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										E+WS

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 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-00138-02-00017
REV. 00A

SUBCONTRACT SUBMITTAL

Best Available Copy

R10270979

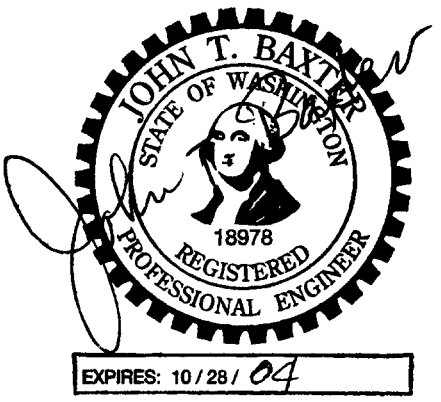
IQRPE REVIEW –
PRETREATMENT FACILITY ELEVATION 0'-0" RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM (RLD) ANCILLARY EQUIPMENT

"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 Facility Elevation 0'-0" Radioactive Liquid Waste Disposal System (RLD) Ancillary Equipment 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 nine (9) sheets numbered one (1) through nine (9).



John T. Baxter
Signature

03/11/2004
Date

KS 3/11/04

24590-CM-HCA-HXYG-~~000~~
-00138-02-00017, REV 00A

STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT FACILITY ELEVATION 0'-0" RADIOACTIVE LIQUID WASTE DISPOSAL SYSTEM (RLD) ANCILLARY EQUIPMENT

COGEMA-IA-038
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.

Scope	Scope of this Integrity Assessment	This Integrity Assessment addresses ancillary equipment for the Pretreatment Facility (PTF) Radioactive Liquid Waste Disposal System RLD. This includes: a. Two Process Condensate Tanks (RLD-TK-00006A/B) located north of the PTF in a secondary containment basin 2 ft. below grade. The ancillary equipment associated with these tanks is shown on P&ID drawings 24590-PTF-M6-RLD-P0001 and –P0002. b. Two Alkaline Effluent Vessels (RLD-VSL-00017A/B) are located inside the PTF in Room P-0118 which is a R2/C3 area. The ancillary equipment associated with these tanks is shown on P&ID drawing 24590-PTF-M6-RLD-P0003. c. Ancillary equipment for the RLD System Process Condensate Distribution Lines is shown on P&ID drawing 24590-PTF-M6-RLD-P0004; d. Ancillary equipment for the Wash Racks for tanks RLD-VSL-00017A/B are shown on P&ID drawing 24590-PTF-M6-RLD-P0006. Ancillary equipment located inside the RLD system tanks and vessels is addressed separately in the Integrity Assessments for these components. Direct buried double containment transfer lines located outside the Pretreatment Facility are outside the scope of this Integrity Assessment.

References	Drawings and System Description	24590-PTF-P1-P01T-P0001, Rev. 2, Pretreatment Facility General Arrangement Plan at Elev. 0'-0"; 24590-PTF-P1-P01T-P0013, Rev. 3, Pretreatment Facility General Arrangement Sect. H-H and Sect. J-J; 24590-PTF-M5-V17T-P0022003, Rev. 0, Process Flow Diagram Pretreatment Radioactive Liquid Disposal (RLD) Systems PWD/RLD; 24590-PTF-M5-V17T-P0022004, Rev. 0, Process Flow Diagram Pretreatment Radioactive Liquid Disposal/Recycle System (RLD); 24590-PTF-M6-RLD-P0001, Rev. 0, P&ID – PTF Radioactive Liquid Waste Disposal System Process Condensate RLD-TK-00006A/B (Q); 24590-PTF-M6-RLD-P0002, Rev. 0, P&ID – PTF Radioactive Liquid Waste Disposal System Process Condensate RLD-PMP-00011A/B, 12A/B & 14A/B; 24590-PTF-M6-RLD-P0003, Rev. 0, P&ID – PTF Radioactive Liquid Waste Disposal System Effluent Collection RLD-VSL-00017A/B & RLD-PMP-00005A/B (Q); 24590-PTF-M6-RLD-P0004, Rev. 0, P&ID – PTF Radioactive Liquid Waste Disposal System Process Condensate Distribution; 24590-PTF-M6-RLD-P0006, Rev. 0, P&ID – PTF Radioactive Liquid Waste Disposal System Plant Wash; 24590-PTF-3YD-PWD-00001, Rev. 1, System Description for Plant Wash and Disposal System PWD and Radioactive Liquid Waste Disposal System RLD

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	Discussion
Design	Ancillary equipment design standards are appropriate and adequate for the equipment's intended use.	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev 2, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; 24590-WTP-PSAR-ESH-01-002-02, Rev. 1a, Preliminary Safety Analysis Report (PSAR) to Support Construction Authorization, PT Facility Specific Information	The Pipe Stress Design Criteria identifies ASME B31.3 as the design code for piping systems of the WTP. The P&ID drawings show the ancillary equipment piping and components as Seismic Category (SC-III) and Quality Level (Non-Quality Related). The Pipe Stress Design Criteria document provides a detailed discussion of seismic categories. Quality Levels are discussed in the PSAR. These codes and standards are acceptable and adequate for the design of the ancillary piping for the intended service.
	If the ancillary equipment to be used is not built to a design standard, the design calculations demonstrate sound engineering principles of construction.	24590-WTP-DC-PS-01-001, Rev 2, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"	The ancillary equipment is built to design standards. The Pipe Stress Design Criteria specifies that piping is to be designed in accordance with ASME B31.3.

	Information Assessed	Source of Information	Discussion
Design	Ancillary equipment has adequate strength at the end of its design life to withstand the operating pressure, operating temperature, thermal expansion, and seismic loads. Equipment is protected against physical damage and excessive stress due to settlement, vibration, expansion, or contraction.	24590-WTP-DC-PS-01-001, Rev 2, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; 24590-WTP-PER-M-02-002, Rev 0, Materials for Ancillary Equipment; Uniform Building Code (UBC), International Conference of Building Officials, 1997; ASME Boiler and Pressure Vessel Code, Section III, Division 1, Rules for Construction of Nuclear Facility Components, 1995; 24590-WTP-VV-PS-01-001, Rev. 1, Verification and Validation Report for ME101, Linear Elastic Analysis of Piping, Version N6	The Pipe Stress Design Criteria requires the use of the ASME B31.3 Code for piping design. ASME B31.3 requires explicit consideration of operating pressure, operating temperature, thermal expansion/contraction, settlement, vibration, and corrosion allowance in the design of piping. The Materials for Ancillary Equipment document requires that the material selection and corrosion/erosion allowances for ancillary equipment in contact with the waste will be equal to or better than the material and corrosion allowance of the waste source vessel. ASME III, Division1, Subsection NC and Appendix F, and the Uniform Building Code (UBC) are used to supplement the requirements of ASME B31.3 for seismic design of Seismic Category (SC-III/SC-IV) ancillary equipment. Details of the seismic design methods are discussed in the Pipe Stress Design Criteria document. Computer codes used for piping design and stress analysis have been tested and approved as discussed in the Verification and Validation Report for ME101, Linear Elastic Analysis of Piping, Version N6. These are adequate and appropriate codes and standards to assure that the ancillary equipment has adequate strength at the end of its design life to withstand all anticipated loads.

	Information Assessed	Source of Information	Discussion
Supports	Ancillary equipment supports are adequately designed.	24590-WTP-DC-PS-01-002, Rev 2, Pipe Support Design Criteria; ASME Boiler and Pressure Vessel Code, Section III, Division 1, Rules for Construction of Nuclear Power Plant Components, 1995; 24590-WTP-PER-PS-02-001, Rev. 4, Ancillary Equipment Pipe Support Design; 24590-WTP-PL-PS-01-001, Rev 1, Verification and Validation Test Plan for Bechtel's ME150 Pipe Support Family of Programs (PCFAPPS)	The Pipe Support Design Criteria document considers all loadings identified in ASME B31.3 and utilizes ASME B&PV Code, Section III, Division 1, Subsection NF and Appendix F, to supplement the requirements of ASME B31.3 for seismic design of Seismic Category (SC-III/IV) pipe supports. Bounding load cases are passed to the pipe support designers from the results of the ancillary equipment piping stress analyses. Analysis is by manual calculation or computer programs that have been tested and approved as discussed in the Verification and Validation Test Plan for Bechtel's ME150 Pipe Support Family of Programs (PCFAPPS). Details of the seismic design methodology are discussed in the Pipe Support Design Criteria document. Examples of typical ancillary equipment supports are shown in the Ancillary Equipment Pipe Support Design document. These are appropriate codes and standards for design of ancillary equipment supports for the RLD system. Ancillary equipment supports are to be designed to allow a minimum of heat to be transferred to the building structures (building structures not to exceed 150 deg F for concrete and 200 deg F for steel).
Connections	Seams and connections are adequately designed.	24590-WTP-DC-PS-01-001, Rev 2, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"	Ancillary equipment for the RLD system is located in R2/C3 areas and other accessible work areas. The Pipe Stress Design Criteria specifies the ASME B31.3 Process Piping design code for the piping systems. Welding is to be performed in accordance with the requirements of ASME B31.3 and the ASME B&PV Code, Section IX. ANSI B16.5 is specified for flange designs. These are appropriate codes and standards for design and fabrication of the RLD System ancillary equipment.

	Information Assessed	Source of Information	Discussion
Frost Heave	The system will withstand the effects of frost heave.	System Description listed above under References; 24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria	The RLD system effluent collection equipment considered in this assessment is located inside the PTF in process cells while the process condensate equipment is located outside the PTF in a secondary containment concrete basin on grade. The Structural Design Criteria requires that all structural foundations shall extend into the surrounding soil below the frost line to preclude frost heave. Both the PTF and the concrete basin are considered to be structural foundations. The frost line is 30 in. below grade. Therefore the ancillary equipment is not subject to the effects of frost heave. RLD system tanks and ancillary equipment that is located outside the PTF is equipped with insulation and is heat traced to preclude freezing the waste contents.
Waste Characteristics	Characteristics of the waste to be stored or treated have been identified (ignitable, reactive, toxic, specific gravity, vapor pressure, flash point, temperature)	24590-WTP-PSAR-ESH-01-002-02, Rev. 1a, Preliminary Safety Analysis Report to Support Construction Authorization; PT Facility Specific Information; System Description listed above under References	The RLD System Description states that the Alkaline Effluent Vessels (RLD-VSL-00017A/B) and the Process Condensate Tanks (RLD-TK-00006A/B) have no important to safety functions. The primary function of the RLD ancillary equipment is containment of the low activity caustic waste and evaporator condensates for either reuse in the PTF processes, or disposal to the Hanford Site LERF/ETF systems. The ancillary equipment considered in this assessment will handle wastes with the same characteristics as do the source vessels. The Preliminary Safety Analysis Report (PSAR) provides a summary of potential hazardous conditions associated with each Pretreatment Facility vessel and the design provisions that are to be used to provide adequate control of each hazard. Although the RLD vessels and tanks are not considered a hazardous source for hydrogen generation, the Pretreatment Vessel Vent Process System provides offgas control in the vessel/tank head spaces. Air in-bleed lines are provided for each vessel/tank for hydrogen dilution.

	Information Assessed	Source of Information	Discussion
Waste Char.	Ancillary equipment is designed to handle the wastes with the characteristics defined above and any treatment reagents.	24590-WTP-PER-M-02-002, Rev 0, Materials for Ancillary Equipment; System Description listed above under References	The Materials for Ancillary Equipment document specifies that ancillary equipment materials that contact the waste are to be equal to or better than those of the upstream source vessels. The System Description states that reagents are not added to the RLD vessels/tanks during normal operations. If waste is out of specification limits, it is transferred to another WTP process system for adjustment.
Compatibility	The pH range of the waste, waste temperature and the corrosion behavior of the structural materials are adequately addressed. Ancillary equipment material and protective coatings ensure the ancillary equipment structure is adequately protected from the corrosive effects of the waste stream and external environments. The protection is sufficient to ensure the equipment will not leak or fail for the design life of the system.	24590-WTP-DB-ENG-01-001, Rev. 1a, Basis of Design; 24590-WTP-PER-M-02-002, Rev 0, Materials for Ancillary Equipment; 24590-WTP-3PS-NN00-T0001, Rev 0, Engineering Specification for Hot and Anti-Sweat Thermal Insulation	The Basis of Design document identifies a service design life of 40 years for the ancillary equipment. Detailed materials selection (corrosion) evaluations are conducted for each vessel in the PTF facility during process design to assure a 40 year service life. The Materials for Ancillary Equipment document requires that the material selection and corrosion/erosion allowances for ancillary equipment in contact with the waste will be equal to or better than the material and corrosion allowance of the waste source vessel. The Thermal Insulation specification requires that all insulating materials used on the outside of ancillary equipment be pre-approved for use on austenitic stainless steel in accordance with applicable ASTM procedures and tests to preclude external corrosion of ancillary equipment. Therefore, the ancillary equipment will provide the expected design service life.

	Information Assessed	Source of Information	Discussion
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the ancillary equipment.	System Description listed above under References; 24590-WTP-PER-M-02-002, Rev 0, Materials for Ancillary Equipment; 24590-WTP-DC-PS-01-001, Rev 2, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"; 24590-WTP-PER-PL-02-001, Rev. 5, Piping Material Class Description	ASME B31.3 is the design code for the WTP piping. Consideration of corrosion, including corrosion allowance, is a mandatory requirement of ASME B31.3. A required service life of 40 years is identified in the Basis of Design for ancillary equipment. Detailed materials selection (corrosion) evaluations are conducted for each vessel in the PTF facility during process design to assure a 40 year service life. The Materials for Ancillary Equipment document requires that downstream ancillary equipment is to be constructed of equal or better materials, and with the same corrosion allowance as the source vessel. Corrosion/Erosion allowances are listed for each Piping Material Class in the Piping Material Class Description document.
Strength	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the vessels are exceeded.	24590-WTP-DC-PS-01-001, Rev 2, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria"	The Pipe Stress Design Criteria document specifies ASME B31.3 as the design code for the WTP piping. ASME B31.3 requires provision be made to safely contain or relieve any pressure to which the piping may be subjected. ASME B31.3 piping not protected by a pressure relieving device, or that can be isolated from a pressure reliving device must be designed for at least the highest pressure that can be developed.
	Maximum flows and any unusual operating stresses are identified	Drawings listed above under References; 24590-WTP-DC-PS-01-001, Rev 2, Pipe Stress Design Criteria including "Pipe Stress Criteria" and "Span Method Criteria" 24590-WTP-PER-PL-02-001, Rev. 5, Piping Material Class Description	The expected flow paths for the ancillary equipment are identified on the P&ID drawings. The Pipe Stress Design Criteria specifies the ASME B31.3 code for piping design. This code requires piping to be designed to the highest pressure that can be developed in a piping system assuring that maximum operating stresses remain within code allowables. Piping material classes are shown on the P&IDs embedded in the item numbers for each ancillary equipment component. The Piping Material Class Description document lists the bounding pressure and temperature limits for each piping material class.

	Information Assessed	Source of Information	Discussion
Secondary Containment	Ancillary equipment is designed with secondary containment that is constructed of materials compatible with the waste and of sufficient strength to prevent failure (pressure gradients, waste, climatic conditions, daily operations), provided with a leak-detection system, and designed to drain and remove liquids.	Drawings and System Description listed above under References; 24590-WTP-DB-ENG-01-001, Rev 1a, Basis of Design	The ancillary equipment considered in this assessment is located in R2/C3 areas within the PTF and outside the PTF in a secondary containment concrete basin on grade. Secondary containment in the R2/C3 areas is provided by a concrete basin with special protective coatings and a sump (PWD-SUMP-00036) as shown on the general arrangement plan which is outside the scope of this integrity assessment. The secondary containment basin outside the PTF is provided with a sump (RLD-SUMP-00003) as shown on the P&ID drawing. This secondary containment basin is also outside the scope of this integrity assessment. All secondary containments will be provided with drains and leak detection systems for detection of primary containment leaks as discussed in the Basis of Design. Above grade transfer lines between the RLD equipment located in the secondary containment basin on grade and the equipment located inside the PTF, are not provided with secondary containment. These lines are fully welded without any valves or other ancillary equipment that might leak, and will be inspected daily for leakage in accordance with the requirements of the WAC.