, as of August 2015, DOE has statused Milestone M-045-83 as “to be missed”
39 (“Final Office of River Protection Tri-Party Agreement Monthly Summary Report August 2015”
40 [ORP 2015]). A HFFACO milestone change control form specifying the date for completion of
41 closure actions at WMA C has been prepared in support of agreements initiated by “Tentative
42 Agreement on Negotiations of Hanford Federal Facility Agreement and Consent Order Revisions
43 Pertaining to Single-Shell Tanks WMA C Documents and Closure” (see Letter 16-TF-0127,
44 “Transmittal of Tentative Agreement on Negotiations of Hanford Federal Facility and Consent
45 Order Revisions on Interim Milestone M-045-82, Submit Complete Permit Modification
46 Requests for Tiers 2 & 3 of the Single-Shell Tank System to Support Final Closure

1 Requirements for Waste Management Area C”). This change control form also identifies RCRA
 2 Tier 3 Component Closure Activity Plan submittal dates for WMA C, and proposed target dates
 3 to initiate RCRA Tier 3 Plan component closure activities.

4
 5 The HFFACO Action Plan, Appendix I provides the process for tank waste retrieval, component
 6 and WMA closure, WMA soil corrective actions, and groundwater actions. Before
 7 implementing closure actions, DOE will retrieve waste from the tanks to meet the criteria
 8 established in the HFFACO Action Plan, Appendix H, or Consent Decree in *State of Washington*
 9 *v. Dept. of Energy*, Case No. 2:08-cv-05085-FVS (E.D. WA October 25, 2010), as appropriate.¹

10
 11 DOE submits SST closure documentation in alignment with HFFACO milestones pursuant to
 12 agreements documented in “ORP Project Managers Meeting July 23, 2013 2440 Stevens Ctr.
 13 Richland, Washington Meeting Minutes Transmittal” (ORP 2013).

14
 15 A number of milestones were negotiated for implementing various characterization, testing, and
 16 interim actions at SST WMAs. Additional WMA C-specific milestones were created to require
 17 submittal of RCRA closure plans for the regulated tank system, and a RCRA facility
 18 investigation (RFI)/corrective measures study (CMS) and a corrective measures implementation
 19 work plan to address contaminated WMA C soil. Groundwater investigation and remediation
 20 activities are identified in the HFFACO Action Plan, Appendix I as being integrated with the
 21 RCRA closure process through the CERCLA remedial investigation (RI)/feasibility study (FS)
 22 process. Ecology reserves the right to require further groundwater response actions consistent
 23 with Ecology’s RCRA corrective action authority.

24 25 **1.2.3 Resource Conservation and Recovery Act of 1976/ 26 Hazardous Waste Management Act**

27
 28 The HFFACO Action Plan, Appendix D, Milestones M-45-82 and M-45-83 designate Ecology
 29 as the lead regulatory agency for SST closure. Ecology regulates the SSTs as dangerous waste
 30 storage and treatment units under the HWMA and WAC 173-303, which implement RCRA.
 31 Closure actions for the WMA C SSTs and ancillary equipment are regulated under RCRA, and
 32 the HWMA. In addition, closure decisions for SST system soils will be made through the RCRA
 33 corrective action process for non-radioactive soil contaminants.

34 35 **1.2.3.1 Single-Shell Tank Closure under Resource Conservation and Recovery Act of 1976.**

36 The HFFACO Action Plan, Section 5.3, requires that treatment, storage, and disposal (TSD)
 37 units close under final status closure requirements (WAC 173-303-610) “irrespective of permit
 38 status.” Thus, while the SST system does not have a final status Part B permit, the SSTs will be
 39 closed under final status closure requirements. WAC 173-303-610 sets forth requirements for
 40 closure and post-closure of dangerous waste management units such as the SST system.
 41 WAC 173-303-640 sets forth requirements for closure and post-closure care of tank systems.
 42 WAC 173-303-665 sets forth requirements for closure and post-closure of landfills.

43

 1 The “Consent Decree” collectively refers to the Consent Decree in Case No. 2:08-cv-05085-FVS (October 25,
 2010), the Amended Consent Decree, Case No. 2:08-cv-05085-RMP (March 11, 2016), and the Second Amended
 Consent Decree, Case No. 2:08-cv-05085-RMP (April 12, 2016).

1 The decision under the TC&WM EIS ROD is that the SST system will be landfill closed under
2 the WAC regulations. The *Clean Closure Practicability Demonstration for Single-Shell Tanks*
3 (DOE/ORP-2014-02) concludes that removal or decontamination of the tank system and soils
4 associated with WMA C is not practicable. Consequently, this RCRA Tier 2 Plan is based on a
5 landfill closure approach, in accordance with WAC 173-303-640(8)(b). DOE will, therefore,
6 close the WMA and perform closure and post-closure care in accordance with applicable landfill
7 closure and post-closure requirements set forth in WAC 173-303-665(6) and WAC 173-303-610.
8 Section 4.0 of this RCRA Tier 2 Plan presents relevant excerpts from these requirements and
9 information on steps DOE will take to meet the requirements. Specific WMA C closure
10 requirements will be incorporated into the Hanford Site-Wide Permit, through the permit
11 modification process. Authorization for implementing closure activities is granted through the
12 Hanford Site-Wide Permit for the RCRA component of the mixed waste.

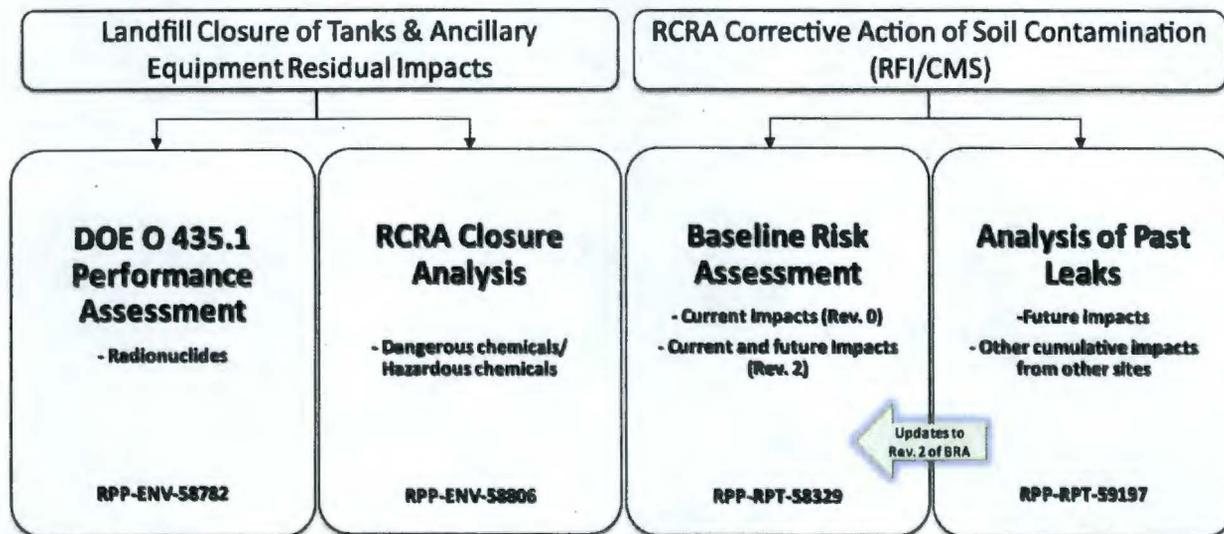
13
14 The HFFACO Action Plan, Appendix I, Section 2.2.1, describes a three-tiered document process
15 for closing the Hanford Site SST system. The RCRA Tier 1 Plan addresses closure topics and
16 issues pertaining to the entire SST system. The RCRA Tier 2 plans are anticipated to address
17 closure actions that will be taken at the WMA level. It is anticipated that a separate RCRA
18 Tier 2 plan will be developed for each of the seven SST WMAs. This RCRA Tier 2 Plan has
19 been prepared specifically for WMA C. The RCRA Tier 3 plans will contain requirements
20 pertaining to the closure of individual WMA components whose closure actions are not already
21 addressed by the RCRA Tier 2 plans. DOE anticipates preparing multiple RCRA Tier 3 plans
22 for WMA C.

23
24 **1.2.3.2 Soil Corrective Actions under *Resource Conservation and Recovery Act of 1976, as***
25 **amended by *Hazardous and Solid Waste Amendments of 1984*.** The HFFACO Action Plan,
26 Appendix I, states that “[c]losure decisions for SST system soils will be made through the RCRA
27 corrective action process pursuant to Agreement Milestones M-45-55 through -62 and its
28 established process for the development of interim measures where appropriate.” Per the
29 HFFACO, Part Three, paragraph 54, “DOE shall develop and submit its proposed remedial
30 action (or corrective action) alternative following completion and approval of an RI and FS (or
31 RCRA RFI and CMS), in accordance with the requirements and schedules set forth in the
32 HFFACO Action Plan. ... In accordance with the Action Plan, Ecology in consultation with
33 DOE shall select the RCRA corrective action(s). The final selection of RCRA corrective
34 action(s) by Ecology shall be final and not subject to dispute.”

35
36 In December 2014, DOE submitted RPP-RPT-58339, “*Phase 2 RCRA Facility Investigation*
37 *Report for Waste Management Area C,*” Draft A to Ecology pursuant to HFFACO
38 Milestone M-045-61. RPP-RPT-58339 was revised and resubmitted to Ecology in
39 December 2016 per Milestone M-45-61A. RPP-RPT-58339 summarizes the results of facility
40 investigations into releases of waste to the environment at WMA C. RPP-RPT-58339 concludes
41 that the nature and extent of releases at WMA C merit the development of a CMS. In parallel
42 with the preparation of the facility investigation report, DOE produced several other documents
43 to support the development of RPP-RPT-59379, “*Waste Management Area C Phase 2 RCRA*
44 *Corrective Measures Study,*” including a baseline risk assessment, RPP-RPT-58329, “*Baseline*
45 *Risk Assessment for Waste Management Area C,*” Rev. 2 (WMA C BRA).

1 A critical component of soil corrective actions planning for WMA C is the development of a
 2 performance assessment pursuant to the HFFACO Action Plan, Appendix I, Section 2.5. This
 3 Appendix I Performance Assessment (IPA) is comprised of four parts that include all the
 4 information and analyses necessary to develop estimates of impacts to human health and the
 5 environment related to planned closure and post-closure conditions at WMA C. The
 6 four components are depicted in Figure 1-3.

7
 8 **Figure 1-3. Components of the Appendix I Performance Assessment.**
 9



10
 11 **References:**

- 12 RPP-ENV-58782, "Performance Assessment of Waste Management Area C, Hanford Site, Washington."
 13 RPP-ENV-58806, "RCRA Closure Analysis of Tank Waste Residuals Impacts at Waste Management Area C, Hanford Site,
 14 Washington."
 15 RPP-RPT-58329, "Baseline Risk Assessment for Waste Management Area C."
 16 RPP-RPT-59197, "Analysis of Past Tank Waste Leaks and Losses in the Vicinity of Waste Management Area C at the Hanford
 17 Site, Southeast Washington."
 18

19 In brief, the first component, on the left side of Figure 1-3, the DOE O 435.1 Performance
 20 Assessment (RPP-ENV-58782, "Performance Assessment of Waste Management Area C,
 21 Hanford Site, Washington"), evaluates impacts to the environment that may result from
 22 radioactive residual waste that will remain in WMA C tanks and ancillary equipment after
 23 closure. The second component (third from the right in Figure 1-3), the RCRA Closure Analysis
 24 (RPP-ENV-58806, "RCRA Closure Analysis of Tank Waste Residuals Impacts at Waste
 25 Management Area C, Hanford Site, Washington"), evaluates hazardous chemicals and dangerous
 26 waste residual contaminants in tanks and ancillary equipment at a closed WMA C. The third
 27 component (second from the right in Figure 1-3), the WMA C BRA (RPP-RPT-58329),
 28 evaluates impacts to human and ecological receptors from both non-radiological and radiological
 29 contaminants in soils at WMA C under current conditions, in the absence of actions to control or
 30 mitigate releases. The fourth component (on the right side of Figure 1-3), the Analysis of Past
 31 Leaks (RPP-RPT-59197, "Analysis of Past Tank Waste Leaks and Losses in the Vicinity of Waste
 32 Management Area C at the Hanford Site, Southeast Washington"), evaluates the long-term fate
 33 and transport of both non-radiological and radiological contaminants in soils at the closed
 34 WMA C. This evaluation of future impacts supports the WMA C BRA, Rev. 2. Relevant

1 components of the WMA C IPA will be incorporated by reference into the Hanford Site-Wide
2 Permit through the RCRA closure plans, as noted in the HFFACO Action Plan, Appendix I,
3 Section 2.5. The WMA C IPA is discussed in more detail in Section 4.2 of this RCRA Tier 2
4 Plan.

6 **1.2.4 Atomic Energy Act of 1954 and DOE O 435.1, Radioactive Waste Management**

8 Under the authority of the AEA, DOE regulates the closure of its facilities that contain
9 radioactive materials under DOE O 435.1 and the associated documents (particularly
10 DOE M 435.1-1, *Radioactive Waste Management Manual*). To close WMA C in a manner that
11 satisfies the requirements of DOE O 435.1, DOE is required to do the following:

- 13 • Issue a DOE O 435.1 waste determination for residual radioactive waste that will remain
14 in WMA C tanks and equipment after retrieval
- 15 • Prepare a DOE O 435.1 Tier 1 closure plan for WMA C as a whole
- 17 • Prepare a DOE O 435.1 Tier 2 closure plan for specific WMA C components
- 18 • Analyze the performance of the closed WMA C system with regard to controlling
19 releases of and exposures to radioactive constituents that will remain at WMA C after
20 closure.

22 DOE O 435.1 requirements for radioactive waste management are driven by the classification of
23 the waste being managed. Residual radioactive waste that will remain within WMA C after
24 retrieval operations are complete must undergo a classification process pursuant to DOE O 435.1
25 that results in a radioactive waste determination. The results of the classification process will
26 influence closure decisions for WMA C components that will contain residual radioactive waste
27 after closure.

29 After DOE issues a radioactive waste determination, DOE will evaluate WMA C closure in a
30 DOE O 435.1 Tier 1 closure plan. That Tier 1 closure plan will define the approach and plans by
31 which WMA C closure will be accomplished and identify closure standards and performance
32 objectives. The DOE O 435.1 Tier 1 closure plan will also address other relevant closure
33 controls including a monitoring plan, institutional controls, and land-use limitations to be
34 maintained in the closure activity. Closure actions for individual components that comprise
35 WMA C will be evaluated in one or more DOE O 435.1 Tier 2 closure plans.

37 A comparison of the projected performance of the closed WMA C and the identified
38 performance objectives and measures for control of residual radioactive contamination in tanks
39 and ancillary equipment is documented in the DOE O 435.1 Performance Assessment of
40 WMA C (RPP-ENV-58782). This performance assessment is one of the four components of the
41 WMA C IPA as depicted in Figure 1-3.

1 **1.2.5 Toxic Substances Control Act of 1976**

2
3 On August 30, 2000, DOE and the U.S. Environmental Protection Agency (EPA) entered into a
4 *Framework Agreement for Management of Polychlorinated Biphenyls (PCBs) in Hanford Tank*
5 *Waste* (Ecology et al. 2000), which includes PCB management in SSTs. A summary of this
6 agreement is that if a sample of SST waste results in a total PCB concentration greater than
7 50 parts per million, or double-shell tank (DST) supernate is used to retrieve the SST waste, the
8 SST waste will be designated as PCB-contaminated waste under 40 CFR 761, "Polychlorinated
9 Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions."

10
11 The DST supernate is regulated as PCB remediation waste. EPA determined that the proposed
12 use of supernate requires a *Toxic Substances Control Act of 1976* (TSCA) approval. Therefore,
13 DOE submitted an application for a risk-based disposal approval (RBDA) (RPP-22777, "*PCB*
14 *Risk Assessment for the Mobilization of Single-Shell Tank Solid Waste Using Double-Shell Tank*
15 *Supernate*") to EPA, the authorizing agency for TSCA. EPA then issued a Phase 1 RBDA
16 common to all 12 WMA C-100-series SSTs and one 241-S Tank Farm SST which have been
17 selected for retrieval using DST supernate [Letter 0501657, "Re: Approval of the Toxic
18 Substance Control Act (TSCA) Risk-based Disposal Approval (RBDA) Application for the
19 Mobilization of Single-Shell Tank Solid Waste Using Double-Shell Tank Supernate"].
20

21 **1.2.6 Air Regulations**

22
23 The Federal *Clean Air Act* (42 USC 7401) (CAA), and its implementing regulations found in
24 Title 40, *Code of Federal Regulations* (CFR) Subchapter C—Air Programs, and the *Washington*
25 *Clean Air Act* (RCW 70.94, "Washington Clean Air Act") and its implementing regulations
26 (WAC 173-400, "General Regulations for Air Pollution Sources"), provide the statutory basis for
27 the air regulation of Hanford Site activities. The emission standards for the control of hazardous
28 pollutants to the atmosphere are found in Title 40 CFR, Part 61, "National Emission Standards
29 for Hazardous Air Pollutants" (40 CFR 61) (NESHAP). Title 40 CFR, Part 70, "State Operating
30 Permit Programs" (40 CFR 70), authorizes a State to enact comprehensive State air quality
31 permitting systems consistent with the requirements of Title V of the CAA. The State of
32 Washington has enacted such systems.
33

34 Ecology has the authority to provide systematic control of air pollution from contaminant
35 sources (WAC 173-400) and issue air operating permits (WAC 173-401, "Operating Permit
36 Regulation"). The State of Washington Department of Health (Health) regulates radioactive air
37 emissions as outlined in WAC 173-480, "Ambient Air Quality Standards and Emission Limits
38 for Radionuclides," and WAC 246-247, "Radiation Protection—Air Emissions"; and issues
39 Radioactive Air Emission Licenses (RAEL). The Benton Clean Air Agency (BCAA) regulates
40 outdoor burning in Benton County pursuant to its delegation from Ecology.
41

42 Ecology is the permitting authority that issues the Hanford Air Operating Permit (AOP) to DOE
43 per WAC 173-401. The AOP includes terms and conditions and the statement of basis for those
44 conditions established by Ecology, Health, and the BCAA, collectively known as the permitting
45 agencies. The AOP is issued for a fixed term of five years, after which the permit is subject to
46 renewal.

1 WMA C activities with the potential to generate air emissions will be conducted in accordance
2 with the terms and conditions set forth by the most current AOP, the CAA, the State of
3 Washington Department of Health RAEL, and in accordance with WAC 173-400 and
4 WAC 173-480. Appropriate precautions will be employed to control fugitive emissions and
5 fugitive dust in accordance with the AOP and Reasonably Available Control Technology will be
6 implemented in accordance with WAC 173-401-605, "Emission Standards and Limitations,"
7 subsection (3) "Reasonably available control technology (RACT)," and the State of Washington
8 Department of Health RAEL.

9
10 Appropriate permits will be obtained for scheduled RCRA Tier 3 plan component closure
11 activities and their associated emission units, as required by the applicable regulations.
12

13 **1.2.7 Groundwater Monitoring and Remediation**

14
15 DOE monitors groundwater at the Hanford Site to fulfill a variety of State and Federal
16 requirements, including RCRA and WAC regulations, CERCLA, and the AEA. Although tank
17 systems do not require groundwater monitoring under WAC 173-303, Ecology and DOE have
18 agreed to establish and maintain a groundwater monitoring network for each WMA under
19 CERCLA, in accordance with the HFFACO Action Plan, Appendix I, Section 2.4.
20

21 Groundwater monitoring at WMA C began in the early 1980s, and RCRA groundwater
22 monitoring was initiated in 1989. From 1989 until 2009, groundwater at WMA C was monitored
23 to detect impacts to groundwater resulting from waste releases to the environment. In July 2009,
24 the specific conductance indicator parameter was verified as exceeding the critical mean in a
25 groundwater monitoring well located downgradient of WMA C. Based on this exceedance,
26 groundwater beneath WMA C is now being monitored under a RCRA interim status
27 groundwater quality assessment program.
28

29 As WMA C closure is completed, DOE will develop a post-closure groundwater monitoring plan
30 for approval by Ecology and incorporation by reference into the Hanford Site-Wide Permit. This
31 post-closure groundwater monitoring plan will be integrated with the groundwater monitoring
32 approach developed pursuant to the groundwater OUs associated with WMA C. Final closure
33 decisions regarding groundwater impacted by WMA C will be made in CERCLA RODs specific
34 to the affected groundwater OUs, 200-BP-5 and 200-PO-1. Therefore, final decisions regarding
35 groundwater remediation beneath WMA C will be determined by the CERCLA ROD that will be
36 issued for the 200-BP-5 OU and 200-PO-1 OU. Additional information on current groundwater
37 monitoring results and future remediation for WMA C SSTs is presented in Chapter 3 of this
38 RCRA Tier 2 Plan.
39

40 **1.2.8 Other 200 Area Remedial and Corrective Actions**

41
42 As noted in the HFFACO Action Plan, Appendix I, Section 3.1, DOE is the responsible agency
43 for the closure of all SST WMAs through post-closure, in close coordination with other closure
44 and cleanup activities of the Central Plateau. Required WMA C closure actions may or may not
45 take place within the same time frame as other planned Central Plateau closure actions. These
46 other closure actions involve facilities and source OUs currently regulated under both RCRA and

1 CERCLA. Closure of facilities and source OUs that are geographically adjacent to WMA C may
2 require activities substantively similar to WMA C closure actions. Where feasible, proximate
3 closure actions will be evaluated to identify opportunities for integration with WMA C closure
4 actions. Pursuant to HFFACO Milestone M-045-80, RPP-46459, "*Single-Shell Tank Waste*
5 *Management Area C RCRA/CERCLA Integration White Paper*" describes how the dangerous
6 waste management unit closure process for a tank system will be carried out for WMA C.

7
8 In addition to the groundwater remediation actions discussed in Section 1.2.7, 200 Area activities
9 taking place in close geographic proximity to the closure of WMA C include remedial and
10 corrective actions related to the Deep Vadose Zone Project; the neighboring group of
11 241-A Tank Farms; the 200-SW-2, 200-EA-1 and 200-IS-1 OUs; and the removal of non-RCRA
12 structures.

- 13
14 • Deep Vadose Zone Project (200-DV-1 OU): DOE established the Hanford Site Deep
15 Vadose Zone Project to capture and expand on approaches to solving the challenges
16 associated with remediating contamination deep in the Hanford Site vadose zone.
17 Information developed by this project will inform the corrective action decision process
18 for WMA C soils about technologies available to address deep vadose zone
19 contamination.
- 20
21 • Neighboring Tank Farms: Future WMA C final landfall cover decisions will need to be
22 integrated with future closure activities and decisions for the following tank farms (listed
23 in order of proximity to WMA C), due to their proximity to WMA C: 241-AN, 241-AZ,
24 241-AY, 241-AX, and 241-A Tank Farms.
- 25
26 • 200-SW-2 OU, 200-EA-1 OU and 200-IS-1 OU: The 200-SW-2 OU encompasses
27 CERCLA past-practice burial ground source units in the 200 East Area and 200 West
28 Area of the Hanford Site. The 200-EA-1 OU consists of the waste sites on the Central
29 Plateau in the inner area of the 200 East Area that are not already assigned to other
30 geographic OUs. The 200-IS-1 OU consists of the pipelines and associated components
31 located in both the 200 East Area and 200 West Area. Activities have been ongoing to
32 map the past-practice pipelines and components in the 200 East Area and 200 West Area.
33 In addition, information has been gathered on the physical characteristics of the pipelines
34 and their operational history. Construction of a final closure surface barrier will be
35 coordinated with decision documents for these OUs.
- 36
37 • Removal of structures not addressed under the RCRA permit: The disposition of
38 numerous contaminated Hanford Site structures will be accomplished in accordance with
39 HFFACO Action Plan, Section 8.0, and the joint DOE-EPA *Policy on Decommissioning*
40 *of Department of Energy Facilities Under the Comprehensive Environmental Response,*
41 *Compensation, and Liability Act* (Department of Energy/Office of Environmental
42 Management, Queried 02/09/2017, [Policy on Decommissioning of Department of
43 Energy Facilities Under the Comprehensive Environmental Response, Compensation,
44 and Liability Act (CERCLA)], [https://energy.gov/em/policy-decommissioning-](https://energy.gov/em/policy-decommissioning-department-energy-facilities-under-comprehensive)
45 [department-energy-facilities-under-comprehensive](https://energy.gov/em/policy-decommissioning-department-energy-facilities-under-comprehensive)). In accordance with this policy, and
46 Section 8.0 and Appendix J (as applicable) of the HFFACO Action Plan, and aside from

1 any possible preventative and maintenance activities, DOE has issued two action
2 memoranda (AMs) for decommissioning surplus facilities consistent with the
3 requirements of CERCLA: DOE/RL-2010-22, *Action Memorandum for General*
4 *Hanford Site Decommissioning Activities*, and DOE/RL-2010-102, *Action Memorandum*
5 *for Decontamination, Deactivation, Decommissioning, and Demolition (D4) Activities for*
6 *200 East Tier 2 Buildings/Structures*. These AMs authorize the removal of specific
7 structures identified in the AMs and describe a decision process that is to be used in the
8 event that contamination is detected beneath removed structures. Three structures within
9 WMA C are included in the 200 East Area Tier 2 AM. Therefore, the planning for an
10 action that may be taken pursuant to that AM will need to be integrated with the planning
11 for closure of WMA C systems and for remediation of WMA C soils under
12 RCRA/HWMA. Additional information is presented in Section 5.5 of this RCRA Tier 2
13 Plan.
14
15

RPP-RPT-59389, Rev. 0

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2.0 WASTE MANAGEMENT AREA C DESCRIPTION

This section describes the significant features of WMA C, including tanks, ancillary equipment, and waste releases, as well as a history of operations and waste constituents.

2.1 WASTE MANAGEMENT AREA C FEATURES

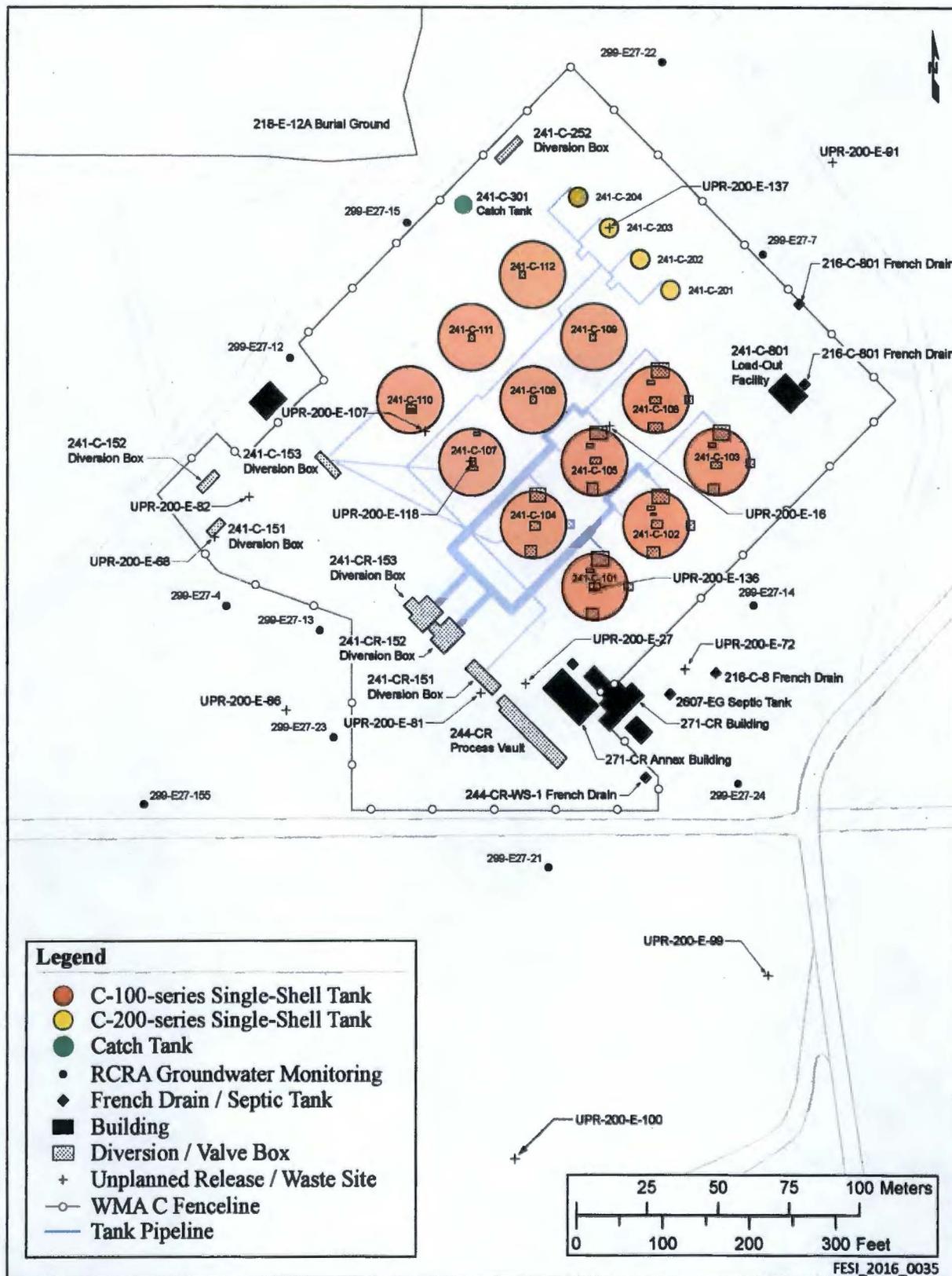
WMA C is located in the east central portion of the 200 East Area of the Central Plateau, within the Hanford Site (Figure 1-1). Figure 2-1 shows a general overview of WMA C and the surrounding area. The C Farm consists of 16 SSTs (twelve 100-series and four 200-series SST systems) and supporting facilities; ancillary equipment such as diversion boxes, catch tanks, vaults, and valve pits; and a cesium loadout station. Specific WMA C features include:

- Twelve 1,892,700 L (535,000 gal) capacity 100-series SSTs (241-C-101 through 241-C-112)
- Four 208,000 L (55,000 gal) capacity 200-series SSTs (241-C-201 through 241-C-204)
- 241-C-301 catch tank of 136,000 L (36,000 gal) capacity
- 244-CR Process Tank Vault (244-CR vault) with four associated tanks: two tanks of 170,343 L (45,000 gal) capacity and two tanks of 55,494 L (15,000 gal) capacity
- Seven diversion boxes
- 241-C valve pit and two valve boxes
- Approximately 11.3 km (7 miles) of below-grade pipeline
- Sixteen recorded unplanned releases (UPRs)
- 71 drywells
- Twelve groundwater monitoring wells
- Miscellaneous equipment utilized to support waste retrieval activities (e.g., C-200 vacuum waste retrieval skids, portable above grade valve boxes, exhausters, transfer line shielding).

General details about some of these features are included below; greater detail about specific components of WMA C will be provided in the relevant RCRA Tier 3 plans.

The SSTs were constructed in place with carbon steel lining the bottom and sides of a reinforced concrete shell. Figure 2-2 shows stages of construction of the C Farm SSTs between 1944 and 1951. The SSTs have concave bottoms (center of each SST lower than the perimeter) and a curving intersection of the sides with the bottom.

Figure 2-1. Waste Management Area C Location, Features, and Surrounding Area.



RCRA = Resource Conservation and Recovery Act of 1976

WMA = Waste Management Area

Figure 2-2. 241-C Farm Single-Shell Tank Construction.

1
2



2-3



3

1 The C-100-series SSTs are 23 meters (m) (75 feet [ft]) in diameter, each with a 5-m (15-ft)
2 operating depth, and an operating capacity of 1,892,700 L (530,000 gal). The 200-series SSTs
3 are 6 m (20 ft) in diameter with a 5-m (17-ft) operating depth and an operating capacity of
4 208,000 L (55,000 gal) each. Both the 100-series and 200-series SSTs sit below-grade with at
5 least 2 m (7 ft) of soil cover to provide radiation shielding for operating personnel. SST pits and
6 risers are located on top of the tanks and provide access to the tank, pumps, and monitoring
7 equipment.

8
9 To support the transfer and waste management operations within C Farm, a complex waste
10 transfer system consisting of pipelines (transfer lines), diversion boxes, vaults, valve pits, and
11 other miscellaneous structures was constructed. Collectively, the included components are
12 referred to as ancillary equipment. There are other structures within the tank farm fence that are
13 being addressed under past-practice authority.

14
15 The 244-CR vault was used to transfer waste solutions from processing and decontamination
16 operations (DOE/RL-92-04, *PUREX Source Aggregate Area Management Study Report*) and is
17 located south of the tanks. The vault is a two-level, multi-cell, reinforced-concrete structure
18 constructed below-grade (DOE/RL-92-04), containing four underground tanks along with
19 overhead piping and equipment. Two tanks, TK-CR-011 and TK-CR-001, have a capacity of
20 170,343 L (45,000 gal) each. The other two tanks, TK-CR-002 and TK-CR-003, have capacities
21 of 55,494 L (15,000 gal) each. This vault was constructed in 1946. The vault ceased operating
22 in 1988, with the exception of tank CR-003, which continued being used for salt waste interim
23 storage. The 244-CR Vault was again used in 1999 to support C Farm jet pumping before it was
24 permanently decommissioned.

25
26 The routing of liquid waste from the operations buildings to the tank farms was accomplished
27 using underground transfer lines, diversion boxes, valve boxes and valve pits. The valve boxes
28 and valve pits contain valve assemblies that were used for routing the liquid waste through
29 transfer lines. The diversion boxes house jumpers (remote pipeline connectors) that allowed
30 waste to be routed from one transfer line to another. The diversion boxes are below-ground,
31 reinforced concrete boxes that were designed to contain any waste that leaked from the
32 high-level waste transfer line connections. The 241-C-151, 241-C-152, 241-C-153 and
33 241-C-252 diversion boxes generally drained by gravity to the 241-C-301 catch tank, where
34 waste from processing and decontamination operations was stored and then pumped to SSTs
35 (DOE/RL-92-04). The 241-C-301 catch tank is an underground tank that is 6 m (20 ft) in
36 diameter and 6.2 m (20.25 ft) tall, with a capacity of 136,275 L (36,000 gal).

37
38 RPP-50233, "Waste Management Area C Closure Conceptual Design Support Document,"
39 describes the physical components located in WMA C. In addition to the components described
40 above, WMA C also contains various utility supply and water lines, ventilation systems, and
41 temporary facility components such as portable valve boxes, mobile structures, and trailers.

2.2 HISTORY OF OPERATIONS AT WASTE MANAGEMENT AREA C

The C Farm was originally constructed to receive Hanford operations waste. The C Farm contains twelve 100-series and four 200-series SSTs located downgradient from the operations facilities from which they received waste. These tanks, along with interconnecting pipelines, were constructed from 1943 to 1944. Additional support structures were constructed prior to the start of operations in 1946. The 100-series SSTs began operations in 1946, and the 200-series SSTs began operations in 1947. Additional facilities were constructed in C Farm in 1951 and 1952, and pipelines were constructed throughout its operating life.

The C Farm is part of the A-AX-C complex whose operations can be separated into five operational phases:

- The Manhattan Project and bismuth phosphate operations (1944 to 1952)
- Uranium recovery operations (1952 to 1957)
- The Plutonium-Uranium Extraction (PUREX) Plant operations (1956 to 1972, 1983 to 1988)
- Waste fractionation operations (1961 to 1978)
- Tank farm interim stabilization (initiated in 1975).

The 100-series SSTs in C Farm were used to store waste primarily from the 221-B Bismuth Phosphate Separations Plant, Tributyl Phosphate Plant, PUREX Plant, and Reduction-Oxidation (REDOX) Plant. The 200-series SSTs primarily received metal waste from the 221-B Bismuth Phosphate Separations Plant, cold uranium waste from the 202-A PUREX Plant, and waste originating from research and development activities at the 201-C Hot Semiworks facility in the 200 East Area of the Hanford Site.

All of the SSTs within C Farm were removed from service from 1970 to 1980. In 1975, tank farm interim stabilization was initiated, which included pumping drainable liquids from the tanks containing drainable liquid volumes that exceeded the interim stabilization criteria. Interim stabilization status of the SSTs is reported in the waste tank summary report that is issued monthly (HNF-EP-0182, "*Waste Tank Summary Report for Month Ending March 31, 2016*," Rev. 339). Interim stabilization removed drainable liquids from the tanks to the extent practical to minimize the potential for future leaks. Following interim stabilization, tank farm isolation activities were performed to reduce the potential for liquid intrusion into the tanks from rainwater or an inadvertent waste transfer. Tank farm isolation activities included removing jumpers and installing isolation blanks on pipe connections within diversion boxes, covering above-ground pits with foam, and isolating floor drains to reduce the possibility of intrusion into the tanks.

1 The 16 SSTs comprise the C Farm SST TSD Unit (HFFACO Action Plan, Appendix B). Waste
 2 from all of the 200-series SSTs has been retrieved, and waste from 11 of the 12 100-series SSTs
 3 has been retrieved.
 4
 5

6 2.3 UNPLANNED RELEASES AT WASTE MANAGEMENT AREA C

7
 8 Sixteen UPRs have occurred within or adjacent to WMA C (see Figure 2-1). A brief description
 9 of these UPRs as summarized from RPP-RPT-58339 is given in Table 2-1. As a part of the
 10 RCRA Corrective Action process, soil characterization at WMA C has been performed and
 11 interim measures have been implemented. Interim measures have included surface water run-on
 12 controls, leak testing and isolating water lines, and capping drywells to prevent water intrusion
 13 (RPP-35484, "Field Investigation Report for Waste Management Areas C and A-AX"). Soil
 14 contamination at WMA C will be addressed according to the corrective action process and
 15 integrated with tank closure; soil contamination will not be addressed in the RCRA Tier 3 plans.
 16

Table 2-1. Waste Management Area C Unplanned Releases. (2 sheets)

| Unplanned Release | Date | Description |
|-------------------|------|--|
| UPR-200-E-16 | 1959 | Surface spill from overground transfer pipeline between tanks 241-C-105 and 241-C-108. Located ~18 m (60 ft) northeast of tank 241-C-105. Approximately 190 L (50 gal) coating waste from the Plutonium Uranium Extraction (PUREX) process. |
| UPR-200-E-27 | 1960 | Airborne particulate contamination possibly due to work in 241-C Tank Farm diversion boxes and 244-CR Process Tank Vault (244-CR vault). Located just east of 244-CR vault. |
| UPR-200-E-68 | 1985 | Wind-borne surface contamination spread from 241-C-151 diversion box. Diversion box flushed and sprayed with fixative to prevent contamination spread. |
| UPR-200-E-72 | 1985 | Contamination from buried contaminated waste. Depth, volume and aerial extent unknown. Located near the 216-C-8 French drain. |
| UPR-200-E-81 | 1969 | Underground transfer pipeline leak northwest of 244-CR vault near 241-CR-151 diversion box. Approximately 136,000 L (36,000 gal) coating waste from the PUREX process. The site was covered with ~0.5 m (18 in.) of backfill and clean gravel. |
| UPR-200-E-82 | 1969 | Feed line leak between 241-C-105 and the 221-B building. Extends to the northeast from the 241-C-152 diversion box to outside of Waste Management Area (WMA) C fence. Estimated 9,800 L (2,600 gal). A shotcrete cap was installed over the release site 20 years after the release. |
| UPR-200-E-86 | 1971 | Underground transfer pipeline leak between 244-AR vault and WMA C. Near southwest corner of WMA C, outside of fence. Estimated 65,800 L (17,385 gal) of waste. A shotcrete cap was installed on the soil surface above this leak location. |

Table 2-1. Waste Management Area C Unplanned Releases. (2 sheets)

| Unplanned Release | Date | Description |
|-------------------|---------|---|
| UPR-200-E-91 | Unknown | Surface contamination that migrated from WMA C to approximately 30 m (100 ft) from the northeast side of the tank farm. Date, nature, and areal extent unspecified. |
| UPR-200-E-99 | Unknown | Surface contamination from numerous piping changes associated with 244-CR vault. Located south of 7 th Street, south of the 244-CR vault. |
| UPR-200-E-100 | 1986 | Wind-borne and biologically transported surface contamination located approximately 60 m (197 ft) south of WMA C, surrounding the 244-A lift station. |
| UPR-200-E-107 | 1952 | Surface spill near tank 241-C-110 inside WMA C. Original spill was approximately 19 L (5 gal) liquid waste. |
| UPR-200-E-115 | Unknown | Contamination consisted of contaminated soil specks and contaminated vegetation located east of 241-C Tank Farm, south of 8th Street, across an unnamed gravel road. Stabilized with gravel in June 2004. |
| UPR-200-E-118 | 1957 | Airborne release from tank 241-C-107 extending north up to approximately 300 m (1,000 ft) beyond the WMA C fence line. Highest exposure rate was estimated to be 50 mrem/hour at ground surface. |
| UPR-200-E-135 | Unknown | This site was identified as contaminated vegetation which has subsequently been removed. The source of contamination is suspected to be an underground leaking pipe in the area. Located south and west of WMA C. |
| UPR-200-E-136 | 1969 | Release from tank 241-C-101 of 64,345 to 90,840 L (17,000 to 24,000 gal) of waste. Type and actual quantity of waste released is uncertain. |
| UPR-200-E-137 | Unknown | Water intrusion and subsequent leak in tank 241-C-203 of 1,514 L (400 gal) PUREX high-level radioactive waste. |

1
2 In addition to the documented UPRs listed in Table 2-1, RPP-PLAN-39114, "Phase 2 RCRA
3 Facility Investigation/Corrective Measures Study Work Plan for Waste Management Area C,"
4 Rev. 2 identifies potential losses and pipeline failures, which will be addressed through the
5 RFI/CMS process.
6
7

8 2.4 WASTE CONSTITUENTS

9
10 The waste managed in WMA C is "mixed waste," meaning that it contains both radioactive and
11 dangerous waste, as defined in WAC 173-303-040, "Definitions". The Part A Permit for the
12 SST system (*Hanford Facility Dangerous Waste Part A Permit Application, Form 3,*
13 *Revision 13, for the Single-Shell Tank System [WRPS 2011]*) lists the waste codes assigned to the
14 SST wastes. Waste codes applicable to all tanks in the SST system are D001-011, D018-019,
15 D022, D028-030, D033-036, D038-041, D043, WP01-02, WT01-02, and F001-005. As noted in
16 the RCRA Tier 1 Plan, the bulk of the tank waste constituents are sodium hydroxide; sodium
17 salts of nitrate, nitrite, carbonate, aluminate, oxalate, and phosphate; and hydrous oxides of
18 aluminum, iron, and manganese. Radioactive isotopes constitute a small fraction of the overall

1 waste volume, but contribute a significant portion of the overall environmental and human health
2 risks. Waste type, volume, and inventory varies among SST farms and from tank to tank within
3 individual WMAs.

4
5 The list of constituents provided in the Part A Form is not specific to WMA C. However, further
6 information on the waste processes contributing to waste managed at WMA C is contained in the
7 RFI report and Section 2.2 of this RCRA Tier 2 Plan.

8
9 Prior to implementation of closure actions in WMA C, waste retrieval from each of the SSTs will
10 be completed and documented in a retrieval data report. A complete and periodically updated
11 waste inventory associated with each individual tank can be found in the Best-Basis Inventory
12 (BBI). Following retrieval, residual tank waste is typically sampled and analyzed, or in certain
13 cases has been based on pre-retrieval samples. Results of this analysis are used to update the
14 BBI.

15
16 The residual waste inventory remaining in the SST components used in the evaluation of risk
17 remaining after closure of WMA C is documented in RPP-ENV-58806 (see Tables 3-12 through
18 3-17). This residual waste inventory consists of a combination of inventory estimates based on
19 post-retrieval sampling and analysis and estimates based on historical data.

20

3.0 GROUNDWATER MONITORING

Groundwater beneath WMA C is monitored under RCRA requirements for dangerous waste and dangerous waste constituents and under the AEA for radionuclides. Data from WMA C groundwater monitoring are integrated into the associated 200-BP-5 CERCLA groundwater OU remedial investigations.

The locations of all WMA C groundwater monitoring wells as of 2015 are shown in Figure 3-1. Quarterly groundwater monitoring reports are prepared for WMA C to present well water level and sampling data results. In addition, annual environmental and groundwater monitoring reports are prepared to document groundwater monitoring results, assessment studies, and other developments occurring at the Hanford Site, including at WMA C.

The discussion in the following subsections of Section 3.0 summarizes the annual groundwater information presented in DOE/RL-2016-09, *Hanford Site Groundwater Monitoring Report for 2015*, and DOE/RL-2016-33, *Hanford Site Environmental Report for Calendar Year 2015*.

3.1 WASTE MANAGEMENT AREA C RESOURCE CONSERVATION AND RECOVERY ACT OF 1976 GROUNDWATER MONITORING

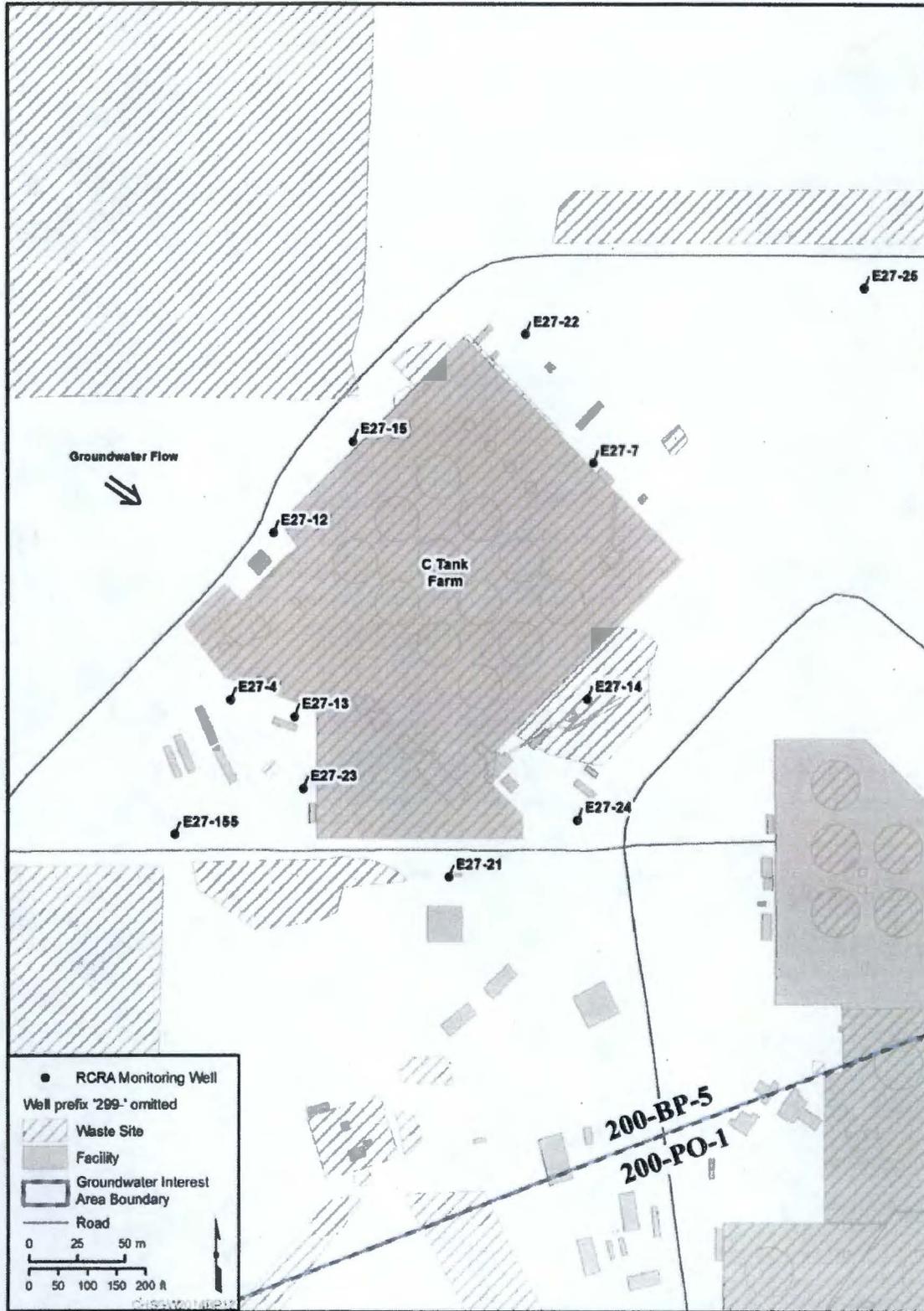
Groundwater monitoring is conducted at WMA C in compliance with WAC 173-303-400, "Interim Status Facility Standards," subsection (3) "Standards" and, by reference, 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Subpart F, "Ground-Water Monitoring System." These regulations require monitoring to determine whether dangerous waste or dangerous waste constituents from the waste site have entered the groundwater.

Groundwater monitoring at C Farm began in the early 1980s, and a RCRA groundwater monitoring program for WMA C was initiated in 1989. Groundwater monitoring was not conducted for the majority of the time that C Farm was used for operational purposes. Between 1989 and 2001, the WMA C RCRA groundwater monitoring program was conducted pursuant to WHC-SD-EN-AP-012, "40 CFR 265 Interim-Status Ground-Water Monitoring Plan for the Single-Shell Tanks," Rev. 0, and its revision, WHC-SD-EN-AP-012, "Interim-Status Groundwater Monitoring Plan for the Single-Shell Tanks," Rev. 1.

Between 2001 and 2009, groundwater monitoring was conducted according to PNNL-13024, "RCRA Groundwater Monitoring Plan for Single-Shell Tank Waste Management Area C at the Hanford Site." In July 2009, the specific conductance indicator parameter was verified as exceeding the critical mean in a well (299-E27-14) located downgradient of WMA C. Based on this exceedance, groundwater beneath WMA C is currently monitored under a RCRA interim status groundwater quality assessment program. The assessment program is contained in DOE/RL-2009-77, *Groundwater Quality Assessment Plan for the Single-Shell Tank Waste Management Area C*.

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1. **Figure 3-1. Waste Management Area C Groundwater Monitoring Well Locations.**
2



Reference: DOE/RL-2015-07, Hanford Site Groundwater Monitoring Report for 2014.

RCRA = Resource Conservation and Recovery Act of 1976

3
4
5
6

1 The WMA C RCRA assessment groundwater sampling and reporting analyses include alkalinity,
2 anions, cyanide, and metals. Field parameters analyzed include pH, specific conductance,
3 temperature, and turbidity. Cyanide is the only dangerous waste constituent from C Farm
4 determined to impact groundwater. All other dangerous waste constituents have been excluded
5 through the assessment process as discussed in Section 4 of DOE/RL-2009-77.

6
7 Estimates of groundwater flow rates are required by Title 40, CFR, Part 265, "Interim Status
8 Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal
9 Facilities" (40 CFR 265), Subpart F—Ground-Water Monitoring, Section 265.93, Preparation,
10 evaluation, and response, subsection (d) item (4) because of the presence of cyanide. According
11 to DOE/RL-2016-09, during 2015 the estimated average flow rate beneath WMA C was
12 0.26 m/d (0.84 ft/d), or 93 m/yr (305 ft/yr). In 2015, water-level measurements which defined
13 the gradient magnitude and flow direction at WMA C were collected quarterly, as required by
14 40 CFR 265.93(d)(7)(i), using a low-gradient monitoring network comprised of 56 wells across
15 the 200 East Area. Detailed methodology is provided in SGW-58828, "*Water Table Maps for
16 the Hanford Site 200 East Area, 2013 and 2014.*" The average groundwater flow direction in
17 2015 at WMA C ranged from 145 to 165 degrees from north to southeast, as shown in Figure 3-1
18 (adapted from DOE/RL-2015-07, *Hanford Site Groundwater Monitoring Report for 2014*).

21 **3.2 ATOMIC ENERGY ACT OF 1954 MONITORING**

22
23 In addition to RCRA monitoring, WMA C is also monitored under AEA requirements. AEA
24 requirements for monitoring radionuclides are included in TPA-CN-578, "Tri-Party Agreement
25 Change Notice Form Groundwater Sampling and Analysis Plan for the 200-BP-5 Operable Unit,
26 DOE/RL-2001-49 Rev 1." Under TPA-CN-578, gross beta, low-level gamma scans, ⁹⁹Tc, and
27 total uranium are monitored quarterly at each well location in accordance with
28 DOE/RL-2001-49, *Groundwater Sampling and Analysis Plan for the 200-BP-5 Operable Unit*,
29 Rev. 1.

32 **3.3 200-BP-5 AND 200-PO-1 OPERABLE UNIT COMPREHENSIVE 33 ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 34 1980 GROUNDWATER MONITORING**

35
36 The contaminated groundwater beneath portions of the Hanford Site is divided into
37 11 groundwater OUs pursuant to CERCLA. The 200 East Area is divided by two groundwater
38 OUs to include 200-BP-5 in the north and 200-PO-1 to the south. WMA C is located very close
39 to the boundary between OUs BP-5 and PO-1 (Figure 3-1).

40
41 Remediation of groundwater contaminants beneath the 200 East Area and WMA C will be
42 determined through the CERCLA decision process and associated decision documents. These
43 decision documents result from the development of: RI/FSSs, treatability studies, work plans, and
44 proposed plans. The regulatory schedules for the preparation of groundwater OU decision
45 documents are developed through HFFACO Milestones as listed in HFFACO Action Plan,
46 Appendix D. The final closure and post-closure care of WMA C is contingent on a CERCLA

1 ROD for remediation of the 200-BP-5 and 200-PO-1 groundwater OUs. The HFFACO schedule
2 for the 200-BP-5 and 200-PO-1 OU documents is currently attached to the M-015-21 interim
3 milestone series.

4
5 In September 2011, the HFFACO milestone change package M-015-11-03 revised the due date
6 for the M-015-21A Milestone (200-BP-5 and 200-PO-1 FS and Proposed Plan) from
7 December 31, 2012, to June 30, 2015. The revised due date was needed in order to obtain
8 funding and implement the technical findings from DOE/RL-2010-74, *Treatability Test Plan for*
9 *the 200-BP-5 Groundwater Operable Unit*. A draft RI report was prepared in 2014, describing
10 the nature and extent of contamination and identifying contaminants of potential concern to
11 support a future FS. In addition, work began on an FS in late 2014 that will be combined with
12 the 200-PO-1 OU. A treatability test in 200-BP-5 OU was performed in 2015 and is documented
13 in DOE/RL-2015-75, *Aquifer Treatability Test Report for the 200-BP-5 Groundwater Operable*
14 *Unit*. In 2016, Change Form M-15-16-02, "Addition To And Modification Of Ecology Lead
15 Regulatory Agency Milestones Within The M-015 Series "Complete the RI/FS (or RFI/CMS and
16 RI/FS) process for all non-tank farm operable units except for canyon/associated past practice
17 waste site OUs covered in M-85-00"" for M-015-21A FS and Proposed Plan was signed by
18 Ecology and DOE with a proposed due date of June 30, 2018.

19
20 The 200-BP groundwater interest area includes the CERCLA 200-BP-5 groundwater OU in the
21 north half of the 200 East Area, which is sampled as described in DOE/RL-2001-49, Rev. 1.
22 Sampling is performed cooperatively with RCRA groundwater wells monitoring contaminants
23 from cribs, ditches, ponds and dangerous waste tank farms in the area.

24
25 The following contaminants exceed drinking water standards and form the most extensive
26 groundwater contaminant plumes in the 200-BP-5 OU: nitrate, ^{129}I , ^{99}Tc , and uranium. These
27 contaminants (except ^{129}I) are thought to emanate from sources located within the 200-BP-5
28 boundary. ^{129}I , which predominantly migrated into 200-BP-5 from sources within the 200-PO-1
29 boundary in the late 1980s and early 1990s. Other contaminants exceeding the drinking water
30 standard have smaller areal extent within 200-BP-5 OU, including arsenic, ^{137}Cs , cyanide,
31 fluoride, $^{239/240}\text{Pu}$, ^{90}Sr , and tritium.

34 **3.4 FINAL STATUS GROUNDWATER MONITORING**

35
36 As the WMA C closure is completed, DOE will develop a post-closure groundwater monitoring
37 plan for approval by Ecology and incorporation by reference into the Hanford Site-Wide Permit.
38 The WMA C post-closure groundwater monitoring plan will be integrated with the groundwater
39 monitoring approach developed pursuant to the 200-BP-5 and 200-PO-1 groundwater OUs
40 associated with WMA C. While groundwater will be monitored during the tank closure effort,
41 final closure decisions regarding groundwater will be made through CERCLA RI/FSs specific to
42 each groundwater OU. Final CERCLA decisions regarding groundwater remediation beneath
43 WMA C will be determined by the CERCLA ROD issued for the two associated OUs.

44
45 Ecology may add alternative requirements through an enforceable document [WAC 173-303-610
46 subsection (1) "Applicability," item (e) and WAC 173-303-645, "Releases from Regulated

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1 Units,” subsection (1) “Applicability,” item (e)]. If this occurs, the post-closure groundwater
2 monitoring plan will include the alternative requirements, as required by WAC 173-303-610
3 subsection (8) “Post-closure plan; amendment of plan,” item (b)(iv).
4

5 Post-closure groundwater monitoring will be integrated with the Central Plateau regional
6 groundwater monitoring system. At that time, a description of the planned groundwater
7 monitoring activities, frequencies at which they will be performed, and reporting requirements
8 will be included in the WMA C post-closure groundwater monitoring plan as required by
9 WAC 173-303-645.
10

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4.0 PERFORMANCE STANDARDS AND RISK ASSESSMENT METHODOLOGY

This section provides a brief overview of the performance standards, requirements, and the modeling approaches used for long-term risk assessment, worker and public exposure methodology, and dose methodology.

4.1 CLOSURE PERFORMANCE STANDARDS

WAC 173-303-610 sets forth the State requirements for closure and post-closure of dangerous waste management units such as WMAs within the SST system. WAC 173-303-640(8) sets forth specific requirements for closure of tank systems and WAC 173-303-665(6) sets forth standards that are specific to closure of a landfill. DOE will close WMA C in compliance with applicable performance standards set out or referenced in WAC 173-303-610(2), item (a). This Section 4.1 of this RCRA Tier 2 Plan discusses how DOE will meet these standards.

The closure performance standards of WAC 173-303-610(2) will be met through the closure activities specified in this closure plan. These standards require the closure of TSD units in a manner that achieves the items below:

- Minimizes the need for further maintenance
- Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, the post-closure escape of dangerous waste, dangerous-waste constituents, leachate, contaminated run-off, or dangerous-waste decomposition products to the ground, surface water, groundwater, or the atmosphere
- Returns the land to the appearance and use of surrounding land areas to the degree possible, given the nature of the previous dangerous-waste activity.

Under the landfill closure approach, WMA C must be closed in a manner that meets the requirements of WAC 173-303-665(6). This regulation requires that final covers be designed and constructed to:

- Provide long-term minimization of migration of liquids through the closed landfill
- Function with minimum maintenance
- Promote drainage and minimize erosion or abrasion of the cover
- Accommodate settling and subsidence so that the integrity of the cover is maintained
- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.

1 Table 4-1 lists the specific RCRA closure requirements from the WAC, includes the compliance
2 strategy for meeting each WAC requirement, identifies the sections in the RCRA Tier 1 Plan and
3 RCRA Tier 2 Plan where each strategy is described, and indicates whether the strategy will be
4 addressed in one of the multiple RCRA Tier 3 plans.
5
6

7 **4.2 DETERMINATION OF PROTECTIVENESS USING THE WASTE** 8 **MANAGEMENT AREA C PERFORMANCE ASSESSMENT** 9

10 WAC 173-303-610(2)(a)(ii) requires that the facility must be closed in a manner that “Controls,
11 minimizes or eliminates to the extent necessary to protect human health and the environment,
12 post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff,
13 or dangerous waste decomposition products to the ground, surface water, groundwater, or the
14 atmosphere.” As discussed in Section 1.2.3.2, an IPA has been prepared for WMA C to
15 demonstrate that the planned closure will meet the closure protectiveness requirement. The
16 WMA C IPA consists of four parts, as shown in Figure 1-3. Together, these parts include all the
17 information and risk analyses necessary to evaluate protectiveness to human health and the
18 environment related to planned closure and post-closure conditions at WMA C.
19

20 Landfill closure for WMA C is the selected alternative in the TC&WM EIS ROD (78 FR 75913),
21 as discussed in Sections 1.1.2 and 1.2.1. To support the decision for landfill closure at WMA C,
22 the evaluation of the risks associated with residual waste in tanks and ancillary equipment is
23 presented in two documents. The RCRA Closure Analysis (RPP-ENV-58806) evaluates the
24 impacts from hazardous chemicals and dangerous waste contaminants remaining in the tanks and
25 ancillary equipment at WMA C following completion of closure. RPP-ENV-58782 evaluates
26 impacts from the radioactive contaminants in the residual waste in tanks and ancillary
27 equipment.
28

29 Cleanup decisions for the WMA C soils will be made through the RCRA corrective action
30 process, which is documented in RPP-RPT-58339, “*Phase 2 RFI Report for Waste Management*
31 *Area C*,” Rev. 0, and RPP-RPT-59379, which contain results from the WMA C BRA using data
32 obtained from surface and subsurface investigations within WMA C. The WMA C BRA
33 evaluates impacts to human and ecological receptors from both the radiological and
34 non-radiological contaminants in soils at WMA C. The initial risk assessment, RPP-RPT-58329,
35 evaluates current impacts to human and ecological receptors predominately from shallow vadose
36 zone (0 to 4.6 m [0 to 15 ft] below ground surface) radiological and non-radiological
37 contamination observed during the RFI field investigations, and the impacts associated with
38 consumption of groundwater. Revision 2 of RPP-RPT-58329 addresses both current and future
39 impacts to human and ecological receptors from both radiological and non-radiological
40 contaminants in soils. The evaluation of long-term fate and transport for future impacts to
41 human and ecological receptors from both radiological and non-radiological contaminants in
42 soils at the closed WMA C is documented in RPP-RPT-59197.
43

Table 4-1. Closure Performance Standards. (7 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | Tier 1 Closure Plan Section | Tier 2 Closure Plan Section | Tier 3 Closure Plan Section | Explanatory Notes |
|--|-----------------------------------|-----------------------------------|-----------------------------------|--|
| General Closure and Post-Closure Requirements | | | | |
| -610(2)(a)(i) General closure performance standards: Minimize need for further maintenance | Section 3 | Section 4 | — | Landfill closure, including grout stabilization and the final cover, will reduce the potential for infiltration or intrusion. The final cover will be constructed in such a way as to minimize need for future maintenance. |
| -610(2)(a)(ii) General closure performance standards: Control, minimize, or eliminate to the extent necessary to protect human health and the environment post-closure escape of dangerous waste | Section 3 | Section 4 | — | Isolation and stabilization of single-shell tanks (SSTs) and other remaining below-grade equipment, along with the final cover, will minimize post-closure release to the environment. |
| -610(2)(a)(iii) General closure performance standards: Return land to appearance and use of surrounding land areas | Section 3 | Section 4 | — | Following closure of the SST, the appearance and use of the land will be consistent with future uses of the 200 Areas. |
| -610(2)(b) Clean closure levels | — | — | — | This requirement would apply to the closure of Waste Management Area (WMA) C, but for the practicability determination. As discussed in the clean closure practicability demonstration document, it is not practicable to accomplish clean closure for the SST system, and the SST system will be landfill-closed. |
| -610(3)(a)(i) Closure plan contents: How each WMA will be closed in accordance with -610(2) | Section 1 | Section 4 | — | Closure activities for each WMA will be detailed in the <i>Resource Conservation and Recovery Act of 1976 (RCRA) Tier 2 Plan</i> and subsequent Tier 3 plans specific to the WMA. |
| -610(3)(a)(ii) Closure plan contents: How final closure of the SST System (facility) will be conducted in accordance with -610(2) | Section 3 | Section 4 | ✓ | This requirement applies to the final closure of the SST system and is addressed in the RCRA Tier 1 Closure Plan. Additional details are provided in the RCRA Tier 2 Plan and the RCRA Tier 3 plans as appropriate. |

Table 4-1. Closure Performance Standards. (7 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | Tier 1 Closure Plan Section | Tier 2 Closure Plan Section | Tier 3 Closure Plan Section | Explanatory Notes |
|---|-----------------------------------|-----------------------------------|-----------------------------------|---|
| -610(3)(a)(ii) Closure plan contents: Maximum extent of operation which will be unclosed during the active life of the SST System (facility) | Section 1 | — | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Closure Plan. |
| -610(3)(a)(iii) Closure plan contents: An estimate of the maximum inventory of waste ever on-site over the active life of the SST System (facility) | Section 1 | — | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Closure Plan. |
| -610(3)(a)(iv) Closure plan contents: Detailed description of methods to be used during partial closures and final closure, including methods to manage dangerous waste (DW) and types of off-site DW management units to be used | — | Section 5 | ✓ | The required information is provided in this RCRA Tier 2 Plan, and will be further addressed in each RCRA Tier 3 plan for WMA C component closure activities. |
| -610(3)(a)(v) Closure plan contents: Detailed description of steps needed to remove or decontaminate all dangerous waste residues and contaminated containment system components, equipment, structures and soils... including... procedures for cleaning equipment and removing contaminated soil | — | Section 5 | ✓ | The requirement for removing contaminated soil applies to the closure of WMA C and will be addressed under the corrective action process, in accordance with Appendix I of the <i>Hanford Federal Facility Agreement and Consent Order</i> (HFFACO) Action Plan. Containment system components for the SSTs and other components will not be removed under the landfill closure approach. |
| -610(3)(a)(v) Closure plan contents: Detailed description of methods for sampling and testing surrounding soils | — | — | — | This requirement applies to the closure of WMA C and will be addressed in the Corrective Measures Implementation Plan. |
| -610(3)(a)(v) Closure plan contents: Detailed description of criteria for determining the extent of decontamination required to satisfy the closure performance standard in -610(2)(a) | — | — | — | Decontamination of equipment will not be undertaken under the landfill closure approach. |

44

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Table 4-1. Closure Performance Standards. (7 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | Tier 1 Closure Plan Section | Tier 2 Closure Plan Section | Tier 3 Closure Plan Section | Explanatory Notes |
|--|-----------------------------------|-----------------------------------|-----------------------------------|---|
| -610(3)(a)(vi) Closure plan contents: Detailed description of other activities – Groundwater monitoring | Section 2 | Section 3 | — | Groundwater monitoring will be conducted according to current approved groundwater monitoring plans until WMA C closure actions are completed. A post-closure monitoring plan will be developed as WMA C closure is completed. |
| -610(3)(a)(vi) Closure plan contents: Detailed description of other activities – Leachate collection | — | — | — | A leachate collection will not be part of the landfill closure of WMA C. The grout stabilization of the SSTs and other system components, and the final closure cover, will minimize infiltration and thus minimize or prevent the development of leachate. |
| -610(3)(a)(vi) Closure plan contents: Detailed description of other activities – Run-on and runoff control | — | Section 5 | — | The current configuration of WMA C and current procedures provide run-on/run-off control. These will be maintained during component closure activities. The final cover design will also incorporate run-on/run-off controls. |
| -610(3)(a)(vii) Closure plan contents: Schedule for closure of WMAs and SST System | Section 5 | Section 6 | ✓ | Schedule information is provided, as required, and managed under the HFFACO. |
| -610(3)(a)(ix) Closure plan contents: Use of alternative requirements under -610(1)(e) | — | — | — | This will apply only if needed for establishing requirements alternative to regulatory requirements. |
| -610(3)(b) Amendment of Plan | Section 1 | — | — | This requirement applies to modification made to the RCRA Tier 1, 2, or 3 Closure Plans and is addressed in the RCRA Tier 1 Closure Plan. |
| -610(3)(c)(i) Notification of partial closure and final closure | — | — | — | Under the HFFACO, compliance agreements are developed to address notification of partial closure and final closure. |
| -610(4)(a) Time allowed for closure: Schedule extension for removal of waste within 90 days | — | — | — | Under the HFFACO, compliance agreements are developed to address notification of partial closure and final closure. |

4-5

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Table 4-1. Closure Performance Standards. (7 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | Tier 1 Closure Plan Section | Tier 2 Closure Plan Section | Tier 3 Closure Plan Section | Explanatory Notes |
|--|-----------------------------------|-----------------------------------|-----------------------------------|--|
| -610(4)(b) Time allowed for closure: Schedule extension for closure of WMA within 180 days | — | — | — | Under the HFFACO, compliance agreements are developed to address notification of partial closure and final closure. |
| -610(5) Management of waste generated during closure | — | — | ✓ | Management of dangerous or mixed waste generated during closure activities will be described in the RCRA Tier 3 plans. |
| -610(6) Certification of closure | Section 6 | Section 7 | ✓ | Closure certifications will be provided, as required. |
| -610(7)(a)(i) Post-closure care and use of property: Groundwater monitoring | Section 7 | Section 8 | — | A post-closure groundwater monitoring plan will be developed as WMA C closure is completed. |
| -610(7)(a)(ii) Post-closure care and use of property: Maintenance and monitoring of waste containment systems | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(7)(c) Post-closure care and use of property: Security | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(7)(d) Post-closure care and use of property: Post-closure use of property | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(8)(a) Post-closure plan: Submit post-closure plan | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(8)(b)(i) Post-closure: Post-closure groundwater monitoring | Section 7 | Section 8 | — | A post-closure groundwater monitoring plan will be developed as WMA C closure is completed. |
| -610(8)(b)(ii) Post-closure plan: Post-closure maintenance | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(8)(b)(iii) Post-closure plan: Point of contact | — | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. This information will be updated as required. |

Table 4-1. Closure Performance Standards. (7 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | Tier 1 Closure Plan Section | Tier 2 Closure Plan Section | Tier 3 Closure Plan Section | Explanatory Notes |
|---|-----------------------------------|-----------------------------------|-----------------------------------|--|
| -610(8)(b)(iv) Post-closure plan: Alternative requirements | — | — | — | Used only if alternative requirements are proposed. |
| -610(8)(d) Amendment of post-closure plan | Section 7 | Section 8 | — | A written notification of request for a permit modification to authorize a change in the approved post-closure plan will be submitted when required. |
| -610(9) Notice to local land authority for disposed waste | Section 6 | Section 7 | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Closure Plan. |
| -610(10) Notice in deed to property for disposed waste, including certification that the notation has been recorded | Section 6 | Section 7 | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Closure Plan. |
| Unit-Specific Closure Requirements for Tank Systems, Landfills, and Groundwater Monitoring | | | | |
| -640(8)(a) Closure and post-closure care: Clean closure approach for tank system | — | — | — | This requirement would apply to the closure of WMA C, but for the practicability determination. As discussed in the clean closure practicability demonstration document, it is not practicable to accomplish clean closure for the SST system, and the SST system will be landfill-closed. |
| -640(8)(b) Closure and post-closure care: Practicability demonstration | — | — | — | This requirement applies to the closure of WMA C. As discussed in the clean closure practicability demonstration document, it is not practicable to accomplish clean closure for the SST system, and the SST system will be landfill-closed. |
| -640(8)(b) Closure and post-closure care: Close in accordance with landfills in -665(6) | Section 1 | — | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Closure Plan. |

Table 4-1. Closure Performance Standards. (7 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | Tier 1 Closure Plan Section | Tier 2 Closure Plan Section | Tier 3 Closure Plan Section | Explanatory Notes |
|--|-----------------------------------|-----------------------------------|-----------------------------------|---|
| -665(6)(a)(i)-(v) Closure and post-closure care: Provide landfill cover designed and constructed to provide long-term minimization of migration of liquids through the closed landfill; function with minimum maintenance; promote drainage and minimize erosion or abrasion of cover; accommodate settling and subsidence; meet permeability requirements | Sections 3 & 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in the design specification for the final closure cover and in the post-closure care plan. |
| -665(6)(b)(i) Post-closure care: Maintain integrity and effectiveness of final cover | Sections 3 & 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in a post-closure care plan. |
| -665(6)(b)(iv) Post-closure care: Maintain & monitor groundwater monitoring system | Sections 2, 3 & 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in the post-closure groundwater monitoring plan. |
| -665(6)(b)(v) Post-closure care: Prevent run-on and runoff from damaging cover | Section 7 | Section 5.4.3, Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in a post-closure care plan. |
| -665(6)(b)(vi) Post-closure care: Protect and maintain surveyed benchmarks | Section 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in a post-closure care plan. |
| -645 Releases from regulated unit (groundwater monitoring program) | Section 2 | Section 3 | — | This requirement applies to the closure of WMA C and will be addressed in the post-closure groundwater monitoring plan. |

Table 4-1. Closure Performance Standards. (7 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | Tier 1 Closure Plan Section | Tier 2 Closure Plan Section | Tier 3 Closure Plan Section | Explanatory Notes |
|--|-----------------------------------|-----------------------------------|-----------------------------------|-------------------|
| Additional Requirements Negotiated between U.S. Department of Energy, Office of River Protection and Washington State Department of Ecology | | | | |
| Reserved for any agreements reached from the M-45 Milestone discussions or from managing the "list" of components being discussed as part of the RPP-9937, "Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document" document revision. | — | — | — | — |

References:

- Ecology, EPA, and DOE, 1989, *Hanford Facility Federal Agreement and Consent Order – Tri-Party Agreement*, 2 vols., as amended, State of Washington Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.
- WAC 173-303-610, "Closure and Post-Closure," *Washington Administrative Code*, as amended.
- WAC 173-303-640, "Tank Systems," *Washington Administrative Code*, as amended.
- WAC 173-303-645, "Releases from Regulated Units," *Washington Administrative Code*, as amended.
- WAC 173-303-665, "Landfills," *Washington Administrative Code*, as amended.

4-9

1

1 Specific details of the modeling assumptions, models, exposure scenarios, data inventories used,
2 and the risk estimates calculated for the WMA C BRA and the WMA C closure scenario are
3 presented in the four individual parts of the WMA C IPA, illustrated in Figure 1-3 of this RCRA
4 Tier 2 Plan. As stated in Section 1.2.3.2 of this RCRA Tier 2 Plan, relevant components will be
5 incorporated by reference into the Hanford Site-Wide Permit as noted in the HFFACO Action
6 Plan, Appendix I, Section 2.5.

7
8 The results of the WMA C BRA indicate an absence of non-radioactive soil contaminants that
9 will require soil remediation, but the risks associated with past releases of radioactive
10 contaminants do indicate a need for evaluation of correction measures. Actions approved under
11 subsequent corrective measure study and corrective measures implementation plans will be
12 coordinated with tank closure actions as necessary for each WMA. In accordance with
13 HFFACO Action Plan, Appendix I, final WMA closure decisions will be made after all
14 components are retrieved and/or characterized, all other component closure activities have been
15 completed, and resulting information is incorporated into the IPA.
16

5.0 WASTE MANAGEMENT AREA C CLOSURE ACTIVITIES

This section describes the WMA C closure activities. The activities described in this section in addition to the activities described in the individual RCRA Tier 3 plans address closure of the various tank farm components within WMA C. Supporting activities that are outside the scope of this RCRA Tier 2 Plan are described herein for completeness.

5.1 OVERVIEW OF WASTE MANAGEMENT AREA C CLOSURE ACTIVITIES

This section provides an overview of the major activities required for landfill closure of WMA C. These activities are common or cross-cutting activities for WMA C as a whole and do not provide detail regarding individual component closure activities. Component-specific closure activities will be described further in the RCRA Tier 3 plans. Closure activities are assumed to be similar to those described in RPP-RPT-49701, "*Waste Management Area C Closure – Conceptual Design Report*." RPP-RPT-49701 provides the technical basis and strategy for closing WMA C in a state consistent with landfill closure of a low-level mixed waste site. RPP-RPT-49701 describes WMA C closure in the following sequence of phases: 1) facility closure of below-grade components (includes grouting and stabilization of tanks and equipment); 2) disposition of above-grade components (e.g., facilities, equipment, utilities), drywells, and groundwater wells; 3) construction of a closure cap; and 4) post-closure monitoring and maintenance. It is assumed in RPP-RPT-49701 that vadose zone contamination at WMA C will be defined through the ongoing RFI/CMS process being conducted in accordance with HFFACO Action Plan, Appendix I.

The general approach is not anticipated to change. However, the activities described herein may be refined during detailed design.

Field activities are planned to characterize the waste, evaluate waste retrieval criteria for the C-301 catch tank and 244-CR vault tanks, and collect information on the condition of the diversion boxes and ancillary facilities to support component-specific closure planning. Waste retrieval activities will be performed in accordance with retrieval work plans, in accordance with HFFACO Action Plan, Appendix I. Waste retrieval activities are not a part of the WMA C closure plans, but are included here for completeness.

WMA C closure activities include the items listed below:

- Stabilizing below-grade tanks and structures to prevent long-term subsidence
- Coordinating with soil cleanup actions defined through the corrective action process
- Decommissioning drywells and groundwater wells
- Conducting other infrastructure actions such as rerouting roads and moving access control fence lines to accommodate the closure barrier

- Constructing a closure barrier/closure cap (closure barrier construction is part of the 241-A Tank Farm complex barrier lobe as described in the TC&WM EIS).

Supporting activities that require completion, but will be performed as part of ongoing tank farm operations or under other regulatory processes, include:

- Removing and dispositioning above-grade equipment located in WMA C
- Performing D4 of past-practice facilities under an Engineering Evaluation/Cost Analysis and subsequent AM (e.g., Cesium Loadout Facility)
- Performing D4 of contaminated above-grade equipment (e.g., C-200-series SST waste retrieval skids)
- Demolishing and removing permanent and temporary buildings (e.g., operations support trailers)
- Deactivating and rerouting of utilities (e.g., water and electric).

5.1.1 Common Grout Systems for Stabilization

Cementitious grout will be used to fill the 100-series SSTs, 200-series SSTs, C-301 catch tank, 244-CR vault and 244-CR vault tanks, and other miscellaneous below-grade structures. The grout will immobilize and isolate contaminants, minimize the need for monitoring and maintenance, and prevent the potential for long-term subsidence of the tank structures, which would affect closure barrier integrity. The two types of grout outlined here will be used for stabilizing below-grade structures depending on the geometry of the structures.

Bulk-fill grout: Bulk-fill grout will be used to stabilize residual waste that remains in the tank/component and fill the void space. Dry grout material may be used to absorb free liquids in the tank, if necessary. The bulk-fill grout is a self-leveling mixture, suitable for filling components such as tanks and diversion boxes. The placement strategy will support the below-grade structures (e.g., tanks, vaults, diversion boxes) and prevent collapse during construction of the closure cap or following closure of the WMA.

Highly-flowable grout: The highly-flowable grout mixture will be similar to the bulk-fill grout but will contain little or no sand, which will enhance flowability. It will be designed to flow greater distances than the bulk-fill grout and to facilitate stabilization of below-grade structures with limited access and where greater flowability would facilitate stabilization. The highly-flowable grout mixture is suitable for filling components such as pipe trenches where it is desirable for the grout to flow longer distances. The highly-flowable grout mixture will consist of cement, fly ash, water, and chemical admixtures.

Grout mixture design specifications will be similar to mixtures previously developed for testing at the Hanford Site and will be finalized during closure design. Key characteristics of the mixture design for production, delivery, and placement include: highly-flowable,

1 non-segregating, with minimal bleed water. Following placement, the mixture should have
2 minimal shrinkage and develop sufficient compressive strength (a minimum 28-day compressive
3 strength of 14.1 kilograms per square centimeter [200 pounds per square inch] is desirable) to
4 prevent long-term subsidence.

5
6 Grout formulations have been previously tested to demonstrate physical properties and
7 performance of the mixture for use in tank closure activities (RPP-RPT-41550, "Closure
8 Demonstration Grout Test Report"). Cold testing in a clean environment was conducted to
9 evaluate different mixture designs for flowability and performance when subject to simulated
10 tank closure activities. Simulated tank closure activities included demonstrating the ability of a
11 grout mixture to be dropped into a tank from the ground surface, free fall for 15.2 m (50 ft), and
12 then flow outwards from the drop point approximately 11.3 m (37 ft) to simulate filling a SST.
13 The cold testing results confirmed that the bulk-fill grout mixture could be dropped without
14 segregating and that it would flow the necessary distance to reach the side of the tank with
15 limited mounding at the drop point (i.e., grout is self-leveling).

16
17 Further refinement of mixture designs and additional testing is planned to support component
18 closure design. Planned testing will optimize the mixture designs and placement strategy for
19 flowing material into the below-grade structures that require stabilization.

20
21 Grout production and delivery to WMA C will be tailored based on project needs for quantities
22 and delivery rates. Using the approach developed in the closure conceptual design report, grout
23 will be produced at a batch plant and transported to WMA C using mix trucks. An existing
24 off-site batch plant or a temporary portable batch plant located on-site could be used for grout
25 production. Mix trucks will be used to transport wet grout from the batch plant to WMA C
26 where the grout will be offloaded and pumped to the component being closed.

27 28 **5.1.2 Component Isolation**

29
30 Tanks, diversion boxes, pipe chases, and the vault will be filled with grout as a part of
31 component closure actions. Some grout will flow into open underground pipelines and
32 encasements. This approach will structurally stabilize the area by preventing long-term
33 subsidence over the tank farm components.

34
35 Prior to grouting, hose-in-hose transfer lines (HIHTL) used for retrieval activities will be
36 removed from service. Plugs/caps will be installed on the primary waste transfer lines and blind
37 flanges installed on the secondary lines. Plugs/caps will also be installed on the primary waste
38 transfer lines and blind flanges installed on the secondary lines at the above-ground portable
39 pits. Isolation blanks and nozzle dams will be installed on the PUREX connectors in the tank
40 pits. The routing board diagram will then be updated to show the components are
41 isolated/disconnected from the DST system. The HIHTL will then be removed from the farm
42 and shipped to Environmental Restoration Disposal Facility for final disposal. Above-ground
43 pits will be covered in foam to prevent intrusion of precipitation into underground components.

1 **5.1.3 Interface between Waste Management Area C and 200-IS-1**

2
3 Approximately 11.3 km (7 miles) of buried pipelines are laid in multiple segments within
4 WMA C. Some pipelines originate outside WMA C at processing facilities or other tank farms
5 and terminate within WMA C, while other pipelines were constructed to transfer waste between
6 WMA C components. Isolation of pipelines will be addressed in the RCRA Tier 3 plans for
7 ancillary equipment component closure and will be coordinated with the CERCLA 200-IS-1 OU
8 RI/FS/RFI/CMS process. Most pipelines routed to WMA C terminate at the wall of a diversion
9 box which could serve as a potential interface location for pipelines. Review of tank farm
10 isolation drawings indicates that the jumpers used to route waste from outside the farm to tanks
11 have been removed and nozzle seals installed on the nozzles within the diversion boxes.
12 The planned approach of stabilizing the diversion boxes with grout will isolate the pipelines by
13 covering the nozzles with grout. Lines that have an open end terminating in the diversion box
14 will be covered with grout and grout will naturally flow into the pipe. Because diversion boxes
15 have been covered and weather sealed for years, an assessment of current conditions and nozzle
16 configurations is planned in support of detailed closure design.
17
18

19 **5.2 COMPONENT CLOSURE ACTIONS**

20
21 Component closure activity plans will be prepared to specifically address closure of the tanks
22 and other tank system components. These RCRA Tier 3 plans will provide descriptions of the
23 planned closure activities for a component or group of components.
24

25 **5.2.1 C-200-Series Component Closure Activity Plan**

26
27 The four C-200-series SSTs will be closed by stabilizing the tanks and risers with grout.
28 Existing in-tank equipment will be removed, as necessary, to establish the access for tank
29 grouting activities. Alternatively, new risers could be installed to establish access in support of
30 grouting activities which would eliminate the need to remove long-length equipment from the
31 tanks. Access requirements include ventilation, visual monitoring using an in-tank camera, and
32 grout delivery. Isolation will be performed as required to prevent pathways for intrusion after
33 grouting and to control grout placement.
34

35 Active ventilation will be used for controlling potential airborne contamination during equipment
36 removal and grouting operations. When the grout level in the tanks approaches the bottom of the
37 tank risers, the active ventilation will be removed, and passive ventilation will be used to filter
38 air that is displaced by the grout placement in the upper portion of the tank and tank risers.
39

40 In-tank equipment that extends above grade will be evaluated for removal and/or cutting and
41 isolating near the ground surface to limit the amount of grading fill necessary to establish the
42 surface contour for the base layer of the final surface barrier.
43

44 Any contaminated equipment removed from the tanks will be managed and dispositioned of in
45 accordance with applicable procedures.
46

1 **5.2.2 C-100-Series Component Closure Activity Plans**

2
3 The C-100-series SSTs (241-C-101 through 241-C-112) will be closed by stabilizing the tanks
4 with grout. Two component closure activity plans will be used for this activity. One component
5 closure activity plan will be used for tanks 241-C-101 through 241-C-106, and one component
6 closure activity plan will be used for tanks 241-C-107 through 241-C-112.

7
8 In-tank equipment will be removed to establish access, as necessary, to support tank grouting
9 activities. Alternatively, new risers could be installed to establish access in support of grouting
10 activities, which would eliminate the need to remove long-length equipment from the tanks.
11 Access is required for ventilation, visual monitoring using an in-tank camera, and grout delivery.
12 Isolation will be performed as required to prevent pathways for intrusion following grouting and
13 to control grout placement. The conceptual design report describes a three-stage approach for
14 filling the C-100-series SSTs that includes bulk-fill of the structure during the first stage, filling
15 of the tank dome in the second stage, and filling the risers and tank pits in a third stage.

16
17 Active ventilation will be used for controlling potential airborne contamination during equipment
18 removal and through the first stage of grouting operations. Passive ventilation will be used
19 during the second and third stages of grouting operations when the tank dome and risers are
20 being filled.

21
22 In-tank equipment that extends above grade will be evaluated for removal and/or cutting and
23 isolating near the ground surface to limit the amount of grading fill necessary to establish the
24 base layer contour for the final surface barrier.

25
26 Contaminated equipment removed from the tank will be managed and dispositioned of in
27 accordance with applicable State or Federal regulations and the most current procedures.

28 **5.2.3 Tank 241-C-301 Component Closure Activity Plan**

29
30
31 Tank C-301 will be closed by grout stabilization. The waste inventory in tank C-301 has not
32 been characterized, and the requirements for retrieval have not been established. It is assumed
33 that the waste in tank C-301 will be retrieved, and the installation of waste retrieval equipment
34 will change the configuration and available access for tank grouting. Tank closure design will
35 identify in-tank equipment to be removed to support tank grouting activities. Alternatively, new
36 risers could be installed to establish access which would eliminate the need to remove
37 long-length equipment from the tanks.

38
39 Access requirements include ventilation, visual monitoring using an in-tank camera, and grout
40 delivery. Isolation will be performed as required to prevent pathways for intrusion following
41 grouting. Based on the conceptual design report, a three-stage approach will be used for filling
42 tank C-301, including bulk-fill of the structure during the first stage, filling of the tank dome in
43 the second stage, and filling the risers and tank pits in the third stage.

44
45 Active ventilation will be used for controlling potential airborne contamination during equipment
46 removal and through the first stage of grouting operations. Passive ventilation will be used

1 during the second and third stages of grouting operations when the tank dome and risers are
2 being filled.

3
4 In-tank equipment that extends above grade will be evaluated for removal and/or cutting and
5 isolating near the ground surface to limit the amount of grading fill necessary to establish the
6 base layer contour for the final surface barrier.

7
8 Contaminated equipment removed from the tank will be managed and disposed of in accordance
9 with applicable State or Federal regulations and the most current existing procedures.

10
11 **5.2.4 244-CR Process Tank Vault Component Closure Activity Plan**

12
13 The 244-CR vault (including tanks and vault structure) will be closed by stabilization with grout.
14 The requirements and plans for retrieving waste from the 244-CR vault tanks have not been
15 developed, so the configuration of in-tank equipment and access for grouting operations are
16 unknown. Closure design will evaluate in-tank equipment for removal to establish the access
17 necessary for tank grouting activities.

18
19 Access requirements include ventilation, visual monitoring using an in-tank camera, and grout
20 delivery. Isolation will be performed as required to prevent pathways for intrusion following
21 grouting. The 244-CR vault includes four tanks within a concrete vault with interconnected
22 ventilation ductwork and below-grade concrete structures that were used for ventilation and
23 routing waste transfer piping.

24
25 A combination of active and passive ventilation will be used for controlling potential airborne
26 contamination during closure activities.

27
28 In-tank equipment that extends above grade will be evaluated for removal and/or cutting and
29 isolating near the ground surface to limit the amount of grading fill necessary to establish the
30 base layer contour for the final surface barrier.

31
32 Contaminated equipment removed from the tank will be managed and disposed of in accordance
33 with applicable State or Federal regulations and existing procedures.

34
35 **5.2.5 Ancillary Equipment Component Closure Activity Plan**

36
37 Ancillary equipment includes diversion boxes, pipe trenches, piping, valve pit, valve boxes, and
38 miscellaneous below-grade structures associated with the tank system.

39
40 The diversion boxes will be closed by stabilizing with grout. The pipe trenches will be stabilized
41 as necessary to prevent long-term subsidence that could affect the integrity of the closure barrier
42 system. Piping will be abandoned in place and will be isolated by sealing off with grout during
43 grout filling of the tanks, pits, and diversion boxes. Requirements for stabilizing smaller
44 below-grade structures (e.g., valve boxes) with grout for structural stability will be evaluated on
45 a case-by-case basis during detailed design. The preferred approach to stabilize below-grade
46 structures is to core drill access holes through cover blocks and cover plates to establish access

1 for grout placement. This approach is contingent on assessment of the contents of the individual
2 components. Cover blocks/plates may require removal if equipment and/or debris within the
3 structures requires investigation or removal.
4

5 6 **5.3 CLOSURE ACTIVITIES FOR NON-TREATMENT, STORAGE, AND DISPOSAL** 7 **COMPONENTS** 8

9 The following activities, although not performed pursuant to RCRA closure authority, are
10 included here to describe the elements required to close WMA C and to provide interface
11 activities, where applicable. These activities are performed through the HFFACO M-045-00
12 Milestone, as part of the final closure.
13

14 Closure activities for non-TSD components associated with WMA C include implementation of
15 corrective measures for soil contamination, D4 of contaminated above-grade buildings and
16 structures within WMA C, removal and/or grout filling of miscellaneous non-TSD structures,
17 and infrastructure modifications.
18

19 **5.3.1 Soil Corrective Measures** 20

21 Soil contamination within WMA C has been evaluated by the RFI/CMS process and is
22 documented in the CMS, RPP-RPT-59379. Actions approved under the resulting corrective
23 measures implementation plan for WMA C will be coordinated with component closure actions.
24

25 **5.3.2 Buildings** 26

27 The decommissioning of excess industrial buildings and structures (“other” facilities) and Tier 2
28 facilities, as defined in the HFFACO Action Plan, Section 8.0, will be accomplished through the
29 CERCLA NTCRA process. Use of the NTCRA process for decommissioning facilities was
30 established through the joint DOE and EPA document *Policy on Decommissioning of*
31 *Department of Energy Facilities under the Comprehensive Environmental Response,*
32 *Compensation, and Liability Act* (DOE-EM 02/09/2017). Furthermore, DOE O 430.1B, *Real*
33 *Property Asset Management* requires the use of NTCRA for decommissioning activities as
34 specified in the joint decommissioning policy. In order for decommissioning and demolition to
35 commence, a site evaluation, Engineering Evaluation/Cost Analysis, AM to indicate the selected
36 alternative from the Engineering Evaluation/Cost Analysis, removal action work plan (RAWP),
37 and sampling and analysis plan must be prepared and approved by the appropriate regulatory
38 authority.
39

40 Following decommissioning and demolition activities at a facility (i.e., building or structure),
41 DOE will forward a letter to EPA and Ecology accompanied by a Facility Status Change Form to
42 provide documentation that the removal action was performed in accordance with the appropriate
43 AM and RAWP requirements. The change form includes a description (including pre- and
44 post-decommissioning and demolition pictures), radiation survey results, and other necessary
45 information demonstrating decommissioning and demolition activities were conducted in
46 accordance with the AM and RAWP requirements.

1 **5.3.3 Miscellaneous Non-Treatment, Storage, and Disposal Structures**

2
3 Miscellaneous non-TSD structures such as septic systems will be dispositioned to support a
4 configuration that is consistent with the engineered surface barrier. Below-grade structures
5 (e.g., septic tanks) within the footprint of the engineered surface barrier will be filled with grout
6 to provide long-term subsidence prevention. Miscellaneous above-grade structures such as
7 control trailers, break trailers, and storage containers will be decontaminated, if necessary, and
8 removed and relocated, or disposed at the Environmental Restoration Disposal Facility or other
9 approved disposal facility.

12 **5.4 ENGINEERED SURFACE BARRIER**

13
14 A modified RCRA Subtitle C surface barrier as described in the TC&WM EIS, Appendix E
15 (E.1.2.5.4.1, "Surface Barriers") will be used to cover WMA C and adjacent tank farms. The
16 engineered surface barrier will be constructed following completion of component closure
17 actions and soil corrective measures.

19 **5.4.1 Site Preparation for Barrier**

20
21 Site preparation activities will be completed before the construction of the engineered surface
22 barrier. Remaining equipment will be removed from within the barrier footprint as necessary.
23 Infrastructure modifications will be made to accommodate the footprint of the barrier, including
24 relocation of access control fence lines, water lines, and electrical distribution lines. Drywells
25 used for tank monitoring will be decommissioned, and groundwater monitoring wells that are
26 within the barrier footprint will be decommissioned or extended to the barrier surface for use
27 during post-closure monitoring.

29 **5.4.2 Interim Surface Barrier**

30
31 An interim surface barrier over all or part of WMA C is one of the corrective measures that will
32 be considered as a part of the corrective action process. The construction of an interim surface
33 barrier (or other corrective measures) would modify the current configuration of the tank farm
34 and would be integrated into the final closure barrier design.

36 **5.4.3 Specifications for Final Surface Barrier Design**

37
38 The final surface barrier design will incorporate RCRA requirements for landfills as defined at
39 WAC 173-303-610 and WAC 173-303-665. The WMA surface barrier will be designed and
40 constructed to accomplish the objectives below:

- 41
- 42 • Provide long-term minimization of migration of liquids through the closed landfill
- 43
- 44 • Function with minimal maintenance
- 45
- 46 • Promote drainage and minimize erosion and abrasion of the cover

- 1 • Minimize surface water run-on and run-off through design of the barrier slope and
2 surrounding grade
- 3
- 4 • Accommodate settling and subsidence so that the integrity of the cover is maintained
- 5
- 6 • Have a permeability less than or equal to the permeability of natural subsoils present.
- 7

8 **5.4.4 Final Surface Barrier Design**

9

10 The modified RCRA Subtitle C barrier design is the reference barrier used for planning
11 purposes. Detailed plans for the final surface barrier design are not needed for a number of
12 years, and it is anticipated that the barrier design will be refined. The modified RCRA Subtitle C
13 barrier is a multi-layered barrier system that is approximately 1.8 to 3 m (6 to 10 ft) thick
14 (depending on the thickness of the grading fill layer). The barrier design consists of eight layers
15 of different materials designed to limit recharge into the soil beneath the barrier. The barrier is
16 an evapotranspiration type barrier that allows precipitation to be stored in the upper layers and
17 transpire to the atmosphere through the cover vegetation. A capillary break/lateral drainage layer
18 and low-permeability asphalt layer serve to minimize migration of water through the barrier
19 system. Additional description of the modified RCRA Subtitle C barrier is provided in
20 DOE/RL-93-33, *Focused Feasibility Study of Engineered Barriers for Waste Management Units*
21 *in the 200 Areas*.

22

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6.0 CLOSURE SCHEDULE

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The HFFACO governs the schedule and sequencing of all activities for closure of WMA C. The existing HFFACO milestones related to WMA C which remain to be completed are found in the M-045 series, as modified. Negotiated dates and statuses for these milestones are listed in the HFFACO change control form. Approved Milestones are located in HFFACO Action Plan, Appendix D (Hanford Site, Queried 02/09/2017, [Hanford Federal Facility Agreement and Consent Order, Appendix D. Work Schedule Milestones and Target Dates Including Designation of Lead Regulatory Agency], <http://www.hanford.gov/files.cfm/ap-App-D.pdf>).

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7.0 CLOSURE CERTIFICATION, NOTICE IN DEED, AND SURVEY PLAT

This section describes closure certification, notice to local land authority, notice in deed to property, and survey documentation required after the completion of final closure of WMA C.

7.1 CLOSURE CERTIFICATION

WMA C closure is based on a landfill closure approach. In accordance with WAC 173-303-610 subsection (6) "Certification of closure," DOE will submit, by registered mail, within 60 days of completing the final closure of WMA C, a certification to Ecology that WMA C has been closed according to the specifications in the approved closure action plan. The certification will be signed by DOE and an independent, qualified, registered, professional engineer in the State of Washington. Completion of final closure will consist of placement of the final cover and installation of post-closure maintenance and monitoring equipment and measures.

Following the completion of closure activities for individual components (e.g., an individual WMA C-200-series SST), certification will be prepared and submitted within 60 days by an independent, qualified, registered, professional engineer in the State of Washington, thus documenting that the component closure activities were performed according to the approved plan.

7.2 NOTICE IN DEED AND SURVEY PLAT

DOE will provide a survey plat that indicates the location and dimensions of the closed dangerous waste units with respect to permanently surveyed benchmarks to Benton County, pursuant to WAC 173-303-610 subsections (9) "Notice to local land authority" and (10) "Notice in deed to property." The survey plat is required no later than the date of submission of the certification of closure of WMA C. The survey plat will be prepared and certified by a professional land surveyor. After the final closure, the survey plat of the WMA will be submitted to Benton County and Ecology. In addition, any restrictive covenants on the use of the land also will be submitted to Benton County for attachment to the property deed, as necessary.

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8.0 POST-CLOSURE CARE

Pursuant to WAC 173-303-610 subsection (7) "Post-closure care and use of property," item (a), the post-closure period begins after certification of closure and will last a minimum of 30 years unless it is amended pursuant to WAC 173-303-610(7)(b). This section provides details of the post-closure plan for inspection and maintenance, erosion control and barrier integrity, security, groundwater monitoring, amendments to the closure plan, and certification. Post-closure groundwater monitoring for WMA C is discussed in Section 3.0 of this RCRA Tier 2 Plan.

8.1 INSPECTIONS, OPERATION AND MAINTENANCE

Periodic inspections of each component of the evapotranspiration type barrier will be conducted through the required post-closure period. Maintenance will be conducted to address observations made during inspections, as applicable.

8.1.1 Inspection Frequency

The inspection will be conducted according to the schedule shown in Table 8-1. This schedule is consistent with a graded approach to inspection and risk reduction. Reduced inspection frequency is planned in later years, assuming cover inspection results in earlier years support a reduced inspection frequency. After the post-closure period is complete, the schedule of inspections will be evaluated based on prior inspections and the type and frequency of repairs that have occurred over the post-closure period to determine if further inspections are needed.

Table 8-1. Inspection Schedule.

| Period (Year) | Frequency | Anticipated Inspection Items |
|---------------|--------------|--|
| 1-5 | Quarterly | Security control; evidence of erosion; integrity of cover, including subsidence and animal intrusion; vegetation cover integrity |
| 6-10 | Semiannually | |
| 11-30 | Yearly | |

Note: The proposed inspection schedule and list of inspection items may change based on performance of the cover and its integrity (i.e., ability to withstand environmental impacts) over time.

A list of items anticipated to be inspected is shown in Table 8-1. The specific inspection checklists will be based on the final cover design and presented in the final inspection and maintenance plans.

The evapotranspiration type barrier will also be inspected after extreme weather (e.g., large thunderstorms, heavy runoff, or a greater-than-100-year storm) or other significant events that could potentially damage the components of the cover or monitoring devices (e.g., fires, earthquakes). These inspections will be conducted as soon as possible following the event and when the safety of the inspection crew is assured.

8.1.2 Inspection, Operation and Maintenance Plans

Comprehensive post-closure inspection and maintenance plans are designed to ensure that the integrity and effectiveness of the cover are maintained. Post-closure inspection, maintenance, and monitoring plans are intended to satisfy requirements of WAC 173-303-665(6)(b)(i). These plans will be prepared specific to final barrier design and submitted to Ecology.

Items to be addressed in the post-closure inspection and maintenance plans include evaluation of erosion and other factors that might affect the integrity of the final cover, run-on and runoff control measures, groundwater well conditions, and security signage.

Operation and maintenance of the cover throughout the post-closure period will address the items listed below, as needed:

- Maintenance of the vegetative cover
- Repair of erosion damage
- Repair of subsidence and animal intrusion
- Repair of run-on and runoff controls
- Repair of security devices
- Presence and condition of surveyed benchmarks.

Actual maintenance needs will be addressed based on observations during inspections and monitoring. Groundwater well conditions will be evaluated during sampling events as detailed in the approved groundwater monitoring plan.

8.2 EROSION CONTROL AND COVER INTEGRITY

This section discusses the controls for erosion damage and cover integrity.

8.2.1 Erosion Damage

The final cover will be inspected periodically to identify erosion damage. The health of the vegetative cover and the integrity of the uppermost layers of the cover are the primary factors in the overall erosion control. Most of the annual precipitation is lost to evapotranspiration. Low annual precipitation, high evapotranspiration rates of the cover material, relatively flat topography, and a stable vegetative cover reduce the possibility of erosion damage due to precipitation. Erosion pins will be placed in representative locations on the landfill area to assist in monitoring for surface erosion from water and wind. Inspections will include assessment of water and aeolian erosion.

- Water erosion: Erosion damage from flooding is low-probability. The flow in the Hanford Reach of the Columbia River is controlled by the Priest Rapids Dam. The flood water associated with a regulated 100-year flood would not leave the present channel banks, while the 100-year flood waters from the Cold Creek would not approach the site.

1 Therefore, the probability of flood-induced erosional damage to the final cover is
2 extremely low.
3

- 4 • Aeolian erosion: There is low probability of damage from wind erosion due to the
5 vegetative cover. The monthly average wind speeds for the Hanford Site range from
6 approximately 13.7 km/h (kilometers/hour) (8.5 miles/h) in the summer to 10 km/h
7 (6.4 miles/h) in the winter. The prevailing regional winds are from the northwest.
8 High/intense winds are typically from the southwest. Wind storms occasionally occur on
9 the Hanford Site, with peak gusts commonly exceeding 80 km/h (50 miles/h). The
10 average number of days in a year when gusts exceed 80 km/h (50 miles/h) is five. In the
11 spring, early summer, and late fall, the local floral community helps control wind erosion.
12 When the floral communities begin to dry out in late summer, the probability of wind
13 erosion remains low because winds usually tend to decrease during this period. One-half
14 of the annual precipitation typically falls during the four months of late fall and winter,
15 when the lowest average wind speeds occur. This, coupled with a comparatively lower
16 evapotranspiration rate, decreases the potential for winter wind erosion damage.
17 Effective long-term protection against wind erosion will require production of a vigorous
18 stand of cover vegetation. A blend of native grasses, forbs, and shrubs will be planted
19 and cultivated on the cover for this purpose.
20

21 Repairs for erosion damage will be made using grading equipment and fill soils. Repairs will
22 return all site surfaces to pre-damaged conditions. All maintenance and repair activities will be
23 noted in the inspection records.
24

25 **8.2.2 Cover Integrity**

26

27 Cover integrity will be evaluated by inspection for the following.
28

- 29 • Subsidence will be assessed using elevation surveys of control points conducted
30 periodically. If subsidence greater than 0.3 m (1 ft) is observed, an evaluation will be
31 performed to identify a corrective solution, which will be submitted to Ecology for
32 approval.
33
- 34 • Damage from vehicular traffic or human trails.
35
- 36 • Animal burrowing or animal trails.
37
- 38 • Integrity of vegetative cover, specifically looking for burned areas, overall plant health,
39 evidence of disease or pests, and weed infestations. Maintenance actions will include
40 reseeding, planting shrubs and potential use of soil amendments.
41

42 **8.3 SECURITY**

43

44 WMA C is located within the Hanford Site controlled access area, where roadways are restricted
45 to authorized personnel and the general public is excluded. Signs required by
46

1 WAC 173-303-310, "Security," subsection (2) item (a) will be maintained during the
2 post-closure period and beyond.

3
4
5 **8.4 GROUNDWATER MONITORING**

6
7 As discussed in Section 3 of this RCRA Tier 2 Plan, groundwater monitoring of wells located
8 around WMA C will continue after the cover is constructed, through and possibly beyond
9 post-closure. A groundwater monitoring plan will be developed for conducting groundwater
10 sampling. The groundwater monitoring plan will meet the monitoring requirements pursuant to
11 WAC 173-303-645. Groundwater monitoring will be conducted for a minimum of 30 years, as
12 required by WAC 173-303-610(7)(a)(i).

13
14
15 **8.5 RECORDKEEPING**

16
17 A maintenance log will be kept by the personnel conducting inspections. The log will include, at
18 a minimum: date and time of inspection, printed name and handwritten or electronic signature of
19 the inspector, a notation of observations, and other relevant information. The log records may be
20 copied and kept in an electronic format; however, all log record information will be maintained
21 for examination by Ecology for the post-closure period. The inspector will record any damage to
22 the cover and/or other maintenance needs, as well as the weather conditions at the time of
23 inspection, and will sign and date the log record. The log records will document the correction
24 of noted problems in accordance with WAC 173-303-320, "General Inspection," subsection (2)
25 item (d).

26
27
28 **8.6 POST-CLOSURE CONTACT**

29
30 The following office is the official contact for WMA C during the post-closure care period:

31
32 Jan B. Bovier, Environmental Compliance Division
33 U.S. Department of Energy
34 Office of River Protection
35 P.O. Box 450
36 Richland, Washington 99352
37 (509) 376-9630

38
39 This information will be updated, as required.

40
41
42 **8.7 AMENDMENT TO THE CLOSURE PLAN AND THE POST-CLOSURE PLAN**

43
44 As required by WAC 173-303-610 subsection (3) "Closure plan; amendment of plan," item (b),
45 the closure plan will be amended if unexpected events require an amendment to the approved
46 closure plan during final closure. In addition, the final design drawings, specifications and other

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1 construction-related documents will be provided to Ecology. As-builts will be updated when
2 completed.

3
4 If an amendment to the approved closure plan is required, DOE will submit a written request to
5 Ecology to authorize a change to the approved plan. The written request will include a copy of
6 the closure plan amendment for approval.

7
8 As required by WAC 173-303-610 subsection (8) "Post-closure plan; amendment of plan,"
9 item (d), the post-closure plan will be amended when required by changes in the post-closure
10 operating plans or facility design. The plan may be amended any time during the active life of
11 the facility or during the post-closure care period. The approved post-closure plan will be
12 amended by submitting a written request to Ecology to authorize a change to the approved
13 post-closure plan. The written request will include a copy of the amended post-closure plan for
14 approval.

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9.0 REFERENCES

- 1
2
3 0501657, 2005, "Re: Approval of the Toxic Substance Control Act (TSCA) Risk-based Disposal
4 Approval (RBDA) Application for the Mobilization of Single-Shell Tank Solid Waste
5 Using Double-Shell Tank Supernate" (letter from M. A. Bussell to R. J. Schepens
6 [U.S. Department of Energy, Office of River Protection], June 2), U.S. Environmental
7 Protection Agency, Region 10, Seattle, Washington.
- 8 15-ECD-0042, 2015, "Submittal of the Tier 1 Closure Plan for the Single-Shell Tank System"
9 (letter from L. D. Olson [Washington River Protection Solutions, LLC] and K. W. Smith
10 [Office of River Protection] to J. A. Hedges [Nuclear Waste Program, Washington State
11 Department of Ecology], September 30), U.S. Department of Energy, Office of River
12 Protection, Richland, Washington.
- 13 16-TF-0127, 2016, "Transmittal of Tentative Agreement on Negotiations of Hanford Federal
14 Facility and Consent Order Revisions on Interim Milestone M-045-82, Submit Complete
15 Permit Modification Requests for Tiers 2 & 3 of the Single-Shell Tank System to Support
16 Final Closure Requirements for Waste Management Area C" (letter from K. W. Smith to
17 A. K. Smith [Nuclear Waste Program, Washington State Department of Ecology],
18 November 29), U.S. Department of Energy, Office of River Protection, Richland,
19 Washington.
- 20 40 CFR Subchapter C—Air Programs, *Code of Federal Regulations*, as amended.
- 21 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal*
22 *Regulations*, U.S. Environmental Protection Agency.
- 23 40 CFR 70, "State Operating Permit Programs," *Code of Federal Regulations*,
24 U.S. Environmental Protection Agency.
- 25 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste
26 Treatment, Storage, and Disposal Facilities," Subpart F—Ground-Water Monitoring,
27 § 265.93, Preparation, evaluation, and response, *Code of Federal Regulations*, as
28 amended.
- 29 40 CFR 761, 1992, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution
30 in Commerce, and Use Prohibitions," *Code of Federal Regulations*, as amended.
- 31 75 FR 75628, "Final Guidance for Federal Departments and Agencies on Establishing, Applying,
32 and Revising Categorical Exclusions Under the National Environmental Policy Act,"
33 *Federal Register*, Vol. 75, pp. 75628–75638, December 6.
- 34 78 FR 75913, 2013, "Record of Decision: Final Tank Closure and Waste Management
35 Environmental Impact Statement for the Hanford Site, Richland, Washington," *Federal*
36 *Register*, Vol. 78, pp. 75913–75919, December 13.
- 37 *Atomic Energy Act of 1954*, 42 USC 2011, et seq., as amended.

- 1 Change Form M-15-16-02, 2016, "Addition To And Modification Of Ecology Lead Regulatory
2 Agency Milestones Within The M-015 Series "Complete the RI/FS (or RFI/CMS and
3 RI/FS) process for all non-tank farm operable units except for canyon/associated past
4 practice waste site OUs covered in M-85-00"," U.S. Department of Energy and
5 Washington State Department of Ecology, Olympia, Washington.
- 6 *Clean Air Act*, Public Law 159, 42 USC 7401–7626, et seq., as amended.
- 7 *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*,
8 42 USC 9601 et seq., as amended.
- 9 Consent Decree, *State of Washington Department of Ecology v. Department of Energy*, Case
10 No. 2:08-cv-05085-FVS, United States District Court, Eastern District of Washington
11 (E.D. WA October 25, 2010).
- 12 Department of Energy/Office of Environmental Management, Queried 04/23/2017, [Policy on
13 Decommissioning of Department of Energy Facilities Under the Comprehensive
14 Environmental Response, Compensation and Liability Act (CERCLA)],
15 [http://energy.gov/em/policy-decommissioning-department-energy-facilities-under-](http://energy.gov/em/policy-decommissioning-department-energy-facilities-under-comprehensive)
16 [comprehensive](http://energy.gov/em/policy-decommissioning-department-energy-facilities-under-comprehensive).
- 17 DOE and Ecology, 2003, *Memorandum of Understanding Between the United States Department*
18 *of Energy, Office of River Protection, and Washington State Department of Ecology*,
19 March 25, U.S. Department of Energy, Office of River Protection/Washington State
20 Department of Ecology, Richland, Washington.
- 21 DOE and Ecology, 2006, *Memorandum of Understanding Between the United States Department*
22 *of Energy and the Washington State Department of Ecology for Development of the*
23 *Hanford Site Tank Closure and Waste Management EIS ("TC&WM EIS")*, January 6,
24 U.S. Department of Energy, Office of River Protection/Washington State Department of
25 Ecology, Richland, Washington.
- 26 DOE/EIS-0391, 2012, *Final Tank Closure and Waste Management Environmental Impact*
27 *Statement for the Hanford Site, Richland, Washington*, U.S. Department of Energy,
28 Washington, D.C.
- 29 DOE M 435.1-1, 2007, *Radioactive Waste Management Manual*, U.S. Department of Energy,
30 Washington, D.C.
- 31 DOE O 430.1B, *Real Property and Asset Management*, U.S. Department of Energy,
32 Washington, D.C.
- 33 DOE O 435.1, 2001, *Radioactive Waste Management*, U.S. Department of Energy,
34 Washington, D.C.
- 35 DOE/ORP-2014-02, 2014, *Clean Closure Practicability Demonstration for Single-Shell Tanks*,
36 Rev. 1, U.S. Department of Energy, Office of River Protection, Richland, Washington.

- 1 DOE/RL-92-04, 1993, *PUREX Source Aggregate Area Management Study Report*, Rev. 0,
2 U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- 3 DOE/RL-93-33, 1996, *Focused Feasibility Study of Engineered Barriers for Waste Management*
4 *Units in the 200 Areas*, Rev. 1, U.S. Department of Energy, Richland Operations Office,
5 Richland, Washington.
- 6 DOE/RL-2001-49, 2004, *Groundwater Sampling and Analysis Plan for the 200-BP-5 Operable*
7 *Unit*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland,
8 Washington.
- 9 DOE/RL-2009-77, 2010, *Groundwater Quality Assessment Plan for the Single-Shell Tank Waste*
10 *Management Area C*, Rev. 0, U.S. Department of Energy, Richland Operations Office,
11 Richland, Washington.
- 12 DOE/RL-2010-22, 2010, *Action Memorandum for General Hanford Site Decommissioning*
13 *Activities*, Rev 0, U.S. Department of Energy, Richland Operations Office, Richland,
14 Washington.
- 15 DOE/RL-2010-74, 2015, *Treatability Test Plan for the 200-BP-5 Groundwater Operable Unit*,
16 Rev 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- 17 DOE/RL-2010-102, 2011, *Action Memorandum for Decontamination, Deactivation,*
18 *Decommissioning, and Demolition (D4) Activities for 200 East Tier 2*
19 *Buildings/Structures*, Rev. 0, U.S. Department of Energy, Richland Operations Office,
20 Richland, Washington.
- 21 DOE/RL-2016-09, 2016, *Hanford Site Groundwater Monitoring Report for 2015*, Rev. 0,
22 U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- 23 DOE/RL-2016-33, 2016, *Hanford Site Environmental Report for Calendar Year 2015*, Rev. 0,
24 U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- 25 Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order –*
26 *Tri-Party Agreement*, 2 vols., as amended, State of Washington Department of Ecology,
27 U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia,
28 Washington.
- 29 Ecology, EPA, and DOE, 2000, *Framework Agreement for Management of Polychlorinated*
30 *Biphenyls (PCBs) in Hanford Tank Waste*, State of Washington Department of Ecology,
31 U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia,
32 Washington.
- 33 Hanford Site, Queried 02/09/2017, [Hanford Federal Facility Agreement and Consent Order,
34 Appendix D. Work Schedule Milestones and Target Dates Including Designation of Lead
35 Regulatory Agency], <http://www.hanford.gov/files.cfm/ap-App-D.pdf>.
- 36 HNF-EP-0182, 2016, “*Waste Tank Summary Report for Month Ending March 31, 2016*,”
37 Rev. 339, Washington River Protection Solutions, LLC, Richland, Washington.

- 1 *National Environmental Policy Act of 1969*, 42 USC 4321–4347, et seq.
- 2 ORP, 2013, “ORP Project Managers Meeting July 23, 2013 2440 Stevens Ctr. Richland,
3 Washington Meeting Minutes Transmittal,” U.S. Department of Energy, Office of River
4 Protection, Richland, Washington.
- 5 ORP, 2015, “Final Office of River Protection Tri-Party Agreement Monthly Summary Report
6 August 2015,” U.S. Department of Energy, Office of River Protection, Richland,
7 Washington.
- 8 PNNL-13024, 2001, “*RCRA Groundwater Monitoring Plan for Single-Shell Tank Waste
9 Management Area C at the Hanford Site*,” as amended, Pacific Northwest National
10 Laboratory, Richland, Washington.
- 11 RCW 43.21C, “State Environmental Policy,” *Revised Code of Washington*, as amended.
- 12 RCW 70.94, “Washington Clean Air Act,” *Revised Code of Washington*, Washington State,
13 Olympia, Washington.
- 14 RCW 70.105, “Hazardous Waste Management,” *Revised Code of Washington*, as amended.
- 15 *Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq.
- 16 RPP-9937, 2014, “*Single-Shell Tank System Leak Detection and Monitoring Functions and
17 Requirements Document*, Rev. 3E, Washington River Protection Solutions, LLC,
18 Richland, Washington.
- 19 RPP-22777, 2004, “*PCB Risk Assessment for the Mobilization of Single-Shell Tank Solid Waste
20 Using Double-Shell Tank Supernate*,” Rev. 0, CH2M HILL Hanford Group, Inc.,
21 Richland, Washington.
- 22 RPP-35484, 2008, “*Field Investigation Report for Waste Management Areas C and A-AX*,”
23 Rev. 1, CH2M Hill Hanford Group, Richland, Washington.
- 24 RPP-46459, 2011, “*Single-Shell Tank Waste Management Area C RCRA/CERCLA Integration
25 White Paper*,” Rev. 3, Washington River Protection Solutions, LLC, Richland,
26 Washington.
- 27 RPP-50233, 2011, “*Waste Management Area C Closure Conceptual Design Support Document*,”
28 Rev. 0, Washington River Protection Solutions, LLC, Richland, Washington.
- 29 RPP-ENV-58782, 2016, “*Performance Assessment of Waste Management Area C, Hanford Site,
30 Washington*,” Washington River Protection Solutions, LLC, Richland, Washington.
- 31 RPP-ENV-58806, 2016, “*RCRA Closure Analysis of Tank Waste Residuals Impacts at Waste
32 Management Area C, Hanford Site, Washington*,” Washington River Protection
33 Solutions, LLC, Richland, Washington.

- 1 RPP-PLAN-39114, 2012, "*Phase 2 RCRA Facility Investigation/Corrective Measures Study*
2 *Work Plan for Waste Management Area C*," Rev. 2, Washington River Protection
3 Solutions, LLC, Richland, Washington.
- 4 RPP-RPT-41550, 2009, "*Closure Demonstration Grout Test Report*," Rev. 1A, Columbia
5 Energy & Environmental Services, Inc. for Washington River Protection Solutions, LLC,
6 Richland, Washington.
- 7 RPP-RPT-49701, 2011, "*Waste Management Area C Closure – Conceptual Design Report*,"
8 Rev. 0, Washington River Protection Solutions, LLC, Richland, Washington.
- 9 RPP-RPT-58329, 2016, "*Baseline Risk Assessment for Waste Management Area C*," Rev. 2,
10 INTERA, Inc./CH2M HILL Plateau Remediation Company/Washington River Protection
11 Solutions, LLC, Richland, Washington.
- 12 RPP-RPT-58339, 2014, "*Phase 2 RCRA Facility Investigation Report for Waste Management*
13 *Area C*," Draft A, Washington River Protection Solutions, LLC, Richland, Washington.
- 14 RPP-RPT-58339, 2016, "*Phase 2 RCRA Facility Investigation Report for Waste Management*
15 *Area C*," Rev. 0, Washington River Protection Solutions, LLC/Freestone Environmental,
16 Inc./TerraGraphics Environmental Engineering, Inc., Richland, Washington.
- 17 RPP-RPT-58858, 2015, "*Tier 1 Closure Plan Single-Shell Tank System*," Rev. 1, Washington
18 River Protection Solutions, LLC, Richland, Washington.
- 19 RPP-RPT-59197, 2016, "*Analysis of Past Tank Waste Leaks and Losses in the Vicinity of Waste*
20 *Management Area C at the Hanford Site, Southeast Washington*," Rev. 0, Washington
21 River Protection Solutions LLC, Richland, Washington.
- 22 RPP-RPT-59379, 2016, "*Waste Management Area C Phase 2 RCRA Corrective Measures*
23 *Study*," Washington River Protection Solutions, LLC/Freestone Environmental Services,
24 Inc./Columbia-Energy and Environmental Services, Inc., Richland, Washington.
- 25 SGW-58828, 2015, "*Water Table Maps for the Hanford Site 200 East Area, 2013 and 2014*,"
26 Rev. 0, CH2M HILL Plateau Remediation Company, Richland, Washington.
- 27 *Toxic Substances Control Act of 1976*, 15 USC 2601, et seq.
- 28 TPA-CN-578, 2013, "Tri-Party Agreement Change Notice Form Groundwater Sampling and
29 Analysis Plan for the 200-BP-5 Operable Unit, DOE/RL-2001-49 Rev. 1," dated
30 August 13, U.S. Department of Energy, Richland Operations Office, and Washington
31 State Department of Ecology, Richland, Washington.
- 32 WA7 89000 8967, 2007, *Hanford Facility Resource Conservation and Recovery Act Permit,*
33 *Dangerous Waste Portion Revision 8C for the Treatment, Storage, and Disposal of*
34 *Dangerous Waste*, State of Washington Department of Ecology, Richland, Washington.
- 35 WAC 173-40, "Pollution Disclosure," *Washington Administrative Code*, as amended.

- 1 WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.
- 2 WAC 303-040, "Definitions," *Washington Administrative Code*, as amended.
- 3 WAC 303-310, "Security," *Washington Administrative Code*, as amended.
- 4 WAC 303-320, "General Inspection," *Washington Administrative Code*, as amended.
- 5 WAC 303-400, "Interim Status Facility Standards," *Washington Administrative Code*, as
6 amended.
- 7 WAC 303-610, "Closure and Post-Closure," *Washington Administrative Code*, as amended.
- 8 WAC 303-640, "Tank Systems," *Washington Administrative Code*, as amended.
- 9 WAC 303-645, "Releases from Regulated Units," *Washington Administrative Code*, as amended.
- 10 WAC 303-665, "Landfills," *Washington Administrative Code*, as amended.
- 11 WAC 173-340-200, "Definitions," *Washington Administrative Code*, as amended.
- 12 WAC 173-340-360, "Selection of Cleanup Actions," *Washington Administrative Code*, as
13 amended.
- 14 WAC 173-400, "General Regulations for Air Pollution Sources," *Washington Administrative*
15 *Code*, Olympia, Washington.
- 16 WAC 173-401, "Operating Permit Regulation," *Washington Administrative Code*, as amended.
- 17 WAC 173-401-605, "Emission Standards and Limitations," *Washington Administrative Code*, as
18 amended.
- 19 WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides,"
20 *Washington Administrative Code*, as amended.
- 21 WAC 197-11, "SEPA Rules," *Washington Administrative Code*, as amended.
- 22 WAC 197-11-610, "Use of NEPA Documents," *Washington Administrative Code*, as amended.
- 23 WAC 246-247, "Radiation Protection—Air Emissions," *Washington Administrative Code*, as
24 amended.
- 25 WHC-SD-EN-AP-012, 1989, "40 CFR 265 Interim-Status Ground-Water Monitoring Plan for
26 *the Single-Shell Tanks*," Rev. 0, Pacific Northwest Laboratory, Richland, Washington.
- 27 WHC-SD-EN-AP-012, 1991, "Interim Status Groundwater Monitoring Plan for Single-Shell
28 *Tanks*," Rev. 1, Westinghouse Hanford Company, Richland, Washington.
- 29 WRPS, 2011, *Hanford Facility Dangerous Waste Part A Permit Application, Form 3,*
30 *Revision 13, for the Single-Shell Tank System*, Washington River Protection
31 Solutions, LLC, Richland, Washington.

ATTACHMENT 2

17-TF-0046

RPP-RPT-59390

***Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure
Activity Plan for 241-C-200 Series Tanks***

Rev. 0

DOCUMENT RELEASE AND CHANGE FORM

Release Stamp

Prepared for the U.S. Department of Energy, Assistant Secretary for Environmental Management
 By Washington River Protection Solutions, LLC., PO Box 850, Richland, WA 99352
 Contractor For U.S. Department of Energy, Office of River Protection, under Contract DE-AC27-08RV14800

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| | |
|--|---|
| 1. Doc No: RPP-RPT-59390 Rev. 00 | |
| 2. Title: Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Activity Plan for 241-C-200 Series Tanks | |
| 3. Project Number: T2R26 <input type="checkbox"/> N/A | 4. Design Verification Required: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| 5. USQ Number: <input checked="" type="checkbox"/> N/A RPP-27195 | 6. PrHA Number Rev. <input checked="" type="checkbox"/> N/A |

Clearance Review Restriction Type:
public

| 7. Approvals | | | |
|---------------------------|------------------------|------------------------|------------|
| Title | Name | Signature | Date |
| Clearance Review | BRATTON, GAYLA E | BRATTON, GAYLA E | 05/04/2017 |
| Document Control Approval | WASHINGTON, MARGUERITE | WASHINGTON, MARGUERITE | 05/04/2017 |
| Originator | HOPKINS, ANDREA M | HOPKINS, ANDREA M | 05/03/2017 |
| Responsible Manager | RUTLAND, PAUL L | RUTLAND, PAUL L | 05/03/2017 |

8. Description of Change and Justification
 Initial release.

9. TBDs or Holds N/A

10. Related Structures, Systems, and Components

| | | |
|--|--|--|
| a. Related Building/Facilities <input checked="" type="checkbox"/> N/A | b. Related Systems <input checked="" type="checkbox"/> N/A | c. Related Equipment ID Nos. (EIN) <input checked="" type="checkbox"/> N/A |
|--|--|--|

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| Document Number | Rev. | Title |
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| 14. Distribution | |
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| ENGLISH, MO D | ONE SYSTEM/CTO |
| HOPKINS, ANDREA M | ENV PROG REPRTG & TECH SUPPORT |
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| PARKER, DAN | CLOSURE & CORRECTIVE MEASURES |
| RUTLAND, PAUL L | ONE SYSTEM/CTO |
| TABOR, CINDY L | CLOSURE & CORRECTIVE MEASURES |

RPP-RPT-59390, Rev. 0

Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Activity Plan for 241-C-200 Series Tanks

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Abstract: This WMA C Component Closure Activity Plan is a part of the third tier of a three-tiered hierarchy of closure plans for the Single-Shell Tank System as defined by the Hanford Federal Facility Agreement and Consent Order Action Plan, Appendix I. This Tier 3 Component Closure Activity Plan provides the background and details of closure activities for the 241-C-200 tanks. It includes information about closure actions and requirements that apply to Waste Management Area C as a whole, and general information about closure of individual tank farm components.

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EXECUTIVE SUMMARY

This “Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Activity Plan for 241-C-200 Series Tanks” (RCRA Tier 3 Plan) describes closure activities for the 241-C-200 series (C-200) single-shell tanks located in the Hanford Site Waste Management Area C. This RCRA Tier 3 Plan is one of multiple Tier 3 component closure activity plans that will support closure of Waste Management Area C as described in RPP-RPT-59389, “*Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C.*” A compliance matrix is provided in Appendix A that indicates which document within the three-tiered single-shell tank closure plan document structure addresses individual closure performance standards.

Waste Management Area C contains four C-200 single-shell tanks, constructed in place from 1944 to 1945 to receive Hanford operations waste. These tanks received operations waste from 1947 until they were removed from service between 1970 and 1980. This Component Closure Activity Plan describes closure requirements specific to the C-200 single-shell tanks. Additionally, an overview is provided of C-200 single-shell tank closure activities including tank preparation, two stages of grout fill, and demobilization. Further details regarding these closure activities will be presented in later documents, including detailed design drawings and work plans.

The 200-series single-shell tanks will be closed to support Waste Management Area C closure, which is based on a landfill closure approach, as discussed in accordance with 78 FR 75913, “Record of Decision: Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington,” pursuant to the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989), Appendix I, and the applicable provisions of the *Resource Conservation and Recovery Act of 1976* (RCRA) and the *Hazardous Waste Management Act (Revised Code of Washington 70.105, “Hazardous Waste Management”)*. This Component Closure Activity Plan does not discuss waste classification determinations and radioactive waste-specific closure actions that the U.S. Department of Energy may take under the *Atomic Energy Act of 1954*. Where this RCRA Tier 3 Plan provides data or discussions about materials regulated under the *Atomic Energy Act of 1954*, that information is provided for informational purposes only.

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1 **TERMS**

| | | |
|----|-----------|--|
| 2 | | |
| 3 | AEA | Atomic Energy Act of 1954 |
| 4 | AMS | articulating mast system |
| 5 | CERCLA | <i>Comprehensive Environmental Response, Compensation, and Liability Act</i> |
| 6 | | <i>of 1980</i> |
| 7 | DOE | U.S. Department of Energy |
| 8 | Ecology | Washington State Department of Ecology |
| 9 | FR | Federal Register |
| 10 | EIS | environmental impact statement |
| 11 | HEPA | high-efficiency particulate air |
| 12 | HFFACO | <i>Hanford Federal Facility Agreement and Consent Order</i> |
| 13 | HWMA | <i>Hazardous Waste Management Act</i> |
| 14 | NEPA | <i>National Environmental Policy Act of 1969</i> |
| 15 | PUREX | Plutonium Uranium Extraction (Plant) |
| 16 | RCRA | <i>Resource Conservation and Recovery Act of 1976</i> |
| 17 | RCW | <i>Revised Code of Washington</i> |
| 18 | RFI | RCRA facility investigation |
| 19 | ROD | record of decision |
| 20 | RDR | retrieval data reports |
| 21 | SEPA | <i>State Environmental Policy Act</i> |
| 22 | SST | single-shell tank |
| 23 | TC&WM EIS | Tank Closure and Waste Management Environmental Impact Statement |
| 24 | TSD | treatment, storage, and disposal |
| 25 | UCL | upper confidence limit |
| 26 | UPR | unplanned release |
| 27 | WAC | Washington Administrative Code |
| 28 | WIDS | Waste Information Data System |
| 29 | WMA | waste management area |

1.0 INTRODUCTION

Closure activities described in this document, the “Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Activity Plan for 241-C-200 Series Tanks” (RCRA Tier 3 Plan), are specific to 241-C-200 (C-200) series single-shell tanks (SSTs).

The U.S. Department of Energy (DOE) will conduct closure activities for single components or groups of components within Waste Management Area (WMA) C in accordance with the framework provided in the *Hanford Federal Facility Agreement and Consent Order (HFFACO)*, also known as the Tri-Party Agreement (Ecology et al. 1989). The HFFACO Action Plan, Appendix I (Section 2.2) establishes a process for closing individual components and the WMAs as contributory actions in closing the SST system. The process involves a three-tiered structure of documentation to integrate the various closure actions within a WMA into WA7 89000 8967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion for the Treatment, Storage, and Disposal of Dangerous Waste* as revised (Hanford Site-Wide Permit). The documents in the three-tiered structure include those listed below:

- Tier 1 – Framework (SST system-wide) closure plan
- Tier 2 – WMA closure action plans
- Tier 3 – Component closure activity plans.

RPP-RPT-58858, “*Tier 1 Closure Plan Single-Shell Tank System*” (RCRA Tier 1 Plan) was submitted to the Washington State Department of Ecology (Ecology) in September 2015 [Letter 15-ECD-0042, “Submittal of the Tier 1 Closure Plan Single-Shell Tank (SST) System”], pursuant to HFFACO Milestone M-045-82. The RCRA Tier 1 Plan addresses closure actions and issues pertaining to the entire Hanford Site SST system. RPP-RPT-59389, “*Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C*” (RCRA Tier 2 Plan) describes actions that will be taken at the WMA C level.

This RCRA Tier 3 Component Closure Activity Plan is one of multiple Tier 3 component closure activity plans that will be developed for different components or groups of components within WMA C.

Together, the RCRA Tier 1 Plan, the RCRA Tier 2 Plan, and the various RCRA Tier 3 component closure activity plans will describe actions that will be required for closure of WMA C in accordance with RCRA and the State of Washington (State) *Hazardous Waste Management Act* (HWMA), Revised Code of Washington (RCW) 70.105, “Hazardous Waste Management.” Separate tiered WMA C closure plans are also being developed pursuant to DOE Order 435.1, *Radioactive Waste Management* (DOE O 435.1).

Consistent with the HFFACO, Part One, Article IV, Paragraph 19, this RCRA Tier 3 Plan addresses residual waste in the tanks, including radioactive material subject to regulation under the *Atomic Energy Act of 1954* (AEA). However, the inclusion of information about such material here does not confer authority to Ecology over otherwise exempt spent, byproduct, and special nuclear material regulated under the AEA.

1.1 BACKGROUND INFORMATION

The Hanford Site SST system is grouped into seven geographically based areas called “waste management areas” (WMAs). This RCRA Tier 3 Plan describes component closure actions that will be taken at WMA C, which is a geographic area that encompasses the Hanford Site 241-C Tank Farm (C Farm). In general, WMA C is coincident with the C Farm fence line; however, some components extend beyond the fence line or are located outside the fence line. Other WMA C components include numerous tanks, pits, transfer pipelines, diversion boxes, and vaults. In addition, soil and groundwater contamination caused by C Farm operations has been identified. This Section discusses the location and features of the C-200 SSTs at WMA C and describes the component closure approach for these tanks.

1.1.1 Location and Extent of C-200 Single-Shell Tanks

WMA C includes four 200-series SSTs, all of which are located on the north side of WMA C, inside the C Farm fence line (Figure 1-1). These four tanks are identified as 241-C-201 (C-201), 241-C-202 (C-202), 241-C-203 (C-203), and 241-C-204 (C-204), and together, for the purposes of this RCRA Tier 3 Plan, are referred to as the C-200 SSTs (Figure 1-2). The construction details and history of operations for the four 200-series SSTs are further described in Sections 1.3 and 1.4 of this RCRA Tier 3 Plan.

1.1.2 Closure Approach

U.S. DOE prepared and submitted to Ecology a clean closure practicability evaluation, DOE/ORP-2014-02, *Clean Closure Practicability Demonstration for Single-Shell Tanks*. In accordance with Washington Administrative Code (WAC) 173-303-640, “Tank Systems,” subsection (8) “Closure and post-closure care,” item (b) and the Tank Closure and Waste Management (TC&WM) Environmental Impact Statement (EIS) Record of Decision (ROD) (78 FR 75913, “Record of Decision: Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington”), DOE demonstrated that removal or decontamination of the tank system and soils associated with WMA C is not practicable.

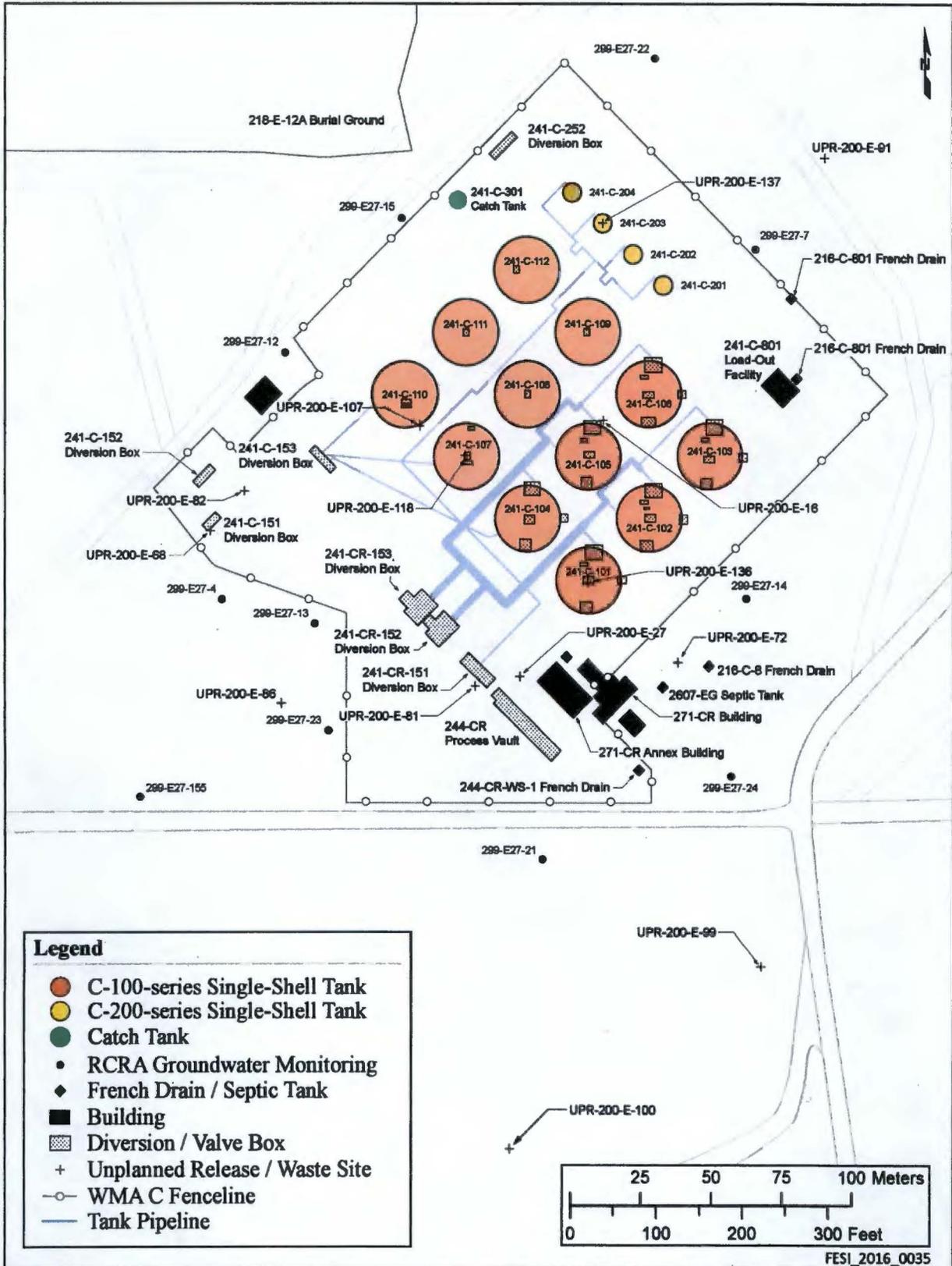
This RCRA Tier 3 Plan is based on a landfill closure approach for the WMA C tank system in accordance with WAC 173-303-665, “Landfills,” subsection (6) “Closure and post-closure care,” item (a), as discussed in the RCRA Tier 1 Plan, consistent with the DOE *National Environmental Policy Act of 1969* (NEPA) EIS for the closure of Hanford Site tanks: DOE/EIS-0391, *Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington* and subsequent TC&WM EIS ROD.

This RCRA Tier 3 Plan addresses the following specific C-200 SSTs: C-201, C-202, C-203, and C-204.

The general closure approach for the C-200 SSTs includes the following planned actions:

- Remove above-grade equipment at each tank as needed to facilitate access
- Stabilize tanks to the extent necessary to prevent long-term subsidence.

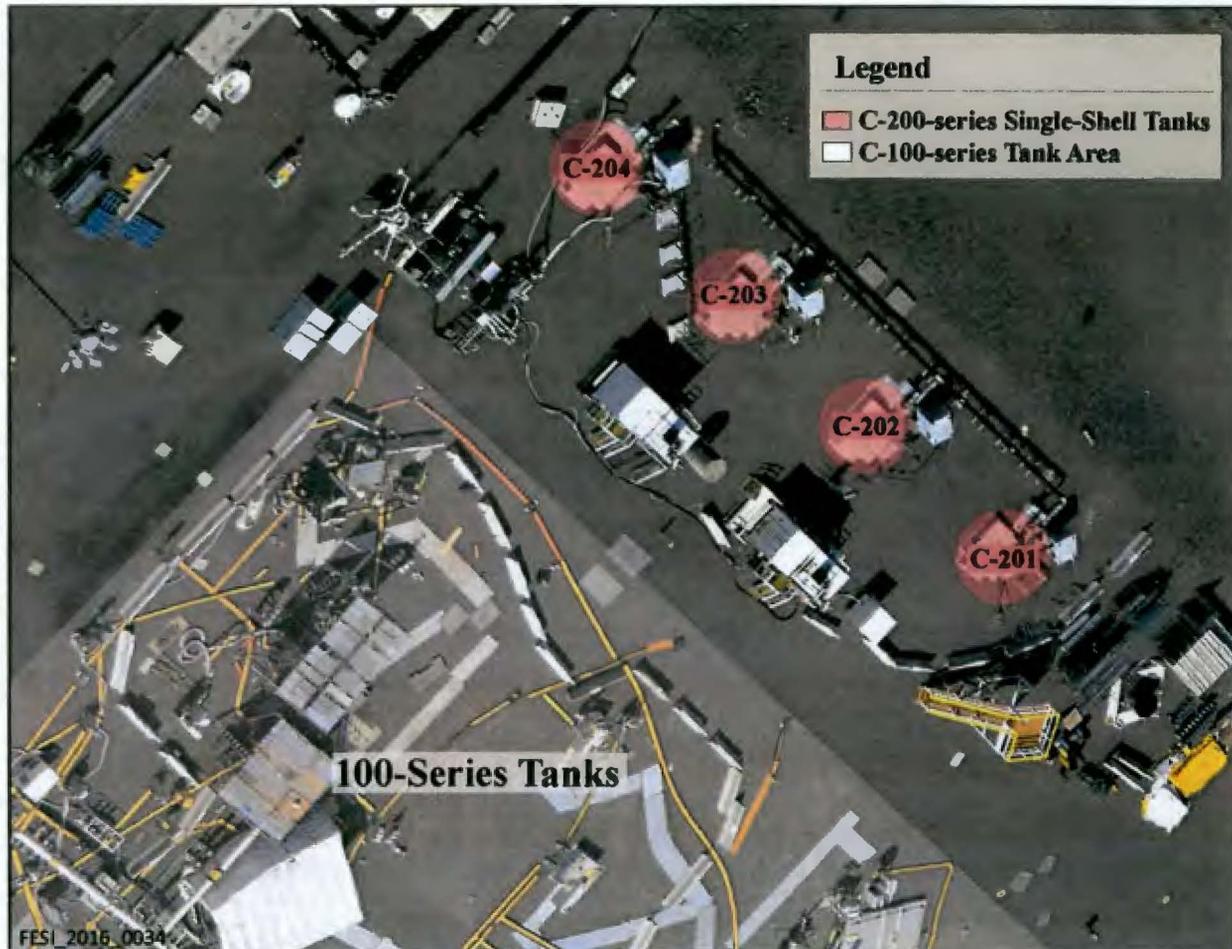
1 **Figure 1-1. Waste Management Area C Location, Features, and Surrounding Area.**
 2



3
 4 RCRA = Resource Conservation and Recovery Act of 1976

WMA = Waste Management Area

1 **Figure 1-2. Aerial Photo of C-200 Single-Shell Tanks in Waste Management Area C.**
 2



3
 4
 5 This RCRA Tier 3 Plan will be subject to public comment as part of the closure permitting
 6 process.

9 1.2 REGULATORY FRAMEWORK – DRIVERS AND INTEGRATION

10
 11 Closure actions at WMA C are consistent with the requirements of the HFFACO, which
 12 describes how requirements of the AEA, as amended; RCRA/HWMA; WAC 173-303,
 13 “Dangerous Waste Regulations”; and the *Comprehensive Environmental Response,*
 14 *Compensation and Liability Act of 1980 (CERCLA)* will be integrated for application to Hanford
 15 Site closure activities. The overall framework for the integration of WMA C closure
 16 requirements is described in HFFACO Action Plan, Appendix I, Section 3.1.

17 The component closure activities described in this RCRA Tier 3 Plan will be conducted in
 18 accordance with all applicable regulations and requirements, including those below:

- 19 • NEPA/*Washington State Environmental Policy Act (SEPA)*

- 1 • CERCLA
- 2
- 3 • RCRA/HWMA
- 4
- 5 • AEA and DOE O 435.1
- 6
- 7 • *Toxic Substances Control Act of 1976*
- 8
- 9 • State and Federal Air Monitoring regulations
- 10
- 11 • HFFACO.
- 12

13 The applicable regulations are discussed in Section 1.2 of the RCRA Tier 2 Plan. The RCRA
14 Tier 2 Plan includes closure actions that will be taken at the WMA C level. The RCRA Tier 2
15 Plan also describes other components and environmental media whose cleanup is integral to final
16 closure actions for the WMA. The WMA C RCRA Tier 3 component closure activity plans will
17 contain requirements pertaining to the closure of individual WMA components or groups of
18 components. This RCRA Tier 3 Plan describes how the C-200 SSTs will be closed to meet
19 applicable RCRA/HWMA closure requirements.
20

21

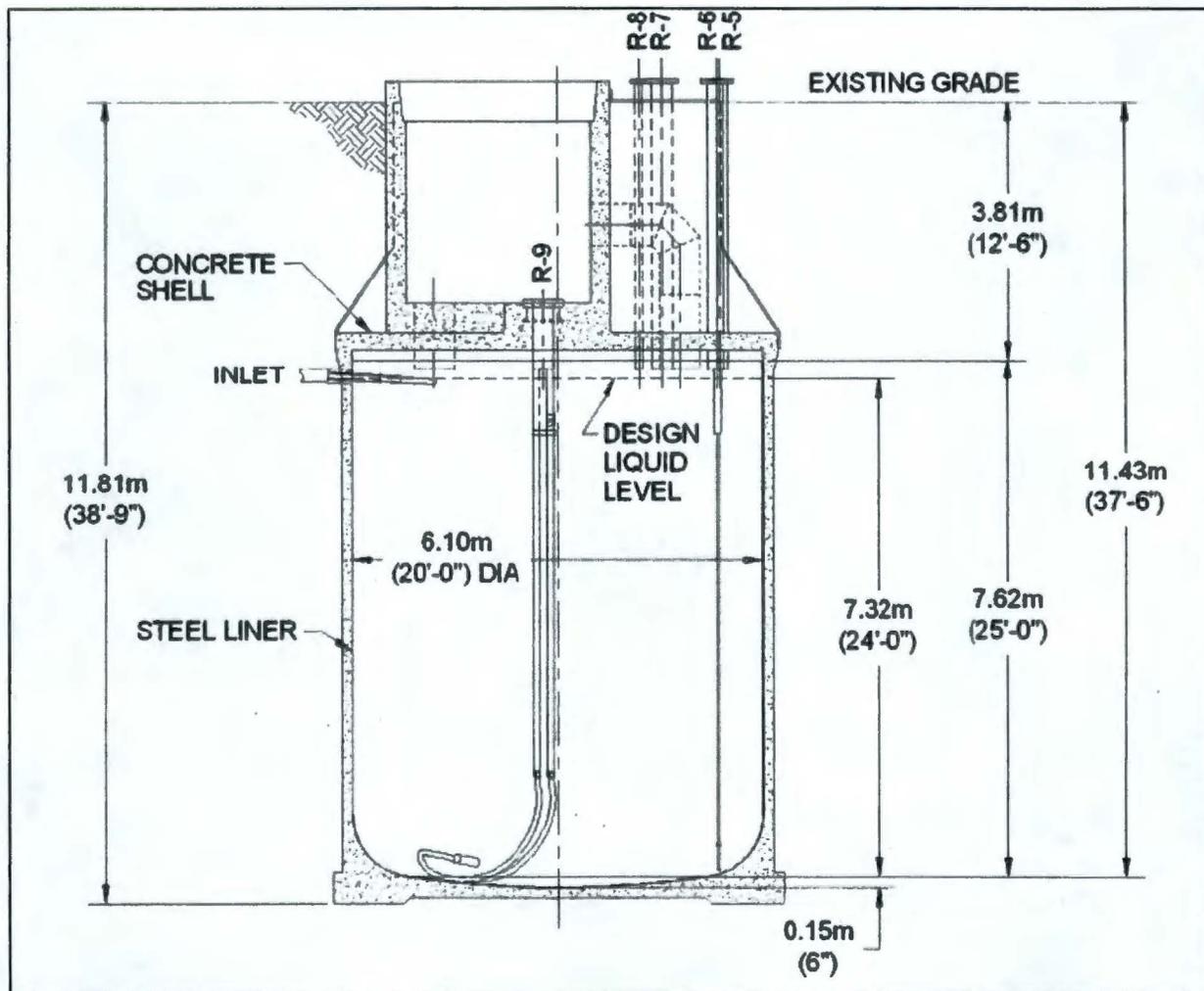
22 **1.3 DESCRIPTION OF C-200 SINGLE-SHELL TANKS**

23

24 The four C-200 SSTs were constructed in place with a carbon-steel liner in a reinforced-concrete
25 shell. The C-200 SSTs were each designed with a nominal operating capacity of 208,000 L
26 (55,000 gal), and are 6 m (20 ft) in diameter with a 7.6 m (25 ft) tall steel liner. Each C-200 SST
27 has a dished bottom (the center of each C-200 SST is lower than the perimeter) with a curving
28 intersection of the sides and bottom. A single stiffener ring is located at the top of the steel liner
29 at 7.8 m (25.5 ft) above the bottom of each tank. The C-200 SSTs are below grade with
30 approximately 3.7 m (12 ft) of soil cover from the top of each tank to ground surface to provide
31 radiation shielding for operating personnel.
32

33 Each C-200 SST has six risers (identified as risers R-5 through R-10) that provide access into the
34 tanks, and a riser (riser R-11) that is attached to the coverplate on the vent hatchway. These
35 risers extend from the interior of each C-200 SST to slightly above ground surface. Two of the
36 six risers are located in a pump pit and extend from the bottom of the pit into the tank. The
37 pump pit has a removable pit cover that was used to provide shielding during historical waste
38 transfer operations; the two risers in the pump pit are not accessible unless the cover block is
39 removed. Additionally, each C-200 SST has a ventilation hatchway constructed with a vertical
40 offset to allow tank ventilation while preventing direct line of sight into the tank to eliminate
41 radiation shine. Figure 1-3 provides a generalized profile view of a typical C-200 SST
42 configuration (tank risers R-10 and R-11 are not visible from the perspective shown in this
43 cross-section).
44

1 **Figure 1-3. C-200 Single-Shell Tank Typical Configuration.**
 2



3
 4
 5
 6 **1.4 HISTORY OF OPERATIONS**
 7

8 During their operating life, the C-200 SSTs received metal waste primarily from the
 9 221-B Bismuth Phosphate Separations Plant and cold uranium waste from the 202-A Plutonium
 10 Uranium Extraction Plant. To a lesser extent, the C-200 SSTs received wastes originating from
 11 research and development activities at the 201-C Hot Semiworks facility in the 200 East Area of
 12 the Hanford Site. The operating history of the C-200 SSTs is described in RPP-15408, "*Origin*
 13 *of Wastes in C-200 Series Single-Shell Tanks,*" and briefly summarized in Section 1.4.1. Waste
 14 losses and unplanned releases (UPRs) associated with the C-200 SSTs are discussed in
 15 Section 1.4.2.

16
 17 Between 1970 and 1980, all of the C-200 SSTs were removed from service. Waste from all of
 18 the C-200 SSTs has been retrieved. Retrieval activities are summarized in Section 1.4.3.
 19

1 1.4.1 C-200 Single-Shell Tank Historical Operations

2
3 The C-200 SSTs (C-201 through C-204) were constructed in place at C Farm from 1944 to 1945.
4 The C-200 SSTs sat unused until November 1947, when they were activated to begin receiving
5 waste.

6
7 Upon activation, the C-200 SSTs began receiving metal waste (high-level waste) from
8 221-B Separations Building bismuth phosphate process operations. The tanks were filled with
9 metal waste by January 1948.

10
11 Between 1951 and 1952, jet pump pits and concrete-encased transfer pipelines to the
12 241-CR-151 master diversion box were installed on the C-200 SSTs in preparation for retrieval
13 of metal waste from the tanks. From 1952 to 1955, metal waste received from the bismuth
14 phosphate process was removed from the C-200 SSTs using a hydraulic mining technique known
15 as sluicing. After these sluicing activities were completed, each of the C-200 SSTs were
16 declared empty. However, given the inspection method used (periscope optics), residual metal
17 waste could have been left in each tank.

18
19 From May 1955 to November 1956, C-200 SSTs received highly radioactive waste from the Hot
20 Semiworks facility. Beginning in November 1955, tanks C-203 and C-204 also received waste
21 from cold uranium runs conducted as part of startup operations at the Plutonium Uranium
22 Extraction Plant (PUREX). The C-200 SSTs were not used to receive waste after being filled
23 with waste from the Hot Semiworks facility. The C-200 SSTs within C Farm were removed
24 from service from 1970 to 1980.

25
26 Waste remaining in the C-200 SSTs had the potential to settle over time, leaving a liquid layer,
27 or supernate, on the surface, and a precipitated sludge on the bottom of the tank. In 1970,
28 supernate removal from the C-200 SSTs began. The volume of supernate removed from
29 tanks C-201, C-202, C-203, and C-204 was 54,000, 55,000, 31,000, and 14,000 gal, respectively.
30 Three tanks contained only a heel, or residual, of supernate and sludge following these removal
31 activities, with the exception of tank C-204, which was reported to contain a remaining
32 41,000 gal of supernate in June 1970. In 1970, the liquid in tanks C-201, C-202, and C-204 was
33 transferred to SST 241-C-104, and the liquid in tank C-203 was transferred to SSTs 241-C-104
34 and 241-C-109. In October 1980, supernate was again pumped from all of the C-200 SSTs using
35 a submersible pump. Residual liquids were subsequently transferred from these tanks into
36 tank 241-C-106 in 1980.

37
38 In 1981, the C-200 SSTs were interim isolated according to SD-WM-TI-356, "*Waste Storage*
39 *Tank Status and Leak Detection Criteria.*" All four tanks were designated "Not Intended for
40 Reuse" and were characterized as stabilized in 1984 (SD-WM-TI-356). The tanks were then
41 prohibited from receiving additional dangerous waste according to WAC 173-303-640 and the
42 Hanford Site-Wide Permit.

43
44 The tanks were placed under a surveillance and monitoring program in accordance with
45 SD-WM-TI-356, conducted as described in RPP-9645, "*Single-Shell Tank System Surveillance*
46 *and Monitoring Program,*" and in accordance with the latest version of RPP-9937, "*Single-Shell*

1 *Tank System Leak Detection and Monitoring Functions and Requirements Document.”*

2 Documentation of monitoring activities is updated annually according to RPP-9937. Controls
3 employed to prevent leakage include maintaining pH greater than 8, composition and chemical
4 reaction protection, hydrostatic head limitation, and temperature control to prevent excessive
5 structural stresses (SD-WM-TI-356).

6
7 Additional information about the C-200 SSTs, including operational history and waste received
8 during operations, is provided in the RCRA Tier 2 Plan, Section 2.0, and in the documents listed
9 in Table 1-1.

10 **Table 1-1. References for Additional C-200 Single-Shell Tanks Information.**

| Description | Document |
|-----------------|---|
| Tank Components | State of Washington Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, 1989, <i>Hanford Federal Facility Agreement and Consent Order</i> , Attachment 2: Action Plan |
| | DOE/RL-88-21, <i>Hanford Facility Dangerous Waste Part A Permit Application</i> , Rev. 35 |
| | RPP-13774, <i>“Single-Shell Tank System Closure Plan”</i> |
| Operations | RPP-15408, <i>“Origin of Wastes in C-200 Series Single-Shell Tanks”</i> |
| Waste Received | RPP-15408, <i>“Origin of Wastes in C-200 Series Single-Shell Tanks”</i> |

11
12 **1.4.2 Waste Volume Decreases and Unplanned Releases**

13
14 In 1988, decreases in waste volume were noted for the C-200 SSTs in HNF-EP-0182, *Waste*
15 *Tank Summary Report for Month Ending September 30, 2005*, Rev. 210. The waste volume
16 decreases associated with tanks C-201, C-202, and C-204 were assumed to be associated with
17 leak events. The waste volume data for these tanks were evaluated in RPP-ENV-33418,
18 *“Hanford C-Farm Leak Inventory Assessments Report”* and the change in liquid levels during
19 operation was attributed to evaporation. RPP-ENV-33418 further notes that ²³⁵U and ²³⁸U have
20 been detected in the vadose zone in groundwater monitoring well 299-E27-7, approximately
21 61 m (200 ft) northeast of the tanks, and suggests the C-200 SSTs appear to be the most likely
22 source for uranium and cyanide in the 299-E27-7 well. Finally, RPP-ENV-33418 concludes
23 there is no basis to estimate magnitude of releases to the soil from the C-200 SSTs or associated
24 pipelines.

25
26 The Waste Information Data System (WIDS) records one UPR associated with the C-200 SSTs,
27 UPR-200-E-137. This UPR is purported to have occurred when water entered SST C-203,
28 migrated through the saltcake, and either became entrained in the saltcake or leaked out of the
29 tank. This UPR site is discussed further in RPP-RPT-58339, *“Phase 2 RCRA Facility*
30 *Investigation Report for Waste Management Area C”* (Phase 2 RFI). Soil contamination will not
31 be addressed in this RCRA Tier 3 Plan.

1 **1.4.3 241-C-200 Series Tank Retrieval Activities**
2

3 Closure of the SSTs is required by Milestone M-045-00, located at Appendix D of the HFFACO
4 Action Plan. Milestone M-045-00 states that "Closure will follow retrieval of as much tank
5 waste as technically possible." In 2003, during preparation for tank retrieval activities, manual
6 liquid level gauges were installed in all of the C-200 SSTs as liquid level indicators for waste
7 volume estimates. Tank waste was retrieved from the C-200 SSTs in 2005 and 2006
8 (HNF-EP-0182). Tanks C-201, C-202, C-203, and C-204 all currently contain less than 150 gal
9 of Hot Semiworks sludge (RPP-ENV-33418).

10
11 Waste retrieval activities for tanks C-202 and C-203 were performed in accordance with
12 RPP-16525, "*C-200-Series Tanks Retrieval Functions and Requirements*," Rev. 6. Waste
13 retrieval activities for tanks C-201 and C-204 were performed in accordance with Rev. 6a of
14 RPP-16525. Following successful retrieval operations, the retrieval methods and residual waste
15 characterization data for each C-200 SST were documented in Retrieval Data Reports (RDRs).
16 RDRs document the completion of retrieval operations and give waste residual assessments as
17 required by the HFFACO Action Plan, Appendix I, Section 2.1.7. Information from the RDRs
18 relevant to this RCRA Tier 3 Plan is summarized in Table 1-2. Following waste retrieval
19 activities, in January 2008, Ecology agreed that the C-200 SSTs had been retrieved to the limit of
20 waste retrieval technology capability, and that the waste retrieval criteria established by
21 Milestones M-45-00 and M-45-00B had been met [Letter 0800207, "Re: Department of Ecology
22 Letter of Completion for Retrieval Data Reports (RDR) for Single-Shell Tanks (SST)
23 241-C-103, 241-C-201, 241-C-202, 241-C-203, and 241-C-204"].
24

Table 1-2. Retrieval Operations and Waste Residual Assessments.

| Tank | Retrieval Data Report | Retrieval | | Initial | Retrieved | Residual Inventory | |
|-----------|--------------------------|------------|------------|-------------------------------------|-------------------------------------|------------------------------------|------------------------------------|
| | | Start | Complete | | | Nominal | 95% UCL |
| 241-C-201 | RPP-RPT-30181 Rev 0-B | 10/25/2005 | 03/23/2006 | 860 gal (115 ft ³) | 703 gal (94 ft ³) | 144 gal (19.2 ft ³) | 153 gal (20.5 ft ³) |
| 241-C-202 | RPP-RPT-29095 Rev 0 | 06/30/2005 | 08/11/2005 | 1,400 gal (187 ft ³) | 1,253 gal (167 ft ³) | 147 gal (19.7 ft ³) | 156 gal (20.9 ft ³) |
| 241-C-203 | RPP-RPT-26475 Rev 1A | 06/30/2004 | 03/24/2005 | 2,640 gal (353 ft ³) | 2,501 gal (334 ft ³) | 139 gal (18.5 ft ³) | 149 gal (19.9 ft ³) |
| 241-C-204 | RPP-RPT-34062 Rev 0 | 07/23/2006 | 12/11/2006 | 1,489 gal (199 ft ³) | 1,346 gal (180 ft ³) | 137 gal (18.3 ft ³) | 147 gal (19.6 ft ³) |

ft³ = cubic feet

gal = gallon

UCL = upper confidence limit

References:

RPP-RPT-26475, "*Retrieval Data Report for Single-Shell Tank 241-C-203*," Rev. 1-A.

RPP-RPT-29095, "*Retrieval Data Report for Single-Shell Tank 241-C-202*," Rev. 0.

RPP-RPT-30181, "*Retrieval Data Report for Single-Shell Tank 241-C-201*," Rev. 0-B.

RPP-RPT-34062, "*Retrieval Data Report for Single-Shell Tank 241-C-204*," Rev. 0.

25
26 Post-retrieval waste residual volumes for each C-200 SST were presented in the RDRs as
27 two values: a nominal inventory and a bounding inventory. The nominal inventory for each
28 tank represents a mean, or average, value calculated. Nominal inventories are calculated by

1 multiplying mean concentration, mean density, and waste volume. Bounding inventories
2 represent a reasonable upper limit for the mean value. Bounding inventories are 95% upper
3 confidence limit (UCL) inventories that are determined using a statistical method described in
4 RPP-6924, "Statistical Methods for Estimating the Uncertainty in the Best Basis Inventories,"
5 and RPP-RPT-27233, "*Tank 241-C-203 Residual Waste Inventory Estimates for Tank*
6 *Component Closure Risk Assessment.*" Table 1-2 shows both nominal and 95% UCL residual
7 inventory values for each C-200 SST as reported in its respective RDR.

8
9 Following retrieval activities, periodic monitoring of the C-200 SSTs continues to be conducted
10 in accordance with best management practices as defined by RPP-9937, Section 5.2. Periodic
11 monitoring includes liquid level and liquid intrusion monitoring. If intrusion is detected,
12 response actions are included in RPP-9937, Appendix B.

14 1.5 WASTE CONSTITUENTS

15
16 The waste managed in WMA C is mixed waste as defined in WAC 173-303-040, "Definitions,"
17 meaning that it contains both dangerous and radioactive constituents. DOE/RL-88-21, *Hanford*
18 *Facility Dangerous Waste Part A Permit Application, Part A Form* for the SST system does not
19 provide a list of waste codes specific to the C-200 SSTs. The Part A Form for the SST system
20 provides a listing of all the waste codes assigned to the SST system. Waste codes applicable to
21 all tanks in the SST system are D001-011, D018-019, D022, D028-030, D033-036, D038-041,
22 D043, WP01-02, WT01-02, and F001-005. As noted in the RCRA Tier 1 Plan, Section 1.2.3,
23 and RCRA Tier 2 Plan, Section 2.4, the bulk of the tank waste constituents are sodium
24 hydroxide; sodium salts of nitrate, nitrite, carbonate, aluminate, oxalate, and phosphate; and
25 hydrous oxides of aluminum, iron, and manganese. Radioactive isotopes constitute less than
26 1% of the overall waste volume, but contribute a substantial portion of the overall risk to human
27 health and the environment. A wide variation in the waste type, volume, and inventory exists
28 among SST farms and from tank to tank within individual WMAs.

29
30 The list of constituents provided in the Part A Form includes the entire Hanford SST system; it
31 does not include individual waste constituents for the C-200 SSTs. Information specific to the
32 waste processes contributing to waste managed at WMA C as a whole is contained in the Phase 2
33 RFI report (RPP-RPT-58339) and Section 2.2 of the RCRA Tier 2 Plan for WMA C.
34 Information pertaining to the waste processes contributing to waste specifically managed in the
35 C-200 SSTs is contained in Section 1.4 of this RCRA Tier 3 Plan.

36
37 Retrieval actions have been completed for all four of the C-200 SSTs. Following retrieval,
38 residual tank waste was sampled and analyzed for three of the four tanks. The post-retrieval
39 sample results were used as the basis of the residual inventory calculation. Tank C-201 could
40 not be sampled, as documented in the RDR, due to insufficient residual waste volume directly
41 under the riser used for sampling. Therefore, for tank C-201, the pre-retrieval sample results
42 were used to support the post-retrieval inventory calculation. The residual waste inventory
43 estimates are presented in RPP-RPT-42323, "*Hanford C-Farm Tank and Ancillary Equipment*
44 *Residual Waste Inventory Estimates.*" The residual waste inventory is used in the RCRA closure
45 analysis documented in RPP-ENV-58806, "*RCRA Closure Analysis of Tank Waste Residuals*
46 *Impacts at Waste Management Area C, Hanford Site, Washington.*"

2.0 SPECIFIC CLOSURE REQUIREMENTS FOR THE C-200 SINGLE-SHELL TANKS

WAC 173-303-610, "Closure and Post-Closure" provides Washington State requirements for closure and post-closure of dangerous waste management units such as WMAs within the SST system, referencing additional standards in WAC 173-303-640(8) pertaining to closure of tank systems and standards in WAC 173-303-665(6) specific to closure of a landfill. DOE will close WMA C in compliance with applicable performance standards referenced in WAC 173-303-610 subsection (2) "Closure performance standard," item (a).

Appendix A, Table A-1 lists the specific RCRA closure requirements from the WAC, includes the compliance strategy for meeting each WAC requirement, and identifies the sections within the RCRA Tier 1 Plan, RCRA Tier 2 Plan, and this RCRA Tier 3 Plan, where the strategy is described in more detail. This section provides a brief overview of the closure requirements and performance standards for the C-200 SSTs.

The closure performance standards of WAC 173-303-610(2) will be met through the component closure activities specified in this RCRA Tier 3 Plan. These standards require the closure of treatment, storage, and disposal (TSD) units in a manner that achieves the items listed below.

- Minimize the need for further maintenance.
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment: post-closure escape of dangerous waste; dangerous-waste constituents; leachate; contaminated run-off; or dangerous-waste decomposition products to the ground, surface water, groundwater, or the atmosphere.
- Return the land to the appearance and use of surrounding land areas to the degree possible, given the nature of the previous dangerous-waste activity.

Stabilizing the four C-200 SSTs with grout will address items one and two. Grout will stabilize the residual waste within the tanks, minimize the mobility of the dangerous waste components, and reduce the possibility of release to the environment. In addition, the grout stabilization will minimize the need for further maintenance by completely filling the tanks and preventing the potential for future subsidence. The design and placement of the final cover over WMA C will address all three of the above items. Current institutional controls will be maintained prior to final closure cover (i.e., fencing, postings, and route maps). The final closure cover is not addressed in this RCRA Tier 3 Plan, but is discussed in the RCRA Tier 2 Plan, Sections 4.1 and 5.4.

Because WMA C will be closing under RCRA landfill regulations, closure must meet the requirements of WAC 173-303-665(6). These requirements state that the final cover must be designed and constructed to:

- Provide long-term minimization of migration of liquids through the closed landfill

- 1 • Function with minimum maintenance
- 2
- 3 • Promote drainage and minimize erosion or abrasion of the cover
- 4
- 5 • Accommodate settling and subsidence so that the cover's integrity is maintained
- 6
- 7 • Have a permeability less than or equal to the permeability of any bottom liner system or
- 8 natural subsoils present.
- 9

10 The design and specifications for the final closure cover are outside the scope of this RCRA
11 Tier 3 Plan. The component closure activities performed under this RCRA Tier 3 Plan will not
12 address the landfill closure requirements of WAC 173-303-665(6) in its entirety. Additional
13 information regarding landfill closure is presented in the RCRA Tier 2 Plan, Sections 1.2.1,
14 1.2.3, 4.0, and 5.0.

15
16

3.0 CLOSURE ACTIVITIES FOR THE C-200 SINGLE-SHELL TANKS

This Section describes C-200 SST closure activities, including tank preparation activities and grouting stages. Closure monitoring strategies, waste management, and the closure barrier are also discussed.

3.1 OVERVIEW OF CLOSURE ACTIVITIES

Tank closure activities included in this RCRA Tier 3 Plan are based on tank closure design described in RPP-RPT-49701, "*Waste Management Area C Closure – Conceptual Design Report.*" The general approach is not anticipated to change. However, the activities described may be refined during detailed design.

Closure activities for the C-200 SSTs involve removing existing equipment from the tanks as necessary to provide tank access, filling the tanks with grout to immobilize residual waste in each tank, and stabilizing the tank structures. Closure activities for the C-200 SSTs include those listed below:

- Tank Preparation Activities for Stage 1 Grout Fill
- Stage 1 Grout Fill
- Tank Preparation Activities for Stage 2 Grout Fill
- Stage 2 Grout Fill
- Demobilization.

3.2 TANK PREPARATION ACTIVITIES

Tank preparation activities are prerequisite to placing grout into the tanks and include the activities below.

- Remove and/or relocate existing above-grade equipment, as necessary, to establish equipment access to the tank risers for removal and/or installation of equipment to support tank closure. The photo in Figure 3-1 is a view from the west side of the tank farm, facing east, that shows the above-grade equipment near the C-200 SSTs.
- Install active ventilation systems (e.g., portable exhauster).
- Remove "in-tank and above-grade equipment" as necessary to establish tank access.
- Remove or modify existing in-tank equipment that extends above grade to the extent necessary so as to prevent interference with construction of the closure cap.
- Setup support stands and grout delivery system interfaces on select tank risers.

Figure 3-1. Eastern View of C-200 Single-Shell Tanks.



3.2.1 Ventilation

Removal of in-tank equipment and Stage 1 grouting will require active ventilation to control potential airborne contamination. The active ventilation system will include a ventilation skid with high-efficiency particulate air (HEPA) filtration. A ventilation skid will be used to maintain the interior of the tank at a slight negative pressure relative to atmosphere by drawing air into the tank through an inlet filter and out of the tank through a bank of HEPA filters using a ducted fan. This reduces the risk of contamination from residuals during grouting activities. Either an existing portable exhaustor or a new ventilation skid would be designed to meet the needs for tank closure. Ventilation system requirements will be addressed through the detailed design and the notice of construction process following evaluation of the potential to emit.

3.2.2 Removal and Disposition of In-Tank Equipment

Minimum tank access requirements for tank stabilization include tank riser access suitable for ventilation (inlet and exhaust), camera access for periodic in-tank monitoring, and riser access suitable for grout placement into the tank. The specific tank risers that will be utilized during tank stabilization will be selected during the detailed design phase. This RCRA Tier 3 Plan will be modified as needed to address any significant change as a result of detailed design. Existing in-tank equipment will be left in the tank unless removal is required to facilitate grouting activities. All equipment removed from the tanks will be packaged, managed, and disposed in an

1 approved disposal facility, preferably on-site, in accordance with existing procedures and
2 regulatory requirements.

3
4 The conceptual design documented in RPP-RPT-49701 evaluates the in-tank equipment and
5 access requirements for performing tank closure activities. An enabling assumption in
6 RPP-RPT-49701 is that in-tank equipment will be entombed with the grout. The planned
7 C-200 tank closure actions described in Section 3.3 are consistent with the tank closure concept
8 documented in RPP-RPT-49701. The in-tank retrieval arm and above-grade containment box
9 will be removed from each of the C-200 SSTs. Figure 3-2 shows a cross-section of one of the
10 C-200 SSTs with the articulating mast system (AMS) extending into the tank. However, as an
11 alternative to removing the in-tank retrieval arm and above-grade containment box, a new
12 small-diameter riser could be installed to provide tank access for grout placement. This option
13 uses recent advances in tank coring as demonstrated on the tank 241-C-105 coring effort.
14 Installing a new small-diameter riser port for grouting may pose less risk to workers and be more
15 cost effective than removing, packaging, and disposing of in-tank equipment. If installation of a
16 new riser is not a lower cost and lower worker risk option, it is expected that removal of the
17 in-tank portion of the vacuum waste retrieval system, along with removal of the manual waste
18 level tape, will be completed for each C-200 SST. Removing this equipment from the tank, or
19 disconnecting and leaving it in the tank to be dispositioned with the tank, along with planned use
20 of other empty tank risers will provide the necessary access and interface for performing
21 component closure activities.

22
23 Each of the C-200 SSTs has equipment installed that extends vertically above the tank risers
24 (e.g., the containment box assembly, riser extensions, level instrumentation). Figure 3-3 shows
25 the components and equipment installed at tank C-201. The concrete tank pits are an integral
26 part of the tank structure and will remain in place following grout filling. Any components or
27 equipment extending above the height of the pits will be removed or cut off so that the height is
28 at or below the elevation of the pit structure. The AMS containment box assembly (grey metal
29 box supported on concrete blocks) extends approximately 6 feet vertically above the tank riser.
30 If this were to remain in place, it would substantially increase the amount of fill material required
31 to establish the base layer of the closure cap. Options to cut the AMS and seal the riser at grade
32 will be evaluated during the detailed closure design phase as alternative to removing the AMS
33 from the tanks. Other installed components such as riser extensions and support stands will be
34 removed to limit the height of equipment extending above the permanent tank structure. In-tank
35 equipment not requiring removal to support closure activities or that is left in the bottom of the
36 tanks (e.g., thermocouple trees, plummets, lead bricks, steel tapes, sludge jet eductor) will be
37 abandoned in place and entombed in grout during tank filling activities.

38 39 **3.2.3 Isolation**

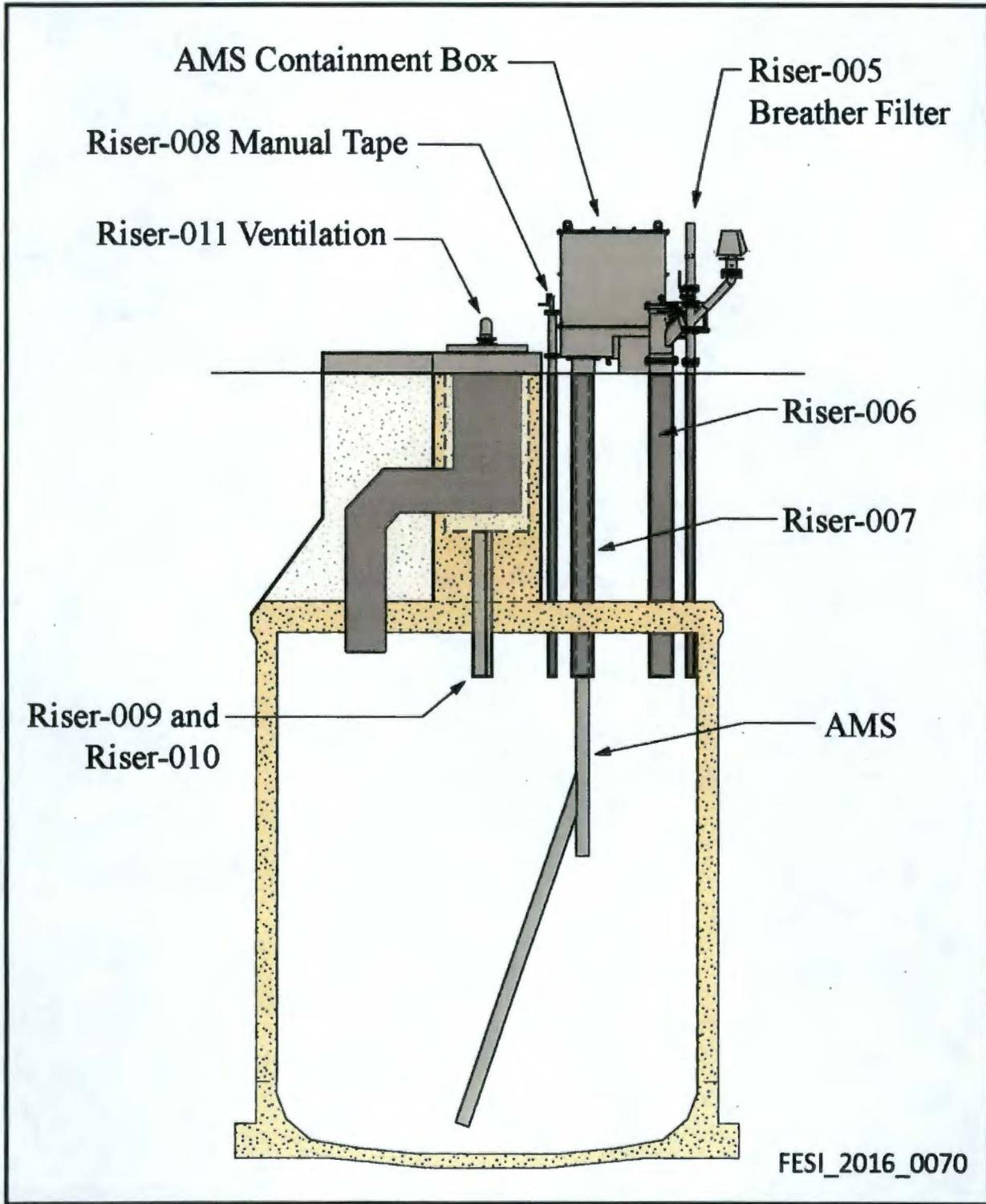
40
41 The purpose of tank and component isolation is to preclude infiltration of precipitation after
42 retrieval has been completed. The tank pits have been covered with foam to prevent rainwater
43 intrusion into the tanks. The buried waste transfer lines and the transfer lines routed in the
44 concrete pipe trenches are sloped to the C-200 SSTs. These lines have been isolated at their
45 point of origin within the diversion boxes using process blanks to preclude drainage. The
46 hose-in-hose transfer lines used for the vacuum waste retrieval system have been removed in

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1 accordance with RPP-12711, "Temporary Waste Transfer Line Management Program Plan" and
2 blind flanges installed on risers.
3

4
5

Figure 3-2. C-200 Single-Shell Tank Cross Section.



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6
7 AMS = articulating mast system

1 **Figure 3-3. Tank 241-C-201 Above-Grade Equipment.**
 2



3
 4 AMS = articulating mast system
 5

6 Tank waste level instrumentation is currently installed in each of the C-200 SSTs and is used for
 7 periodic intrusion monitoring.
 8

9 Buried waste transfer lines penetrate the sidewall of each tank. These lines were used during
 10 active operations to transfer waste into the tanks. There are also buried transfer lines in concrete
 11 pipe trenches that terminate at jumper nozzles within the tank pits. These lines are open at the
 12 tank; grout will flow into these lines during tank grouting operations. No actions will be taken to
 13 isolate the out-of-service waste transfer lines. All of the waste transfer lines routed to the
 14 C-200 SSTs drained toward the tanks; any grout flowing into the lines during grout filling
 15 activities would be flowing upslope and would travel a limited distance.
 16

17 **3.2.4 Tank Modifications for Equipment Interface** 18

19 No tank modifications are anticipated for interfacing with equipment that will be used to close
 20 the tanks. Existing risers will be utilized to temporarily install equipment (e.g., in-tank cameras).
 21 Current plans include core drilling through the pump pit cover block to install a temporary riser
 22 for grouting the pump pit.

3.3 GROUTING

Cementitious grout will be used to fill the tanks and provide long-term structural stability following component and WMA C closure. Additives may be used in the mixture design to aid in grout production, delivery, placement, or performance (e.g., improve working time, improve flowability, or reduce bleed water). The grout mixture design will be a combination of cement, supplementary cementitious materials (e.g., fly ash), sand, and admixtures. Mixture designs will be established during detailed closure design to provide a mixture that is highly flowable with low bleed water and low shrinkage characteristics.

It is anticipated that tank stabilization will be completed in two stages. The number of stages could change based on field evaluations, safety considerations, and administrative controls that require additional steps. Each C-200 SST has a flat top with tank risers that penetrate into the headspace. Active ventilation will be used in Stage 1, while the residual waste heel is encapsulated and the tank is filled to a level just below the tank risers. Passive ventilation will be used during Stage 2, while filling the tank headspace, risers, and pits. The risers and pits will be filled individually, which could be performed in one or more steps.

Current plans for grout production, delivery, and placement in the C-200 SSTs are based on obtaining the grout from a local batch plant, using mix trucks to deliver the grout to the site, and using a pump truck to transfer the grout from the edge of the farm to the tanks.

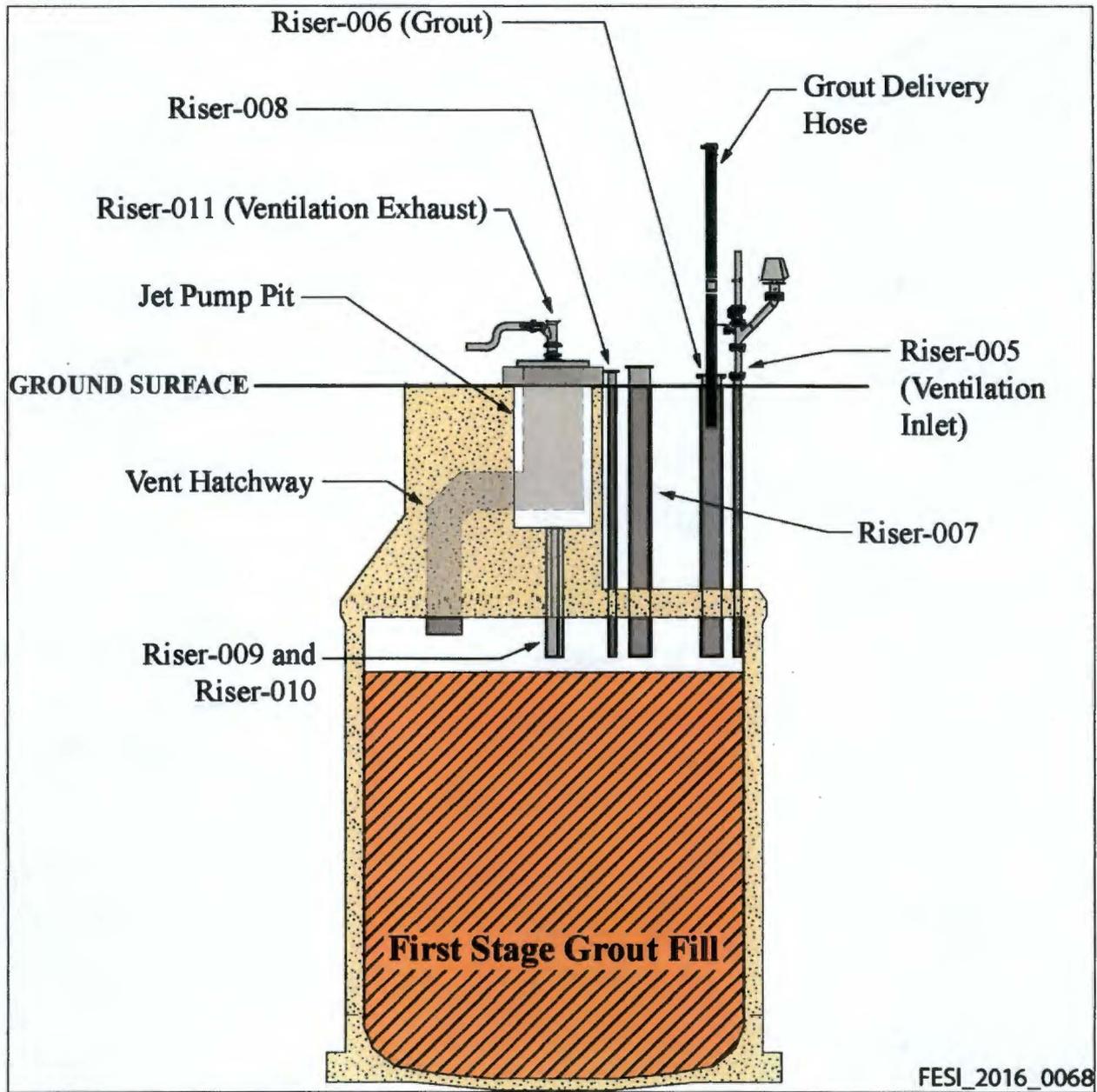
3.3.1 Stage 1

The purpose of Stage 1 grouting is to immobilize residual waste remaining in the tanks and fill the bulk of the tank volume. Stage 1 grouting will involve delivery and placement of grout into a tank. Based on current plans for grout production and delivery, grout placement into the C-200 SSTs during Stage 1 can be performed at a near-continuous pour, allowing for the possibility of Stage 1 grouting of a single tank to be completed in one day, depending on grout transport and delivery logistics. Each tank would be grouted separately.

Active ventilation with filtration will be used during Stage 1 grouting to control airborne contamination displaced by the grout, and to provide positive inflow of air for installation of the in-tank camera and for grout placement at the tank riser.

Approximately 270 cubic yards of grout will be placed in each tank during Stage 1 grouting. This will bring the grout to approximately 7.3 m (24 ft) above the base of each tank, which is approximately 0.3 m (1 ft) below the tank risers that penetrate through the top of each tank. Figure 3-4 illustrates the grout fill level at the completion of Stage 1. After completion of Stage 1 grout placement, in-tank conditions will be monitored to ensure excess bleed water has evaporated or been absorbed by the addition of a dry grout mix before initiating Stage 2 grout placement. This will reduce the potential for having excess water in the tank risers during Stage 2 grouting activities.

Figure 3-4. Stage 1 Grouting.



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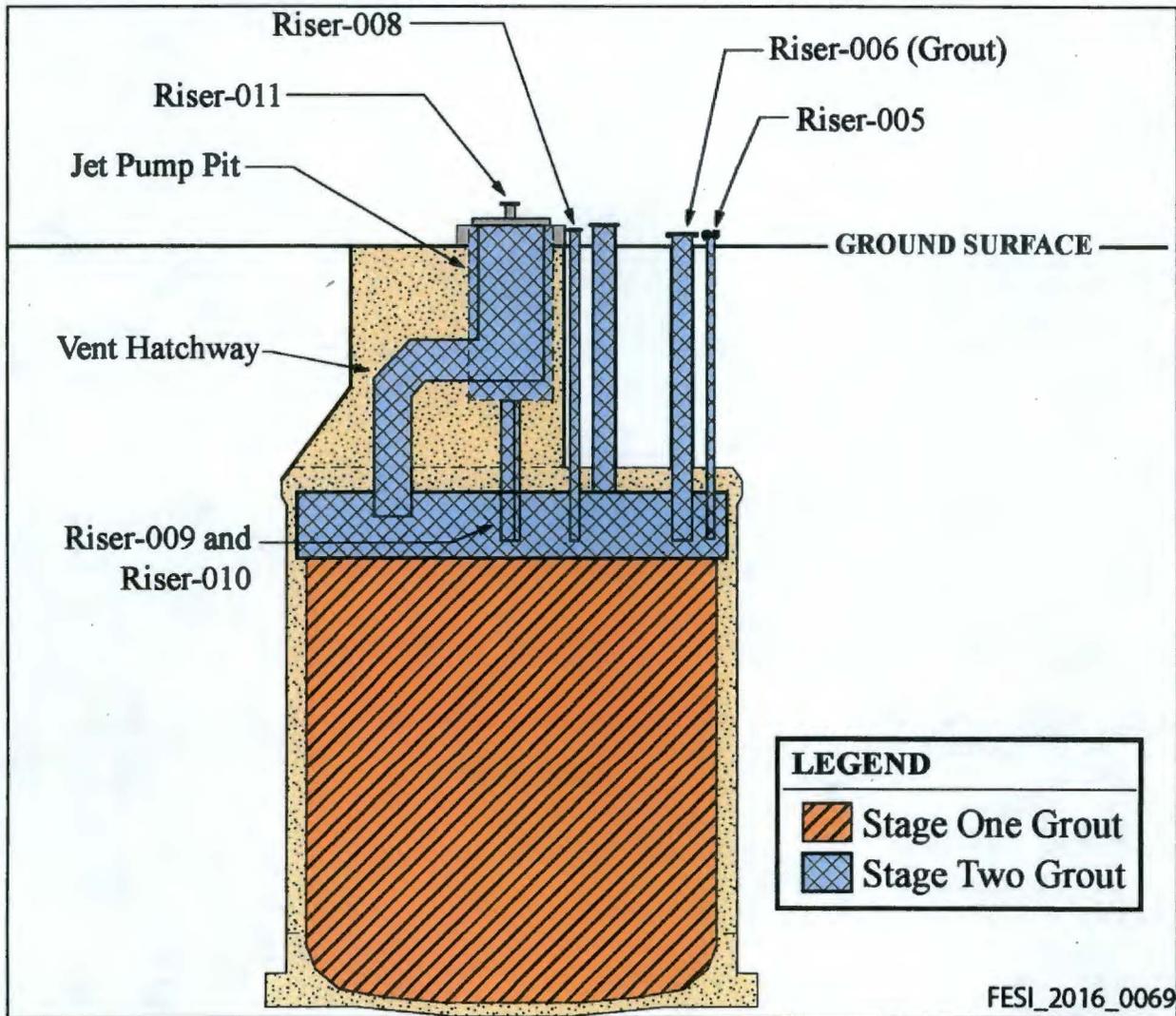
3.3.2 Stage 2

7 The purpose of Stage 2 grouting is to fill the remaining void spaces and tank access risers with
 8 grout. Stage 2 grouting will provide controlled delivery of wet grout to fill the remaining tank
 9 headspaces, to the extent practicable, as well as the tank risers and the tank pits. Before initiating
 10 Stage 2 grouting activities, the active ventilation will need to be shut down and the ventilation
 11 connections to each tank removed. Control of potential airborne contamination will be
 12 maintained using glove bags with HEPA filtration. Alternatively, a portable exhauster could be

1 used to capture air displaced by grout placement if detail work planning identifies the need for
 2 active ventilation to address industrial safety or radiological control requirements.

3
 4 Approximately 20 cubic yards of grout is required to fill the risers, pits, and ventilation hatchway
 5 in each tank. Figure 3-5 illustrates the grout fill disposition at the completion of Stage 2. After
 6 each tank headspace is filled above the bottom of the tank riser penetrations, the risers will need
 7 to be filled individually. The rate of grout delivery will be based on the size and geometry of the
 8 void space being filled.

9
 10 **Figure 3-5. Stage 2 Grouting.**



12
 13
 14 Stage 2 grouting will raise the grout level to cover the transfer lines that penetrate the tank
 15 sidewalls and the jumper nozzles in the pump pits. These penetrations are open where they
 16 terminate at each tank and are isolated where the lines originate, each in one of the diversion
 17 boxes. Grout will flow a short distance into these lines as the grout fill progresses. However,
 18 since the grout will be flowing upslope into the lines, flow into the lines will be limited.

1 **3.4 MONITORING DURING TANK CLOSURE**

2
3 During Stage 1 grouting, the in-tank conditions will be periodically monitored with a camera to
4 visually confirm placement and monitor progress. Additionally, process parameters, such as
5 volume of grout placed, will be monitored to track progress against design requirements.
6

7
8 **3.5 MANAGEMENT OF WASTE GENERATED DURING CLOSURE**

9
10 Waste generated during closure activities will include personal protective equipment,
11 contaminated equipment removed from the tank, grout delivery hose sections that go into the
12 tank, and glove bags and HEPA filters used for contamination control during grouting
13 operations.
14

15 All waste generated during closure and equipment removed from the tanks will be managed as
16 mixed waste and disposed of at an approved disposal facility, preferably on-site, in accordance
17 with dangerous waste regulations using existing procedures.
18

19 Mix truck washout will be performed in a designated washout area using best management
20 practices as defined in *Categorical State Waste Discharge Permit Number ST0004511*
21 (Ecology 2014).
22

23 The grout will likely be procured from a commercial supplier.
24

25 A waste planning checklist will be prepared, as part of the work planning process, in accordance
26 with existing tank farm operating procedures.
27

28
29 **3.6 CLOSURE BARRIER**

30
31 No closure barrier (or interim barrier) will be constructed as part of component closure. Interim
32 barriers will be evaluated and addressed in a corrective measure study to mitigate past leaks,
33 spills and UPRs. A permanent, modified RCRA Subtitle C closure barrier will be addressed as
34 part of WMA C closure. Additional information is presented in Section 5.4.2 of the RCRA
35 Tier 2 Plan.
36
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4.0 CLOSURE SCHEDULE

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The schedule for, and sequencing of, all activities for closure of the C-200 SSTs is consistent with the HFFACO. The existing HFFACO milestones specifically related to the C-200 SSTs which remain to be completed are found in the M-045 series. The change package M-45-17-01 provides the schedule for closure activities, and is provided as part of the RCRA Tier 2 Plan submittal.

Tank closure preparation activities and grout filling of the tanks is anticipated to be completed within 360 days. Should unanticipated conditions arise, and an extension to the 360-day period become necessary, a permit modification request will be submitted to Ecology for approval at least 30 days before the anticipated completion date. Closure certification for completion of the C-200 SSTs component closure will be submitted within 60 days of completion of the grout filling of the four tanks.

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5.0 CLOSURE CERTIFICATION

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As described in the RCRA Tier 2 Plan, Section 7.1, final closure of WMA C will require the completion of closure activities for a number of components, which will be conducted over a period of time. Therefore, closure certifications will be prepared and submitted for each of the individual components or for groups of components. Within 60 days of completing the closure activities for the four C-200 SSTs, DOE will submit to Ecology, by registered mail, a certification that closure activities were completed according to the specifications in this RCRA Tier 3 Plan. The certification will be signed by DOE and an independent, qualified, registered, professional engineer in the State of Washington.

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6.0 REFERENCES

- 1
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3 0800207, 2008, "Re: Department of Ecology Letter of Completion for Retrieval Data Reports
4 (RDR) for Single-Shell Tanks (SST) 241-C-103, 241-C-201, 241-C-202, 241-C-203, and
5 241-C-204" (letter from J. J. Lyon to S. J. Olinger [Office of River Protection,
6 U.S. Department of Energy], January 7), State of Washington Department of Ecology,
7 Richland, Washington.
- 8 15-ECD-0042, 2015, "Submittal of the Tier 1 Closure Plan Single-Shell Tank (SST) System"
9 (letter from L. D. Olson [Washington River Protection Solutions, LLC] and K. W. Smith
10 [Office of River Protection] to J. A. Hedges [Nuclear Waste Program, Washington State
11 Department of Ecology], September 30), U.S. Department of Energy, Office of River
12 Protection, Richland, Washington.
- 13 78 FR 75913, 2013, "Record of Decision: Final Tank Closure and Waste Management
14 Environmental Impact Statement for the Hanford Site, Richland, Washington," Federal
15 Register, Vol. 78, pp. 75913–75919, December 13.
- 16 *Atomic Energy Act of 1954*, 42 USC 2011, et seq., as amended.
- 17 *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*,
18 42 USC 9601 et seq., as amended.
- 19 DOE/EIS-0391, 2012, *Final Tank Closure and Waste Management Environmental Impact*
20 *Statement for the Hanford Site, Richland, Washington*, U.S. Department of Energy,
21 Washington, D.C.
- 22 DOE O 435.1, 2001, *Radioactive Waste Management*, U.S. Department of Energy,
23 Washington, D.C.
- 24 DOE/ORP-2014-02, 2014, *Clean Closure Practicability Demonstration for the Single-Shell*
25 *Tanks*, Rev. 1, U.S. Department of Energy, Office of River Protection, Richland,
26 Washington.
- 27 DOE/RL-88-21, 2003, *Hanford Facility Dangerous Waste Part A Permit Application*, Rev. 35,
28 U.S. Department of Energy, Richland, Washington.
- 29 Ecology, 2014, *Categorical State Waste Discharge Permit Number ST0004511*, State of
30 Washington Department of Ecology, Olympia, Washington.
- 31 Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order –*
32 *Tri-Party Agreement*, 2 vols., as amended, State of Washington Department of Ecology,
33 U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia,
34 Washington.
- 35 HNF-EP-0182, 2005, *Waste Tank Summary Report for Month Ending September 30, 2005*,
36 Rev. 210, CH2M HILL Hanford Group, Inc., Richland, Washington.

- 1 *National Environmental Policy Act of 1969*, 42 USC 4321–4347, et seq.
- 2 RCW 43.21C, “*State Environmental Policy*,” *Revised Code of Washington*, as amended
3 (Washington State Environmental Policy Act).
- 4 *Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq.
- 5 RPP-6924, 2010, “*Statistical Methods for Estimating the Uncertainty in the Best Basis*
6 *Inventories*,” Rev. 1, CH2M HILL Hanford Group, Inc., Richland, Washington.
- 7 RPP-9645, 2002, “*Single-Shell Tank System Surveillance and Monitoring Program*,” Rev. 0,
8 CH2M HILL Hanford Group, Inc., Richland, Washington.
- 9 RPP-9937, 2014, “*Single-Shell Tank System Leak Detection and Monitoring Functions and*
10 *Requirements Document*,” Rev. 3E, Washington River Protection Solutions, LLC,
11 Richland, Washington.
- 12 RPP-12711, 2016, “*Temporary Waste Transfer Line Management Program Plan*,” Rev. 7A,
13 Washington River Protection Solutions, LLC, Richland, Washington.
- 14 RPP-13774, 2004, “*Single-Shell Tank System Closure Plan*,” Rev. 2, CH2M HILL Hanford
15 Group, Richland, Washington.
- 16 RPP-15408, 2003, “*Origin of Wastes in C-200 Series Single-Shell Tanks*,” Rev. 0, CH2M HILL
17 Hanford Group, Richland, Washington.
- 18 RPP-16525, 2004, “*C-200-Series Tanks Retrieval Functions and Requirements*,” Rev. 6,
19 CH2M HILL Hanford Group, Inc., Richland, Washington.
- 20 RPP-16525, 2005, “*C-200-Series Tanks Retrieval Functions and Requirements*,” Rev. 6a,
21 CH2M HILL Hanford Group, Inc., Richland, Washington.
- 22 RPP-ENV-33418, 2015, “*Hanford C-Farm Leak Inventory Assessments Report*,” Rev. 3,
23 Washington River Protection Solutions, LLC, Richland, Washington.
- 24 RPP-ENV-58806, 2016, “*RCRA Closure Analysis of Tank Waste Residuals Impacts at Waste*
25 *Management Area C, Hanford Site, Washington*,” Washington River Protection
26 Solutions, LLC, Richland, Washington.
- 27 RPP-RPT-26475, 2006, “*Retrieval Data Report for Single-Shell Tank 241-C-203*,” Rev. 1-A,
28 CH2M HILL Hanford Group, Inc., Richland, Washington.
- 29 RPP-RPT-27233, 2007, “*Tank 241-C-203 Residual Waste Inventory Estimates for Tank*
30 *Component Closure Risk Assessment*,” Rev. 2, Los Alamos Technical Associates, Inc./
31 CH2M HILL Hanford Group, Inc., Richland, Washington.

- 1 RPP-RPT-29095, 2006, "*Retrieval Data Report for Single-Shell Tank 241-C-202*," Rev. 0,
2 CH2M HILL Hanford Group, Richland, Washington.
- 3 RPP-RPT-30181, 2006, "*Retrieval Data Report for Single-Shell Tank 241-C-201*," Rev. 0-B,
4 CH2M HILL Hanford Group, Richland, Washington.
- 5 RPP-RPT-34062, 2007, "*Retrieval Data Report for Single-Shell Tank 241-C-204*," Rev. 0,
6 CH2M HILL Hanford Group, Richland, Washington.
- 7 RPP-RPT-42323, 2015, "*Hanford C-Farm Tank and Ancillary Equipment Residual Waste
8 Inventory Estimates*," Rev. 3, Washington River Protection Solutions, LLC, Richland,
9 Washington.
- 10 RPP-RPT-49701, 2011, "*Waste Management Area C Closure – Conceptual Design Report*,"
11 Rev. 0, Washington River Protection Solutions, LLC, Richland, Washington.
- 12 RPP-RPT-58339, 2014, "*Phase 2 RCRA Facility Investigation Report for Waste Management
13 Area C*," Rev. 0, Washington River Protection Solutions, LLC/Freestone Environmental,
14 Inc./TerraGraphics Environmental Engineering, Inc., Richland, Washington.
- 15 RPP-RPT-58858, 2015, "*Tier 1 Closure Plan Single-Shell Tank System*," Rev. 1, Washington
16 River Protection Solutions, LLC, Richland, Washington.
- 17 RPP-RPT-59389, in process, "*Tier 2 Resource Conservation and Recovery Act (RCRA) Closure
18 Action Plan for Waste Management Area C*," Rev. 0, Washington River Protection
19 Solutions, LLC, Richland, Washington.
- 20 SD-WM-TI-356, 1988, "*Waste Storage Tank Status and Leak Detection Criteria*," Rev. 0,
21 Westinghouse Hanford Company, Richland, Washington.
- 22 *Toxic Substances Control Act of 1976*, 15 USC 2601, et seq.
- 23 WA7 89000 8967, 2007, *Hanford Facility Resource Conservation and Recovery Act Permit,
24 Dangerous Waste Portion Revision 8C for the Treatment, Storage, and Disposal of
25 Dangerous Waste*, State of Washington Department of Ecology, Richland, Washington.
- 26 WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.
- 27 WAC 173-303-040, "Definitions," *Washington Administrative Code*, as amended.
- 28 WAC 173-303-610, "Closure and Post Closure," *Washington Administrative Code*, as amended.
- 29 WAC 173-303-640, "Tank Systems," *Washington Administrative Code*, as amended.
- 30 WAC 173-303-665, "Landfills," *Washington Administrative Code*, as amended.

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APPENDIX A

CLOSURE PERFORMANCE STANDARDS

RPP-RPT-59390, Rev. 0

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Table A-1. Closure Performance Standards. (6 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | RCRA Tier 1 Plan Section | RCRA Tier 2 Plan Section | RCRA Tier 3 Plan Section | Explanatory Notes |
|---|--------------------------------|--------------------------------|--------------------------------|--|
| General Closure and Post-Closure Requirements | | | | |
| -610(2)(a)(i) General closure performance standards: Minimize need for further maintenance | Section 3 | Section 4 | — | Landfill closure, including grout stabilization and the final cover, will reduce the potential for infiltration or intrusion. The final cover will be constructed in such a way as to minimize need for future maintenance. |
| -610(2)(a)(ii) General closure performance standards: Control, minimize, or eliminate to the extent necessary to protect human health and the environment post-closure escape of dangerous waste (DW) | Section 3 | Section 4 | — | Isolation and stabilization of single-shell tanks (SSTs) and other remaining below-grade equipment, along with the final cover, will minimize post-closure release to the environment. |
| -610(2)(a)(iii) General closure performance standards: Return land to appearance of surrounding land areas | Section 3 | Section 4 | — | Following closure of the SST, the appearance and use of the land will be consistent with future uses of the 200 Areas. |
| -610(2)(b) Clean closure levels | — | — | — | This requirement would apply to the closure of Waste Management Area (WMA) C, but for the practicability determination. As discussed in the clean closure practicability demonstration document, it is not practicable to accomplish clean closure for the SST system, and the SST system will be landfill-closed. |
| -610(3)(a)(i) Closure plan contents: How each WMA will be closed in accordance with -610(2) | Section 1 | Section 4 | — | Closure activities for each WMA will be detailed in the RCRA Tier 2 Plan specific to the WMA. |
| -610(3)(a)(ii) Closure plan contents: How final closure of the SST System (facility) will be conducted in accordance with -610(2) | Section 3 | Section 4 | — | This requirement applies to the final closure of the SST system and is addressed in the RCRA Tier 1 Plan. Additional details are provided in the RCRA Tier 2 Plan and the RCRA Tier 3 Plan, as appropriate. |
| -610(3)(a)(ii) Closure plan contents: Maximum extent of operation which will be unclosed during the active life of the SST System (facility) | Section 1 | — | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Plan. |

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Table A-1. Closure Performance Standards. (6 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | RCRA Tier 1 Plan Section | RCRA Tier 2 Plan Section | RCRA Tier 3 Plan Section | Explanatory Notes |
|---|--------------------------------|--------------------------------|--------------------------------|--|
| -610(3)(a)(iii) Closure plan contents: An estimate of the maximum inventory of waste ever on-site over the active life of the SST System (facility) | Section 1 | — | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Plan. |
| -610(3)(a)(iv) Closure plan contents: Detailed description of methods to be used during partial closure and final closure, including methods to manage DW and types of off-site DW management units to be used | — | Section 5 | Section 3 | The required information is provided in the RCRA Tier 2 Plan, and will be further addressed in each RCRA Tier 3 component closure activity plan for WMA C component closure activities. |
| -610(3)(a)(v) Closure plan contents: Detailed description of steps needed to remove or decontaminate all DW residues and contaminated containment system components, equipment, structures and soils including... procedures for cleaning equipment and removing contaminated soil | — | Section 5 | Section 3 | The requirement for removing contaminated soil applies to the closure of WMA C and will be addressed under the Corrective Action process, in accordance with Appendix I of the Tri-Party Agreement (TPA) Action Plan. Containment system components for the SSTs and other components will not be removed under the landfill closure approach. |
| -610(3)(a)(v) Closure plan contents: Detailed description of methods for sampling and testing surrounding soils | — | — | — | This requirement applies to the closure of WMA C and will be addressed in the Corrective Measures Implementation Plan. |
| -610(3)(a)(v) Closure plan contents: Detailed description of criteria for determining the extent of decontamination required to satisfy the closure performance standard in -610(2)(a) | — | — | — | Decontamination of equipment will not be undertaken under the landfill closure approach. |
| -610(3)(a)(vi) Closure plan contents: Detailed description of other activities – Groundwater monitoring | Section 2 | Section 3 | — | Groundwater monitoring will be conducted according to current approved groundwater monitoring plans until WMA C closure actions are completed. A post-closure monitoring plan will be developed as WMA C closure is completed. |

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Table A-1. Closure Performance Standards. (6 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | RCRA Tier 1 Plan Section | RCRA Tier 2 Plan Section | RCRA Tier 3 Plan Section | Explanatory Notes |
|--|--------------------------------|--------------------------------|--------------------------------|---|
| -610(3)(a)(vi) Closure plan contents: Detailed description of other activities – Leachate collection | — | — | — | A leachate collection will not be part of the landfill closure of WMA C. The grout stabilization of the SSTs and other system components, and the final closure cover will minimize infiltration and thus, minimize or prevent the development of leachate. |
| -610(3)(a)(vi) Closure plan contents: Detailed description of other activities – Run-on and runoff control | — | Section 5 | — | The current configuration of WMA C and current procedures provide run-on/run-off control. These will be maintained during component closure activities. The final cover design will also incorporate run-on/run-off controls. |
| -610(3)(a)(vii) Closure plan contents: Schedule for closure of WMAs and SST System | Section 5 | Section 6 | Section 4 | Schedule information is provided, as required, and managed under the <i>Hanford Facility Federal Agreement and Consent Order</i> (HFFACO). |
| -610(3)(a)(ix) Closure plan contents: Use of alternative requirements under -610(1)(e) | — | — | — | This will apply only if needed for establishing requirements alternative to regulatory requirements. |
| -610(3)(b) Amendment of Plan | Section 1 | — | — | This requirement applies to modification made to the RCRA Tier 1, 2, and 3 Plans and is addressed in the RCRA Tier 1 Plan. |
| -610(3)(c)(i) Notification of partial closure and final closure | — | — | — | Under the HFFACO, compliance agreements are developed to address notification of partial closure and final closure. |
| -610(4)(a) Time allowed for closure: Schedule extension for removal of waste within 90 days | — | — | — | Under the HFFACO, compliance agreements are developed to address notification of partial closure and final closure. |
| -610(4)(b) Time allowed for closure: Schedule extension for closure of WMA within 180 days | — | — | — | Under the HFFACO, compliance agreements are developed to address notification of partial closure and final closure. |
| -610(5) Management of waste generated during closure | — | — | Section 3.5 | Management of dangerous or mixed waste generated during closure activities will be described in the RCRA Tier 3 component closure activity plans. |
| -610(6) Certification of closure | Section 6 | Section 7 | Section 5 | Closure certifications will be provided, as required. |

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Table A-1. Closure Performance Standards. (6 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | RCRA Tier 1 Plan Section | RCRA Tier 2 Plan Section | RCRA Tier 3 Plan Section | Explanatory Notes |
|--|--------------------------------|--------------------------------|--------------------------------|--|
| -610(7)(a)(i) Post-closure care and use of property: Groundwater monitoring | Section 7 | Section 8 | — | A post-closure groundwater monitoring plan will be developed as WMA C closure is completed. |
| -610(7) (a)(ii) Post-closure care and use of property: Maintenance and monitoring of waste containment systems | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(7)(c) Post-closure care and use of property: Security | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(7)(d) Post-closure care and use of property: Post-closure use of property | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(8)(a) Post-closure plan: Submit post-closure plan | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(8)(b)(i) Post-closure: Post-closure groundwater monitoring | Section 7 | Section 8 | — | A post-closure groundwater monitoring plan will be developed as WMA C closure is completed. |
| -610(8)(b)(ii) Post-closure plan: Post-closure maintenance | Section 7 | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. |
| -610(8)(b)(iii) Post-closure plan: Point of contact | — | Section 8 | — | A post-closure care plan will be developed after final closure activities for WMA C are completed. This information will be updated as required. |
| -610(8)(b)(iv) Post-closure plan: Alternative requirements | — | — | — | Used only if alternative requirements are proposed. No alternative requirements are currently proposed. |
| -610(8)(d) Amendment of post-closure plan | Section 7 | Section 8 | — | A written notification of request for a permit modification to authorize a change in the approved post-closure plan will be submitted when required. |
| -610(9) Notice to local land authority for disposed waste | Section 6 | Section 7 | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Plan. |
| -610(10) Notice in deed to property for disposed waste, including certification that the notation has been recorded | Section 6 | Section 7 | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Plan. |

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Table A-1. Closure Performance Standards. (6 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | RCRA Tier 1 Plan Section | RCRA Tier 2 Plan Section | RCRA Tier 3 Plan Section | Explanatory Notes |
|--|--------------------------------|--------------------------------|--------------------------------|--|
| Unit-Specific Closure Requirements for Tank Systems, Landfills, and Groundwater Monitoring | | | | |
| -640(8)(a) Closure and post-closure care: Clean closure approach for tank system | — | — | — | This requirement would apply to the closure of WMA C, but for the practicability determination. As discussed in the clean closure practicability demonstration document, it is not practicable to accomplish clean closure for the SST system, and the SST system will be landfill-closed. |
| -640(8)(b) Closure and post-closure care: Practicability demonstration | — | — | — | This requirement applies to the closure of WMA C. As discussed in the clean closure practicability demonstration document, it is not practicable to accomplish clean closure for the SST system, and the SST system will be landfill-closed. |
| -640(8)(b) Closure and post-closure care: Close in accordance with landfills in -665(6) | Section 1 | — | — | This requirement applies to the closure of WMA C and is addressed in the RCRA Tier 1 Plan. |
| -665(6)(a)(i)-(v) Closure and post-closure care: Provide landfill cover designed and constructed to provide long-term minimization of migration of liquids through the closed landfill; function with minimum maintenance; promote drainage and minimize erosion or abrasion of cover; accommodate settling and subsidence; meet permeability requirements | Sections 3 & 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in the design specification for the final closure cover and in the post-closure care plan. |
| -665(6)(b)(i) Post-closure care: Maintain integrity and effectiveness of final cover | Sections 3 & 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in a post-closure care plan. |
| -665(6)(b)(iv) Post-closure care: Maintain & monitor groundwater monitoring system | Sections 2, 3 & 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in the post-closure groundwater monitoring plan. |
| -665(6)(b)(v) Post-closure care: Prevent run-on and runoff from damaging cover | Section 7 | Section 5.4.3, Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in a post-closure care plan. |

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Table A-1. Closure Performance Standards. (6 sheets)

| Regulatory Requirement Summary (from <i>Washington Administrative Code</i> 173-303 unless otherwise specified) | RCRA Tier 1 Plan Section | RCRA Tier 2 Plan Section | RCRA Tier 3 Plan Section | Explanatory Notes |
|---|--------------------------------|--------------------------------|--------------------------------|--|
| -665(6)(b)(vi) Post-closure care: Protect and maintain surveyed benchmarks | Section 7 | Section 8 | — | This requirement applies to the closure of WMA C and will be addressed in a post-closure care plan. |
| -645 Releases from regulated unit (groundwater monitoring program) | Section 2 | Section 3 | — | This requirement applies to the closure of WMA C and will be addressed in the groundwater monitoring plan. |
| Additional Requirements Negotiated between U.S. Department of Energy and Washington State Department of Ecology | | | | |
| Reserved for any agreements reached from the M-45 Milestone discussions or from managing the "list" of components being discussed as part of RPP-9937, "Single-Shell Tank System Leak Detection and Monitoring Functions and Requirements Document" revision. | — | — | — | — |

RCRA = *Resource Conservation and Recovery Act of 1976*, 42 USC 6901, et seq.

Reference: RPP-9937, 2014, "Single Shell Tank System Leak Detection and Monitoring Functions and Requirements Document," Rev. 3E, Washington River Protection Solutions, LLC, Richland, Washington.

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INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

Part I: Background Information

| | |
|--|---|
| Title: Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Activity Plan for 241-C-200 Series Tanks | Information Category: <input type="checkbox"/> Abstract <input type="checkbox"/> Journal Article <input type="checkbox"/> Summary <input type="checkbox"/> Internet <input type="checkbox"/> Visual Aid <input type="checkbox"/> Software <input type="checkbox"/> Full Paper <input type="checkbox"/> Report <input checked="" type="checkbox"/> Other Component Closure Activity Plan |
| Publish to OSTI? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Trademark/Copyright "Right to Use" Information or Permission Documentation <input type="checkbox"/> Yes <input checked="" type="checkbox"/> NA |
| Document Number: RPP-RPT-59390 Revision 0 | Date: March 2017 |
| Author: Mesford, Timothy B | |

Part II: External/Public Presentation Information

| | |
|--|--|
| Conference Name: | |
| Sponsoring Organization(s): WRPS | |
| Date of Conference: | Conference Location: |
| Will Material be Handed Out? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Will Information be Published? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>(If Yes, attach copy of Conference format instructions/guidance.)</i> |

Part III: WRPS Document Originator Checklist

| Description | Yes | N/A | Print/Sign/Date |
|--|-------------------------------------|-------------------------------------|---|
| Information Product meets requirements in TFC-BSM-AD-C-01? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| Document Release Criteria in TFC-ENG-DESIGN-C-25 completed? (Attach checklist) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| If product contains pictures, safety review completed? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Lawrence, Hugh K Email Pg. 3/IDMS Data File att. |

Part IV: WRPS Internal Review

| Function | Organization | Date | Print Name/Signature/Date |
|-----------------------|--------------|------------|---|
| Subject Matter Expert | WRPS | 05/08/2017 | Mesford, Timothy B IDMS Data File att. |
| Responsible Manager | WRPS | 03/01/2017 | Rutland, Paul L IDMS Data File att. |
| Other: | | | |

Part V: IRM Clearance Services Review

| Description | Yes | No | Print Name/Signature |
|---|--------------------------|-------------------------------------|---|
| Document Contains Classified Information? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | If Answer is "Yes," ADC Approval Required _____ Print Name/Signature/Date |
| Document Contains Information Restricted by DOE Operational Security Guidelines? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Reviewer Signature: _____ Print Name/Signature/Date |
| Document is Subject to Release Restrictions? <i>If the answer is "Yes," please mark category at right and describe limitation or responsible organization below:</i> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Document contains: <input type="checkbox"/> Applied Technology <input type="checkbox"/> Protected CRADA <input type="checkbox"/> Personal/Private <input type="checkbox"/> Export Controlled <input type="checkbox"/> Proprietary <input type="checkbox"/> Procurement – Sensitive <input type="checkbox"/> Patentable Info. <input type="checkbox"/> OOU <input type="checkbox"/> Predecisional Info. <input type="checkbox"/> UCNI <input type="checkbox"/> Restricted by Operational Security Guidelines <input type="checkbox"/> Other (Specify) _____ |
| Additional Comments from Information Clearance Specialist Review? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Information Clearance Specialist Approval <div style="border: 1px solid black; padding: 2px; display: inline-block; margin: 5px;"> APPROVED <small>By Janis Aardal at 12:54 pm, May 08, 2017</small> </div> _____ Print Name/Signature/Date |

When IRM Clearance Review is Complete – Return to WRPS Originator for Final Signature Routing (Part VI)

INFORMATION CLEARANCE REVIEW AND RELEASE APPROVAL

Part VI: Final Review and Approvals

| Description | Approved for Release | | Print Name/Signature |
|---|-------------------------------------|--------------------------|---|
| | Yes | N/A | |
| WRPS External Affairs | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.4/IDMS Data Holloway, Jerry N |
| WRPS Office of Chief Counsel | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.5/IDMS Data Roden, Mari L |
| DOE – ORP Public Affairs/Communications | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.6/IDMS Data Marshall, Richard A |
| Other: ORP SME | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.7/IDMS Data Bovier, Jan B |
| Other: DOE OCC | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Email P.6/IDMS Data Zelen, Benjamin J |

Comments Required for WRPS-Indicate Purpose of Document:

This "Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Activity Plan for 241-C-200 Series Tanks" (Component Closure Activity Plan) describes closure activities for the 241-C-200 series (C-200) single-shell tanks located in the Hanford Site Waste Management Area C. This Component Closure Activity Plan is one of multiple Tier 3 component closure activity plans that will support closure of Waste Management Area C.

APPROVED

By Janis Aardal at 12:54 pm, May 08, 2017

**Approved for Public Release;
Further Dissemination Unlimited**

Information Release Station

Was/Is Information Product Approved for Release? Yes No

If Yes, what is the Level of Releaser? Public/Unrestricted Other (Specify) _____

Date Information Product Stamped/Marked for Release: 05/08/2017

Was/Is Information Product Transferred to OSTI? Yes No

Forward Copies of Completed Form to WRPS Originator

From: [Lawrence, Hugh K](#)
To: [Aardal, Janis D](#)
Subject: RE: Tier 3 edit summary -- RPP-RPT-59390 Rev. 0
Date: Wednesday, May 03, 2017 3:50:13 PM

Janis,

I have reviewed the corrected *Tier 3 edit summary (RPP-RPT-59390 Rev. 0)*, as requested, from an industrial safety point of view. Based on that review the *Corrected Tier 3 edit summary* is **approved** for use. Any question or comment, please ask.

Hugh Lawrence
WRPS Safety Programs

From: Aardal, Janis D
Sent: Wednesday, May 03, 2017 2:01 PM
To: Rutland, Paul L <Paul_L_Rutland@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>; Holloway, Jerry N <Jerry_N_Holloway@rl.gov>; Roden, Mari L <Mari_L_RODEN@rl.gov>; Marshall, Richard A <Richard_A_Marshall@orp.doe.gov>
Cc: Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>; Mesford, Timothy B <Timothy_B_Mesford@rl.gov>
Subject: FW: Tier 3 edit summary -- RPP-RPT-59390 Rev. 0
Importance: High

Hi, A corrected Tier 3 edit summary. The IDMS clearance workflow is presently with ORP.

Please provide WRPS approval of the updated Rev. 0 (in the link) to be attached to the clearance form. Thanks again, Janis Aardal, Information Clearance Lead

From: Hopkins, Andrea M
Sent: Wednesday, May 03, 2017 1:56 PM
To: Aardal, Janis D <Janis_D_Aardal@rl.gov>
Subject: FW: Tier 3 edit summary

Jessa summarized the changes to the Tier 3 below. Thanks so much for your help. Andrea

From: Jessa Szecsody [<mailto:jessaszecsody@gofreestone.com>]
Sent: Wednesday, May 03, 2017 1:44 PM
To: Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>
Subject: Tier 3 edit summary

From: [Holloway, Jerry N](#)
To: [Aardal, Janis D](#)
Subject: RE: Tier 3 edit summary -- RPP-RPT-59390 Rev. 0
Date: Wednesday, May 03, 2017 2:08:01 PM

I approve

Jerry Holloway
Washington River Protection Solutions,
contractor to the United States Department of Energy
509.372.9953

From: Aardal, Janis D
Sent: Wednesday, May 03, 2017 2:01 PM
To: Rutland, Paul L <Paul_L_Rutland@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>; Holloway, Jerry N <Jerry_N_Holloway@rl.gov>; Roden, Mari L <Mari_L_RODEN@rl.gov>; Marshall, Richard A <Richard_A_Marshall@orp.doe.gov>
Cc: Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>; Mesford, Timothy B <Timothy_B_Mesford@rl.gov>
Subject: FW: Tier 3 edit summary -- RPP-RPT-59390 Rev. 0
Importance: High

Hi, A corrected Tier 3 edit summary. The IDMS clearance workflow is presently with ORP.

Please provide WRPS approval of the updated Rev. 0 (in the link) to be attached to the clearance form. Thanks again, Janis Aardal, Information Clearance Lead

From: Hopkins, Andrea M
Sent: Wednesday, May 03, 2017 1:56 PM
To: Aardal, Janis D <Janis_D_Aardal@rl.gov>
Subject: FW: Tier 3 edit summary

Jessa summarized the changes to the Tier 3 below. Thanks so much for your help. Andarea

From: Jessa Szecsody [<mailto:jessaszecsody@gofreestone.com>]
Sent: Wednesday, May 03, 2017 1:44 PM
To: Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>
Subject: Tier 3 edit summary

Andrea,

From: [Roden, Mari L](#)
To: [Aardal, Janis D](#)
Cc: [Mesford, Timothy B](#); [Hopkins, Andrea M](#); [^Information Clearance](#)
Subject: Re: URGENT DELIVERABLE: Tier 3 edit summary -- RPP-RPT-59390 Rev. 0
Date: Monday, May 08, 2017 11:31:07 AM

Sorry, I think I approved the tier 2 twice. This is approved as well.

Thank you,

Mari

Sent from my iPhone

On May 8, 2017, at 11:28 AM, Aardal, Janis D <Janis_D_Aardal@rl.gov> wrote:

Hi Mari, May we please also have your email approval of the final Tier 3 document?

Thank you, Janis Aardal, Information Clearance Lead

<http://idmsweb.rl.gov/idms/livelink.exe/open/212237350>

From: Aardal, Janis D

Sent: Wednesday, May 03, 2017 2:01 PM

To: Rutland, Paul L <Paul_L_Rutland@rl.gov>; Lawrence, Hugh K <Hugh_K_Lawrence@rl.gov>; Holloway, Jerry N <jerry_N_Holloway@rl.gov>; Roden, Mari L <Mari_L_RODEN@rl.gov>; Marshall, Richard A <Richard_A_Marshall@orp.doe.gov>

Cc: Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>; Mesford, Timothy B <Timothy_B_Mesford@rl.gov>

Subject: FW: Tier 3 edit summary -- RPP-RPT-59390 Rev. 0

Importance: High

Hi, A corrected Tier 3 edit summary. The IDMS clearance workflow is presently with ORP.

Please provide WRPS approval of the updated Rev. 0 (in the link) to be attached to the clearance form. Thanks again, Janis Aardal, Information Clearance Lead

From: Hopkins, Andrea M

Sent: Wednesday, May 03, 2017 1:56 PM

To: Aardal, Janis D <Janis_D_Aardal@rl.gov>

Subject: FW: Tier 3 edit summary

Jessa summarized the changes to the Tier 3 below. Thanks so much for your help.

Andrea

From: Jessa Szecsody [<mailto:jessaszecsody@gofreestone.com>]

Sent: Wednesday, May 03, 2017 1:44 PM

To: Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>

Subject: Tier 3 edit summary

Andrea,

For the Tier 3...

From: [Marshall, Richard A](#)
To: [^Information Clearance](#)
Cc: [Bovier, Jan B](#); [Zelen, Benjamin J](#); [Aardal, Janis D](#); [Garcia, Jolynn M](#)
Subject: DOCUMENT REVIEW REQUESTED: comments for RPP-RPT-59390 -- Tier 3 edit summary
Date: Monday, May 08, 2017 10:30:06 AM

ORP Approvals for RPP-RPT-59390.

Rich Marshall

Public Involvement Specialist
North Wind Solutions
Contractor to the Office of River Protection
United States Department of Energy
Office: 509.376.9767
Cell: 509.619.3137
Richard_A_Marshall@orp.doe.gov

From: Zelen, Benjamin J
Sent: Monday, May 01, 2017 10:01 AM
To: Bovier, Jan B <Jan_B_Bovier@orp.doe.gov>; King, Grace J <Grace.King@rl.doe.gov>
Cc: Sondag, Joseph M <Joseph_Sondag@orp.doe.gov>; Hopkins, Andrea M <Andrea_M_Hopkins@rl.gov>; Kemp, Christopher J <Christopher_J_Kemp@orp.doe.gov>; Mattlin, Ellen M <ellen_m_mattlin@orp.doe.gov>
Subject: RE: WMA C Tier 2 and Tier 3 Closure Report Comments

We don't have any additional comments

Benjamin Zelen
Assistant Chief Counsel for Environmental
Office of Chief Counsel
U.S. Department of Energy
(509) 376-0815

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From: Bovier, Jan B
Sent: Thursday, May 04, 2017 7:13 AM
To: Marshall, Richard A <Richard_A_Marshall@orp.doe.gov>; Zelen, Benjamin J

<benjamin.zelen@rl.doe.gov>

Cc: Garcia, JoLynn M <JoLynn_M_Garcia@orp.doe.gov>; Aardal, Janis D <Janis_D_Aardal@rl.gov>

Subject: RE: DOCUMENT REVIEW REQUESTED: comments for RPP-RPT-59390 -- Tier 3 edit summary

All:

I have reviewed this document and I have "No Comments" at this time

VR

Jan B. Bovier, P.E.

Tank Closure Program Manager

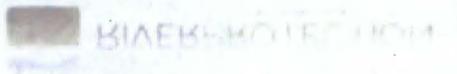
Tank Farms Programs Division

Department of Energy – Office of River Protection (DOE-ORP)

Phone # 509-376-9630

Cell # 315-767-8886

Email: Jan_B_Bovier@orp.doe.gov



```

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</task>
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ATTACHMENT 3

17-TF-0046

Change Form M-45-17-01

***Establish Closure Milestones and Target Dates per M-045-82 for WMA C
Draft***

| | | |
|--|--|--------------------------------|
| Change Number DRAFT M-45-17-01 | Federal Facility Agreement and Consent Order Change Control Form Do not use blue ink. Type or print using black ink. | Date 1/24/2017 |
| Originator G.D. Trenchard, DOE-ORP | | Phone (509) 373-4016 |
| Class of Change <input type="checkbox"/> I - Signatories <input checked="" type="checkbox"/> II - Executive Manager <input type="checkbox"/> III - Project Manager | | |
| Change Title Establish Closure Milestones and Target Dates per M-045-82 for WMA-C | | |
| Description/Justification of Change <p>This Hanford Federal Facility Agreement and Consent Order Change Control Form establishes the target dates for the closure of Waste Management Area (WMA)-C. This change control form creates 5 new milestones, 12 new target dates, and modifies 2 existing milestones.</p> <p>The closure approach set forth in this change control form establishes milestones and target dates to implement an incremental approach to tank closure which:</p> <ol style="list-style-type: none"> 1. Allows lessons learned from one closure to be applied to the planning of the next closure. 2. Enhances overall safety by decreasing chances of worker exposure to tank vapors and decreasing the need for workers to work around obstructions in the tank farm. 3. Improves the ability of DOE to fund and execute closure activities within overall budgeting and personnel constraints. 4. Demonstrates progress towards WMA-C closure and allows for momentum to be gained. 5. Reduces annual costs for monitoring and maintenance. 6. Eliminates potential issues from extended storage (e.g., tank vapors and water intrusion). | | |
| Impact of Change This HFFACO Change Control Form establishes milestones and target dates to implement an incremental closure approach for WMA-C. | | |
| Affected Documents The HFFACO, as amended, and Hanford Site internal planning, management, and budget documents (e.g., River Protection Project System Plan, baseline control documents, and related work authorizations and directives). | | |
| Approvals _____ DOE-ORP / G.D. Trenchard Date _____ Approved _____ Disapproved _____ EPA / D.A. Faulk Date _____ Approved _____ Disapproved _____ Ecology / A.K. Smith Date _____ Approved _____ Disapproved | | Page 1 of 4 |

Authorized Changes

Modifications to Tri-Party Agreement text is displayed as double underline to indicate added text and ~~strikeout~~ to indicate deleted text.

| | | |
|--------------------------------|--|-------------------|
| <u>M-045-82-T01</u> | <u>Ecology issue response summary and Tier 3 Permit Modification for C-200 series tanks</u> | <u>02/28/2021</u> |
| <u>Lead Regulatory Agency:</u> | | |
| <u>M-045-82-T02</u> | <u>DOE begin grout filling of first C-200 series tank</u> | <u>04/30/2021</u> |
| <u>Lead Regulatory Agency:</u> | | |
| <u>M-045-82B</u> | <u>Submit to Ecology C-107 to C-112 series tanks RCRA Tier 3 Component Activity Closure Plan</u> | <u>07/31/2020</u> |
| <u>Lead Regulatory Agency:</u> | | |
| <u>M-045-82-T03</u> | <u>Ecology issue response summary and Tier 3 Permit Modification for C-107 to C-112 series tanks</u> | <u>11/30/2022</u> |
| <u>Lead Regulatory Agency:</u> | | |
| <u>M-045-82-T04</u> | <u>DOE begin grout filling of first C-107 to C-112 series tank</u> | <u>01/31/2023</u> |
| <u>Lead Regulatory Agency:</u> | | |
| <u>M-045-82C</u> | <u>Submit to Ecology C-101 to C-106 series tanks RCRA Tier 3 Component Activity Closure Plan</u> | <u>01/31/2021</u> |
| <u>Lead Regulatory Agency:</u> | | |

| | | |
|---|--|-------------------|
| <u>M-045-82-T05</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>Ecology issue response summary and Tier 3</u> <u>Permit Modification for C-101 to C-106 series</u> <u>tanks</u> | <u>04/30/2023</u> |
| <u>M-045-82-T06</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>DOE begin grout filling of first C-101 to C-106</u> <u>series tanks</u> | <u>12/31/2024</u> |
| <u>M-045-82D</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>Submit to Ecology the C-301 Catch Tank RCRA</u> <u>Tier 3 Component Activity Closure Plan</u> | <u>11/30/2022</u> |
| <u>M-045-82-T07</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>Ecology issue response summary and Tier 3</u> <u>Permit Modification for C-301 Catch Tank</u> | <u>12/31/2024</u> |
| <u>M-045-82-T08</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>DOE begin stabilization of C-301 Catch Tank</u> | <u>03/31/2027</u> |
| <u>M-045-82E</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>Submit to Ecology the CR Vault Tier 3</u> <u>Component Activity Closure Plan</u> | <u>4/30/2025</u> |
| <u>M-045-82-T09</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>Ecology issue response summary and Tier 3</u> <u>Permit Modification for CR Vault</u> | <u>05/31/2027</u> |

| | | |
|--|---|---|
| <u>M-045-82-T10</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>DOE begin stabilization of CR Vault</u> | <u>06/30/2027</u> |
| <u>M-045-82F</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>Submit to Ecology the Ancillary Equipment RCRA Tier 3 Component Activity Closure Plan</u> | <u>4/30/2022</u> |
| <u>M-045-82-T11</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>Ecology issue response summary and Tier 3 Permit Modification for ancillary equipment</u> | <u>08/31/2024</u> |
| <u>M-045-82-T12</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> | <u>DOE begin stabilization of ancillary equipment</u> | <u>10/31/2026</u> |
| <u>M-045-62</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> Ecology | Submit to Ecology, in accordance with HFFACO Action Section 9.2.2, the draft Tier 3 closure plan to implement corrective measures identified in the <u>for review and approval as a Tri-Party Agreement primary document a approved Phase 2 Corrective Measures Implementation Work Plan (CMIP) for WMA C.</u> | <u>08/31/2028</u> To be established in accordance with the date identified in the M-45-82 Tier 2 closure plan |
| <u>M-045-83</u> <u>Lead</u> <u>Regulatory</u> <u>Agency:</u> Ecology | Complete the Closure of WMA C by completing all closure activities specified in the Tier 2 Closure Plan, not including activities specifically described in the Tier 2 Closure Plan as requiring integration with closure of other WMAs. | <u>08/31/2031</u> To be established in accordance with the date identified in M-45-82 Tier 2 closure plan |