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										
										EHS
										BMS

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-00138-01-11 Rev. NA
[When applicable]

Accepted by DC Pfluger (Print Name) DC Pfluger (Signature) 10/9/03 (Date)

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

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REV. 00B

SUBCONTRACT SUBMITTAL

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(A) YAE 10-9-03

(C) JC 10/15/03

R10129795

STRUCTURAL INTEGRITY ASSESSMENT OF THE HIGH LEVEL WASTE FACILITY ELEVATION 0'-0" SECONDARY CONTAINMENT

"I, John T. Baxter 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 High Level Waste Facility Elevation 0'-0" 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 indicate that the design intent fully satisfies the requirements of the WAC.

The attached review is 7 sheets numbered 1 through 7.

RPP-WTP
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10-6-03 10/8/03
(B) Processed/ Data Entry | Copied/ QA | Scanned | Filed
(A) JGE 10-6-03
(C) KS 10/7/03

JOHN T. BAXTER
STATE OF WASHINGTON
18978
REGISTERED PROFESSIONAL ENGINEER
EXPIRES: 10/28/04

John T. Baxter 10/02/2003
Signature Date

24590-CM-~~HCH~~ HC4-HXYG-00138-01-11, Rev. 00B
JAS 10-6-03

STRUCTURAL INTEGRITY ASSESSMENT OF THE HIGH LEVEL WASTE FACILITY ELEVATION 0'-0" SECONDARY CONTAINMENT

COGEMA-IA-014
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.

Scope	Scope of this Integrity Assessment	This integrity assessment addresses High Level Waste Facility 0'-0" Elevation Secondary Containment. Rooms are located at elevations between (-) 9'-0" and elevation 0'-0", and above, inside the High Level Waste Facility. The specific rooms considered in this assessment are: H-0116B, H-0117, H-0304A and H-0310A.
References	Drawings	The drawings are the general arrangement plan at elevation 0'-0" (FROM EL. -9'-0" TO EL. 8'-0", and above) and associated sections. 24590 HLW P1 P01T P0002, Rev. 2, HLW VITRIFICATION BUILDING GENERAL ARRANGEMENT PERMIT PLAN AT EL. 0'-0"; 24590 HLW P1 P01T P0008, Rev. 6, HLW VITRIFICATION BUILDING GENERAL ARRANGEMENT PERMIT SECTIONS A-A, B-B & C-C; 24590 HLW P1 P01T P0009, Rev. 5, HLW VITRIFICATION BUILDING GENERAL ARRANGEMENT PERMIT SECTIONS D-D, E-E & F-F; 24590 HLW P1 P01T P0010, Rev. 5, HLW VITRIFICATION BUILDING GENERAL ARRANGEMENT PERMIT SECTION G-G & SECTION H-H; 24590 HLW P1 P01T P0011, Rev. 6, HLW VITRIFICATION BUILDING GENERAL ARRANGEMENT PERMIT SECTION J-J & SECTION K-K

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 assure the design intent fully satisfies the WAC requirements.

	Information Assessed	Source of Information	Assessment
Foundation 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	The Structural Design Criteria adequately presents design guidance for both mat and spread footings based on the geotechnical site investigation for the facility (H-1616-51, Shannon & Wilson, 2000). Bearing capacity and settlement design parameters are furnished 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 Excavation and Backfill Specification provides structural backfill requirements based on the geotechnical report and adequate current codes and standards for selection, placing, and compacting structural backfill including testing of candidate fill materials and completed backfills. The Specification for Material Testing Services provides current adequate codes and standards for testing of candidate structural fill materials and in-situ testing of structural fills as they are constructed. The codes and standards are consistent with those called out in the Excavation and Backfill Specification.
	Foundation design loads (including full tanks) and estimated settlement are adequately considered.	24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; 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 subsection on 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-DC-ST-01-001, Rev. 1, Structural Design Criteria; ACI 349, Code Requirements for Nuclear Safety-Related Concrete Structures; ACI 318-99, Building Code Requirements for Structural Concrete	The Structural Design Criteria references current adequate design criteria for the design of concrete foundations and footings. ACI 349-01 is referenced for design of "safety" grade structures and ACI 318-99 is referenced for the strength design of "commercial grade" structures.

	Information Assessed	Source of Information	Assessment
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. 0, Basis of Design	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 aggregates for chemical reactivity. Instructions for mixing and delivering Ready-Mix Concrete are adequate and current. As noted in the Basis of Design document (section 4.7), the water table lies about 200 feet below the deepest foundations so 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 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 is 30 inches below finished grade. Therefore, the foundation will not be subjected to frost heave.
Seismic Design	Seismic considerations have been adequately addressed.	24590-WTP-PER-CSA-02-001, Rev. 3, Secondary Containment Design; 24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria; ANSI/AISC N690, Specification for the Design, Fabrication and Erection of Steel Safety-Related Structures for Nuclear Facilities; AISC MO16-89, Manual of Steel Construction - Allowable Stress Design, Ninth Edition; ASCE 4, Seismic Analysis of Safety Related Nuclear Structures and Commentary	The Secondary Containment Design document describes and provides references for the design methodology, materials, loads, and load combinations (including seismic loads) for the HLW Building secondary containment. The Structural Design Criteria provides detailed discipline specific codes and standards for the design of Seismic Category (SC-I/II) HLW secondary containment foundations and structures by the design engineers. ACI-349-01 and ACI 318-99 provide the design codes and load combinations for design of the secondary containment reinforced concrete foundations and structures. Structural steel components of the secondary containment structures and stainless steel liners are to be designed using ANSI/AISC N690 and the AISC Allowable Stress Design code. ASCE 4-98 is used for guidance on seismic analysis of safety-related nuclear structures. These codes and standards are adequate and acceptable for addressing seismic considerations.

	Information Assessed	Source of Information	Assessment
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. 0, 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. 3, Secondary Containment Design; 24590-WTP-PER-J-02-001, Rev. 4, Leak Detection - Sump Level Measurement in Secondary Containment Systems	The Basis of Design states that cells and sumps are appropriately lined and any spills are removed and flushed within 24-hr or as timely as possible. Based on detailed analysis of the corrosive properties of expected waste process operations and evaluation of potential leak scenarios, the Material Selection report identifies appropriate and adequate corrosion resistant materials for Secondary Containment liners, coatings, and leak detection hardware. The Secondary Containment Design report provides adequate typical construction details for liners including tank anchorage details, stainless steel liner details, special protective coatings, sumps, and leak detection equipment to be used for Secondary Containment. Typical details are furnished for leak detection and sump level measurement systems equipment both in cell, and out of cell in the Leak Detection - Sump Level Measurement specification.
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-PER-CSA-02-001, Rev. 3, 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	Because the Secondary Containment being considered is installed inside the High Level Waste Vitrification Building as shown on the drawings, climatic conditions and vehicular traffic are not applicable load cases. The Secondary Containment Design requirements document identifies adequate and appropriate design codes and standards and all applicable load cases (operational stresses) from site specific conditions that must be considered in the design. The procurement subcontract specification for furnishing the stainless steel liner plates includes specific provisions for protection of completed liners during the construction process. Similar specifications for protection of coatings will be developed during the coating selection process. Factors to be considered during coating selection are adequately discussed in the Material Selections for Building Secondary Containment/Leak Detection document.

	Information Assessed	Source of Information	Assessment
Strength	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. 3, Secondary Containment Design; 24590-WTP-3PI-NLLR-00002, 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	Because the Secondary Containment being considered is installed inside the High Level Waste Vitrification Building as shown on the drawings, traffic, heavy equipment, precipitation and frost are not applicable load cases. The Secondary Containment Design requirements document identifies adequate and appropriate design codes and standards and all applicable load cases (operational stresses) from site specific conditions that must be considered in the design. The procurement subcontract specification for furnishing the stainless steel liner plates includes specific provisions for protection of completed liners during the construction process. Similar specifications for protection of coatings will be developed during the coating selection process. Factors to be considered during coating selection are adequately discussed in the Material Selections for Building Secondary Containment document.
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. 3, Secondary Containment Design	These conditions are fully addressed in the Structural Design Criteria and the Secondary Containment Design requirements documents. The design requirements and codes and standards specified are adequate to satisfy these performance goals. The procurement and construction specifications adequately provide for proper foundation construction and installation of the Secondary Containment. The General Arrangement Plan drawing and the associated Cross-Section drawings show the Secondary Containment boundaries.
	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. 4, 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 not less than once each lift to assure adequate compaction. Requirements for testing and record keeping are current and adequate for both 'safety grade' fills and 'commercial grade' fills.

	Information Assessed	Source of Information	Assessment
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.	24590-WTP-DB-ENG-01-001, Rev. 0 Basis of Design; Drawings listed above under References	This requirement is specified in the Basis of Design. Secondary containments being reviewed in this Integrity Assessment are all located inside the High Level Waste Vitrification Building where they are protected from precipitation as shown in the General Arrangement Plan and the associated Cross-Section 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. 0, Basis of Design	The Secondary Containments shown in the General Arrangement Plan at Elevation 0'-0" are inside the High Level Waste Vitrification Building which shields them from precipitation and surface water percolation. The ground water table is located about 200 feet below the floors of the cells at elevation 0'-0" as noted in the Basis of Design.
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. 3, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 0, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates	The Secondary Containment Design requirements document provides adequate and appropriate codes and standards for design of leak tight stainless steel liners. This report (CSA-02-001) also includes appropriate details for design and installation of special protective coatings free of cracks and gaps. The procurement specification for design, fabrication and installation of stainless steel liners identifies construction and inspection processes that are adequate and appropriate for installation of the liners and minimizing cracks or gaps.

	Information Assessed	Source of Information	Assessment
Liner System	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. 3, Secondary Containment Design	The Material Selections Study contains adequate and appropriate general information on the compatibility of planned Secondary Containment stainless steel liners and special protective coatings with the waste. The Secondary Containment Design report provides adequate and appropriate standard details for design and installation of liners and special protective coatings that will prevent migration of the waste into the concrete.

COGEMA ENGINEERING

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BNI-Subcontracts

October 2, 2003

COGEMA-03-0294

D. J. Whiting
Bechtel National, Inc.
Waste Treatment Plant
2435 Stevens Center MS14-3B
Richland, Washington 99352

Dear Ms. Whiting:

STRUCTURAL INTEGRITY ASSESSMENT OF THE HIGH LEVEL WASTE FACILITY ELEVATION 0'-0" SECONDARY CONTAINMENT, REV. 1

The integrity assessment has been completed per the contract requirements and is attached for your use. The assessment found the design intent is sufficient to ensure the foundations and secondary containments will be adequately designed and will have sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection to ensure that they will not collapse, rupture, or fail.

If you have any questions, please contact me at (509) 376-5445, or via facsimile at (509) 372-0504.

Sincerely,

K. V. Scott, Manager
Facilities, Structures & Components

jb

Attachment

cc: D. C. Pfluger w/ attachment

2425 Stevens Center Place, Second Floor, Richland, Washington 99352 Tel: (509) 372-3572 - Fax: (509) 372-3169
COGEMA Engineering Corporation