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December 9, 2009

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

BY PDC

Dear Ms. Broadbent:

**BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00211
IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR HLW
HSH TANKS (HSH-TK-00001/2)
(IA-3002325-000)**

The integrity assessment of the subject tanks has been completed per the contract requirements and is enclosed for your use. The assessment found that the design is sufficient to ensure that each tank 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

**IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
HLW HSH TANKS (HSH-TK-00001/2)**

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
HLW HSH TANKS (HSH-TK-00001/2)**

"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 HLW HSH Tanks (HSH-TK-00001/2), as required by the Washington Administrative Code, *Dangerous Waste Regulations*, Section WAC-173-303-640(3) (a) through (g) applicable components."

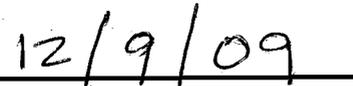
"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, 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 ten (10) pages numbered one (1) through ten (10).




Signature


Date

**IQRPE Structural Integrity Assessment Report for HLW HSH
Tanks (HSH-TK-00001/2)**

IA-3002325-000

Scope	Scope of this Integrity Assessment	This Integrity Assessment includes two HSH system Decontamination Tanks (HSH-TK-00001/2) located at Floor Elevation 0'-0" in Room H-0310A and Room H-0304A, respectively, of the HLW Vitrification Building as shown on general arrangement drawing (24590-HLW-P1-P01T-00002).
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 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, WAC-173-303-640, Tank Systems.</i>	

References	<p><u>Material Requisition:</u> 24590-CM-MRA-HDYR-00001, Rev. 4, Maintenance Decontamination Equip C/DS (MH051) (VHCQ)(ECI)(PUREX)</p> <p>The following Specifications with their respective revision and specification change notices are listed directly in the Material Requisition or are indirectly embedded in the specification listed in the MR:</p> <p>24590-WTP-3PS-MV00-T0001, Engineering Specification for Pressure Vessel Design and Fabrication; 24590-WTP-3PS-G000-T0001, General Specification for Supplier Quality Assurance Program Requirements; 24590-WTP-3PS-G000-T0002, Engineering Specification for Positive Material Identification (PMI); 24590-WTP-3PS-G000-T0003, General Specification for Packaging, Shipping, Handling, and Storage Requirements; 24590-WTP-3PS-FB01-T0001, Engineering Specification for Structural Design Loads for Seismic Category III/IV Equipment and Tanks; 24590-WTP-3PS-HD00-T0001, Engineering Specification for Maintenance Decontamination Equipment; 24590-WTP-3PS-MTSS-T0001, Engineering Specification for Tank Welding; 24590-WTP-3PS-SS00-T0002, Engineering Specification for Welding of Structural Stainless Steel and Welding of Carbon Steel to Stainless Steel; 24590-WTP-3PS-P000-T0001, Engineering Specification for Piping Material Classes.</p> <p><u>Vendor Fabrication Drawings (**Code 1 and 2 Drawings):</u> 24590-CM-POA-HDYR-00001-06-00035, Rev. 00G, HSH Decon Tank No.1 Assembly; 24590-CM-POA-HDYR-00001-06-00036, Rev. 00H, HSH Decon Tank Sub-Assembly; 24590-CM-POA-HDYR-00001-06-00037, Rev. 00I, HSH Decon Tank Weldment & Details; 24590-CM-POA-HDYR-00001-06-00038, Rev. 00I, HSH Decon Tank Weldment & Details; 24590-CM-POA-HDYR-00001-06-00039, Rev. 00H, HSH Decon Tank Weldment & Details; 24590-CM-POA-HDYR-00001-06-00058, Rev. 00E, HSH Decon Tank No. 2 Assembly; 24590-CM-POA-HDYR-00001-06-00046, Rev. 00F, HSH Pump Support Package Assembly.</p> <p>**Code 1 Drawing is an “as fabricated vendor drawing” approved/accepted by Bechtel National Inc. Code 2 Drawing is an “as fabricated vendor drawing” approved/accepted by Bechtel National Inc., with comments.</p> <p><u>Plant Drawings:</u> 24590-HLW-M6-HSH-00004, Rev. 1, P&ID-HLW System HSH Melter Cave 1 Decontamination System; 24590-HLW-M6-HSH-20004, Rev. 1, P&ID-HLW System HSH Melter Cave 2 Decontamination System; 24590-HLW-M0-HSH-00072, Rev. 2, HLW Vitrification System HSH Design Proposal Drawing Decontamination Tank; 24590-HLW-M0-HSH-00075, Rev. 1, HLW Vitrification System HSH Melter Caves 1 & 2 Design Proposal Drawing Decontamination Tank Process Diagram; 24590-HLW-P1-P01T-00002, Rev. 7, HLW Vitrification Building General Arrangement Plan at Elev. 0’-0”; 24590-HLW-P1-P01T-00008, Rev. 11, HLW Vitrification Building General Arrangement Sections A-A, B-B, & C-C; 24590-HLW-P1-P01T-00009, Rev. 11, HLW Vitrification Building General Arrangement Sections D-D, E-E, & F-F; 24590-HLW-P1-P01T-00011, Rev. 11, HLW Vitrification Building General Arrangement Sections J-J & K-K.</p>
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Information Assessed	Source of Information	Assessment
<p>Design</p> <p>Tank design standards are appropriate and adequate for the tank's intended use.</p>	<p>Specifications, Material Requisition and Drawings listed above under References;</p> <p>American Petroleum Institute Standard API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks, 10th Edition; ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers.</p>	<p>The Engineering Specification for Maintenance Decontamination Equipment requires the HSH system Decontamination Tanks (HSH-TK-00001/2) to be designed and fabricated in accordance with API 620 Standard and Specification for Tank Welding. Tanks appurtenances are to be designed per Specification for Pressure Vessel Design and Fabrication requirements. The tanks are not to be stamped. The Quality Level of the tanks is CM (commercial), safety class is APC (additional protection class), and Seismic Criteria is SC-III. The associated pipes are to be designed per ASME B31.3 and Specification for Piping Material Classes. Supplementary requirements are specified in the Engineering Specification for Pressure Vessel Design and Fabrication. The above standards, codes, and specifications provide requirements for tank analysis, positive material identification, lifting attachment design, fabrication tolerances, acceptable welding procedures for the tanks and appurtenances, welder qualifications and testing records, NDE inspections and records, packaging, shipping, handling and storage requirements. These tanks are vertical with a 72 in. ID cylinder by 222 in. high, from bottom to top with a conical bottom extension and an open top. The over all height of each tank inclusive of supports is 274 in. The tanks are built with 1/2" thick plate and are supported on four legs which in turn are supported from and anchored to the concrete floor. Material for the tanks and appurtenances is 316L stainless steel. The standards listed above are adequately appropriate for the intended use of the tanks.</p>

	Information Assessed	Source of Information	Assessment
<p>Design (cont'd)</p>	<p>If a non-standard tank is to be used, the design calculations demonstrate sound engineering principles of construction.</p>	<p>Specifications, Material Requisition, and Drawings listed above under References;</p> <p>American Petroleum Institute Standard API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks, 10th Edition; 24590-CM-POA-HDYR-00001-05-00003, Rev. 00H, HSH Decontamination Tank Code (Design Calculation); 24590-CM-POA-HDYR-00001-05-00007, Rev. 00B, HSH Tank Thermal Design Calculation.</p>	<p>The Engineering Specification for Maintenance Decontamination Equipment requires that the HLW Decontamination Tanks (HSH-TK-00001/2) are designed and fabricated as standard tanks in accordance with the provisions of the API-620 Standard. Supplemental design information is included in the specifications for utilizing sound engineering principles of construction for the tank. Each tank is a shop fabricated tank that is delivered to the WTP site after design, fabrication, and testing to the requirements of the Engineering Specification for Maintenance Decontamination Equipment and API-620 Standard. Review of the HSH Tank Design Calculation documents show that the tanks have been designed as a standard tanks per applicable requirements of API-620 Standard and other documents listed in the Material Requisition for the tanks. The aforementioned statements and the vendor fabrication drawings reviewed demonstrate that sound engineering principles of construction and fabrication have been used for the tanks.</p>

Information Assessed	Source of Information	Assessment
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Design (cont'd)</p> <p>Tank has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.</p>	<p>Specifications, Drawings, and Material Requisition listed above under References;</p> <p>American Petroleum Institute standard API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks, 10th Edition; 24590-CM-POA-HDYR-00001-05-00003, Rev. 00H, HSH Decontamination Tank Code (Design Calculation); 24590-CM-POA-HDYR-00001-05-00007, Rev. 00B, HSH Tank Thermal Design Calculation. 24590-WTP-3DP-G04T-00905, Rev. 10A, Determination of Quality Levels.</p>	<p>The Specification for Maintenance Decontamination Equipment identifies the tanks' operating pressure and temperature ranges, the materials selected for the tanks, the corrosion allowance, and the tank quality level and seismic category which determine the requirements for seismic design. The HLW Tanks (HSH-TK-00001/2) are Quality Level (CM) and Seismic Category (SC-III). The Specification for Maintenance Decontamination Equipment and API 620 Standard require specific consideration of the operating pressures and temperatures and seismic loads in the design process. API-620 Standard requires that corrosion allowance thickness be added to the nominal tank design thickness when evaluating the adequacy of the tank components for these loads at end of its life. Detailed requirements for seismic analysis and load determination are furnished in the API-620 Standard and the Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks; including a discussion of Seismic Categories. Quality Levels are discussed in detail in the Determination of Quality Levels document. Review of the HSH Design Calculation documents shows that the tanks have adequate strength after the appropriate consideration of corrosion allowance, operating temperature and pressure, seismic, and other applicable loads such as suspended loads have been accounted for. Furthermore, approval and acceptance of the vendor fabrication drawings by Bechtel National, Inc. (BNI) is an added assurance that all applicable requirements stated above and as described in documents (including daughter documents) listed in Material Requisition for the tanks have been met.</p>

Information Assessed		Source of Information	Assessment
Foundation	Tank foundation will maintain the load of a full tank.	<p>Specifications listed above under References;</p> <p>American Petroleum Institute Standard API-620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks, 10th Edition; 24590-WTP-DB-ENG-01-001, Rev. 1O, Basis of Design; 24590-CM-POA-HDYR-00001-05-00003, Rev. 00H, HSH Decontamination Tank Code (Design Calculation); 24590-CM-POA-HDYR-00001-05-00007, Rev. 00B, HSH Tank Thermal Design Calculation.</p>	<p>The Engineering Specification for Maintenance Decontamination Equipment and API-620 Standard both specify requirements that ensure adequate design of tank supports. The design load cases include the load of a full tank. Review of the HSH Tanks Design Calculation documents show that the tank supports have adequate strength to maintain the loads of full tank and are anchored to the tank and floor. Furthermore, Chapter 14 of the Basis of Design document requires that the foundation underlying the tank support must be adequate to support the loads from full tank, which is out of scope of this assessment. The assessment of the adequacy of the underlying foundation is part of a separate integrity assessment report for the secondary containment of the tank.</p>
	If in an area subject to flooding, the tank is anchored.	<p>Specifications listed above under References;</p> <p>24590-HLW-PER-M-02-003, Rev. 3, Flood Volume for the HLW Facility.</p>	<p>The Engineering Specification for Maintenance Decontamination Equipment includes the requirement that the tank supports and anchors shall be designed for the load case where the tank is empty and externally fully submerged. However, the Flooding Volume document shows that the computed flood height in Rooms H-0304A and H-0310A is 3.22 ft (38.64 in.) above the floor level which is lower than the tank's supporting 4 legs height of 47.5 in., therefore, no buoyant forces act on the tank and hence there is no need for such consideration for these tanks. However, the supports are adequately anchored to the floor.</p>

Information Assessed		Source of Information	Assessment
Foundation (cont'd)	Tank system will withstand the effects of frost heave.	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 12, Structural Design Criteria.	The Structural Design Criteria requires that structural foundations for all outdoor equipment shall extend into the surrounding soil below the frost line to preclude frost heave effects. The frost line for structural foundations is 30 in. The HLW foundation mat as shown on the drawings is at Floor Elev. (-) 21'-0" and tanks (HSH-TK-00001/2) located at Floor Elev. 0'-0" in Rooms H-0310A/H-0304A inside the HLW building are not subjected to frost heave effects.
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (dangerous waste characteristics, specific gravity, vapor pressure, flash point, storage temperature)	Plant Item Material Selection Data Sheet, 24590-HLW-N1D-HSH-P0001, Rev. 0, HSH-TK-00001 & 2 (HLW) Decontamination Tank Melter Cave 1 and 2; 24590-WTP-PER-PR-03-002, Rev. 3, Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems; 24590-WTP-PER-PR-03-001, Rev. 1, Prevention of Hydrogen Accumulation in WTP Tank Systems and Miscellaneous Treatment Unit Systems.	The Plant Item Material Selection Data Sheet document addresses various waste characteristics (extracted from other documents) including the pH range and chemical composition of the waste to select appropriate tank materials and recommends corrosion allowance. Dangerous waste characteristics are appropriately addressed in the Control of Toxic Vapors and Emissions document and Prevention of Hydrogen Accumulation document. These two documents do not specifically list the HSH tanks to exhibit any dangerous waste characteristics. The HSH tanks provide primary confinement of the waste during normal operations, abnormal operations, and during and after a Design Basis Earthquake. The tanks are expected to contain nitric acid up to 2M. Other chemicals may be used in the future, requiring further evaluation. The present evaluation has assumed that chlorides, including HCl, will not be added to the tanks.

Information Assessed		Source of Information	Assessment
Waste Characteristics (cont'd)	Tank is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Specifications listed above under References; Plant Item Material Selection Data Sheet, 24590-HLW-N1D-HSH-P0001, Rev. 0, HSH-TK-00001 & 2 (HLW) Decontamination Tank Melter Cave 1 and 2.	The Specification for Maintenance Decontamination Equipment states that decontamination chemicals will be injected along with neutralizing reagents. The Plant Item Material Selection Data Sheet demonstrates that the tanks are to be designed to process the wastes discussed above. The fluids from the tanks are pumped to a radioactive waste disposal system for further processing.
	The waste types are compatible with each other.	Specifications listed above under References; Plant Item Material Selection Data Sheet, 24590-HLW-N1D-HSH-P0001, Rev. 0, HSH-TK-00001 & 2 (HLW) Decontamination Tank Melter Cave 1 and 2.	The decontamination entails the removal of unwanted radioactive fixed and loose contaminants using various mechanical and chemical methods. The primary function of these Decontamination Tanks is to decontaminate large equipment using liquid spray and/or soaking. The Plant Item Material Selection Data Sheet or the Specification for Maintenance Decontamination Equipment did not describe or identify where any incompatible liquids or chemicals are mixed in the decontamination process.

	Information Assessed	Source of Information	Assessment
Corrosion Protection	<p>Tank material and protective coatings ensure the tank structure is adequately protected from the corrosive effects of the waste stream and external environments (expected to not leak or fail for the design life of the system)</p>	<p>Drawings and Specifications listed above under References;</p> <p>Plant Item Material Selection Data Sheet, 24590-HLW-N1D-HSH-P0001, Rev. 0, HSH-TK-00001/00002 (HLW) Decontamination Tank Melter Cave 1 and 2; 24590-CM-POA-HDYR-00001-05-00003, Rev. 00H, HSH Decontamination Tank Code (Design Calculation).</p>	<p>The Plant Item Material Selection Data Sheet shows that the HSH Decontamination Tanks (HSH-TK-00001/2) normally operate at atmospheric pressure, a nearly zero pH value, and at a temperature of 95°F. The Specification for Maintenance Decontamination Equipment specifies the tanks to be designed for a temperature of 212°F. Decontamination liquids are considered to contain nitric acid up to 2M. The tanks assembly drawings show the material as 316 L stainless steel as recommended in the Plant Item Material Selection Data Sheet. The Plant Item Material Selection Data Sheet also recommends corrosion allowance of 0.04 in., however, conservative corrosion allowance of 0.125 in. was used in the tank Design Calculation. The HSH tanks are located in the HLW Rooms H-0310A and H-0304A. These rooms are equipped with sumps to pump out any accumulation of liquid in them.</p>

Information Assessed		Source of Information	Assessment
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the tank.	Drawings listed above under References; Plant Item Material Selection Data Sheet, 24590-HLW-N1D-HSH-P0001, Rev. 0, HSH-TK-00001/00002 (HLW) Decontamination Tank Melter Cave 1 and 2; 24590-CM-POA-HDYR-00001-05-00003, Rev. 00H, HSH Decontamination Tank Code (Design Calculation); 24590-CM-POA-HDYR-00001-05-00007, Rev. 00B, HSH Tank Thermal Design Calculation.	The bases for the HSH tanks' material selection and the minimum recommended corrosion allowance are furnished in the Plant Item Material Selection Data Sheet. The 316 L stainless steel material with 0.04 in. corrosion allowance is recommended for the tanks, however, Design Calculation conservatively used corrosion allowance of 0.125 in. Selection of material and corrosion allowance used is adequate and appropriate for the 40-year service life of the tank.
Pressure Relief	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the tank are exceeded.	Drawings listed above under References.	The HSH Decontamination Tanks (HSH-TK-00001/2) are designed to overflow through a 4" diameter unrestricted line, as shown on the drawings, which will prevent their over pressurization. Also the tanks are built with removable fitted top lid (used during decontamination operation process); therefore, the tanks cannot be pressurized.



Master Distribution Schedule for WTP Project Subcontract Management Group

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Subcontract Number:	24590-CM-HC4-HXYG-00211
Subcontract Title:	Tank Integrity Design Assessments
Subcontractor Name:	AREVA Federal Services LLC
Subcontract Administrator:	Jennifer Broadbent

PDC Document Number	Rev	Document Title	Rev
CCN #169562		IQRPE Structural Integrity Assessment Report For HLW HSH Tanks (HSH-TK-00001/2) (IA-3002325-000)	

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Master Distribution Schedule for WTP Project Subcontract Management Group

Subcontract Number:	24590-CM-HC4-HXYG-00211
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