R10610491

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

Maintenance Decontamination Equipment

Content applicable to ALARA? ☒ Yes ☐ No

ADR No.
24590-WTP-ADR-M-02-006

Rev
0

ISSUED BY:
RPP-WTP PDC

Quality Level
CM
DOE Contract No. DE-AC27-01RV14136

REV	DATE	BY	CHECK	REVIEW	E&NS	QA	DPEM
3	2/2/04			PHIL SNIDER		SVEN AKERMAN	DJ Wilsey
2	12/2/03	ARR	PM	DJ Wilsey		Greg T Warner	DJ Wilsey for
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SPECIFICATION No.
24590-WTP-3PS-HD00-T0001

Rev
3

Revision History

Revision	Reason for Revision
0	Issued for Procurement
1	Issued for Purchase; complete revision
2	Issued for Purchase; added TOOL-00031, TOOL-00026 was Low Pressure, revised paragraphs 1.4, 4.1 and 9.7
3	Issued for Purchase; incorporated SCNs 24590-WTP-3PN-HD00-00001 thru -00005

Contents

Appendices

1 Scope

1.1 Project Description and Location

Decontamination equipment will be used in four facilities: High Level Waste (HLW), Low Activity Waste (LAW), the Pre-Treatment Facility (PTF), and the Analytical Laboratory (LAB). Decontamination entails the removal of unwanted radiological fixed and loose surface contaminants using various mechanical and chemical processes. Gloveboxes provide containment for manual methods of decontaminating smaller parts prior to repair. Decontamination booths provide containment allowing decontamination of larger pieces of equipment. Tanks and spray systems will accommodate in-cell decontamination of large equipment. Spray lances will be provided through-wall in strategic locations to decontaminate equipment using liquid spray or CO2 blasting methods. Spray lances will also be used inside gloveboxes and decontamination booths. Portable decontamination spray or blast supply equipment will deliver the decontamination media to lances for decontaminating plant equipment. Joggle plugs (by others) will be provided for through wall penetrations of spray and blast unit hoses, to maintain the radiological boundary and allow for future process changes and spraying equipment removal and replacement from out cell. Other miscellaneous decontamination equipment includes parts washers and a crane decontamination system

1.2 Equipment, Material, and Services Required

The Seller shall provide all materials, hardware and labor to design, fabricate, assemble, inspect, functionally test, document and package the listed equipment as provided in this specification, other applicable drawings or documentation referenced.

Mandatory technical requirements and design constraints are typically indicated on data sheets, drawings and specifications by use of terms such as "shall", "required", "mandatory", "maximum", "minimum", or "not to exceed", or by other use of notes. Examples of mandatory technical requirements are dimensions and their associated tolerances, bounding locations of center of gravity (CG) or estimated weight not to be exceeded.

Seller scope of work includes, but is not limited to:

- Seller shall be responsible for the technical adequacy of the design furnished, including constructability, reliability, operability, and maintainability.
- Equipment fabricated and assembled in compliance with this specification, and the referenced codes and standards
- Examination/inspection
- Packaging and preparation for shipping
- Submittals as identified in this specification and summarized on G321-E and G321-V forms.
- Providing the Buyer full access to the Seller's facility for performing inspections or surveillance of any work performed within the scope of the contract
- Installation, Operation, and Maintenance Manuals
- Supporting calculations and analyses, when defined
- Any special tools or handling equipment required for assembly, erecting, maintenance, or disassembly of the gloveboxes, decontamination booths, or other deliverable equipment

- Factory acceptance testing where required
- Loading of equipment on Buyer-arranged conveyances.
- Field support for installation and testing, when required.

The Seller shall submit parts lists and costs for equipment summarized in the G321-E form.

Referenced Design Proposal Drawing (DPD) listed in section 2.5, Mechanical Data Sheets (MDS) listed in Appendix B, and Technical Specification lists details and other requirements of deliverable equipment.

The following deliverable equipment is included within the Seller's scope of work:

Decontamination Tanks

DOCUMENT NUMBER	DESCRIPTION	PLANT ITEM NUMBER
24590-HLW-M0-HSH-00071	DPD, HSH Decontamination Tank Assembly, Melter 1	24590-HLW-MT-HSH-TK-00001
24590-HLW-M0-HSH-00074	DPD, Decontamination Tank Pump Support Package, Melter 1	24590-HLW-MT-HSH-TK-00003
24590-HLW-M0-HSH-00071	DPD, HSH Decontamination Tank Assembly, Melter 2	24590-HLW-MT-HSH-TK-00002
24590-HLW-M0-HSH-00074	DPD, Decontamination Tank Pump Support Package, Melter 2	24590-HLW-MT-HSH-TK-00004
24590-PTF-M0D-PIH-00015	MDS, PTF Decon Tank at PIH	24590-PTF-MT-PIH-TK-00001
24590-PTF-M0-PIH-00019	DPD, PTF Decon Tank at PIH	24590-PTF-MT-PIH-TK-00001

Booths and Gloveboxes

DOCUMENT NUMBER	DESCRIPTION	PLANT ITEM NUMBER
24590-PTF-M0-M17T-00001	PTF Maintenance Decontamination Booth	24590-WTP-MH-10-MHAN-00004
24590-PTF-M0-M10T-00051	PTF Maintenance Decontamination Glovebox	24590-WTP-MH-10-MHAN-00005
24590-LAW-M0-M17T-00001	LAW Maintenance Decontamination Booth	24590-WTP-MH-20-MHAN-00004
24590-LAW-M0-M10T-00003	LAW Maintenance Decontamination Glovebox	24590-WTP-MH-20-MHAN-00005
24590-HLW-M0-M17T-00009	HLW Maintenance Decontamination Booth	24590-WTP-MH-30-MHAN-00004
24590-HLW-M0-M10T-00077	HLW Maintenance Decontamination Glovebox	24590-WTP-MH-30-MHAN-00007
24590-LAB-M0-M10T-00002	LAB Decontamination Glovebox	24590-WTP-MH-60-MHAN-00003

Miscellaneous Equipment

DOCUMENT NUMBER	DESCRIPTION	PLANT ITEM NUMBER
24590-HLW-M0-HSH-00078	Crane Decontamination System, Melter 1	24590-HLW-MH-HSH-MHAN-00011
24590-HLW-M0D-HSH-00150	Parts Washer, Melter 1	24590-HLW-MH-HSH-MHAN-00041
24590-HLW-M0-HSH-00078	Crane Decontamination System, Melter 2	24590-HLW-MH-HSH-MHAN-00055
24590-HLW-M0D-HSH-00212	Parts Washer, Melter 2	24590-HLW-MH-HSH-MHAN-00057
24590-HLW-M0D-30-00266	Pressure Washing Supply System, Unit 1	24590-HLW-30-TOOL-00028
24590-HLW-M0D-30-00267	Pressure Washing Supply System, Unit 2	24590-HLW-30-TOOL-00029
24590-PTF-M0D-M17T-00002	PTF CO2 Decontamination Blast Unit	24590-WTP-MZ-10-MAINT-00001
24590-PTF-M0D-M10T-00007	Roaming CO2 Decontamination Blast Unit	24590-WTP-MZ-10-MAINT-00002
24590-LAW-M0D-M17T-00002	LAW CO2 Decontamination Blast Unit	24590-WTP-MZ-20-MAINT-00001
24590-HLW-M0D-M17T-00017	HLW CO2 Decontamination Blast Unit	24590-WTP-MZ-30-MAINT-00002
24590-HLW-M0D-M10T-00030	Roaming CO2 Decontamination Blast Unit	24590-WTP-MZ-30-MAINT-00004
24590-LAB-M0D-M10T-00003	C3 Workshop CO2 Decontamination Blast Unit	24590-WTP-MZ-60-MAINT-00001
24590-PTF-M0D-PIH-00031	Pressure Washing Supply System, PTF Portable Unit	24590-PTF-PIH-TOOL-00037

Spray Lances

DOCUMENT NUMBER	DESCRIPTION	PLANT ITEM NUMBER

DOCUMENT NUMBER	DESCRIPTION	PLANT ITEM NUMBER
24590-HLW-M0D-HSH-00123	MDS, Maintenance Area Manual Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00027
24590-HLW-M0D-HSH-00124	MDS, Maintenance Area Upper Manual Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00028
24590-HLW-M0D-HSH-00125	MDS, Decontamination Area Manual Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00018
24590-HLW-M0D-HSH-00134	MDS, Decontamination Area Manual CO2 Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00029
24590-HLW-M0D-HSH-00137	MDS, Melter Cave Decontamination Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00031
24590-HLW-M0D-HSH-00126	MDS, Decontamination Pit Lower Remote Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00020
24590-HLW-M0D-HSH-00127	MDS, Decontamination Pit Lower Remote CO2 Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00022
24590-HLW-M0D-HSH-00135	MDS, Decontamination Pit Upper Remote Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00023
24590-HLW-M0D-HSH-00136	MDS, Melter Cave Remote CO2 Spray Lance, Melter 1	24590-HLW-FH-HSH-TOOL-00030
24590-HLW-M0D-HPH-00094	MDS, Spray Lance, Decon Area, Pour Tunnel 1H-B019A	24590-HLW-FH-HPH-TOOL-00010
24590-HLW-M0D-HSH-00217	MDS, Maintenance Area Manual Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00042
24590-HLW-M0D-HSH-00218	MDS, Maintenance Area Upper Manual Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00043
24590-HLW-M0D-HSH-00213	MDS, Decontamination Area Manual Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00039
24590-HLW-M0D-HSH-00219	MDS, Decontamination Area Manual CO2 Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00044
24590-HLW-M0D-HSH-00221	MDS, Melter Cave Decontamination Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00046
24590-HLW-M0D-HSH-00214	MDS, Decontamination Pit Lower Remote Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00040
24590-HLW-M0D-HSH-00215	MDS, Decontamination Pit Lower Remote CO2 Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00048
24590-HLW-M0D-HSH-00216	MDS, Decontamination Pit Upper Remote Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00041
24590-HLW-M0D-HSH-00220	MDS, Melter Cave Remote CO2 Spray Lance, Melter 2	24590-HLW-FH-HSH-TOOL-00045
24590-HLW-M0D-HPH-00238	MDS, Spray Lance, Bogie Decon, Pour Tunnel 2	24590-HLW-FH-HPH-TOOL-00029
24590-HLW-M0D-HPH-00093	MDS, Spray Lance, Decontamination H343 (remote)	24590-HLW-FH-HPH-TOOL-00015
24590-HLW-M0D-HRH-00018	MDS, Spray Lance, Decontamination HB045	24590-HLW-FH-HRH-TOOL-00003
24590-HLW-M0D-HDH-00043	MDS, Canister Rinse Tunnel Spray Lance (CO2)	24590-HLW-FH-HDH-TOOL-00006
24590-HLW-M0D-HDH-00044	MDS, Canister Rinse Bogie Spray Lance	24590-HLW-FH-HDH-TOOL-00007
24590-HLW-M0D-HMH-00002	MDS, Decon Spray Lance (Air Lock Melter Sump 1)	24590-HLW-FH-HMH-TOOL-00001
24590-HLW-M0D-HMH-00003	MDS, Decon Spray Lance (Air Lock Melter Sump 2)	24590-HLW-FH-HMH-TOOL-00002
24590-HLW-M0D-HFH-00045	MDS, Power Manipulator Spray Lance (water)	24590-HLW-FH-HFH-TOOL-00010
24590-HLW-M0D-HFH-00046	MDS, Power Manipulator Spray Lance (CO2)	24590-HLW-FH-HFH-TOOL-00013
24590-HLW-M0D-RWH-00077	MDS, Spray Lance, Remote (CO2)	24590-HLW-FH-RWH-TOOL-00019
24590-HLW-M0D-RWH-00044	MDS, Spray Lance, Manual (CO2)	24590-HLW-FH-RWH-TOOL-00022
24590-HLW-M0D-RWH-00043	MDS, Spray Lance, Remote (liquid)	24590-HLW-FH-RWH-TOOL-00020
24590-PTF-M0D-PFH-00030	MDS, Crane Decon Manual CO2 Spray Lance	24590-PTF-FH-PFH-TOOL-00017
24590-PTF-M0D-PFH-00028	MDS, Decontamination Chamber Remote CO2 Spray Lance	24590-PTF-FH-PFH-TOOL-00015
24590-PTF-M0D-PIH-00014	MDS, Maintenance Area Remote CO2 Spray Lance	24590-PTF-FH-PIH-TOOL-00024
24590-PTF-M0D-RWH-00065	MDS, Spray Lance, P-0121A	24590-PTF-FH-RWH-TOOL-00016
24590-PTF-M0D-RWH-00066	MDS, Spray Lance, P-0122A	24590-PTF-FH-RWH-TOOL-00017
24590-PTF-M0D-RWH-00067	MDS, Spray Lance, P-0223	24590-PTF-FH-RWH-TOOL-00018
24590-PTF-M0D-PIH-00026	MDS, Low Pressure Spray Lance, Maintenance Cave Area	24590-PTF-FH-PIH-TOOL-00028
24590-PTF-M0D-PIH-00027	MDS High Pressure Spray Lance, Maintenance Cave Area	24590-PTF-FH-PIH-TOOL-00026
24590-PTF-M0D-PIH-00028	MDS, Low Pressure Spray Lance, Maintenance Cave Area	24590-PTF-FH-PIH-TOOL-00027
24590-PTF-M0D-PWD-00001	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00001
24590-PTF-M0D-PWD-00002	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00002
24590-PTF-M0D-PWD-00003	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00003
24590-PTF-M0D-PWD-00004	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00004
24590-PTF-M0D-PWD-00005	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00005
24590-PTF-M0D-PWD-00006	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00006
24590-PTF-M0D-PWD-00007	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00007
24590-PTF-M0D-PWD-00008	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00008
24590-PTF-M0D-PWD-00009	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00009
24590-PTF-M0D-PWD-00010	MDS, Low Pressure Spray Lance, Hot Cell Area	24590-PTF-FH-PWD-TOOL-00010

DOCUMENT NUMBER	DESCRIPTION	PLANT ITEM NUMBER
24590-PTF-M0D-PWD-00011	MDS, Low Pressure Spray Lance, P-0119	24590-PTF-FH-PWD-TOOL-00011
24590-PTF-M0D-PFH-00039	MDS, Spray Lance, Remote H2O	24590-PTF-FH-PFH-TOOL-00016

The following items and services, not included in the Seller's scope of work, will be supplied by the Buyer:

- Transportation of products to the jobsite; refer to Section 7 of the purchase order for the Seller's requirements pertaining to packaging and shipping.
- Unloading, storage, installation and field-testing at the jobsite, except where Seller's assistance is required.
- Field installation of fire protection in gloveboxes and decontamination booths
- Embed plates, joggle plugs, and through wall liners
- Exhaust Ventilation equipment for gloveboxes and decontamination booths, (including HEPA filters and ducting). Exhaust demisters are within Seller's scope and shall be supplied by the Seller.
- Two ton hoist for decontamination booths
- Jumper nozzles for decontamination tank piping when specified
- Electrical and instrumentation jumpers for wiring when specified

1.3 Subcontract Work

The Seller may subcontract any portion of the design, fabrication, or assembly provided it meets the quality assurance requirements of this specification. Unless specified otherwise, the Seller is responsible for performance of all inspections and testing, including receipt and control of raw material through fabrication, testing, and configuration control to assure conformance with the requirements stated within in this specification. The subcontractor and subcontracted work shall be reviewed by the Buyer prior to starting the work. The Seller will be ultimately responsible for the completeness and quality of all materials included in this specification.

1.4 Definitions, Acronyms and Abbreviations

Glovebox	The Glovebox is a mechanism used for the containment of contaminated equipment during decontamination and repair.
Shall	Indicates a mandatory requirement for all actions of the Seller
AFBMA	Anti-Friction Bearing Manufacturers Association
AGS	American Glovebox Society
ANSI	American National Standard Institute
ASME	American Society of Mechanical Engineers
ASNT	American Society for Non-Destructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
CFR	Code of Federal Regulations

DPD	Design Proposal Drawing
HEPA	High Efficiency Particulate Air
HLW	High Level Waste
ILAW	Immobilized Low Active Waste
ITS	Important to Safety
LAW	Low Active Waste
LAB	Analytical Laboratory
MDS	Mechanical Data Sheet – Design document that describes equipment specific requirements and conditions.
MSDS	Material Safety Data Sheet
MSM	Master Slave Manipulator
MR	Material Requisition
NACE	National Association of Corrosion Engineers
NEC	National Electric Code
NDE	Non-destructive Examination
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram
PIL	Plant Item List
PQR	Procedure Qualification Record
PTF	Pre-Treatment Facility
QL	Quality Level
QAP	Quality Assurance Program
RPP-WTP	River Protection Project – Waste Treatment Plant
SSC	Structure, System or Component
SSPC	Steel Structures Painting Council
UBC	Uniform Building Code
USCS	U.S. Customary System "inch-pound system"
UNC	Unified National Coarse
WPS	Welding Procedure Specification
w.g.	Water gauge
CG	Center of Gravity
RRC	Risk Reduction Class
CM	Commercial

SC	Seismic Category
PV	Pressure Vessel
RTD	Resistance Temperature Detector
VT	Visual Inspection

1.5 Quality Classifications

1.5.1 General

All equipment shall be purchased as Commercial Quality equipment.

For Quality Assurance requirements refer to Section 8 of this specification.

2 Applicable Documents

2.1 General

Work shall be done in accordance with the referenced codes, standards, and documents listed below, which are an integral part of this specification. If the Seller determines other documents, than those listed, are applicable, the Seller shall refer those documents to the Buyer for evaluating the applicability to the specific component or equipment.

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. When more than one code, standard, or reference document covers the same topic, the requirements for all must be met.

For codes and standards listed below, the specific revision or effective date identified, as well as the specific revision or effective date of codes and standards that they incorporate by reference (daughter codes and standards), shall be followed. If a date or revision is not identified, the last issue, including addenda, at the time of quotation shall apply.

Any known conflicts between the specification or drawings, and the applicable codes and standards, shall be brought to the attention of the Buyer, via a Supplier Deviation Disposition Request (SDDR), for resolution prior to start of work. A blank SDDR form can be found in Section 2.5 of the MR.

The document revision in effect at the time of contract award shall govern, unless specified otherwise. The use of any other edition, revision, or issue of a reference document requires Buyer's approval.

2.2 Codes

NEC (NFPA 70)	National Electric Code
DOE-STD-1066-97, (Chapter 15)	Fire Protection Design Criteria, Glovebox Fire Protection
DOE Order 0 414.1A, 9/29/99	Quality Assurance
NFPA 801, Section 7.4	Standard for Fire Protection for Facilities Handling Radioactive Materials, 2003 Edition

2.3 Industry Standards

2.3.1 Occupational Health & Safety Administration (OHSA)

29 CFR 1910.23	Guarding Floor and Wall Opening and Holes

2.3.2 American Glovebox Society

AGS-G001	Guideline for Gloveboxes, 1998

2.3.3 American National Standard Institute (ANSI)/American Welding Society (AWS)

ANSI/AWS D1.1	Structural Welding Code – Steel
ANSI/AWS D1.6	Structural Welding Code - Stainless Steel
ANSI/AWS D9.1	Sheet Metal Welding Code

2.3.4 American Petroleum Institute (API)

API 620	Design and Construction of Large, Welded, Low Pressure Storage Tanks, 10th edition, Feb. 1, 2002

2.3.5 American Society of Mechanical Engineers (ASME)

ASME B31.3	Process Piping, 1996
ASME Y14.5M	Dimensioning and Tolerancing

2.3.6 American Society for Nondestructive Testing (ASNT)

SNT-TC-1A	Recommended Practice No. SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing, 1980

2.3.7 International Electrotechnical Commission (IEC)

IEC 60529	Degrees of Protection Provided by Enclosures

2.3.8 Underwriters Laboratory (UL)

UL 1776	High Pressure Cleaning Machine

2.3.9 Steel Structures Painting Council (SSPC)

SSPC-SP1	Solvent Cleaning

2.3.10 Pipe Fabrication Institute (PFI)

ES-24	Pipe Bending Methods, Tolerances, Processes and Material Requirements

2.4 Project Documents

The document revision in the associated MR (Material Requisition)/PO package documents shall govern.

The following is a list of other WTP specifications that have been invoked by WTP specifications referenced, or their subsequent daughter specifications that may not have been specifically listed:

- *Engineering Specification for Packaging, Handling, and Storage Requirement,* 24590-WTP-3PS-G000-T0003.
- *General Specification for Supplier Quality Assurance Program Requirements,* 24590-WTP-3PS-G000-T0001.
- *General Specification for Mechanical Handling Equipment Design and Manufacture,* 24590-WTP-3PS-M000-T0002.
- *Engineering Specification for Instrumentation for Package Systems,* 24590-WTP-3PS-JQ07-T0001
- *Engineering Specification for Electrical Requirements for Packaged Equipment,* 24590-WTP-3PS-EKP0-T0001.
- *Specification for Tank Welding,* 24590-WTP-3PS-MTSS-T0001.
- *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel,* 24590-WTP-3PS-SS00-T0002.
- *Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks,* 24590-WTP-3PS-FB01-T0001.
- *Engineering Specification for Piping Material Classes,* 24590-WTP-3PS-P000-T0001.
- *Piping Material Classification, Pipe Class S11B,* 24590-WTP-3PB-P000-TS11B.
- *Engineering Specification for Pressure Vessel Design and Fabrication,* 24590-WTP-3PS-MV00-T0001.
- *Engineering Specification for Welding of Carbon Structural Steel,* 24590-WTP-3PS-SS00-T0001.
- *Engineering Specification for Positive Material Identification,* 24590-WTP-3PS-G000-T0002.
- Technical Supply Condition for Valves, 24590-WTP-3PS-PV00-T0001.
- *Engineering Specification for Shop Fabrication of Piping,* 24590-WTP-3PS-PS02-T0001.
- *Engineering Specification for Actuators for ON/OFF Valves,* 24590-WTP-3PS-JV15-T0001
- *Engineering Specification for Shop Applied Special Protective Coatings to Steel Items and Equipment,* 24590-WTP-3PS-AFPS-T0001

2.5 WTP Drawings

The document revision listed in the MR package for WTP documents shall govern.

2.5.1 Design Proposal Drawings

2.5.1.1 Decontamination Booths and Gloveboxes

Document Number	Document Description
24590-PTF-M0-M17T-00001	PTF Maintenance Decontamination Booth
24590-PTF-M0-M10T-00051	PTF Maintenance Decontamination Glovebox

24590-LAW-M0-M17T-00001	LAW Maintenance Decontamination Booth
24590-LAW-M0-M10T-00003	LAW Maintenance Decontamination Glovebox
24590-HLW-M0-M17T-00009	HLW Maintenance Decontamination Booth
24590-HLW-M0-M10T-00077	HLW Maintenance Decontamination Glovebox
24590-LAB-M0-M10T-00002	LAB Maintenance Decontamination Glovebox

2.5.1.2 Decontamination Tanks and Spray System

Document Number	Document Description
24590-HLW-M0-HSH- 00071	HSH Decontamination Tank Assembly
24590-HLW-M0-HSH- 00072	Decontamination Tank
24590-HLW-M0-HSH- 00073	Decontamination Tank Spray and Sparge System
24590-HLW-M0-HSH- 00074	Decontamination Tank Pump Support Package
24590-HLW-M0-HSH-00075	Decontamination Tank Process Flow Diagram
24590-HLW-M0-HSH- 00076	Decontamination Tank Discharge Filter Assembly
24590-HLW-M0-HSH- 00077	Decontamination Tank Drip Pan
24590-PTF-M0-PIH-00019001	PTF Decon Tank at PIH
24590-PTF-M0-PIH-00019002	PTF Decon Tank at PIH

2.5.1.3 Miscellaneous Decontamination Equipment

Document Number	Document Description
24590-HLW-M0-HSH- 00078	Crane Decontamination System

3 Design Requirements

3.1 General Criteria

It is not the intent to specify herein all details of design and construction. It shall be the responsibility of the Seller to supply equipment that has been designed and fabricated in accordance with specified codes and standards, and to apply a standard of workmanship suitable for the intended purpose. Buyer weight and CG calculations are preliminary and bounding for Buyer's civil/structural use only. Seller shall provide weight and CG calculations and mark deliverable equipment when specified, as noted on associated DPDs.

3.2 Basic Requirements of Decontamination Booths and Gloveboxes

The Seller shall furnish the gloveboxes and decontamination booths complete with required auxiliary systems, instruments, and safety devices to provide efficient and safe operations. This shall include, but is not limited to the following:

- Maximum bounding weight is 2,718 lb. for LAW, HLW and PTF gloveboxes and 20,375 lb. for decontamination booths The LAB Glovebox bounding weight is 6000 lb an the LAB Glovebox Platform bounding weight is 5264 lb.
- Provide required shielding when specified as material thickness on DPDs.
- Provide a means for passing manual swab samples outside the glovebox and decontamination booth.
- The glovebox and decontamination booth lighting shall be external and fluorescent.

Decontamination Booth and Glovebox Seismic Criteria is SCIII. The Safety Class is Not Important to Safety.

3.2.1 Shielding Requirements

For all material thickness requirements refer to the glovebox and decontamination booth DPD listed in Section 2.5.1. Material thickness specified shall be considered minimum.

Recessed areas or internal pockets shall not reduce the required minimum shielding thickness of the glovebox.

3.3 Basic Requirements of Decontamination Tanks

The tank shall be designed and fabricated in accordance with API 620 and 24590-WTP-3PS-MTSS-T0001. Vibro-etching may be used as an alternative to the low stress stamping required in 24590-WTP-3PS-MTSS-T0001 to record welder/weld joint traceability.The tank shall not be a stamped vessel. Tank piping nozzle loads, nozzle reinforcing and nozzle orientation for jumpers shall be in accordance with 24590-WTP-3PS-MV00-T0001, Section 3, *Pressure Vessel Design and Fabrication.*

Process piping shall be designed in accordance with the applicable requirements identified in ASME B31.3 and project specification 24590-WTP-3PS-P000-T0001, *Engineering Specification for Piping Material Classes.* The piping material class for interfacing to the Buyer provided jumper piping shall be in accordance with 24590-WTP-3PB-P000-TS11B, *Piping Material Classification, Pipe Class* S11B. Piping fabrication shall be in accordance with 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping.*

Seller shall consider design details and material thickness shown on Drawings as the minimum requirements. Seller shall not scale Drawings.

The decontamination tanks shall have a quality level of "CM", (commercial). The safety class is "RRC". The Seismic Criteria is "SC-III".

Local gamma dose rates in the general area of each decontamination tank shall be 10,000 mrad/hr maximum. Neutron dose rates are negligible.

The temperatures in the rooms housing the decontamination tanks shall be 59°F minimum and 95°F maximum; humidity varies between 5% and 100%. Operating temperatures controls for each tank shall be capable of being set and maintained at selected temperatures between 59°F and 240°F.

The chemical delivery and control system (HLW tanks only) shall be designed in accordance to the Pump Support Package DPD (24590-HLW-M0-HSH-00074) and process flow diagram (24590-HLW-M0-

HSH-00075). The pump support package shall have a structural frame and stainless steel sheet metal cover. The frame shall provide sufficient rigidity to achieve and maintain illustrated tolerances throughout the working lifetime of the tank. The sheet metal cover shall provide lance overspray, drip and splash protection of internal components and provide a means of pump heat rejection. The requirements of the pump support package include, but are not limited to:

- Tank heating and agitation using steam sparging
- Tank agitation using air sparging
- High volume, high pressure spray
- Injection of chemicals
- Recirculation of fluids
- Neutralization of chemicals
- Sample waste stream
- Transfer of fluids from the tank to radioactive waste disposal system
- Remote disassembly

The Decontamination Tank Spray and Sparge System (HLW tanks only) primary function is to:

- Provide a support structure to deliver and disperse sprays at predetermined levels
- Protect the tank shell from physical damage due to contact with items being cleaned
- Provide a stepped support structure for templates suspending items for cleaning. The maximum suspended load, including tooling (by Buyer) shall not exceed 8,000 lb.

The Decontamination Tank Spray System shall have tested and documented performance provided before shipment. All spray ring nozzles shall be of the flat fan type with low spray angles to maximize impact. The fan of each nozzle shall be oriented vertically with nozzles pointing up , down, and radially inward as required to provide full coverage on a 12" diameter cylinder, throughout the height of the tank. Cleaning configuration 1 is the top ring operating alone with nozzles pointing downward, arranged to preclude spray from exiting the tank. Configuration 2 is the middle pair operating together with nozzles pointing up, down, and radially inward. Configuration 3 is the bottom pair of rings operating together similar to the middle pair, however, the bottom ring shall have no downward pointing nozzles. The Seller shall submit the nozzle type, spray angle, orifice size, operating pressure and flow rates in the above configurations and the expected impact in pounds per square inch on the 12" diameter cylinder stated above.

3.4 Basic Requirements of PTF Decon Tanks

The Pre-treatment Decon Tank (24590-PTF-M0D-PIH-00015 and 24590-PTF-M0-PIH-00019) requirements include, but are not limited to:

- Remote disassembly
- Transfer of fluids from the tank to radioactive waste disposal system

3.5 Basic Requirements of Spray Lances

The Seller shall provide spray lances with all hosing and connections necessary for mechanical and chemical decontamination. This shall include, but is not limited to the following:

- Provide lances compatible with facility equipment such as master slave manipulators (MSMs), power manipulators, and decontamination booths or gloveboxes per listed DPD or datasheet
- Provide compatibility with mechanical spray or blast equipment as well as chemical decontamination
- Provide construction and materials suitable for decontamination of the spray lance
- Provide lances with manually operated controls per datasheet

3.6 Basic Requirements of Decontamination Blast and Spray Equipment

The Seller shall provide decontamination blast and spray equipment for decontamination of plant structures and equipment. This shall include, but is not limited to the following:

- Provide compatibility with spray lance
- Provide remote operation compatibility with a foot pedal per datasheet
- Provide remote operation with all safety features inherent in a handheld spray lance
- Provide portability to move around the plant
- Provide compatibility with the chemicals listed on the Mechanical Data Sheet
- Provide pressure washers that are UL listed

3.7 Basic Requirements of Crane Decontamination Equipment

The crane decontamination equipment (24590-HLW-M0-HSH-00078) is used to decontaminate the exterior of the overhead crane, the overhead mast mounted power manipulator or the interior telescopic mast of power manipulator. The decontamination equipment shall hang from the overhead crane with a bail and direct a nozzle at the manipulator, mast or the crane above. The equipment shall be compatible with liquid spray lances and CO_2 pellet lances and capable of being remotely assembled or disassembled, using MSM or the Power Manipulator hand. The nozzle shall be remotely adjustable with the number of desired angles shown on the design proposal drawing. The lances shall be compatible with the pressure washers or CO_2 blast units described in this technical specification. The Seller shall allow for additional weight to be added. The lance angle shall be remotely adjustable with a power manipulator or MSM. Two hose reel and skid combinations shall be included with the crane decontamination equipment. The skid shall provide additional weight necessary for long payout of hose and remote connection of hoses to a spray lance, the crane decontamination equipment, or when attached directly to the spray manifold on the power manipulator for internal mast decontamination. One hose reel shall be for CO2 and the other shall be for liquid. The hose reels shall be handled remotely. The flow shall be restricted when a hose fails to prevent whipping, and protected from excess flow using a 10 gpm orifice. For each set of the two HSH Crane Decontamination Equipment, provide a 20' length of air hose and 20' length of water hose of the same size and manufactured of the same materials as the existing. Provide Staubli GPL25.1205/IC/TL/JE/SP female with GPL25.6205/IC/TL male connectors on each air line and RBE11.1203/IC/TL/VD/RD/JE female with RBE11.6203/IC/TL male connectors on each liquid line.

The crane decontamination equipment shall have a quality level of "CM". The safety class is "Not Important to Safety". The Seismic Criteria is "SC-V".

3.8 Basic Requirements of Parts Washer

The parts washer (24590-HLW-M0D-HSH-00150 and 24590-HLW-M0D-HSH-00212) shall spray and soak equipment for cleaning and decontamination. The washer shall be operated manually or remotely using the power manipulator. The drain and fill valves shall be capable of being operated manually and remotely. Drain, fill, and recirculation functions shall be full automated for remote operation, but have the capabilities for local manual operation.

3.9 Features of Decontamination Booths and Gloveboxes

Refer to Design Proposal Drawings in Section 2.5.1.

The gloveboxes and decontamination booths are fastened to the floor embeds. Other than material thickness specified on DPD, the gloveboxes will not require any additional shielding for shielding purposes. (see Section 3.2.1). The glovebox components are operated manually. The decontamination booth and glovebox shall have a sloped floor in the bottom draining into a sump provided by the Seller. The sump shall be drained through a 2 in. nominal pipe stub-out. The stub-out shall be pre-filtered with a minimum screen open area of 3.5 in.2 with a maximum of ¼ in. square clear openings. The screen shall withstand a flow of 25 gallons/min. Fire protection hardware is the responsibility of the Buyer's fire protection contractor. The Seller is required to coordinate design interfaces for the fire protection system with the Buyer's fire protection contractor. Coordination shall occur as part of the detail design.

Other features are noted as follows:

- The ports require metal hatch covers.
- The gloveports shall be of the quick change style that allows for timely conversion to pass-through ports
- The glove material shall be specified by the Seller, see AGS-G001-1998.
- The decontamination booth shall have a two ton manually operated turntable.
- The turntable shall be manually operated with a shaft through the wall of the decontamination booth and a crank on the outside at the operating station.
- The decontamination booth shall have a W 10 × 19 monorail beam for a 2 ton chain hoist
- The decontamination booth shall have an Exhaust demister
- Provide grilles (or screens) on the exhaust plenum on each of the Gloveboxes and 3 Booths.
- Provide HEPA filters with counterbalance backdraft dampers on the inbleeds into the airlock portion of the 3 Decontamination Booths. Provide HEPA filters between the airlock portion and the workcenter portion. Provide counterbalance backdraft dampers with each of the 3 Glovebox inbleeds.
- Provide 8"-10" dia. emergency exhaust flanges and inbleed filter housings with each Decontamination Booth and Glovebox.
- Provide a leak-tight seal on the inner air lock doors on the 3 Decontamination Booths.
- Provide a flange and removable end plate on the inbleed portion of each of the 3 Gloveboxes.
- Provide a flanged horizontal exhaust tee on the LAB Glovebox exhaust centered at 117" above the floor. The south facing outlet shall be 8" dia. and the north facing 14" square.

3.10 Features of HLW Decontamination Tanks and Spray System

Tanks shall have lifting features to allow installation of the tank using an overhead crane. When tank and associated equipment are serviced by overhead power manipulator, the maximum jaw opening shall be 5". Equipment being decontaminated is suspended inside the tank on Buyer supplied tooling supported on steps inside the spray ring assembly. A strainer unit shall be located at the bottom of the tank. The strainer unit shall be remotely removable using the overhead power manipulator without prior removal of the spray and sparge system. When specified, temperature, density, and level sensors shall be provided by the Seller according to the design proposal drawings. When specified, Resistance Temperature Detectors (RTD) shall be dual sensor, fully sheathed in T316L stainless steel and spring loaded bayonet connector, see Section 3.4 of Engineering Specification for Instrumentation for Package Equipment, 24590-WTP-3PS-JQ07-T0001. Plant wash and drain shall be connected to the tank through jumpers specified on the design proposal drawing. The Buyer will confirm to the Seller details of the crane hook prior to final design.

The spray system inside the HLW tank shall be removable from the tank using a remotely operated lifting feature for nozzle adjustment and repair. Jumper connections shall be located at the top of the tank and readily accessible within the crane approach area to allow remote disconnection and removal of the spray system and pump support package. All valves shall be on/off Flowserve® Durco® Mach 1 valves, or Buyer approved equal. All valves shall comply with 24590-WTP-3PS-PV00-T0001, Engineering Specification for Technical Supply Condition for Valves. All valves involved with emptying the decontamination tank shall comply with 24590-WTP-3PS-JV15-T0001, Engineering Specification for Actuators for On/Off Valves. Actuators containing electronics shall be sealed to IP66 according to IEC 60529. Valves shall withstand solids that may pass through the finest screen on the outlet of the tank.

The tank piping and internal components shall be designed to minimize contamination traps and maximize contamination removal through rinsing.

Unless noted otherwise, specified HLW tank jumpers are 2" nominal pipe size. Pipe sizes for the various spray ring circuits, as well as for air and steam may be reduced as required to achieve specified design performance parameters provided size reduction is on the tank side of 2" jumper connectors. The tank discharge jumper to Radioactive Liquid Drain shall have a remotely actuated Drain Valve, check valve, and flow restricting device to maintain flow at or below 30 gpm.

The HLW tank chemical injection, air piping, and all other sizes less than ¾" shall incorporate Staubli (or approved equal) remotely operated connectors where engaged by MSMs.

Remote operated electrical power, control, and instrumentation connectors, where engaged by MSMs, shall be provided by the Buyer. Mounting and terminating is the responsibility of the Seller. If Buyer is incapable of providing electrical or instrument jumper connectors at the time required by the Seller, The Seller shall provide temporary cables as necessary to facilitate testing and provide terminal strips and bulkhead connectors to terminate and mount buyer provided jumpers at a later date.

Major features of the pump support package include, but are not limited to:

- Entire system remotely operable to facilitate liquid recirculation for decontamination of radioactive equipment
- Jumpered connections between the pump, tank, plant wash and drain
- Entire system capable of being flushed and rinsed
- Cover and panels, when specified, shall be remotely removable

- Control panel out-cell on cell wall accessible to operators
- Remotely removable electrical, plant air, and jumpered connections
- Chemical injection equipment shall be provided with spill pallet or other spill containment

3.10.1 Decontamination Tank Control and Instrumentation System

The HLW tank control and instrumentation shall be a turn-key system consisting of a Decon Tank Control Panel, Chemical Injection Control Panel, and all associated sensing, indicating, interlocks, and control elements required to provide a functional decontamination system. See Appendix A for a pictorial representation of the HLW Decontamination Tank Instrumentation and Control System.

The Decon Tank Control Panel shall house all controls and indication associated with Decon Tank operations, including lamp test and self diagnostics. The panel shall have on/off controls for the following:

- Recirculating Pump
- Temperature Controller

The tank control panel shall have open/close switches for the following:

- Plant Wash Supply Valve
- Plant Steam Supply Valve
- Top Spray Ring Supply Valve
- Middle Spray Ring Supply Valve
- Bottom Spray Ring Supply Valve
- Drain Valve (valve by Buyer)
- Recirculating/Drain 3-way Valve

The tank control panel shall have the following indication:

- Tank Level
- Tank Liquid Density
- Tank Temperature

The tank control panel shall have equipment status indication for the following:

- Plant Wash Supply Valve position
- Plant Steam Supply Valve position
- Top Spray Ring Supply Valve position
- Middle Spray Ring Supply Valve position
- Bottom Spray Ring Supply Valve position
- Drain Valve (valve by Buyer) position
- Recirculating/Drain 3-way Valve position
- Chemical Injection Pump

The control panel shall have indication for interlock enable/disable functions and remote panel enable/disable for the following:

- Drain Valve interlock with plant RLD Tank Level
- Break Pot feeder valve(s) status
- Break Pot temperature
- Chemical Injection Control Panel remote control for Recirculating Pump

3.10.2 Chemical Injection Control Panel

The Chemical Injection Control Panel shall house all controls and indication associated with Chemical Injection operations, including lamp test and self diagnostics. The panel shall have on/off controls for the following:

- Chemical Injection Pump
- Recirculating Pump

The control panel shall also have equipment status indication for the following:

- Chemical Injection Pump
- Recirculating Pump
- Drain/Recirculating 3-way Valve

The control panel shall have Decontamination Tank indication status for the following:

- Tank Level
- Tank Liquid Density
- Tank Temperature

3.11 Major features of the PTF Decon Tank include, but are not limited to:

- Jumpered connections between plant wash and the tank
- Entire system remotely operable
- A steam operated ejector is used to transfer the vessel contents to plant wash and drain
- A removable and reusable sediment screen is installed at the tank drain/ejector inlet
- A steam sparge system is fitted to provide agitation of contents

3.12 Design Life

All hardware, less consumables shall have a design life of 40 years.

3.13 Environmental Conditions

The equipment shall be designed and manufactured to be suitable for operation within the environment of the LAW, HLW, PTF, and LAB building operating areas as shown on the Mechanical Data Sheets or otherwise specified.

3.14 Mechanical Requirements For Decontamination Booths and Gloveboxes

Equipment subject to maintenance shall be broken down into convenient sub-assemblies to effect ease of replacement per section 5.2.2 of 24590-WTP-3PS-M000-T0002, General Specification for Mechanical Handling Equipment Design and Manufacture.

3.14.1 Bearings

See General Specification for Mechanical Handling Equipment Design and Manufacture 24590-WTP-3PS-M000-T0002, Section 4, Bearings and Bushings.

3.14.2 Fasteners

The use of hexagon headed bolts with sufficient clearance for socket wrenches is required. The range of bolt sizes shall be kept to a minimum in order to limit the number of tools required for maintenance. All bolt types shall be of USCS (inch) units.

Set screws used for locking purposes do not require mechanical locking, but require the use of a removable thread locking compound similar to Loctite Threadlock 242.

Washers, plain or spring, shall not be used except where specifically required and shown on Seller drawings.

Fasteners that might have to be removed for maintenance purposes will be accessible from the worker side of the glovebox.

See "*General Specification for Mechanical Handling Equipment Design and Manufacture*", 24590-WTP-3PS-M000-T0002, Section 4, Fasteners, for additional information.

3.14.3 Lift Points and Lifting Hardware

The glovebox and decontamination booth shall have designated lift points clearly identified in accordance with section 3.4 of 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture*. The gross weights of the equipment shall be noted on the external packaging.

3.15 Mechanical Requirements For Decontamination Tanks

3.15.1 Corrosion Allowance

Corrosion allowance for decontamination tanks is specified on the MDS or DPD and shall be applied to each surface exposed to process vapor or liquid. Internal piping and charge tanks (if used) shall have the specified corrosion allowance applied to both internal and external surfaces, in accordance with 24590-WTP-3PB-P000-TS11B, *Piping Material Classification, Pipe Class* S11B.

- Unless otherwise specified, corrosion allowance shall not be applied to external tank surfaces.

3.15.2 Supports and Anchors

- Seller shall provide tank supports as illustrated on the associated DPD.
- For vertical tanks, the minimum anchor bolt diameter shall be 1 inch UNC unless otherwise specified on the Buyer DPD.
- A minimum of four bolts is to be used. Larger numbers are to be multiples of four.
- Supports and anchors shall be designed to secure a buoyant tank in case the tank is empty and fully submerged.
- Supports for piping and jumper nozzles.

3.16 Mechanical Requirements For Spray Lances

Seller shall verify spray lance compatibility with Master Slave Manipulator (MSM) and power manipulator when compatibility is noted on the MDS. The MSM's jaws shall have the dimensions of ½ in. wide and 1 ¾ in. long. The Buyer will provide the Seller details of the power manipulator jaws prior to the final design. The maximum thrust of the spray lance shall not exceed 20 lbs, measured at the MSM grip point.

3.17 Mechanical Requirements For Decontamination Blast and Spray Equipment

Seller shall verify compatibility with Master Slave Manipulator (MSM) when using out cell controls during remote in-cell operated spray lances in accordance with 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture, Section 5.2.6.* The force produced by the blast and spray equipment shall not inhibit remote operation of the lance. Pressure Washing Supply System steam temperature shall not exceed 350°F and 1500 psig.

3.18 Mechanical Requirements For Crane Decontamination Equipment

The crane decontamination equipment shall be designed in accordance with 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture, Section 5.2,* and relevant proposal drawings 24590-HLW-M0-HSH-00078. Nozzle adjustment and hose reel connections shall be done remotely before use with either the power manipulator or MSM.

3.19 Seismic Loading

Seismic loads associated with decontamination tanks shall be determined from 24590-WTP-3PS-FB01-T0001, *Engineering Specification for Structural Design Loads for Seismic Category III & IV Equipment and Tanks* Refer to the Design Proposal Drawing and the Basic Requirements section of this specification for the appropriate seismic classification. Through a seismic event, the decontamination tanks shall remain upright, intact and structurally sound, preventing any liquid loss through rupture or failure, and retain all mechanical contents housed in them,

3.20 Electrical Requirements

Refer to 24590-WTP-3PS-JQ07-T0001, *Engineering Specification for Instrumentation for Package Systems* for requirements for instrumentation and control of deliverable equipment.

Refer to 24590-WTP-3PS-EKP0-T0001, *Engineering Specification for Electrical Requirements for Packaged Equipment* for electrical requirements for deliverable equipment.

Wiring diagrams for all electrical connections shall be submitted to the Buyer for all the decontamination booths and gloveboxes as well as the Decontamination Tank and Chemical Injection Control and Instrumentation Systems. These submittals are summarized in the G321-E form.

The decontamination booths, decontamination gloveboxes, HSH decontamination tanks and spray system, and parts washer shall be designed for permanent grounding per NFPA 70. Grounding shall comply with the Grounding Section 6.6 of the *Engineering Specification for Electrical Requirements for Packaged Equipment*, 24590-WTP-3PS-EKP0-T0001.

The layout of components and wiring shall be such as to afford easy access for operation and maintenance.

3.21 Accessibility and Maintenance

The unit shall be configured so that standard maintenance techniques and practices can be utilized during maintenance.
Seller shall provide special tooling if required. Tooling shall meet requirements of MSMs if used in a Hot Cell in accordance with 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture, Section 5.2.6.*

4 Materials

4.1 Construction

Materials of construction shall be as specified on the DPD and MDSs. If Seller desires to use alternative materials, a change request shall be processed via the Supplier Deviation Disposition Request (SDDR) form.

Selection of commercial components indicated on the DPD is for proposal purposes only. The Seller is responsible for full validation of the components selected for the contracted application whether identical to the proposed items or otherwise.

All materials installed or used shall be used in accordance with MSDS requirements in 29 CFR 1910. Gloveboxes/Decontamination Booths, their incorporated windows, and hoods shall be of noncombustible materials.

Do not use materials containing Teflon or zinc during manufacture or testing of any deliverable equipment that is subject to acids or high radioactive environments.

Marking or packing materials containing chlorides shall not be used on stainless steel components. Cleaning agents or solutions that can adversely affect the materials shall not be used. The Seller shall take suitable precautions during all stages of construction to prevent carbon steel contamination of stainless steels.

Material Test Reports (MTR) for all structural load bearing stainless steel and carbon steel shall be submitted to Buyer per this specification and as summarized in G321-V form.

Where special requirements or restrictions are applied to standard commercial items, these will be specified on the drawings or in accompanying documentation.

Materials shall meet the requirements listed in section 4.11 of *General Specification for Mechanical Handling Equipment Design and Manufacture,* (24590-WTP-3PS-M000-T0002) unless otherwise specified such as for radiation requirements.

Materials shall be new and free from defects. Classification of fabrication materials shall be in accordance with ASTM. For structural mechanical tubing, ASTM A554 may be substituted for ASTM A511.

Seller shall perform a positive identification of materials test in the fabrication of each tank per 24590-WTP-3PS-G000-T0002, *Engineering Specification for Positive Material Identification.* This is applicable to all alloys higher than Type 304L and wetted by process or acidic decontamination liquids or vapors.

4.1.1 Pipe Fittings

Pipe fittings shall conform to the appropriate ASME and ANSI standards for materials and dimensions unless otherwise stated in the purchase order, see 24590-WTP-3PS-P000-T0001 *Engineering Specification for Piping Material Classes.* The piping material class for interfacing to the Buyer provided jumper piping shall be S11B.

4.2 Spray Lances

All external surfaces shall be resistant to oxidation and compatible with chemicals listed on the MDSs. Anodizing and coating procedures proposed for normally readily oxidized materials shall be approved by the Buyer. Components transporting liquid decontamination liquids, that are to be welded, shall be made of 316L stainless steel. Un-welded components may be made using 316 stainless steel.

4.3 Equipment Subject to Radiation:

See Section 5, *General Specification for Mechanical Handling Equipment Design and Manufacture,* 24590-WTP-3PS-M000-T0002, for materials approved for radiation environments.

4.4 Prohibited Materials

See Section 4, under *Materials, Prohibited Materials, General Specification for Mechanical Handling Equipment Design and Manufacture,* 24590-WTP-3PS-M000-T0002 for those materials not to be used.

5 Fabrication

5.1 General

Fabrication shall be undertaken using USCS "inch-pound" units, unless otherwise approved by the Buyer. Manufacture shall conform to the requirements of drawings and specifications. The Seller shall inform the Buyer if any aspect of the drawing or specification content is incorrect, or if the application could have an adverse effect on the operation or reliability of equipment. Changes to Buyer requirements cannot be made except with the written consent of the Buyer via the Supplier Deviation Disposition Request (SDDR) form.

5.1.1 Welding

- All welding procedure processes and consumables for carbon steel or stainless steel shall be to AWS D1.1, AWS D1.6, AWS D9.1, subject to the limitations and requirements of 24590-WTP-3PS-SS00-T0001, *Engineering Specification for Welding Carbon Structural Steel and* 24590-WTP-3PS-SS00-T0002, *Engineering Specification for Welding of Structural Stainless Steel and Welding of Structural Carbon Steel to Structural Stainless Steel.*
- Reports of weld inspections shall be submitted to the Buyer for information as part of the data package.
- Buyer retains the right to require weld procedure tests to be conducted when deemed necessary.
- Welder qualifications shall be preformed in accordance with AWS D1.1, and AWS D1.6.

5.1.2 Assembly

Unless otherwise specified on the drawing, fabrications shall be free of pockets or traps where water may lodge, and totally enclosed box specifications shall be leak tight to prevent the ingress of fluid, for example water, during decontamination.

5.1.3 Heat Treatment

Seller shall determine if special heat treatment processes are required during fabrication. If required, procedures shall be submitted for review as summarized in the G321-E form. Vibratory stress relief is not acceptable.

5.1.4 Surface Finish

See 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture*, Section 5, Finish Aspects and Coatings for finishing requirements.

5.1.5 Miscellaneous Requirements

- Jigs and fixtures shall be retained by the Seller until written authority to scrap is received from the Buyer.
- See 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture*, Section 5 for additional fabrication requirements.
- Glovebox and Decontamination Booth shall be constructed in sections. For accessibility restrictions during installation, the maximum envelope dimensions of an individual section shall not exceed 5'~~-feet~~ × 6'-6"~~-feet~~ × 7'-6"~~-feet~~.

5.2 Decontamination Tanks

5.2.1 General

Seller shall, if necessary, provide temporary stiffening and jigging to prevent shell distortion during fabrication, welding processes, heat treatment, hydrostatic testing, or shipment.
Fabrication tolerances shall be in accordance with DPDs.

The sequence of fabrication shall be planned to permit maximum access to the internal surfaces to enable examination of all welds. Internal welds shall be inspected and signed off prior to continued fabrication.

Plates and pipes shall be cut to size and shape by machining, grinding, shearing, plasma, laser, or water jet cutting. All thickness of plate or pipe cut by air plasma cutting shall have the edges dressed to a smooth, bright finish. Material cut by the inert gas shielded plasma, laser or water jet process will not require further dressing other than deburring. All lubricants, burrs, and debris shall be removed after cutting.

If a butt-welded seam is required between materials of different thickness, the thicker material shall normally be machined on the side away from the process liquid. Machining shall ensure a smooth finished profile with no sharp corners.

When rolling any austenitic stainless plate, care shall be taken to prevent carbon pickup or contamination of rolled material. The work area shall be free of carbon steel grindings and general cleanliness shall be maintained to preclude carbon contamination.

Only stainless steel brushes, clean iron-free sand, ceramic or stainless steel grit shall be used for cleaning stainless steel or non-ferrous alloy surfaces. Cleaning tools or materials shall not have been previously used on carbon steel.

Internal piping bends shall have a center line radius of four times the pipe nominal diameter. In confined spaces, the center line radius may be reduced to three times the outside diameter of the pipe. The pipe shall not be terminated or butt-welded within the bend, a straight length of 4 inches prior to the weld is recommended, see 24590-WTP-3PS-P000-T0001 *Engineering Specification for Piping Material Classes.* The piping material class for interfacing to the Buyer provided jumper piping shall be S11B.

Pipe bending methods, tolerances, processes, and material requirements shall comply with PFI Standard ES-24 and require Buyer's review. These requirements shall apply equally to tube bending processes.

5.2.2 Layout

Plate size shall be chosen to minimize welding.
The longitudinal seams of adjacent shell courses shall be staggered by a minimum length (measured from the toe of the welds) of 5 times the plate thickness, or 4 inches whichever is greater. Where it is considered impractical to meet this requirement, Seller shall submit a proposed layout to the Buyer for review.

Saddles shall be continuously welded to the shell. Welded seams under the saddle or wear plate are not permitted. Longitudinal weld seams in the shell should not be located within 15° of the horn of the saddle.

Plate layouts shall be arranged so that longitudinal and circumferential weld seams clear all nozzles, and their reinforcing pads to the maximum extent possible. A minimum clearance of eight times the plate thickness from the toes of the welds is required.

Structural attachment welds such as internal support rings or clips, external stiffening rings, insulation support rings, and ladder, platform or pipe support clips shall clear weld seams by a minimum of 2

inches. If overlap of pad type structural attachments and weld seams is unavoidable, the portion of the seam to be covered shall be ground flush and radiographically examined before the attachment is welded. The seam shall be radiographed per API 620.. Radiographic examination of longitudinal weld seams is not required when single-plate edge type attachments such as tray support rings, stiffening rings, insulation support rings, ladder, platform, or pipe support clips cross such weld seams.

5.2.3 Nozzles, and Reinforcing Pads

When applicable, nozzles that require field welds during equipment installation shall be prepared for field welding by fitting with a protective cover of the same material, tack welding in place and sealed to prevent dirt and water from entering the tank.

All jumpers are 2" nominal pipe size unless noted otherwise, see 24590-WTP-3PS-P000-T0001 *Engineering Specification for Piping Material Classes.* The piping material class for interfacing to the Buyer provided jumper piping shall be S11B. Jumper nozzles will be provided by the Buyer. Nozzle materials of construction are different from the remainder of the mating piping yet are compatible. The Seller will be required to generate a specific weld procedure. Nozzle materials of construction will be available to the Seller after the purchase order is awarded.

5.2.4 Welding

All welding shall be continuous. Stitch welding is prohibited.

Joints shall be assembled and retained in position for welding. The use of manipulators or other devices to permit welding in the flat position should be employed where practical.

All attachments e.g. lugs, brackets, nozzles, pads and reinforcements around openings (when permitted) and other members shall follow the contour and shape of the surface to which they will be attached. The gap at all exposed edges to be welded shall not exceed 1/16 inch or one-twentieth of the thickness of the attachment at the point of attachment whichever is greater.

Where fillet welds only are used, the maximum fit-up gap between the components being joined shall be 1/8 inch. The components shall be clamped or otherwise maintained together during welding.

Attachment point of spiders, braces, or other temporary attachments shall match the material of the tank.

All welding involving decontamination tanks shall be completed according to API 620.

5.3 Crane Decontamination Equipment

5.3.1 Miscellaneous Requirements

See 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture*, Section 5.1 for any additional fabrication requirements. The lifting bail shall be constructed according to Appendix D, Remote Hook and Bail Configuration. The lifting bail shall be constructed for 3 ton rotating hook applications using the 3 ton lifting bail dimensions.

6 Tests and Inspections

6.1 General

6.1.1 Standard/Commercial Manufacture Items

Standard commercial items such as fasteners, gearboxes, actuators, and electric motors shall in general be inspected and tested against manufacturers specifications and industry standards.

6.1.2 Sub-Assemblies

Where sub-assemblies erected at the shop have to be dismantled for transport to the site, the fasteners holding them together shall be inspected. Fasteners exhibiting distortion, galling, permanent set, or other damage shall, at the discretion of the Buyer, be replaced.

6.1.3 Inspection and Test Plan

The Seller shall submit an inspection and test plan as summarized in the G321-E form. The inspection and test plan shall summarize the manufacturing sequences, including Seller and Buyer test points and hold or notification points for Buyer's inspection as indicated in the Buyer's surveillance plan.

This plan shall include provisions for increased hold and notification points as the project progresses. The Seller shall submit an inspection report to the Buyer as summarized in the G321-E form.

6.1.4 Hardness Testing

- Hardness testing is required when austenitic stainless steel plate is cold formed to make sections such as angles and channels.
- Hardness testing is required when austenitic stainless steel pipe is cold formed for bends with a centerline radius less than three times the nominal pipe diameter.
- Any cold forming process, which may significantly increase hardness, shall be in accordance with an approved procedure, which contains hardness testing. The procedure and report shall be submitted in the mechanical test procedure and report as summarized in the G321-E and G321-V form.
- Hardness testing shall be performed on areas subject to the greatest deformation after cold working or any re-work. The maximum permitted hardness is HRB 92.
- If the maximum permitted hardness is exceeded, the Seller shall heat treat and test the component to meet this requirement. Seller shall submit a written procedure and report for suitable heat treatment and testing as summarized in the G321-E and G321-V form.

6.1.5 Surface Finish Inspection

Included in the inspection and test plan summarized in the G321-E form shall be procedures for visually inspecting the surface finish of each manufactured item. The inspections shall be performed after completion of all fabrication, cleaning, finish coating (where applicable), and testing.

Inspection of mill finished, ground, or machined surface finishes shall confirm that design requirements have been met.

Inspection of weld surface finishes, shall confirm that design requirements have been met, and shall take place prior to finish coating (where applicable).

Following inspection, the Seller shall verify acceptance of surface finishes in an inspection report as summarized in the G321-V form.

6.1.6 Visual Weld Inspection

The Seller shall develop and implement a procedure to perform visual weld inspections (visual tests, VT) to inspect 100% of each weld. The inspection shall be developed in accordance with AWS D1.1 and AWS D1.6.

The Seller shall submit a visual weld inspection report and weld map for each fabricated item. The report shall record inspection results, the date and time of inspection, and signatures of certified inspection personnel performing the inspection.

The visual weld inspection report and weld map shall be submitted as summarized in the G321-V form.

6.2 Decontamination Booths and Gloveboxes

6.2.1 Leak Testing

The glovebox and decontamination booth shall be leak tested per Section 5.11.3 in the AGS-G001 standard. The decontamination booth leak rate shall be applied to the outer boundary of the decontamination booth/airlock assembly. The leak rate (volume per hour) shall not exceed .5% of the volume at 4 in. w.g. as specified in the AGS-G001 standard. The leak rate procedures and test results shall be submitted to the Buyer as summarized in the G321-E and G321-V forms.

6.3 Decontamination Tanks and Spray System

6.3.1 Shop Tests

Submit an atmospheric hydrostatic leak test procedure and report of the tank, pump, and associated piping as summarized on the G321-E and G321-V form by:

- Filling the tank with water to the overflow and holding for a minimum of one (1) hour.

6.3.2 Performance Testing

Upon completion of the hydrostatic testing, the Seller shall run performance testing on the spraying system by circulating the water used for hydrostatic testing in the three configurations described in paragraph 3.3. Actuate each configuration using the control panel and associated valves. Measure and record the following parameters in each of the three configurations:

- Circulating pump discharge pressure
- Total flow rate
- Spray pattern (video recording is preferred)

Upon completion of performance testing, run the circulating pump until all water is discharged from the tank by actuating the 3-way valve in the discharge configuration.

Demonstration of the removal and installation of the spray ring assembly can be accomplished as planned using the lifting device and shop crane. Demonstration of the removal and installation of the pump support package can be accomplished as intended using the lifting equipment and shop crane. Demonstration of the installation and removal of the discharge filter screen. Demonstrate the interchangeability of the Melter 1 Pump Support Package on Melter 2 Decontamination Tank and vise versa. Mechanical test procedures used to perform these tests shall be submitted to the Buyer as summarized in the G321-E form. The results of the test procedures shall be submitted to the Buyer as summarized in the G321-V form.

6.3.3 Non-Destructive Examinations (NDE)

Main shell seams on all tanks shall be in accordance with API 620. Seams shall have the root weld back-gouged and dressed and radiograph inspected per API 620. All welds joining the nozzle neck to the shell, bottom, or heads, shall be dye-penetrant tested. Dye-penetrant testing shall be performed in accordance with section 7.15.4 of API 620. Manufacturer's radiograph and dye penetrant test methods shall be submitted to the Buyer as summarized in the G321-E form. Records of the dye penetrant and radiograph tests shall be submitted to the Buyer as summarized in the G321-V form. Submit radiograph film as summarized on the 321-E form.

All mandatory NDE (visual) of the tank surface shall be carried out after the completion of fabrication, including any heat treatment. The NDE work must be performed by an inspector certified to the requirements of SNT-TC-1A. The interpretation of the results shall be done by either Level II or Level III inspectors certified to SNT-TC-1A.

6.3.4 Final Inspection of Completed Tank

All external and, where access permits, internal examinations will be carried out by the Seller according to test and inspection procedures submitted to the Buyer as summarized in the G321-E form. The finished dimensions and cleanliness of the tanks shall comply with the relevant Drawings and specifications after completion of all tests. The results of the test and inspection plan shall be submitted to the Buyer as summarized in the G321-V form.

6.4 Spray Lances

6.4.1 Shop Tests

The Seller shall submit a mechanical test procedure as summarized in the G321-E form. The mechanical test procedure shall verify the operability of the equipment in accordance to the requirements of the datasheet. Specifically, the equipment shall operate over the entire pressure range, and work correctly with the MSM or power manipulator being supplied to the Buyer. The results of the test procedures shall be submitted to the Buyer as summarized in the G321-E form.

6.5 Decontamination Blast or Spray Equipment

The Seller shall submit a mechanical test procedure as summarized in the G321-E form. The mechanical test procedure shall verify the operability of the equipment in accordance to the requirements of the datasheet. Specifically, the equipment shall operate over the entire pressure range, and work correctly

with the Seller supplied foot pedal. The results of the test procedure shall be submitted to the Buyer as summarized in the G321-E form.

6.6 Crane Decontamination Equipment

6.6.1 Shop Tests

The Seller shall submit a mechanical test procedure as summarized in the G321-E form. The mechanical test procedure shall include the angles of which the lance can be operated at, a functionality test using a pressure washer at 1500 psi and approximately 2.5 gallons/minute, and a functionality test using the maximum blast pressure and ice consumption of the CO_2 blast unit. The results of the mechanical test procedure test shall be submitted to the Buyer as summarized in the G321-V form.

6.7 Parts Washer

6.7.1 Shop Tests

The Seller shall submit a mechanical test procedure to the Buyer outlining the functionality test as summarized in the G321-E form. The results of the mechanical test report shall be submitted to the Buyer as summarized in the G321-V form.

7 Preparation for Shipment

7.1 General

Packaging, handling, and storage will be performed in accordance with project specification 24590-WTP-3PS-G000-T0003, *Engineering Specification for Packaging, Handling, and Storage Requirements*. The Seller shall submit all documents listed in Section 11 of *Engineering Specification for Packaging, Handling, and Storage Requirements* as summarized in G321-E form.

7.2 Surface Preparation

Remove all dirt, oil, grease, loose mill scale, rust, weld splatter, and other foreign matter on surfaces to be painted. Solvent clean surfaces to SSPC-SP1 as the minimum or to the manufacture's recommended criteria if equal or better for the following equipment: crane decontamination equipment, decontamination booths, and gloveboxes.

7.3 Painting and Coatings

Seller shall paint or coat items in accordance with 24590-WTP-3PS-M000-T0002, *General Specification for Mechanical Handling Equipment Design and Manufacture, Section 4.13.* This requirement applies to the following equipment: crane decontamination equipment, tanks, pump support package, decontamination booths, and gloveboxes.

7.4 Tagging

The deliverable equipment shall be tagged in accordance with Section 7 of the Purchase Order.

Each piece of equipment shall be tagged or labeled with its Plant Item Number in accordance with the *General Specification for Mechanical Handling Equipment Design and Manufacture* (24590-WTP-3PS-M000-T0002) Human Factors Table. Refer to MDS or DPD for further details on nameplates as specified.

Tagging requirements for the tanks and other deliverable equipment are shown on the DPD. A stainless steel nameplate in characters not less than ¼ inch high shall be attached to the decontamination booths and gloveboxes showing the plant item number in a normally visible location. A stainless steel tag plate shall be attached with a stainless steel wire to all other equipment listed in this specification. Separate or loose items shall be tagged with the plant item number for which they are intended. Instruments shall be tagged according to the *Engineering Specification for Instrumentation for Package Systems*, 24590-WTP-3PS-JQ07-T0001, Section 8.

7.5 Packaging

The equipment shall be packaged in accordance with Section 7 of the MR.

The Seller shall verify, by calculation if necessary, that the tank and internals will withstand loads occurring during shipping for the chosen mode of transportation.

Threaded connections shall be cleaned and protected with metal or plastic caps and plugs.

All equipment shall be adequately packed, braced, supported, and securely anchored such that the equipment is fully protected for shipment.

All separate or loose items shall be boxed, individually protected as required and packed in a plywood container for shipment. Each container shall include a complete copy of the Bill of Materials identifying each item in the container.

Equipment enclosed in boxes shall have the Buyer's purchase order number and equipment number affixed on the outside of the box per Section 7 of the Purchase Order.

The Seller shall be solely responsible for the adequacy of the preparation for shipment. In addition, the Seller will provide detailed instructions for storage and handling.

Loads shall be securely fastened to pallets, stillages, timber spacers, or skids as reviewed by the Buyer, to facilitate handling. If the equipment does not posses the inherent strength to be handled using fork lift or crane, then strong backs or other bracing devices shall be provided. Loads to be handled by cranes shall be furnished with lifting eyes.

Lifting instructions shall be plainly indicated on the equipment or cases containing the equipment. Each package shall be clearly marked with the contract number, job number, plant item number and site location, together with the gross weights. For packaged equipment or equipment skids, center of load markers shall be permanently attached to the equipment to assist in lifting, removing, handling and setting the equipment.

7.5.1 Decontamination Tanks and Spray System

All flanged openings, which are not provided with a cover, shall be protected by a carbon steel blind flange of the same rating as the flange, a full-faced rubber gasket with a minimum thickness of 1/8 inch and carbon steel bolts with stainless steel washers.

For spray rings and other internal parts, suitable supports shall be provided to avoid damage during shipment. Temporary internal bracing shall be painted yellow and a label, located near the nameplate, shall state that the tank contains temporary bracing that must be removed.

When tanks are shipped in the horizontal position, the Seller shall take all necessary precautions in loading by blocking and bracing the tank and furnishing all necessary material to prevent damage to the tank or any internal component.

The Seller shall verify, by calculation if necessary, that the tank and internals will withstand loads occurring during shipping for the chosen mode of transportation.

7.6 Documentation

The Seller shall submit Material Safety Data Sheet (MSDS) for information in accordance with Section 7 of the Purchase Order. The Seller shall submit paint identifying information for the following equipment: crane decontamination equipment, tanks, pump support package, decontamination booths, and gloveboxes. MSDS and paint identifying information shall be submitted as material descriptions as summarized in the G321-E form.

8 Quality Assurance

8.1 QA Requirements Specific to Items or Services

The Seller's Quality Assurance Program (QAP) Requirements are included in 24590-WTP-3PS-G000-T0001, *General Specification for Supplier Quality Assurance Program Requirements.*

Seller's QAP Manual shall be submitted to Buyer for review in accordance with 24590-WTP-3PS-G000-T0001.

For SSC's indicated in this specification as Non-ITS, or Commercial Quality, the Seller shall have and maintain a Buyer approved Quality Assurance Program meeting the applicable sections of DOE Order O 414.1A, as per 24590-WTP-3PS-G000-T0001, and the Supplier Quality Assurance Program Requirements Data Sheet, 24590-WTP-3PD-HDYR-00005.

Should any portion of the work defined within this specification be subcontracted, these requirements shall be passed on to the sub-contractor as applicable to the work being performed.

8.2 Program QA Elements

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

9 Configuration Management

9.1 General

Section 3 Drawings and Data Requirements of the Material Requisition lists all documentation and submittals required. The G321-V form lists all the documents required for quality verification and the G321-E form lists those engineering documents required. SDDRs shall be approved by the project prior to shipping of the item.

9.2 Meeting Minutes

The Seller shall document all discussions held in meetings between the Seller and the Buyer, or Buyer's representative, unless otherwise directed by the Buyer. The Seller shall send meeting minutes to the Buyer within 5 working days following the meeting.

9.3 Design Compliance Matrix

The Seller shall develop a matrix that tabulates the design requirements of this specification and the method of compliance. The matrix shall describe how each requirement is met including narrative as well as references to drawings, calculations, and other specific documentation that demonstrates compliance.

The matrix shall be included as a preliminary document in the 50% design review package. The preliminary document shall form the template for the final document.

The matrix shall be included as a final document in the 90% design review package.

9.4 Submittals

General requirements and submittal procedures are also covered in Section 3 of the Material Requisition. Each document to be submitted must be listed on the 15EX form. This form tracks the scheduled and actual delivery of each submittal. It will be completed at the time of award.

9.5 Quality Assurance Plan

Seller's Quality Assurance Plan (QAP) shall be submitted to the Buyer with the sellers proposal if not presently on record per this specification and as summarized in the Section 3 G-321-E form. Afterward, the QAP shall be re-submitted for project records tracking.

9.6 Drawings

Any proposed changes to Buyer drawings or documents shall be submitted to the Buyer via a Supplier Deviation Disposition Request (SDDR) in accordance with Section 2 of the Purchase Order. All drawings shall be fully dimensioned with the dimensions in USCS (inch–pound) units, showing all critical interface dimensions and their tolerances as specified. Critical interface dimensions shall be identified, including a note explaining how to distinguish these dimensions.

The Seller shall prepare and submit drawings in accordance with the American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME) Standard Y-14 series, *Drafting Standards*. The Seller shall provide wiring diagrams consistent with Buyer's *Engineering Specification*

for Electrical Requirements for Packaged Systems, Section 10, 24590-WTP-3PS-EKP0-T0001. All drawings shall have an associated bill of materials that lists

- item number for each individual part
- quantity of each item listed
- description for each item listed
- reference code (ASTM, ANSI, etc.) when required for an item
- Material callout or Seller part number

As summarized in the G321-E form, Engineering Document Requirements, the Seller shall submit all shop detail drawings, assembly drawings, and foundation and mounting detail drawings for the decontamination booths and gloveboxes, the decontamination tank and spray system, and the pump support package.

The Seller shall submit all shop and detail drawings and assembly drawings for the crane decontamination equipment.

9.7 Design Reviews and Meetings

Design review shall be conducted in accordance with the method outlined in this section. The number of design reviews may be changed at the Buyer's discretion.

The Seller shall provide to the Buyer, a minimum of five (5) working days prior to the scheduled meeting, copies of documentation or information that is expected to be discussed and presented in the meeting. Documentation may be provided as either hard copies or as electronic files sent via the email (if not previously submitted in accordance with the submittal schedule).

The Seller shall participate in the design review, present the design including discussion of the provided submittals, and shall be prepared to discuss any comments.

Following the 90% design review meeting, the Buyer will formally transmit comments or other requests on the design submittals. The Seller is required to provide response/resolution to the Buyer's comments in accordance with the submittal schedule, or request deviation from the Buyer's requirements through use of the Buyer's SDDR form.

The resolved/corrected submittals shall be provided in the final design report in accordance with the submittal schedule.

9.7.1 Contract Award Design Kick-Off Meeting

The contract award kick-off meeting will be an informal discussion conducted at the Buyer's facility to ensure the newly awarded contract is clear and concise, and that the Seller has a clear understanding of the scope of the contract.

9.7.2 20% Design Review

The first interim review will be an informal review conducted at the Seller's facility after approximately 20% of the design is completed. Preliminary design media, including arrangement and

assembly drawings, drawings containing maintenance envelopes, calculations and analyses will be reviewed by the Buyer.

The Seller shall be prepared to discuss any Seller-recommended changes to the approaches indicated on the Buyer's DPD and identify any conflicts with the equipment envelope dimensions.

9.7.3 50% Design Review

The second interim review will be an informal review conducted at the Buyer's facility after approximately 50% of the design is completed. Preliminary design media, including arrangement and assembly drawings, electrical design and load list, calculations and analysis, and the Design Compliance Matrix shall be provided to the Buyer for review.
The preliminary design media shall be provided to the Buyer at a mutually agreed time prior to the scheduled meeting.

9.7.4 90% Design Review

At the conclusion of definitive design, a formal 90% design review will be conducted at the Buyer's facility in accordance with the RPP-WTP procedures. The (draft) final design report, including all design media, supporting calculations and analysis, Design Compliance Matrix and other required submittals which documents the design shall be provided to the Buyer.

9.7.5 Final Design Closeout Meeting

The Seller shall provide a corrected, completed final design report (and any other submittals requiring changes) that resolves any issues associated with the 90% review. An informal meeting shall be held to accept the revised design media and resolve any remaining open items.

9.8 Procedures

For fabrication processes requiring welding, welding procedures as summarized in the G321-E form shall be submitted to the Buyer if pre-qualified welds are not used.

9.9 Manuals

Seller shall provide a clearly written instruction manual, prepared on good quality paper and suitably bound; manual shall be submitted to Buyer per this specification and as summarized in the G321-E form.

The manual shall include:

1. Installation instructions.
2. Complete parts list, recommended spare parts list, names of manufacturers with OEM model or; part numbers, and special ordering instructions (if applicable) for replaceable parts.
3. Description of the equipment, special tools, and sub-assemblies. As applicable, significant technical characteristics, test and adjustment information, and safety/warning notices.
4. Operating instructions, referencing drawings/diagrams as appropriate.
5. Maintenance and operational instructions.
6. Recommended inspection points if any, with procedures and period for inspection (preventative maintenance).

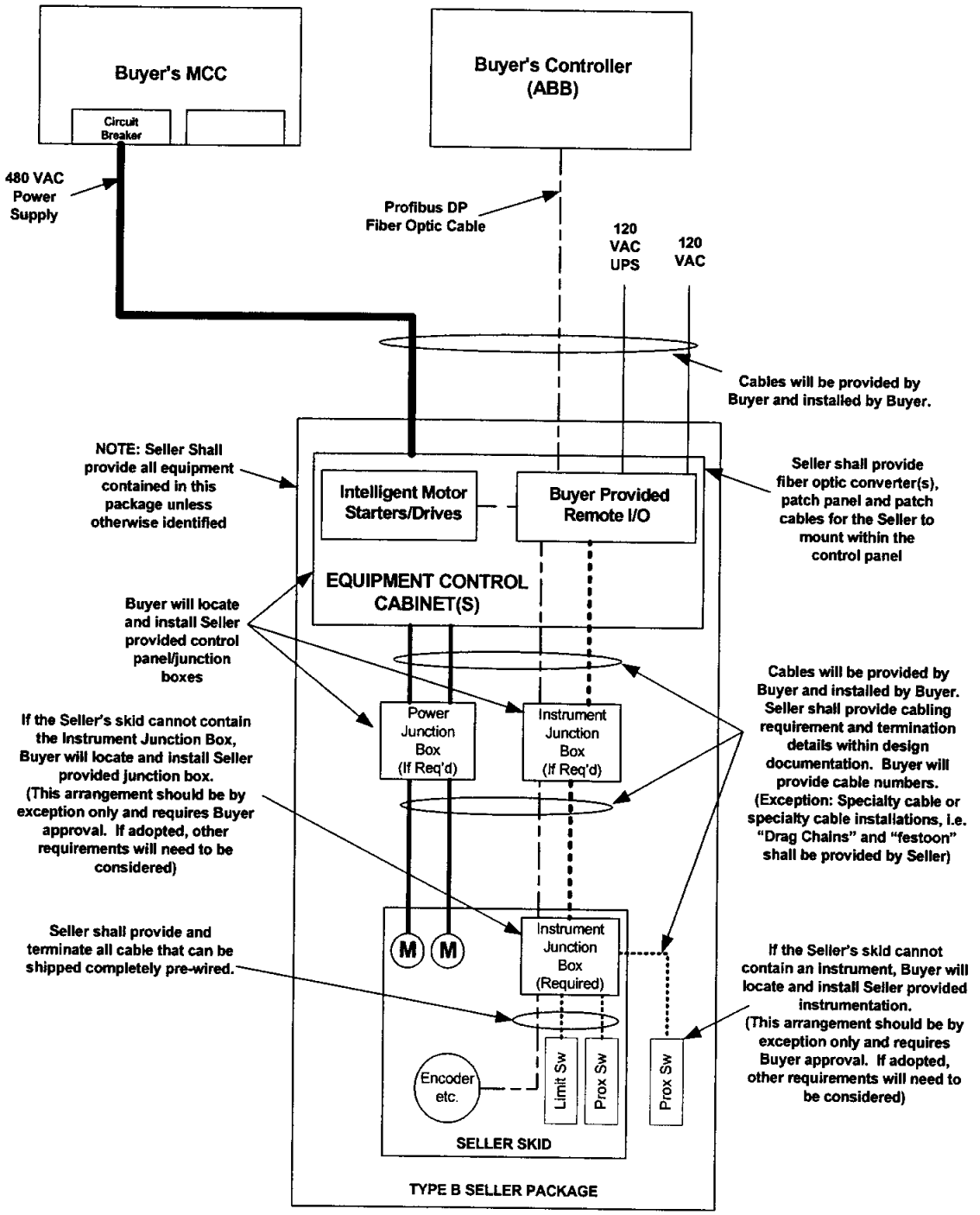
7. Site storage instructions.
8. In-storage maintenance requirements.
9. Rigging and lifting instructions.
10. Special handling requirements.

9.10 SDDRs

The following SDDRs have been incorporated by reference:

- 24590-WTP-SDDR-PROC-04-00590
- 24590-WTP-SDDR-PROC-05-00092
- 24590-WTP-SDDR-PROC-05-00193
- 24590-WTP-SDDR-PROC-05-00482
- 24590-WTP-SDDR-M-05-00008
- 24590-WTP-SDDR-M-05-00092
- 24590-WTP-SDDR-M-05-00177
- 24590-WTP-SDDR-M-05-00242
- 24590-WTP-SDDR-M-05-00778

Appendix A
HLW Decontamination Tank Instrumentation and Control System



This "Type B" package is unique to equipment that contains Buyer provided Remote I/O.
The Controller and Software for controlling will be provided by the Buyer.

TYPE B - HSH DECON OPTION

DATE	REV.
01/31/05	A

Appendix B
Equipment Plant Item Numbers and Datasheet Numbers

PIL Number	Datasheet Number	Document Description
24590-PTF-MT-PIH-TK-00001	24590-PTF-M0D-PIH-00015	Pretreatment Facility Decontamination Tank
24590-HLW-HSH-MHAN-00041	24590-HLW-M0D-HSH-00150	Parts Washer (Melter 1)
24590-HLW-HSH-MHAN-00057	24590-HLW-M0D-HSH-00212	Parts Washer (Melter 2)
24590-HLW-FH-HSH-TOOL-00027	24590-HLW-M0D-HSH-00123	Maintenance Area Manual Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00028	24590-HLW-M0D-HSH-00124	Maintenance Area Upper Manual Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00018	24590-HLW-M0D-HSH-00125	Decontamination Area Manual Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00029	24590-HLW-M0D-HSH-00134	Decontamination Area Manual CO2 Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00031	24590-HLW-M0D-HSH-00137	Melter Cave Decontamination Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00020	24590-HLW-M0D-HSH-00126	Decontamination Pit Lower Remote Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00022	24590-HLW-M0D-HSH-00127	Decontamination Pit Lower Remote CO2 Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00023	24590-HLW-M0D-HSH-00135	Decontamination Pit Upper Remote Spray Lance (Melter 1)
24590-HLW-FH-HSH-TOOL-00030	24590-HLW-M0D-HSH-00136	Melter Cave Remote CO2 Spray Lance (Melter 1)
24590-HLW-FH-HPH-TOOL-00010	24590-HLW-M0D-HPH-00094	Spray Lance, Decon Area, Pour Tunnel 1 H-B019A
24590-HLW-FH-HSH-TOOL-00042	24590-HLW-M0D-HSH-00217	Maintenance Area Manual Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00043	24590-HLW-M0D-HSH-00218	Maintenance Area Upper Manual Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00039	24590-HLW-M0D-HSH-00213	Decontamination Area Manual Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00044	24590-HLW-M0D-HSH-00219	Decontamination Area Manual CO2 Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00046	24590-HLW-M0D-HSH-00221	Melter Cave Decontamination Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00040	24590-HLW-M0D-HSH-00214	Decontamination Pit Lower Remote Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00048	24590-HLW-M0D-HSH-00215	Decontamination Pit Lower Remote CO2 Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00041	24590-HLW-M0D-HSH-00216	Decontamination Pit Upper Remote Spray Lance (Melter 2)
24590-HLW-FH-HSH-TOOL-00045	24590-HLW-M0D-HSH-00220	Melter Cave Remote CO2 Spray Lance (Melter 2)
24590-HLW-FH-HPH-TOOL-00029	24590-HLW-M0D-HPH-00238	Spray Lance, Bogie Decon, Pour Tunnel 2
24590-HLW-FH-HPH-TOOL-00015	24590-HLW-M0D-HPH-00093	Spray Lance, Decontamination H343 (Remote)
24590-HLW-FH-HRH-TOOL-00003	24590-HLW-M0D-HRH-00018	Spray Lance, Decontamination HB045
24590-HLW-FH-HDH-TOOL-00006	24590-HLW-M0D-HDH-00043	Canister Rinse Tunnel Spray Lance (CO2)
24590-HLW-FH-HDH-TOOL-00007	24590-HLW-M0D-HDH-00044	Canister Rinse Bogie Spray Lance
24590-HLW-FH-HMH-TOOL-00001	24590-HLW-M0D-HMH-00002	Decon Spray Lance (Air Lock Melter Sump 1)
24590-HLW-FH-HMH-TOOL-00002	24590-HLW-M0D-HMH-00003	Decon Spray Lance (Air Lock Melter Sump 2)
24590-HLW-FH-HFH-TOOL-00010	24590-HLW-M0D-HFH-00045	Power Manipulator Spray Lance (Water)
24590-HLW-FH-HFH-TOOL-00013	24590-HLW-M0D-HFH-00046	Power Manipulator Spray Lance (CO2)
24590-HLW-FH-RWH-TOOL-00022	24590-HLW-M0D-RWH-00044	Spray Lance, Manual (CO2)
24590-HLW-FH-RWH-TOOL-00020	24590-HLW-M0D-RWH-00043	Spray Lance, Remote (Liquid)
24590-PTF-FH-PFH-TOOL-00017	24590-PTF-M0D-PFH-00030	Crane Decon Manual CO2 Spray Lance
24590-PTF-FH-PFH-TOOL-00015	24590-PTF-M0D-PFH-00028	Decontamination Chamber Remote CO2 Spray Lance
24590-PTF-FH-PIH-TOOL-00024	24590-PTF-M0D-PIH-00014	Maintenance Area Remote CO2 Spray Lance
24590-PTF-FH-RWH-TOOL-00016	24590-PTF-M0D-RWH-00065	Spray Lance P-0121A
24590-PTF-FH-RWH-TOOL-00017	24590-PTF-M0D-RWH-00066	Spray Lance P-0122A
24590-PTF-FH-RWH-TOOL-00018	24590-PTF-M0D-RWH-00067	Spray Lance P-0223
24590-PTF-FH-PIH-TOOL-00028	24590-PTF-M0D-PIH-00026	Low Pressure Wash Lance, Maintenance Cave Area

PIL Number	Datasheet Number	Document Description
24590-PTF-FH-PIH-TOOL-00026	24590-PTF-M0D-PIH-00027	High Pressure Wash Lance, Maintenance Cave Area
24590-PTF-FH-PIH-TOOL-00027	24590-PTF-M0D-PIH-00028	Low Pressure Wash Lance, Maintenance Cave Area
24590-PTF-FH-PWD-TOOL-00001	24590-PTF-M0D-PWD-00001	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00002	24590-PTF-M0D-PWD-00002	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00003	24590-PTF-M0D-PWD-00003	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00004	24590-PTF-M0D-PWD-00004	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00005	24590-PTF-M0D-PWD-00005	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00006	24590-PTF-M0D-PWD-00006	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00007	24590-PTF-M0D-PWD-00007	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00008	24590-PTF-M0D-PWD-00008	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00009	24590-PTF-M0D-PWD-00009	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00010	24590-PTF-M0D-PWD-00010	Low Pressure Wash Lance, Hot Cell Area
24590-PTF-FH-PWD-TOOL-00011	24590-PTF-M0D-PWD-00011	Low Pressure Wash Lance, P-0119
24590-WTP-MZ-30-MAINT-00002	24590-HLW-M0D-M17T-0017	HLW CO2 Decontamination Blast Unit
24590-WTP-MZ-30-MAINT-00004	24590-HLW-M0D-M10T-0030	Roaming HLW CO2 Decontamination Blast Unit
24590-HLW-FH-30-TOOL-00028	24590-HLW-M0D-30-00266	Pressure Washing Supply System, Unit 01
24590-HLW-FH-30-TOOL-00029	24590-HLW-M0D-30-00267	Pressure Washing Supply System, Unit 02
24590-WTP-MZ-10-MAINT-00001	24590-PTF-M0D-M17T-00002	PTF CO2 Decontamination Blast Unit
24590-WTP-MZ-10-MAINT-00002	24590-PTF-M0D-M10T-00007	Roaming PTF CO2 Decontamination Blast Unit
24590-WTP-MZ-20-MAINT-00001	24590-LAW-M0D-M17T-00002	LAW CO2 Decontamination Blast Unit
24590-WTP-MZ-60-MAINT-00001	24590-LAB-M0D-M10T-00003	LAB CO2 Decontamination Blast Unit
24590-HLW-FH-RWH-TOOL-00077	24590-HLW-M0D-RWH-00019	Spray Lance, Remote (CO2)
24590-PTF-FH-PIH-TOOL-00037	24590-PTF-M0D-PIH-00031	Liquid Pressure Washing Supply System, PTF Portable Unit
24590-PTF-FH-PFH-TOOL-00016	24590-PTF-M0D-PFH-00039	Spray Lance, Remote H2O