Job No. 24590

Bechtel National, Inc.

SUPPLIER DOCUMENT STATUS

1. [X] **Work may proceed.**
2. [ ] **Revise and resubmit. Work may proceed subject to resolution of indicated comments.**
3. [ ] **Revise and resubmit. Work may not proceed.**
4. [ ] **Review not required. Work may proceed.**

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligations.

REVIEWED									

G-321 Document Category N/A
[From Supplement A to G-321-E (E) or G-321-V (V), as applicable, or "N/A" if SSRS is used]

Supersedes BNI Document No. N/A Rev.
[When applicable]

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Released by
[When applicable] Print Name Signature Date

416 GP&S 7-03

24590-CM-HC4-HXYG-00138-02-00018 REV. 00A

PURCHASE ORDER SUBMITTAL

Best Available Copy

R10273210

IQRPE REVIEW
OF
THE LOW ACTIVITY WASTE (LAW) FACILITY ELEVATION 28'-0" LEVEL-SECONDARY CONTAINMENT

"I, Tarlok S. 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 Low Activity Waste (LAW) Facility Elevation 28'-0" Level Secondary Containment, as required by The Dangerous Waste Regulations, namely, WAC 173-303-640(3) applicable paragraphs, i.e., (a) through (g)."

"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 intent fully satisfies the requirements of the WAC.

The attached review is nine (9) pages numbered 1 through 9.

EXPIRES: 02/15/06

T S Hundal
Signature

3/19/04
Date

24590-CM-HC4-HXYG-00138-02-00018, REV. 00A

STRUCTURAL INTEGRITY ASSESSMENT OF LOW ACTIVITY WASTE (LAW) FACILITY ELEVATION 28'-0" LEVEL- SECONDARY CONTAINMENT

COGEMA-IA-42

REV. 0

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.

Scope	Scope of this Integrity Assessment	This Integrity Assessment addresses Low Activity Waste (LAW) Facility Secondary Containment at Elev. 28'-0". The specific room considered in this assessment is L-0218.
References	Drawings	24590-LAW-P1-P01T-P0004, Rev. 0, LAW Vitrification Building General Arrangement Plan at El. 28'-0"; 24590-LAW-P1-P01T-P0009, Rev. 5, LAW Vitrification Building General Arrangement Section G-G, H-H, and J-J.
Summary of Assessment		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 controls and requirements to ensure the design intent fully satisfies the requirements of Washington Administrative Code, WAC-173-303-640, *Dangerous Waste Regulations* for Tank Systems.

	Information Assessed	Source of Information	Discussion
Design	Description of subsurface conditions and soil bearing capacity are adequate.	24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; 24590-BOF-3PS-CE01-T0001, Rev. 4, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 2, Engineering Specification for Material Testing Services; WTSC99-1036-42-17, RPP-WTP Final Report Geotechnical Investigation, Shannon & Wilson Inc. (H-1616-51), May 2000.	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 codes and standards are consistent with those called out in the Specification for Excavation and Backfill. The room 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.
	Foundation design loads (including full tanks) and estimated settlement are adequately considered.	24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; ACI 349-01, Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary; ASCE 7-98, Minimum Design Loads for Buildings and Other Structures.	The Structural Design Criteria uses current adequate standards to define design loads and load combinations (ASCE 7-98, ACI 349-01 and ACI 318-99). 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 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.

	Information Assessed	Source of Information	Discussion
Design	Design calculation approach and design basis of footings with design standard references (e.g., ACI) are adequate.	24590-WTP-DB-ENG-01-001, Rev. 1A, Basis of Design; 24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary.	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 commercial grade structures.
Foundation Design	Foundation material is compatible with the soil.	24590-WTP-3PS-DB01-T0001, Rev. 6, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete; 24590-BOF-3PS-C000-T0001, Rev. 2, Engineering Specification for Material Testing Services; 24590-WTP-DB-ENG-01-001, Rev. 1A, 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. The Basis of Design document indicates the water table lies about 200 feet below the deepest foundations; therefore, there is little reason to expect compatibility problems between the concrete foundations and the site soils. The room 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.
	Foundation will withstand the effects of frost heave	24590-WTP-DC-ST-01-001, Rev. 1, 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 inside/interior of the building at Elevation 28'-0", therefore, it is not subjected to the detrimental effects of frost heave.

	Information Assessed	Source of Information	Discussion
Seismic	Seismic considerations have been adequately addressed.	24590-WTP-PER-CSA-02-001, Rev. 4, Secondary Containment Design; 24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; 23590-WTP-PSAR-ESH-010002-03, Rev. 1, Preliminary Safety Analysis Report to Support Construction Authorization: LAW Facility Specific Information; ACI 318-99, Building Code Requirements for Structural Concrete and Commentary; UBC 1997, Uniform Building Code; AISC M016-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition.	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 PSAR document shows the room in this integrity assessment to be Quality Level-2 (QL-2) and 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. 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.

	Information Assessed	Source of Information	Discussion
Compatibility	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.	24590-WTP-DB-ENG-01-001, Rev. 1A, 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. 4, Secondary Containment Design; 24590-WTP-PER-J-02-001, Rev. 4, Leak Detection – Sump Level Measurement in Secondary Containment Systems.	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 Material Selections document states that special protective coatings are acceptable where human access is allowed for performing maintenance. Where sumps are used, the typical details are furnished for leak detection/sump level measurement systems equipment in the Leak Detection - Sump Level Measurement document.

	Information Assessed	Source of Information	Discussion
Strength	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).	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 1A, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 4, Secondary Containment Design.	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 being considered is located in the room inside the LAW Vitrification Building rather than being directly buried, therefore, pressure gradients and vehicular traffic are not considered applicable load cases.
	The Secondary Containment system has sufficient strength in the presence of operational stresses from site-specific conditions (i.e., traffic, heavy equipment, precipitation, frost).	Drawings listed above under References; 24590-WTP-PER-CSA-02-001, Rev. 4, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 0, 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.	The LAW facility drawings show Secondary Containment being considered is installed 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 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 metal liner/special protective coating integrity and the associated maintenance requirements.

	Information Assessed	Source of Information	Discussion
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.	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; 24590-WTP-PER-CSA-02-001, Rev. 4, Secondary Containment Design.	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 are adequate to satisfy these performance goals. The design and construction specifications adequately provide for proper foundation construction and installation of the Secondary Containment. The LAW general arrangement drawings provide appropriate location of the Secondary Containment being considered.
	The placement, structural support, and type of material used for backfill around and below the Secondary Containment are appropriate.	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; 24590-BOF-3PS-CE01-T0001, Rev. 5, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 2, Engineering Specification for Material Testing Services.	The LAW facility drawings show the Secondary Containment being considered is installed inside the building. Because it is located inside the building at Elev. 28'-0", the backfill material requirements are not applicable; however, the design requirements for structural support for the Secondary Containment are adequately addressed in the Structural Design Criteria document. The Excavation and Backfill, and Material Testing specifications contain current adequate industry standards for selecting and testing fill materials, placing and compacting backfills, and testing to ensure adequate compaction. Requirements for testing and record keeping are adequate for both safety grade fills and commercial grade fills are addressed in Specification for Material Testing and Specification for Excavation and Backfill.

	Information Assessed	Source of Information	Discussion
Infiltration	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.	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 1A Basis of Design.	The Basis of Design document requires the design to provide adequate measures to prevent run-on or infiltration of precipitation. The secondary containment 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
	The design includes an external moisture barrier or other means to prevent moisture from entering the room.	Drawings listed above under References; 24590-WTP-DB-ENG-01-001, Rev. 1A, Basis of Design.	The Basis of Design document requires the design include provisions to prevent external moisture intrusion. The Secondary Containment shown in the general arrangement drawings is inside the LAW Vitrification 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 200 feet below the building mat foundation, therefore, ground water infiltration is precluded.

	Information Assessed	Source of Information	Discussion
Liner System	The containment area is free of cracks or gaps and the design discusses methods of their minimization.	24590-WTP-DB-ENG-01-001, Rev. 1A, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 4, Secondary Containment Design; 24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-3PS-AFPS-TP006, Rev. 0, Field Applied Special Protective Coatings for Secondary Containment Areas.	The Basis of Design document requires the liner system to be free of cracks and gaps. 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 and special protective coatings free of cracks and gaps. The Material Selections and Special Protective Coatings documents provide adequate requirements for the secondary containment liners and protective coating materials, respectively.
	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.	24590-WTP-PER-M-02-001, Rev. 3, Material Selections for Building Secondary Containment/Leak Detection; 24590-WTP-PER-CSA-02-001, Rev. 4, Secondary Containment Design; 24590-WTP-3PS-AFPS-TP006, Rev. 0, Field Applied Special Protective Coatings for Secondary Containment Areas.	The Material Selections and Special Protective Coating documents contain general information on the compatibility of planned Secondary Containment stainless steel liners and special protective coatings with the waste. These linings and special protective coatings prevent the waste from migrating into the concrete. The Secondary Containment Design and Special Protective Coatings documents provide standard installation details for liners and special protective coatings that will ensure leak-tight liners that prevent the migration of the waste into the concrete.