Bechtel National, Inc.

Job No. 24590

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 EWS

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. 24590-CM-HC4-HXYG-00138-01-16 Rev. 00A
[When applicable]

Accepted by DC Pflueger (Print Name) _____ (Signature) 3/11/04 (Date)

Released by N/A (Print Name) _____ (Signature) _____ (Date)
[When applicable]

416 GP&S 7-03

24590-CM-HC4-HXYG-00138-01-16
REV. 00B

SUBCONTRACT SUBMITTAL

Best Available Copy

R10270838

IQRPE REVIEW OF THE ANALYTICAL LABORATORY (LAB) FACILITY BELOW GRADE 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 Analytical Laboratory (LAB) Facility Below Grade 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 9 pages numbered 1 through 9.

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
28213
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES: 02/15/06

T S Hundal
Signature

3/11/04
Date

24590-CM-HC4-HXYG-00138-01-10, REV. 003

STRUCTURAL INTEGRITY ASSESSMENT OF THE ANALYTICAL LABORATORY (LAB) FACILITY BELOW GRADE LEVEL SECONDARY CONTAINMENT

COGEMA-IA-018
REV. 1

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.

Analytical Laboratory (LAB) Facility Below Grade Level Secondary Containment	COGEMA-IA-018, Rev. 1

Scope	Scope of this Integrity Assessment	This Integrity Assessment addresses Analytical Laboratory (LAB) Facility Secondary Containment at below grade elevations. The specific cells considered in this assessment are: A-B002, A-B003, A-B004, A-B005, A-B006, and A-B007.
References	Drawings	24590-LAB-P1-60-P0007, Rev. 1, Analytical Laboratory General Arrangement Plan at El. (-) 19'-0", Sections E-E, F-F, & G-G; 24590-LAB-P1-60-P0010, Rev. 0, Analytical Laboratory General Arrangement Sections A-A, B-B, C-C, & D-D.
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. 5, 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.
	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; 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).
	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.

	Information Assessed	Source of Information	Discussion
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.
	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 to extend below the 30" frost line from the finished grade. This is adequate to preclude any detrimental effects due to 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; 24590-LAB-3YD-RLD-00001, Rev. 1, System Description for Radiological Liquid Waste Disposal System for the Analytical Laboratory; 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 LAB facility secondary containment components. The System Description document shows 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 LAB 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 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 report 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. 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 LAB general arrangement drawings show the location of the secondary containment cells 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 LAB facility secondary containment components. The secondary containments being considered are located in cells inside the Analytical Laboratory Building rather than 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. 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.	The LAB drawings show Secondary Containments being considered are installed below grade inside the building. 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 (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 report addresses the potential effects of operations conditions on 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 LAB general arrangement drawings provide an adequate description 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.	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 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.

	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 Analytical Laboratory 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 cell.	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 Containments shown in the general arrangement drawings are inside the Analytical Laboratory Building which shields them 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 floors of the cells, 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-PER-CSA-02-001, Rev. 4, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 1, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.	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 and special protective coatings 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 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.	The Material Selections document contains 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 document provides 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.