ISSUED BY RPP-WTP PDC INIT DATE 1/12/04

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

Shop Fabrication of LAW Melter Piping and Components

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EXPIRES: 5/31/2006

P.E. 1/7/04

Content applicable to ALARA? ☐ Yes ☒ No

ADR No.
N/A

Rev
N/A

NOTE: Contents of this document are Dangerous Waste Permit affecting.

Quality Designator
QL
DOE Contract No. DE-AC27-01RV14136

REV	DATE	REASON FOR REVISION	BY	CHECK	REVIEW	QA	APEM/DEM
0	1/7/04	Issued for Permitting Use	DJR		C.A. Jenz	N/A	

SPECIFICATION No. 24590-LAW-3PS-PF00-TP001 **Rev** 0

Notice

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the US 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.

Contents

Appendices

1 Scope

1.1 Project Description and Location

The River Protection Project – Waste Treatment Plant (RPP-WTP) is a complex of radioactive waste processing facilities that will be designed, engineered and constructed by Bechtel National, Inc. for the Department of Energy (DOE). The facility will pretreat and immobilize the low-activity waste (LAW) and high-level waste (HLW) currently stored in underground storage tanks at the Hanford Site. The facility will convert radioactive waste into solid glass, a process called vitrification. The facility operating design life is 40 years.

The Hanford Site occupies an area of about 560 square miles and the RPP-WTP is located in the 200 East Area of the Hanford site, near Richland, Washington along the Columbia River. The Counties of Benton, Franklin, and Grant surround the Hanford Site.

1.2 Equipment, Material, and Services Required

1.2.1 Fabricate, inspect and test LAW melter piping and components in strict accordance with the requirements, codes, drawings, and specifications contained in and referenced by this document and the associated purchase documents.

1.2.2 Provide necessary labor, tools, and equipment to safely perform the specified work in accordance with the requirements of this specification, design drawings, and the purchase order.

1.2.3 Provide necessary material and components including plate, piping, expansion joints/bellows, couplings, hose, insulation, bolts/studs, gaskets, etc., as specified on the design drawings.

1.2.4 Provide necessary material and components to fabricate and assemble the LAW main and standby offgas pipe lines. This assembly and fabrication work includes, but is not limited to, the following: Nickel alloy pipe rolled from plate, offgas shield wall penetrations, HILTAP couplings, shielded expansion joints, custom flanges, bolts/studs and gaskets, insulation, and relief devices.

1.2.5 Provide necessary material and components to fabricate and assemble the LAW Feed piping encasement and hose assemblies. This assembly and fabrication work includes, but is not limited to, the following: custom fabricated stainless steel encasement with flanges and gasketed covers, seal plate assemblies, hose assemblies, bolts/studs and gaskets.

1.2.6 Perform required inspections and testing of LAW melter offgas piping, hose assemblies, encasements and other components, including Nondestructive Examination (NDE) of weld joints, hydrostatic testing, and leak testing.

1.2.7 Provide Positive Material Identification (PMI) on the LAW offgas piping and components.

1.2.8 Tag LAW melter piping spools and components with identification numbers in accordance with the identification numbers shown on the design drawings or other instructions from the Buyer.

1.3 Work by Others

1.3.1 The Seller is not required to purchase the (2) 10 inch butterfly valves with actuators, or any other item listed as government furnished equipment. See Appendix A.

1.3.2 Installation of the LAW main and standby offgas pipe lines, LAW feed lines, encasement and hose assemblies at the LAW facility will be done by the Buyer.

1.4 Definitions

1.4.1	Buyer	Bechtel National, Inc.
1.4.2	Buyer's Representative	The Buyer's designee(s), who shall witness online operations at the Seller's sites and performs onsite inspections and surveillances.
1.4.3	Seller	Manufacturer, assembler, fabricator, vendor, supplier or equal who provides equipment, systems, components, services, or other products for delivery to the Buyer.
1.4.4	LAW Melter	Low Activity Waste Melter
1.4.5	Vitrification	The process of combining a waste stream with glass formers at high temperature to produce a stable waste form.

1.5 Safety/Quality Classifications

1.5.1 LAW offgas pipe and components: Safety Design Class (SDC) / Quality Level –1 (QL-1)

1.5.2 LAW melter feed encasement and hose: Commercial Material (CM)

2 Applicable Documents

2.1 General

2.1.1 Work shall be done in accordance with the referenced codes, standards, and specifications, listed below, which are an integral part of this specification.

2.1.2 When specific chapters, sections, parts, or paragraphs are listed following a code, industry standard, or reference document, only those chapters, sections, parts, or paragraphs of the document are applicable and shall be applied. If a date or revision is not listed, the latest issue, including addenda, at the time of Request for Quote (RFQ) shall apply. When more

than one code, standard, or referenced document covers the same topic, the requirements for all must be met with the most stringent governing.

2.1.3 In the event of a conflict between the requirements of the referenced codes, standards, specifications, regulations and procedures, the Seller shall submit the recommended resolution to the Buyer for review and permission to proceed prior to implementation.

2.2 Codes

2.2.1	ASME B&PV Code, Section V	Nondestructive Examination
2.2.2	ASME B&PV Code, Section IX	Qualification standard for Welding and Brazing procedures, Welders, Brazers, and Welding and Brazing Operators
2.2.3	ASME B31.3–1996	Process Piping
2.2.4	Deleted	
2.2.5	Deleted	
2.2.6	ASTM B366-2001	Standard Specification for Factory - Made wrought Nickel and Nickel Alloy Fittings
2.2.7	ASTM B705-2000	Standard Specification for Nickel-Alloy (UNS N06625, N06219 and N08825) welded pipe.
2.2.8	ASTM B829-1999	Standard Specification for General Requirements for Nickel and Nickel Alloys Seamless Pipe and Tube
2.2.9	AWS QC1	Standard for AWS Certification of Welding Inspectors

2.3 Industry Standards

2.3.1 Pipe Fabrication Institute (PFI) Standards

PFI-ES-3-1981	Fabricating Tolerance
PFI-ES-5-2002	Cleaning of Fabricated Piping
PFI-ES-31-1992	Standard for Protection of Ends of Fabricated Piping Assemblies

2.3.2 American Society of Nondestructive Testing (ASNT)

2.3.2.1 Recommended Practice No. SNT-TC-1A, June 1980 Edition through 2001 Edition, all-inclusive, and its applicable supplements.

2.4 Reference Specifications

2.4.1	24590-WTP-3PS-G000-T0001	General Specification for Supplier Quality Assurance Program Requirements

2.4.2	24590-WTP-3PS-G000-T0003	Engineering Specification for Packaging, Handling, and Storage Requirements
2.4.3	24590-WTP-3PS-G000-TP002	Engineering Specification for Positive Material Identification (PMI)
2.4.4	24590-WTP-3PS-NWP0-T0001	Engineering Specification for General Welding and NDE Requirements for Supplier Fabricated Piping
2.4.5	Deleted	
2.4.6	Deleted	
2.4.7	Deleted	
2.4.8	Deleted	

3 Design Requirements

3.1 Design By Others

3.1.1 The LAW melter piping and component design will be performed by the Buyer and will be depicted on the individual design drawings released to the Seller.

4 Materials

4.1 General

4.1.1 Materials shall be in accordance with the Buyer furnished drawings, the Purchase Order, and specifications, unless written permission to proceed with alternate materials is granted by the Buyer via the Supplier Deviation Disposition Request (SDDR) per the purchase order requirement.

4.1.2 Material traceability is required for Quality Level QL-1 piping and components.

4.1.3 Positive Material Identification shall be required on the LAW offgas piping and components, and shall be done in accordance with Document 24590-WTP-3PS-G000-TP002.

4.1.4 Materials shall be new.

4.2 Restricted Materials

4.2.1 The majority of materials for the LAW melter piping components fabrication are called out on the design drawings. However, the drawings may not list miscellaneous materials used during the work covered by this specification. Such materials may include tape, markers, cutting fluids, cleaning agents, greases, and oils, which may come in contact with LAW melter pipe and other components. Miscellaneous materials shall meet the following requirements: The halogen content shall not exceed 200 ppm. The total sulfur content shall not exceed 400 ppm.

The total of low melting point metals such as lead, zinc, copper, tin, antimony, mercury shall not exceed 1 percent. Of this mercury should not exceed 50 ppm. These low melting metals shall not be intentionally added during the manufacture of the miscellaneous material. Certification shall be available for Buyer inspections.

4.3 Special Requirements

4.3.1 Ten-inch, schedule 80S pipe made from UNS N06625 material is not readily available in machine-made welded or seamless pipe. The design drawings depict a conservative method of fabricating the pipe and elbows from rolled plate for the small quantity required. It is acceptable to substitute 10-inch, schedule 80S pipe manufactured to ASTM B 705 or ASTM B444, from UNS N06625 material. Submit the ASTM number to the Buyer for information, if this option is selected.

4.3.2 Ten-inch, schedule 80S, long radius elbows made from UNS N06625 material, are not readily available in factory-made wrought buttweld fittings. The design drawings depict a conservative method of fabricating the pipe and elbows from rolled plate for the small quantity required. It is acceptable to substitute factory-made wrought buttweld fittings manufactured to ASTM B 366 from UNS N06625 material. Submit the ASTM number to the Buyer for information, if this option is selected.

4.4 Storage of Special Materials

4.4.1 The Seller shall handle and store materials in a locked controlled area to prevent misappropriation, damage, or deterioration of materials. The Seller shall protect tags and other identifying objects on delivered material for establishing identification and traceability. Heat numbers removed by fabrication or cutting shall be transferred to the used and unused material to maintain traceability.

5 Fabrication

5.1 Welds

5.1.1 Piping welds and attachments to piping shall be welded and inspected in accordance with ASME B31.3 – 1996 and document 24590-WTP-3PS-NWP0-T0001, except as listed below. NDE is listed in section 6, "Tests and Inspections".

5.1.1.1 Document 24590-WTP-3PS-NWP0-T0001, paragraph 3.2, does not apply.

5.1.1.1.1 Replace Paragraph 3.2, document 24590-WTP-3PS-NWP0-T0001, with the following: Before any fabrication is to commence, the Seller shall submit to the Buyer a detailed Welding Procedure Application List identifying the Welding Procedures being used. This document shall also identify the extent of NDE along with PMI. This document shall be submitted to the Buyer for review in accordance with the Material Requisition (MR), section 3, Form G-321-E. A review status of "Work May Proceed" shall be obtained prior to use. The Form G-321-E instructions and form provide the time frames

required for submittals. Figure 1 in document 24590-WTP-3PS-NWP0-T0001 is a typical example of the Welding Procedure Application List.

5.1.1.2 Backing rings are not permitted.

5.1.2 Deleted

5.1.3 Welder's Qualification -Personnel performing pipe welding shall be qualified in accordance with Section IX of the ASME B&PV Code.

5.1.4 Prepare and submit shop / as-built drawings, including identification of shop welds.

5.2 Assembly

5.2.1 Unless otherwise noted on the design drawings, dimensional tolerances of PFI-ES-3 for fabricated piping assemblies shall not be exceeded.

6 Tests and Inspections

6.1 Personnel Qualifications

6.1.1 Certified Welding Inspector : Seller personnel performing welding inspections shall be Certified Weld Inspectors (CWI), in accordance with the requirements specified in American Welding Society (AWS) QC1. The following documentation shall be submitted prior to the start of welding: current AWS CWI certification, current and valid visual acuity examination for CWI personnel, and weld inspection procedures.

6.1.2 Nondestructive examination (NDE) personnel shall be qualified and certified in accordance with the recommended guidelines of the American Society of Nondestructive Testing (ASNT). Recommended Practice No. SNT-TC-1A. Qualified inspectors shall have at least a level II or level III certification to perform NDE.

6.2 Nondestructive Examinations

6.2.1 The Seller is responsible for all nondestructive examination and testing of piping, components, and hose assemblies furnished under this specification.

6.2.2 Buyer's representative shall be provided free access to the Seller's facilities, to review, to witness, inspect, and report progress of work.

6.2.3 No sub-tier supplier shall perform NDE work without submittal of NDE procedure and Buyer's review/ and approval in accordance with the Material Requisition (MR), section 3, Form G-321-E. All submittals shall be from the Seller to the Buyer (not from the Sellers sub-tier supplier directly to the Buyer).

6.2.4 Perform and evaluate examinations per procedures and acceptance standards prepared in accordance with the applicable Code and/or Standard, and ASME Boiler and Pressure Vessel

Code, Section V. In addition, the specific examination requirements per Appendix B shall be performed.

6.2.5 Deleted

6.3 Shop Tests

6.3.1 Unless otherwise noted on the individual design drawings, all piping and hoses with fluid-containing components shall be hydrostatically tested in accordance with the requirements of ASME B31.3, Chapter VI.

6.3.2 Test pressure shall be 150% of design pressure and adjusted for design temperature per ASTM B31.3 paragraph 345.4.2. Maintain test pressure for a minimum of 10 minutes. Acceptance criterion shall be: *No leaks observed.*

6.3.3 The Seller shall submit a hydrostatic testing procedure for review and approval in accordance with the Material Requisition (MR), Section 3, Form G-321-E. This will be done prior to performing the hydrostatic testing.

6.3.4 The test medium can be distilled water or deionized water, or clean, potable water having less than 100 ppm halides.

6.3.5 LAW Feed Line Encasement Leak Test.

6.3.5.1 Isolate each end of the encasement. Connect temporary fill, drain and vent connections to the encasement assembly. Fill and vent the encasement until completely full. Acceptance criterion: *No leaks observed.*

6.3.6 A test report shall be prepared, certified and submitted to the Buyer for each completed hydrostatic or leak test. The Seller shall also include a record of the accepted testing as part of the pipe spool documentation.

7 Preparation for Shipment

7.1 Cleanliness

7.1.1 Perform cleaning of fabricated piping as outlined in PFI-ES-5. Cleaned piping shall be free of loose rust or mill scale, blisters, grease, sand, oil, dirt, and other foreign materials.

7.1.2 Clean austenitic stainless steel and/or nickel based alloy piping in a protected area that is free from air-borne chloride contamination. Prevent contamination from non-stainless steel particles such as machine chips, grinding dust, weld spatter, and other debris during fabrication by shielding or other suitable means.

7.1.3 Only austenitic stainless steel brushes that have not been previously used on another material may be used on austenitic stainless steel and nickel alloy piping when brushes are applied.

7.1.4 Where solvent is required to remove grease or oil from austenitic stainless steel and/or nickel based alloy piping, acetone or alcohol (ethyl, methyl, or isopropyl) shall be used. Alternatively, a detergent flush may be used in lieu of solvent cleaning with prior permission to proceed from Buyer.

7.1.5 Final cleaning materials in contact with austenitic stainless steel and/or nickel based alloy shall contain less than 200 ppm halogens. If detergent cleaning is used, rinse with potable water having no more than 100 ppm chloride content. After rinsing, the piping shall be drained out completely such that no standing pockets/puddles of water remain that may later concentrate by evaporation. Removal of excess rinse water may be augmented by swabbing, squeegeeing, or air blowing.

7.1.6 After cleaning, blow dry the interior surfaces of all piping.

7.2 Tagging

7.2.1 Tag each spool, pipe, hose and component with a stainless steel tag. Attach the tag with stainless steel wire. The tag shall be engraved or stamped with the identification information. Each tag shall contain: Spool or piece number, MR number, and drawing number.

7.3 Packaging

7.3.1 Packaging, handling and storage shall be in accordance with Document 24590-WTP-3PS-G000-T0003.

7.3.2 Comply with the minimum end protection requirements criteria outlined in PFE-ES-31.

7.3.3 Cover pipe openings with nonmetallic end caps. Seal the edge of the end cap to the pipe exterior with at least 2 passes of sealing tape. Sealing tape containing less than 200 ppm halogens shall be used on stainless steel piping.

7.3.4 Block, strap and separate with dunnage as necessary to prevent damage during shipment.

7.3.5 Place small loose pieces in boxes for protection during shipment. Identify each box with the Material Requisition (MR) number.

7.3.6 The Seller shall take extra precautions to ensure that welded-in valves are protected during shipment.

8 Quality Assurance

8.1 QA requirements specific to item(s) or service

8.1.1 The Seller's Quality Assurance Program (QAP) Requirements are specified in 24590-WTP-3PS-G000-T0001 and detailed in the Supplier Quality Assurance Program Requirements Data Sheet.

8.1.2 The Seller's QAP Manual shall be submitted to Buyer for review in accordance with 24590-WTP-3PS-G000-T0001 and the procurement documents.

8.1.3 Submittal requirements stated in this specification will be specified in the procurement documents.

8.2 Program QA elements

8.2.1 Seller's QAP, as a minimum, shall contain the requirements detailed in the Supplier Quality Assurance Program Requirements Data Sheet(s) listed in Section 2 of the Material Requisition.

9 Configuration Management

9.1 See Section 2 of the Material Requisition for mandatory contents of Seller's QA program.

10 Documentation and Submittals

10.1 General

10.1.1 Documentation and submittals shall be per Material Requisition (MR) Section 3, Forms G-321-E and G-321-V.

Appendix A Government Furnished Equipment

10" Butterfly Valve with Actuator, LOP-YV-1008, 24590-QL-MRP-JV01-00003
10" Butterfly Valve with Actuator, LOP-YV-2008, 24590-QL-MRP-JV01-00003

Appendix B Nondestructive Examination (NDE) of Fabrication Pipe Welds

ASME B31.3 Process Piping (1996)	
Type of Weld	Normal Fluid Service
Girth and Miter Welds	100% VT 5% RT or 5% UT
Longitudinal Welds	100% VT Spot RT
Fillet including Socket, Seal, and Attachment Welds for Branch Reinforcement and Supports	100% VT 100% PT
Branch Connections including Pressure-containing Welds in Branches	100% VT 100% PT

Notes:
1. Acceptance Criteria for Normal Fluid Service, ASME B31.3-96

Legend:
RT – Radiographic Examination
PT – Liquid Penetrant Examination
VT – Visual Examination
UT – Ultrasonic Examination