Bechtel Systems
&
Infrastructure, Inc.

JOB No. 24590

SUPPLIER DOCUMENT STATUS

1. ☐ 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.

	M	P	ML	H	MH	E	C&I	CS&A	PD	PT	ESH
REVIEWED											6/12

G-321 DOCUMENT CATEGORY N/A
[From Supplement A to G-321-E (E) or G-321-V (V), as applicable]

RESPONSIBLE ENGINEER for [illegible] DATE 7/12/02

24590-CM-HC4-HXYG-00138-01-01

SUBCONTRACT SUBMITTAL

7/12/02 7-12-02

Processed/ Data Entry ☒ Copied/ QA ☐ Scanned ☐ Filed

STRUCTURAL INTEGRITY ASSESSMENT OF THE WASTE TREATMENT AND IMMOBILIZATION PLANT

PRETREATMENT SECONDARY CONTAINMENT ELEVATION -45' -0" DESIGN PACKAGE

COGEMA-IA-001
Rev. 0

RPP-WTP
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IQRPE REVIEW – PRETREATMENT SECONDARY CONTAINMENT ELEVATION -45'-0" DESIGN PACKAGE

"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 Pretreatment Secondary Containment Elevation -45'-0" Design Package as required by the Dangerous Waste Regulations, namely, WAC 173-303-640(3) (applicable paragraphs (i.e., (a) through (g)). ~~The project is still in the early phase of final design and parts of the package are still preliminary in detail~~; ~~however~~, the ~~materials~~ documentation reviewed indicate that the design intent fully satisfies the requirements of the WAC.

"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 attached review is 3 sheets numbered 1 through 3.

JOHN T. BAXTER
STATE OF WASHINGTON
16978
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES: 10 / 28 / 02

John T. Baxter

July 3, 2002

Signature Date

24590-CM-HC4-HXYG-00138-01-01

	Information Assessed	Y/N	Source of Information	Assessment
Tank Foundation	Description of Subsurface Conditions and Soil Bearing Capacity are Adequate.	Y	Engineering Specifications: 24590-BOF-3PS-C000-T0001, Rev. 1, Material Testing Services; 24590-BOF-3PS-CE01-T0001, Rev. 2, Excavation and Backfill; 24590-WTP-DC-ST-01-001, Rev. 0, Structural Design Criteria; H-1616-51, RPP-WTP Geotechnical Investigation Report by Shannon & Wilson, Inc., May 2000 (Not Reviewed).	1. 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). 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 sands for foundations is precluded. 2. 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. 3. 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	Y	24590-WTP-DC-ST-01-001, Rev. 0, Structural Design Criteria	The Structural Design Criteria uses current adequate standards to define design loads and load combinations (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 subsection on geotechnical parameters and foundation design.
	Design Calculation Approach and Design Basis of Footings with Design Standard References (e.g., ACI) are Adequate	Y	24590-WTP-DC-ST-01-001, Rev. 0, Structural Design Criteria; RPT-W375-RU00002, Issue 2, TWRS-P Facility Design Basis Earthquake - Peak Ground Acceleration, Seismic Response Spectra, and Seismic Design Approach; 24590-WTP-DB-ENG-01-001, Rev. 0, Basis of Design.	The Structural Design Criteria references current adequate design criteria for the design of concrete foundations and footings. ACI 318-99 is referenced for the design of commercial grade structures and ACI 349-01 is referenced for "safety" grade structures.
	Foundation Material is Compatible with the Soil	Y	24590-WTP-DC-ST-01-001, Rev. 0, Structural Design Criteria; 24590-WTP-DB-ENG-o1-001, Rev. 0, Basis of Design; 24590-WTP-3PS-DB01-t0001, Rev. 1, Engineering Specification for Furnishing and Delivering Ready Mix Concrete; 24590-BOF-3PS-C000-T0001, Rev. 1, Material Testing Services; 24590-WTP-3PS-D000-T0001, Rev. 0, Engineering Specification for Concrete Work.	ICD28 in the Basis of Design indicates that aggregate for the foundation concrete will be taken from Pit 30 as described in the ICD. 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. Aggregates from Pit 30 should be checked for potential Alkali-Silica Reactivity since the coarse aggregates are mostly siliceous rock. Adequate test procedures are provided in the Material Testing Services specification for testing candidate aggregates. Instructions for mixing and delivering Ready-Mix Concrete are adequate and current. The specification for Concrete Work provides adequate requirements for forming the foundations, placing embedments for liners and reinforcing steel, and pouring the concrete. As noted in the Basis of Design document, 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.

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	Information Assessed	Y/N	Source of Information	Assessment
	Foundation will Withstand the Effects of Frost Heave	Y	24590-WTP-DC-ST-01-001, Rev. 0, Structural Design Criteria	The Structural Design Criteria includes adequate provisions to preclude frost heave in the section addressing Lateral Earth Pressure loads. All foundations are required to extend into the soil more than 30 inches below finish grade. The frost line is 30 inches below finished grade.
	Seismic Considerations are Adequate	Y	24590-WTP-DC-ST-01-001, Rev. 0, Structural Design Criteria; RPT-W375-RU00002, Issue 2, TWRS-P Facility Design Basis Earthquake - Peak Ground Acceleration, Seismic Response Spectra, and Seismic Design Approach; 24590-WTP-DB-ENG-01-001, Rev. 0, Basis of Design.	The Structural Design Criteria provides current adequate codes and standards for the design of the secondary containment structures and their liners. Lateral force design requirements for safety grade structures are consistent with guidance in RPT-W375-RU-00002, Issue 2. Lateral force requirements for commercial grade structures are taken from the Uniform Building Code (1997) which is appropriate. Design codes for safety grade structures are ACI 349-01 and AISC N690-1994 for concrete and steel structures respectively. Design codes for commercial grade structures are ACI-318 and AISC M016-89 for concrete and steel respectively.
Secondary Containment	COMPATIBILITY & STRENGTH			
	The stored waste is compatible with its SC and leak detection hardware based on a detailed chemical and physical analysis of the waste(s) used and other information sources	Y	1. Bechtel Letter Contract: BRN-HXYG-0138-105, July 1, 2002 2. 24590-WTP-PER-M-02-001, Material Selections for Building Secondary Containment/Leak Detection, July 1, 2002.	The secondary containment (SC) and leak detection equipment is compatible with the expected stored waste and corrosive chemical spills. The cells and sumps are appropriately lined and any spills are removed and flushed within 24-hr. Two tanks at -45 ft (PWD-VSL-00045 and -00033, per reference 1) are assumed to be catch tanks for cell drains and process overflows. One sump serves both tanks. The tank cell floor and walls are to be lined with leak-tight type 304L stainless steel. The wet sump is made of appropriate materials as defined in reference 2. The leak detection equipment material is to have equal or better corrosion resistance than the sump material.
	The design indicates that the SC 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).	Y	24590-WTP-DB-ENG-01-001, Rev. 0, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 0, Secondary Containment Design	These general requirements are stated as general design goals in the Basis of Design document. The explicit design codes and standards, loads and load combinations are stated in the Secondary Containment Design document. These requirements and codes and standards are adequate for the design. Since the secondary containments are located in vaults in the Pretreatment Building rather than directly buried, pressure gradients and vehicular traffic are not applicable load cases.
	The SC system has sufficient strength in the presence of operational stresses from site-specific conditions (i.e. traffic, heavy equipment, precipitation, frost).	Y	24590-WTP-DB-ENG-01-001, Rev. 0, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 0, Secondary Containment Design; 24590-WTP-3PS-NLLR-T0002, Rev. 0, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates.	Because the secondary containment is installed inside the pretreatment building, precipitation and frost are not applicable load cases. The procurement subcontract specification for furnishing the liner plates includes specific provisions for protection of completed liners during the construction process.
	FOUNDATION INTEGRITY			
	The SC is properly supported by a foundation or base in order to prevent failure from settlement, compression, or uplift, including the residual effects of installation	Y	24590-WTP-DB-ENG-01-001, Rev. 0, Basis of Design; 24590-WTP-PER-CSA-02-001, Rev. 0, Secondary Containment Design; 24590-WTP-DC-ST-01-001, Rev. 0, Structural Design Criteria.	These conditions are fully addressed in the reference design criteria documents. The design requirements and codes and standards specified are adequate to satisfy these requirements.
	The placement, structural support, and type of material used for backfill around and below the SC are appropriate.	Y	24590-BOF-3PS-CE01-T0001, Rev. 2, Engineering Specification for Excavation and Backfill; 24590-BOF-3PS-C000-T0001, Rev. 1, Technical 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 after 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.

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	Information Assessed	Y/N	Source of Information	Assessment
	LINER SYSTEM			
Secondary Containment	Designed to contain 100% of the capacity of the largest tank within its boundary.	Y	24590-WTP-DB-ENG-01-001, Rev. 0 Basis of Design.	This requirement is specified the Environmental section of the Basis of Design document. Reference materials furnished for the review are general design requirements, design and contract specifications and preliminary drawings that reflect the design intent. The draft WTP operating permit indicates the design will meet this requirement.
	The design or operation (e.g. diking & curbing) prevents run-on or infiltration of precipitation into the SC system unless the collection system has sufficient excess capacity (25 yr rainfall) to contain the run-on or precipitation.	Y	24590-WTP-DB-ENG-01-001, Rev. 0 Basis of Design. WTP Draft Operating Permit # WA 7890008967.	This requirement is specified in the Environmental section of the Basis of Design document. In addition, all secondary containments for tanks being reviewed are located in the interiors of the Pretreatment, Low-Activity Waste Vitrification and High-Level Waste Vitrification buildings.
	The design includes an external moisture barrier or other means to prevent moisture from entering the vault.	Y	24590 PTF P1 P01T P0006, Rev. 0, PRETREATMENT FACILITY GENERAL ARRANGEMENT PLAN AT EL (-)45'-0"; 24590 PTF P1 P01T P0009, Rev. 0, PRETREATMENT FACILITY GENERAL ARRANGEMENT SECTION C-C; 24590-WTP-DB-ENG-01-001, Rev. 0, Basis of Design.	The tanks and vaults shown on the general arrangement plan at elevation (-) 45'-0" lie below the Pretreatment Building which shields them from surface water percolation. Presumably, the Pretreatment Building will have provisions for control of rainwater runoff consistent with the Hanford Site State Waste Discharge Permit Number ST 4510 discussed in the Basis of Design document. The ground water table is located about 200 feet below the floor of the vault at elevation (-) 45'-0" as noted above.
	The containment area is free of cracks or gaps and the design discusses methods of their minimization (e.g. waterstops, installation practices).	Y	Prime Subcontract 24590-QL-SRA-MTF5-00001, Rev. 1, Service Requisition - 4 Pack/SS Liner Plate; 24590-WTP-3PS-NLLR-T0002, Rev. 0, Engineering Specification for Furnishing, Detailing, Fabrication, Delivery and Installation of Stainless Steel Liner Plates; 24590-WTP-3PS-SS00-T0002, Rev. 1, Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel ; 24590-WTP-PER-CSA-02-001, Rev. 0, Secondary Containment Design.	Both the Secondary Containment Design documentation and the Prime Subcontract documentation provide current adequate requirements and codes and standards to provide leak tight stainless steel liners for secondary containment. Construction processes are adequately described and appropriate for installation of the liners. Standard details shown in the Secondary Containment Design package are consistent with the Prime Subcontract for the S/S liners.
	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 compatibilities with the stored waste. The lining or coating must prevent the waste from migrating into the concrete.	Y	24590-WTP-PER-M-02-001, Rev. 0, Material Selections for Building Secondary Containment/Leak Detection; 24590-PTF-M6-PWD-00012, Rev. B, P&ID - PTF Plant Wash & Disposal System C5/R5 Process Cell Sumps (Q)	The Material Selection Study contains general information on the compatibility of planned stainless steel liners and protective coatings with the secondary containment concrete. Based on the P&ID for PWD-SUMP-00040 the liner in the (-) 45'-0" elevation cells is stainless steel. See the first item under the heading COMPATIBILITY & STRENGTH for additional assessment information.
	The seals (e.g. waterstops) used in the joints are compatible with the waste.	N/A	Not Applicable	The (-) 45'-0" elevation secondary containments are lined with stainless steel. Waterstops are not required.

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COGEMA ENGINEERING

July 8, 2002

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BY PDC

M. T. Rogers
Bechtel National, Inc. MS9-B
Waste Treatment Plant
3000 George Washington Way
Richland, Washington 99352

Dear Mr. Rogers:

STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT SECONDARY CONTAINMENT ELEVATION -45' -0" DESIGN PACKAGE FOR THE WASTE TREATMENT AND IMMOBILIZATION PLANT.

The subject integrity assessment has been completed per the contract requirements and is attached for your use and comment. The assessment found the design intent is sufficient to ensure the foundation and secondary containment will be adequately designed and that the foundation and secondary containment will have sufficient structural strength, compatibility with the waste(s) to be stored or treated, and corrosion protection to ensure that it 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

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

kld

Attachment

cc: D. C. Pfluger MS4-E2 w/ attachment

7/8/02

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