



U.S. Department of Energy

~~Office of Environmental Management~~P.O. Box 450, MSIN H6-60
Richland, Washington 99352

APR 06 2010

10-ESQ-089

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

RECEIVED
APR 21 2010
EDMC

Dear Ms. Hedges:

SUBMITTAL OF HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PERMIT MODIFICATION NOTIFICATION FORM 24590-LAW-PCN-ENV-06-017

Reference: WA7890008967, "Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit 10, 'Waste Treatment and Immobilization Plant.'"

This letter transmits the Hanford Facility RCRA Permit Modification Notification Form 24590-LAW-PCN-ENV-06-017 attached, for the Washington State Department of Ecology (Ecology) review and approval. The form describes a requested Class 1 modification to the Reference.

Modification Notification Form 24590-LAW-PCN-ENV-06-017 updates the Independent Qualified Registered Professional Engineer (IQRPE) Report for the Low-Activity Waste (LAW) Facility's Secondary Containment Cells/Rooms located at floor elevations (-)21 ft-0 in, 3 ft-0 in, 28 ft-0 in, and 48 ft-0 in, to replace the three secondary containment IQRPE Reports currently found in Appendix 9.11 of the Reference.

During the Permit Change Notice (PCN) review period, Ecology indicated this report contained new information requiring public review of the IQRPE Report. Please include this PCN in the public review period for Permit Package LAW-034, "IQRPE Structural Integrity Assessment Report for LAW Autosampling System (ASX) Secondary Containment (Sampler Cabinets)."

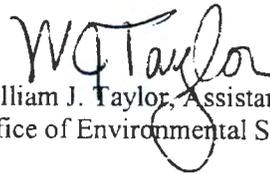
Ms. Jane A. Hedges
10-ESQ-089

-2-

APR 06 2010

If you have any questions, please contact me, or your staff may contact Gae M. Neath,
Environmental Compliance Division, (509) 376-7828.

Sincerely,



William J. Taylor, Assistant Manager
Office of Environmental Safety and Quality

ESQ:GMN

Attachment

cc w/attach:

B. L. Curn, BNI
B. G. Erlandson, BNI
P. A. Fisher, BNI
S. K. Murdock, BNI
D. C. Robertson, BNI
F. M. Russo, BNI
Administrative Record (WTP H-0-8)
BNI Correspondence
Environmental Portal, LMSI

cc electronic:

M. M. Carhart, Ecology
K. A. Elsethagen, Ecology (1 hard copy)
T. Z. Gao, Ecology
S. A. Thompson, MSA
A. C. McKarns, RL
D. J. Sommer, SCS

cc w/o attach:

D. M. Busche, BNI
J. Cox, CTUIR
S. G. Harris, CTUIR
S. L. Dahl, Ecology
G. P. Davis, Ecology

D. McDonald, Ecology
G. P. Bohnee, NPT
K. Niles, Oregon Energy
S. R. Weil, RL
R. Jim, YN

Attachment
10-ESQ-089

Hanford Facility RCRA Permit Modification Notification
Form 24590-LAW-PCN-ENV-06-017

Quarter Ending June 30, 2010

24590-LAW-PCN-ENV-06-017

Hanford Facility RCRA Permit Modification Notification Form
Part III, Operating Unit 10
Waste Treatment and Immobilization Plant

Index

Page 2 of 3: Hanford Facility RCRA Permit, Part III, Operating Unit 10, Waste Treatment and Immobilization Plant
Update the integrity assessments in Appendix 9.11 of the Dangerous Waste Permit for the LAW Facility's Secondary Containment Cells/Rooms located at floor elevation (-)21'-0" (Cell L-B001B); elevation 3'-0" (@ elevation 2'-0" Cells L-0123, L-0124, and L-0126); elevation 28'-0" (Room L-0218); and elevation 48'-0" (Room L-0304F) within the building.

Submitted by Co-Operator:

Donna M Busche 3/23/10
D. M. Busche Date

Reviewed by ORP Program Office:

G. A. Girard 4/2/10
G. A. Girard Date

Quarter Ending June 30, 2010

24590-LAW-PCN-ENV-06-017

| Hanford Facility RCRA Permit Modification Notification Form | | | |
|---|--|------------------------------------|--|
| Unit: | | Permit Part: | |
| Waste Treatment and Immobilization Plant | | Part III, Operating Unit 10 | |
| <u>Description of Modification:</u> | | | |
| The purpose of this modification is to update the Integrity Assessment of the Low Activity Waste (LAW) secondary containment cells and rooms located at elevations (-)21'-0", 3'-0", 28'-0", and 48'-0" currently located in Appendix 9.11 of the Dangerous Waste Permit (DWP). | | | |
| <u>Appendix 9.11</u> | | | |
| Replace: | 24590-CM HC4-HXYG-00138-01-06A | With: | CCN 169564, Areva Federal Services Number: IA-3002605-000 |
| | 24590-CM HC4-HXYG-00138-01-10, Rev. 00B | | |
| | 24590-CM HC4-HXYG-00138-02- 00018, Rev. 00A | | |
| This modification requests Ecology approval and incorporation into the permit the above mentioned integrity assessment report. The report has been updated by the Independent Qualified Registered Professional Engineer (IQRPE). The report reflects the IQRPE's review of drawings, specifications and data sheets produced in accordance with references including the following: | | | |
| <ul style="list-style-type: none"> • 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; • 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; • WTSC99-1036-42-17, RPP-WTP Final Report Geotechnical Investigation, Shannon & Wilson Inc. (H-1616-51), May 2000; • ACI 318-99, Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute; • ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary, American Concrete Institute; • ASCE 7-98, Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers; • 24590-LAW-DBC-S13T-00003, Rev. 1, Differential Settlement Effects on the Foundation (Calculations); • UBC 1997, Uniform Building Code; • AISC M016-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition; | | | |
| For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information" were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, <i>Dangerous Waste Regulations</i> , WAC-173-303-640, <i>Tank Systems</i> . | | | |

Quarter Ending June 30, 2010

24590-LAW-PCN-ENV-06-017

| WAC 173-303-830 Modification Class: | Class 1 | Class ¹ 1 | Class 2 | Class 3 |
|---|--------------------------|----------------------|--------------------------|-----------------------------|
| Please mark the Modification Class: | | X | | |
| Enter relevant WAC 173-303-830, Appendix I Modification citation number: | | | | |
| Enter wording of WAC 173-303-830, Appendix I Modification citation: | | | | |
| In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class ¹ 1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval." | | | | |
| Modification Approved/Concur: | <input type="checkbox"/> | Yes | <input type="checkbox"/> | Denied (state reason below) |
| <u>Reason for denial:</u> | | | | |
| | | | Reviewed by Ecology: | |
| | | | Kelly Elsethagen | Date |



ISSUED BY
RPP-WTP PDC

169564



AFS-10-0049

February 24, 2010

Ms. Jennifer Broadbent
Subcontract Administrator
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

RPP-WTP
RECEIVED
FEB 25 2010
BY PDC

Dear Ms. Broadbent:

**BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00211
IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW
SECONDARY CONTAINMENT (IA-3002605-000)**

The structural integrity assessment of the subject secondary containment has been completed per the contract requirements and is enclosed for your use. The assessment found that the design is sufficient to ensure that the secondary containment is adequately designed and has sufficient structural strength, compatibility with the waste(s) to be processed/stored/treated, and corrosion protection to ensure that it will not collapse, rupture, or fail.

If you have any questions, please contact Tarlok Hundal at (509) 371-1975, or via email at tarlok.hundal@areva.com.

Sincerely,

Fred R. Renz
Contract Management
AREVA Federal Services LLC
Richland Office

llm

Enclosure (1)

cc: D. C. Pfluger, MS 5-L w/enclosure (2)

AREVA Federal Services LLC

2101 Horn Rapids Road, RC-19, Richland, WA 99354, P. O. Box 840, Richland, WA 99352
Tel.: 509 375 8096 - Fax: 509 375 8495 - www.areva.com

**IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAW SECONDARY CONTAINMENT**

Please note that source, special nuclear and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the U.S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

**IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAW SECONDARY CONTAINMENT**

"I, Tarlok Hundal have reviewed, and certified a portion of the design of a new tank system or component located at the Hanford Waste Treatment Plant, owned/operated by Department of Energy, Office of River Protection, Richland, Washington. My duties were independent review of the current design for the LAW Secondary Containment, as required by the Washington Administrative Code, *Dangerous Waste Regulations*, Section WAC-173-303-640(3) (a) through (g) applicable components."

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

The documentation reviewed indicates that the design fully satisfies the requirements of the WAC.

The attached review is forty-five (45) pages numbered one (1) through forty-five (45).



T. Hundal
Signature

2/24/10
Date

| | | |
|------------------------------|------------------------------------|---|
| Scope | Scope of this Integrity Assessment | <p>This Integrity Assessment addresses the LAW Facility's Secondary Containment Cells/Rooms located at following floor elevations within the building:</p> <ol style="list-style-type: none"> 1. Floor Elev. (-)21'-0" (Cell L-B001B), pp. 4 thru 16 2. Floor Elev. 3'-0 (@ Elev. 2'-0": Cells L-0123, L-0124, and L-0126), pp. 17 thru 26 3. Floor Elev. 28'-0 (Room L-0218), pp. 27 thru 36 4. Floor Elev. 48'-0 (Room L-0304F), pp. 37 thru 45 |
| Summary of Assessment | | <p>For each item of "Information Assessed" (i.e., Criteria) on the following pages, the items listed under "Source of Information"* were reviewed and found to furnish adequate design requirements and controls to ensure that the design fully satisfies the requirements of Washington Administrative Code (WAC), Chapter 173-303 WAC, <i>Dangerous Waste Regulations</i>, WAC-173-303-640, <i>Tank Systems</i>.</p> |

| | | |
|------------|----------|---|
| References | Drawings | <p>24590-LAW-P1-P01T-00001, Rev. 3, LAW Vitrification Building General Arrangement Plan at El. (-)21'-0";</p> <p>24590-LAW-P1-P01T-00002, Rev. 5, LAW Vitrification Building General Arrangement Plan at El. 3'-0";</p> <p>24590-LAW-P1-P01T-00003, Rev. 4, LAW Vitrification Building General Arrangement Plan at El. 22'-0";</p> <p>24590-LAW-P1-P01T-00004, Rev. 4, LAW Vitrification Building General Arrangement Plan at El. 28'-0";</p> <p>24590-LAW-P1-P01T-00005, Rev. 3, LAW Vitrification Building General Arrangement Plan at El. 48'-0";</p> <p>24590-LAW-P1-P01T-00006, Rev. 1, LAW Vitrification Building General Arrangement Plan at El. 68'-0";</p> <p>24590-LAW-P1-P01T-00007, Rev. 8, LAW Vitrification Building General Arrangement Section A-A, B-B, C-C, and S-S;</p> <p>24590-LAW-P1-P01T-00008, Rev. 7, LAW Vitrification Building General Arrangement Section D-D, E-E, F-F, and T-T;</p> <p>24590-LAW-P1-P01T-00009, Rev. 8, LAW Vitrification Building General Arrangement Section G-G, H-H, and J-J;</p> <p>24590-LAW-P1-P01T-00010, Rev. 8, LAW Vitrification Building General Arrangement Section K-K, L-L, and M-M;</p> <p>24590-LAW-P1-P01T-00011, Rev. 6, LAW Vitrification Building General Arrangement Section N-N, P-P, R-R, and U-U;</p> <p>24590-WTP-FSK-CON-T-01-004, Rev. 7, Field Sketch HLW and LAW Excavation and Mudmat;</p> <p>24590-LAW-DB-S13T-00002, Rev. 11, LAW Vitrification Building Main Building General Concrete Notes;</p> <p>24590-LAW-DB-S13T-00003, Rev. 9, LAW Vitrification Building Main Building Concrete Key Plan at El. (-) 21'-0";</p> <p>24590-LAW-DB-S13T-00004, Rev. 1, LAW Vitrification Building Main Building Concrete Key Plan at El. (+) 3'-0";</p> <p>24590-LAW-DB-S13T-00005, Rev. 0, LAW Vitrification Building Main Building Concrete Key Plan at El. (+) 28'-0";</p> <p>24590-LAW-DB-S13T-00006, Rev. 0, LAW Vitrification Building Main Building Concrete Key Plan at El. (+) 48'-0";</p> <p>24590-LAW-DB-S13T-00007, Rev. 3, LAW Vitrification Building Main Building Conc. Forming Plan Zone 1 @ El. (-) 21'-0";</p> <p>24590-LAW-DB-S13T-00020, Rev. 1, LAW Vitrification Building Main Building Partial Conc. Forming Plan Zone 7 @ El. (+) 2'-0, (Process Cells);</p> <p>24590-LAW-DB-S13T-00021, Rev. 2, LAW Vitrification Building Main Building Partial Conc. Forming Plan Zone 8 @ El. (+) 2'-0, (Process and Effluent Cells);</p> <p>24590-LAW-DB-S13T-00028, Rev. 4, LAW Vitrification Building Main Bldg. Partial Conc. Forming Plan Zone 5 @ El. (+) 28'-0";</p> <p>24590-LAW-DB-S13T-00135, Rev. 8, LAW Vitrification Building Main Bldg. Partial Conc. Forming Plan Zone 5 @ El. (+) 48'-0";</p> <p>24590-LAW-DD-S13T-00001, Rev. 6, LAW Vitrification Building Main Bldg. Liner Plate Grillage Details;</p> <p>24590-LAW-DD-S13T-00002, Rev. 2, LAW Vitrification Building Main Bldg. Conc. Embedment C3/C5 Grillage at El. (-) 21'-0";</p> <p>24590-LAW-DD-S13T-00004, Rev. 3, LAW Vitrification Building Main Bldg. Process Cell Melter #1 Support Ring & Grillage Sub-Assembly;</p> <p>24590-LAW-DD-S13T-00005, Rev. 2, LAW Vitrification Building Main Bldg. Process Cell Melter #2 Support Ring & Grillage Sub-Assembly;</p> <p>24590-LAW-DD-S13T-00006; Rev. 4, LAW Vitrification Building Main Bldg. Effluent Cell Ring Support Ring & Grillage Sub-Assembly;</p> <p>24590-LAW-DD-S13T-00009, Rev. 5, LAW Vitrification Building Main Bldg. Process and Effluent Cell Vessel Anchorage/ Support Ring Schedule & Details;</p> <p>24590-LAW-DD-S13T-00012, Rev. 1, LAW Vitrification Building Main Bldg. C3/C5 Collection Vessel Embed Assy;</p> <p>24590-LAW-DD-S13T-00014, Rev. 5, LAW Vitrification Building Main Bldg. 24" and 30" Dia. Sump Details;</p> |
|------------|----------|---|

| | | |
|----------------------------|----------|---|
| References (cont'd) | Drawings | 24590-LAW-DG-S13T-00005, Rev. 2, LAW Vitrification Building Main Building Bot. Conc Reinf. Plan Zone 1 @ El. (-) 21'-0"; 24590-LAW-DG-S13T-00012, Rev. 2, LAW Vitrification Building Main Building Top Conc Reinf. Plan Zone 1 @ El. (-) 21'-0"; 24590-LAW-DG-S13T-00025, Rev. 2, LAW Vitrification Building Main Building Partial Reinf. Plan Zone 7 @ TOC El. (+) 2'-0"; 24590-LAW-DG-S13T-00026, Rev. 2, LAW Vitrification Building Main Building Partial Reinf. Plan Zone 8 @ TOC El. (+) 2'-0"; 24590-LAW-DG-S13T-00035, Rev. 4, LAW Vitrification Building Main Building Partial Reinf. Plan Zone 5 @ TOC El. (+) 28'-0"; 24590-LAW-DG-S13T-00174, Rev. 3, LAW Vitrification Building Main Building Partial Reinf. Plan Zone 5 @ TOC El. (+) 48'-0"; 24590-LAW-SS-S15T-00011, Rev. 4, LAW Vitrification Building Main Bldg. Structural Steel Partial Floor Plan Zone 7 @ TOS El. (+) 0'-4"; 24590-LAW-SS-S15T-00012, Rev. 4, LAW Vitrification Building Main Bldg. Structural Steel Partial Floor Plan Zone 8 @ TOS El. (+) 0'-4"; 24590-LAW-SS-S15T-00018, Rev. 7, LAW Vitrification Building Main Bldg. Structural Steel Partial Floor Plan Zone 5 @ TOS El. (+) 27'-0"; 24590-LAW-SS-S15T-00027, Rev. 9, LAW Vitrification Building Main Bldg. Structural Steel Partial Floor Plan Zone 5 @ TOS El. (+) 47'-0". |
|----------------------------|----------|---|

| | Information Assessed | Source of Information | Assessment |
|---------------|--|--|---|
| Design | Description of subsurface conditions and soil bearing capacity are adequate. | <p>Drawings listed above under references;</p> <p>24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria;</p> <p>WTSC99-1036-42-17, RPP-WTP Final Report Geotechnical Investigation, Shannon & Wilson Inc. (H-1616-51), May 2000;</p> <p>24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill;</p> <p>24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services;</p> <p>24590-LAW-DBC-S13T-00001, Rev. 1, Foundation Wall Calculations for Lateral Soil Loads;</p> <p>24590-LAW-DBC-S13T-00009, Rev. 2, Foundation Basemat Design (Calculations);</p> <p>24590-WTP-3DP-G04B-00037, Rev. 15B, Engineering Calculations;</p> <p>24590-LAW-S0C-S15T-00001, Rev. 0, GTStrudl Finite Element Analysis Model;</p> <p>24590-LAW-S0C-S15T-00002, Rev. 1, LAW Floor Loading (Calculations);</p> <p>24590-LAW-S0C-S15T-00003, Rev. 0, Spring Base Static Analysis (Calculations);</p> <p>24590-LAW-DBC-S13T-00008, Rev. 1, Preliminary Foundation Sizing (Calculations).</p> | <p>The Structural Design Criteria provides adequate design guidance for both mat and spread footings based on the Geotechnical Investigation report for the facility. Bearing capacity and settlement design parameters are presented for the dense Hanford Upper and Lower Sand Units and Structural Fill. Use of the loose wind blown (dune) sands for foundations is precluded. The Specification for Excavation and Backfill provides structural backfill requirements based on the geotechnical report and current codes and standards for the selection, placing, compacting, and backfill testing of candidate fill materials and completed backfills. The Specification for Material Testing Services provides current adequate codes and standards for testing of the candidate structural fill materials and in-situ testing of structural fills as they are placed. The drawings show that appropriate foundation subsurface and backfill materials have been utilized and/or placed under and around the secondary containment structure. Review of the Concrete Reinforcing design calculations of the concrete cell L-B001B acting as secondary containment for the vessel (RLD-VSL-00004) located in this cell show that the subsurface conditions and bearing capacity are adequate to sustain the applicable loads. The methodology described in the Engineering Calculations document assures that the final secondary containment structure is designed to comply with all applicable requirements. Review of the design calculations shows that the allowable soil bearing capacity used is appropriate and adequate.</p> |

| | Information Assessed | Source of Information | Assessment |
|-----------------|--|--|--|
| Design (cont'd) | Foundation design loads (including full tanks) and estimated settlement are adequately considered. | <p>Drawings listed above under references;</p> <p>24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary, American Concrete Institute; ASCE 7-98, Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers; 24590-LAW-DBC-S13T-00003, Rev. 1, Differential Settlement Effects on the Foundation (Calculations); 24590-LAW-DBC-S13T-00008, Rev. 1, Preliminary Foundation Sizing (Calculations); 24590-LAW-DBC-S13T-00009, Rev. 2, Foundation Basemat Design (Calculations); 24590-LAW-S0C-S15T-00002, Rev. 1, LAW Floor Loading (Calculations); 24590-LAW-DBC-S13T-00019, Rev. A, Elevation +3 Slab on Grade (Calculations); 24590-LAW-DBC-S13T-00005, Rev. 0, Thermal Analysis for the Basemat and Pour Cave Walls (Calculations).</p> | <p>The Structural Design Criteria uses current adequate standards to define design loads and load combinations (ACI 318-99, ACI 349-01, and ASCE 7-98). Dead and fluid loads are included in these loads and load combinations. Settlement design parameters are included in the Structural Design Criteria (Section 7.7, Geotechnical Design Parameters and Foundation Design). Review of the design calculations show that full load of the vessel, equipment, and other miscellaneous loads have been appropriately considered for the foundation design and the design drawings accurately reflect the detail as shown in the design calculations.</p> |

| | Information Assessed | Source of Information | Assessment |
|-------------------------------|---|--|--|
| <p>Design (cont'd)</p> | <p>Design calculation approach and design basis of footings with design standard references (e.g., ACI) are adequate.</p> | <p>Drawings listed above under references; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute; 24590-LAW-DBC-S13T-00009, Rev. 2, Foundation Basemat Design (Calculations); 24590-LAW-S0C-S15T-00001, Rev. 0, GTStrudl Finite Element Analysis Model; 24590-WTP-VV-ST-01-001, Rev. 5A, Verification and Validation Test Plan and Test Report for GTSTRUDL.</p> | <p>The Basis of Design document provides many fundamental general requirements for footing design. The Structural Design Criteria document references current adequate detailed design criteria for the design of concrete foundations and footings. ACI 318-99 code is referenced for the strength design of the secondary containment structures. Review of the Foundation Basemat Design calculations shows that design approach, basis, and methodology used for the design of the secondary containment foundations/footings is appropriate. And the conclusions of the design calculations are correctly shown in the design drawings. The above mentioned codes and standards, design approach, methodology, and basis delineated are appropriate and adequate for the foundation design. The input parameters used in the GTSTRUDL computer code utilized for this secondary containment design are appropriate and the output results have been appropriately validated via the Verification and Validation Test Plan and Test Report document.</p> |

| | Information Assessed | Source of Information | Assessment |
|--------------------------|---|---|--|
| Foundation Design | Foundation material is compatible with the soil. | <p>Drawings listed above under references;</p> <p>24590-WTP-3PS-DB01-T0001, Rev. 8, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete;</p> <p>24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services;</p> <p>24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill;</p> <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design.</p> | <p>The materials for secondary containment structure and backfill used under it are consistently identified in the specifications, drawings, and calculations. The Specification for Furnishing and Delivering Ready-Mix Concrete provides adequate current testing requirements for the selection of coarse and fine aggregates and the procurement of cementitious materials. Adequate test procedures are provided in the Material Testing Services specification for testing candidate concrete aggregates for chemical reactivity. Instructions for mixing and delivering ready-mix concrete are adequate and current. The Specification for Excavation and Backfill provide adequate requirements for the material used under foundation. As noted in the Basis of Design document (Section 4.7), the groundwater table is more than 250 feet below the ground surface; therefore, no compatibility problem is expected between the concrete foundation and the surrounding backfill materials used under and around it.</p> |
| | Foundation will withstand the effects of frost heave. | <p>Drawings listed above under references;</p> <p>24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria.</p> | <p>The Structural Design Criteria includes adequate provisions to preclude frost heave in the section addressing lateral earth pressure loads. All structural foundations are required to extend into the soil below the frost line to preclude frost heave. The frost line depth is 30 in. below the finished grade. The structural drawings show that bottom of the foundation basemat of secondary containment cell L-B001B is at Elev. (-) 26'-0", i.e., 26 ft below the finished grade elevation, therefore, it will not be subjected to frost heave effects.</p> |

| | Information Assessed | Source of Information | Assessment |
|----------------|--|---|---|
| Seismic | Seismic considerations have been adequately addressed. | 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-WTP-PSAR-ESH-01-002-03, Rev. 4I, Preliminary Documented Safety Analysis (PDSA) to Support Construction Authorization: LAW Facility Specific Information; UBC 1997, Uniform Building Code; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; AISC M016-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition; 24590-LAW-DBC-S13T-00009, Rev. 2, Foundation Basemat Design (Calculations); 24590-LAW-DBC-S13T-00001, Rev. 1, Foundation Wall Calculations for Lateral Soil Loads; 24590-LAW-DBC-S13T-00011, Rev. 2C, Basement Wall Design (Calculations). | The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The LAW Facility PDSA document designates the LAW facility Structures, Systems, and Components (SSCs) to be Seismic Category III (SC-III) and performance category 2 (PC-2) for other natural phenomenon hazards (NPH). The Structural Design Criteria document provides detailed discipline specific codes and standards for the design of SC-III LAW secondary containment foundations, structures, and liners by the design engineers. Design loads and analysis methods for SC-III secondary containments and liners are taken from the Uniform Building Code (UBC 1997). The ACI 318-99 code provides the design requirements and load combinations for the design of the secondary containment reinforced concrete foundations and structures. The AISC M016-89 code is used for the design of SC-III secondary containment stainless steel liners and all structural steel elements. The above listed codes, standards, and documents adequately address the applicable seismic requirement and review of the design calculations shows that these requirements are appropriately considered and met. |

| | Information Assessed | Source of Information | Assessment |
|----------------------|---|--|--|
| Compatibility | <p>The stored waste is compatible with its Secondary Containment and leak detection hardware based on a detailed chemical and physical analysis of the wastes used and other information sources.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PER-J-02-001, Rev. 4, Leak Detection – Sump Level Measurement in Secondary Containment Systems.</p> | <p>The Basis of Design document states that secondary containment structure is to be appropriately lined and any leaks or spills will be removed within 24 hours of a leak detection or in as timely a manner as possible. Based on a detailed chemical and physical analysis of the wastes and other process information sources; the Material Selections report identifies appropriate corrosion resistant materials for secondary containment liners and leak detection hardware. The Secondary Containment Design document provides adequate typical construction details for liners including tank anchorage details, sumps, and leak detection equipment to be used for secondary containment structures. Typical details are furnished for leak detection/sump level measurement systems equipment in the Leak Detection-Sump Level Measurement document. The above mentioned documents provide adequate information that the materials and hardware used are compatible with the waste and the design drawings show the appropriate required installation details.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Strength | <p>The design shows that the Secondary Containment has sufficient strength and thickness to prevent failure owing to pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stress of daily operations (e.g., vehicular traffic).</p> | <p>Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-LAW-DBC-S13T-00001, Rev. 1, Foundation Wall Calculations for Lateral Soil Loads; 24590-LAW-DBC-S13T-00009, Rev. 2, Foundation Basemat Design (Calculations); 24590-LAW-S0C-S15T-00002, Rev. 1, LAW Floor Loading (Calculations). 24590-LAW-PER-M-02-002, Rev. 6, Flooding Volume for LAW Facility (Calculations); 24590-LAW-DBC-S13T-00011, Rev. 2C, Basement Wall Design (Calculations).</p> | <p>The Structural Design Criteria document identifies adequate and appropriate design codes and standards and all applicable load cases from site specific conditions that must be considered in the design. Pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stresses of daily operations are adequately stated as design goals in the Basis of Design document. The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The secondary containments being considered is located in the below ground level cells (L-B100B) inside the LAW facility, therefore, is not subject to vehicular traffic. Applicable pressure gradient due to soil load are considered in the design calculations. The design calculations and drawings reviewed show that the foundation slab and the secondary containment walls are adequately designed to sustain the applicable loads imposed by vessel, liner plate and equipment, and that of the soil around the secondary containment cell and that it will not fail due to these loads.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Strength (cont'd) | <p>The Secondary Containment system has sufficient strength in the presence of operational stresses from site-specific conditions (i.e., traffic, heavy equipment, precipitation, frost).</p> | <p>Drawings listed above under References; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-LAW-DBC-S13T-00001, Rev. 1, Foundation Wall Calculations for Lateral Soil Loads; 24590-LAW-DBC-S13T-00011, Rev. 2C, Basement Wall Design (Calculations); 24590-LAW-DBC-S13T-00009, Rev. 2, Foundation Basemat Design (Calculations).</p> | <p>The LAW drawings show secondary containment being considered is installed below grade inside the building. Because it is located inside the building, traffic, heavy equipment, precipitation and frost are not applicable load cases. The Secondary Containment Design document identifies the applicable load cases (operational stresses) from site specific conditions that must be considered in the design. The Engineering Specification for Furnishing Stainless Steel Liner Plates includes specific provisions for protection and repair of completed liners during the construction process. The Material Selections for Building Secondary Containment document addresses the potential effects of operations conditions on liner integrity and the associated maintenance requirements. The design calculations and drawings show that the secondary containment structure has sufficient strength to sustain loads from applicable operational loads.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Foundation Integrity | <p>The Secondary Containment is properly supported by a foundation or base in order to prevent failure from settlement, compression, or uplift, including the residual effects of installation.</p> | <p>Drawings listed above under References;</p> <p>24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design;</p> <p>24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria;</p> <p>24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill;</p> <p>24590-WTP-3PS-DB01-T0001, Rev. 8, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete;</p> <p>24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services;</p> <p>24590-LAW-DBC-S13T-00001, Rev. 1, Foundation Wall Calculations for Lateral Soil Loads;</p> <p>24590-LAW-DBC-S13T-00009, Rev. 2, Foundation Basemat Design (Calculations);</p> <p>24590-LAW-S0C-S15T-00002, Rev. 1, LAW Floor Loading (Calculations);</p> <p>24590-LAW-DBC-S13T-00003, Rev. 1, Differential Settlement Effects on the Foundation (Calculations).</p> | <p>Settlement, compression, or uplift including the residual effects of installation, are addressed in the Secondary Containment Design and the Structural Design Criteria documents. The design requirements and the codes and standards specified are adequate to satisfy these performance goals. The design and related specifications adequately provide for proper foundation construction and installation of the secondary containment. The reference documents and general arrangement drawings provide adequate description of the secondary containment being considered. Review of the design calculations and drawings shows that the design process appropriately considered all applicable load factors for the foundation design to prevent its failure.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Foundation Integrity (cont'd) | <p>The placement, structural support, and type of material used for backfill around and below the Secondary Containment are appropriate.</p> | <p>Drawings listed above under References; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services; 24590-WTP-PER-CON-02-001, Rev. 6, Installation of Tank Systems and Miscellaneous Unit Systems.</p> | <p>The drawings and Specification for Excavation and Backfill provide specific material to be used under and around the secondary containment foundations and contain placing and backfilling requirements. The Material Testing specifications contain current adequate industry standards for selecting and testing fill materials, and testing not less than once each lift to ensure adequate compaction. Requirements for testing and record keeping are current and adequate for the backfill around and below the secondary containment. Furthermore, the Certification of Construction by an independent, qualified, installation inspector or an independent, qualified, registered professional engineer (IQRPE) as required by the Installation of Tank System document will ensure that all vessel system units including secondary containment structural support and backfill placement comply with the applicable documents.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Infiltration | <p>The design or operation (e.g., diking & curbing) prevents run-on or infiltration of precipitation into the Secondary Containment system unless the collection system has sufficient excess capacity (25 yr rainfall) to contain the run-on precipitation.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-LAW-PER-M-02-002, Rev. 6, Flooding Volume for LAW Facility (Calculations); 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design.</p> | <p>The Basis of Design document requires that secondary containment structure shall be capable to contain 100% liquid volume of the largest tank in the group of tanks plus the precipitation from a 25-year, 24-hour rainfall event. The secondary containment cell L-B001B is located inside the LAW facility where it is protected from direct precipitation by the building structure as shown in the general arrangement drawings, therefore, will not be subjected to precipitation effects. Since the vessel (RLD-VSL-00004) is completely enclosed inside the secondary containment structure (cell L-B001B), therefore, 100% liquid volume containment requirement is automatically satisfied. The Flooding Volume and Secondary Containment Design documents show that the entire cell floor and walls up to a height of 9'-6" are also lined with stainless steel plate which further ensures containment of the entire volume of RLD-VSL-00004 vessel.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Infiltration (cont'd) | <p>The design includes an external moisture barrier or other means to prevent moisture from entering the room.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.</p> | <p>The Basis of Design document requires the design include provisions to prevent external moisture intrusion. The secondary containment cell L-B001B shown in the general arrangement drawings is located inside the LAW building which shields it from precipitation and surface water percolation. As noted in the Basis of Design document, the ground water table is located about 250 feet below the ground surface, therefore, ground water infiltration is precluded. However, as a good engineering practice, the drawings show that the secondary containment structure has the bituminous damp-proofing material applied to the external faces of its concrete walls which also mitigates moisture infiltration. The drawings also show stainless steel liner plate installed at the inside face of the cell walls and floor which provide added measure to prevent moisture from entering the cell. The Engineering Specifications for Stainless Steel Liner Plates provide adequate testing and inspection details to ensure quality installation.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Liner System | <p>The containment area is free of cracks or gaps and the design discusses methods of their minimization.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.</p> | <p>The Basis of Design document requires the liner system to be installed must be free of deficiencies such as cracks and gaps and its installation should be inspected and documented by an independent qualified installation inspector or independent qualified professional engineer trained and experienced in installation of tank systems. The Secondary Containment Design document provides current adequate design requirements and codes and standards to design leak tight stainless steel liners. This document includes appropriate details for installation of stainless steel liners free of cracks and gaps. The procurement specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates provides adequate requirements and standards for furnishing stainless steel liners free of cracks and gaps. The design drawings and Secondary Containment Design document show the liner installation details. The installation completion, testing and examination techniques, and inspection requirements per Engineering Specification document further ensure their quality installation.</p> |
| | <p>The design has considered the compatibility of the concrete liner or coatings and waste and presents information on coatings planning to be used from the manufacturer addressing compatibility with the stored waste. The lining or coating must prevent the waste from migrating into the concrete.</p> | <p>Drawings listed above under References; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design.</p> | <p>The Material Selections document contains general information on the compatibility of planned secondary containment stainless steel liners with the waste. The drawings and Secondary Containment Design document provide standard installation details for liners that will ensure leak-tight liners which will prevent the migration of the waste into the concrete.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Design | Description of subsurface conditions and soil bearing capacity are adequate. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; WTSC99-1036-42-17, RPP-WTP Final Report Geotechnical Investigation, Shannon & Wilson Inc. (H-1616-51), May 2000; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services. | The Structural Design Criteria provides adequate design guidance for both mat and spread footings based on the Geotechnical Investigation report for the facility. Bearing capacity and settlement design parameters are presented for the dense Hanford Upper and Lower Sand Units and Structural Fill. Use of the loose wind blown (dune) sands for foundations is precluded. The Specification for Excavation and Backfill provides structural backfill requirements based on the geotechnical report and current codes and standards for the selection, placing, compacting, and backfill testing of candidate fill materials and completed backfills. The Specification for Material Testing Services provides current adequate codes and standards for testing of the candidate structural fill materials, and in-situ testing of structural fills as they are placed. The secondary containment cells L-0123, L-0124, and L-0126 are at located at Elev. 3'-0" level inside the building; the subsurface and soil related items do not directly associate with them but do have an overall effect on their structural strength from the foundations below at Elev. (-) 21'-0" which have been appropriately addressed in the section above at Elev. (-) 21'-0". |

| | Information Assessed | Source of Information | Assessment |
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| Design (cont'd) | Foundation design loads (including full tanks) and estimated settlement are adequately considered. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ASCE 7-98, Minimum Design Loads for Buildings and Other Structures; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary; 24590-LAW-DBC-S13T-00015, Rev. B, Elevated Slab Design + 3 ft. (Calculations); 24590-LAW-SSC-S15T-00023, Rev. A, Process Cell Steel Framing (Calculations); 24590-WTP-3DP-G04B-00037, Rev. 15B, Engineering Calculations. | The Structural Design Criteria uses current adequate standards to define design loads and load combinations (ASCE 7-98, ACI 318-99, and ACI 349-01). Dead and fluid loads are included in these loads and load combinations. Settlement design parameters are included in the Structural Design Criteria (Section 7.7, Geotechnical Design Parameters and Foundation Design). The secondary containment cells identified herein (L-0123, L-0124, and L-0126) are located inside the building at Elev. 3'-0" level. The subsurface and soil related items such as settlement do not directly associate with them but do have an overall effect on their structural strength from the foundation below at Elev. (-) 21'-0", which has been addressed in the previous section above. However, the review of the design calculations of the immediate slab and steel framing members that support the vessels and liners located on the floor in the subject process cells (L-0123, L-0124, and L-0126) show that full weights of the vessels have been appropriately considered. The methodology described in the Engineering Calculations document assures that the final secondary containment structure is designed to comply with all applicable requirements. |
| | Design calculation approach and design basis of footings with design standard references (e.g., ACI) are adequate. | 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary. 24590-LAW-DBC-S13T-00015, Rev. B, Elevated Slab Design + 3 ft. (Calculations); 24590-LAW-SSC-S15T-00023, Rev. A, Process Cell Steel Framing (Calculations). | The Basis of Design provides many fundamental general requirements for footing design. The Structural Design Criteria document references current adequate detailed design criteria for the design of concrete foundations and footings. ACI 318-99 is referenced for the strength design of secondary structures. The design calculations reviewed show that these codes and standards have been appropriately invoked in the design process for the secondary containment cells footings. |

| | Information Assessed | Source of Information | Assessment |
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| Foundation Design | Foundation material is compatible with the soil. | 24590-WTP-3PS-DB01-T0001, Rev. 8, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design. | The specification for Furnishing and Delivering Ready-Mix Concrete provides adequate current requirements for the selection of coarse and fine aggregates, and the procurement of cementitious materials. The specification for Material Testing Services provides adequate test procedures for testing the candidate aggregates to ensure adequate concrete durability. As noted in the Basis of Design document (Section 4.7), the groundwater table is more than 250 feet below the ground surface; therefore, no compatibility problem is expected between the concrete foundation and the surrounding backfill materials used under and around it. The secondary containment cells identified herein (L-0123, L-0124, and L-0126) are located inside the building at Elev. 3'-0" level. The subsurface and soil related items such as settlement do not directly associate with them but do have an overall effect on their structural strength from the foundation below at Elev. (-) 21'-0", which has been addressed in the previous section above. |
| | Foundation will withstand the effects of frost heave. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria. | The Structural Design Criteria requires all structural foundations for outdoor components to extend below the 30" frost line from the finished grade (Elev. 0'-0"). The secondary containment cells L-0123, L-0124, and L-0126 are located inside the building at Elev. 3'-0", therefore, they are not subjected to the detrimental effects of frost heave. |

| | Information Assessed | Source of Information | Assessment |
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| Seismic | Seismic considerations have been adequately addressed. | 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PSAR-ESH-01-002-03, Rev. 4I, Preliminary Documented Safety Analysis to Support Construction Authorization: LAW Facility Specific Information; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; UBC 1997, Uniform Building Code; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; AISC M016-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition; 24590-LAW-DBC-S13T-00015, Rev. B, Elevated Slab Design + 3 ft. (Calculations); 24590-LAW-SSC-S15T-00023, Rev. A, Process Cell Steel Framing (Calculations). | The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The LAW Facility PDSA document shows that the cells in this integrity assessment to be Seismic Category-III (SC-III) components. The Structural Design Criteria document provides detailed discipline specific codes and standards for the design of SC-III LAW secondary containment foundations, structures, and liners by the design engineers. Design loads and analysis methods for SC-III secondary containments and liners are taken from the Uniform Building Code (UBC 1997). The ACI 318-99 code provides the design requirements and load combinations for the design of the secondary containment reinforced concrete foundations and structures. The AISC M016-89 code is used for the design of SC-III secondary containment stainless steel liners and building structural steel. The above listed code and standards adequately address the consideration of the requirements of the applicable seismic loads. Review of the design calculations show that the seismic loads have been appropriately considered in the design process of the secondary containment elements. |

| | Information Assessed | Source of Information | Assessment |
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| Compatibility | <p>The stored waste is compatible with its Secondary Containment and leak detection hardware based on a detailed chemical and physical analysis of the wastes used and other information sources.</p> | <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PER-J-02-001, Rev. 4, Leak Detection – Sump Level Measurement in Secondary Containment Systems; 24590-LAW-PER-M-02-002, Rev. 6, Flooding Volume for LAW Facility; 24590-LAW-PER-M-02-001, Rev. 5, LAW Facility Sump Data.</p> | <p>The Basis of Design document states that the secondary containment cells are to be appropriately lined and any leaks or spills will be removed within 24 hours of a leak detection or in as timely a manner as possible. Based on a detailed chemical and physical analysis of the wastes and other process information sources, the Material Selections document identifies appropriate corrosion resistant materials for secondary containment liners, and leak detection hardware. The Secondary Containment Design document provides adequate typical construction details for liners as well as vessel anchorage details, sumps, and leak detection equipment to be used for secondary containment where required. The typical details are furnished for leak detection/sump level measurement systems equipment in the Leak Detection-Sump Level Measurement document. The Flooding Volume and LAW Facility Sump Data documents provide compatible liner material and other applicable installation details for the secondary containment cell structures.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Strength | <p>The design shows that the Secondary Containment has sufficient strength and thickness to prevent failure owing to pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stress of daily operations (e.g., vehicular traffic).</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-LAW-DBC-S13T-00015, Rev. B, Elevated Slab Design + 3 ft. (Calculations); 24590-LAW-DBC-S13T-00023, Rev. A, Upper Process Shearwall Design, (Calculations); 24590-LAW-SSC-S15T-00023, Rev. A, Process Cell Steel Framing (Calculations).</p> | <p>The LAW general arrangement drawings show the location of the secondary containment cells (L-0123, L-0124, and L-0126) at floor elevation 3'-0" in the building. Pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stresses of daily operations are adequately stated as design goals in the Basis of Design document. The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The secondary containment cells being considered are located inside the LAW Vitrification Building, therefore, climatic condition or vehicular traffic are not considered applicable load cases. However, daily operational loads, static head, and pressure gradient due to liquid release inside the cells are considered adequately in the design calculations which show that the secondary containment cells have sufficient strength to prevent their failure.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Strength (cont'd) | <p>The Secondary Containment system has sufficient strength in the presence of operational stresses from site-specific conditions (i.e., traffic, heavy equipment, precipitation, frost).</p> | <p>Drawings listed above under References; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-LAW-DBC-S13T-00015, Rev. B, Elevated Slab Design + 3 ft. (Calculations); 24590-LAW-DBC-S13T-00023, Rev. A, Upper Process Shearwall Design, (Calculations); 24590-LAW-SSC-S15T-00023, Rev. A, Process Cell Steel Framing (Calculations).</p> | <p>The LAW facility drawings show secondary containment cells being considered are located inside the building at Elev. 3'-0". Because they are located inside the building, traffic, heavy equipment, precipitation, and frost are not applicable load cases. The Secondary Containment Design document identifies the applicable load cases including operational stresses from site specific conditions that must be considered in the design. The Engineering Specification for Furnishing Stainless Steel Liner Plates includes specific provisions for protection of and repair of completed liners during the construction process. The Material Selections for Building Secondary Containment document addresses the potential effects of operations conditions on steel liner integrity and the associated maintenance requirements. The requirements identified in the above listed documents adequately address the site-specific conditions and the review of the design calculations also shows that secondary containment cells have sufficient strength to sustain the applicable loading conditions.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Foundation Integrity | <p>The Secondary Containment is properly supported by a foundation or base in order to prevent failure from settlement, compression, or uplift, including the residual effects of installation.</p> | <p>24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria.</p> | <p>Settlement, compression, or uplift including the residual effects of installation, are addressed in the Secondary Containment Design document and the Structural Design Criteria. The design requirements and codes and standards specified in these documents are adequate to satisfy these performance goals. The subject secondary containment cells L-0123, L-0124, and L-0126 are located at floor Elev. + 3'-0" which are not directly subjected to foundation settlement, compression or uplift including residual effects. Their effect has been appropriately considered on the foundation of the structures at Elev. (-) 21'-0" which support the subject secondary containment elements. It is contained in the section above for Elev. (-) 21'-0" level.</p> |
| | <p>The placement, structural support, and type of material used for backfill around and below the Secondary Containment are appropriate.</p> | <p>Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services.</p> | <p>The LAW facility drawings show the secondary containment being considered are located inside the building. Because the subject cells L-0123, L-0124, and L-0126 are located inside the building at Elev. 3'-0", the backfill material requirements are not applicable. However, the design requirements for foundations and structure that support the secondary containment components are adequately addressed in the Structural Design Criteria, Excavation and Backfill, and Material Testing documents. These documents contain adequate industry standards for designing, selecting and testing fill materials, placing and compacting backfills, and testing to ensure adequate compaction below and around the foundations of the structures. The foundations evaluation is included above in the section for Elev. (-) 21'-0".</p> |

| | Information Assessed | Source of Information | Assessment |
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| Infiltration | <p>The design or operation (e.g., diking & curbing) prevents run-on or infiltration of precipitation into the Secondary Containment system unless the collection system has sufficient excess capacity (25 yr rainfall) to contain the run-on precipitation.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.</p> | <p>The Basis of Design document requires the design to provide adequate measures to prevent run-on or infiltration of precipitation. The secondary containment cell components are located inside the LAW Vitrification Building where they are protected from the direct precipitation by the building structure as shown in the general arrangement drawings, therefore, run-on precipitation is precluded. The drawings also show stainless steel liner plate installed at the inside face of all cell walls and floor which provide added measure to prevent moisture from entering the cells. The Engineering Specifications for Stainless Steel Liner Plates provide adequate testing and inspection details to ensure quality installation.</p> |
| | <p>The design includes an external moisture barrier or other means to prevent moisture from entering the room.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.</p> | <p>The Basis of Design document requires the design include provisions to prevent external moisture intrusion. The secondary containment cells L-0123, L-0124, and L-0126 shown in the general arrangement drawings are located inside the LAW building which shields them from precipitation and surface water percolation, therefore, ground water infiltration is precluded. The drawings also show stainless steel liner plate installed at the inside face of all cell walls and floor which provide added measure to prevent moisture from entering the cells. The Engineering Specifications for Stainless Steel Liner Plates provide adequate testing and inspection details to ensure quality installation.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Liner System | <p>The containment area is free of cracks or gaps and the design discusses methods of their minimization.</p> | <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.</p> | <p>The Basis of Design document requires the liner system to be installed must be free of deficiencies such as cracks and gaps and its installation should be inspected and documented by an independent qualified installation inspector or independent qualified professional engineer trained and experienced in installation of tank systems. The Secondary Containment Design document provides current adequate design requirements and codes and standards to design leak tight liners. This document includes appropriate details for installation of stainless steel liners to be free of cracks and gaps. The Material Selections and Stainless Steel Liner Plates documents provide adequate requirements for the secondary containment liners.</p> |
| | <p>The design has considered the compatibility of the concrete liner or coatings and waste and presents information on coatings planning to be used from the manufacturer addressing compatibility with the stored waste. The lining or coating must prevent the waste from migrating into the concrete.</p> | <p>24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.</p> | <p>The Material Selections and Special Protective Coating documents contain general information on the compatibility of planned secondary containment stainless steel liners (SST) with the waste. The SST lining material used in cells L-0123, L-0124, and L-0126 prevent the waste from migrating into the concrete. The Secondary Containment Design and Stainless Steel Liners documents provide standard installation details for liners that will ensure leak-tight liners that prevent the migration of the waste into the concrete.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Design | Description of subsurface conditions and soil bearing capacity are adequate. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; WTSC99-1036-42-17, RPP-WTP Final Report Geotechnical Investigation, Shannon & Wilson Inc. (H-1616-51), May 2000; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4 Engineering Specification for Material Testing Services. | The Structural Design Criteria provides adequate design guidance for both mat and spread footings based on the Geotechnical Investigation report for the facility. Bearing capacity and settlement design parameters are presented for the dense Hanford Upper and Lower Sand Units and Structural Fill. Use of the loose wind blown (dune) sands for foundations is precluded. The Specification for Excavation and Backfill provides structural backfill requirements based on the geotechnical report and current codes and standards for the selection, placing, compacting, and backfill testing of candidate fill materials and completed backfills. The Specification for Material Testing Services provides current adequate codes and standards for testing of the candidate structural fill materials, and in-situ testing of structural fills as they are placed. Room L-0218 identified in the scope is at Elev. 28'-0" level inside the building; the subsurface and soil related items do not directly associate with it but do have an overall effect on its structural strength from the foundation below at Elev. (-) 21'-0" which has been discussed in the section above. |

| | Information Assessed | Source of Information | Assessment |
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| Design (cont'd) | Foundation design loads (including full tanks) and estimated settlement are adequately considered. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ASCE 7-98, Minimum Design Loads for Buildings and Other Structures; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary; 24590-LAW-SSC-S15T-00032, Rev. A, Steel Framing Elevation +28' Non Process and Effluent Cells (Calculations); 24590-LAW-DBC-S13T-00028, Rev. A, Elevated Floor Slab Design @ El. +28'-0"; 24590-WTP-3DP-G04B-00037, Rev. 15B, Engineering Calculations. | The Structural Design Criteria uses current adequate standards to define design loads and load combinations (ASCE 7-98, ACI 318-99, and ACI 349-01). Dead and fluid loads are included in these loads and load combinations. Settlement design parameters are included in the Structural Design Criteria (Section 7.7, Geotechnical Design Parameters and Foundation Design). The secondary containment room L-0218 is located at Elev. 28'-0" level inside the building. The subsurface and soil related items do not directly associate with it but do have an overall effect on its structural strength from the foundation below. However, the review of the design calculations of the immediate slab and steel framing members which support the secondary containment structure, equipment, and coatings around tank (LVP-TK-00001) located on the floor in the subject room (L-0218) show that appropriate design loads including full weight of the tank have been considered. The methodology described in the Engineering Calculations document assures that the final secondary containment structure is designed to comply with all applicable requirements. |

| Information Assessed | | Source of Information | Assessment |
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| Design (cont'd) | Design calculation approach and design basis of footings with design standard references (e.g., ACI) are adequate. | 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; AISC M016-89, Manual of Steel Construction, Allowable Stress Design, Ninth Edition; 24590-LAW-SSC-S15T-00032, Rev. A, Steel Framing Elevation +28' Non Process and Effluent Cells (Calculations); 24590-LAW-DBC-S13T-00028, Rev. A, Elevated Floor Slab Design @ El. +28'-0". | The Basis of Design provides many fundamental general requirements for footing design. The Structural Design Criteria document references current adequate detailed design criteria for the design of concrete foundations and footings. ACI 318-99 is referenced for the strength design of the concrete structures and AISC M016-89 for the structural steel framing elements of the facility. The design calculations reviewed show that the approach and basis used for design are adequately utilized per the required codes and standards and the requirements have been appropriately met in the design process of the secondary containment room footings. |
| Foundation Design | Foundation material is compatible with the soil. | 24590-WTP-3PS-DB01-T0001, Rev. 8, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete; 24590-BOF-3PS-C000-T0001, Rev. 4 Engineering Specification for Material Testing Services. | The specification for Furnishing and Delivering Ready-Mix Concrete provides adequate current requirements for the selection of coarse and fine aggregates, and the procurement of cementitious materials. The specification for Material Testing Services provides adequate test procedures for testing the candidate aggregates to ensure adequate concrete durability. The secondary containment room L-0218 is located at Elev. 28'-0" level inside the building. The subsurface and soil related items do not directly associate with it but do have an overall effect on its structural elements from the foundations below which has been appropriately addressed above in section at Elev. (-) 21'-0". |

| Information Assessed | | Source of Information | Assessment |
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| Foundation Design (cont'd) | Foundation will withstand the effects of frost heave. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria. | The Structural Design Criteria requires all structural foundations for outdoor components to extend below the 30" frost line from the finished grade (Elev. 0'-0"). Room L-0218 is located inside the building at Elev. 28'-0", therefore, it is not subjected to the detrimental effects of frost heave. |
| Seismic | Seismic considerations have been adequately addressed. | 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PSAR-ESH-01-002-03, Rev. 4I, Preliminary Documented Safety Analysis to Support Construction Authorization: LAW Facility Specific Information; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; UBC 1997, Uniform Building Code; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; AISC M016-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition; 24590-LAW-SSC-S15T-00032, Rev. A, Steel Framing Elevation +28' Non Process and Effluent Cells (Calculations); 24590-LAW-DBC-S13T-00028, Rev. A, Elevated Floor Slab Design @ El. +28'-0". | The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The LAW Facility PDSA document shows the room in this integrity assessment to be Seismic Category-III (SC-III) component. The Structural Design Criteria document provides detailed discipline specific codes and standards for the design of SC-III LAW secondary containment foundations, structures, and liners by the design engineers. Design loads and analysis methods for SC-III secondary containments and liners are taken from the Uniform Building Code (UBC 1997). The ACI 318-99 code provides the design requirements and load combinations for the design of the secondary containment reinforced concrete foundations and structures. The AISC M016-89 code is used for the design of SC-III secondary containment stainless steel liners and building structural steel. The above listed code and standards adequately address the consideration of the requirements of the applicable seismic loads. Review of the design calculations show that the seismic loads have been appropriately considered in the design process of the secondary containment elements. |

| | Information Assessed | Source of Information | Assessment |
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| Compatibility | <p>The stored waste is compatible with its Secondary Containment and leak detection hardware based on a detailed chemical and physical analysis of the wastes used and other information sources.</p> | <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PER-J-02-001, Rev. 4, Leak Detection – Sump Level Measurement in Secondary Containment Systems; 24590-LAW-PER-M-02-002, Rev. 6, Flooding Volume for LAW Facility; 24590-LAW-PER-M-02-001, Rev. 5, LAW Facility Sump Data.</p> | <p>The Basis of Design document states that the secondary containment rooms are to be appropriately lined and any leaks or spills will be removed within 24 hours of a leak detection or in as timely a manner as possible. Based on a detailed chemical and physical analysis of the wastes and other process information sources, the Material Selections document identifies appropriate corrosion resistant materials for secondary containment special protective coatings and leak detection hardware. The Secondary Containment Design document provides adequate typical construction details for special protective coatings including tank anchorage details, sumps, and leak detection equipment to be used for secondary containment where required. The typical details are furnished for leak detection/sump level measurement systems equipment in the Leak Detection - Sump Level Measurement document. The Flooding Volume and LAW Facility Sump Data documents provide compatible liner material and other applicable installation details for the secondary containment room structures.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Strength | <p>The design shows that the Secondary Containment has sufficient strength and thickness to prevent failure owing to pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stress of daily operations (e.g., vehicular traffic).</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-LAW-SSC-S15T-00032, Rev. A, Steel Framing Elevation +28' Non Process and Effluent Cells (Calculations); 24590-LAW-DBC-S13T-00028, Rev. A, Elevated Floor Slab Design @ El. +28'-0".</p> | <p>The LAW general arrangement drawings show the location of the secondary containment room L-0218 in the building. Pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stresses of daily operations are adequately stated as design goals in the Basis of Design document. The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The secondary containment room L-0218 being considered is located inside the LAW Vitrification Building, therefore, vehicular traffic is not considered an applicable load case. However, daily operational loads, static head, and pressure gradient due to liquid release inside the secondary containment room walls are considered adequately in the design calculations which show that the secondary containment has sufficient strength to prevent its failure.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Strength (cont'd) | <p>The Secondary Containment system has sufficient strength in the presence of operational stresses from site-specific conditions (i.e., traffic, heavy equipment, precipitation, frost).</p> | <p>Drawings listed above under References;</p> <p>24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design;</p> <p>24590-WTP-3PS-AFPS-T0006, Rev. 1, Specification for Field Applied Special Protective Coatings for Secondary Containment Areas;</p> <p>24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection.</p> <p>24590-LAW-SSC-S15T-00032, Rev. A, Steel Framing Elevation +28' Non Process and Effluent Cells (Calculations);</p> <p>24590-LAW-DBC-S13T-00028, Rev. A, Elevated Floor Slab Design @ El. +28'-0".</p> | <p>The LAW facility drawings show secondary containment room L-0218 being considered is located inside the building. Because it is located inside the building, traffic, heavy equipment, precipitation and frost are not applicable load cases. The Secondary Containment Design document identifies the applicable load cases (operational stresses) from site specific conditions that must be considered in the design. The Engineering Specification for Field Applied Special Protective Coating includes specific provisions for protection of and repair of completed special protective coating material. The Material Selections for Building Secondary Containment document addresses the potential effects of operations conditions on special protective coating integrity and the associated maintenance requirements. Daily operational loads, static head, and pressure gradient due to liquid release inside the secondary containment room are considered adequately in the design calculations which show that it has sufficient strength to sustain the applicable loads.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Foundation Integrity | <p>The Secondary Containment is properly supported by a foundation or base in order to prevent failure from settlement, compression, or uplift, including the residual effects of installation.</p> | <p>24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-LAW-SSC-S15T-00032, Rev. A, Steel Framing Elevation +28' Non Process and Effluent Cells (Calculations); 24590-LAW-DBC-S13T-00028, Rev. A, Elevated Floor Slab Design @ El. +28'-0".</p> | <p>Settlement, compression, or uplift including the residual effects of installation, are addressed in the Secondary Containment Design document and the Structural Design Criteria. The requirements identified in the codes and standards specified in these design documents are adequate to satisfy the performance goals. The subject secondary containment room L-0218 is located at floor Elev. 28'-0" which is not directly subjected to foundation settlement, compression or uplift including residual effects. Their effect has been appropriately considered on the foundation of the structures at Elev. (-) 21'-0" which support the subject secondary containment elements. It is contained in the section above for Elev. (-) 21'-0" level.</p> |
| | <p>The placement, structural support, and type of material used for backfill around and below the Secondary Containment are appropriate.</p> | <p>Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services.</p> | <p>The LAW facility drawings show the secondary containment room L-0218 being considered is located inside the building at Elev. 28'-0". Because the subject room is located at Elev. 28'-0", the backfill material requirements are not applicable. However, the design requirements for foundations and structure that support the secondary containment components are adequately addressed in the Structural Design Criteria, Excavation and Backfill, and Material Testing documents. These documents contain adequate industry standards for designing, selecting and testing fill materials, placing and compacting backfills, and testing to ensure adequate compaction below and around the foundations of the structures. The foundations evaluation is included above in the section for Elev. (-) 21'-0" level.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Infiltration | <p>The design or operation (e.g., diking & curbing) prevents run-on or infiltration of precipitation into the Secondary Containment system unless the collection system has sufficient excess capacity (25 yr rainfall) to contain the run-on precipitation.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design.</p> | <p>The Basis of Design document requires the design to provide adequate measures to prevent run-on or infiltration of precipitation. The secondary containment room L-0218 is located inside the LAW Vitrification Building where it is protected from direct precipitation by the building structure as shown in the general arrangement drawings, therefore, this requirement does not apply.</p> |
| | <p>The design includes an external moisture barrier or other means to prevent moisture from entering the room.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design.</p> | <p>The Basis of Design document requires the design to include provisions to prevent external moisture intrusion. The secondary containment room L-0218 shown in the general arrangement drawings is inside the LAW Vitrification Building which shields it from precipitation and surface water percolation, therefore, this requirement does not apply to this secondary containment.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Liner System | <p>The containment area is free of cracks or gaps and the design discusses methods of their minimization.</p> | <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-3PS-AFPS-T0006, Rev. 1, Specification for Field Applied Special Protective Coatings for Secondary Containment Areas.</p> | <p>The Basis of Design document requires the liner system to be installed must be free of deficiencies such as cracks and gaps and its installation should be inspected and documented by an independent qualified installation inspector or independent qualified professional engineer trained and experienced in installation of tank systems. The Secondary Containment Design document provides current adequate design requirements, and codes and standards to design leak tight liners. This document includes appropriate details for installation of the special protective coatings free of cracks and gaps. The Material Selections and Special Protective Coatings documents provide adequate requirements for the secondary containment protective coating material.</p> |
| | <p>The design has considered the compatibility of the concrete liner or coatings and waste and presents information on coatings planning to be used from the manufacturer addressing compatibility with the stored waste. The lining or coating must prevent the waste from migrating into the concrete.</p> | <p>24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-3PS-AFPS-T0006, Rev. 1, Specification for Field Applied Special Protective Coatings for Secondary Containment Areas; 24590-LAW-PER-M-02-002, Rev. 6, Flooding Volume for LAW Facility.</p> | <p>The Material Selections and Special Protective Coating documents contain general information on the compatibility of planned secondary containment special protective coatings with the waste. The secondary containment room L-0218 has special protective coating applied to the floor and its containment walls. The Flooding Volume document provides the height of the secondary containment wall. The Secondary Containment Design and Special Protective Coatings documents provide standard installation details for the special protective coatings. Surface preparations and applicable details such as corner coving on floor/wall and wall/wall joints as described and/or shown in the aforementioned documents will ensure leak-tight protective coating layer that will stop the migration of the waste into the concrete.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Design | Description of subsurface conditions and soil bearing capacity are adequate. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; WTSC99-1036-42-17, RPP-WTP Final Report Geotechnical Investigation, Shannon & Wilson Inc. (H-1616-51), May 2000; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4 Engineering Specification for Material Testing Services. | The Structural Design Criteria provides adequate design guidance for both mat and spread footings based on the Geotechnical Investigation report for the facility. Bearing capacity and settlement design parameters are presented for the dense Hanford Upper and Lower Sand Units and Structural Fill. Use of the loose wind blown (dune) sands for foundations is precluded. The Specification for Excavation and Backfill provides structural backfill requirements based on the geotechnical report and current codes and standards for the selection, placing, compacting, and backfill testing of candidate fill materials and completed backfills. The Specification for Material Testing Services provides current adequate codes and standards for testing of the candidate structural fill materials, and in-situ testing of structural fills as they are placed. Room L-0304F identified in the scope is located at Elev. 48'-0" level inside the building. The subsurface and soil related items do not directly associate with it but do have an overall effect on its structural strength from the foundation below at Elev. (-) 21'-0" which has been discussed in the section above. |

| | Information Assessed | Source of Information | Assessment |
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| Design (cont'd) | <p>Foundation design loads (including full tanks) and estimated settlement are adequately considered.</p> | <p>24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ASCE 7-98, Minimum Design Loads for Buildings and Other Structures; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary; 24590-LAW-DBC-S13T-00034, Rev. A, Elevated Floor Slab Design @ +48'-0" (Calculations); 24590-LAW-SSC-S15T-00049, Rev. A, Steel Framing at EL. +48' (Calculations); 24590-WTP-3DP-G04B-00037, Rev. 15B, Engineering Calculations.</p> | <p>The Structural Design Criteria uses current adequate standards to define design loads and load combinations (ASCE 7-98, ACI 318-99, and ACI 349-01). Dead and fluid loads are included in these loads and load combinations. Settlement design parameters are included in the Structural Design Criteria (Section 7.7, Geotechnical Design Parameters and Foundation Design). The room L-0304F identified in the scope is located at Elev. 48'-0" level inside the building. The subsurface and soil related items do not directly associate with it but do have an overall effect on its structural strength from the foundation below. However, the review of the design calculations of the immediate slab and steel framing members that support the scrubber (LVP-SCB-00001) located on the floor in the bermed section of room (L-0304F) show that full weight of the scrubber has been appropriately considered. The methodology described in the Engineering Calculations document assures that the final secondary containment structure is designed to comply with all applicable requirements.</p> |
| | <p>Design calculation approach and design basis of footings with design standard references (e.g., ACI) are adequate.</p> | <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; AISC M016-89, Manual of Steel Construction, Allowable Stress Design, Ninth Edition; 24590-LAW-DBC-S13T-00034, Rev. A, Elevated Floor Slab Design @ +48'-0" (Calculations); 24590-LAW-SSC-S15T-00049, Rev. A, Steel Framing at EL. +48' (Calculations).</p> | <p>The Basis of Design provides many fundamental general requirements for footing design. The Structural Design Criteria document references current adequate detailed design criteria for the design of concrete foundations and footings. ACI 318-99 is referenced for the strength design of the concrete structures and AISC M016-89 for the structural steel framing elements of the facility. The design calculations reviewed show that the approach and basis used for design are adequately utilized per the required codes and standards and the requirements have been appropriately met in the design process of the secondary containment room footings.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Foundation Design | Foundation material is compatible with the soil. | 24590-WTP-3PS-DB01-T0001, Rev. 8, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services. | The specification for Furnishing and Delivering Ready-Mix Concrete provides adequate current requirements for the selection of coarse and fine aggregates, and the procurement of cementitious materials. The specification for Material Testing Services provides adequate test procedures for testing the candidate aggregates to ensure adequate concrete durability. The room L-0304F identified in the scope is located at Elev. 48'-0" level inside the building. The subsurface and soil related items do not directly associate with it but do have an overall effect on its structural elements from the foundations below which has been appropriately addressed in the section above for Elev.(-) 21'-0" level. |
| | Foundation will withstand the effects of frost heave. | 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria. | The Structural Design Criteria requires all structural foundations for outdoor components to extend below the 30" frost line from the finished grade (Elev. 0'-0"). Room L-0304F is located inside the building at Elev. 48'-0", therefore, it is not subjected to the detrimental effects of the frost heave. |

| Information Assessed | | Source of Information | Assessment |
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| Seismic | Seismic considerations have been adequately addressed. | 24590-WTP-PFR-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PSAR-ESH-01-002-03, Rev. 4I, Preliminary Documented Safety Analysis to Support Construction Authorization: LAW Facility Specific Information; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; UBC 1997, Uniform Building Code; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; AISC M016-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition; 24590-LAW-DBC-S13T-00034, Rev. A, Elevated Floor Slab Design @ +48'-0" (Calculations); 24590-LAW-SSC-S15T-00049, Rev. A, Steel Framing at EL. +48' (Calculations). | The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The LAW Facility PDSA document shows the room in this integrity assessment to be Seismic Category-III (SC-III) components. The Structural Design Criteria document provides detailed discipline specific codes and standards for the design of SC-III LAW secondary containment foundations, structures, and liners by the design engineers. Design loads and analysis methods for SC-III secondary containments and liners are taken from the Uniform Building Code (UBC 1997). The ACI 318-99 code provides the design requirements and load combinations for the design of the secondary containment reinforced concrete foundations and structures. The AISC M016-89 code is used for the design of SC-III secondary containment structural steel elements. The above listed code and standards adequately address the consideration of the requirements of the applicable seismic loads. Review of the design calculations show that the seismic loads have been appropriately considered in the design process of the secondary containment elements. |

| | Information Assessed | Source of Information | Assessment |
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| <p>Compatibility</p> | <p>The stored waste is compatible with its Secondary Containment and leak detection hardware based on a detailed chemical and physical analysis of the wastes used and other information sources.</p> | <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design.</p> | <p>The Basis of Design document states that the secondary containment rooms are to be appropriately lined and any leaks or spills will be removed within 24 hours of a leak detection or in as timely a manner as possible. Based on a detailed chemical and physical analysis of the wastes and other process information sources, the Material Selections document identifies appropriate corrosion resistant materials for secondary containment liners, special protective coatings, and leak detection hardware. The Secondary Containment Design document provides adequate typical construction details for liners including tank anchorage details, special protective coatings, sumps, and leak detection equipment to be used for secondary containment where required. The subject room L-0304F at floor Elev. 48'-0" directly drains through the floor drain into the Caustic Collection Tank (LVP-TK-00001) located at the lower floor Elev. 28'-0." Room L-0304F floor and its 4" high concrete curb are coated with special protective coating material. The Material Selections document states that special protective coatings are acceptable where human access is allowed for performing maintenance.</p> |

| | Information Assessed | Source of Information | Assessment |
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| Strength | <p>The design shows that the Secondary Containment has sufficient strength and thickness to prevent failure owing to pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stress of daily operations (e.g., vehicular traffic).</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-LAW-DBC-S13T-00034, Rev. A, Elevated Floor Slab Design @ +48'-0" (Calculations); 24590-LAW-SSC-S15T-00049, Rev. A, Steel Framing at EL. +48' (Calculations).</p> | <p>The LAW general arrangement drawings show the location of the secondary containment room in the building. Pressure gradients, static head during a release, physical contact with the waste, climatic conditions, and the stresses of daily operations are adequately stated as design goals in the Basis of Design document. The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the LAW facility secondary containment components. The secondary containment room L-0304F being considered is located in inside the LAW Vitrification Building, therefore, pressure gradients and vehicular traffic are not considered applicable load cases. However, normal daily operational loads are adequately considered in the design calculations which show that the secondary containment room has sufficient strength to prevent its failure.</p> |

| Information Assessed | | Source of Information | Assessment |
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| Strength (cont'd) | The Secondary Containment system has sufficient strength in the presence of operational stresses from site-specific conditions (i.e., traffic, heavy equipment, precipitation, frost). | <p>Drawings listed above under References;</p> <p>24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design;</p> <p>24590-WTP-3PS-AFPS-T0006, Rev. 1, Specification for Field Applied Special Protective Coatings for Secondary Containment Areas;</p> <p>24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection;</p> <p>24590-LAW-DBC-S13T-00034, Rev. A, Elevated Floor Slab Design @ +48'-0" (Calculations);</p> <p>24590-LAW-SSC-S15T-00049, Rev. A, Steel Framing at EL. +48' (Calculations).</p> | <p>The LAW facility drawings show secondary containment room L-0304F being considered is located inside the building. Because it is located inside the building, traffic, heavy equipment, precipitation and frost are not applicable load cases. The Secondary Containment Design document identifies the applicable load cases (operational stresses) from site specific conditions that must be considered in the design. The Special Protective Coatings document includes specific provisions and details for installation and protection and repair of the completed protective coating. The Material Selections for Building Secondary Containment document addresses the potential effects of operations conditions on special protective coating integrity and the associated maintenance requirements. Daily normal operational loads are adequately considered in the design calculations which show that it has sufficient strength to sustain the applicable loads.</p> |
| Foundation Integrity | The Secondary Containment is properly supported by a foundation or base in order to prevent failure from settlement, compression, or uplift, including the residual effects of installation. | <p>24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design;</p> <p>24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria.</p> | <p>Settlement, compression, or uplift including the residual effects of installation, are addressed in the Secondary Containment Design document and the Structural Design Criteria. The design requirements and codes and standards specified in these documents are adequate to satisfy the performance goals. The subject secondary containment room L-0304F is located at floor Elev. + 48'-0" which is not directly subjected to foundation settlement, compression or uplift including residual effects. Their effect has been appropriately considered on the foundation of the structures at Elev. (-) 21'-0" which support the subject secondary containment elements. It is contained in the section above for Elev. (-) 21'-0" level.</p> |

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| Foundation Integrity (cont'd) | <p>The placement, structural support, and type of material used for backfill around and below the Secondary Containment are appropriate.</p> | <p>Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria; 24590-BOF-3PS-CE01-T0001, Rev. 6, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 4, Engineering Specification for Material Testing Services.</p> | <p>The LAW facility drawings show the secondary containment room L-0304F being considered is located inside the building. Because the subject room L-0304F is located inside the building at Elev. 48'-0", the backfill material requirements are not applicable. However, the design requirements for foundations and structure that support the secondary containment components are adequately addressed in the Structural Design Criteria, Excavation and Backfill, and Material Testing documents. These documents contain adequate industry standards for designing, selecting and testing fill materials, placing and compacting backfills, and testing to ensure adequate compaction below and around the foundations of the structures. The foundations evaluation is included above in the section for Elev. (-) 21'-0".</p> |
| Infiltration | <p>The design or operation (e.g., diking & curbing) prevents run-on or infiltration of precipitation into the Secondary Containment system unless the collection system has sufficient excess capacity (25 yr rainfall) to contain the run-on precipitation.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design.</p> | <p>The Basis of Design document requires the design to provide adequate measures to prevent run-on or infiltration of precipitation. It should be noted that the coated bermed area of Room L-0304 at Elev. 48'-0", surrounding the LVP Caustic Scrubber (LVP-SCB-00001) provides the secondary containment. Room L-0304F is located inside the LAW Vitrification Building at Elev. 48'-0", where it is protected from direct precipitation by the building structure as shown in the general arrangement drawings, therefore, this requirement does not apply.</p> |
| Infiltration | <p>The design includes an external moisture barrier or other means to prevent moisture from entering the room.</p> | <p>Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design.</p> | <p>The Basis of Design document requires the design include provisions to prevent external moisture intrusion. The secondary containment room L-0304F shown in the general arrangement drawings is inside the LAW Vitrification Building which shields it from precipitation and surface water percolation, therefore, this requirement does not apply.</p> |

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| Liner System | <p>The containment area is free of cracks or gaps and the design discusses methods of their minimization.</p> | <p>24590-WTP-DB-ENG-01-001, Rev. 10, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-3PS-AFPS-T0006, Rev. 1, Specification for Field Applied Special Protective Coatings for Secondary Containment Areas.</p> | <p>The Basis of Design document requires the liner system to be installed must be free of deficiencies such as cracks and gaps and its installation should be inspected and documented by an independent qualified installation inspector or independent qualified professional engineer trained and experienced in installation of tank systems. The Secondary Containment Design document provides current adequate design requirements and codes and standards to design leak tight liners. This document includes appropriate details for installation of special protective coatings free of cracks and gaps. The Material Selections and Special Protective Coatings documents provide adequate requirements for the secondary containment protective coating materials.</p> |
| | <p>The design has considered the compatibility of the concrete liner or coatings and waste and presents information on coatings planning to be used from the manufacturer addressing compatibility with the stored waste. The lining or coating must prevent the waste from migrating into the concrete.</p> | <p>24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-3PS-AFPS-T0006, Rev. 1, Specification for Field Applied Special Protective Coatings for Secondary Containment Areas; 24590-WTP-PER-CSA-02-001, Rev. 8, Secondary Containment Design.</p> | <p>The Material Selections and Special Protective Coating documents contain general information on the compatibility of planned secondary containment special protective coatings with the waste. The Secondary Containment Design and Special Protective Coatings documents provide standard installation details for the special protective coatings. Surface preparations and applicable details such as corner coving on floor/wall and wall/wall joints as described and/or shown in the aforementioned documents will ensure leak-tight protective coating layer that will stop the migration of the waste into the concrete.</p> |