ISSUED BY
RPP-WTP PDC

R11727186

AREVA

AFS-15-0238

June 29, 2015

Ms. Tess Klatt
Subcontract Administrator
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

Dear Ms. Klatt:

BECHTEL NATIONAL, INC. CONTRACT NO. 24590-CM-HC4-HXYG-00240 IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT FOR LAW LVP THERMAL CATALYTIC OXIDIZER/REDUCER (TCO Unit) (IA-3013146-000)

The integrity assessment of the subject LAW LVP Thermal Catalytic Oxidizer/Reducer (TCO Unit) has been completed per the contract requirements and is enclosed for your use. The assessment found that the design is sufficient to ensure that the LAW LVP Thermal Catalytic Oxidizer/Reducer (TCO Unit) 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,

Elizabeth W. Smith, C.P.M
Contract Administrator
AREVA Federal Services LLC
Richland Office

Enclosure (1)

LP

cc: D. C. Pfluger, MS5-I w/enclosure (2)

24590-CM-HC4-HXYG-00240-02-00012 Rev. 00A

IQRPE STRUCTURAL INTEGRITY ASSESSMENT REPORT
FOR
LAW LVP THERMAL CATALYTIC OXIDIZER/REDUCER (TCO Unit)

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
LAW LVP THERMAL CATALYTIC OXIDIZER/REDUCER (TCO Unit)

"I, Tarlok Singh 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 LAW LVP Thermal Catalytic Oxidizer/Reducer (TCO Unit), 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 twelve (12) pages numbered one (1) through eleven (12).

TARLOK SINGH HUNDAL
STATE OF WASHINGTON
20213
REGISTERED
PROFESSIONAL ENGINEER

Signature

6/29/2015
Date

Scope	Scope of this Integrity Assessment	The scope of this integrity assessment includes LAW Catalytic Oxidizer/Reducer Miscelleneous Units, collectively known as Thermal Catalytic/Oxidizer (TCO Unit). This TCO Unit houses four subcomponents namely VOC Catalyst Oxidizer (LVP-SCO-00001), Selective Catalyst Reducer (LVP-SCR-00001), Electric Heater (LVP-HTR-00002), and Heat Recovery Exchanger (LVP-HX-00001). The TCO Unit associated with the LVP system is shown on the Process Flow Diagram 24590-LAW-M5-V17T-00011. The LAW LVP system receives melter offgas from the Primary Offgas System (LOP) and its primary safety function is to ensure containment of hazardous gases within the system. The offgas stream has potentially high levels of Oxides of Nitrogen (NO_x) and Volatile Organic Compounds (VOCs). The LAW TCO unit's catalysts remove VOCs and NO_x compounds from the offgas, before further processing in caustic scrubber and exhausters prior to release via discharge stack. The TCO Unit is mounted on a skid (LVP-SKID-00002) located in Room L-0304F at Floor Elevation 48'-0" of the LAW facility as shown on General Arrangement Plan drawing 24590-LAW-P1-P01T-00005.
Summary of Assessment		For each item of "Information Assessed" (i.e., Criteria) on the following pages, the documents 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, *Dangerous Waste Regulations,* Section WAC-173-303-640 (3) (a) through (g) applicable elements of the *Tank Systems.*

References	Material Requisition, Specifications, and Plant Drawings	Material Requisition (MR): 24590-QL-MRA-MBT0-00007, Rev. 3, Oxidizers, Thermal Catalytic LAW. Specifications: The following Specifications with their respective revision and Specification Change Notices (SCNs) are listed in the above listed MR, except as marked with asterisk *: 24590-LAW-3PS-MBTV-T0001, Engineering Specification for LAW Thermal Catalytic Oxidizer/Reducer; 24590-WTP-3PS-MV00-T0001, Engineering Specification for Pressure Vessel Design and Fabrication; *24590-WTP-3PS-MV00-T0002, Engineering Specification for Seismic Qualification Criteria for Pressure Vessels; *24590-WTP-3PS-MV00-T0003, Engineering Specification for Fatigue Analysis of Pressure Vessels; 24590-WTP-3PS-MVB2-T0001, Engineering Specification for Welding of Pressure Vessels, Heat Exchangers, and Boilers; 24590-WTP-3PS-G000-T0002, Engineering Specification for Positive Material Identification (PMI) for Shop Fabrication; 24590-WTP-3PS-G000-T0003, Engineering Specification for Packaging, 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-SS00-T0001, Engineering Specification for Welding of Structural Carbon Steel; 24590-WTP-3PS-SS00-T0002, Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel. Plant Drawings: 24590-LAW-P1-P01T-00005, Rev. 5, LAW Vitrification Building General Arrangement Plan at El. 48'-0"; 24590-LAW-DD-S13T-00306, Rev. 9, LAW Vitrification Building Carbon Bed Adsorbers and Catalytic Oxidizer/Reducer Equipment Anchorage @ El. 48'-0"; 24590-LAW-DD-S13T-00313, Rev. 0, LAW Vitrification Building Thermal Catalytic Oxidizer/Reducer Anchor Bolt Schedule at El. 48'-0"; 24590-LAW-DD-S13T-00314, Rev. 0, LAW Vitrification Building Catalytic Oxidizer/Reducer Equipment Anchorage @ El. (+) 47'-0"; 24590-LAW-M5-V17T-00011, Rev. 5, Process Flow Diagram LAW Vit Secondary Offgas Treatment (System LVP), including DCN #s 24590-LAW-M5N-V17T-00012, -00019, -00023, and -00029; 24590-LAW-M6-LVP-00005001, Rev. 2, P&ID- LAW Secondary Offgas/Vessel Vent Process System Amonia Dilution Skid; 24590-LAW-M6-LVP-00005002, Rev. 2, P&ID- LAW Secondary Offgas/Vessel Vent Process System SCO/SCR Skid; 24590-LAW-P1-P23T-00051, Rev. 4, LAW Vitrification Building Equipment Location Plan El. 48'-0"/Area 4; 24590-LAW-P1-P23T-00052, Rev. 5, LAW Vitrification Building Equipment Location Plan El. 48'-0"/Area 5; 24590-LAW-DB-S13T-00135, Rev. 9, LAW Vitrification Building Main Building Partial Conc Forming Plan Zone 5 @ El. (+) 48'-0"; 24590-LAW-SS-S15T-00028, Rev. 6, LAW Vitrification Building Main Building Structural Steel Partial Floor Framing Plan Zone 5 @ TOS El. (+) 47'-0".

References (cont'd)	Vendor Fabrication Drawings	Vendor Fabrication Drawings (*Bechtel Status Code 1 and 2 Drawings): 24590-CD-POC-MBT0-00007-01-00182, Rev. 00F, LAW Thermal Catalytic Oxidizer-VOC SCO Housing Weldment, Sht. 1-2; 24590-CD-POC-MBT0-00007-01-00237, Rev. 00E, LAW Thermal Catalytic Oxidizer-VOC-SCO Front Weldment; 24590-CD-POC-MBT0-00007-01-00238, Rev. 00H, LAW Thermal Catalytic Oxidizer-Mechanism General Assembly; 24590-CD-POC-MBT0-00007-01-00239, Rev. 00H, LAW Thermal Catalytic Oxidizer-VOC SCO General Assembly, Sht. 1-3; 24590-CD-POC-MBT0-00007-01-00240, Rev. 00H, LAW Thermal Catalytic Oxidizer-NOX Housing Weldment, Sht. 1-2; 24590-CD-POC-MBT0-00007-01-00253, Rev. 00J, LAW Thermal Catalytic Oxidizer-NOX Front Weldment; 24590-CD-POC-MBT0-00007-01-00254, Rev. 00F, LAW Thermal Catalytic Oxidizer-NOX General Assembly, Sht. 1-3; 24590-CD-POC-MBT0-00007-01-00255, Rev. 00F, LAW Thermal Catalytic Oxidizer-Heat Exchanger Weldment, Sht. 1-2; 24590-CD-POC-MBT0-00007-01-00279, Rev. 00E, LAW Thermal Catalytic Oxidizer-Heat Exchanger General Assembly, Sht. 1-3; 24590-CD-POC-MBT0-00007-01-00281, Rev. 00D, LAW Thermal Catalytic Oxidizer-Heater Housing Weldment; 24590-CD-POC-MBT0-00007-01-00282, Rev. 00C, LAW Thermal Catalytic Oxidizer-Heater Inlet Duct Weldment; 24590-CD-POC-MBT0-00007-01-00283, Rev. 00C, LAW Thermal Catalytic Oxidizer-Heater Outlet Duct Weldment; 24590-CD-POC-MBT0-00007-01-00315, Rev. 00C, LAW Thermal Catalytic Oxidizer-Heater Front Weldment; 24590-CD-POC-MBT0-00007-01-00325, Rev. 00F, LAW Thermal Catalytic Oxidizer-Heater General Assembly, Sht. 1-3; 24590-CD-POC-MBT0-00007-01-00326, Rev. 00D, LAW Thermal Catalytic Oxidizer-Heater Inlet Duct General Assembly, Sht. 1-2; 24590-CD-POC-MBT0-00007-01-00327, Rev. 00E, LAW Thermal Catalytic Oxidizer-Heater Outlet Duct General Assembly, Sht. 1-3; 24590-CD-POC-MBT0-00007-01-00328, Rev. 00F, LAW Thermal Catalytic Oxidizer-VOC Inlet Weldment; 24590-CD-POC-MBT0-00007-01-00348, Rev. 00C, LAW Thermal Catalytic Oxidizer-VOC SCO Base Frame Weldment; 24590-CD-POC-MBT0-00007-01-00351, Rev. 00F, LAW Thermal Catalytic Oxidizer-NH3-NOX Base Frame Weldment; 24590-CD-POC-MBT0-00007-01-00352, Rev. 00C, LAW Thermal Catalytic Oxidizer-Heat Exchanger Base Frame Weldment; 24590-CD-POC-MBT0-00007-01-00353, Rev. 00C, LAW Thermal Catalytic Oxidizer-TCO General Arrangement, Sht. 1-4; 24590-CD-POC-MBT0-00007-01-00354, Rev. 00D, LAW Thermal Catalytic Oxidizer-LAW TCO Final Assembly, Sht. 1-4; 24590-CD-POC-MBT0-00007-01-00357, Rev. 00G, LAW Thermal Catalytic Oxidizer-Heat Exchanger Inlet/Outlet Weldment; 24590-CD-POC-MBT0-00007-01-00386, Rev. 00D, LAW Thermal Catalytic Oxidizer-TCO General Assembly, Sht. 1-2; 24590-CD-POC-MBT0-00007-01-00387, Rev. 00D, LAW Thermal Catalytic Oxidizer-Heat Exchanger Inlet/Outlet General Assembly; 24590-CD-POC-MBT0-00007-01-00388, Rev. 00C, LAW Thermal Catalytic Oxidizer-Heat Exchanger Inlet-Outlet Machined; 24590-CD-POC-MBT0-00007-01-00389, Rev. 00C, LAW Thermal Catalytic Oxidizer-Heater Housing Machined; 24590-CD-POC-MBT0-00007-01-00390, Rev. 00D, LAW Thermal Catalytic Oxidizer-Heater Inlet Duct Machined; 24590-CD-POC-MBT0-00007-01-00391, Rev. 00D, LAW Thermal Catalytic Oxidizer-Heater Outlet Duct Machined; 24590-CD-POC-MBT0-00007-01-00397, Rev. 00B, LAW Thermal Catalytic Oxidizer-TCO Field Installation, Sht. 1-9; 24590-CD-POC-MBT0-00007-01-00401, Rev. 00D, LAW Thermal Catalytic Oxidizer-Shipping Drawings, Sht. 1-4. * Bechtel Status Code 1 Drawing is an "as fabricated vendor drawing" approved/accepted by Bechtel. Bechtel Status Code 2 Drawing is an "as fabricated vendor drawing" approved (with comments)/accepted by Bechtel.

References (cont'd)	Mechanical Data Sheet, Corrosion Evaluation, and System Description	<u>Mechanical Data Sheet (MDS)</u>: 24590-LAW-MKD-LVP-00012, Rev. 13, LAW Catalytic Oxidizer/Reducer (LVP-SKID-00002/00003). <u>Corrosion Evaluation</u>: 24590-LAW-N1D-LVP-00005, Rev. 3, LAW Catalytic Oxidizer Heat Recovery Exchanger (LVP-HX-00001); 24590-LAW-N1D-LVP-00006, Rev. 3, LAW Catalytic Oxidizer Electric Heater (LVP-HTR-00002); 24590-LAW-N1D-LVP-00007, Rev. 4, LAW Thermal Catalytic Oxidizer (LVP-SCO-00001); 24590-LAW-N1D-LVP-00008, Rev. 3, LAW NOx Selective Catalytic Reducer (LVP-SCR-00001). <u>System Description:</u> 24590-LAW-3YD-LOP-00001, Rev. 3, System Description for the LAW Primary Offgas (LOP) and Secondary Offgas/Vessel Vent (LVP) Systems, including SDCN # 00011, 00012, 00013, and 00015.

	Information Assessed	Source of Information	Assessment
Design	Plant Item design standards are appropriate and adequate for the vessel have intended use.	Material Requsition, Specifications, Drawings, and Mechanical Data Sheet listed above under References; ASME Boiler and Pressure Vessel Code (B&PV), Section VIII, Division 1 & 2, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers; AISC N690, American National Standard-Nuclear Facilities-Steel Safety Related Structures for Design, Fabrication, and Erection, American Society of Steel Construction; AISC M016, Manual of Steel Construction, ASD 9th Edition, American Society of Steel Construction; AWS 1.1, Structural Welding Code-Steel, American Welding Society; AWS 1.6, Structural Welding Code-Stainless Steel; American Welding Society; UBC 1997, Uniform Building Code. 24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria; ASTM Standards, American Society for Testing and Materials.	The LAW TCO Unit is considered as a vessel. The TCO Unit is also interchangeably termed herein as Plant Item or Miscellaneous Unit. The Engineering Specifications, Material Requisition, and Mechanical Data Sheet documents require that the TCO Unit housing and its components design, fabrication, and installation be per applicable codes, standards, and design criteria listed in the Source of Information column herein. The unit will be without the National Board of Registration ASME Code stamp. Supplementary requirements for the TCO Unit are specified in the listed referenced engineering specifications. The supplementary requirements include structural design requirements, fatigue, seismic, and thermal analyses, positive material identification, fabrication tolerances, welding procedures, welder qualifications and testing records, NDE inspections and records, packaging, handling, and storage requirements. The TCO Unit is identified as Safety Significant (SS), Quality Level (Q), and Seismic Category (SC-III) in the Mechanical Data Sheet. The Vendor Fabrication drawings show that the TCO Unit is approximately 43 ft (L) x 10 ft (W) x 13 ft (H). The drawings reviewed show that TCO Unit housing and its numerous components are built with various grades of stainless steel material (mainly type 347). The TCO Unit is adequately insulated to maintain the surface temperature below 140 °F for protection of the workers and below 150 °F for support steel and concrete elements as required per Engineering Specification for TCO Unit and Structural Design Criteria, respectively. The TCO Unit is mounted on an ASTM A992 carbon steel frame skid. The design requirements specified in the aforementioned codes, standards, and specifications are appropriate and adequate for the intended use of the TCO Unit.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	If a non-standard Plant Item is to be used, the design calculations demonstrate sound engineering principles of construction.	Material Requisition, Mechanical Data Sheet, Specifications, and Drawings listed above under References; ASME Boiler and Pressure Vessel Code (B&PV), Section VIII, Division 1 & 2, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers; AISC N690, American National Standard-Nuclear Facilities-Steel Safety Related Structures for Design, Fabrication, and Erection, American Society of Steel Construction; AISC M016, Manual of Steel Construction, ASD 9th Edition, American Society of Steel Construction; AWS 1.1, Structural Welding Code-Steel, American Welding Society; AWS 1.6, Structural Welding Code-Stainless Steel; American Welding Society; UBC 1997, Uniform Building Code. 24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria; ASTM Standards, American Society for Testing and Materials. 24590-LAW-MVC-LVP-00004, Rev. A, LVP-SKID-00002, LAW Thermal Catalytic Oxidizer / Reducer, Stress Analysis with ANSYS, including ECCN # 24590-LAW-MVE-LVP-00001.	The LAW LVP TCO Unit is a non-standard offgas treatment assembly that is shop fabricated. The referenced Material Requisition, Mechanical Data Sheet, and Specifications require that the TCO Unit be designed, fabricated, inspected, tested, and installed per the applicable codes, standards, and design criteria listed in the Source of Information column herein. Review of the TCO Stress Analysis and drawings show that appropriate applicable load cases and combinations thereof were used utilizing sound engineering principles for the design and construction of the TCO Unit. Furthermore, approval and acceptance of the vendor fabrication drawings by Bechtel National Inc. (BNI), is an added assurance that all applicable requirements stated in aforementioned documents (including daughter documents) for the TCO Unit have been met.

	Information Assessed	Source of Information	Assessment
Design (cont'd)	Plant Item has adequate strength, after consideration of the corrosion allowance, to withstand the operating pressure, operating temperature, and seismic loads.	Material Requisition, Specifications, Mechanical Data Sheet, and Corrosion Evaluation listed above under References; ASME Boiler and Pressure Vessel Code (B&PV), Section VIII, Division 1 & 2, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; ASME B31.3 Code, Process Piping, American Society of Mechanical Engineers; AISC N690, American National Standard-Nuclear Facilities-Steel Safety Related Structures for Design, Fabrication, and Erection, American Society of Steel Construction; AISC M016, Manual of Steel Construction, ASD 9th Edition, American Society of Steel Construction; AWS 1.1, Structural Welding Code-Steel, American Welding Society; AWS 1.6, Structural Welding Code-Stainless Steel; American Welding Society; UBC 1997, Uniform Building Code; 24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria; ASTM Standards, American Society for Testing and Materials. 24590-LAW-MVC-LVP-00004, Rev. A, LVP-SKID-00002, LAW Thermal Catalytic Oxidizer / Reducer, Stress Analysis with ANSYS, including ECCN # 24590-LAW-MVE-LVP-00001.	The Engineering Specification for LAW TCO Unit and Mechanical Data Sheet documents require that the TCO Unit housing including all related components and appurtenances be designed and fabricated in accordance with the applicable sections of codes, standards, and design criteria listed in the Source of Information column herein. These codes and standards require specific consideration of operating pressures, temperatures, corrosion allowance, and seismic loads in the design process. Supplementary requirements are specified in the referenced engineering specifications. The supplementary requirements include structural design, fatigue and thermal analyses, positive material identification, fabrication tolerances, acceptable welding procedures, welder qualifications and testing records, NDE inspections and records, and packaging, handling, and storage requirements for the TCO Unit. The Mechanical Data Sheet identifies the operating pressure and temperature ranges and seismic category for the TCO Unit. Corrosion allowance of 0.010" is recommended for the TCO Unit as identified in the Corrosion Evaluation and Mechanical Data Sheet documents. The Engineering Specification for Seismic Design of Pressure Vessels specifies requirements for the seismic design. The Stress Analysis with ANSYS document reviewed shows that the applicable design and loading parameters were appropriately considered in the design process and the TCO Unit has adequate strength to sustain them during its design life.

	Information Assessed	Source of Information	Assessment
Foundation	Plant Item foundation will maintain the load of a full unit.	Material Requisition, Specifications, and Mechanical Data Sheet listed above under references; ASME Boiler and Pressure Vessel Code (B&PV), Section VIII, Division 1 & 2, Rules for Construction of Pressure Vessels, American Society of Mechanical Engineers; AISC N690, American National Standard-Nuclear Facilities-Steel Safety Related Structures for Design, Fabrication, and Erection, American Society of Steel Construction; AISC M016, Manual of Steel Construction, ASD 9th Edition, American Society of Steel Construction; AWS 1.1, Structural Welding Code-Steel, American Welding Society; AWS 1.6, Structural Welding Code-Stainless Steel; American Welding Society; UBC 1997, Uniform Building Code; 24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria; 24590-WTP-DB-ENG-01-001, Rev. 2, Basis of Design; 24590-LAW-MVC-LVP-00004, Rev. A, LVP-SKID-00002, LAW Thermal Catalytic Oxidizer / Reducer, Stress Analysis with ANSYS, including ECCN # 24590-LAW-MVE-LVP-00001; 24590-LAW-DDC-S13T-00055, Rev. 1A, LAW Thermal Catalytic Oxidizer/Reducer Anchorage, including ECCN # 24590-LAW-DDE-S13T-00075 and -00076.	The Engineering Specifications, Material Requisition, and Mechanical Data Sheet documents require that the TCO Unit housing support be designed per applicable requirements of the codes, standards, and design criteria listed in Source of Information column herein. The requirements in the aforementioned codes and standards have adequate structural design requirements to ensure proper support for the TCO Unit. The Basis of Design document requires that the supports and foundations shall be designed adequately to sustain all applicable loads including the full weight of the unit. The review of Stress Analysis and Anchorage calculation documents shows that the supporting frame of the TCO Unit housing has been designed adequately to handle the applicable loads. However, it should be noted that the evaluation of the TCO Unit housing foundation (concrete floor slab @ Elev. 48'-0") is not in the scope of this report. It is covered under a separate integrity assessment report.

	Information Assessed	Source of Information	Assessment
Foundation (cont'd)	If in an area subject to flooding, the Plant Item is anchored.	Drawings, Specifications, and Mechanical Data Sheet listed above under References; 24590-LAW-MVC-LVP-00004, Rev. A, LVP-SKID-00002, LAW Thermal Catalytic Oxidizer / Reducer, Stress Analysis with ANSYS, including ECCN # 24590-LAW-MVE-LVP-00001; 24590-LAW-DDC-S13T-00055, Rev. 1A, LAW Thermal Catalytic Oxidizer/Reducer Anchorage, including ECCN # 24590-LAW-DDE-S13T-00075 and -00076.	As shown on the referenced drawings, the TCO Unit is located at floor Elevation 48'-0" of the LAW facility. The Specification for Pressure Vessel Design and Fabrication requires that supports and anchors shall be designed to secure the buoyant unit in case the unit is empty and submerged to the level indicated in the Mechanical Data Sheet. The Mechanical Data Sheet indicates design basis event flood height of 0.92 ft (11") in Room L-0304F. It is noted that the drawings show that the TCO Unit housing is mounted on a steel frame skid. This skid is made up of multiple 6" H x 4" W tube steel transverse support members placed on two W8 (8" H) longitudinal sections, adding up to 14" height dimension above the floor slab that makes the bottom of TCO Unit more than the aforementioned flood height of 0.92 ft (11"). Therefore, as noted in the Mechanical Data Sheet, it precludes submergence of the TCO Unit's sensitive components and hence, it is not subject to buoyant forces for anchorage consideration. However, the TCO Unit is attached to skid (LVP-SKID-00002) frame which in turn is welded to the surface plates. And the surface plates are anchored to the floor slab with thru bolts to sustain other applicable design loads including seismic forces as shown in the reviewed listed Stress Analysis and Anchorage documents and related drawings.
	Plant Item system will withstand the effects of frost heave.	Drawings listed above under References; 24590-WTP-DC-ST-01-001, Rev. 13, Structural Design Criteria.	The Structural Design Criteria document requires that all structural foundations extend into the surrounding soil below the 30 inch frost line in order to preclude frost heave. As shown on the referenced drawings, the TCO Unit installed in the LAW facility at floor Elevation 48'-0" which is not subject to frost heave, hence, the TCO Unit is not subjected to any 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)	System Description, Mechanical Data Sheet, and Corrosion Evaluation listed above under References; 24590-WTP-PER-PR-03-002, Rev. 3, Control of Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Unit Systems; 24590-WTP-M4C-V11T-00004, Rev. C, Calculation of Hydrogen Generation Rates and Times to Lower Flammability Limit for WTP. 24590-LAW-M4C-LOP-00001, Rev. 3, LAW Melter Offgas System Design Basis Flowsheets, including ECCN # 00003 and 00009; CCN 280210, LAW Miscellaneous Treatment Unit Hydrogen Accumulation Documentation for the DWP Administrative Record.	The Mechanical Data Sheet presents the operating temperatures and pressures for the TCO Unit. The Corrosion Evaluation documents address the chemical composition of the offgas in order to select appropriate TCO Unit materials and specify the corrosion allowance. The System Description document identifies the offgas being handled by the TCO Unit as hazardous, but not as ignitable or flammable. The main function of the TCO Unit is to prevent the escape of toxic and hazardous gas vapors to the environment from the LAW offgas system. The TCO Unit design is required to provide an intact housing pressure boundary during normal and abnormal operations and during and after design level seismic events. Waste characteristics that are hazardous, such as ignitability, reactivity, and toxicity are appropriately addressed in the Control of Toxic Vapors and Emissions, Calculation of Hydrogen Generation Rates, Melter Offgas System Design Basis Flowsheets, and CCN 280210 documents. The System Description and the Control of Toxic Vapors and Emissions documents describe that the LAW TCO Unit remove volatile organic compounds (VOCs) and nitrogen oxides (NO_x) compounds from the LAW offgas LVP exhaust system. Review of the Calculation for Hydrogen Generation Rates, Melter Offgas System Design Basis Flowsheets, and CCN 280210 documents show that this miscellaneous TCO Unit does not pose any hydrogen generation or accumulation hazard.
	Plant Item is designed to store or treat the wastes with the characteristics defined above and any treatment reagents.	Corrosion Evaluation, Mechanical Data Sheet, and System Description listed above under References.	The Corrosion Evaluation documents and the Mechanical Data Sheet adequately demonstrate incorporation of identified waste characteristics into the TCO Unit design. Normal and abnormal operating conditions are discussed in the System Description document. The offgas passing thru the SCR catalyst unit is injected with ammonia vapors and C3 air from the ammonia/air dilution skid (LVP-SKID-00003) housing the dilution fans (LVP-FAN-00001/00002) and a mixing chamber.

	Information Assessed	Source of Information	Assessment
Compatibility	The waste types are compatible with each other.	System Description and Drawings listed above under References.	The System Description document and Process Flow Diagram drawings show LVP system exhausters draw gases from melters through TCO Unit to remove VOC and NO_x compounds from the offgas constituents. The System Description document lists various administrative controls in place, which are adequate to ensure that no waste type compatibility issues exist in handling or processing the offgas constituents.
Compatibility	Plant Item material and protective coatings ensure the vessel 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).	Corrosion Evaluation, Mechanical Data Sheet, Material Requisition, System Description, and Specifications listed above under References.	The material selection process included internal corrosion considerations relevant to the operating conditions of the TCO Unit. Based upon those considerations, various grades of stainless steel material were chosen for the TCO Unit components for compounds in direct contact with the offgas stream as documented in the Corrosion Evaluation documents for this equipment. The material selection is listed on the Mechanical Data Sheet under materials of construction. These material selections and corrosion allowance value of 0.010" were based upon a design life of 40 years per System Description document. As the TCO Unit operates in generally dry and actively ventilated conditions, therefore, external corrosion is not considered to be an issue. In order to prevent release of any gases leak testing and acceptance required per Material Requisition document will ensure pressure boundary integrity of the TCO Unit and that it will provide the intended service during its design life.
Corrosion Allowance	Corrosion allowance is adequate for the intended service life of the Plant Item.	Corrosion Evaluation, Mechanical Data Sheet, and System Description listed above under References.	The Corrosion Evaluation documents and Mechanical Data Sheet specify a corrosion allowance value of 0.010" for all TCO Unit components. This corrosion allowance value is appropriate as the equipment operates under dry-air conditions and no condensation is expected. These recommendations are based upon stainless steel material characteristics and an intended design service life of 40 years as listed in System Description and Mechanical Data Sheet.

	Information Assessed	Source of Information	Assessment
Pressure Controls	Pressure controls (vents and relief valves) are adequately designed to ensure pressure relief if normal operating pressures in the Plant Item are exceeded.	System Description listed above under References.	The System Description document provides a discussion of Normal and Off-Normal operations of the LAW Secondary Offgas System. The installation of pressure monitors and controls instrumentation in the LVP system ensure to prevent over pressurization of the TCO Unit. The functionality of the TCO Unit and differential pressure monitoring instrument including periodic checking of the bypass valve interlock and actuator is performed to prevent any restrictions in the path of the offgas flow and hence prevention of over pressurization of any TCO Unit components.

Master Distribution Schedule for WTP Project Subcontract Management Group

SUBMITTAL TRANSMITTAL:	☒ **First Submittal**	☐ **Re-Submittal**	☐ **QVRP Package**	☐ **RFI**
☒ **No Review Required**	☐ **No Review Required Re-Submittal**	☐ **Submittal Supplement**		
CORRESPONDENCE:	☐ **With Attachment**	☐ **W/O Attachment (letter only)**	☐ **RFI**	
	☐ **Fax as Original (Letter Only)**	☐ **Fax as Original (With Attachment)**		
☐ **Pre-Award/Award Package**		☐ **Executed Change Order Package**		
☐ **Executed Amendment Package**		☐ **Back Charge**	☐ **Closeout Package**	

Subcontract Number:	24590-CM-HC4-HXYG-00240
Subcontract Title:	Tank Integrity Design Assessments
Subcontractor Name:	AREVA Federal Services, LLC
Subcontract Administrator:	Tess Klatt

PDC Document Number	Rev	Document Title	Rev
24590-CM-HC4-HXYG-00240-02-00012	00A	IQRPE Structural Integrity Assessment Report For LAW LVP Thermal Catalytic Oxidizer/Reducer (TCO Unit) (IA-3013146-000)	
Associated GRCN # _____			

DUE BACK TO SUBCONTRACT ADMINISTRATOR NO LATER THAN: N/A

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