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&NS
										MTE

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 Dan Pflueger (Print Name) DC Pflueger (Signature) 10/13/03 (Date)

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

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24590-CM-HC4-HXYG-00138-02-05
REV. 00A

SUBCONTRACT SUBMITTAL

10/15/03

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OCT 09 2003

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COGEMA-IA-022, Rev. 0

BY PDC

IQRPE REVIEW – PRETREATMENT FACILITY TREATED LAW CONCENTRATE STORAGE PROCESS (TCP) 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 Treated LAW Concentrate Storage Process (TCP) 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 seven (7) sheets numbered one (1) through seven (7).

JOHN T. BAXTER
STATE OF WASHINGTON
18978
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES: 10/28/04

9-03 10/13/03
(B) Processed/ Data Entry | Copied/ QA | Scanned | Filed
(A) KJ 10/9/03
(C) dw 10/9/03

John T. Baxter
Signature

10/02/2003
Date

24590-CM-HC4-HXVG-00138-02-05, REV. COA

STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT FACILITY TREATED LAW CONCENTRATE STORAGE PROCESS (TCP) ANCILLARY EQUIPMENT

COGEMA-IA-022
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) Treated LAW Concentrate Process (TCP) System. The vessel (TCP-VSL-00001) and ancillary equipment are located in a central hot cell and adjacent process cells in the Pretreatment Facility, and TCP-BULGE-00004 is located in an adjacent R3/C3 area. Ancillary equipment located inside the TCP system vessel is addressed separately in the Integrity Assessment for the vessel. Direct buried coaxial transfer lines located outside the Pretreatment Facility are outside the scope of this Integrity Assessment.
References	Drawings and System Description	24590-PTF-M5-V17T-P0006, Rev. 0, Process Flow Diagram Treated LAW Concentrate Storage-System TCP; 24590-PTF-M6-TCP-P0001, Rev. 0, P&ID - PTF Treated LAW Concentrate Storage System TCP-VSL-00001 (Q); 24590-PTF-M6-TCP-P0002, Rev. 0, P&ID - PTF Treated LAW Concentrate Storage Utility Services - PSA Rack (Q); 24590-PTF-P1-P01T-P0001, Rev. 2, Pretreatment Facility General Arrangement Plan at EL. 0'-0"; 24590-PTF-P1-P01T-P0013, Rev. 3, Pretreatment Facility General Arrangement Sect. H-H and Sect. J-J; 24590-PTF-3YD-TCP-00001, Rev. 0, System Description for Treated LAW Concentrate Storage Process (TCP); System Description Change Notice (SDCN), SDCN NO. 24590-PTF-3YN-TCP-00001 for System Description Number 24590-PTF-3YD-TCP-00001, Rev. 0

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 1, Pipe Stress Design Criteria; 24590-WTP-3PS-MX00-TP001, Rev. 1, Engineering Specification for Process Bulge Design and Fabrication; ASME B31.3 Code, Process Piping, 1996 Edition, American Society of Mechanical Engineers; ASME B&PV Code, Section VIII Pressure Vessels; 24590-PTF-MXD-TCP-00001, Rev. A, Mechanical Systems Data Sheet: Process Bulge, TCP-BULGE-00004	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 process piping as Commercial Grade and Seismic Category (SC-III). Ancillary equipment associated with the Pulse Jet Ventilation (PJV) system is Quality Level (QL-2) and Seismic Category (SC-II). The Engineering Specification for Process Bulge Design and Fabrication includes requirements for general design, fabrication, project management, quality assurance, inspection and testing of Process Bulges for use in WTP facilities. The Mechanical Systems Data Sheet indicates that TCP-BULGE-00004 secondary containment structure is Quality Level (QL-2), Seismic Category (SC-II) and is to be designed in accordance with ASME B&PV code, Section VIII, Pressure Vessels. Piping within TCP-BULGE-00004 is Quality Level (QL-1), Seismic Category (SC-I) and is to be designed in accordance with ASME B31.3. Other bulge components are Commercial Grade, Seismic Category (SC-III). The codes and standards are acceptable and adequate for the design of both the ancillary piping and the process bulge 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 1, Pipe Stress Design Criteria; 24590-WTP-3PS-MX00-TP001, Rev. 1, Engineering Specification for Process Bulge Design and Fabrication	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. The Engineering Specification for Process Bulge Design requires bulge piping to be designed to ASME B31.3 and the bulge secondary containment to be designed to ASME B&PV code, Section VIII.

	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 1, Pipe Stress Design Criteria; 24590-WTP-PER-M-02-002, Rev 0, Materials for Ancillary Equipment; 24590-WTP-3PS-MX00-TP001, Rev. 1, Engineering Specification for Process Bulge Design and Fabrication	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. Elements of the ASME B&PV Code, Section III (Subsection NC and Appendices F and N) are used to supplement the requirements of ASME B31.3 for seismic design of Seismic Category (SC-I/II) ancillary equipment. ASME III, 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. The Engineering Specification for Process Bulge Design and Fabrication requires the bulge secondary containment to be designed in accordance with ASME B&PV Code, Section VIII requirements for a similar set of design conditions to those specified in ASME B31.3 for process piping. Seismic design for Seismic Category (SC-I/II) bulge structures and components is in accordance with the specification Seismic Qualification of Seismic Category I/II Equipment and Tanks and AISC N690. Seismic Design for Seismic Category (SC-III/IV) bulge structures and components is in accordance with the UBC and AISC Allowable Stress Design method. The Materials for Ancillary Equipment document uses a conservative design approach specifying that ancillary equipment downstream of a waste source vessel is to be constructed of the same or better material and with the same corrosion allowance as the source vessel itself.

	Information Assessed	Source of Information	Discussion
Supports	Ancillary equipment supports are adequately designed.	24590-WTP-DC-PS-01-002, Rev 1, Pipe Support Design Criteria; 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 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-I/II and 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. Details of the seismic design methodology are discussed in the Pipe Support Design Criteria document. Analysis is by manual calculation or approved computer programs that have been verified and validated. These are appropriate codes and standards for design of ancillary equipment supports for the TCP 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). Design standards for vessel internal equipment supports are discussed in the integrity assessment for the TCP system tanks.
Connections	Seams and connections are adequately designed.	24590-WTP-DB-ENG-01-001, Rev 0, Basis of Design; 24590-WTP-DC-PS-01-001, Rev. 1, Pipe Stress Design Criteria; 24590-WTP-3PS-MX00-TP001, Rev. 1, Engineering Specification for Process Bulge Design and Fabrication;	The Basis of Design specifies that in-cell piping that is non-maintainable will be fully welded. 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. The Engineering Specification for Process Bulge Design and Fabrication requires that welding for the bulge secondary containment is to be performed in accordance with the requirements of ASME B&PV Code, Sections VIII and IX. ANSI B16.5 is specified for flange designs. These are appropriate codes and standards for design and fabrication of the mixed waste TCP System ancillary equipment.
Supports	The system will withstand the effects of frost heave.	System Description and SDCN listed above under References; 24590-WTP-DC-ST-01-001, Rev. 1, Structural Design Criteria	The TCP system ancillary equipment considered in this assessment is located in process cells, TCP-BULGE-00004, and R3/C3 areas inside the Pretreatment Facility. The Structural Design Criteria requires that all structural foundations shall extend into the surrounding soil below the frost line to preclude frost heave. The frost line is 30 in. below grade. Therefore the ancillary equipment is not subject to the effects of frost heave.

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	Information Assessed	Source of Information	Discussion
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. 1, Preliminary Safety Analysis Report to Support Construction Authorization; PT Facility Specific Information; System Description and SDCN listed above under References; 24590-WTP-PER-PL-02-001, Rev. 2, Piping Material Class Description; 24590-WTP-3PS-PF00-T0001, Rev. 1, Engineering Specification for Jumper Fabrication for PT and HLW	The TCP System Description states that the primary functions of the TCP system are to receive Treated LAW concentrate waste from the Treated LAW Evaporation Process (TLP), provide lag storage for the waste, and to transfer this waste to the LAW facility for vitrification. The system vessel can also receive, store and transfer LAW concentrate from the Cesium Ion Exchange System (CXP), treated LAW concentrate from the Feed Receipt System (FRP), and treated solids from the Ultrafiltration Process (UFP). The ancillary equipment considered in this assessment will handle wastes with the same characteristics as do the source vessels. Operating pressures for ancillary equipment will be different from those of the vessels. Enveloping pressures and temperatures are reflected in the pipe class assigned to each pipe run as discussed in the Piping Material Class Description document. 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. Design provisions for control of these hazards are listed in the PSAR. Although the TCP vessel is not considered a hazardous source for hydrogen generation, the Pretreatment Vessel Vent Process System provides offgas control in the TCP vessel head space and ancillary equipment. A facility wide grounding system is furnished to control ignition sources in this vessel and the ancillary equipment, including jumpers.
	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 and SDCN listed above under References	The System Description indicates that the TCP vessel is used only for lag storage of treated concentrate waste. Additional reagents are not introduced to this vessel during normal operations. 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.

	Information Assessed	Source of Information	Discussion
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.	System Description and SDCN listed above under References; 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 identifies a service design life of 40 years for the ancillary equipment. All non-maintainable items will be designed to last the life of the facility. 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.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the ancillary equipment.	System Description and SDCN listed above under References; 24590-WTP-PER-M-02-002, Rev 0, Materials for Ancillary Equipment; 24590-WTP-DC-PS-01-001, Rev. 1, Pipe Stress Design Criteria; 24590-WTP-PER-PL-02-001, Rev. 2, Piping Material Class Description	ASME B31.3 is the 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 located in inaccessible process cells. 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.

	Information Assessed	Source of Information	Discussion
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. 1, Pipe Stress Design Criteria.	Pressure controls related to the TCP vessels themselves are discussed in their structural integrity assessments. ASME B31.3 is 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 1, Pipe Stress Design Criteria	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.
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 listed above under References; System Description and SDCN listed above under References; 24590-WTP-DB-ENG-01-001, Rev 0, Basis of Design	The ancillary equipment considered in this assessment is located in process cells, TCP-BULGE-00004, and R3/C3 areas within the Pretreatment facility. Secondary containment for ancillary equipment within the process cells is provided by the liners and sumps within the cells which are outside the scope of this integrity assessment. Secondary containment in the R3/C3 areas is provided by special protective coatings, curbs, and regulated drain systems which are 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. The P&ID drawing shows that the Secondary Containment for TCP-BULGE-00004 is equipped with a drain routed to Plant Wash and Disposal System vessel PWD-VSL-00033.

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BNI-Subcontracts

October 2, 2003

COGEMA-03-0295

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

Dear Ms. Whiting:

STRUCTURAL INTEGRITY ASSESSMENT OF THE PRETREATMENT FACILITY TREATED LAW CONCENTRATE STORAGE PROCESS (TCP) ANCILLARY EQUIPMENT

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 ancillary equipment will be adequately designed and that the ancillary equipment 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 MS4-E2 w/ attachment

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