24590-CM-HC4-HXYG-00138	- 02 - 00050	00A
PO/SCT	**Submittal**	**Rev**

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]

Accepted by DC Affinger _____ 11/16/04
Print Name Signature Date

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

TP0406_34 7-04

SUBCONTRACT SUBMITTAL

STRUCTURAL INTEGRITY ASSESSMENT OF THE HIGH LEVEL WASTE (HLW) MELTER CAVE SUPPORT HANDLING SYSTEM (HSH) DECONTAMINATION TANKS (HSH-TK-00001/2)

COGEMA-IA-076
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.

R10424844

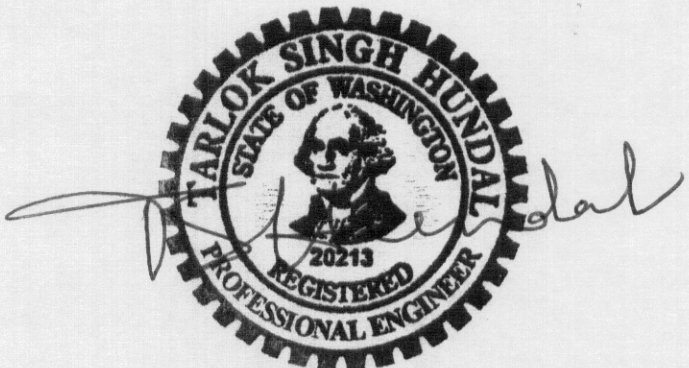
IQRPE REVIEW
OF
THE HIGH LEVEL WASTE (HLW)
MELTER CAVE SUPPORT HANDLING SYSTEM (HSH)
DECONTAMINATION TANKS (HSH-TK-00001/2)

"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 High Level Waste (HLW) Melter Cave Support Handling System (HSH) Decontamination 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 intent fully satisfies the requirements of the WAC.

The attached review is six (6) pages numbered one (1) through six (6).



EXPIRES: 02/15/06

T S Hundal

Signature

11-12-04

Date

24590-CM-HC4-HXYG-00188-02-00050 REV.00A

Scope	Scope of this Integrity Assessment	This Integrity Assessment includes two HSH system Decontamination Tanks (HSH-TK-00001/2) located in room H-0310A and room H-0304A, respectively, in the HLW Vitrification Building:
References	Specifications, Drawings	The following Specifications with their respective revision and specification change notices are listed directly in the Material Requisition No. 24590-CM-MRA-HDYR-00001, Rev. 3 or are indirectly embedded in the specification listed in this MR: 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. Drawings: 24590-HLW-M0-HSH-00071, Rev. 0, HLW Vitrification System HSH Melter Caves 1 & 2 Design Proposal Drawing Decontamination Tank Assembly; 24590-HLW-M0-HSH-00072, Rev. 1, HLW Vitrification System HSH Design Proposal Drawing Decontamination Tank; 24590-HLW-M0-HSH-00075, Rev. 1, HLW Vitrification System HSH Design Proposal Drawing Decontamination Tank Process Flow Diagram; 24590-HLW-P1-P01T-P0002, Rev. 3, HLW Vitrification Building General Arrangement (Permit) Plan at EL. 0'-0"; 24590-HLW-P1-P01T-P0008, Rev. 7, HLW Vitrification Building General Arrangement (Permit) Sections A-A, B-B, and C-C; 24590-HLW-P1-P01T-P0009, Rev. 6, HLW Vitrification Building General Arrangement (Permit) Sections D-D, E-E, and F-F; 24590-HLW-P1-P01T-P0011, Rev. 7, HLW Vitrification Building General Arrangement (Permit) Sections J-J & 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 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	Assessment
Design	Tank design standards are appropriate and adequate for the tank's intended use.	Specifications listed under Material Requisition and Drawings listed above under References; 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.	The Engineering Specification for Maintenance Decontamination Equipment requires the HSH system Decontamination Tanks, HSH-TK-00001/00002, to be designed and fabricated in accordance with API 620 standard and Specification for Tank Welding and their appurtenances 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 RRC (risk reduction 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, equipment drop evaluation, fabrication tolerances, acceptable welding procedures for the tanks and appurtenances, welder qualifications and testing records, NDE inspections and records, and lifting, packaging, shipping, handling and storage requirements. These are adequate and acceptable design standards for the intended use of the tanks. These tanks are vertical with a 72 in. ID cylinder by 218 in. high, from bottom to top with a conical bottom and an open top. The tanks are built with 1/2" minimum 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.
	If a non-standard tank is to be used, the design calculations demonstrate sound engineering principles of construction.	Specifications listed under Material Requisition and Drawings listed above under References.	The HSH Decontamination Tanks, HSH-TK-00001/00002 are standard API 620 tanks. The Specification for Maintenance Decontamination Equipment requires that these tanks be delivered after design, fabrication, inspection, and testing. Supplemental design information is provided by the reference documents listed in the Source of Information column for utilizing sound engineering principles of construction of the tanks.

Information Assessed		Source of Information	Assessment
Design	Tank has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Specifications listed under Material Requisition and Drawings listed above under References; American Petroleum Institute standard API 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks, 10th Edition.	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 Specification for Maintenance Decontamination Equipment requires specific consideration of the operating pressures and temperatures and seismic loads in the design process. API 620 states that when corrosion is expected on any part of the tank including its appurtenances, additional metal thickness in excess of design computations shall be provided and shall be at least equal to the expected corrosion loss during the desired life of the tank. API 620 also addresses seismic design and analysis of the tanks. Detailed supplemental requirements for seismic load determination are furnished in the Specification for Seismic Category III/IV Equipment and Tanks. These codes, standards, and specifications are adequate and appropriate for the design of the HSH tanks to withstand operating pressure and temperature loads and seismic loads for the specified design life.

	Information Assessed	Source of Information	Assessment
Foundation	Tank foundation will maintain the load of a full tank.	Specifications listed under Material Requisition above under References; AISC Manual of Steel Construction, 9th Edition, American Institute of Steel Construction; 24590-WTP-DB-ENG-01-001, Rev. 1B, Basis of Design.	The Engineering Specification for Pressure Vessel Design and Fabrication requires the use of AISC Manual of Steel Construction for the design of the tank supports. This code ensures an adequate design for the tank supports. Chapter 14 of the Basis of Design document requires that the tank foundation design must be adequate to support the loads from the full tank.
	If in an area subject to flooding, the tank is anchored.	Specifications listed under Material Requisition under References.	The Specification for Maintenance Decontamination Equipment requires the supports and anchors to be designed to secure a buoyant tank in case the tank is empty and fully submerged.
	Tank system will withstand the effects of frost heave.	24590-WTP-DB-ENG-01-001, Rev. 1B, Basis of Design.	The Basis of Design document requires that all structural foundations for outdoor equipment extend a distance below grade that exceeds the 30" depth of the frost line. These tanks are located inside/interior of the building floor at grade-level, therefore, the tank foundations are not subject to the frost heave effects.

	Information Assessed	Source of Information	Assessment
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, storage temperature)	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-WTP-PER-PR-03-002, Rev. 1, Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment 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 addresses the pH range and chemical composition of the waste to select appropriate tank materials and specify the corrosion allowance. Waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are appropriately addressed in the Toxic Vapors and Emissions document and Prevention of Hydrogen Accumulation document. These two documents do not specifically list these HSH tanks to exhibit any hazardous 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.
	Tank is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Specifications listed under Material Requisition 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.	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 under Material Requisition 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.	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 or blasting methods. 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	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)	Drawings and Specifications 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.	The Plant Item Material Selection Data Sheet shows that the HSH Decontamination Tanks, HSH-TK-00001/00002 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 240°F. Decontamination liquids are considered to contain nitric acid up to 2M. The tanks assembly drawings show the material as 316 L stainless steel and corrosion allowance of 0.125 in. 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. Therefore, the rooms' environment should remain dry during normal operations which will limit external corrosion of the tanks over the facility design life.
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.	The bases for the HFP 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 to be used and 0.125 in. corrosion allowance required for the tanks are shown on the drawings for the tank assembly. Selection of material and corrosion allowance is adequate and appropriate for the 40 year service life.
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-00001/00002 are designed to overflow through a 4" diameter unrestricted line, as shown on the drawings, which will prevent their over pressurization.