AR TARGET SHEET

The following document was too large to scan as one unit, therefore, it has been broken down into sections.

EDMC#: 0068138
SECTION: 2 of 2

DOCUMENT #:

TITLE: Ecology review of DBVS

Rev. 0, October 31, 2005

Permit Attachment KK Tank Management

Appendix 4 Secondary Waste System

Section 4 Engineering Change Notices

ECN 722466, Revision 0 [a]
ECN 723118, Revision 2

(a) ECN 722466 is located in Attachment LL, Appendix 1, Section 4.

CH2M HILL ENGINEERING CHANGE NOTICE

Page 1 of 13

☒ DM ☐ FM ☐ TM

1a. ECN 723118 R 2

1b. Proj. ECN - - R

2. Simple Modification ☒ Yes ☐ No	3. Design Inputs – For full ECNs, record information on the ECN-1 Form (not required for Simple Modifications)	4. Date 5/23/2005
5. Originator's Name, Organization, MSIN, & Phone No. M.W. Leonard, Closure Projects Engineering Support, T4-67, 373-2730	6. USQ Number No. - - - R - ☒ N/A	7. Related ECNs N/A
8. Title Release non-proprietary versions of DBVS PFDs	9. Bldg. / Facility No. DBVS/241-G	10. Equipment / Component ID N/A
11. Approval Designator ER		
12. Engineering Documents/Drawings to be Changed (Incl. Sheet & Rev. Nos.) RPP-24544, Rev. 1a	13. Safety Designation ☐ SC ☐ SS ☐ GS ☒ N/A	14. Expedited/Off-Shift ECN? ☐ Yes ☒ No
15a. Work Package Number N/A	15b. Modification Work Completed N/A (Responsible Engineer / Date)	15c. Restored to Original Status (TM) N/A (Responsible Engineer / Date)
16. Fabrication Support ECN? ☐ Yes ☒ No		

17. Description of the Change (Use ECN Continuation pages as needed)

This ECN supplements RPP-24544, Rev. 1a "DBVS IQRPE/RCRA Design Review Package" to release the non-proprietary version of the DBVS Process Flow Diagrams (PFDs) with the RCRA Design Review Package (see attached pages).

Problem: Previous revisions of DBVS PFDs contian information proprietary to AMEC.

Solution: Update PFDs to remove information proprietary to AMEC without compromising technical completeness of PFD so that the PFDs can be transmitted to Ecology without restrictions on use.

Analysis: PFDs contain information necessary for the technical completeness of the RCRA Design Packages. Worked with AMEC & GeoSafe to implement above solution.

18. Justification of the Change (Use ECN Continuation pages as needed)

DBVS PFDs are needed for technically complete design information so that EPA and WDOE can approve RCRA regulated portions of the DBVS design.

Until approval of DBVS DSA, a USQ is not required.

19. ECN Category

☐ Direct Revision
☒ Supplemental
☐ Void/Cancel

ECN Type

☐ Supercedure
☐ Revision

20. Distribution

Name	MSIN	Name	MSIN
GP Janicek	S7-12	MJ Sutey	S7-70
DH Shuford	T4-67	DW Hamilton	T4-67
JD Guberski	R1-51	FR Miera	H6-03
TH May	T4-67	PK Brockman	R2-50
MW Leonard	T4-67	RR True	R3-26
SE Carlson	T4-67	RL Brown	S7-75
^CH2M EQRG	R1-14	JC Hoffman	S7-83

Release Stamp

DATE: MAY 24 2005
STA: 4
HANFORD RELEASE
ID: 2.
KJ for Mr. Willison

A-6003-563.1 (09/04)

CH2M HILL ENGINEERING CHANGE NOTICE

Page 2 of 13 ☒ DM ☐ FM ☐ TM

1a. ECN 723118 R 2

1b. Proj. ECN - - R

21. Revisions Planned (Include a brief description of the contents of each revision)

ECN-723118, R3 is planned to incorporate the attached pages into RPP-24544, Rev. 1b, Appendix E.

Note: All revisions shall have the approvals of the affected organizations as identified in block 11 "Approval Designator," on page 1 of this ECN.

22. Design Basis Documents ☒ Yes ☐ No

23. Commercial Grade Item Dedication Numbers (associated with this design change)

N/A

24. Engineering Data Transmittal Numbers (associated with this design change, e.g., new drawings, new documents)

N/A

25. Other Non Engineering (not in HDCS) documents that need to be modified due to this change

Type of Document	Document Number	Update Completed On	Responsible Engineer (print/sign and date)
Alarm Response Procedure	N/A		
Operations Procedure	N/A		
Maintenance Procedure	N/A		

Type of Document	Document Number	Type of Document	Document Number
N/A			

. Field Change Notice(s) Used?

☐ Yes ☒ No

If Yes, Record Information on the ECN-2 Form, attach form(s), include a description of the interim resolution on ECN Page 1, block 17, and identify permanent changes.

NOTE: ECNs are required to record and approve all FCNs issued. If the FCNs have not changed the original design media then they are just incorporated into the design media via an ECN. If the FCN did change the original design media then the ECN will include the necessary engineering changes to the original design media.

27. Design Verification Required?

☐ Yes ☒ No

If Yes, as a minimum attach the one page checklist from TFC-ENG-DESIGN-P-17.

28. Approvals

	Facility/Project Signatures	Date		A/E Signatures	Date
Design Authority	M.W. LEONARD for GP Janicek per telecon GP Janicek 5/23/05 M.W. Leonard	5/23/05	Originator/Design Agent		
Resp. Engineer	DH Shuford M.W. Leonard for DHS	5/23/05	Professional Engineer		
Resp. Manager	MJ Sutey	5/23/05	Project Engineer		
Quality Assurance			Quality Assurance		
IS&H Engineer			Safety		
NS&L Engineer			Designer		
Environ. Engineer	M.W. LEONARD for J.D. Guberski per telecon 5/23/05 M.W. Leonard JD Guberski	5/23/05	Environ. Engineer		
Engineering Checker	SE Carlson	5/23/05	Other		
Other	J.W. Hobbs for R.L. Brown per telecon w/ M.W. Leonard RL Brown (Rad Con) 5/23/05	5/23/05	Other		
Other	DW Hamilton (PM)	5/23/05	DEPARTMENT OF ENERGY / OFFICE OF RIVER PROTECTION		
Other	T.H. May (Proc. Eng.)	5/23/05	Signature or a Control Number that tracks the Approval Signature		
Other					
ner			ADDITIONAL SIGNATURES		
ner					
Other					

A-6003-563.1 (09/04)

APPENDIX E

DEMONSTRATION BULK VITRIFICATION SYSTEM PROCESS FLOW DIAGRAMS

Drawing Number	Revision	Title	Page
F-145579-00-A-0021	0H	Full DBVS Feed Preparation & Melt Process Flow Diagram	5
F-145579-00-A-0022	0H	Full DBVS Trailer Off-Gas Treatment Process Flow Diagram	6
F-145579-00-A-0023	0H	Full DBVS Tri-Mer and SCR Process Flow Diagram	7
F-145579-00-A-0024	0H	Full DBVS Feed Preparation & Melt Single Block PFD	8
F-145579-00-A-0025	0H	Full DBVS Trailer Off-Gas Treatment Single Block Diagram	9
F-145579-00-A-0026	0H	Full DBVS Tri-Mer and SCR Single Block Diagram	10
F-145579-00-A-0030	G	Full DVBS Feed Preparation & Melt (Tri-Mer Operating) Process Flow Diagram	11
F-145579-00-A-0031	G	Full DVBS Feed Preparation Trailer Off-Gas Treatment (Tri-Mer Operating) Process Flow Diagram	12
F-145579-00-A-0032	G	Full DVBS Tri-Mer Scrubber (Tri-Mer Operating) Process Flow Diagram	13

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The current versions of the figures listed below are located in Permit Attachment FF, Appendix B.

F-145579-00-A-0021, Revision 0J
F-145579-00-A-0022, Revision 0H
F-145579-00-A-0023, Revision 0H
F-145579-00-A-0024, Revision 0J
F-145579-00-A-0025, Revision 0H
F-145579-00-A-0026, Revision 0H

Permit Attachment KK Tank Management

Appendix 4 Secondary Waste System

Section 5 Specifications

145579-D-SP-011, Revision 1, Construction Specification for Secondary Waste Pump Skid
145579-011-CN-002, Change Notice: Specification 145579-D-SP-011
145579-D-SP-031, Revision 1, Secondary Waste Storage Tank Specification
TECN 018.001, Technical Engineering Change Notice to the Secondary Waste Storage Tanks Specification
TECN D-SP-031.R01.2, Technical Engineering Change Notice to the Secondary Waste Storage Tanks Specification

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TECHNICAL SPECIFICATION

The document revision number is indicated below. Please replace all revised pages of this document and destroy the superseded copies.

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

REV No.	ISSUED FOR	ORIGIN	DATE	INITIAL
0	Approval	C. Grenard	03-Jan-05	CG
1	Design Review RCR Comment Incorporation	C. Grenard	24-Mar-05	CG

DOCUMENT APPROVAL

CLIENT APPROVAL (AMEC RICHLAND)		DMJM (RICHLAND)	
Original Approvals On File		*Original Approvals On File*	
Project Manager:	3/25/05	Project Manager:	
Date:		Date:	3/28/05
Q.A. Rep.:		Discipline Lead:	
Date:	3/25/05	Date:	3/25/05
CLIENT APPROVAL (CH2M HILL)		Originator:	
Project Manager:	3/30/05	Date:	3/25/05
Date:	3/30/05		

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
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CLIENT:	AMEC E&E - Richland, Washington		

ABBREVIATIONS AND ACRONYMS

AISC	American Institute for Steel Construction
AATCC	American Association of Textile Chemists and Colorists
ANSI	American National Standards Institute, Inc.
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	American Society for Testing and Materials
AWS	American Welding Society
B&PV	Boiler and Pressure Vessel
CFR	*Code of Federal Regulations*
CH2M HILL	CH2M HILL Hanford Group, Inc.
CMTR	Certified Material Test Report
CoC	Certificate of Conformance
CWI	Certified Welding Inspector
DOE	U.S. Department of Energy
FAT	Factory Acceptance Test
HI	Hydraulic Institute
IEEE	Institute of Electrical and Electronics Engineers
IESNA	Illuminating Engineering Society of North America
ISO	International Organization for Standardization
MCS	Monitoring and Control System
NCR	nonconformance report
NDE	nondestructive examination
NEC®	*National Electrical Code*
NEMA	National Equipment Manufacturers Association
NIST	National Institute of Standards and Technology
NRTL	Nationally Recognized Testing Laboratory
P&ID	piping and instrumentation diagram
PLC	programmable logic controller

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PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

QA	quality assurance
SAE	Society of Automotive Engineers
SWPS	secondary waste pump skid
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
WAC	*Washington Administrative Code*

TRADEMARKS

Appleton	Registered trademark of EGS Electrical Group and Appleton Electric Company Corporation.
AutoCAD	Registered trademark of AutoDesk, Inc.
Cutler-Hammer	Registered trademark of Eaton Corporation.
Electromark	Registered trademark of Permar Systems, Incorporated DBA Electromark Company.
Hoffman	Registered trademark of Federal Cartridge Corporation DBA, Hoffman Engineering Company Corporation.
Leviton	Registered trademark of Leviton Manufacturing Co, Incorporated.
Loctite	Registered trademark of Henkel Loctite.
Mini Power-Zone	Registered trademark of Square D Company Corporation.
NEC	Registered trademark of the National Fire Protection Association.
Neo-Lube	Registered trademark of Watson Bowman ACME Corporation.
Square D	Registered trademark of Square D Company Corporation.
Tri-Mer	Registered trademark of Tri-Mer Corporation.
Weidmüller	Registered trademark of Weidmüller Interface GMBH & Company Corporation.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

1 SCOPE

Throughout this specification, Contract Responder shall act as the Seller and AMEC Earth and Environmental, Inc. shall act as the Buyer.

1.1 INCLUDED IN SCOPE

This specification provides the minimum requirements for the design, analysis, fabrication, inspection, testing, documentation, packaging and shipping of a secondary waste pump skid (SWPS) consisting of:

1. Primary and backup pumps, with motors and disconnect switches, to deliver liquid effluent from the SWPS inlet to the appropriate SWPS outlet.

2. All interconnecting piping, valving, and instruments between the SWPS inlet and SWPS outlets.

3. Inline filters with provisions for a set of backup inline filters. The filters will have the plumbing to provide for filter bypass.

4. Electrical distribution equipment, including disconnect switches, transformer, distribution panel, wiring, conduit, local pushbutton stations, and convenience receptacles. Sketches SK-DBVS-E107 and SK-DBVS-E108 have been provided to assist in defining the scope for motor control wiring.

5. .The SWPS equipment will be installed in an International Organization for Standardization (ISO)-rated freight container (i.e., skid). The ISO freight container shall be equipped with lighting, heating, and air conditioning systems. The SWPS shall be installed on a concrete pad. The Seller is responsible for providing anchor points.

6. Develop waste transfer pump design documentation, supporting calculations, fabrication drawings, and mounting details.

7. Perform fabrication, assembly, examination, inspection, testing, packaging, and shipping of one SWPS.

8. Develop complete quality assurance (QA) data package for the design and assembly of one SWPS.

9. The SWPS shall be Factory Acceptance Test (FAT) at Seller's location. An inspection and test plan, including FAT for systems, subsystems, and components at the Seller's site shall be provided (see Sections 1.1 and 4.2). Acceptance testing will also be preformed on the Hanford Site after installation. The Seller shall provide on-site support.

10. The external air conditioning units shall be installed by the Seller, but may be removed for transport.

11. The material handled is considered hazardous and radioactive waste that is regulated under the requirements of 40 CFR 264, Subpart J; WAC 173-303-640; and 10 CFR 830.

Drawings and sketches provided with this specification represent a minimum set of Buyer expectations for the assembled system. The Seller shall use this information, along with additional material in the specification, to generate a set of design and fabrication drawings with sufficient detail for construction. Examples of information to be developed by the Seller includes, but is not limited to, dimensioning and associated tolerances, mounting and weld details, and material types and quantities.

Component information provided on the Bidder's Drawing and Data Commitments sheet (Appendix A) with this specification contain the critical characteristics identified by the Buyer for the assembled system. The Seller shall use this information, along with performance requirements either in the specification or generated from Seller prepared calculations, to generate a completed set of data sheets for components of the assembled system. Form, fit, and function shall be evaluated by the Seller in the course of design work and development of the design and fabrication drawings. The Seller shall not deviate from the information provided on the data sheets (Appendix C).

1.2 NOT INCLUDED IN SCOPE

Work not included in this specification is:

1. Installation of the SWPS at the Buyer's facilities,
2. Supply of the breather filter,
3. Supply of hose-in-hose transfer lines connected to the SWPS,
4. Supply of the leak detector sensors and electronics,
5. Supply of the programmable logic controller (PLC) equipment,
6. Design or manufacture of the electrical conductors on the line side of the 480V power terminal box.
7. Motor starters are located in a remote motor control center.
8. Weather-proof emergency pump shutoff will be installed under a separate contract.
9. Integration testing with other systems and subsystems using liquid effluent.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

2 APPLICABLE DOCUMENTS

The codes, standards, and other documents listed in Table 2-1 and Table 2-2 are of the latest issue and addenda in effect at the time of procurement (unless otherwise specified). These documents form a part of the basis of design for this procurement to the extent specified in the applicable sections of this specification. In the event of a conflict between documents referenced herein and the requirements of this specification, the requirements of this specification shall take precedence when the specification is more stringent. All conflicts, alternative standards, or omissions shall be brought to the attention of the Buyer for resolution. Significant sections noted are not meant to negate the remainder of the specification, but to emphasize sections of greater importance.

2.1 GOVERNMENT DOCUMENTS

Table 2-1: Government Documents

Government Documents	Title
10 CFR 830	"Nuclear Safety Management," *Code of Federal Regulations*, as amended.
29 CFR 1910	"Occupational Safety and Health Standards," *Code of Federal Regulations*, as amended.
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," Subpart J, *Code of Federal Regulations*, as amended.
47 CFR 15	"Radio Frequency Devices," *Code of Federal Regulations*, as amended.
DOE/RL-92-36	*Hanford Site Hoisting and Rigging Manual*, U.S. Department of Energy, Richland, Washington.
WAC 173-303-640	"Tank Systems," *Washington Administrative Code*, as amended.

2.2 NON-GOVERNMENT DOCUMENTS

Table 2-2: Non-Government Documents (7 sheets)

Code/Standard	Title
AATCC Test Method 27	*Water Resistance: Hydrostatic Pressure Test*, American Association of Textile Chemists and Colorists, Research Triangle Park, North Carolina.

Table 2-2: Non-Government Documents (7 sheets)

Code/Standard	Title
AISC	*Manual of Steel Construction—Allowable Stress Design*, Ninth Edition, American Institute of Steel Construction, Chicago, Illinois.
AISC	*Manual of Steel Construction—Load and Resistance Factor Design*, Third Edition, American Institute of Steel Construction, Chicago, Illinois.
ANSI/AWS D1.3	*Structural Welding Code—Sheet Steel*, American Welding Society, Miami, Florida.
ANSI C63.16	*American National Standard Guide for Electrostatic Discharge Test Methodologies and Criteria for Electronic Equipment*, American National Standards Institute, Washington, D.C.
ANSI/HI 3.1-3.5	*American National Standard for Rotary Pumps for Nomenclature, Definitions, Applications and Operation*, Hydraulic Institute, Parsippany, New Jersey.
ANSI/HI 3.6	*American National Standard for Rotary Pump Tests*, Hydraulic Institute, Parsippany, New Jersey.
ANSI/IESNA RP-7	*Lighting Industrial Facilities*, Illuminating Engineering Society of North America, New York, New York.
ANSI Y14.1	*Drawing Sheet Size and Format*, American National Standards Institute, Inc., New York, New York.
ANSI Y14.5M	*Dimensioning and Tolerancing*, American National Standards Institute, New York, New York.
ASCE 4-98	*Seismic Analysis of Safety-Related Nuclear Structures*, American Society of Civil Engineers, Reston, Virginia.
ASCE 7-98	*Minimum Design Loads for Buildings and Other Structures*, American Society of Civil Engineers, Reston, Virginia.
ASHRAE Fundamentals Handbook	*2001 ASHRAE Handbook – Fundamentals*, American Society of Heating, Refrigerating, and Air Conditioning Engineers, Atlanta, Georgia.
ASME B&PV Code	*ASME Boiler and Pressure Vessel Code*, American Society of Mechanical Engineers, New York, New York. Section VIII, "Rules for Construction of Pressure Vessels" Section IX, "Welding and Brazing Qualifications"
ASME B16.5	*Pipe Flanges and Flanged Fittings*, American Society of Mechanical Engineers, New York, New York.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table 2-2: Non-Government Documents (7 sheets)

Code/Standard	Title
ASME B16.9	*Factory-Made Wrought Steel Buttwelding Fittings*, American Society of Mechanical Engineers, New York, New York.
ASME B16.11	*Forged Fittings, Socket Welding and Threaded*, American Society of Mechanical Engineers, New York, New York.
ASME B18.2.1	*Square and Hex Bolts and Screws Inch Series*, American Society of Mechanical Engineers, New York, New York.
ASME B18.2.2	*Square and Hex Nuts*, American Society of Mechanical Engineers, New York, New York.
ASME B30.20	*Below-the-Hook Lifting Devices*, American Society of Mechanical Engineers, New York, New York.
ASME B31.3	*Process Piping*, American Society of Mechanical Engineers, New York, New York.
ASME NQA-1, 1994*	*Quality Assurance Program Requirements for Nuclear Facilities*, American Society of Mechanical Engineers, New York, New York.
ASME PCC-1	*Guidelines for Pressure Boundary Bolted Flange Joint Assembly*, American Society of Mechanical Engineers, New York, New York.
ASNT SNT-TC-1A	*Recommended Practice*, American Society of Nondestructive Testing, Columbus, Ohio.
ASTM A 36/A 36M	*Standard Specification for Carbon Structural Steel*, American Society of Testing and Materials, New York, New York.
ASTM A 53/A 53M	*Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*, American Society of Testing and Materials, New York, New York.
ASTM A 105/A 105M	*Standard Specification for Carbon Steel Forgings for Piping Applications*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 106	*Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 108	*Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

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TECHNICAL SPECIFICATION

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PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table 2-2: Non-Government Documents (7 sheets)

Code/Standard	Title
ASTM A 182/A 182M	*Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 193/A 193M	*Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 194/A 194M	*Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service, or Both*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 234/A 234M	*Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 307	*Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 312/A 312M	*Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 325	*Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 403/A 403M	*Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 500	*Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM A 563a	*Standard Specification for Carbon and Alloy Steel Nuts*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table 2-2: Non-Government Documents (7 sheets)

Code/Standard	Title
ASTM A 569	*Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM C 518	*Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM D 1621	*Standard Test Method for Compressive Properties of Rigid Cellular Plastics*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM D 1622	*Standard Test Method for Apparent Density of Rigid Cellular Plastics*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM E 84	*Standard Test Method for Surface Burning Characteristics of Building Materials*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM E 96	*Standard Test Methods for Water Vapor Transmission of Materials*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
ASTM E 285	*Standard Test Method for Oxyacetylene Ablation Testing of Thermal Insulation Materials*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.
AWS D1.1/D1.1M	*Structural Welding Code—Steel*, American Welding Society, Miami, Florida.
AWS D1.6	*Structural Welding Code—Stainless Steel*, American Welding Society, Miami, Florida.
AWS QC-1	*Standard for AWS Certification of Welding Inspectors*, American Welding Society, Miami, Florida.
HNF-SD-GN-ER-501	*Natural Phenomena Hazards, Hanford Site, Washington*, Revision 1B, Westinghouse Hanford Company, Richland, Washington.
IEC 61000-4-2	*Electromagnetic Compatibility (EMC) – Part 4-2: Testing and Measurement Techniques – Electrostatic Discharge Immunity Test*, International Engineering Consortium, Chicago, Illinois.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table 2-2: Non-Government Documents (7 sheets)

Code/Standard	Title
IEEE C62.41.1	*IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits*, Institute of Electrical and Electronics Engineers, New York, New York.
IEEE C62.41.2	*IEEE Recommended Practice on Characterization of Surges in Low Voltage (1000 V and Less) AC Power Circuits*, Institute of Electrical and Electronics Engineers, New York, New York.
IEEE Std C37.90.2	*IEEE Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers*, Institute of Electrical and Electronics Engineers, New York, New York.
IEEE Std 141	*IEEE Recommended Practice for Electric Power Distribution for Industrial Plants*, Institute of Electrical and Electronics Engineers, New York, New York.
IEEE Std 142	*IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems*, Institute of Electrical and Electronics Engineers, New York, New York.
IEEE Std 242	*IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems*, Institute of Electrical and Electronics Engineers, New York, New York.
IEEE Std 519	*Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems*, Institute of Electrical and Electronics Engineers, New York, New York.
IESNA HB-9	*IESNA Lighting Handbook*, 9th Edition, Illuminating Engineering Society of North America, New York, New York.
ISO 668	*Series 1 Freight Containers Classification, Dimensions and Ratings*, International Organization for Standardization, Geneva, Switzerland.
ISO 1161	*Series 1 Freight Containers – Corner Fittings – Specification*, International Organization for Standardization, Geneva, Switzerland.
ISO 1496-2	*Series 1 Freight Containers –Specification and Testing – Part 2: Thermal Containers*, International Organization for Standardization, Geneva, Switzerland.
NEMA MG-1	*Motors and Generators*, National Electrical Manufacturers Association, Rosslyn, Virginia.

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PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table 2-2: Non-Government Documents (7 sheets)

Code/Standard	Title
NFPA 70	*National Electrical Code*, 2002 Edition, National Fire Protection Association, Quincy, Massachusetts.
UBC, 1997	*1997 Uniform Building Code*, International Conference of Building Officials, Whittier, California.
UL-listed	*Electrical Appliance and Utilization Equipment Directory*, Underwriters Laboratories, Inc., Northbrook, Illinois.
UL 508A	*Standard for Industrial Control Panels*, Underwriters Laboratories, Inc., Northbrook, Illinois.
* NQA-1 (the relevant requirements of NQA-1 are included in Section 4).	

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TECHNICAL SPECIFICATION

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CLIENT:	AMEC E&E - Richland, Washington		

3 TECHNICAL REQUIREMENTS

3.1 ITEM DEFINITION

The SWPS is comprised of a ISO freight container into which pumps, piping, valves, and instrumentation will be mounted and secured. Functionally, the SWPS will draw liquid effluent water or flush water at the SWPS inlet connection and pump it either to the secondary waste disposal truck or the appropriate effluent storage tank. The SWPS contains instruments to monitor the flow of the fluid. The functions of the freight container include secondary containment, primary support for transportation and movement, temperature maintenance, and interface connections between the assembly and other systems.

3.1.1 Item Diagram

Figure 3-1 illustrates the major SWPS components.

Major components of the SWPS include:

1. An insulated ISO freight container;
2. Dual pumps;
3. Secondary waste filters;
4. Piping and piping supports;
5. Air-operated and manual valves;
6. Breather filter (not provided for in this specification);
7. Process instrumentation (leak detector not provided for in this specification);
8. Electrical power distribution equipment;
9. Heating, ventilation, and air conditioning equipment; and
10. Filtered water and compressed air system piping.

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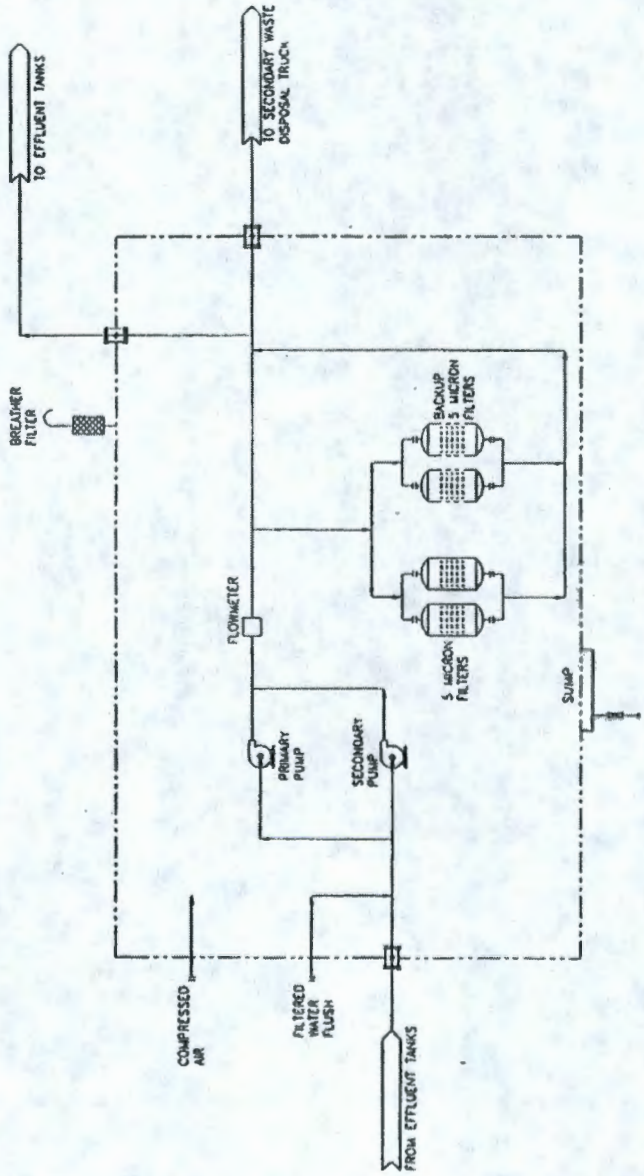

Figure 3-1: Secondary Waste Pump Skid Process Flow Diagram

3.1.2 Interface Definition

The SWPS enclosure is represented by the dashed line in Figure 3-1. See Drawing F-145579-37-A-0100 (Appendix B) for additional information. See AMEC Earth and Environmental, Inc. Drawings F-145579-00-A-0099 and F-145579-00-A-0100 (Appendix B) for symbol definitions. Connection points with other systems and processes are identified in Table 3-1.

Table 3-1: Secondary Waste Pump Skid Enclosure Pipe Penetrations (3 sheets)

Penetration Number (DBVS-SWPS)	Description	Connection
CP-01	Discharge to Effluent Tanks	• Inner Pipe Connection: 2-in. CJ Stud, River Bend Hose Specialty, Part No. JBW6-8, 316L stainless. • Encasement Flange Termination: 6-in. 150 class RF, ASTM A 105/A 105M[a]. • Reference Sketch DBVS-SK-M001 (Appendix B) for connection details and critical dimensions.
CP-02	Breather Filter	• 1-1/2-in. FNPT, Class 2000 or 3000, ASTM A 105/A 105M[a] (plug for shipment). • Note: Breather filter is Buyer-supplied.
CP-03	Inlet from Flush Water Supply	• 2-in. threaded coupling, ASTM A 105/A 105M[a], Grade C with quick disconnect.
CP-04	Inlet from Effluent Tanks	• Inner Pipe Connection: 2-in. CJ Stud, River Bend Hose Specialty, Part No. JBW6-8, 316L stainless. • Encasement Flange Termination: 6-in. 150 class RF, ASTM A 105/A 105M[a]. • Reference Sketch DBVS-SK-M001 (Appendix B) for connection details and critical dimensions.

Table 3-1: Secondary Waste Pump Skid Enclosure Pipe Penetrations (3 sheets)

Penetration Number (DBVS-SWPS-)	Description	Connection
CP-05	Containment Drain from Sump	• 1-1/2-in. FNPT, Class 2000 or 3000 extending no more than 1/2 in. beyond the exterior wall with 1-1/2-in. threaded nipple, ball valve (V-535) male cam and groove fitting with cap (QD-501M).
CP-06	Discharge To Secondary Waste Disposal Truck	• Inner Pipe Connection: 2-in. CJ Stud, River Bend Hose Specialty, Part No. JBW6-8, 316L stainless. • Encasement Flange Termination: 6-in. 150-in. RF, ASTM A 105/A 105M[(a)]. • Reference Sketch DBVS-SK-M001 (Appendix B) for connection details and critical dimensions.
CP-07	Compressed Air Supply	• 1/2-in. threaded coupling, ASTM A 105/A 105M[(a)], Grade C with quick disconnect.
N/A	Main Electrical Distribution Connection	• External 480V power terminal box.
N/A	Pump motor circuit connections	• External 480V power terminal box.
N/A	Motor pushbutton connections	• External 120V terminal box.
N/A	Main electrical grounding connection	• External grounding lug.

Table 3-1: Secondary Waste Pump Skid Enclosure Pipe Penetrations (3 sheets)

Penetration Number (DBVS-SWPS)	Description	Information
N/A	Main Monitoring and Control System Connection	• Generic termination panel.

FNPT = female national pipe thread. RF = raised-face.

[a]ASTM A 105/A 105M, *Standard Specification for Carbon Steel Forgings for Piping Applications*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

3.1.2.1 Electrical Connection

A one-line diagram of the electrical connections are shown on Sketch DBVS-SK-E106 (Appendix B). The following sections describe the connections in more detail.

3.1.2.1.1 480V Power Connection

The SWPS transformer shall receive three sources of 480V ac power from an external source. One single-phase, 480V ac circuit shall be provided for the transformer and distribution panel. Two 3-phase, 480V ac circuits shall be provided for the transfer pump motors.

All 480V ac circuits shall terminate in a terminal box on the outside of the SWPS enclosure in accordance with Sketch DBVS-SK-E106 (Appendix B). The outside cover of the terminal box shall be labeled in accordance with Sketch DBVS-SK-M001 (Appendix B). 25 percent spare terminals shall be provided in all terminal boxes.

Power for the transfer pump motors shall be routed from the terminal box directly to the motors. Power for the transformer shall be routed from the terminal box directly to the transformer.

3.1.2.1.2 Grounding Connection

A grounding lug shall be provided on the outside frame of the SWPS to facilitate attachment of a grounding electrode. The location of the grounding lug shall be shown on the shop drawings. See Section 3.3.1.8.3 and Sketch DBVS-SK-E106 (Appendix B) for grounding requirements.

3.1.2.2 Monitoring and Control System Connection

The Monitoring and Control (MCS) is not part of this contract; therefore, the Seller shall interface with the physical instruments and components through the use of a Seller-provided termination panel mounted on the outside of the SWPS. Each SWPS MCS connection shall be capable of operating the contained process and utility equipment from a 24V dc or, in the case of motor starters, 120V ac termination. The MCS interfaces are identified as instruments or components shown on the system piping and instrumentation diagram (P&ID) (Appendix B). The termination panel shall have a 20 percent spare capacity.

See Section 3.3.1.16 for MCS termination details.

3.1.2.3 Secondary Containment

The lower section of the SWPS enclosure shall be a secondary containment capable of holding at least 800 gal of liquid. The enclosure shall include a pump-out port for removal of any liquid contained by the enclosure. The sump shall be designed such that 1.5 gal of liquid will provide a pool depth of at least 1 in. The Buyer will install leak detection after delivery.

3.1.2.4 Filtered Water Interface

Filtered water will be provided to the SWPS at 50 gal/min and 50 psig at the Filtered Water System, inlet quick disconnects (DBVS-WRS-PS-QD1).

3.1.2.5 Compressed Air Interface

Compressed air (filtered and dried) will be provided to the SWPS at a minimum of 5 ft^3/min and 80 to 100 psig at the Compressed Air System, inlet penetration (DBVS-WRS-PS-QD2).

3.1.2.6 Breather Filter Interface

The SWPS will have a breather filter capable of maintaining the freight container pressure at atmospheric pressure. The breather filter will be attached at the freight container penetration (DBVS-SWPS-CP-01). The Seller shall provide the interfacing coupling for the filter.

3.2 CHARACTERISTICS

The characteristics (e.g., functional, physical, performance, and environmental) that the SWPS must comply with to satisfy the requirements of this specification are described below and on the datasheets (Appendix C).

3.2.1 Functional Characteristics

3.2.1.1 Design Pressure

The design pressure for the SWPS piping and components, including instrumentation, shall be determined by the Seller using the hydraulic data in Appendix D, but shall not be less than 150 psig or greater than 375 psig.

3.2.1.2 Flow Rate

The SWPS shall be capable of operating at a flow rate of 70 ± 10 gal/min. The pump shall be capable of restarting with 12 in. of waste in the tanks.

3.2.1.3 Secondary Waste Filtration

1. The SWPS shall route secondary waste going to the off-loading pad through a 5 micron filter.
2. The maximum pressure drop across the filter shall be 20 psig.
3. The filters shall have a minimum surface area of 185 ft^2.
4. Filter housings shall be designed for filter element bag-out.

3.2.1.4 Waste Properties

The SWPS shall be capable of pumping dryer condensate, Off-Gas Treatment System hydrosonic scrubber effluent, and Tri-Mer® scrubber effluent with the properties identified in Table 3-2 through Table 3-7.

Table 3-2: Dryer Condensate Physical Properties

Properties	Data
Supernatant Liquid Density:	0.98 g/mL
Viscosity:	1 centipoise (max)
Fluid pH:	Approximately 7
Temperature:	50 – 150 °F

Table 3-3: Dryer Condensate Chemical Composition

Analyte	Analyte Weight %
Water	100.00
I-129	530 ppb (mass)
Total	100.00

Table 3-4: Off-Gas Treatment System Hydrosonic Scrubber Liquid Effluent Physical Properties

Properties	Data
Supernatant Liquid Density:	1.07 g/mL
Viscosity:	1.5 centipoise (max.)
Fluid pH:	> 13
Temperature:	50 – 150 °F

Table 3-5: Off-Gas Treatment System Hydrosonic Scrubber Liquid Effluent Chemical Composition

Analyte	Analyte Weight%
Water	89.41
NaOH_aq	0.47
$Na2SO_3$_aq	0.87
NaCl_aq	0.04
$NaNO_3$_aq	1.60
Na_2CO_3_aq	7.61
Total	100.00

Table 3-6: Tri-Mer Scrubber Effluent Properties

Properties	Data
Supernatant Liquid Density:	1.02 g/mL
Viscosity:	1.2 centipoise
Fluid pH:	9+
Temperature:	50 – 150 °F

Table 3-7: Tri-Mer Scrubber Effluent Composition

Analyte	Analyte Weight%
Water	84.3
NaCl	2.6
NO_3^-_aq	2.8
Na+ _aq	1.02
Na_2SO_3_aq	3.0
$NaNO_3$_aq	0.3
NaOH_aq	0.1
$NaNO_2$_aq	0.22
Na_2SO_4_aq	3.1
Total	100.00

3.2.2 Physical Characteristics

The system with associated supports, piping, instruments, and electrical infrastructure shall be installed within the confines of a 20-ft ISO freight container.

The maximum soil loading because of the weight of the SWPS including the installed equipment shall be less than 2,000 psf.

3.2.3 Reliability

All SWPS assembly equipment including, but not limited to, the piping, pumps and motors, casings, shafts, valves, filters, bearings, seals, and fasteners shall have a minimum service life of 2 years and a design life of 5 years. Documentation to demonstrate this requirement is met shall be collected and prepared by the Seller. Documentation shall be submitted to and verified by the Buyer before fabrication.

3.2.4 Maintainability

Maintainability characteristics that affect the design (lubrication, parts replacement and repair, spares, modular construction, test points, etc.), shall be identified by the Seller and include, but are not limited to, the following:

1. Maintenance and Repair Cycles. Specify frequency or availability requirements for maintenance of the components (e.g., scheduled maintenance every 40-operating hours).

2. Service and Access. Specify requirements for ease of service (e.g., access openings/spacing, self-test capability, inspection windows, test fixtures, sealed bearings). Include requirements for service (e.g., remove and replace only, bench repair, special tools, remote handling/maintenance). Include requirements for breakdown and storage of the system (e.g., drainage of piping, pressure relief before disconnect of fittings, de-energizing system). Adequate working space shall be provided around all electrical equipment in accordance with the NEC® (NFPA 70). Critical equipment, instrumentation, or high maintenance items shall be accessible for ease of inspection and removal and replacement. Adequate space and accessibility shall be provided for removal and replacement of individual instruments or equipment without removal of adjacent equipment. Valves, test points or ports, and calibration adjustments shall be accessible.

3. Decontamination. All components in contact with processing fluids must be capable of being decontaminated and ultimately decommissioned, dismantled, and disposed of as radioactive waste. All material and

equipment shall be fabricated and installed to facilitate routine removal, cleaning, or decontamination. Attention shall be paid to eliminating crevices and obtaining smooth weldments through the entire process flow stream.

4. Spares and Spare Parts. Develop a list of recommended spares and spare parts.

5. Special Tools. The system shall facilitate maintenance with commercially available tools wherever possible. The Seller shall furnish all special tools unique to the Seller's equipment that are necessary for installation, startup, operation, maintenance, and adjustment of the equipment and accessories furnished by the Seller. The special tools become the property of the Buyer. If supplied, the Seller shall also provide a list of all special tools furnished, identifying the function of each tool and the specific item(s) for which the tool is used. The Seller shall indicate if the tool is required for assembly, disassembly, installation, startup, operation, maintenance, or adjustment. The Seller shall provide detailed drawings and procurement information for the special tools.

6. Maintenance Considerations. The design of the assembled system shall follow a minimum maintenance philosophy (i.e., selection of components should take into consideration potential maintenance in addition to other considerations). Components shall be designed to allow handling and maintenance by personnel outfitted in protective clothing, self-contained breathing apparatus, and gloves. Components shall also be designed so they can be removed and replaced in a modular manner.

7. Lock and Tag. Both mechanical and electrical systems shall be designed to be locked out and tagged out during maintenance actions. Where applicable, the Seller shall identify on fabrication drawings those components which have a built in feature that support the application of a log and tag.

8. Standardization. To the extent practical, common components shall be used to minimize spare parts, tools, and procedures. Fastener sizes, drive size, and type shall also be standardized to effect maintenance with a minimum number of tools.

3.2.5 Environment

The assembled system shall be designed to operate and be stored in the climatic and environmental conditions listed in Table 3-8.

Table 3-8: Environmental Conditions

Parameter	Environmental Condition
Ambient air temperature range[a]	-25 to 115 °F with a maximum 24-h differential of 52 °F[b]
Relative humidity range[a]	Near 0 to 100%
Maximum precipitation[a]	2.5 in. in a 6-h period
Sand and dust concentrations[a]	1.10×10^{-5} lbm/ft^3 with a size of 150 µm or less
Solar radiation[a]	900 langleys, distributed over a 12-h period
Heating and cooling basis wind factors other than those noted above	Derive from ASHRAE Fundamentals Handbook[c] for the Hanford Site

[a]HNF-SD-GN-ER-501, *Natural Phenomena Hazards, Hanford Site, Washington*, Revision 1B, Westinghouse Hanford Company, Richland, Washington.

[b]The system is not expected to operate below 0 °F, only provide freeze protection below 0 °F.

[c]*2001 ASHRAE Handbook – Fundamentals*, American Society of Heating, Refrigerating, and Air Conditioning Engineers, Atlanta, Georgia.

3.2.6 Transportability and Storage

The assembled system shall have a modular design to facilitate disassembly and relocation to the final destination at the Hanford Site.

1. The assembled system shall be capable of being moved by crane or truck without modifications.

2. Lift points shall be provided for the lifting and handling of equipment and components.

3. The assembled system packaging shall support the contained equipment so it can withstand a 0.75-gravity (forward), hard-braking stop and a rearward acceleration of 0.25 gravity, as well as shock and vibration loads

associated with transportation. All appurtenances (i.e., air conditioning unit) shall be removed before shipping.

4. The assembled system and any accessories shall be sized for transport using local roadways and freeways (i.e., less than 8.5 ft wide, 53 ft long, and 14 ft tall).

5. The assembled system shall be stored and operated outside of an extended period of time, five years maximum, and will be exposed to the environmental conditions found at the Hanford Site as identified in Section 3.2.5.

6. Appurtenances on the SWPS enclosure that exceed transportation height, width, or length requirements should be removed following the FAT and packaged and shipped separately, or packaged and shipped within the enclosure.

3.2.7 Safety

The equipment shall be designed to maintain the safety of operators and the general public. The Seller shall provide all necessary guards, lockouts, and other safety equipment for safe operation as required under 29 CFR 1910.

3.3 DESIGN AND CONSTRUCTION

3.3.1 Parts/Materials/Processes

The Seller shall procure and use components with the characteristics listed in the data sheets provided in Appendix C. When allowed by the data sheet (i.e., specific part number not provided or specific manufacturer not provided), it is the Seller's responsibility to develop a complete data sheet for the components identified in the Seller's design drawings. Completed data sheets, as well as vendor information (catalog cut sheets, vendor drawings, etc.) for components shall be submitted by the Seller.

Component substitutions may be proposed by the Seller in the fabrication drawings for approval by the Buyer. Substitutions will be considered if a component is no longer available, or the proposed substitution improves the design, reduces cost, or improves the production schedule.

Only new parts and materials shall be used for the assembly. Used, surplus, or reconditioned parts and materials are prohibited.

All components shall be installed in accordance with manufacturer's instructions. If conflicts arise with the specified components or component interfaces (line sizes, fittings, electrical requirements, etc.) during design and fabrication, they shall be brought to the attention of the Buyer for resolution.

No aluminum or "yellow" metals are to be used. No beryllium shall be present. Exposed polymer materials shall be constructed of anti-static materials. No asbestos shall be used.

Lead shall not be used unless the lead is fully encapsulated and identified with a permanent tag. Polychlorinated biphenyls shall not be used in the design of the assembled system.

3.3.1.1 Piping – Design

Piping systems for the system and interconnecting piping from the Compressed Air and Filtered Water Systems shall be designed and fabricated, inspected, examined, and tested in accordance with the ASME B31.3 piping code for "Normal Fluid Service." Piping systems include all piping components and supports.

Pumps shall meet the requirements of ANSI/HI 3.1-3.5 and ANSI/HI 3.6, as applicable.

3.3.1.2 Piping – Line Routing

The Seller shall develop drawings showing pipe routing consistent with the requirements of this specification. Additional considerations for the pipe routing are listed as follows:

1. Elbows and pipe bends not manufactured in accordance with listed standards in ASME B31.3 (Table 326.1) may be provided in accordance with ASME B31.3 (Paragraphs 304.2 and 332).

2. The material shall be suitable for the bending process.

3. The finish shall be free of cracks and substantially free from buckling.

4. The wall thickness after bending shall not be less than minimum wall thickness considering corrosion-erosion and mill under-run tolerance.

5. The minimum wall thickness of the bend intrados and extrados shall not be less than that calculated by equations listed in ASME B31.3 (Paragraph 304.2).

6. Bend flattening (the difference between maximum and minimum diameters at any cross section) shall not exceed 8 percent of nominal outside diameter for internal pressure. Metal shall not be removed to achieve these requirements.

7. The proposed assembly layouts shall meet the requirements of ASME B31.3.

3.3.1.3 Piping – Vents and Drains

High-point vent(s) shall be installed as required for venting air in preparation for testing or operation. Low-point drain(s) shall be installed as required for draining the system before maintenance or lay-up. Eliminate low spots to minimize freestanding liquids in the piping. Gravity draining of the piping system is preferred. The Seller shall provide basis for draining method if other than gravity draining.

3.3.1.4 Piping – Pipe and Equipment Supports

Piping attached to equipment shall be installed with fasteners made finger-tight until alignment is achieved, at which time all fasteners shall be tightened. Tightening torque shall be that which is recommended by the ASME B31.3 piping code for "Normal Fluid Service," or gasket manufacturer recommended torque values for the gasket system used. Flange assembly and bolting shall be performed in accordance with ASME PCC-1. Piping support bolting shall be installed and torqued in accordance with manufacturer's recommendations. Inspection documentation shall be provided as evidence of proper bolt torquing.

Piping and equipment shall be supported by pipe supports attached to a support frame using strut. The Seller shall develop detailed fabrication drawings of the

required piping and equipment supports, including welding details. Location of frames members and supports shall be based on analyses performed by the Seller (see Section 3.3.11 for required analyses).

All piping supports shall conform to the ASME B31.3 piping code for "Normal Fluid Service," with additional support at valves, elbows, tees, and equipment as required. Additional supports shall be provided, if necessary, to comply with the requirements stated in the design loads section, Section 3.3.11.2.

Pipe supports shall be capable of supporting the piping in all conditions of operation and shipment. The supports shall allow free expansion and contraction of the piping and prevent excessive stress resulting from transferred weight being introduced into the piping and connected equipment.

Equipment that could be subjected to water damage shall be raised above the door threshold containment level to protect components in the event of a piping leak.

The Seller shall level-plumb piping using shims, etc., to support the pipe and to avoid forced piping deflections at support points. The pipe supports may be stainless or painted carbon steel.

The Seller shall provide detailed fabrication drawings of the required piping supports, including welding details, for review and approval.

3.3.1.5 Piping Materials

Piping components shall be listed components in accordance with ASME B31.3 (Table 326.1).

The Seller shall select materials based on acceptable lifetime performance of materials subjected to the chemical and radiation exposures described in this specification. Exposed polymer materials shall be constructed of anti-static materials. Material selection shall be identified in the Seller documents to the Buyer..

Material type and grade shall be clearly identified on the Bill of Materials. Certified Material Test Reports (CMTR) are required for all materials and components coming in contact with the waste. Pipe flange bolting and pipe

support materials for the waste fluid piping shall also have CMTRs. The Seller shall identify any materials that do not have CMTRs for review and approval. CMTRs are not required for electrical materials, components or accessories, insulating materials, gaskets, or seals. Copies of Certificates of Conformance (CoC) shall be provided for all materials not having CMTRs. CMTRs are required for all materials normally.

The Seller shall provide CMTRs and CoCs for review.

3.3.1.5.1 Screwed Pipe Fittings

Screwed pipe fittings shall be in accordance with ASME B16.11. Screwed fittings are acceptable for instrumentation taps, drains, and vents, and the filter water and compressed air systems; but shall not be used for main process pipe runs. Close or butt nipples are not permitted. For all male-tapered pipe threads, use polytetrafluoroethylene (TFE) tape or equivalent. Threaded joints shall be joined using low-chloride, Loctite® PST.

3.3.1.5.2 Flanged Pipe Fittings

Flanges for pipe greater than 1/2 in. shall be standard 150-lb raised-face flanges in accordance with ASME B16.5 and shall be made from the same type of steel as the pipe in which it will be welded. Flange assembly and bolting shall be performed in accordance with ASME PCC-1.

3.3.1.5.3 Socket Welded Pipe Fittings

Socket welded pipe fittings shall be in accordance with ASME B16.11. Socket welds shall be avoided for main pipe runs.

3.3.1.5.4 Butt-Welded Fittings

Butt-welded fittings shall be in accordance with ASME B16.9. Welded laterals, if used, shall be in compliance with ASME B31.3.

3.3.1.5.5 Stainless-Steel Pipe Materials

Stainless-steel pipe shall be ASTM A 312/A 312M, Schedule 40, Type 304L. Stainless-steel pipe flanges and flanged, socket weld, or screwed fittings shall be

ASTM A 182/A 182M, Grade F, Type 304L. Stainless-steel butt-welded fittings shall be ASTM A 403/A 403M, WP-S, Type 304L. The Seller shall verify the compatibility of 304L stainless steel with secondary waste and recommend alternative materials, if necessary.

1. All grades of stainless steel may be substituted for one another depending on availability and providing the substitution still complies with the above specifications and has prior approval of the Buyer.

2. Piping shall be a listed component as stated in ASME B31.3 (Table 326.1).

3.3.1.5.6 Carbon-Steel Pipe Materials

Carbon-steel pipe having a diameter of 1-1/2 in. and smaller shall be ASTM A 106, Grade B. Carbon-steel pipe having a diameter of 2 in. and greater shall be ASTM A 53/A 53M, Type S, Grade B. Carbon-steel pipe flanges and flanged, socket weld, or screwed fittings shall be ASTM A 105/A 105M. Material for butt-welded fittings shall be ASTM A 234/A 234M, Grade A WPB. Piping shall be a listed component as stated in ASME B31.3 (Table 326.1).

3.3.1.5.7 Stainless-Steel Tubing

All stainless-steel tubing shall be seamless and shall meet the chemical and physical characteristics given in ASTM A 269. Tubing shall be a listed component as stated in ASME B31.3.

3.3.1.5.8 Stainless-Steel Tubing Fittings

Fittings for instrument air tubing may be Swagelok® compression fittings or approved equivalent, stainless steel, 300 series, per ASTM A 276 or ASTM A 182/A 182M. Copies of CoCs shall be provided.

3.3.1.5.9 Steel Forgings and Wrought Piping Fittings

All forgings, including flanges, and wrought piping fittings shall be listed components as stated in ASME B31.3 (Table 326.1), and shall meet the requirements of ASTM A 182/A 182M. All stainless-steel forgings and wrought piping fittings used in the fabrication shall be Series 300 stainless steel and shall meet the requirements of ASTM A 403/A 403M, Grade WP-S. Carbon-steel pipe

flanges and flanged fittings, and socket weld or screwed fittings shall be ASTM A 105/A 105M. Material for carbon-steel butt-weld fittings shall be ASTM A 234/A 234M, Grade A WPB.

3.3.1.5.10 Piping Gaskets/Seals

Pipe flange connections shall use PSI Inc., LineBacker® sealing gaskets with stainless steel as the retainer material and Viton® as the sealing element. LineBacker® Type F sealing gaskets shall be used for raised-face flanges and LineBacker® Type E sealing gaskets shall be used for flat-face flanges.

1. All elastomeric seals shall have radiation resistance for the radiation dose levels shown in this specification. Viton® is acceptable for the radiation levels specified.

2. No CMTRs are required for gaskets or seals, copies of CoCs shall be provided.

3.3.1.5.11 Weld Filler

The weld filler material shall be as specified in the approved Welding Procedure Specification, see Section 3.3.1.11.

3.3.1.5.12 Pipe Bends

Considerations for pipe bending are listed below:

1. Elbows and pipe bends not manufactured in accordance with listed standards in ASME B31.3 (Table 326.1) may be provided in accordance with ASME B31.3 (Paragraphs 304.2 and 332).

2. The material shall be suitable for the bending process.

3. The finish shall be free of cracks and substantially free from buckling.

4. The wall thickness after bending shall not be less than minimum wall thickness considering corrosion-erosion and mill under-run tolerance.

5. The minimum wall thickness of the bend intrados and extrados shall not be less than that calculated by equations listed in ASME B31.3 (Paragraph 304.2).

6. Bend flattening (the difference between maximum and minimum diameters at any cross section) shall not exceed 8 percent of nominal outside diameter for internal pressure. Metal shall not be removed to achieve these requirements.

7. The proposed assembly layouts shall meet the requirements of ASME B31.3.

3.3.1.6 Structural Materials

3.3.1.6.1 Weld Studs

Weld studs shall be metallurgically compatible with the material in which they are welded. Weld studs shall be made from stock material that meets the requirements of ASTM A 108 for mild carbon steel.

3.3.1.6.2 Carbon-Steel Plate and Sheet

All carbon-steel plate shall be general purpose, hot-rolled, low-carbon steel in accordance with ASTM A 36/A 36M. Carbon-steel sheet shall be provided in accordance with ASTM A 569.

3.3.1.6.3 Carbon-Steel Shapes

Carbon-steel structural shapes shall conform to the requirements of ASTM A 36/A 36M.

3.3.1.6.4 Carbon-Steel Bars and Rods

Carbon-steel bars and rods shall conform to ASTM A 108 with a minimum yield of 36,000 psi and maximum carbon content 0.35 percent.

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3.3.1.6.5 Carbon-Steel Structural Rectangular Tube

Structural carbon-steel, rectangular tubing shall conform to the requirements of ASTM A 500, Grade B.

3.3.1.6.6 Stainless-Steel Sheet and Plate

Stainless-steel sheet shall meet the chemical and physical requirements of ASTM A 240/A 240M and ASTM A 480/A 480M. Stainless-steel plate shall meet the chemical and physical requirements of ASTM A 240/A 240M. The plate shall be provided with a cleaned finish.

3.3.1.6.7 Stainless-Steel Bars and Shapes

Parts made from stainless-steel bars and shapes shall be Series 300 stainless steel. Stainless-steel bars and shapes shall meet the chemical and physical requirements of ASTM A 276.

3.3.1.7 Fasteners

The Seller shall select fasteners, when they are not specifically called out in this specification, using the following guidelines:

1. Carbon-steel bolts, nuts, and washers shall be used where mating parts are not stainless steel;

2. Stainless-steel bolts, nuts, and washers shall be used when the mating parts are stainless steel;

3. Pipe flange bolting components shall be listed in ASME B31.3 (Table 326.1) meeting the requirements of ASME B18.2.1 and ASME B18.2.2.

4. No fasteners shall be capable of vibrating loose under operating conditions. All such joints should be tack welded or have some equivalent means of ensuring they remain intact. Double-nutting is not an acceptable method of securing fasteners. Low-chloride, Loctite® threadlock may be used where applicable.

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5. Low-chloride, anti-galling compound (e.g., Loctite® 8013 or 8009 or Neo-Lube®) shall be applied where stainless-steel bolts are used.

6. Stainless-steel bolts, cap screws, and washers shall be ASTM A 193/A 193M, Grade B8. Stainless-steel nuts shall be heavy hex nuts in accordance with ASTM A 194/A 194M, Grade 8. Stainless-steel washers shall be ASTM A 325, Type 3. Bolts and cap screws shall be grade marked.

7. General purpose carbon-steel bolts shall be ASTM A 307 or better, depending on strength and torque requirements. Carbon-steel nuts shall be ASTM A 563a. Bolts and cap screws shall be grade marked.

8. Structural bolts and cap screws shall be grade-marked and shall conform to ASTM A 325.

9. Copies of CMTRs shall be provided for all fasteners used for piping, pipe supports, or component support structures.

10. All graded fasteners shall conform to ASME B18.2.1, SAE J429, and ASTM A 354.

11. The Seller shall ensure that suspect or counterfeit fasteners and components are not used. Suspect fasteners can be identified by the following inspection methods:

    a. Head markings are marred, missing, or appear to have been altered;

    b. Threads show evidence of dressing or wear (threads should be of uniform color and finish);

    c. Head markings are inconsistent within a heat lot; and

    d. Head markings matching one of those identified on the U.S. Customs Service *Control of Suspect/Counterfeit Items* (Appendix E).

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3.3.1.8 Electrical – Design and Component Selection

3.3.1.8.1 General

The electrical installation shall meet the requirements of the NEC® (NFPA 70), as administered by the CH2M HILL Hanford Group, Inc. (CH2M HILL) electrical inspector.

Electrical equipment shall be listed or labeled by a Nationally Recognized Testing Laboratory (NRTL), such as Underwriters Laboratories, Inc. (UL), when a category exists. Note: NRTLs are listed on the Occupational Safety and Health Administration website at http://www.osha-slc.gov/dts/otpca/nrtl/index.html. It is the Seller's responsibility to ensure the listing is appropriate for the equipment specified.

It is the Seller's responsibility to obtain a listing or label for equipment without a listing or label by a NRTL.

When a listing or label can not be obtained, it is the Seller's responsibility to provide equipment critical characteristics, engineering data, and test data for the Buyers engineer to evaluate the acceptance of the product.

Any component, equipment, assembly, or system without a NRTL listing or label shall be subject to the approval of the CH2M HILL electrical inspector.

Where NEC® inspection is required, the Seller shall arrange for a CH2M HILL NEC® inspection to occur at the Seller's facility before shipping any assembly not covered in whole by a NRTL listing or label. The Seller shall perform modifications as required by the NEC® inspector before shipping.

Cabinets containing assembled control systems shall be designed, constructed, and listed or labeled to UL 508A, as applicable.

Design and operation of the assembled system shall meet the requirements of IEEE Std 141, IEEE Std 142, IEEE Std 242, and IEEE Std 519.

A permanent plaque or directory shall be installed at each feed and branch circuit disconnect location denoting all other services, feeder or branch circuits supplying the skid.

3.3.1.8.2 Electrical – Routing

The Seller shall select the routing of conduits between devices and the power and instrumentation and control enclosures. Care shall be taken to run conduit along the frame members where they can be mounted. Care shall be taken to select routes where conduit does not interfere with maintenance or replacement access to devices such as pumps or valves. Sketches of the routing locations shall be submitted to the Buyer for review and approval before proceeding with the work.

3.3.1.8.3 Electrical – Grounding

1. All power circuits shall include a ground wire that serves as the equipment grounding conductor, independent from the neutral wire. All powered devices shall be connected to the ground circuit wire. In addition, the skid frame, enclosures, raceways, covers, and enclosure doors shall be attached to the electrical ground. This may be accomplished by means of a screw, lock washer, and ring connector attachment at a spot where all paint and surface corrosion has been cleaned from the frame. The frame shall not be used as a current carrying conductor between devices.

2. Ground wires shall be green-insulated or bare-stranded copper wire.

3. Ground conductors shall be unspliced and continuous between termination points. Ground distribution shall be through terminal blocks or a ground bus. Wire nuts or butt splices are not acceptable.

4. The resistance between the main ground connection to the skid and any point in the ground circuit shall be less than 0.1 ohm as measured with a calibrated ohm meter.

5. The instrument ground circuit shall be separate and isolated from the power ground circuit to the extent allowed by the NEC® (NFPA 70). The requirements for the instrument ground circuit installation are the same as the power ground requirements given above.

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3.3.1.8.4 Electrical – Conduit Fill

The sum of the cross-sectional areas of all contained conductors shall not exceed the interior cross-sectional area of the raceway as calculated in the tables in Chapter 9 of the NEC® (NFPA 70) for raceway fill.

3.3.1.8.5 Electrical – Strain Relief

Strain relief shall be provided for all cables. The strain relief device shall comply with the following:

Strength - The device shall be capable of withstanding a 35 lb pull for one minute (from any direction) without allowing movement of the raceway or cable that could damage the conductor insulation or strain the conductor terminations.

3.3.1.8.6 Electrical – Conduit Support

Conduit shall be supported by attachment to the frame. The Seller shall provide rigid brackets or additional frame members for attaching conduit when frame members are not in a convenient location. Attachment shall be on regular intervals per NEC® (NFPA 70). Attachment shall be made using "U" clips which may be connected to the frame using either weld studs and nuts or bolts or approved NEC® (NFPA 70) method.

3.3.1.8.7 Electrical – Segregation of Control and Power Wiring

Power circuit wiring and control circuit signal wiring shall be run in separate conduits. Signal wiring that transmits ac signals shall be run in separate conduits from signal wiring that transmits dc signals.

3.3.1.8.8 Electrical – Splicing

No splicing is allowed. The Seller shall provide junction boxes with terminal blocks for connection of devices such as valves and instrument sensors that are provided with pigtail leads.

3.3.1.8.9 Electrical – Enclosure Wiring

All enclosure wiring shall be routed, harnessed, appropriately laced, or in plastic wiring ducts. Where possible, all electrical penetrations into cabinets shall be from the bottom of the cabinet.

3.3.1.8.10 Instrument Enclosures

Exposed live parts and contacts (greater than 50V) in enclosures shall be guarded to prevent unintentional contact during maintenance activities. Door-mounted equipment shall be constructed or shielded so that no live parts will be exposed to unintentional contact when the door is open.

3.3.1.8.11 Electrical Enclosures

Unless otherwise noted, outdoor enclosures shall be rated NEMA 4; indoor enclosures shall be rated a minimum of NEMA 12. If a NEMA 4 or NEMA 12 enclosure is not available because of equipment design or ventilation requirements, then a NEMA 3R or NEMA 1 enclosure may be used, respectively.

3.3.1.8.12 Disconnect Switches

As shown on Sketch DBVS-SK-M001 (Appendix B), 480V ac, nonfused, horsepower-rated, disconnect switches shall be installed just inside the personnel access door of the skid assembly. They shall be accessible to maintenance personnel, be within sight of the associated load, and be labeled clearly with the equipment number and description of the load that they serve in accordance with Sketch DBVS-SK-E106 (Appendix B). Disconnect switches shall be designed to be locked and tagged out.

3.3.1.8.13 Transformer and Distribution Panel

A 480-120/240V ac single-phase transformer and associated distribution panel shall be installed on the skid assembly. The distribution panel and transformer may be combined as a single unit (e.g., Square D® Mini Power-Zone®). A detailed panel schedule listing breaker sizes and loads shall be located inside the panel door and provided as one of the shop drawings.

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Electrical power shall be distributed to all electrical components (except motors) from this distribution panel. Circuit breakers serving convenience receptacles shall be protected by GFCI circuit breakers. A spare 50-amp GFPE breaker shall be provided for future heat-trace applications.

3.3.1.8.14 Electric Motors

1. Electrical motors shall be designed and tested in accordance with NEMA MG-1.
2. Motors 1 hp and greater shall be 3 phase.
3. Electrical motors shall be rated at 480V ac, 3 phase, 60 Hz.
4. Electrical motors shall have a minimum service factor of 1.15.
5. Electrical motors shall have a minimum insulation class of F, as defined in NEMA MG-1.
6. The Seller shall provide the electrical motor specifications and data sheet to the Buyer for approval before final selection.

3.3.1.8.15 Pushbutton Stations

Local pushbutton stations shall be provided for the transfer pumps and shall be located on the support structure in a readily accessible location within sight of the motors. Pushbutton wiring shall labeled in accordance with Sketches SK-DBVS-E107 (Sheets 1 and 2) and SK-DBVS-DBVS-E108 (Sheets 1 and 2). Pushbutton wiring shall be routed to an external terminal box. 25 percent spare terminals shall be provided in the terminal box.

3.3.1.8.16 Motor Disconnect Switch Auxiliary Contact Wiring

Control wiring from motor disconnect auxiliary contacts shall be routed to an external terminal box in accordance with Sketches SK-DBVS-E107 (Sheets 1 and 2) and SK-DBVS-E108 (Sheets 1 and 2).

3.3.1.8.17 Receptacles

Convenience receptacles shall conform to NEMA 5-15R. Duplex receptacles shall be installed on the inside of the freight container near each door for general-purpose use.

3.3.1.8.18 Interior Lighting

The Seller shall provide vapor-tight, high-impact fluorescent lighting fixtures to provide interior lighting. Interior lighting levels shall be in accordance with ANSI/IESNA RP-7 and shall be confirmed by approved calculation before fabrication and by light meter test before delivery. A minimum average illumination of 50 fc shall be provided at the floor level. Fixtures may be wall mounted or ceiling mounted, but if ceiling mounted the means of attachment (bolts, etc.) must not penetrate the freight container roof. Shadowing around areas requiring maintenance shall be avoided as practicable. A three-way light switch shall be located near each door on the inside of the freight container.

3.3.1.8.19 Exterior Lighting

The Seller shall provide photo-cell-activated wall-mounted, weatherproof, high-pressure sodium light fixtures as required around the perimeter of the freight container. Exterior lighting levels shall be in accordance with ANSI/IESNA RP-7 and shall be confirmed by approved calculation before fabrication and by light meter test before delivery.

3.3.1.9 Drawings

The Seller shall provide all design drawings necessary for the SWPS which include, but is not limited to, drawing outlines, interface drawings, electrical wiring diagrams, control wiring diagrams, pipe support drawings, dimensional drawings, rigging sketches, and as-built drawings. Drawings shall be submitted to the Buyer for review and approval.

The Seller shall develop drawings that detail how the specified parts and materials will be assembled to meet the requirements of this specification. The drawing package shall include detail fabrication drawings, assembly drawings, arrangement drawings, general electrical drawings, electrical wiring and conduit schedule, and final as-built drawings. Drawings shall have a parts and materials

list, as applicable, that clearly identifies quantity, manufacturer, the part or model number, material type and grade, electrical characteristics, size, and general descriptions. Drawings shall include dimensional layouts, dimensioned subassemblies, dimensioned component details (if not included on manufacturer's cut sheets), flow and electrical diagrams, material and fastener sizes, descriptions, weld symbols, and notes. The arrangement drawings shall provide weight and center of gravity locations for the overall assembly as well as for major subassemblies (e.g., skid-mounted equipment within a larger assembly or large equipment moved and mounted as a unit).

The assembled system shall be designed to comply with the P&ID. If conflicts arise between the proposed design and the P&ID, they shall be brought to the attention of the Buyer for resolution. Any changes from the approved drawings shall be identified to the Buyer using the Request for Information form (Appendix F) for review of the change. The change shall then be controlled by the Seller to ensure the fabrication drawings are properly updated to incorporate the change. Final as-built drawings shall be prepared by the Seller at the conclusion of fabrication and testing.

Drawing size shall be per ANSI Y14.1. Parts and materials list shall include quantity, manufacturer, the part or model number, material type and grade, electrical characteristics, size, and general descriptions. All component parts shall refer to applicable material specifications, such as the military, ASME, ASTM, federal, or other specifications. As-built drawings shall be verified in accordance with QA Program Controls before submittal, and shall be in accordance with Buyer-supplied drawing procedures.

Drawings shall be prepared using AutoCAD® compatible drafting software. A copy of all as-built drawing files (one of which shall be an electronic AutoCAD® release 2000 or higher compatible file format) shall be included in the final drawing package. Drawings shall use the ROMANS AutoCAD® text font and the minimum text height shall be 1/8 in.

Mechanical sketches are provided in Appendix B for reference only, with exception of the critical dimensions and interfaces specified. Deviations from the arrangement can be made by the Seller to improve the fabrication of the total assembly; however, the detailed fabrication drawings are to be reviewed and approved by the Buyer before initiation of fabrication.

3.3.1.10 Material Control Process

The Seller shall develop a material control procedure to be used in the execution of the work. The material control procedure shall address procurement controls, segregation, and traceability of materials including weld filler rod from receipt at the shop through processing.

3.3.1.10.1 Exposure of Stainless Steel to Chloride Materials

Stainless steel shall not be in contact with materials containing more than 250-ppm chlorine. Low-chloride markers shall be used. Chlorinated solvents shall not be used to clean stainless steel.

3.3.1.10.2 Contact of Stainless and Carbon Steel

Contact between carbon steel and stainless steel shall be avoided during fabrication. Temporary carbon-steel clamps, supports, braces, and fixtures shall not come into direct contact with stainless-steel surfaces. Galvanized-steel clamps or fixtures may not be used on stainless-steel piping or components. Wire brushes shall be stainless steel. Grinding wheels and wire brushes shall be new or used previously on stainless steel only.

3.3.1.11 Welding Process

Welding of all piping shall be performed in accordance with ASME B31.3, Category D, piping code for "Normal Fluid Service." Certified welders shall perform welding of all structural steel in accordance with AWS D1.1/D1.1M for carbon steel or AWS D1.6 for stainless steel. Welding for sheet steel shall be in accordance with ANSI/AWS D1.3. Visual and nondestructive examination (NDE) procedures, Welding Procedures, Procedure Qualification Records, and Welder Procedure Qualification Records shall be submitted for review and approval.

3.3.1.11.1 Welding Procedure Requirements

All welding shall be performed in accordance with the Seller's approved Welding Procedure Specifications. Each Welding Procedure Specification shall be qualified with a Procedure Qualification Record as required in ASME B&PV Code, Section IX; AWS D1.1/D1.1M; AWS D1.6; or ANSI/AWS D1.3; as applicable.

Welding of all stainless steel including, but not limited to, structural shapes, rectangular tubing, plate, and sheet shall be performed in accordance with AWS D1.6 nontubular, statically-loaded conditions. Welding of stainless-steel or carbon-steel piping shall be performed in accordance with the ASME B31.3 piping code for "Normal Fluid Service." Automatic pipe welding equipment and techniques may be used.

Welding of all carbon steel including, but not limited to, structural shapes, rectangular tubing, plate, and sheet shall be performed in accordance with AWS D1.1/D1.1M nontubular, statically-loaded conditions.

Welded connections on the lifting components shall be 100 percent visual and 100 percent Dye-Penetrant Test or Magnetic-Particle Test inspected. If a weld is in a radioactive material boundary (e.g., process piping), then these welds will require a minimum of a visual inspection and additional NDE (dye penetrant, magnetic particle, or x-ray, as appropriate).

3.3.1.11.2 Weld Joints and Preparation

Weld joints are as permitted by the referenced standards. Weld joint design, as noted on the fabrication drawings, shall be sent to the Buyer for review and approval before fabrication.

Post weld heat treatment of carbon-steel piping is not required.

3.3.1.11.3 Weld Repairs

Weld defects shall be removed and repaired as allowed by the referenced welding standards. The original Welding Procedure Specification shall be used for weld repair. Welds that fail examination, shall not be ground out and repaired more than twice before the section is abandoned and replaced.

3.3.1.11.4 Welding Materials

The weld filler material shall be as specified in the approved Welding Procedure Specification.

3.3.1.11.5 Weld Map

All welds (including typical welds) shall have unique numbering listed on a weld map(s). The weld map(s) shall include the weld number, weld procedure number, filler material control number, welder identification, NDE procedure number, and examiner identification. Individual weld maps are to be provided per component when multiple components are produced.

Weld identification shall be performed as follows:

1. Prepare weld identification drawings, isometric or spool, which show relative position of pressure containing welds and attachment welds to pressure retaining components.

2. Assign weld numbers to pressure-containing welds and attachment welds to pressure-retaining components as made. Record weld numbers on weld identification drawings as welds are made.

3. Place the welder bonder identification symbol and weld number adjacent to welds on completion. Place the identification symbol approximately every 3 ft on long seams or large welds.

4. Do not reuse weld numbers. If a weld is completely replaced, assign a new number.

5. Show heat and lot numbers on weld identification drawings for materials requiring CMTR.

Weld identification documentation shall be submitted to the Buyer for review and approval.

3.3.1.12 Fabrication Travelers

The Seller shall prepare fabrication traveler(s) for the fabrication and testing of the assembled system. The fabrication traveler(s) shall include detailed procurement, fabrication, assembly, cleaning, examination, inspection, testing, packaging, shipping, and handling steps required to properly fabricate, assemble, and test the equipment in accordance with the drawings and specifications.

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3.3.1.13 Freight Container

3.3.1.13.1 Freight Container General Requirements

A Series 1 freight container in accordance with ISO 668 and ISO 1161 shall be used as the SWPS enclosure. The preferred freight container designation is ICC or IC. The Seller shall select a container size sufficient to house the indicated equipment while providing access as denoted in this specification. A Series 1 thermal freight container in accordance with ISO 1496-2 may be substituted if the insulation will not interfere with fabrication or space requirements needed for personnel access during operation and maintenance. If a Series 1 thermal freight container is used, the preferred thermal freight container classification is 46.

3.3.1.13.2 Freight Container Air Leakage Requirements

An air leak test shall be performed by the fabricator per ISO 1496-2 and shall meet the leakage requirement of ISO 1496-2 (Sections 8.13 and 8.14).

3.3.1.13.3 Inlet and Outlet Pipe Connections

Pipe penetrations will be installed in the walls of the freight container. Proximity of penetration points are shown on Sketch DBVS-SK-M001 (Appendix B) and described in Table 3-1. Connection details are shown on Sketch DBVS-SK-M001 (Appendix B).

3.3.1.13.4 Freight Container Personnel Doors

A personnel door shall be installed on the opposite-end corner of the container away from the double door for entry into the sampler room. A second personnel door shall be installed for entry into the equipment room for operation and maintenance activities. Proximity of the doors are shown on Sketch DBVS-SK-M001 (Appendix B). The doors shall be metal leak-tight, marine-type door with an insulating core. The doors shall have an elastomeric gasket sealing the door to the container and hasps for locking using a padlock.

3.3.1.13.5 Freight Container Water-tight Door Thresholds

Removable, metal, water-tight thresholds shall be installed across the bottom of each door. The threshold shall be at least 2-in. higher than the maximum pool depth.

3.3.1.13.6 Freight Container Heating

An interior electrical resistance-type unit heater shall be installed inside the freight container for protect piping and components from freezing. The unit heater shall be sized based on the minimum temperature in the temperature range specified in Table 3-8 of Section 3.2.6 coincident with 59 °F inside design temperature.

Loads shall be calculated as prescribed in the ASHRAE Fundamentals Handbook and submitted for approval.

3.3.1.13.7 Freight Container Cooling for Equipment Protection

Cooling shall be provided inside the freight container for temperature control during hot weather. The cooling capacity shall be based on the maximum temperature in the temperature range and solar radiation specified in Table 3-8 of Section 3.2.6 coincident with an indoor ambient temperature of 85 °F dry bulb, 67 °F wet bulb. Cooling shall be provided by a "Ductless Split System" air conditioner. The indoor unit shall be ceiling-mounted; the outdoor unit shall be mounted on the roof. Refrigerant piping shall be sized, routed, and insulated in accordance with the manufacturer's written instructions.

Loads shall be calculated as prescribed in the ASHRAE Fundamentals Handbook and submitted for approval.

Equipment shall be selected such that no environmental condition, indoor or outdoor, exceeds the manufacturer's written maximum or minimum ambient requirements.

Condensate from the indoor unit shall be trapped and routed through a P-trap to be collected in a standard 5-gal carboy, provided by the Seller, located in the interior of the freight container. Flexible clear tubing may be used for makeup between P-trap and carboy.

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3.3.1.14 Freight Container Insulation

The SWPS freight container shall have insulation meeting requirements of ISO 1496-2 for thermal containers if a pre-insulated container is used or as defined in Table 3-9 if shop installed insulation is used. The inside of the freight container walls shall have a minimum 1 in. of insulation. The insulation must be covered by a minimum 1/16-in.-thick sheet metal. Before shop insulating the freight container, insulation material specifications shall be submitted to the Buyer for approval.

Table 3-9: Insulating Material Specifications

Property	Value	Units	Test Method
Core density	1.9–2.2	lb/ft^3	ASTM D 1622[a]
Water vapor transmission	< 1.0 @ 2 in. thick	perms	ASTM E 96[b]
R-value	7.0 (min) @ 1 in. thick	$h \cdot ft^2 \cdot °F/Btu$	ASTM C 518[c]
Compressive strength	25 (min)	psi	ASTM D 1621[d]
Flame spread	<25	--	ASTM E 84[e]
Smoke developed	≤50	--	ASTM E 84[e]
Air leakage	0 @ 6.24 psf	cfm/ft^2	ASTM E 285[f]
Hydrostatic pressure resistance	No failure @ 184.9 cm head pressure	--	AATCC Test Method 127[g]

[a] ASTM D 1622, *Standard Test Method for Apparent Density of Rigid Cellular Plastics*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[b] ASTM E 96, *Standard Test Methods for Water Vapor Transmission of Materials*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[c] ASTM C 518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[d] ASTM D 1621, *Standard Test Method for Compressive Properties of Rigid Cellular Plastics*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[e] ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[f] ASTM E 285, *Standard Test Method for Oxyacetylene Ablation Testing of Thermal Insulation Materials*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[g] AATCC Test Method 127, *Water Resistance: Hydrostatic Pressure Test*, American Association of Textile Chemists and Colorists, Research Triangle Park, North Carolina.

Compatible loose fill insulation shall be used in areas where the normal ISO freight container insulation is removed for the piping penetrations. Loose-fill

insulation shall be applied only after substrate construction, penetration work, and related welding and other hot work have been completed.

3.3.1.15 Freight Container Floors, Walls, and Drains

The freight container floor shall be fabricated from painted mild steel. The flooring shall be designed to carry the equipment loads as specified in this specification. In no case shall the floor load rating be less than a standard ISO Series 1 freight container. Floor seams shall be seal welded and water tight. In lieu of this latter requirement, a stainless-steel drip pan in the process area may be substituted. The pan shall be sized to hold 800 gallons. of water. A water-leak test shall be provided to verify leak tightness.

The interior walls, doors, and ceiling of the freight container shall be painted mild steel. The liner seams shall be designed to prevent leakage into the walls and facilitate decontamination by water spray. Seams shall be fabricated to minimize contamination entrapment.

The freight container shall be designed to completely drain liquids from the walls to the floor, and to drain any freestanding liquids in the container to a floor sump. The Seller is responsible for installing a floor drain and pipe near one corner of the container. The freight container will be installed in the field on grade preferentially sloped to the corner sump.

3.3.1.16 Monitoring and Control System

The MCS is not part of this contract; therefore, the Seller shall provide a termination panel that the Buyer will use to access components on the assembled system. The termination panel shall be located on the outside of the freight container, be rated for outside environmental condition, shall be easily accessible for maintenance (approximately 60 in. high from the ground); and shall meet NEC® (NFPA 70) requirements for working clearances. The exact location of the panel will be determined based on minimization of wiring, internal skid interferences, and external connection routing. The preferred location is on the freight container side with the personnel access doors.

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Only local instruments and components are required to be wired and terminated to the termination panel. The local instruments and components[1] shall be routed in conduit and terminated at the local termination panel. Terminations shall be tension-clamp terminals capable of individual replacement (i.e., DIN rail mounted). An example is a Weidmüller® type WDU. Alternating current power and alternating current/direct current inputs shall be physically separated.

The normal field voltages from or to the MCS is 24V dc, which enhances personal safety during maintenance. Over 50V represent hazardous voltage which should be avoided unless authorized by the Buyer. This does not apply to equipment that requires 120V ac, but with low voltage interfaces to the MCS.

The Seller shall prepare an interface panel wiring to instrument/component drawing. See Figure 3-2 as an example.

Twisted Shielded Pair, tinned copper wiring shall be used for analog instrument signals. Individual wires shall be labeled for the destination with the cable being labeled with both FROM and TO information (see Appendix G).

3.3.1.17 Instrument Calibration and Characteristics

All instrument transmitters shall provide an isolated 4-20-mA signal to the MCS, unless a different output is required for the process. Justification shall be clearly indicated on the completed Component Data Sheet. All pneumatic control valves shall accept a 4-20-mA control signal from the MCS and provide position indication to the MCS. Interface connections shall be through wire termination points on the instruments. Instruments, tubing, piping, and wiring shall be installed in accordance with the instrument manufacturer's recommendations and the best practice for the industry. Purchasing and installation of the MCS input/output modules are not included in this contract. Locally indicating instruments/sensors shall be installed such that they are easily readable by an operator standing on the floor at the entry access point to the freight container. The Buyer shall provide guidance with positioning based on best available knowledge of the configuration.

[1] Instruments shown on the drawings with a box around the symbol are Monitoring and Control System virtual displays or controls, and require no action by the Seller.

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All instruments shall be factory-calibrated and a Calibration Data Package shall be provided including a Certificate of Calibration traceable to the National Institute of Standards and Technology (NIST), for each article contracted. In addition, the actual Calibration Records for each instrument, shall also be included containing the instrument identification, accuracy requirements and results, and the as-found and as-left data.

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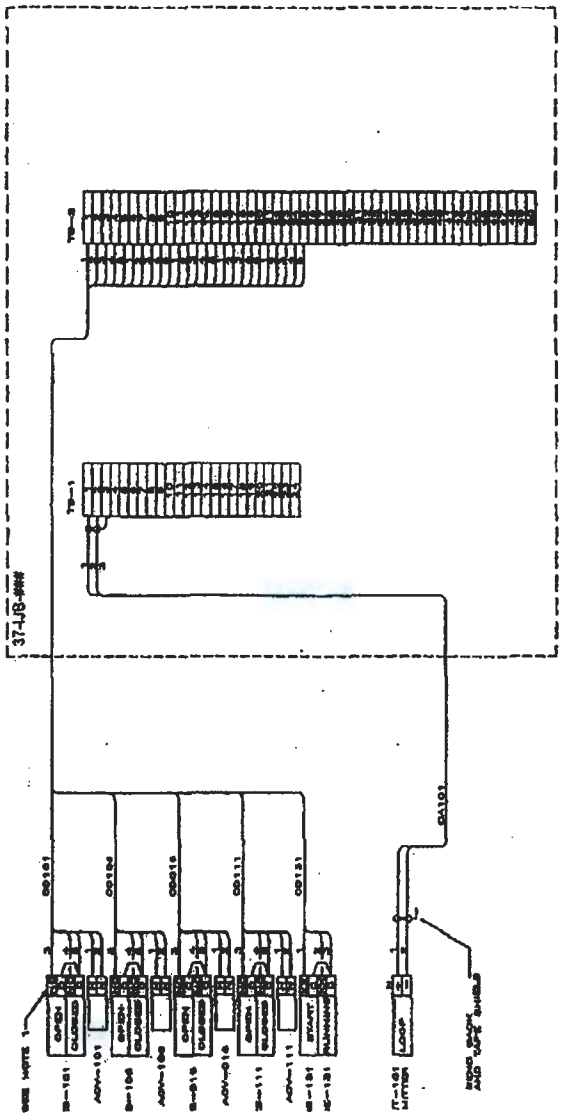

Figure 3-2: Interface Panel Wiring to Instrument/ Component Drawing (Example)

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Each calibration certificate shall be signed by the Seller's representative responsible for calibration, attesting to its authenticity and shall be identified with the:

1. Buyer's contract number,

2. Identification of the article to which the certificates applies, and

3. Standards used for calibration.

The Certificates of Calibration will be held on file by the Buyer's Records Management as objective evidence to support the actual test results and attest to the fact that the calibrated item(s) met requirements.

Certification stating the equipment furnished to the contract requirements has been calibrated using standards whose calibration is traceable to the NIST or other documented evidence, must be submitted stating the basis of the calibration. In addition, the Seller shall submit a report of actual calibration results. The report shall be identifiable to the acceptance criteria of the items submitted and shall meet contract requirements. The report shall contain the signature of the authorized representative of the agency verifying compliance. One copy of the documentation, unless otherwise specified, shall accompany the applicable item(s) shipped.

The Seller shall provide Instrumentation types and manufacturer to the Buyer for approval before purchase of the instrument. Recommended field recalibration procedures shall also be provided in the final data package along with a list of special tools required for recalibration.

Component data sheets for the process instrumentation are provided in the Bidder's Drawing and Data Commitments sheet (Appendix A).

3.3.1.18 Mechanical Assembly Requirements

All equipment shall be assembled to the structural frame observing the equipment manufacturer's recommended assembly instructions. Equipment shall be checked to ensure that it is provided with adequate amounts of fresh lubricants of the proper selection.

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3.3.1.19 Workmanship

General: Remove all burrs and break all sharp edges.

1. Drawings:

   a. Dimensioning and tolerancing shall be interpreted per ANSI Y14.5M and

   b. Tolerances not specified on drawings shall be as shown in Table 3-10.

Table 3-10: Standard Drawing Dimension Tolerances

Dimension	Tolerance
One Decimal Place	± 0.1
Two Decimal Places	± 0.06
Three Decimal Places	± 0.030
Angular	± 2°

2. Welding to ball valves:

   a. Ball valves shall be disassembled before welding to the valve body.

3. Piping and components:

   a. Pipe flange, man-way, and flange faces shall be within ± 2° of vertical or horizontal, whichever is appropriate;

   b. Pipe flange bolt holes shall straddle centerlines;.

   c. Material and debris shall be removed from piping and components before welding/assembly; and

   d. Secondary containment housing flanges shall be flat.

3.3.2 Industry and Government Standards

The codes, standards, and source documents that provide the design fabrication and testing requirements are listed in Section 2. Sections within this document provide specific details or reference for application of the codes and standards documents. Conflicts found between the referenced codes and standards will be referred to the Buyer for resolution.

3.3.3 Radiation

3.3.3.1 Electromagnetic Interference/ Electromagnetic Compatibility

The equipment shall be designed in accordance with the limits set forth in HNF-2962 as summarized in the following subsections.

3.3.3.1.1 Unintentional Radiators

Equipment shall comply with the emission limits specified in 47 CFR 15, Subpart B. The Seller must provide certification that the emissions from equipment or the device are within the limits specified in 47 CFR 15 or an Federal Communications Commission-accepted international standard.

3.3.3.1.2 Radio Frequency Interference Susceptibility

Applicable equipment shall be tested and evaluated for the immunity to radio frequency interference from portable communications equipment. The testing method and procedure for testing process instrumentation are found in IEEE Std C37.90.2.

Since the frequencies of interest are in the bands of 120 to 190 MHz and 420 to 480 MHz, the equipment shall be evaluated from 20 to 1,000 MHz. The electric field intensity of 30V/m shall be used for testing.

3.3.3.1.3 Equipment Alternating Current Mains Surge Protection

Applicable equipment shall be designed to withstand the surge waves specified in IEEE C62.41.1 and IEEE C62.41.2. The equipment shall be type tested by the

manufacturer in accordance with this standard, and certification provided by the Seller.

3.3.3.1.4 Electrostatic Discharge Protection

The system, or individual parts of the system, shall not be damaged and shall continue to function after being subject to electrostatic discharge on operating panels and other controls normally available to operating personnel. The manufacturer shall provide certification that Electrostatic Discharge testing was performed according to the methodologies found in ANSI C63.16 or IEC 61000-4-2. The test voltage should be at least 4 kV. ANSI C63.16 provides additional references to selecting the proper voltage ranges to be used.

3.3.3.2 Nuclear

The secondary waste pump skid materials shall operate in a 0.00233 mR/h radiation field with a cumulative radiation dose of less than or equal to 60.55 R without failure.

3.3.4 Cleanliness

Before assembly; and before preparing for shipment, all components shall be cleaned by flushing with clean water (or just air if deemed appropriate by the Seller) and blown clean and dry with compressed air to the extent that extraneous materials, such as those listed below, are not present:

1. Metallic or other dusts (shop dust), chips, turnings, and weld splatter;
2. Abrasive particles;
3. Rust and other loose corrosion particles;
4. Magnetic and liquid penetrant residues, dye check, etc.;
5. Foreign material (i.e., paper, tape, plastic, sand, and wood);
6. Cutting oils;
7. Excess lubrication, grease, and oil; and

8. Marking dyes.

The fabrication traveler shall describe the cleaning and packaging steps taken.

The SWPS equipment ports and pipe openings shall be temporarily capped following cleaning and drying for shipment. Packaging requirements following cleaning are documented in Section 5.1.1.

3.3.5 Corrosion of Parts

Stainless-steel components do not require painting except as required for identification or other markings. If used, paint on stainless steel shall be epoxy-phenolic. Solvents and cleaning solutions used on stainless steel for paint preparation shall be chloride free.

All exposed surfaces of carbon steel shall be protected from corrosion by priming and painting (see Section 3.3.6 for protective coating requirements).

To the extent practical, connections between dissimilar metals shall be avoided.

3.3.6 Protective Coatings

Protective coatings shall be used on equipment in order to meet reliability and maintainability requirements; to protect equipment from environmental conditions; and to provide a clean, smooth surface for decontamination. Protective coatings shall be compatible with the secondary waste. The weldments shall be completed and painted entirely before installation of piping and components on the frames. Care shall be taken to protect the paint during equipment installation. Touch-up shall be performed to repair defects after the equipment installation is completed. Protective coating specifications shall be prepared by the Seller. All exposed carbon-steel surfaces shall be painted with the manufacturer's standard color.

3.3.6.1 Painting Preparation

The Seller shall prepare all surfaces in accordance with the manufacturer's instructions. Painting shall be performed in a clean, well-ventilated area separated from airborne particulates generated by shop operations.

3.3.6.2 Paint Application

Paint application shall be in accordance with manufacturer's instructions. Special attention shall be paid to crevices, weld lines, corners, and edges to obtain film thicknesses to meet manufacturer recommendations. Care shall be taken when painting so that motor nameplates, lifting eyes, or lifting swivel nameplates are not covered.

3.3.6.3 Primer

The Seller shall use standard zinc-rich primer for carbon-steel structures or piping. Precoated or stainless-steel pipe support components do not require painting.

3.3.6.4 Paint

1. The Seller shall use a standard top coat compatible with the primer for finish coats on carbon-steel structures or piping.

2. Precoated or stainless-steel pipe support components do not require painting.

3.3.7 Interchangeability

The Seller shall specify the assembly level at which components shall be interchangeable or replaceable. This is a design consideration to be reflected on the design drawings and/or supporting documents (such as calculations and analyses).

3.3.8 Identification and Marking

Component identification labeling shall be performed in accordance with the following guidelines and shall match the final P&ID or electrical one-line diagram for the assembled system. Clearly mark and identify any components that are required to be removed before installation of the assembly at Buyer location (e.g., shipping blocks). The markings on all motors shall be in accordance with the NEC® (NFPA 70) and NEMA MG-1.

3.3.8.1 Equipment Labeling

The Seller shall label all valves, instruments, and mechanical equipment in accordance with this specification. Equipment to be labeled shall include, as a minimum:

1. Label internal and external valves;

2. Instruments and gauges, pumps, motors, tanks, compressors, and filters;

3. Motor controls centers, power panels, instrument enclosures, and switches; and

4. Junction boxes shall follow the labeling convention below:

   a. Instrument (24V dc): 37-IJB-###

   b. Electrical (110V ac): 37-EJB-###

   c. Power (480V ac): 37-PJB-###

Only the Equipment Identification Number (EIN) is required to be on the tag. Tags shall be 1-3/8 in. by 2-3/4 in. minimum and use 3/16-in.-high black text on white background. The tags shall be plastic and have at least a single hole for attaching to components.

Tags shall be attached to components without a flat surface using a nylon tie wrap. Tags shall be attached to components with a flat surface using clear silicon rubber adhesive. Equipment tags shall be located where they are readily visible and not subject to damage or accidental removal during equipment operation. Tags shall be suitable for the environment on which they are installed.

3.3.8.2 Piping Labeling

1. Piping shall be marked with arrows to denote fluid flow direction and text to denote fluid type conveyed. The fluid conveyed shall be marked as "PROCESS," "COMPRESSED AIR," or "FILTERED WATER," as applicable. Text shall be all capital letters. The label background and

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lettering colors shall be per the following list. Process fluid piping shall be yellow field with black letters,

2. Compressed air piping shall be blue field with white letters, and

3. Filtered water piping shall be green field with white letters.

4. Labels shall be made from self-sticking polyester or vinyl (Electromark® part number P400 series of Buyer-approved equal). For pipes that are less than 3/4 in. in diameter, the label size and lettering shall be appropriately sized to the size of the pipe. For pipe that is greater than 3/4 in. in diameter, lettering shall be in accordance with Table 3-11.

Table 3-11: Pipe Labeling Format

Pipe Outside Diameter (minimum) (inch)	Pipe Outside Diameter (maximum) (inch)	Length of Color for Field for Pipe Marker (inch)	Size of Letter for Legend (inch)
0.75	1.25	8	0.5
1.5	2	8	0.75
2.5	6	12	1.25
8	10	24	2.5
10	--	32	3.5

5. The labels shall be placed on pipes in the location most readable from the operator's normal viewing position.

6. Piping labels shall be placed before and after each valve and piping joint.

3.3.8.3 Wire and Cable Labeling

All wires and cables shall be labeled at both terminations with the identification shown on the Seller developed fabrication drawings. Labels for instrumentation wire and cabling shall follow the convention in Appendix G. Wire label material requirements and color coding are given in Table 3-12.

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Table 3-12: Wire Color Coding Requirements

Service, Feeder, or Branch Circuit	Conductor	Insulation Color	Insulation Type
480Y/277V ac, 3-phase systems	Phase A	Red	THWN/THHN or XHHW
	Phase B	Yellow	
	Phase C	Blue	
	Neutral	White or Gray	
	Equipment Grounding Conductor	Green (or bare)	
208Y/120V ac, 3-phase systems	Phase A	Black	
	Phase B	Purple	
	Phase C	Brown	
	Neutral	White or Gray	
	Equipment Grounding Conductor	Green (or bare)	
120/240V ac, 1-phase systems	Hot No. 1	Black	
	Hot No. 2	Brown	
	Neutral	White or Gray	
	Equipment Grounding Conductor	Green (or bare)	

3.3.8.4 Terminal Labeling

Terminal block label tags shall be a durable plastic material. The tag color shall be white background with black lettering. Each terminal on the terminal block shall be labeled with a clearly visible terminal number. Numbered terminal block covers may be used for this purpose.

The tag may be mounted on a surface of the enclosure in close proximity of the terminal block. Tags shall be attached securely by means of durable stranded stainless-steel cable, clamps, or chains.

3.3.8.5 Conduit Labeling

1. All conduits shall be labeled with the identification tag on the contract drawings and the highest voltage contained in the conduit as in the following example:

E-123 - 110 VAC 1PH

2. The minimum letter height shall be 1/4 in. The label length shall be as long as required to contain the required information. The label color shall be white background with black lettering. Text shall be all capital letters. The labels shall be a durable material that is permanently secured to the conduit by an adhesive or mechanical means. The label may be metallic or plastic. The label shall be affixed securely in place in a manner to prevent their loss, damage, slippage, or accidental removal. However, the means used to mount the label should permit its removal when necessary without damage to the surface to which it was attached.

3.3.8.6 Labeling of Handling and Lifting Devices

All equipment that is designed to be mechanically lifted shall have marked lifting points and be marked with the lifting weight. Lift points shall be identified with yellow paint. All specialized lifting devices shall be marked in accordance with DOE/RL-92-36, as follows.

1. Structural and mechanical below-the-hook devices shall be provided with identification displaying the following data, as a minimum:

   a. Rated load,

   b. Manufacturer's name,

   c. Lifting device weight (if over 100 lb),

   d. Drawing number (if applicable), and

   e. Serial number (if applicable).

2. The identification data may be displayed on a nametag, nameplate, metal stamp, or other permanent marker. If the lifting device comprises several lifting devices that can be detached from the assembly, these individual lifting devices shall be marked with their individual load rating also.

3. Clearly mark and identify any components required for removal before equipment installation (e.g., shipping blocks).

3.3.8.7 Electric Motor Labeling

The markings on all motors shall be in accordance with the NEC® (NFPA 70) and NEMA MG-1. Care should be taken when painting, such that the motor nameplates, lifting eyes, or lifting swivel manufacture nameplates are not to be painted.

3.3.9 Nameplates

The assembled system shall have a Seller provided nameplate with the following minimum information: project number, purchase order number, assembly name and number (provided by the Buyer), assembly weight, and this specification number (including revision).

3.3.10 Human Engineering

Human factors engineering principles and criteria shall be integrated into the design of systems and the facilities that house and support these systems. Operator movements and accessibility of equipment and controls in the work area shall be considered. Clear and unobstructed access shall be provided to each system component for operation and maintenance.

3.3.11 Qualification

The drawings, calculations, and associated design media shall show full compliance with this specification and Buyer-approved exceptions or modifications. The Seller's design media (drawings and calculations) shall be prepared by, or under the supervision of, a Professional Engineer licensed in the State of Washington. The responsibilities of the assigned Professional Engineer for preparation and control of each deliverable shall be in accordance with the engineering practice laws and regulations of the State of Washington. Portions

of drawings originated by others, such as as-built vendor information on P&IDs, shall be clearly identified. If the Seller cannot meet these requirements through utilization of existing registered Washington State Professional Engineers or certifying Professional Engineers through comity in the State of Washington, the Seller shall inform the Buyer so that a resolution can be reached.

To obtain approval for the design of the fabricated system the Seller shall perform the following:

1. Prepare calculations required by this specification and document how the results of the calculations were incorporated into the design and fabrication drawings (e.g., adequacy of pump to meet calculated demand, selection of weld size to meet structural requirement).

2. Identify those materials and/or components that require a CMTR or CoC. At a minimum, CMTRs are required for process piping and all material that provides a structural support function (e.g., struts, plate, pipe fasteners). Where CMTRs are not available, CoCs are acceptable.

3. Prepare complete data sheets and obtain vendor cut sheets for major components of the assembled system. At a minimum, the set of major components shall be those shown on the P&ID (valves, instruments, equipment, etc.). This information package will be used to evaluate how the Seller has evaluated the form, fit, and function of components for their intended use as shown on drawings and in supporting calculations.

3.3.11.1 Structural Calculations

In general, equipment and structures shall be analyzed and designed in accordance with UBC (1997) and ASCE 7-98, as the minimum requirements. The loads and load combinations used in the analysis shall be as defined in UBC (1997) or other national codes and standards, as referenced in this section or as otherwise defined in this specification. In addition, the Hanford Site-specific design requirements are included as part of this specification and shall be incorporated in the analysis, as applicable, in determining the loads, load combinations, and allowable stresses to which the equipment or structures shall be designed.

Calculations shall demonstrate that equipment will withstand applied loads without loss of integrity or release of radioactive/hazardous material. The calculations shall also show that the SWPS will not tip over nor slide, the use of a friction factor shall be either justified or conservatively not allowed.

3.3.11.1.1 Dead Loads

Dead loads include the weight of all permanent materials and equipment, including the assembled system equipment weight, with and without the weights of fluids and materials being handled.

The unit weights of material and construction assemblies shall be those given in ASCE 7-98. Where unit weights are neither established in that standard nor determined by test or analysis, the weights shall be determined from data in Seller design and fabrication drawings or from catalog cut sheets.

3.3.11.1.2 Live Loads

Live loads are those loads produced by the use and occupancy of the unit and do not include construction and environmental loads such as wind load, snow load, rain load, earthquake load, flood load, or dead load. Live loads are produced by operations, maintenance workers, and equipment.

1. Live loads shall be not less than the minimum uniform load or concentrated load stipulated in ASCE 7-98.

2. The minimum roof design live load shall be 20 lb/ft^2 (includes ashfall).

3. The weight of service equipment that may be removed with change of use of a given area shall be considered as live load.

3.3.11.1.3 Earthquake Loads

Earthquake induced design loads, as a minimum, shall comply with the UBC (1997) Seismic Zone 2B for essential facilities. The structural response may be determined using the methods of UBC (1997) or ASCE 4-98, with an importance factor, Ip = 1.5 for structures, systems and components and seismic zone factor, Z = 0.2.

The soil profile type as defined by UBC (1997) (Section 1636.2) is taken as SE for conservatism.

3.3.11.1.4 Snow Loads

Snow loads for the equipment shall be in conformance with ASCE 7-98. A ground snow load, Pg of 15 lbf/ft^2 shall be used for calculating roof snow load. Unbalanced snow loads resulting from drifting or sliding shall be considered. Snow loads, full or unbalanced, shall be substituted for roof live loads where such loading results in larger members or connections.

3.3.11.1.5 Wind Loads

The equipment shall be designed to resist pressures from wind from any direction. Partial wind loading shall be considered if it produces a more severe effect. Wind load design shall comply with ASCE 7-98, using the 85 mph "3-second gust wind velocity" with an importance factor of 1.15 and Exposure Category C.

3.3.11.1.6 Ash Loads

An ash loading of 5 lb/ft^2 shall be considered in the design of equipment or support structures exposed to the elements. The ash loading shall be evaluated using the load combination, S = D + L + A in addition to other load combinations, defined by the referenced codes and standards in determining the governing loads for design and analysis.

3.3.11.1.7 Load Combinations and Stresses

Load combinations, allowable stresses, and strength requirements as defined in UBC (1997) and ASCE 7-98 shall be used in determining the governing load combination(s), acceptability of the design, and stability of the equipment or structure.

The stability of the equipment or structure against overturning and sliding shall be determined and the stability maintained, based on a safety factor of 1.5. Anchorage of the equipment components to the support structure(s) shall be designed using the methods in UBC (1997) for life-safety systems (importance factor, I = 1.5).

Anchorage shall comply with UBC (1997). Acceptable types of concrete anchorages include cast-in-place anchors satisfying the requirements of UBC (1997), and industry-standard wedge-type expansion-type anchors having capacities published by the International Conference of Building Officials. Anchor size shall be a minimum diameter of 12 mm (1/2 in.) regardless of calculated anchorage requirements. Alternative anchorage methods or types may be proposed for Buyer consideration.

3.3.11.1.8 Hoisting and Rigging Loads

The lifting apparatus (eyebolts, hoist rings, and lifting bails) shall be designed in accordance with the AISC *Manual of Steel Construction—Allowable Stress Design*, the AISC *Manual of Steel Construction—Load and Resistance Factor Design*, and ASME B30.20. Equipment designed and fabricated by the Seller shall have a safety factor of 3 based on yield strength. Equipment purchased by the Seller shall have a safety factor of 5 based on ultimate strength. Documents shall be provided to the Buyer demonstrating incorporation of these safety factors. The Seller shall identify the total weight, the center of gravity, and the lift points and rigging methods necessary for lifting each component. Lift points shall be identified with yellow paint. Any special tooling, spreader bars, or other recommended fabricated devices for lifting shall be provided by the Seller.

3.3.11.1.9 Secondary Containment Hydrostatic Load

For the secondary containment, the confinement structure shall safely contain the volume of waste specified in Section 3.1.2.3.

3.3.11.1.10 Secondary Waste Pump Skid Freight Container Loads

The SWPS freight container shall be certified to meet the structural requirements defined in ISO 1161 and ISO 1496-2.

3.3.11.2 Mechanical Calculations

Mechanical calculations performed for the piping system shall be prepared in accordance with piping code requirements in ASME B31.3. As a minimum, calculation shall include the following subjects:

1. Pipe wall thickness calculations for pressure (ASME B31.3, Paragraph 304.1).

2. Stress calculations for sustained loads because of pressure, dead load, and any other sustained loads (ASME B31.3, Paragraph 302.3.5).

3. Stress calculations for displacement stresses, such as thermal loads. Use Equation (16) in ASME B31.3 (Paragraph 319.4) for flexibility analysis on simple systems.

4. Stress calculations for occasional load such as pressure, dead weight, other sustained loads, and earthquake loads (ASME B31.3, Paragraph 302.3.6).

5. Hanger stress calculations for dead weight, thermal, and seismic loads (ASME B31.3, Section 321; ASCE 7-98; UBC 1997, and AISC *Manual of Steel Construction—Allowable Stress Design* for source reference, in addition use an Importance factor - I_p = 1.5 and Seismic coefficient - C_a = 0.34) Note: wind load is not required for this piping system because it is enclosed in a freight container.

6. The Seller shall determine the appropriate corrosion allowances for all piping system calculations.

3.3.11.2.1 Piping Interface Loads

Loads on the interface connectors are shown in Table 3-13.

Table 3-13: Secondary Waste Pump Skid Hose-In-Hose Transfer Line Connector Design Loads

Nozzle (Inlet & Outlet) Pipe Size	Dead Weight Load (D)	Axial Seismic Load (A)	Horizontal Seismic Load (H)	Vertical Down Seismic Load (V)
2 in.	100 lb	100 lb	100 lb	100 lb

3.3.11.2.2 Additional Mechanical Calculations

Additional calculations that shall be performed, if applicable for the assembled system, include: head loss (for verifying proper pump sizing), valve actuator sizing, piping and equipment heat trace (for freeze protection), and heating and cooling loads for occupied areas (calculated as prescribed in the ASHRAE Fundamentals Handbook).

3.3.11.3 Electrical Calculations

Electrical calculations shall be done in support of NEC® (NFPA 70) requirements, ANSI/IESNA RP-7-1 requirements, and requirements of this specification. Calculations shall include, but are not limited to:

1. Indoor and outdoor lighting calculations in accordance with IESNA HB-9, using input from this specification and ANSI/IESNA RP-7-1.

2. Electrical load calculation, with any assumptions regarding demand factors or load diversity clearly stated.

3. Wire sizing calculation for all power conductors, with all assumptions regarding duty cycle clearly stated.

4. Equipment sizing/selection calculation (transformers, distribution panels, overcurrent protection, etc.), with any assumptions clearly stated.

5. Raceway sizing calculation, for all conduit and other raceways.

Care shall be taken to ensure that ambient temperature considerations and heat gain from direct sun are considered appropriately when performing calculations for wire and equipment size.

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3.3.12 Document Submittal

The following subsections provide the minimum document requirement submittals.

3.3.12.1 General Requirements

Information to be supplied with the bid, for review, and as final is shown on the Bidder's Drawing and Data Commitments sheet (Appendix A). The submittals presented on this sheet shall be delivered as the delineated packages for review and approval

Each document submittal shall be identified with this specification number, item number, purchase order number, and Seller's identification number. Submittals shall be transmitted to the Buyer in accordance with the directions found in the Request for Quote.

Data shall be sufficiently clear to allow legible copies to be made on standard reproduction equipment after microfilming.

Approval by the Buyer does not relieve the Seller from the responsibility for accuracy or adequacy of design under this specification.

Submittals are divided into two types: (1) those requiring "approval before proceeding" (i.e., weld procedures or prepurchase evaluation data) and (2) those requiring "approval before shipment" (i.e., vendor information data).

Submittals requiring approval before shipment will be reviewed to verify completeness and adequacy for their intended purposes.

Unacceptable items that require approval before proceeding will be handled as specified below.

A submittal requiring approval that is not approved by the Buyer will be dispositional as:

1. "Not Approved, Revise and Resubmit." The submittal is considered technically deficient, or incomplete, and is therefore unacceptable.

Resubmittal is required; hence fabrication, procurement, or performance of procedures shall not proceed.

2. "Approved with Exception." Fabrication, procurement, and performance of procedures may proceed, and resubmittal is required to verify incorporation of the exception. Final acceptance of the item is contingent on the Buyer's receipt and approval of the corrected submittal.

Submittals requiring approval before shipment that are determined to be incomplete or inadequate will be marked "Resubmit" and will be returned. An explanation of the deficiencies will be included for corrective action by the Seller.

3.3.12.1.1 Design Documentation

The Seller shall provide all shop fabrication drawings that detail how the specified parts and materials will be assembled to meet the requirements of this specification. Shop fabrication drawings shall clearly identify the material type and grade on the Bill of Material. The Seller shall include a Bill of Material and submit to the Buyer for review and approval. Final as-built drawings shall be provided by the Seller at the conclusion of fabrication and testing. Arrangement drawings (Sketch DBVS-SK-M001) are provided in Appendix B. Modifications to the arrangement drawings can be proposed by the Seller to improve the fabrication of the total assembly; however, modifications and the detailed fabrication drawings are to be approved by the Buyer before procurement of material or initiation of fabrication.

The Seller shall fabricate the equipment according to the approved design drawings submitted to the Buyer.

The Seller shall submit design questions and request design changes in writing to the Buyer for resolution or concurrence.

The Seller shall maintain designated full-size drawing sets for incorporating design changes concurred with the Buyer. The Seller shall incorporate all redline changes on the drawings and submit both paper and electronic copies of the as-built drawings to the Buyer.

All design calculations required for the ASME piping, support structure, and lifting and handling shall be included in reports that have undergone independent

review by the Seller's qualified personnel. Design calculation reports shall be submitted to the Buyer for review and approval before the start of fabrication.

3.3.12.1.2 As-Built Drawings

The Seller shall deliver to the Buyer three hard copies and one electronic copy of the final fabrication level as-built drawings and specifications accurately depicting the product delivered. Drawings shall include dimensional layouts, dimensioned subassemblies, dimensioned component details (if not included on manufacturer's cut sheets), flow and electrical diagrams, material and fastener sizes, descriptions, weld symbols, and notes. The designer's name, responsible engineer's name, Bill of Materials, and drawing numbers shall appear on the index (cover sheet).

3.3.12.2 Fabrication Traveler

The Buyer will insert witness/hold points in the fabrication traveler during the review and approval of the fabrication traveler. Witness points can be waived by the Buyer, but must be documented in writing. Hold points require the Buyer personnel to be present during the fabrication, examination, inspection, or test step. Final fabrication traveler shall include final hold point for Buyer walkdown for final article acceptance before shipment.

3.3.12.3 Schedule and Component Lead Time

A proposed schedule of fabrication, inspection, and testing of all equipment shall be submitted for review with the bid and approval with the submittal of the fabrication traveler(s).

A proposed schedule shall be provided showing the discrete steps and schedule to complete all work described in this specification. The schedule shall identify fabrication drawings, engineering, parts procurements, fabrication, examination, inspection, and testing activities. A list of components and lead time delivery for each component shall be provided to the Buyer. Component substitutions can be proposed by the Seller to improve the fabrication, schedule, or cost; provided such substitutions are approved by the Buyer. The schedule shall allow two weeks for review and approval of structural calculations and one week for review and approval of all other documents. The Buyer shall provide a calculation review sheet identifying requirements for the calculations.

3.3.12.4 Spare Parts List and Special Tool Requirements

The Seller shall provide the following, as required for installation, maintenance, and operation of the assembly.

1. Recommended spare parts list for Buyer concurrence. The spare parts lists shall be based on equipment mean time between failures and long lead procurement items (long lead defined as longer than four weeks from order placement to delivery).

2. List of required special tools.

3. Special tools manufactured during fabrication shall also be provided on delivery.

4. List of required lubricants.

5. Lubricant required for startup and operations shall be delivered with Material Safety Data Sheets and shall be provided on delivery of related equipment.

Submit spare parts, special tool, and supporting vendor data for review and approval.

3.3.12.5 Final Data Package

The Seller shall not ship the SWPS and ancillary hardware until all tests and inspections have been performed and the final data package is complete and approved by the Buyer. The Seller shall notify the Buyer three weeks before the intended shipping date, and shall allow the Buyer one week after receiving the package, and before shipment, to review the data package. The final data package shall include all items specified on the Bidder's Drawing and Data Commitments sheet (Appendix A).

3.3.13 Personnel and Training

Records for the following areas shall be prepared and made available for the Buyer. Review of the qualifications may be subject to a surveillance or source inspection by the Buyer.

3.3.13.1 Welder Qualification

Welder shall be qualified in accordance with ASME B&PV Code, Section IX and AWS D1.1/D1.1M, as applicable. Documentation for personnel performing welding, including tacking, shall be maintained in a Welder Performance Qualification record.

3.3.13.2 Weld Examination

Welds shall be examined per ASME B31.3 at a minimum for piping and pipe supports and per AWS D1.1/D1.1M for structural steel. An ASME B31.3 weld examiner shall meet the code requirements. Welded connections on the lifting components shall be 100 percent visual and 100 percent Dye-Penetrant Test or Magnetic-Particle Test inspected.

3.3.13.3 Electrical Inspection

The Hanford Site CH2M HILL Hanford Group, Inc. NEC® Electrical Inspector shall inspect equipment fabricated under this contract that is not NRTL-listed or labeled. All deficiencies found shall be corrected or dispositioned before shipment.

4 QUALITY ASSURANCE REQUIREMENTS

The following subsections provide the minimum QA requirements for this specification.

4.1 GENERAL

The Seller shall document, implement, and maintain a QA Program that is based on a national standard and identifies the activities and items to which it applies. The QA Program must address each of the areas discussed within this QA requirements flowdown. The Seller must submit the QA Program to the Buyer for review before award of contract.

The Seller shall assess its QA Program regularly to ensure its effective implementation.

The QA Program shall provide for indoctrination and training, as necessary, of personnel performing activities affecting quality to ensure that suitable proficiency is achieved and maintained. Personnel who conduct inspection and test activities shall be qualified to conduct those activities and certification of the qualification must be submitted to the Buyer on request.

4.1.1 Design

The Seller must define, control, and verify designs developed for this contract. Design inputs must be specified on a timely basis and correctly translated into design documents. Design interfaces must be identified and controlled. Persons who did not design the item must be used to verify design adequacy. Design changes, including field changes, must be reviewed and approved by the same personnel who reviewed and approved the initial designs.

4.1.2 Procurement Document Control

Procurement documents must include or reference sufficient quality and technical requirements in order to describe the items and services requested. Procurement documents must be reviewed and approved by the authorized personnel within the Seller's organization, and changes must be reviewed and approved by the same individuals who reviewed and approved the original procurement documents.

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The Seller must have a process for accepting procured items. This process must include one or a combination of the following: Certificate of Conformance, source verification, receiving inspection, and post-installation testing.

The Seller shall provide a legible and reproducible CoC. The CoC shall be signed by the Seller's authorized representative responsible for quality assurance.

The CoC shall contain, as a minimum, the following information:

1. Identification of the Buyer's contract or purchase order number under which the materials, equipment, component, or service is being purchased.

2. Provide traceability by means of positive identification from the material, equipment, component, or service to the CoC.

3. Identify the specific procurement requirements met by the material, equipment, component, or service supplied (i.e., codes, standards, or other applicable specification). The procurement requirements shall include any approved changes, waivers, or deviations applicable to the subject materials, equipment, component, or service.

4. Identify any procurement requirements that have not been met, together with an explanation and the means for resolving the nonconformance.

The Seller's certification system, including the procedures to be followed in filling out a certificate and the administrative procedures for review and approval of the certificates, shall be described in the Seller's QA Program.

The certification system shall provide a means to verify the validity of the Seller's certificates and the effectiveness of the certification system (i.e., during the performance of audits of the Seller or independent inspection or test of the items). The Buyer shall conduct this verification at intervals commensurate with the Seller's past quality performance.

The Seller is required to flowdown all QA requirements from this contract to any subtier subcontractor/suppliers. Any access to the subtier subcontractor/suppliers' facilities for verification activities will be requested

through the Seller before access, and verification activities may be performed jointly.

The Seller shall warrant that all items furnished under the contract are genuine (i.e., new, not refurbished and/or counterfeit) and match the quality, test reports, markings, and/or fitness for intended use as required by the contract. Any materials furnished as part of the contract that the government or other duly recognized agency had been previously found to be suspect/counterfeit shall not be used.

All items are subject to inspection at the Seller's facility or lower-tier subcontractor's facility. The Seller shall notify the Buyer, at least seven working days in advance, of the time when such items or activities will reach the Buyer's identified inspection hold points. As a minimum, final inspection before packaging for shipment shall be considered such a hold point, unless specifically waived by the Buyer.

The Seller shall obtain all materials to be delivered under the contract directly from the original manufacturer or an authorized manufacturer's representative. The Seller shall provide legible and reproducible documentation, with the materials, that provides objective evidence that the items were provided by the original manufacturer. Such documentation may include a copy of the purchase order to the manufacturer and shipping documentation or manufacturer invoice (each of which would identify that the materials were obtained from the original manufacturer).

The Seller shall submit, with or prior to item shipment, a recommended spare parts list. The list shall provide the name and address of the original supplier of the replacement part, and the part's drawings, specification, or catalog identity including applicable change or revision information.

All items and/or services procured under this specification shall be subject to inspection by the Buyer or Buyer's representative throughout the contract. Additionally, procured items and/or services shall be subject to inspection for acceptance.

The Seller shall grant access to the Seller's facilities and records for inspection or audit by the Buyer, his designated representative, and/or other parties authorized by the Buyer.

4.1.3 Instructions, Procedures, and Drawings

The Seller must document and implement appropriate instructions, procedures, and drawings. Instructions and procedures must include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished.

4.1.4 Identification and Control of Items

The Seller shall establish controls to ensure that only correct and accepted items are used or installed.

All items shall be identified with the applicable part number, model number, or other identifier prescribed in this specification. Identification shall be on the item or the package containing the item. When the identification is on the item, such marking shall not impair the service of the item or violate dimensional, chemical, or physical requirements.

The Seller shall submit a legible and reproducible copy of the product data sheet (e.g., drawing, catalog cut sheet, brochure) that provides adequate information to enable the Buyer to verify the form and function of the articles procured. One copy of such documentation, unless otherwise specified, shall accompany the item.

The Seller shall identify each item, assembly, package, container, or material, having limited shelf life, with the cure date or date of manufacture and the expiration date. The Seller shall specify any storage temperatures, humidity and environmental conditions that should be maintained. Material shall not be furnished having less than 75 percent of the total shelf life available at the time of shipment.

Certified Material Test Reports containing actual chemical analysis and mechanical properties of the material being supplied shall be submitted before or with each shipment of material. Each CMTR shall contain the following information as a minimum:

1. Product description [e.g., specification(s), codes, type of material];
2. Actual results of chemical analysis/mechanical testing in accordance with the provisions of the code, standard, and/or specification;
3. The specification and material grade;
4. Traceability to the item tested (e.g., heat number, lot number);
5. Name and address of manufacturer (may be identified by letterhead, logo, etc.);
6. Manufacturer's ASME certificate number and expiration date;
7. Buyer's contract number and item number to which the report applies; and
8. The report shall be signed by an authorized representative of the manufacturer.

In addition to the ASTM/ASME marking, the Seller shall physically identify each item/part furnished to the Buyer with the heat number (or identification number that is traceable to the heat number) and the contract number. Methods and materials used to accomplish required markings shall be compatible with the material being marked. Small items shall be bagged/wrapped and tagged.

4.1.5 Control of Processes

The Seller shall have processes to control processes, including special processes that control or verify quality (e.g., welding, heat treating, and NDE). Special processes must be performed by qualified personnel using qualified procedures in accordance with specified requirements.

Seller personnel performing weld inspections shall be certified as a Certified Welding Inspector (CWI) in accordance with the requirements of AWS QC-1.

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The following documentation shall be submitted for Buyer approval before the start of fabrication:

1. Current AWS CWI certification;

2. Current/valid visual acuity examination (must be given every three years); and

3. Visual weld inspection procedure(s).

Welding procedures and personnel shall be qualified in accordance with applicable AWS or ASME requirements specified in the contract. The Seller shall submit copies of all welding procedures, procedure qualification records, and welder qualification records to be employed. Buyer review and approval of these documents is required before start of fabrication.

Nondestructive examination personnel shall be qualified and certified in accordance with the recommended guidelines of ASNT SNT-TC-1A. The Seller is not authorized to begin fabrication until the following documentation has been approved by the Buyer:

1. NDE personnel qualification and certification procedure;

2. Level I, II, and/or III personnel qualification and certification records, including objective evidence of NDE training, formal education, examination, experience, date of hire, and current visual acuity exam; and

3. NDE method procedure(s) compliant with the applicable requirements of the Buyer's contract.

Nondestructive examination reports and radiographs shall be traceable to the item examined, shall include all essential examination parameters, and shall be signed and dated by a qualified/certified NDE examiner. All NDE reports and radiographs shall accompany or preceded shipment of the item or component. Radiographs and radiographic technique and examination reports shall be subject to approval by the Buyer before shipment.

These requirements shall be passed to lower-tier subcontractors.

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4.1.6 Verification and Verification Methods

The Seller shall have a process to plan and execute inspections to verify conformance of an item or activity to specified requirements. The process shall document the characteristics to be inspected and inspection methods to be employed. The Seller shall document the results of inspections. Inspections for acceptance shall be performed by persons other than those who performed or directly supervised the work being inspected.

The Seller shall submit, as required by the contract, legible, reproducible copies of inspection and/or test reports. The reports shall include, as a minimum, the following information:

1. Identification of applicable inspection and/or test procedure;
2. Resulting data for all characteristics evaluated, as required by inspection or test procedures, including reference to information on action taken in connection with nonconformances;
3. Traceability to the item inspected/tested (e.g., serial number, part number, lot number), date of inspection, name of inspector, type of observation; and
4. Signature of the Seller's authorized representative or agency performing the inspection or test.

Key items to be verified include, but are not limited to, the mechanical and electrical function of all equipment and components.

4.1.7 Test Control

The Seller shall have a process (to plan and execute tests) to verify conformance of an item or activity to specified requirements. The process shall document the characteristics to be tested and test methods to be employed. Tests required to collect data, such as for siting or design input, shall be evaluated.

The Seller shall prepare a detailed test plan. Before starting work, the plan shall be submitted to the Buyer for approval and insertion of Buyer's designated source inspection and witness notification points. The test plan shall provide the following, at a minimum:

1. Traceability to the Buyer's purchase/contract order document number;
2. Name or description of the item to be tested (e.g., components, assemblies, subassemblies);
3. Method/procedure to be used during test; and
4. Subsequent revisions/modifications to the test plan require review and approval by the Buyer before implementation of the changes.

The Seller shall provide test reports that include, as a minimum:

1. Item tested,
2. Date of test,
3. Tester or data recorder,
4. Type of observation,
5. Results and acceptability,
6. Action taken in connection with any deviations noted, and
7. Person evaluating test results.

Test plans and test reports must be submitted to the Buyer for the project records.

4.1.8 Control of Measuring and Test Equipment

The Seller shall control tools, gauges, instruments, and other measuring and testing equipment used for activities affecting quality, and shall calibrate at specified periods and adjust to maintain accuracy within necessary limits.

The Seller shall maintain legible, reproducible copies of the Certificates of Calibration, traceable to the NIST, for each article contracted. Each Certificate of Calibration shall be signed by the Seller's representative responsible for calibration, attesting to its authenticity, and shall be identified with the following information:

1. Buyer's contract number,
2. Identification of the article to which the Certificate of Calibration applies, and
3. Standards used for calibration.

In addition, the Seller shall submit a report of actual calibration results. The report shall be identifiable to the acceptance criteria of the items submitted and shall meet the contract requirements. The report shall contain the signature of the authorized representative of the agency verifying compliance. One copy of the documentation, unless otherwise specified, shall accompany the applicable item(s) shipped.

The Certification of Calibration will be held on file by the Buyer as objective evidence to support the actual test results and attest to the fact that the calibrated item(s) met requirements.

4.1.9 Handling, Storage, and Shipping

The Seller shall prepare and submit for Buyer review and approval, before use, procedure(s) or plan(s) for the packaging and shipping of materials, equipment, or components to be furnished under the contract. The procedure(s) or plan(s) shall include, as appropriate, cleanliness inspection before packaging, use of preservatives and coatings, descriptions of specially designed shipping containers, handling and rigging data, final inspections, and the type of transfer and shipping vehicles.

4.1.10 Inspection, Test, and Operating Status

The Seller shall have a process to identify the status of inspection and activities on items or in documents traceable to the items, and to ensure that items which have not passed the required inspections and tests are not inadvertently

installed, used, or operated. Status shall be maintained through indicators (i.e., physical location) and tags, markings, shop travelers, stamps, inspection records, or other suitable means. The Seller must specify the authority for application and removal of tags, markings, labels, and stamps.

4.1.11 Control of Nonconforming Items

The Seller must have a process to control items that do not conform to specified requirements to prevent inadvertent installation or use. These controls must provide for identification, documentation, evaluation, segregation (when practical), and disposition of nonconforming items, and for notification to affected organizations.

All nonconforming conditions identified at the Seller's facility, with a proposed disposition of "Accept-As-Is" or "Repair," as defined below, shall be approved by the Buyer before supplier implementation of the nonconformance report (NCR) disposition:

1. Accept-As-Is: Nonconforming materials will perform its intended function.

2. Repair: Nonconforming item can be corrected so that its characteristics meet requirements of the contract.

Nonconforming items identified as "Repair" or "Rework" shall be re-examined in accordance with applicable procedures and with the original acceptance criteria, unless the nonconforming item disposition has established alternate acceptance criteria.

Nonconformances shall be documented by the Seller on their own nonconformance form or one provided by the Buyer. After documenting the nonconformance and providing a proposed disposition and technical justification, the report shall be submitted to the Buyer.

After the proposed disposition has been evaluated, and approved or rejected by the Buyer, the form shall be returned to the Seller. Corrective action may only take place after Buyer approval. Copies of completed, Buyer-approved, NCRs shall be shipped to the Buyer with the affected item.

4.1.12 Corrective Action

The Seller shall have a process to promptly identify conditions adverse to quality, and to correct them as soon as practical. The identification, cause, and corrective action for conditions adverse to quality shall be documented and reported to appropriate levels of management. Follow-up action shall be taken to verify implementation of this corrective action.

During the period of performance of work for this contract, the Seller shall provide, to the Buyer, copies of all documents that constitute reports of conditions adverse to quality (e.g., deficiencies, weaknesses, nonconformances, or noncompliances with established requirements) related to items or services provided to the Buyer.

In addition, the Seller shall ensure flowdown of these requirements to its subtier subcontractors/suppliers of quality-affecting items and/or services procured for work performed for the Seller.

4.1.13 Quality Assurance Records

The Seller shall have a process to specify, prepare, and maintain records that furnish documentary evidence of quality. Records shall be legible, identifiable, retrievable, and protected against damage, deterioration, or loss. The process shall establish and document responsibilities and requirements for records transmittal, distribution, retention, maintenance, and disposition.

4.1.14 Control of Graded Fasteners

The following are minimum requirements for high strength graded fasteners produced in compliance with national consensus standards (i.e., SAE, ASTM, ASME):

1. Fasteners shall exhibit grade marks and manufacturers identification symbols (headmarks) as required in the specifications referenced in the contract.

2. When requested by the Buyer, the Seller shall provide legible and reproducible copies of the manufacturers CMTRs. These CMTRs shall report the values of the actual chemical and physical tests performed on

the represented fastener lot and material heat. Fastener packaging and labeling shall be traceable by lot number or other means to the CMTR.

3. Fasteners shall be inspected and documented to verify compliance with this QA Clause. Additionally, fasteners may also be subject to destructive testing by the Buyer to verify compliance.

4.2 INSPECTIONS AND TESTS

Factory Acceptance Testing of the equipment is required. Factory Acceptance Test specifications, procedures, and documentation of test results shall be prepared and submitted. All temporary electrical equipment including wiring and instruments necessary to allow component testing will be provided by the Seller.

Water used for hydrostatic testing shall be tested for chlorides before use. The chloride content of the test medium shall not exceed 250 ppm for water temperatures of 149 °F or less.

Dated calibration labels shall be visible on all test equipment. Measuring and test equipment used for acceptance inspections and tests shall be controlled in accordance with the Seller's QA Program and shall be traceable to a national measurement standard.

Each component, instrument, sensor, and valve shall be tested to verify that it is functional. In order to complete these functional check-out tests, the Seller will have to provide temporary power and switches for each valve activation and component activation circuit in the system. Compressed air or bottled nitrogen is also required for pneumatically-actuated valves. All electrical devices shall be tested from the SWPS junction box to the end device and all instrumentation shall be tested from the SWPS junction box termination.

4.2.1 Electrical Testing

The following sections detail the requirements for electrical testing.

4.2.1.1 Motor Test

All motors shall be given a routine test to demonstrate that the motors are installed correctly and free from mechanical and electrical defects. Motor tests

shall be performed in accordance with the Seller's standard practice. Tests shall include, but are not limited to:

1. Motors shall be designed and tested by the manufacturer in accordance with NEMA MG-1. Certificates of Conformance and/or certified test results shall be supplied for the following tests:

   a. Rated load readings of current, power, and speed at rated voltage and frequencies;

   b. No load readings of current, power, and speed at rated voltage and frequencies;

   c. High potential test results in accordance with NEMA MG 1-12.03; and

   d. 1000V dc Megger test for one minute, phase to ground.

2. Motors shall be checked for correct rotation and incoming power terminals shall be labeled by phase for proper rotation.

4.2.1.2 Wiring and Breaker Test

All wiring and breakers shall be given routine tests to demonstrate that they are free from mechanical and electrical defects. Wiring and breaker tests shall be performed in accordance with the Seller's standard practice. The Seller shall provide wiring and breakers test data that include, but are not limited to:

1. Megger tests are required for all electrical power wiring;

2. Continuity testing is required for all electrical power and instrumentation wiring; and

3. Circuit breakers are to be inspected for proper size, correct installation, manual operation of handles, and suspect/counterfeit parts.

4.2.2 Instrumentation Testing

Each instrument will be tested for proper operation. This may require applying temporary power, a 4-20-mA loop with indicators, or other methods to verify

proper indication and function. All signals that are fed to the termination panel shall be verified at the termination panel. The device should be tested with fluid to physically activate the devices for detecting level, pressure, flow, etc., as applicable.

For control loops provided by the MCS, no testing will be required except the individual sensors/switches and starters. Example: A level switch feeds the PLC which controls the feed pump. The level switch shall be tested, but the shutdown signal to the pump can not be verified without the MCS hardware and program, provided later.

For local control function, the system shall be provided with the normal fluid, where practical, to operationally test the control loop. Example: Level interlock to the feed pump shutdown will be tested by filling the tank above the level switch position and verifying the pump shuts down.

4.2.3 Remote-Operated Valve Tests

Verify remote-operated valves cycle through an open and close cycle and achieve their specified fail position on loss of compressed air or loss of electric power.

Each valve shall be activated to verify that the valve functions and that valve-position-switch-contacts are properly made (using an ohmmeter). The valve shall be activated from the SWPS junction box and verify limit-switch-contacts change state at the SWPS junction box. The Seller shall make a checklist that indicates all contacts checked. The Valve-Test Checklist shall be submitted to the Buyer for review and approval. The checklist shall include all contacts where application of voltage would fire a solenoid, actuate an air-operated valve, and change positions between switch contacts.

4.2.4 Heating, Ventilation, and Air Conditioning System Tests

Verify heating and cooling system is operational and functions properly.

4.2.5 Pressure Leak Test

All piping shall be pressure leak tested accordance with ASME B31.3 piping code for "Normal Fluid Service," Paragraph 345, including the sensitive leak test (a soap bubble test has sufficient sensitivity). Components that could be damaged during the test shall be isolated or removed and the outlet flanged, capped, or plugged. Results shall be recorded. A video record of the pressure-leak tests shall be submitted to the Buyer with test records/documents.

4.2.6 Flow Tests

1. Verify discharge of water flow rate satisfies the flow rate requirement in Section 3.1.2.2. Flow with the maximum filter pressure drop shall be tested using an external device to simulate the increase in filter Dp. The discharge pressure shall be measured at the SWPS outlet.

2. Verify pump shutoff head does not exceed the design pressure (Section 3.2.1.1).

3. Verify the filter pressure drop is consistent with manufacturer information (i.e., the pressure drop is not too high nor too low for a clean filter).

4.2.7 Freight Container Leak Test

The freight container shall be static leak tested by filling the freight container with water to the doors threshold level and left standing for a period of 24 hour. No visible drop in water level or other signs of leakage shall be evident. Equipment, wiring, insulation, or other materials that may be damaged by the water shall be removed before the test or protected from damage.

4.2.8 Lift Tests

The fully assembled SWPS shall be lifted from a horizontal position without incurring any damage. The lifting points shall be shown to account for the offset loads, such that the SWPS hangs with its vertical axis within ten degrees of vertical. All lifting accessories or components shall be load tested to 125 percent of the rated load capacity.

Verify the weight and center of gravity of the overall assembly.

4.2.9 Acceptance Criteria

Acceptance criteria will be defined after process testing at the Seller's facilities. It is expected that a standard factory acceptance test will be used to accept the SWPS, at point of shipment from the factory. The SWPS will be shipped to Washington, at a location near the Hanford Site to be determined by the Buyer, where it will be installed by the Buyer. An acceptance test shall be performed by the Buyer.

4.2.10 Inspections

Specific inspections by the Buyer or Buyer's representative that may take place at the Seller's facilities include a suspect fasteners inspection before shipment of equipment. Electrical equipment installation and wiring practices will be subject to review by NEC® Inspectors.

5 PREPARATION FOR DELIVERY

5.1 GENERAL

Every item that is shipped shall arrive at the jobsite in the same condition when it passed all quality control inspections and tests.

The equipment shall be prepared for delivery to the Buyer's specified site located near the U.S. Department of Energy's Hanford Site in Richland, Washington in a manner that can easily be inspected by the Buyer's personnel. The Seller shall be responsible for the equipment and associated components provided by the Seller through shipping and receiving of the equipment. The Seller shall be responsible for any damage that occurred during shipping.

The equipment will remain the property of the Seller until the Buyer has completed a receipt inspection at the Buyer's facility.

5.1.1 Packaging and Shipping Instruction Manual

The Seller shall prepare an instruction manual(s) that includes packaging information, handling information, shipping information, storage information, operational procedures,. maintenance procedures, and special assembly procedures. The instruction manual(s) shall be submitted to the Buyer for approval before shipment.

A recommended spare parts list shall be prepared and provided to the Buyer.

5.1.2 Operation and Maintenance Manual

Provide an Operation and Maintenance Manual containing all information and procedures necessary to operate and maintain the assembled system. Component manuals and other vendor data such as the following shall be provided, as applicable:

1. One-line diagram, layout drawings, schematic and wiring diagrams;
2. Illustrated parts lists with manufacturer catalog numbers;
3. Certified copy of factory test results;

4. Recommended maintenance schedule;

5. Maintenance procedures; and

6. Operating procedures.

Submit Operation and Maintenance Manual, component manuals, and other vendor data to the Buyer for approval before shipment.

5.2 PRESERVATION AND PACKAGING

Before packaging, all residual water present in the systems from acceptance testing shall be thoroughly drained and dried by purging oil-free dry air through the system. All open pipe ends shall be sealed to prevent ingress of debris and vermin into the system. The assembly shall be thoroughly cleaned to remove any dirt or dust that may have accumulated on the equipment during testing. Defects in the paint shall be touched-up. Moving parts shall be secured to prevent movement during shipping.

5.3 PACKING

1. The Seller shall package equipment to protect items during shipping. Bracing structures shall be installed where items could be damaged or vibrate loose during transportation. All bracing must be clearly identified, both in the packaging instruction and by labeling on the outside of the receipt tanks.

2. Rigging sketches or a handling procedure shall be prepared by the Seller for items that require special handling. These sketches will identify weights, sling locations, balance points, methods of attachment, and other information necessary for safe handling.

3. Packaging or preservative coatings shall be visually inspected after loading. Damaged areas shall be repaired. Items shipped with desiccants shall be inspected after loading to verify that seals are intact.

4. Cushioning shall be used where protection from shock and vibration is required. Cushioning materials shall have sufficient strength to provide the

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required protection, shall exhibit no corrosive effect when in contact with the item being cushioned, and shall not readily support combustion.

5. Temporary cushioning, blocking, bracing, or anchoring placed within an item for shipping protection that shall be removed before operation of the item, shall be identified by a warning(s) placed in a conspicuous manner to effect proper removal of the packing material.

6. Blocking and bracing used for protection of the load shall prevent item movement and withstand thrust and impact applied in any direction. Blocking and bracing used in direct contact with the item being blocked shall not have a corrosive effect on the item.

7. The weight, lifting points, or center of gravity indicated on the crate, skid, or package of major components shall be used to ensure proper handling during loading.

8. Written instructions covering the location and stacking limits of the crates or boxes on the transport vehicle shall be specified, as appropriate. These instructions should be marked on the container.

9. Precautions shall be taken to minimize marring of the finish of painted surfaces during handling and shipping, as practicable.

10. Cables, slings, chain falls, etc., shall not be placed where they can cause damage to any component part. Mating surfaces, machined areas, etc., shall be avoided.

11. All items shall be protected from the deleterious effects of shock, vibration, physical damage, moisture, salt spray, condensation, and weather during shipping, as applicable.

12. Items shall be inspected for cleanliness before packaging. Dirt, oil, residue, metal chips, or other forms of contamination shall be removed in accordance with Section 3.3.4. Any entrapped water shall be removed.

13. All openings into items shall be capped, plugged, and sealed with materials which perform their intended function without causing deleterious effects on the equipment or its operation.

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14. Nonmetallic plugs and caps shall be brightly colored. Clear plastic caps or plugs are not to be used except when specified.

15. Plugs or caps shall be prevented from falling into, or being pushed into, openings after installation and shall be secured to prevent accidental removal.

16. Items subject to corrosion, either internal or external, shall be suitably protected.

17. Items packed in shipping containers shall be blocked, braced, or cushioned to prevent physical damage.

18. Instrumentation, electrical and electronic equipment, motors, and other electrical assemblies and equipment shall be packaged in a waterproof enclosure. This may be the enclosure the item will operate in. For items without waterproof enclosures, a vapor barrier shall be placed around the enclosure. In either case, the enclosure shall be able to exclude dirt and facilitate handling and marking of the item. Barrier materials shall be nonhalogenated if used in contact with austenitic stainless steels, shall be noncorrosive, shall not readily support combustion, and shall not be, otherwise, harmful to the item being packaged. Desiccants may be used inside the enclosure or vapor barrier.

19. "Anchoring" of the item within a crate or on a skid means to adequately fasten the item during shipment and protect the item from potential damage as a result of rough handling. Bolting is preferred. When bolts are used for anchoring, the following criteria shall apply:

    a. If precision holes in the item are used for anchoring, properly fitting bolts shall be used to prevent marring or elongation of the holes.

    b. Items shall be marked to preserve identity during shipping, receiving, and storage per the following requirements:

        i. Identification shall be stamped, etched, stenciled, or otherwise marked on the item or on tags affixed to the item.

ii. The marking shall not be deleterious to the material nor violate any other section of this specification.

iii. When tags are employed, they shall be of material that will retain the marking and withstand weathering deterioration and other normal shipping and handling effects.

20. Items not specifically covered by these requirements shall be handled in accordance with sound material handling practices.

5.4 MARKING

Packages shall be properly and clearly marked. At a minimum, the required information shall include the contract number, the name and equipment number of the item within the package, the actual weight of the package and its contents, and the orientation of the equipment within the crate. Each package shall be labeled as part of the entire shipment, such as "Crate 1 of 2."

5.5 HANDLING

The Seller shall lift equipment using a forklift or crane, utilizing the lifting points designed for that purpose.

Provide diagram showing rigging equipment to be used for off-loading the SWPS once it arrives at Buyer's location.

5.6 SHIPPING

The Seller's truck driver shall carry bills of lading for each shippable unit that is delivered to the Buyer.

The Seller shall obtain approval to ship from the Buyer before the equipment is prepared for shipment.

5.7 RECEIVING

The Buyer's agent will perform a receipt inspection on receipt of the equipment at the Buyer's specified site.

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This receipt inspection shall consist of the following:

1. Verify all parts are present and not damaged during shipping.

2. Documentation review—determine that documentation required by contract to accompany equipment is present and traceable to the equipment shipped as required by the Bidder's Drawing and Data Commitments sheet (Appendix A).

The Seller is responsible for accommodating the receipt inspection process by:

1. Designing and using packaging that allows for easy opening or disassembly to reveal the item(s) for inspection, then reclosing to permit the same packaging to be used for post-receipt transportation on the Hanford Site.

2. Selecting locations on equipment for identification numbers that promotes easy identification without extensive disassembly of packaging materials. It is preferred that packaging be marked to indicate the approximate position of identification numbers on equipment within the packaging.

3. Ensuring that all required documentation accompanying the equipment is present and obvious on, or within, the packaging.

6 NOTES

1. Unless otherwise specified, equipment furnished under this section shall be fabricated and installed in compliance with the instructions of the manufacturer.

2. The Seller shall ensure that all equipment, accessories, and installation materials comply with the specification and that adequate provision is made in the SWPS design and fabrication for mounting the specified system equipment and accessories.

3. The Seller is solely responsible for construction means, methods, techniques, sequences, procedures, and safety precautions and programs.

4. The Seller shall provide all labor, equipment, and material required to provide a complete and functional system.

5. To avoid delays in construction, the Seller shall ensure that all components of the system are available to meet the required schedule.

6. The Seller shall obtain necessary permits, arrange for inspections, and obtain approval of the appropriate Seller's local "Authority Having Jurisdiction" over the work described.

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7 APPENDICES

The following appendices make up part of this specification:

Appendices	Description
A	Bidder's Drawing and Data Commitments
B	Drawings and Sketches
C	Data Sheets
D	Secondary Waste Pump Skid Hydraulic Model Data
E	TFC-ESHQ-Q_C-C-03, Revision B, *Control of Suspect/Counterfeit Items*
F	Request for Information
G	Instrumentation Naming and Tagging Convention

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CLIENT:	AMEC E&E - Richland, Washington		

Appendix A

Bidder's Drawing and Data Commitments

(5 pages including cover)

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TECHNICAL DATA SHEETS

PROJECT:	Final DBVS Design	145579-D-DS-011.1	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID EQUIPMENT NO.: 37-DS8-001	
CLIENT:	AMEC E&E - Richland, Washington		

BIDDER'S DRAWING AND DATA COMMITMENTS

Vendor shall supply all drawings, manuals and documentation in the quantities indicated. Approval drawings are due within the listed number of calendar days after issue of the Purchase Order or Letter of Intent. The dates set out for drawing and data submissions are governed by the engineering design schedule of the project. The Vendor shall supply one Autocad disk file and requested number of copies within the listed number of calendar days. Final drawings must be certified as correct and bear the Vendors name, equipment number and Purchase Order Number. Drawing Transmittals listing the document numbers, revison numbers, quantities, status and document types must be included with all submissions (including electronic submittals)

SEND ALL DOCUMENTS TO:

Submit all documents via courier service
Faxed documents must be followed by the originals.
Electronic E-mail or FTP transmissions of drawings & data must be copied to Document Control
Always include a transmittal

DMJMH+N, Inc.
dba DMJM Technology
3250 Port of Benton Blvd
Richland, WA 99354-1670
Attn: Project Records
Phone: (509) 375-7856
Fax: (509) 375-5331

BIDDERS MUST PROVIDE ESTIMATED LEAD TIMES FOR APPROVAL DRAWINGS

Proposal	Bidder shall include this data for each item			REVIEW ITEMS DUE WITHIN	VENDOR COMMITMENT
	Review	Required before ordering or start of fabrication			
		Final	Required within 7 days prior to shipment and before final payment		
PROPOSAL	REVIEW	FINAL	DESCRIPTION	(DAYS)	(DAYS)
E+3			Proof of NQA-1 or equivalent QA program		
E+3			Experience list and maintainability information		
E+3			Completed data sheets and vendor information		
E+3			Subcontractor list		
E+3	E+3		Design, fabrication & delivery schedule	PO+7	
	E+3		Completed data sheet for Buyer-approved component substitutions	PO+21	
	E+3		90% Design and Fabrication Package including: - Drawings (with welding details) - Calculations - Completed Equipment Data Sheets - Vendor Cut Sheets/Technical Brochures - Bill of materials	PO+21	
	E+3		100% Design and Fabrication Package including: - Drawings (with welding details) - Calculations - Completed Equipment Data Sheets - Vendor Cut Sheets/Technical Brochers - Bill of materials	PO+21	
	E+3	E+1	Test Plans/Test Procedures	PO+21	
	E+1	E+1	NDE personnel certifications	PO+21	
	E+1	E+1	Visual Weld/NDE procedures	PO+21	
	E+1	E+1	Visual weld examination procedure/weld map	Fab-10	

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TECHNICAL DATA SHEETS

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	Review	Required before ordering or start of fabrication			
		Final	Required within 7 days prior to shipment and before final payment		
PROPOSAL	REVIEW	FINAL	DESCRIPTION	(DAYS)	(DAYS)
	E+3	E+1	Welding procedures, procedure qualification records, and welder performance qualification records	Fab-10	
	E+3	E+1	AWS CWI certificate	Fab-10	
	E+3	E+1	Material Control Procedures	Fab-10	
	E+3	E+3	Protective coating specifications	Fab-10	
	E+3	E+1	Fabrication travelers	Fab-10	
	E+3	E+1	Cleaning procedures	Fab-10	
	E+3	E+1	NCR's	When identified +3	
	E+3	E+3	Fabrication red-line changes	When identified	
	E+3	E+1	Packaging and Shipping Plan	Del-21	

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TECHNICAL DATA SHEETS

PROJECT:	Final DBVS Design	145579-D-DS-011.1	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID EQUIPMENT NO.: 37-D58-001	
CLIENT:	AMEC E&E - Richland, Washington		

BIDDER'S DRAWING AND DATA COMMITMENTS

Vendor shall supply all drawings, manuals and documentation in the quantities indicated. Approval drawings are due within the listed number of calendar days after issue of the Purchase Order or Letter of Intent. The dates set out for drawing and data submissions are governed by the engineering design schedule of the project. The Vendor shall supply one Autocad disk file and requested number of copies within the listed number of calendar days. Final drawings must be certified as correct and bear the Vendors name, equipment number and Purchase Order Number. Drawing Transmittals listing the document numbers, revison numbers, quantities, status and document types must be included with all submissions (including electronic submittals)

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BIDDERS MUST PROVIDE ESTIMATED LEAD TIMES FOR APPROVAL DRAWINGS

Proposal	Bidder shall include this data for each item			REVIEW ITEMS DUE WITHIN	VENDOR COMMITMENT
	Review	Required before ordering or start of fabrication			
		Final	Required within 7 days prior to shipment and before final payment		
PROPOSAL	REVIEW	FINAL	DESCRIPTION	(DAYS)	(DAYS)
		E+1	Final Data Package including: - As-Built drawings - Fabrication Traveler Closeout - Recommended spare parts and frequency of replacement - Rigging sketches - System assembly instructions - Operation and maintenance manuals - Final Test results (document and video records) - Packing list and identification of shipping supports - Field Calibration Procedures and Reports - Inspection Reports - CoC's / CMTRs - Motor Testing Documentation (per NEMA) - NEC inspection certificate, electromagnetic interference test results, and instrument log test results	Del-10	

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TECHNICAL DATA SHEETS

PROJECT:	Final DBVS Design	145579-D-DS-011.1	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID EQUIPMENT NO.: 37-D58-001	
CLIENT:	AMEC E&E - Richland, Washington		

BIDDER'S DRAWING AND DATA COMMITMENTS

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Proposal	Bidder shall include this data for each item			REVIEW ITEMS DUE WITHIN (DAYS)	VENDOR COMMITMENT (DAYS)
	Review	Required before ordering or start of fabrication			
		Final	Required within 7 days prior to shipment and before final payment		
PROPOSAL	REVIEW	FINAL	DESCRIPTION		

THE TIMELY RECEIPT OF THE VENDOR DOCUMENTS IS CRITICAL TO THIS PROJECT.
Buyer commits to a 10 working day turnaround cycle after reciept of approval documents.

I agree to provide the listed documentation and data and the dates shown above.

Vendor Signature _____ Date _____

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Appendix B

Drawings and Sketches

Drawing or Sketch	Revision	Sheet	Title
F-145579-00-A-0099	G	1	Bulk Vitrification P&ID "Typicals" Legend
F-145579-00-A-0100	I	1	Bulk Vitrification P&ID Symbol Legend
F-145579-37-A-0100	0C	1	Bulk Vitrification Secondary Waste Pump Skid / Loadout P&ID
DBVS-SK-E106	A	1	DBVS Secondary Waste Pump Skid One-Line and Grounding Diagrams
DBVS-SK-E107	A	1	Bulk Vitrification Sec. Waste Transf. Pump No. 1 Schematic Diagram
DBVS-SK-E107	A	2	Bulk Vitrification Sec. Waste Transf. Pump No. 1 Wiring Diagram
DBVS-SK-E108	A	1	Bulk Vitrification Sec. Waste Transf. Pump No. 2 Schematic Diagram
DBVS-SK-E108	A	2	Bulk Vitrification Sec. Waste Transf. Pump No. 2 Wiring Diagram
DBVS-SK-M001	B	1	Secondary Waste Pump Skid Container Interfaces
DBVS-SK-M103	B	1 and 2	Bulk Vitrification HIHTL Penetration Details
			Total Drawing Pages, including cover: 10

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P&ID INTERLOCK LEGEND:

A = PROCESS AREA

AXX = AREA #0: PROCESS/FACILITY SUPPORT
BXX = AREA 31: SOL RECEIPT
CXX = AREA 32: WASTE RECEIPT
DXX = AREA 33: DRYER
EXX = AREA 34: DRYER TO BOX
FXX = AREA 35: BOX (KV)
GXX = AREA 36: OFF GAS TREATMENT
HXX = AREA 37: SECONDARY LIQUID WASTE

T = TABLE WITHIN AN AREA

XAT, XBT, XCT ..... etc.

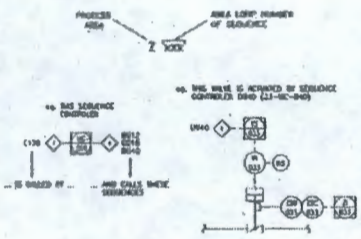
M = MEMBER WITHIN A TABLE
(MAXIMUM 26 MEMBERS)

XMA, XMB, XMC ..... etc.

SEE 145579-F-DC-004 "MCE INTERLOCK REGISTER" FOR FURTHER DETAILS.

SEQUENCE CONTROLLER LEGEND

SEQUENCE CONTROLLERS USE A DIFFERENT METHOD OF EXISTING INTERACTION WITH FIELD CHOICES



AREA SEQUENCE CONTROLLERS

AREA 31
0042 = 31-SC-012
0142 = 31-SC-142
0412 = 31-SC-412

AREA 33
D031 = 33-SC-014
D040 = 33-SC-040

AREA 35
C090 = 35-SC-010

AREA 34
E120 = 34-SC-120
E207 = 34-SC-207
E208 = 34-SC-208
E209 = 34-SC-209
E209 = 34-SC-209
E031 = 34-SC-031
E032 = 34-SC-032

AREA 36
F130 = 36-SC-130

AREA 36
G010 = 36-SC-010

LIST OF ABBREVIATIONS FOR "FLUID NOMENCLATURE" FINAL DBVS

AIR:
AA AMBIENT AIR
AC COMPRESSED AIR
AI INSTRUMENT AIR

DRY SOLID:
BDO BORON OXIDE
CCS CLEAN SOIL
DDW DRIED WASTE
DGF GLASS FORMER
DZO ZIRCONIUM OXIDE

GAS:
GNH AMMONIA GAS

OIL/GREASE:
DSF OIL-DIESEL FUEL
OH OIL-HYDRAULICS

PROCESS SOLUTION:
PUC DRYER CONDENSATE
PLS LIQUID SIMULANT
PLW LOW ACTIVITY WASTE
PPS SODIUM SOLUTION
PSW SECONDARY WASTE
PTS TRI-UCE SOLUTION

REAGENT:
RNH AMMONIA LIQUID
RAS SULFAMIC ACID
RNN CAUSTIC (NaOH)
RNP SODIUM PERCHLORATE (NaClO4)
RNS SODIUM SULFATE

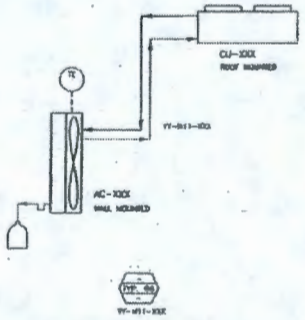
VACUUM, VAPOUR AND VENT LINES:
VCS CLEAN SOIL VENT LINE
VOE OFF GAS VENT LINE
VVC VACUUM LINE
VVP VAPOUR LINE

WATER/STEAM:
STC STEAM CONDENSATE
STS STEAM
WBD BOILER BLOWDOWN WATER
WBF BOILER FEEDWATER
WC CHILLED WATER
WED EQUIPMENT DRAIN
WF FILTERED WATER
WFI FIRE WATER
WG GLYCOL
WGL GLAND WATER
WPQ POTABLE WATER

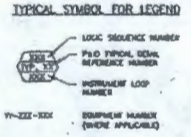
NOTE:
1 THE FIRST LETTER IN THE LINE ABBREVIATION SHALL DESIGNATE THE FLUID CATEGORY, THE REMAINING LETTERS SHALL DESIGNATE THE FLUID.

TYPICAL #05
(ON TRAILER)
SPACE HEATER

TYPICAL #06
(ON TRAILER)
AIR CONDITIONING



TYPICAL SYMBOL FOR LEGEND



E	ISSUED FOR APPROVAL & SOL REPORT	10 JAN 06	JK	BM	PWS	BH
D	ISSUED FOR CLIENT INT. REVIEW	20 DEC. 05	JK	BM	PWS	BH
C	ISSUED FOR REVIEW, UPDATE & INTERNAL	02 NOV 04	JK	BM	PWS	BH
B	ISSUED FOR REVIEW INTERNAL	5 Nov 04	BM	CDH	PWS	JMS
C	ISSUED FOR APPROVAL	27 AUG 04	JMS	CDH	PWS	BM
B	INITIAL ISSUED FOR INTERNAL REVIEW. REMOVED FLOWS, ADD F-145,[illegible]	23 JUL 04	JMS	CDH	PWS	JMS
A	ISSUED FOR SCOP & REVIEW	1 APR 04	JMS	CDH	PWS	BM
Rev.	REVISION DESCRIPTION	Date	By	Chk'd	Appr'd	Appr'd

Wilson 5/3/05

F-145579-00-A-0099 G

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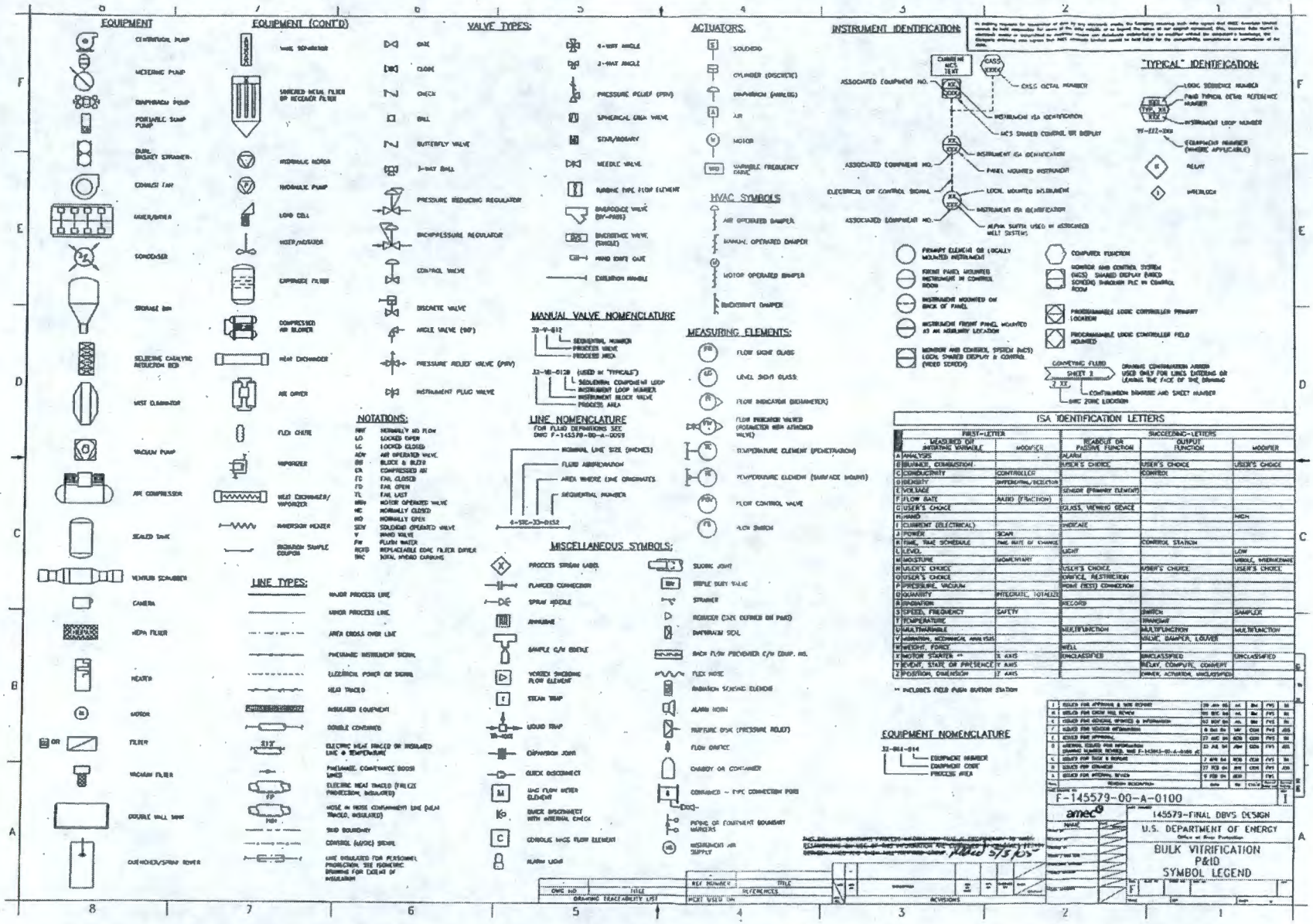
145579-FINAL DBVS DESIGN

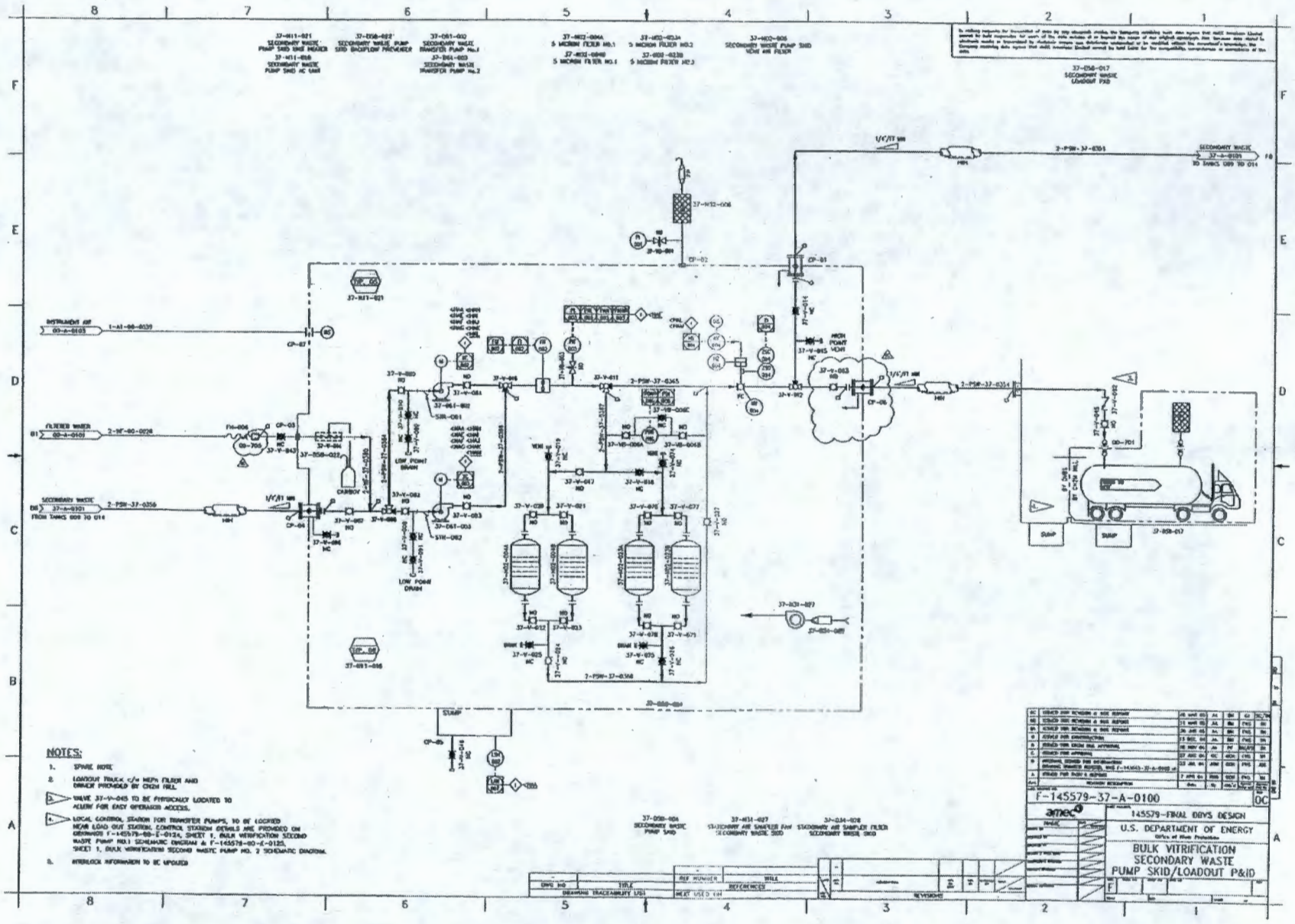
U.S. DEPARTMENT OF ENERGY
Office of Waste Processing

BULK VITRIFICATION
P&ID
"TYPICALS" LEGEND

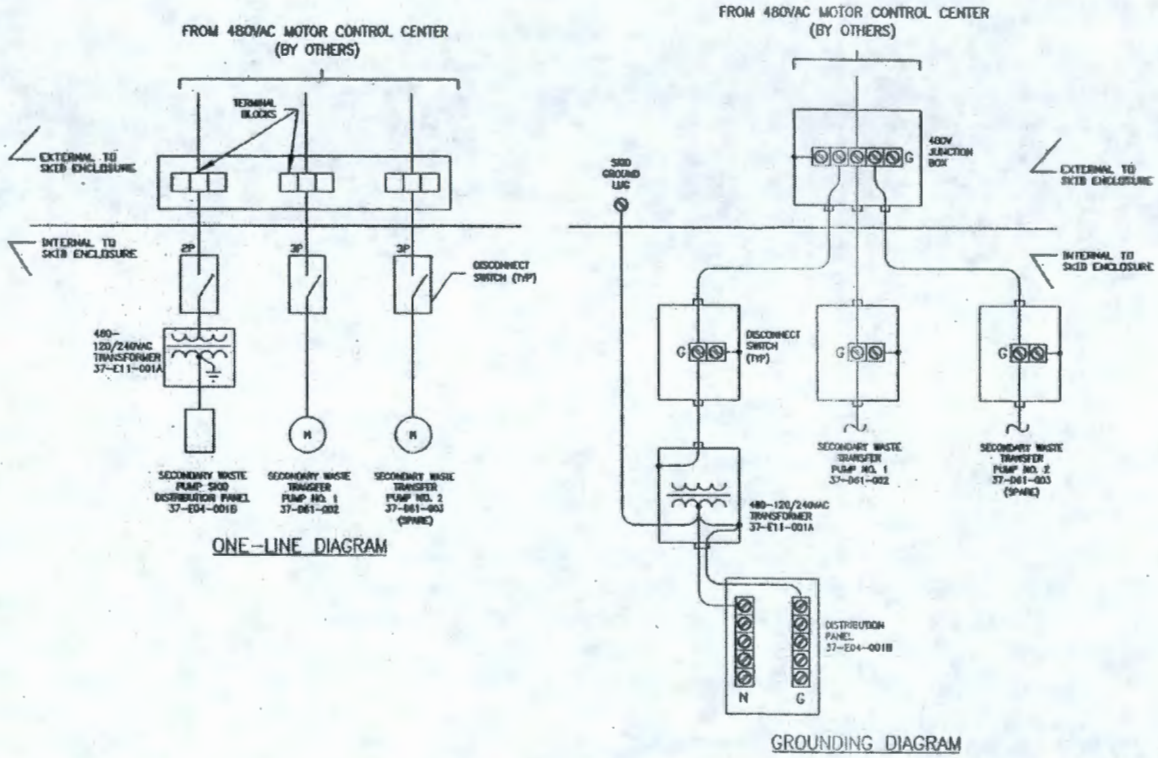
F

DRAWING TRACEABILITY LIST | REFERENCES | REVISIONS


EQUIPMENT
CENTRIFUGAL PUMP
METERING PUMP
DIAPHRAGM PUMP
PORTABLE SUMP PUMP
DUAL BASKET STRAINER
EXHAUST FAN
MIXER/BLENDER
CONDENSER
STORAGE BIN
SELECTIVE CATALYTIC REDUCTION BED
MIST ELIMINATOR
VACUUM PUMP
AIR COMPRESSOR
SEALED TANK
VENTURI SCRUBBER
CAMERA
HEPA FILTER
HEATER
MOTOR
FILTER
VACUUM FILTER
DOUBLE WALL TANK
OVERHEAD/SPRAY TOWER
EQUIPMENT (CONT'D)
WIRE SEPARATOR
SINTERED METAL FILTER OR MECHANICAL FILTER
HYDRAULIC MOTOR
HYDRAULIC PUMP
LOAD CELL
MIXER/AGITATOR
EMPTY FILTER
COMPRESSED AIR BLOWER
HEAT EXCHANGER
AIR DRYER
FLEX CHUTE
VAPORIZER
HEAT EXCHANGER/ VAPORIZER
IMMERSION HEATER
SIGNATURE SAMPLE COUPON
VALVE TYPES:
GATE
GLOBE
CHECK
BALL
BUTTERFLY VALVE
3-WAY BALL
PRESSURE REDUCING REGULATOR
BACKPRESSURE REGULATOR
CONTROL VALVE
DISCRETE VALVE
NEEDLE VALVE (90°)
PRESSURE RELIEF VALVE (PRV)
INSTRUMENT FLUID VALVE
4-WAY ANGLE
3-WAY ANGLE
PRESSURE RELIEF (PRV)
SPHERICAL DISK VALVE
STAR/ROTARY
NEEDLE VALVE
RAMBINE PIPE FLOW ELEMENT
DIAPHRAGM VALVE (DIV-PARS)
DIVERSENCE VALVE (SINGLE)
HAND DRIP GUIT
EXPANSION RAMBLE
ACTUATORS:
SOLENOID
CYLINDER (DISCRETE)
DIAPHRAGM (ANALOG)
AIR
MOTOR
VARIABLE FREQUENCY DRIVE
HVAC SYMBOLS
AIR OPERATED DAMPER
MANUAL OPERATED DAMPER
MOTOR OPERATED DAMPER
BACKDRAFT DAMPER
MANUAL VALVE NOMENCLATURE
32-V-612
SEQUENTIAL NUMBER
PROCESS VALVE
PROCESS AREA
32-VE-0128 (USED IN "TYPICALS")
SOLENOIDS COMPONENT LOOP
INSTRUMENT LOOP NUMBER
INSTRUMENT BLOCK VALVE
PROCESS AREA
LINE NOMENCLATURE
FOR FLUID DEFINITIONS SEE DWG F-145579-00-A-0059
NOMINAL LINE SIZE (INCHES)
FLUID ABBREVIATION
AREA WHERE LINE ORIGINATES
SEQUENTIAL NUMBER
4-SRC-32-0152
NOTATIONS:
NNF NORMALLY NO FLOW
LO LOCKED OPEN
LC LOCKED CLOSED
AOV AIR OPERATED VALVE
BB BLOCK & BLEED
CA COMPRESSED AIR
FC FAIL CLOSED
FO FAIL OPEN
FL FAIL LAST
MOV MOTOR OPERATED VALVE
NC NORMALLY CLOSED
NO NORMALLY OPEN
SOV SOLENOID OPERATED VALVE
V HAND VALVE
FW FLUSH WATER
RCFD REPLACEABLE CONC FILTER DRYER
TNC TOTAL NITRO CARBONS
MEASURING ELEMENTS:
FLOW SIGHT GLASS
LEVEL SIGHT GLASS
FLOW INDICATOR (DIAPHRAGM)
FLOW PRESSURE VALVED (ROTAMETER WITH ATTACHED VALVE)
TEMPERATURE ELEMENT (PENETRATION)
TEMPERATURE ELEMENT (SURFACE MOUNT)
FLOW CONTROL VALVE
FLOW SWITCH
MISCELLANEOUS SYMBOLS:
PROCESS STREAM LABEL
FLANGED CONNECTION
SPRAY NOZZLE
ANNULUS
SAMPLE C/W BOTTLE
VORTEX SHEDDING FLOW ELEMENT
STEAM TRAP
LIQUID TRAP
EXPANSION JOINT
QUICK DISCONNECT
UNC FLOW METER ELEMENT
CHECK DISCONNECT WITH INTERNAL CHECK
CORIOLIS MASS FLOW ELEMENT
ALARM LIGHT
SLIDING JOINT
SIMPLE BURY VALVE
STRAINER
ROBINCER (SAME DEFINER ON PIND)
DIAPHRAGM SEAL
BACK FLOW PREVENTER C/W COMP. NO.
FLEX HOSE
ANNUNCIATOR SCHEMIC ELEMENT
ALARM HORN
RUPTURE DISK (PRESSURE RELIEF)
FLOW ORIFICE
CHARGY OR CONTAINER
COMMAND - TYPE CONNECTION PORT
PRINT OF EQUIPMENT BOUNDARY MARKERS
INSTRUMENT AIR SUPPLY
LINE TYPES:
MAJOR PROCESS LINE
MINOR PROCESS LINE
AREA CROSS OVER LINE
PNEUMATIC INSTRUMENT SIGNAL
ELECTRICAL POWER OR SIGNAL
HEAT TRACED
INSULATED EQUIPMENT
DOUBLE CONTAINED
ELECTRIC HEAT TRACED OR INSULATED LINE @ TEMPERATURE
PNEUMATIC CONTAINED BOOST LINES
ELECTRIC HEAT TRACED (FREEZE PROTECTION, INSULATED)
HOSE IN HOSE CONTAINMENT LINE (HEAT TRACED, INSULATED)
SKID BOUNDARY
CONTROL (AUTO) SIGNAL
LINE INSULATED FOR PERSONNEL PROTECTION. SEE ISOMETRIC DRAWING FOR EXTENT OF INSULATION
INSTRUMENT IDENTIFICATION:
ASSOCIATED EQUIPMENT NO.
CHANNEL NO. TEXT
CLASS XXXX
CLASS OCTAL NUMBER
INSTRUMENT ISA IDENTIFICATION
MCS SHARED CONTROL OR DISPLAY
INSTRUMENT ISA IDENTIFICATION
PANEL MOUNTED INSTRUMENT
ELECTRICAL OR CONTROL SIGNAL
LOCAL MOUNTED INSTRUMENT
INSTRUMENT ISA IDENTIFICATION
ALPHA SUFFIX USED IN ASSOCIATED WELT SYSTEMS
"TYPICAL" IDENTIFICATION:
LOGIC SEQUENCE NUMBER
PAID TYPICAL DETAIL REFERENCE NUMBER
INSTRUMENT LOOP NUMBER
TY-EEE-XXX
EQUIPMENT NUMBER (WHERE APPLICABLE)
RELAY
INTERLOCK
PRIMARY ELEMENT OR LOCALLY MOUNTED INSTRUMENT
FRONT PANEL MOUNTED INSTRUMENT IN CONTROL ROOM
INSTRUMENT MOUNTED ON BACK OF PANEL
INSTRUMENT FRONT PANEL MOUNTED AS AN ASSEMBLY LOCATION
MONITOR AND CONTROL SYSTEM (MCS) LOCAL SHARED DISPLAY & CONTROL (VIDEO SCREEN)
COMPUTER FUNCTION
MONITOR AND CONTROL SYSTEM (MCS) SHARED DISPLAY (MCS) SCREENS SHADOWS PLC IN CONTROL ROOM
PROGRAMMABLE LOGIC CONTROLLER PRIMARY LOCATION
PROGRAMMABLE LOGIC CONTROLLER FIELD MOUNTED
CONVEYING FLUID
SHEET 3
2 XX
DRAWING CONTAMINATION AREAS USED ONLY FOR LINES EXITING OR LEAVING THE FACE OF THE DRAWING
CONTAMINATION DRAWING AND SHEET NUMBER
SRC ZONE LOCATION
ISA IDENTIFICATION LETTERS
FIRST-LETTER
MEASURED OR INITIATING VARIABLE
MODIFIER
SUCCEEDING-LETTERS
READOUT OR PASSIVE FUNCTION
OUTPUT FUNCTION
MODIFIER
A ANALYSIS — ALARM
B BURNER, COMBUSTION — USER'S CHOICE — USER'S CHOICE — USER'S CHOICE
C CONDUCTIVITY — CONTROLLER — CONTROL
D DENSITY — DIFFERENTIAL/SELECTOR
E VOLTAGE — SENSOR (PRIMARY ELEMENT)
F FLOW RATE — RATIO (FRACTION)
G USER'S CHOICE — GLASS, VIEWING DEVICE
H HAND — HIGH
I CURRENT (ELECTRICAL) — INDICATE
J POWER — SCAN
K TIME, TIME SCHEDULE — TIME RATE OF CHANGE — CONTROL STATION
L LEVEL — LIGHT — LOW
M MOISTURE — MOMENTARY — MIDDLE, INTERMEDIATE
N USER'S CHOICE — USER'S CHOICE — USER'S CHOICE — USER'S CHOICE
O USER'S CHOICE — ORIFICE, RESTRICTION
P PRESSURE, VACUUM — POINT (TEST) CONNECTION
Q QUANTITY — INTEGRATE, TOTALIZE
R RADIATION — RECORD
S SPEED, FREQUENCY — SAFETY — SWITCH — SAMPLER
T TEMPERATURE — TRANSMIT
U MULTIVARIABLE — MULTIFUNCTION — MULTIFUNCTION — MULTIFUNCTION
V VIBRATION, MECHANICAL ANALYSIS — VALVE, DAMPER, LOUVER
W WEIGHT, FORCE — WELL
X MOTOR STARTER ** — 3 AXIS — UNCLASSIFIED — UNCLASSIFIED — UNCLASSIFIED
Y EVENT, STATE OR PRESENCE — 7 AXIS — RELAY, COMPUTE, CONVERT
Z POSITION, DIMENSION — 17 AXIS — DRIVER, ACTUATOR, UNCLASSIFIED
** INCLUDES FIELD PUSH BUTTON STATION
EQUIPMENT NOMENCLATURE
32-MIX-014
EQUIPMENT NUMBER
EQUIPMENT CODE
PROCESS AREA
F-145579-00-A-0100
amec
145579-FINAL DBVS DESIGN
U.S. DEPARTMENT OF ENERGY
Office of River Protection
BULK VITRIFICATION
P&ID
SYMBOL LEGEND
DWG NO
TITLE
REV NUMBER
TITLE
DRAWING TRACEABILITY LIST
NEXT WORK ON
REFERENCES
REVISIONS


NOTES:
1. SPARE NOTE
2. LOADOUT TRUCK c/w HEPA FILTER AND DRAIN PROVIDED BY CH2M HILL
3. VALVE 37-V-045 TO BE PHYSICALLY LOCATED TO ALLOW FOR EASY OPERATOR ACCESS.
4. LOCAL CONTROL STATION FOR TRANSFER PUMPS, TO BE LOCATED NEAR LOAD OUT STATION. CONTROL STATION DETAILS ARE PROVIDED ON DRAWINGS F-145579-00-I-0124, SHEET 1, BULK VITRIFICATION SECOND WASTE PUMP NO.1 SCHEMATIC DIAGRAM & F-145579-00-I-0125, SHEET 1, BULK VITRIFICATION SECOND WASTE PUMP NO. 2 SCHEMATIC DIAGRAM.
5. INTERLOCK INFORMATION TO BE UPDATED
F-145579-37-A-0100
145579-FINAL DBVS DESIGN
U.S. DEPARTMENT OF ENERGY
BULK VITRIFICATION
SECONDARY WASTE
PUMP SKID/LOADOUT P&ID

DWG NO	SH	REV
DBVS-SK-E106	1 OF 1	A



DMJM Technology

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NAME	DATE
DRAWN BY B. HICKMAN	
DESIGN AUTH	

U.S. DEPARTMENT OF ENERGY
Office of River Protection

TITLE: DBVS SECONDARY WASTE PUMP SKID ONE-LINE AND GROUNDING DIAGRAMS

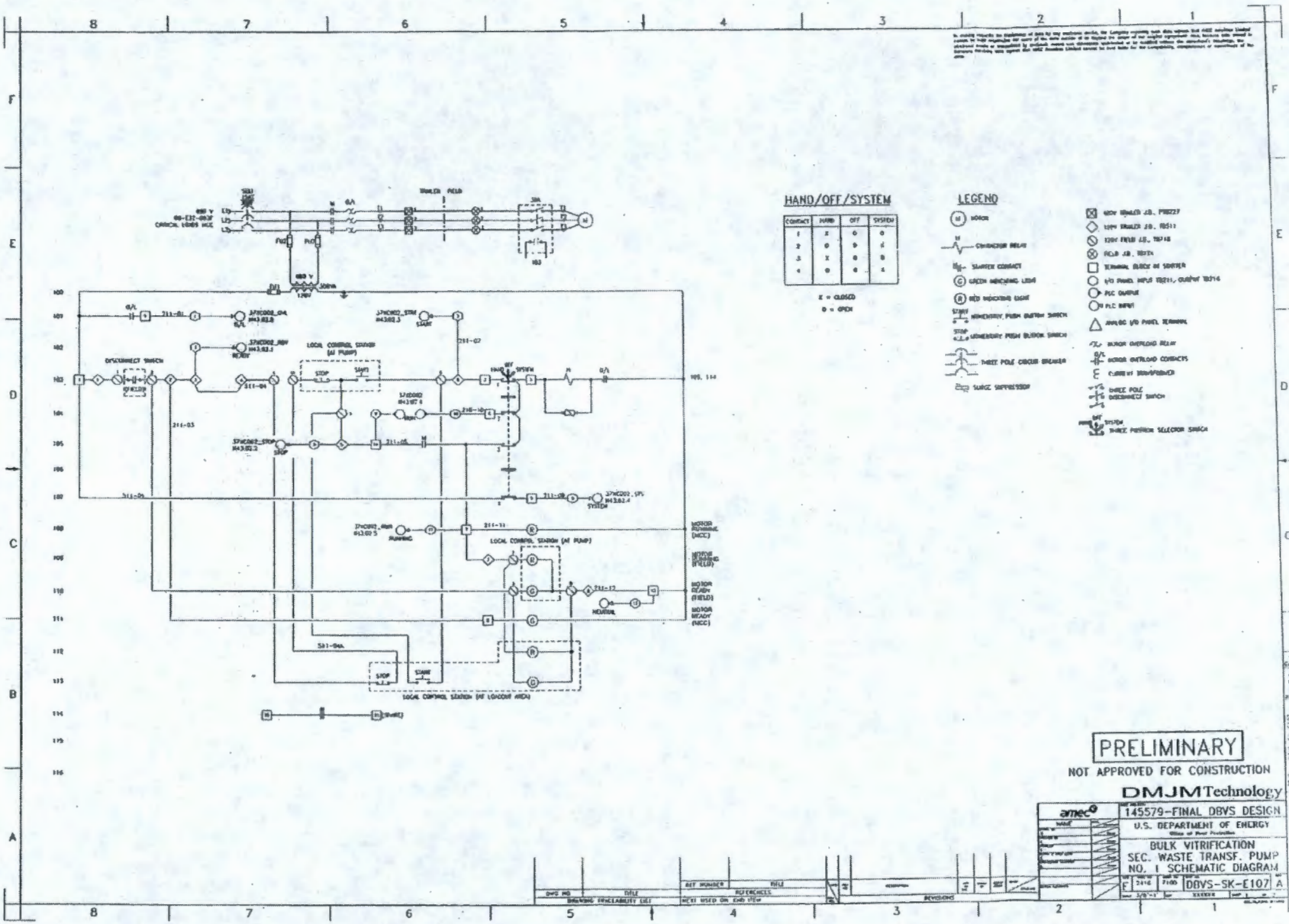
SIZE	BLDG NO	INDEX NO	DWG NO	REV
B			DBVS-SK-E106	A

SCALE | EDT | SHEET 1 OF 1

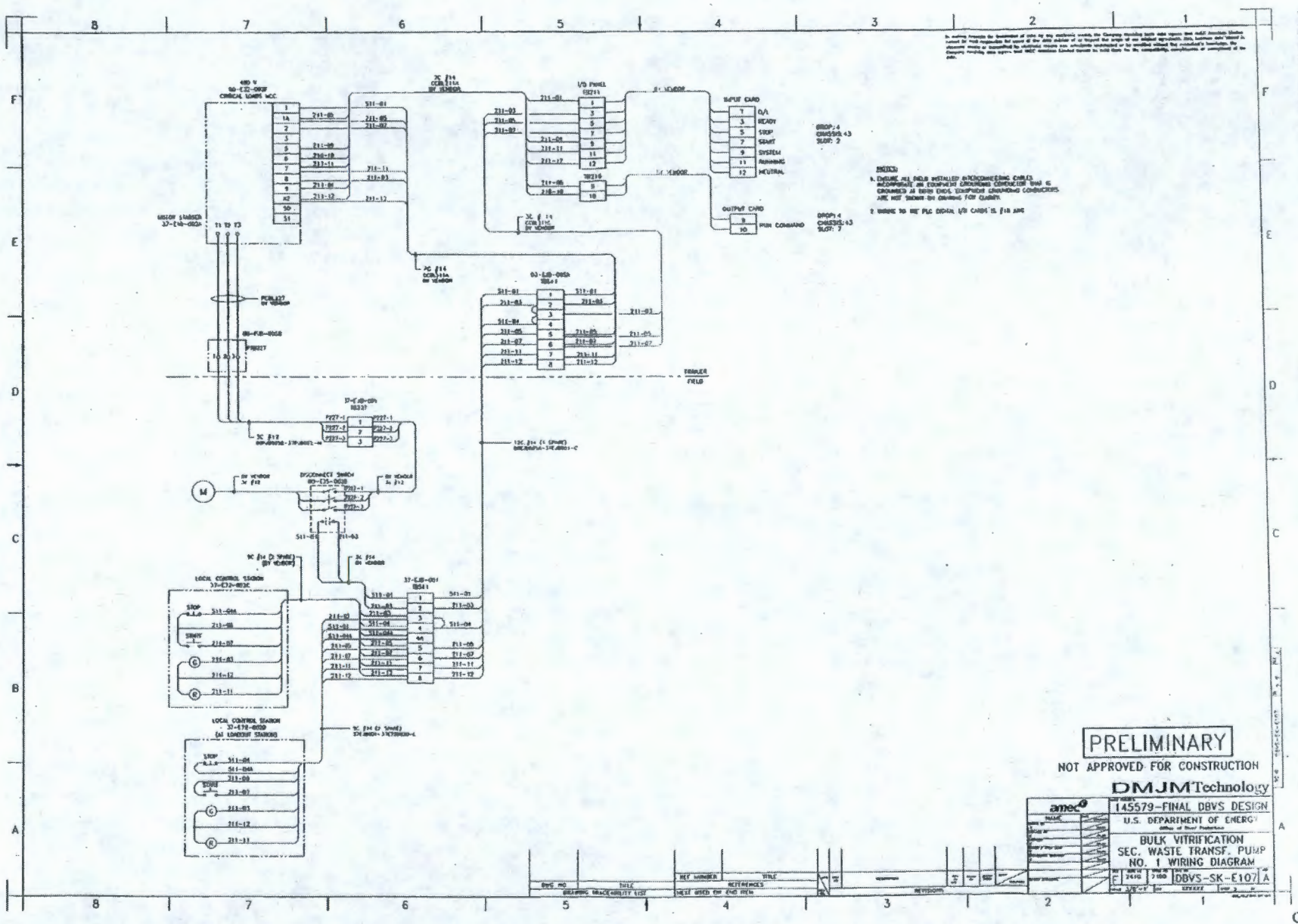
BOE_TB_BLDWG (01-01)

REF NUMBER	TITLE
REFERENCES	
NEXT USED ON	

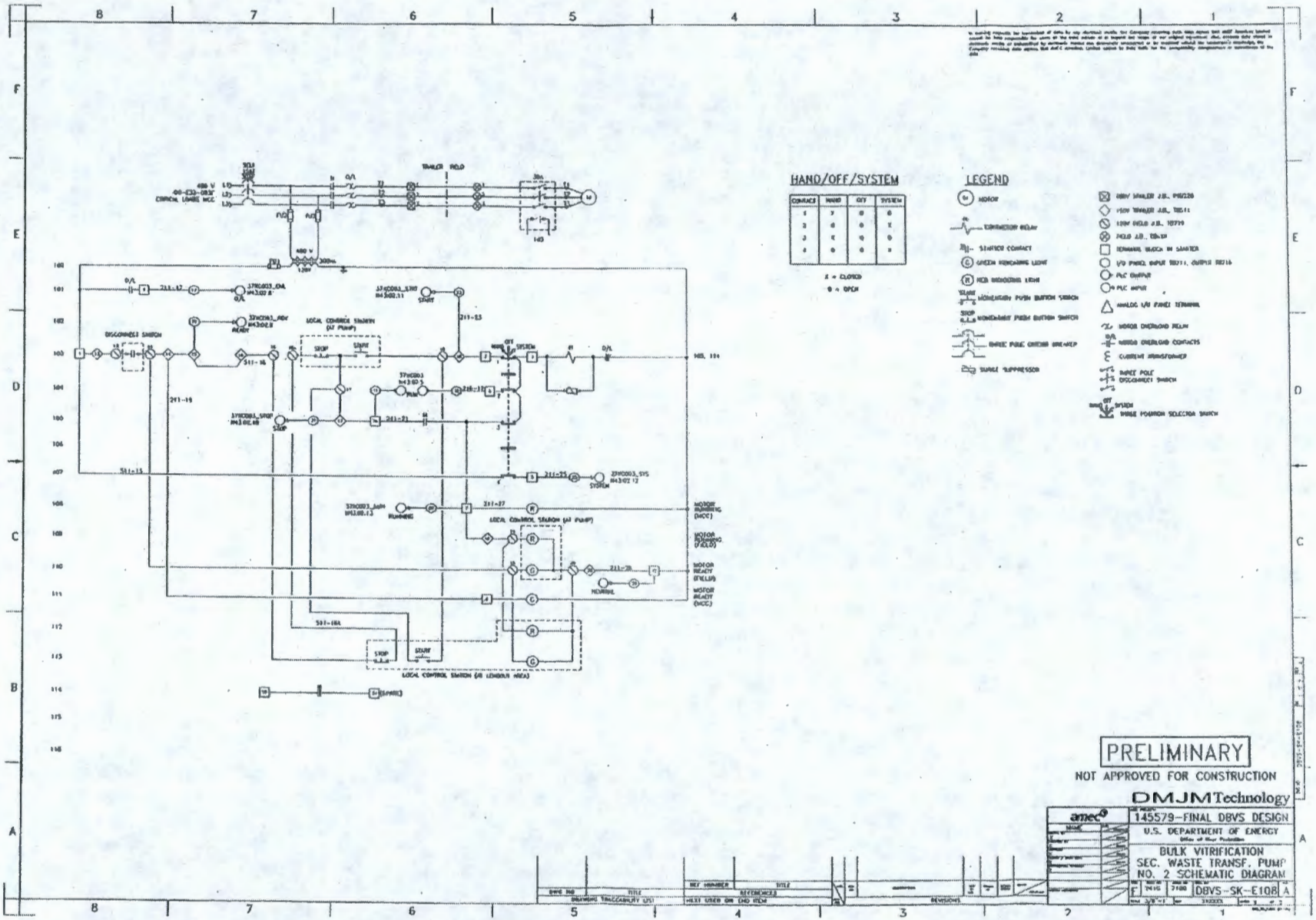
REV NO	DESCRIPTION	REV BY DATE	ENGR COMPANY
REVISIONS			


HAND/OFF/SYSTEM
LEGEND
LOCAL CONTROL STATION (AT PUMP)
LOCAL CONTROL STATION (AT LOADOUT AREA)
DISCONNECT SWITCH
MOTOR RUNNING (NCC)
MOTOR READY (NCC)
PRELIMINARY
NOT APPROVED FOR CONSTRUCTION
DMJM Technology
145579-FINAL DBVS DESIGN
U.S. DEPARTMENT OF ENERGY
BULK VITRIFICATION
SEC. WASTE TRANSF. PUMP
NO. 1 SCHEMATIC DIAGRAM
DBVS-SK-E107

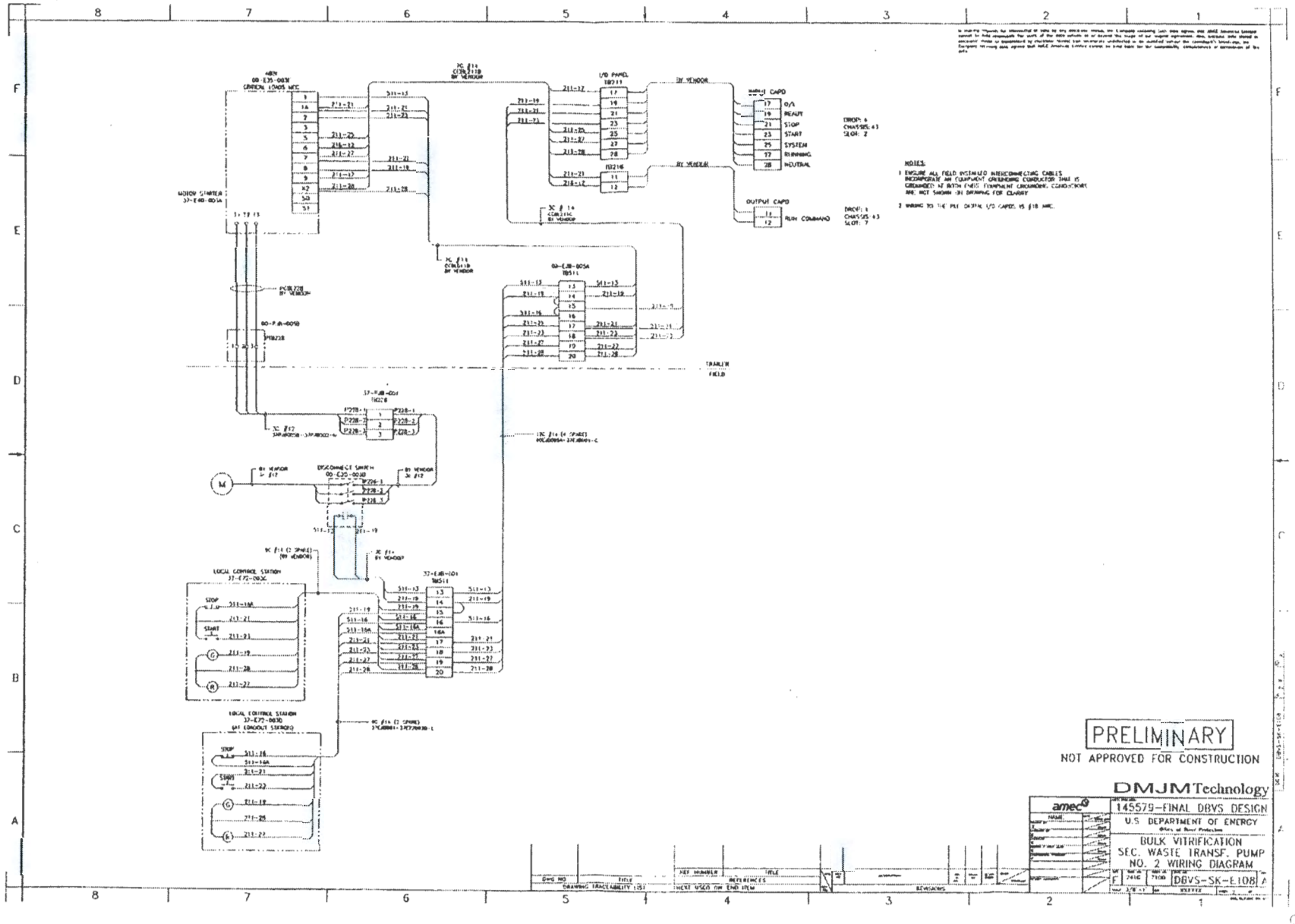
RPP-24544 REV 1

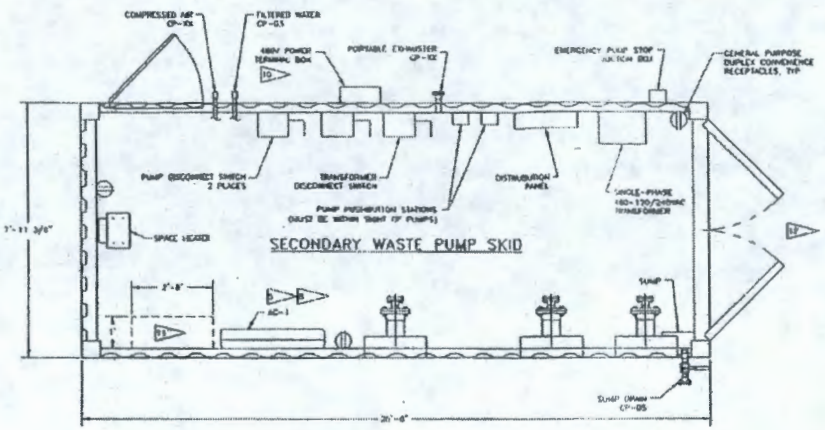


G3-120


HAND/OFF/SYSTEM
LEGEND
LOCAL CONTROL STATION (AT PUMP)
LOCAL CONTROL STATION (AT PUMP)
LOCAL CONTROL STATION (AT LONGARM AREA)
MOTOR RUNNING (MCC)
MOTOR RUNNING (FIELD)
MOTOR READY (FIELD)
MOTOR READY (MCC)
PRELIMINARY
NOT APPROVED FOR CONSTRUCTION
DMJM Technology
145579-FINAL DBVS DESIGN
U.S. DEPARTMENT OF ENERGY
BULK VITRIFICATION
SEC. WASTE TRANSF. PUMP
NO. 2 SCHEMATIC DIAGRAM
DBVS-SK-E108

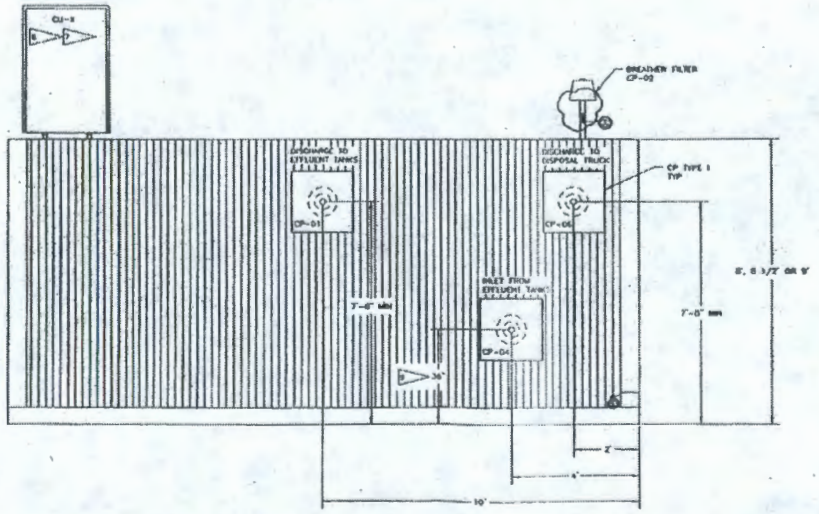
RPP-24544 REV 1





SECONDARY WASTE PUMP SKID

PLAN VIEW (ROOF REMOVED)



SECONDARY WASTE PUMP SKID INTERFACES

SIDE VIEW

GENERAL NOTES:

1. REFERENCE SPECIFICATION 145579-D-SP-001 FOR DESIGN, FABRICATION, TESTING AND INSPECTION REQUIREMENTS.
2. DO NOT SCALE. ALL DIMENSIONS ARE IN INCHES AND ARE REFERENCE ONLY UNLESS OTHERWISE SPECIFIED.
3. THIS ARRANGEMENT DRAWING IS PROVIDED TO ILLUSTRATE THE GENERAL REQUIRED CONFIGURATION. LOCATION OF SPECIFIC PIPING AND EQUIPMENT WILL BE PROVIDED BY THE SELLER ON FABRICATION DRAWINGS FOR BUYER APPROVAL. LOCATION OF SPECIFIC ITEMS MAY BE ADJUSTED TO ACCOMMODATE FABRICATION AND FUNCTIONAL REQUIREMENTS.
4. FOR SIMPLICITY AND CLARITY, INTERNAL AND EXTERNAL LIGHTING AND ASSOCIATED EQUIPMENT ARE NOT SHOWN (SEE SPECIFICATION FOR LIGHTING REQUIREMENTS).
5. MOUNT UNIT PER MANUFACTURERS RECOMMENDATIONS.
6. SEAL REFRIGERANT PIPING AND CONDUIT PENETRATIONS THROUGH CONTAINER WALL WITH RTV. INSULATE SUCTION LINE WITH 3/4" THICK CLOSED CELL FOAM PIPE INSULATION.
7. MOUNT CONDENSING UNIT ON UNISTRUT CHANNEL WELDED TO ROOF OF CONTAINER.
8. WALL MOUNT AC-1 APPROX 6'-6" ABOVE FLOOR.
9. CRITICAL DIMENSION.
10. LABEL OUTSIDE OF JUNCTION BOX COVER AS FOLLOWS: "CAUTION: THREE 480VAC SOURCES PRESENT."
11. AREA DESIGNATED FOR FUMED HOOD AIR SAMPLER TO BE INSTALLED BY BUYER. AREA SHALL SPAN FROM FLOOR TO 3'-0" ABOVE FLOOR MINIMUM.
12. DOUBLE DOORS MAY BE LOCATED ON EITHER END OF PUMP SKID, FILTERS SHALL BE LOCATED JUST INSIDE THE DOUBLE DOORS.
13. SEE DRAWING DBVS-SK-M103 FOR CP PENETRATION DETAILS

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145579-FINAL DBVS DESIGN

U.S. DEPARTMENT OF ENERGY
Office of River Protection

SECONDARY WASTE PUMP SKID CONTAINER INTERFACES

DBVS-SK-M001 C

REV	DATE	DESCRIPTION
C		RELEASED WITH SPECIFICATION 145579-D-SP-011 REV 0
B		ISSUED FOR COMMENT

DRAWING TRACEABILITY LIST

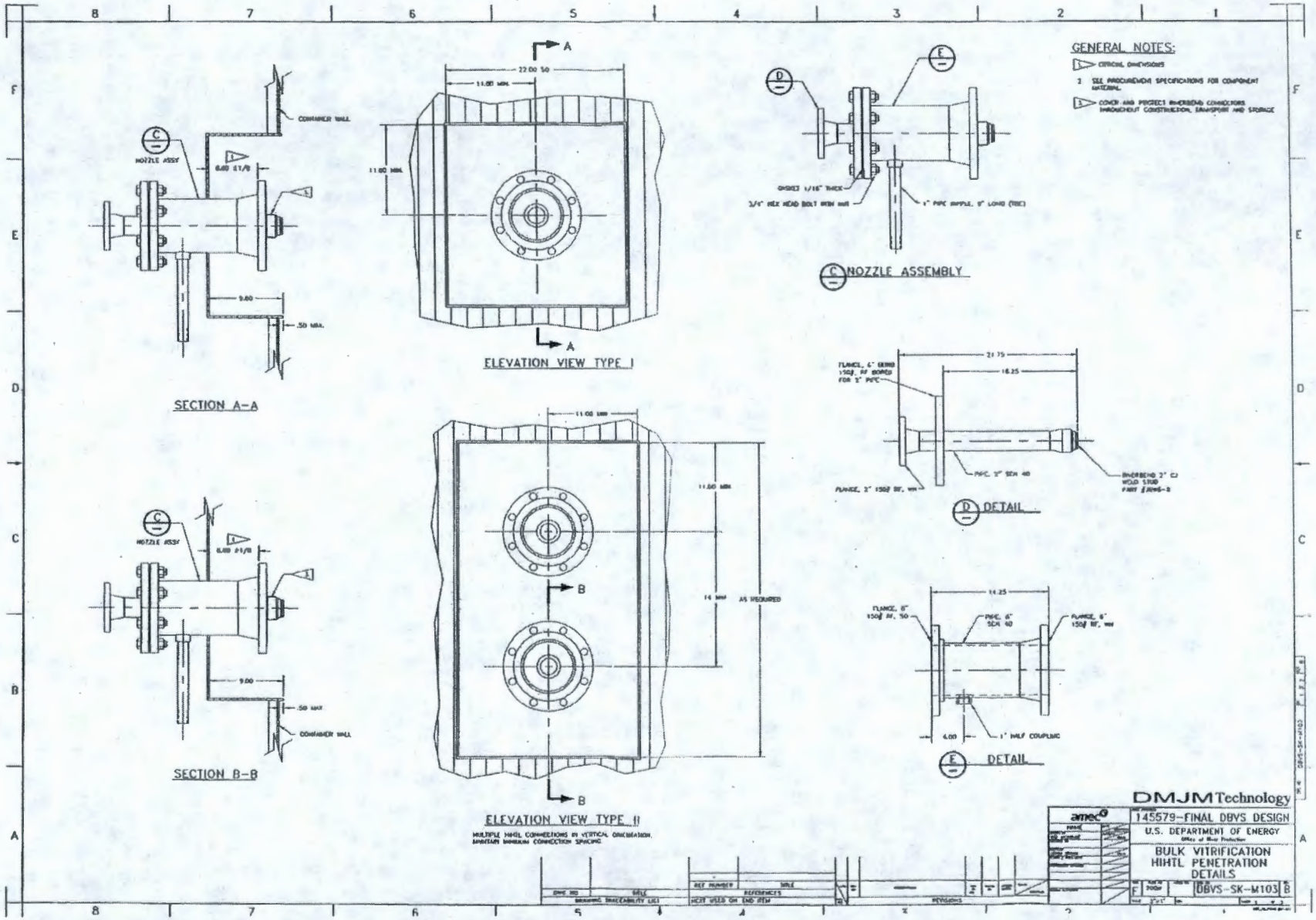
DWG NO	TITLE	DEV NUMBER	TITLE

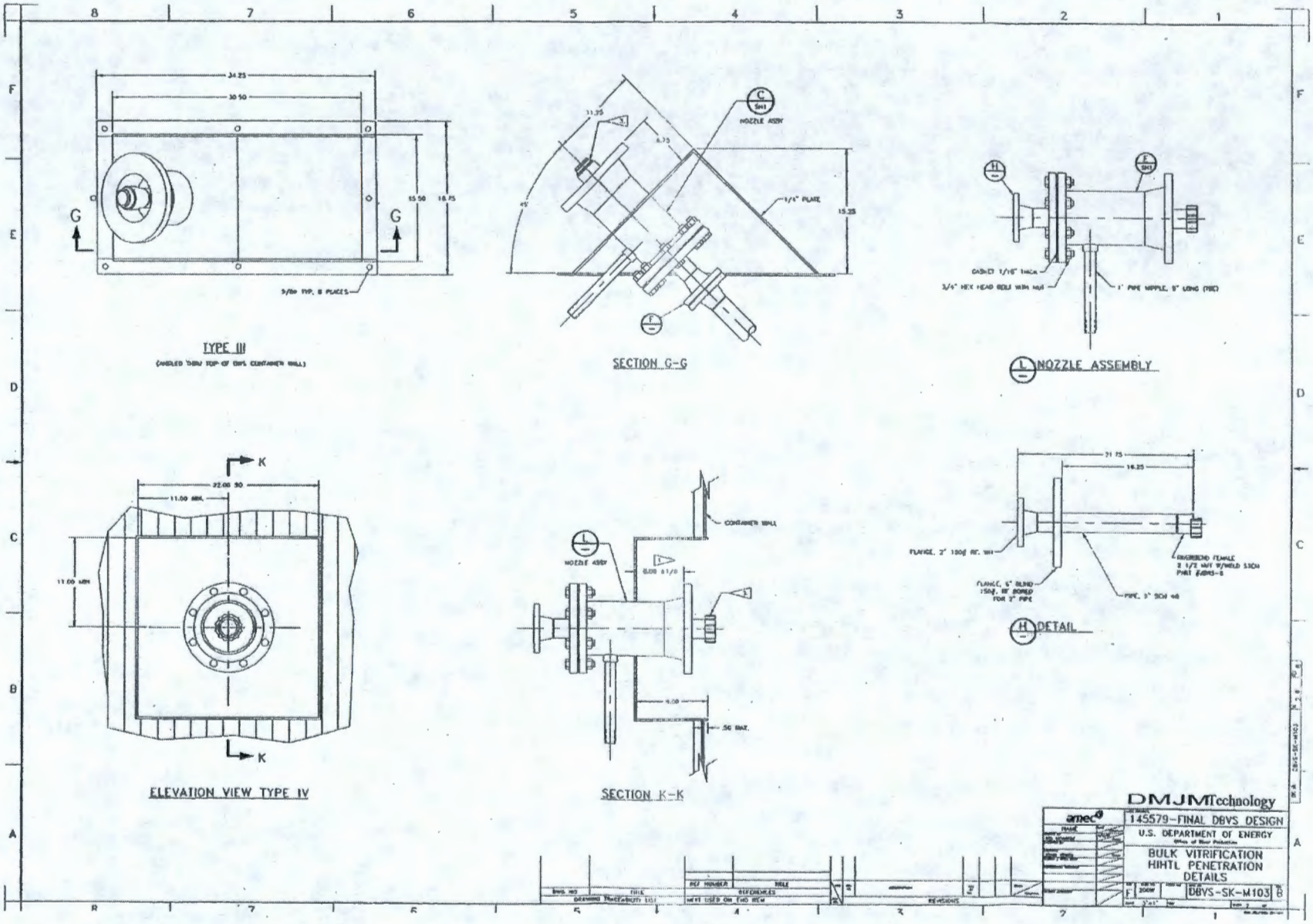
REFERENCES

NEXT USER ON DWG NEW

REVISIONS

G3-123


GENERAL NOTES:
1 CRITICAL DIMENSIONS
2 SEE PROCUREMENT SPECIFICATIONS FOR COMPONENT MATERIAL
3 COVER AND PROTECT INHERENT CONNECTORS THROUGHOUT CONSTRUCTION, TRANSPORT AND STORAGE
SECTION A-A
SECTION B-B
ELEVATION VIEW TYPE I
ELEVATION VIEW TYPE II
MULTIPLE HIHTL CONNECTIONS IN VERTICAL ORIENTATION, MAINTAIN MINIMUM CONNECTION SPACING
NOZZLE ASSY
CONTAINER WALL
NOZZLE ASSEMBLY
DETAIL
DETAIL
DMJM Technology
145579-FINAL DBVS DESIGN
U.S. DEPARTMENT OF ENERGY
BULK VITRIFICATION HIHTL PENETRATION DETAILS
DBVS-SK-M103
B


TYPE III
SECTION G-G
NOZZLE ASSEMBLY
ELEVATION VIEW TYPE IV
SECTION K-K
DETAIL
DMJMTechnology
145579-FINAL DBVS DESIGN
U.S. DEPARTMENT OF ENERGY
BULK VITRIFICATION
HIHTL PENETRATION
DETAILS
DBVS-SK-M103

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DMM technology

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Appendix C

Data Sheets

Title	Number of Pages
Cover Page	1
Container Air Conditioner	1
Container Cooling Condenser	1
Container Heating Unit	1
Effluent 5-micron Filter Housings	1
Y-Filter	1
Effluent Pumps	1
Quick Disconnects	1
Distribution Panel	1
Fluorescent Lighting Fixtures	1
High Pressure Sodium Lighting Fixtures	1
Local Control Station	1
Nonfused Disconnect Switch	1
Single-Phase Transformer	1
Flow Indicator Transmitter (VORTEX)	1
Differential Pressure Indictor Transmitter	1
Manual Valve (2-Way)	1
Manual Valve (3-Way)	1
Pneumatically Controlled Valve (2-Way)	1
3-Valve Manifold	1
Gauge Valve	1
Reduced Pressure Backflow Preventer	1
Total Data Sheet Pages	22

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RPP-24544 REV 1

amec

Container Air Conditioner					SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION		SHEET 1	OF 1	DATE 3/22/2005
					BY CEG	CHKD	APPR.
					P.O.		
					REQ.		

Project: Final DBVS Design

1. Fluid	Indoor Ambient Air	16. MFR.	Mitsubishi
2. Temperature Dry Bulb	85 F	17. Model No.	Seller Selected
3. Temperature Wet Bulb	67 F		
4. Outdoor Temp. Dry Bulb	115 F		
5. Total Capacity	Seller Selected (Assume 20,000 BTU/hr for bid)		
6. Sensible Capacity	Seller Selected		
7. Air Flow	Seller Selected		
8. Fan RPM	Seller Selected		
9. Voltage	120		
10. Hertz	60		
11. Phase	1		
12. Full Load Amps	Seller Selected		
13. Minimum Ampacity	Seller Selected		
14. Max Fuse Size	Seller Selected		
15. Thermostat	Remote Controller	18. Supplier	Thermal Supply Inc.
		19. Address	Kennewick, WA
		20. Phone	(509) 783-0140
		21. Fax	(509) 783-1223

Rev.	Tag. No.	Line no./Equip.	P&ID	Dia. Seal Mat'l	T° Max.	Temperature Norm.	Max.	Range	Service	Notes
	37-AC-018		F-145579-37-A-0100			85	95	68 - 95	DBVS SWPS COOLING	

NOTES

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011 (Data Sheets) V.0

RPP-24544 REV 1

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Container Cooling Condenser				SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION	SHEET 1	OF 1	DATE 3/22/2005
				BY CEG	CHK'D	APPR.
				P.O.		
				REQ.		

Project: Final DBVS Design

1. Fluid	Outdoor Ambient Air	16. MFR.	Mitsubishi
2. Temperature Dry Bulb	115 F	17. Model No.	Seller Selected
3. Temperature Wet Bulb	65 F		
4. Capacity	Seller Selected (Assume 20,000 BTU/hr for bid)		
5. Air Flow	Seller Selected		
6. Fan RPM	Seller Selected		
8. Voltage	240		
9. Hertz	60		
10. Phase	1		
11. Minimum Ampacity	Seller Selected		
12. Fan Motor	Seller Selected		
13. Compressor RLA	Seller Selected		
14. Crankcase Heater	Seller Selected		
15. Max Fuse Size	Seller Selected	18. Supplier	Thermal Supply Inc.
		19. Address	Kennewick, WA
		20. Phone	(509) 783-0140
		21. Fax	(509) 783-1223

Rev.	Tag. No.	Line no. /Equip.	P&ID	Dia.Seal Matr1	1" Max.	Temperature Norm.	Max.	Range	Service	Notes
	37-CU-016		F-145579-37-A-0100			50	115		DBVS SWPS COOLING	

NOTES

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011_(Data_Sheets).XLS

RPP-24544 REV 1

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Container Heating Unit				SPEC. No. 145579-D-SP-011	
NO.	BY	DATE	REVISION	SHEET 1 OF 1	DATE 3/22/2005
				BY CEG / CHK'D	APPR.
				P.O.	
				REQ.	

Project: Final DBVS Design

1. Fluid	Indoor Ambient Air	16. MFR.	Chromalox
2. Flow	Seller Selected	17. Model No.	
3. Capacity	Seller Selected (Assume 15,000 BTU/hr for bid)		
4. Fan RPM	Seller Selected		
5. Fan HP	Seller Selected		
6. Temp. Rise	Seller Selected		
7. Voltage	120 or 480		
8. Hertz	60		
9. Phase	3		
10. Full Load Amps	Seller Selected		
11. Thermostat	Internal, Set Point 40 F		
12. Transformer	Internal, 24 V		
13. Disconnect Switch	Internal, Seller Selected Amps	18. Supplier	Valin Northwest
		19. Address	Bellevue, WA
		20. Phone	(800) 634-5573
		21. Fax	(425) 885-5579

Rev.	Tag. No.	Line no. /Equip.	P&ID	Dia.Seal Matrl	T* Max.	Temperature Norm.	Max.	Range	Service	Notes
	UH-XXX		F-143643-37-A-0100			40	*		LES SKID HEATING	

NOTES

*: Seller Selected

S20.41

* information supplied by manufacturer unless already specified

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Effluent 5-Micron Filter Housings					SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION		SHEET 1	OF 1	DATE 3/22/2005
					BY CEG	CHK'D	APPR.
					P.O.		
					REQ.		

Project: Final DBVS Design

1. Material	Stainless Steel/Polypropoylene	8. MFR.	Ronningen-Petter
2. Filter Median	5 Micron Absolute	9. Model No.	See details in notes.
3. Inlet/Outlet Conn.	2" 150# RF Flange	10. Max Flow	70 gpm through two units (35 gpm each)
4. Body/Sump Drain	Seller Selected	11. Operating Pressure	
5. Vent	Seller Selected	12. Design Pressure	Seller Determined, but not < 150 psig
6. Gauge	Seller Selected		
		13. Operating Temp	50 F - 100 F
7. Housing O-Ring	Seller Selected	11. Design Temp	40 F - 150 F
		12. pH	7 TO >13
Code:	ASME Code Sec. VIII, Division I, Stamped		
		10. Supplier	Whitney Equipment Company, Inc.
		11. Address	Vancouver, WA
		12. Phone	(360) 694-9175
		13. Fax	(360) 695-2389

Rev.	Tag. No.	Line no. /Equip.	P&ID	Dia.Seal Mat'l	T° Max.	Pressure Norm.	Pressure Max.	Pressure Range	Service	Notes
	32-N02-XXXX		F-145579-37-A-0100		150 F	*	20 psid		Condensate (Water), Dilute Caustic, & Dilute Acid[2]	

NOTES

Filter Housing: Max-Load RP-740.

Filter: Max-Load 700 Series, 5 Micron. Minimum surface area of 185 ft2/Assembly.

1. Minimum filter Dp at nominal flow shall be 1 to 5 psid. Maximum filter Dp at nominal flow shall be 20 psid.
2. Filter housing shall be designed for bag-out of filter element with housing angled at least 10degrees from horizontal minimize dripping during bag-out.

<: Seller Selected

S20.41

* information supplied by manufacturer unless already available

RPP-24544 REV 1

amec

Y-Filter				SPEC. No. 145579-D-SP-011	
NO.	BY	DATE	REVISION	SHEET 1 OF 1	DATE 3/22/2005
				BY CEG / CHK'D	APPR.
				P.O.	
				REQ.	

Project: Final DBVS Design

1. Material: Seller Selected
2. Filter Median: Seller Selected (Note 1)
3. Inlet/Outlet Conn.: 2" 150# RF Flange
4. Body/Sump Drain: Seller Selected
5. Vent: N/A
6. Gauge: N/A
7. Housing O-Ring: Seller Selected

Code: ASME Code Sec. VIII, Division I, Stamped

8. MFR.: Seller Selected
9. Model No.: Seller Selected
10. Max Flow: 70 gpm
11. Operating Pressure:
12. Design Pressure: Seller Determined between 150 and 375 psig
13. Operating Temp: 50 F - 100 F
14. Design Temp: 40 F - 150 F
15. pH: 7 TO >13
16. Supplier:
17. Address:
18. Phone:
19. Fax:

Rev.	Tag. No.	Line no. /Equip.	P&ID	Dia.Seal Matr'l	T° Max.	Pressure* Norm.	Pressure* Max.	Pressure* Range	Service	Notes
	STR-001		F-145579-37-A-010		150 F	*	*		Condensate (Water), Dilute Caustic, & Dilute Acid[2]	
	STR-002		F-145579-37-A-010		150 F	*	*		Condensate (Water), Dilute Caustic, & Dilute Acid[2]	

NOTES

1. Seller shall select filter screen size to protect pump from construction debris during startup testing. The Seller may chose to provide a spoolpiece to replace the Y-Filter housing during normal operation.

*: Seller Selected

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011 (Data Sheet) V1.0

RPP-24544 REV 1

amec

Effluent Pumps				SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION	SHEET 1	OF 1	DATE 3/22/2005
				BY CEG	CHK'D	APPR.
				P.O.		
				REQ.		

Project: Final DBVS Design

1. Fluid: Condensate (Water), Dilute Caustic, & Dilute Acid
2. Pump Case: Stainless steel
3. Insulation: Class F or better
4. TDH: Seller Selected
5. Impeller/Shaft: Stainless steel
6. Frame: Seller Selected
7. Capacity: Seller Selected
8. Gaskets/O-rings: Seller Selected
9. Stator Fill: Seller Selected
10. Liners: Stainless steel
11. Operating Temperature: 35 F to 150 F
12. Voltage: 480 V
13. Hertz: 60 Hz
14. Phase: 3
15. RPM: Seller Selected
16. Design Temperature: 150 F
17. Design Pressure: Seller Selected
18. MFR.: CHEMPUMP
19. Model No.: GVHS (Seller to determine specific model)
20. Motor: Seller Selected
21. Design Power: Seller Selected
22. Inlet head loss: Seller Selected
23. Discharge head loss: Seller Selected

22. Supplier: CHEMPUMP
23. Address: Warrington, PA
24. Phone: (215) 343-6000
25. Fax: (215) 343-8543

Rev.	Tag. No.	Line no. /Equip.	P&ID	Dia.Seal Matr1	T° Max.	Pressure (psi) Norm.	Max.	Range	Service	Notes
	37-D61-002		F-143643-37-A-0100		150 F	*	*		Condensate (Water), Dilute Caustic, & Dilute Acid	
	37-D61-003		F-143643-37-A-0100		150 F	*	*		Condensate (Water), Dilute Caustic, & Dilute Acid	

NOTES

*: Seller Selected

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011 (Data Sheet) V.5

amec

Quick Disconnects				SPEC. No. 145579-D-SP-011	
NO.	BY	DATE	REVISION	SHEET 1 OF 1	DATE 3/22/2005
				BY CEG / CHK'D	APPR.
				P.O.	
				REQ.	

Project: Final DBVS Design

1. Type: "Andrews" / "Boss-Lock" Type A Adapters
2. Material: SS

Coupling

3. Size: 2 in
4. Overall Length: Seller Selected
5. Adapter Length: Seller Selected
6. Distance Across Flats: Seller Selected

Dust Cap

7. Type: Seller Selected
8. Material: SS
9. Size: Seller Selected
10. Overall Length: Seller Selected
11. Coupler Length: Seller Selected
12. Distance Across Closed Cam Arms: Seller Selected
13. Distance Across Open Cam Arms: Seller Selected
14. MFR.: DIXON VALVE & COUPLING
15. Model No.: Seller Selected
16. Supplier: DIXON VALVE & COUPLING
17. Address: PORTLAND, OR
18. Phone: (503) 289-0400
19. Fax: -

Rev.	Tag. No.	Line no. /Equip.	P&ID	Dia.Seal Matr1	T° Max.	Pressure Norm.	Pressure Max.	Pressure Range	Service	Notes
	QD-XXX		F-143643-37-A-0100		150 F	*	*	*	Water	

NOTES

1. Also order Dixon "EZ Boss-Lock" Dust Cap for QD

*: Seller Selected

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011 (Data Sheets).XLS

amec

Distribution Panel				SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION	SHEET 1	OF 1	DATE 3/22/2005
				BY CEG	CHK'D	APPR.
				P.O.		
				REQ.		

Project: Demonstration Bulk Vitrification Project

1. Volts	120/240V ac, single-phase	9. MFR.	Seller Selected
2. Amps	Seller Selected	10. Model No.	Seller Selected
3. Breaker type	Bolt-on		
4. Main Breaker	yes		
4.a. Amps (trip)	Seller Selected		
4.b. MFR	Seller Selected		
4.c. Model No.	Seller Selected		
5. Therm. Mag. breakers	yes		
5.a. MFR	Seller Selected		
5.b. Model No.	Seller Selected		
6. GFCI breakers	yes		
6.a. MFR	Seller Selected		
6.b. Model No.	Seller Selected		
7. GFPE breakers	yes		
7.a. Quantity	1		
7.b. Amps (trip)	50	11. Supplier	Seller Selected
7.c. MFR	Seller Selected	12. Address	
7.d. Model No.	Seller Selected	13. Phone	
8. Documentation	detailed panel schedule, inside door	14. Fax	

Rev.	*Tag. No.	Line no. /Equip.	P&ID						Service	Notes

NOTES

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011 (Data Sheet) M.S.

amec

Fluorescent Lighting Fixtures				SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION	SHEET 1	OF 1	DATE 3/22/2005
				BY CEG	CHK'D	APPR.
				P.O.		
				REQ.		

Project: Demonstration Bulk Vitrification Project

1. Volts	120V ac	9. MFR.	Seller Selected
2. Watts	Seller Selected	10. Model No.	Seller Selected
3. Quantity	Seller Selected		
4. Fixture type	Fluorescent		
5. Lamp Type	Seller Selected		
6. Ballast	Rapid start, cold weather		
7. Diffuser	High-impact, vapor-tight, hinged or latched to housing		
8. Mounting	Wall or ceiling (surface)		
		11. Supplier	Seller Selected
		12. Address	
		13. Phone	
		14. Fax	

Rev.	*Tag. No.	Line no. /Equip.	P&ID						Service	Notes

NOTES

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011 (Data Sheets).XLS

RPP-24544 REV 1

amec

High Pressure Sodium Lighting Fixtures				SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION	SHEET 1	OF 1	DATE 3/22/2005
				BY CEG	CHKD	APPR.
				P.O.		
				REQ.		

Project: Demonstration Bulk Vitrification Project

1. Volts	120V ac	9. MFR.	Seller Selected
2. Watts	Seller Selected	10. Model No.	Seller Selected
3. Quantity	Seller Selected		
4. Lamp type	High Pressure Sodium (low wattage)		
5. Ballast	Integral, rated for temperature range of -15 deg F to 115 deg F		
6. Reflector/diffuser	Assymetric, cut-off type (low glare)		
7. Mounting	Wall		
8. Options	Integral photocell control		
		11. Supplier	Seller Selected
		12. Address	
		13. Phone	
		14. Fax	

Rev.	*Tag. No.	Line no. /Equip.	P&ID						Service	Notes

NOTES

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011_(Data_Sheets).XLS

amec

TECHNICAL DATA SHEETS

PROJECT:	Final DBVS Design	145579-D-SP-011	
PROJECT NO.:	145579	Local Control Station	
CLIENT:	AMEC E&E - Richland Washington		

No. Required	TBA	Area	
PFD #		Stream No.	
		Quality Assurance Level	Commercial

Operating Conditions			Rev				Rev
Location (Indoors/Outdoors)	Outdoors			Operation - Days per year		365	
Operation (continuous/intermittent)	Continuous			- Hours per day		24	
Max. Ambient Air Temp. (°F)	115			Availability	%	90	
Min Ambient Air Temp. (°F)	-25			Elevation (ft)		663	
Equipment Numbers	See Note 2			Environment - Radioactive		Yes	
				- Toxic		No	
				- Corrosive		No	
				- Flammable		No	

Equipment data		A-B Part #	Materials		
Enclosure (surface mount))	NEMA 4	800T-4TZ	Enclosure	Die Cast	
Dielectric strength (> 1 minute)	>1000V		Standard Legend Plate	Aluminum	
Push Button-red (1N.O+1N.C.) "Start"	Momentary	800T-A6A			
Push Button-green (1N.O+1N.C.) "Stop"	Momentary	800T-A1A			
Pilot light -red (120VAC, LED type with transfo	Running	800T-P16R			
Pilot light -green (120VAC, LED type with trans	Ready	800T-P15G			
Standard legend plate - START		800T-X566			
Standard legend plate - STOP		800T-X567			
Voltage (continuous) (v)	120				
Ampere (max continuous rate) (A)	10				
Approvals UL Listed					

Finish			Enclosure Layout		
By VENDOR (Yes/No)	Yes		Conduit entries (bottom only) *		
Painting - External *					
- Internal *					

Comments/Notes:

1) All items with an * shall be filled in by the VENDOR
2) Allen-Bradley Catalog have been indicated. Approved equals may be submitted

Date	14-Oct-04						
By	GC						
Chked	JDM						
Rev.	A						

RPP-24544 REV 1

amec

Nonfused Disconnect Switch				SPEC. No. 145579-D-SP-011		
NO.	BY	DATE	REVISION	SHEET 1	OF 1	DATE 3/22/2005
				BY CEG	CHK'D	APPR.
				P.O.		
				REQ.		

Project: Demonstration Bulk Vitrification Project

1. Volts: 480V ac
2. Amps (frame): Seller Selected
3. Poles: Seller Selected
4. Enclosure: NEMA 4
5. Options: 1 NO, 1 NC auxiliary contact (motor disconnects only)
6. MFR.: Seller Selected
7. Model No.: Seller Selected
8. Supplier: Seller Selected
9. Address:
10. Phone:
11. Fax:

Rev.	*Tag. No.	Line no. /Equip.	P&ID						Service	Notes

NOTES

S20.41

* Information supplied by manufacturer unless already specified

145579-D-SP-011 (Data Sheets).XLS

RPP-24544 REV 1

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Single-Phase Transformer				SPEC. No. 145579-D-SP-011	
NO.	BY	DATE	REVISION	SHEET 1 OF 1	DATE 3/22/2005
				BY CEG / CHK'D	APPR.
				P.O.	
				REQ.	

Project: Demonstration Bulk Vitrification Project

1. Volts: 480-120/240V ac, single-phase
2. kVA: Seller Selected
3. Coil material: copper
4. Temperature rise: 115 deg C (min)
5. Enclosure: NEMA 1 (min)
6. MFR.: Seller Selected
7. Model No.: Seller Selected
8. Supplier
9. Address
10. Phone
11. Fax

Rev.	Tag. No.	Line no. /Equip.	P&ID						Service	Notes

NOTES

S20.41

* information supplied by manufacturer unless already specified

145579-D-SP-011_(Data_Sheets).XLS

amec AMEC E&C Services Limited Trail, BC Canada

Instrumentation Data Sheet

ASSET NUMBER: 145579-D-SP-011 TAG NUMBER: 37-FIT-002

SUBJECT:	Flow Indicator Transmitter (VORTEX)		
SERVICE:	Secondary Waste Pump/Loadout Skid		
SUPPLIER:	CB Engineering Pacific Inc. (Mike		
MAKE:	Yokagawa	P.O. No.:	
MODEL:	DY Vortex Flowmeter	P&ID No.:	145579-37-A-0100

TRANSMITTER

		Power Supply:	24VDC
Model No.:	DY040-EAMBS1-2D/MV	Output:	4-20 mA Isolated
Range:	5.7 – 193.7 GPM	Relay Output:	NA
Calibrated Range:	6 – 100 GPM	Local Indication:	1.0" LCD (3 ½" Digits)
Case Material:	Aluminum alloy	Conduit Connect:	½" FNPT
Enclosure Rating:	NEMA4X	Mounting Bracket:	Integral to transducer

TRANSDUCERS

Model No.:	DY040-EAMBS1-2D/MV	
Line Material:	SS	
Line Size/Sch'd:	2" 150 psig	
Transducer Mat'L:	SS	
Process Connection:	2" 150 psig Raised Flange	
Signal Cable Length:		
Mounting.:	Vertical	
Classification:	Factory Mutual	

316SS Tags permanently affixed to instrument:

OPTIONS Accuracy 0.25% span or better
Display to read GPM

SERVICE CONDITIONS:

Line No./Size/Sch	1 ½"/ *	Max. Velocity:	
Fluid:	Water (condensate), Dilute caustic / Dilute acid	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32°F	Percent Solids:	
Temp Oper.:	85°F	Material Build-Up:	
Temp Max.:	150°F	Vibration:	
Press Oper.:	*	Line Material:	
Press Max.:	*		

NOTES:

1. The Buyer has reviewed the transmitters offered and found that the following ordering information from Yokagowa, DY040-EAMBS1-2D may be suitable. In any case, the final selection the component is the responsibility of the Seller as this is provided for information only.
2. * Seller Selected

By: RW	Chk:	Appd.	Date: 12/15/04	Project: DBVS	Rev: 0

amec AMEC E&C Services Limited Trail, BC Canada

Instrumentation Data Sheet

ASSET NUMBER: **145579-D-SP-011** TAG NUMBER: **37-PDIT-006**

SUBJECT:	Differential Pressure Indicator Transmitter		
SERVICE:	Secondary Waste Pump / Loadout Skid		
SUPPLIER:	CB Engineering Pacific Inc.(Mike Reeve)		
MAKE:	Yokogawa	P.O. No.:	
MODEL:	EJA Series	P&ID No.:	**145579-37-A-0100**

TRANSMITTER

		Power Supply:	24V dc
Model No.:	EJA110A	Output:	4-20 mA Isolated
Range:	*	Relay Output:	N/R
Calibrated Range:	*	Local Indication:	1.0" LCD (3 ½" digits)
Case Material:	Low copper cast-aluminum	Conduit Connect:	½" FNPT
Enclosure Rating:	NEMA4X	Mounting Bracket:	Integral to transducer

TRANSDUCERS

Model No.:	EJA110A-EMS5A-92DA/FF1
Line Material:	SS
Line Size/Sch'd:	¼"/*
Transducer Mat'l.:	SS
Process Connection:	¼" FNPT
Signal Cable Length:	
Mounting.:	Horizontal
Classification:	Factory Mutual

316SS Tags permanently affixed to instrument:

OPTIONS Accuracy 0.25% span or better
Display to read in "psi"

SERVICE CONDITIONS:

Line No./Size/Sch		Max. Velocity:	NA
Fluid:	Water (condensate), Dilute Caustic / Dilute Acid	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32°F	Percent Solids:	NA
Temp Oper.:	85°F	Material Build-Up:	NA
Temp Max.:	150°F	Vibration:	NA
Press Oper.:	*	Line Material:	316 SS
Press Max.:	*		

NOTES:

1. The Buyer has reviewed the transmitters offered and found that the following ordering information from Yokogawa, EJA110A-EMS5A-92DA/FF1 may be suitable. In any case, the final selection the component is the responsibility of the Seller as this is provided for information only.
2. * Seller Selected

By: RW	Chk:	Appd.	Date: 121404	Project: DBVS	Rev: 0

amec	AMEC E&C Services Limited Trail, BC Canada	Instrumentation Data Sheet	
ASSET NUMBER:	145579-D-SP-011	TAG NUMBER:	37-V-XXX
SUBJECT:	Manual Valve (2-Way)		
SERVICE:	Secondary Waste Pump / Loadout Skid		
SUPPLIER:	UNIT PROCESS COMPANY Everett, WA Phone (509)346-9920 Fax (509)346-9951		
MAKE:	FLOWTEK	P.O. No.:	
MODEL:	TRIAD Series	P&ID No.:	145579-37-A-0100

Type:	FULL PORT BALL VALVE		
Body Size:	¼" through 2 ½"		
Body Material:	STAINLESS STEEL		
Port Size:	FULL PORT		
Number of Ports:	2		
Guiding:	*		
Packing Matl. / Type	*		
Design Pressure:	*		
Design Temp:	150 °F		
Flow Rate Norm/Max:	70 GPM: / *		
Oper sp gr/Visc	1		
Crit Press/% Solids	/ <0.0% SOLIDS		

SERVICE CONDITIONS:

Line No./Size/Sch		Max. Velocity:	NA
Fluid:	Water (condensate), Dilute Caustic / Dilute Acid	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32 °F	Percent Solids:	NA
Temp Oper.:	85 °F	Material Build-Up:	NA
Temp Max.:	150 °F	Vibration:	NA
Press Oper.:	*	Line Material:	316 SS
Press Max.:	*		

NOTES:

1. * Seller Selected

By: RW	Chk:	Appd.	Date: 121504	Project: DBVS	Rev: 0

amec	AMEC E&C Services Limited Trail, BC Canada	Instrumentation Data Sheet	
ASSET NUMBER:	145579-D-SP-011	TAG NUMBER:	37-V-XXX
SUBJECT:	Manual Valve (3-Way)		
SERVICE:	Secondary Waste Pump / Loadout Skid		
SUPPLIER:	UNIT PROCESS COMPANY Everett, WA Phone (509)346-9920 Fax (509)346-9951		
MAKE:	FLOWTEK	P.O. No.:	
MODEL:	MPF150/MPF300	P&ID No.:	145579-37-A-0100

Type:	FULL PORT BALL VALVE		
Body Size:	¼" through 2 ½"		
Body Material:	STAINLESS STEEL		
Port Size:	FULL PORT		
Number of Ports:	2, T Port 90°, Pattern F or G		
Guiding:	*		
Packing Matl. / Type	*		
Design Pressure:	*		
Design Temp:	150 °F		
Flow Rate Norm/Max:	70 GPM: / *		
Oper sp gr/Visc	1		
Crit Press/% Solids	/ <0.0% SOLIDS		

SERVICE CONDITIONS:

Line No./Size/Sch		Max. Velocity:	NA
Fluid:	Water (condensate), Dilute Caustic / Dilute Acid	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32 °F	Percent Solids:	NA
Temp Oper.:	85 °F	Material Build-Up:	NA
Temp Max.:	150 °F	Vibration:	NA
Press Oper.:	*	Line Material:	316 SS
Press Max.:	*		

NOTES:

1. * Seller Selected

By: RW	Chk:	Appd.	Date: 121504	Project: DBVS	Rev: 0

amec	AMEC E&C Services Limited Trail, BC Canada	Instrumentation Data Sheet	
ASSET NUMBER:	145579-D-SP-011	TAG NUMBER:	37-HV-004
SUBJECT:	Pneumatically Controlled Valve (2-Way)		
SERVICE:	Secondary Waste Pump / Loadout Skid		
SUPPLIER:	UNIT PROCESS COMPANY Everett, WA Phone (509)346-9920 Fax (509)346-9951		
MAKE:	FLOWTEK	P.O. No.:	
MODEL:	TRIAD Series	P&ID No.:	145579-37-A-0100

Type:	FULL PORT BALL VALVE	Actuator Series:	Bray Series 92/93
Body Size:	2"	Actuator Size:	*
Body Material:	STAINLESS STEEL	Air Pressure:	80-100 psig
Port Size:	FULL PORT	Failure Position:	Closed
Number of Ports:	2	Local Position Indication:	Yes
Guiding:	*	Position Transmitter:	Yes (4-20mA)
Packing Matl. / Type	*	Manual Operation:	No
Design Pressure:	*	Design Temp:	32 °F to 150 °F
Design Temp:	150 °F		
Flow Rate Norm/Max:	70 GPM: / *		
Oper sp gr/Visc	1		
Crit Press/% Solids	/ <0.0% SOLIDS		

SERVICE CONDITIONS:

Line No./Size/Sch		Max. Velocity:	NA
Fluid:	Water (condensate), Dilute Caustic / Dilute Acid	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32 °F	Percent Solids:	NA
Temp Oper.:	85 °F	Material Build-Up:	NA
Temp Max.:	150 °F	Vibration:	NA
Press Oper.:	*	Line Material:	316 SS
Press Max.:	*		

NOTES:

1. * Seller Selected

By: RW	Chk:	Appd.	Date: 121504	Project: DBVS	Rev: 0

amec	AMEC E&C Services Limited Trail, BC Canada	Instrumentation Data Sheet	
ASSET NUMBER:	145579-D-SP-011	TAG NUMBER:	37-VB- 006A/B/C
SUBJECT:	3-Valve Manifold		
SERVICE:	Secondary Waste Pump / Loadout Skid		
SUPPLIER:			
MAKE:	SWAGELOK	P.O. No.:	
MODEL:		P&ID No.:	145579-37-A-0100

Type:	3-VALVE MANIFOLD		
Body Size:	*		
Body Material:	STAINLESS STEEL		
Port Size:	*		
Number of Ports:	2		
Guiding:	*		
Packing Matl. / Type	*		
Design Pressure:	*		
Design Temp:	150 °F		
Flow Rate Norm/Max:	70 GPM: / *		
Oper sp gr/Visc	1		
Crit Press/% Solids	/ <0.0% SOLIDS		

SERVICE CONDITIONS:

Line No./Size/Sch		Max. Velocity:	NA
Fluid:	Water (condensate), Dilute Caustic / Dilute Acid	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32 °F	Percent Solids:	NA
Temp Oper.:	85 °F	Material Build-Up:	NA
Temp Max.:	150 °F	Vibration:	NA
Press Oper.:	*	Line Material:	316 SS
Press Max.:	*		

NOTES:

1. * Seller Selected

By: RW	Chk:	Appd.	Date: 121504	Project: DBVS	Rev: 0

amec	AMEC E&C Services Limited Trail, BC Canada	Instrumentation Data Sheet	
ASSET NUMBER:	145579-D-SP-011	TAG NUMBER:	37-VB-003
SUBJECT:	Gauge Valve		
SERVICE:	Secondary Waste Pump / Loadout Skid		
SUPPLIER:			
MAKE:	SWAGELOK	P.O. No.:	
MODEL:	SS-6PNBGXX-XX	P&ID No.:	145579-37-A-0100

Type:	Gauge Valve, Ball Tip Design		
Body Size:	*		
Body Material:	STAINLESS STEEL		
Port Size:	*		
Number of Ports:	2		
Guiding:	*		
Packing Matl. / Type	*		
Design Pressure:	*		
Design Temp:	150 °F		
Flow Rate Norm/Max:	70 GPM: / *		
Oper sp gr/Visc	1		
Crit Press/% Solids	/ <0.0% SOLIDS		

SERVICE CONDITIONS:

Line No./Size/Sch		Max. Velocity:	NA
Fluid:	Water (condensate), Dilute Caustic / Dilute Acid	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32 °F	Percent Solids:	NA
Temp Oper.:	85 °F	Material Build-Up:	NA
Temp Max.:	150 °F	Vibration:	NA
Press Oper.:	*	Line Material:	316 SS
Press Max.:	*		

NOTES:

1. * Seller Selected

By: RW	Chk:	Appd.	Date: 121504	Project: DBVS	Rev: 0

amec	AMEC E&C Services Limited Trail, BC Canada	Instrumentation Data Sheet	
ASSET NUMBER:	145579-D-SP-011	TAG NUMBER:	37-D58-022
SUBJECT:	Reduced Pressure Backflow Preventer		
SERVICE:	Secondary Waste Pump / Loadout Skid		
SUPPLIER:	North Pacific Marketing, Inc. 2514 100th Ave. Bellevue, WA 98004 (425)454-6660		
MAKE:	Conbraco	P.O. No.:	
MODEL:	40-20X-2TS (Seller to Select Size)	P&ID No.:	145579-37-A-0100

Type:	Reduced Pressure		
Body Size:	1"		
Body Material:	STAINLESS STEEL		
Port Size:	*		
Number of Ports:	2		
Guiding:	*		
Packing Matl. / Type	*		
Design Pressure:	*		
Design Temp:	150 °F		
Flow Rate Norm/Max:	20 GPM/50 GPM		
Oper sp gr/Visc	1		
Crit Press/% Solids	/ <0.0% SOLIDS		

SERVICE CONDITIONS:

Line No./Size/Sch		Max. Velocity:	NA
Fluid:	Filtered Waster	Spec. Gravity:	1.0
Flow:	None	Acidity:	NA
Temp Min.:	32 °F	Percent Solids:	NA
Temp Oper.:	85 °F	Material Build-Up:	NA
Temp Max.:	150 °F	Vibration:	NA
Press Oper.:	*	Line Material:	316 SS
Press Max.:	*		

NOTES:

1. * Seller Selected

By: RW	Chk:	Appd.	Date: 121504	Project: DBVS	Rev: 0

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DATUM technology

amec

TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Appendix D

Secondary Waste Pump Skid Hydraulic Model Data

(5 pages)

Table D-1: Secondary Waste Pump Skid Hydraulic Model Data

Location (From/To)	Reference Lengths	Reference Elevation @ CPs	Piping Segment Description
Tank 1 Outlet to Pumps			
SWS storage tank level	N/A	1.70 ft	N/A, waste reference level in the tank.
SWS storage Tank 1, outlet nozzle	1 ft	1.31 ft/1.43 ft	Tank bottom nozzle, 2-in. weldolet, two each 45 degree bends and 2-in. Schedule 40 seamless pipe.
Tank 1 tank piping, tank outlet	1 ft	1.43 ft/1.43 ft	2-in. Schedule 40 seamless pipe, with one each 2-way ball valve (FP) in "bypass" position and one each HIHTL penetration.
HIHTL, Tank 1 to Tank 2	16 ft	1.43 ft/1.43 ft	2-in. hose.
Tank Skid 2 outlet piping	2 ft	1.43 ft/1.43 ft	2-in. Schedule 40 seamless pipe, with one each 3-way ball valve (FP) in "through" position and two each HIHTL penetrations.
HIHTL, Tank 2 to Tank 3	16 ft	1.43 ft/1.43 ft	2-in. hose.
Tank 3 outlet piping	2 ft	1.43 ft/1.43 ft	2-in. Schedule 40 seamless pipe, with one each 3-way ball valve (FP) in "through" position and two each HIHTL penetrations.
HIHTL, Tank 3 to Tank 4	16 ft	1.43 ft/1.43 ft	2-in. hose.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table D-1: Secondary Waste Pump Skid Hydraulic Model Data

Location (From/To)	Reference Lengths	Reference Elevation @ CPs	Piping Segment Description
Tank Skid 4 outlet piping	2 ft	1.43 ft/1.43 ft	2-in. Schedule 40 seamless pipe, with one each 3-way ball valve (FP) in "through" position and two each HIHTL penetrations.
HIHTL, Tank 4 to Tank 5	16 ft	1.43 ft/1.43 ft	2-in. hose.
Tank 5 outlet piping	2 ft	1.43 ft/1.43 ft	2-in. Schedule 40 seamless pipe, with one each 3-way ball valve (FP) in "through" position and two each HIHTL penetrations.
HIHTL, Tank 5 to Tank 6	16 ft	1.43 ft/1.43 ft	2-in. hose.
Tank 6 outlet piping	2 ft	1.43 ft/1.43 ft	2-in. Schedule 40 seamless pipe, with one each 3-way ball valve (FP) in "through" position and two each HIHTL penetrations.
HIHTL, Tank 6 to pump skid	61 ft	1.43 ft/3 ft	2-in. hose.
Pump skid piping, pump suction	Determined by the Seller	Determined by the Seller	2-in. Schedule 40 seamless pipe, two each 2-way ball valve (FP), one each 3-way ball valve (FP) in "through/bypass" position, one each Tee with flow straight through, and one each HIHTL penetration. The Seller to determine number of 90 degree pipe bend.
Canned motor pump	N/A	Determined by the Seller	Canned motor pump.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table D-1: Secondary Waste Pump Skid Hydraulic Model Data

Location (From/To)	Reference Lengths	Reference Elevation @ GPs	Piping Segment Description
Pump to Tank Truck			
Pump skid piping, pump discharge to skid connection point	Determined by the Seller	Determined by the Seller	2-in. Schedule 40 seamless pipe, one each 3-way ball valve (FP) in "bypass/through" position, one each 3-way ball valve (FP) in "bypass" position, one each 3-way ball valve (FP) in "through" position, nine each 2-way ball valve (FP), six each Tees with flow through branches, one each Yokagawa flow element, and one each HIHTL penetration. The Seller to determine number of 90 degree pipe bend.
HIHTL, pump skid to stanchion	85 ft	≥3.2 ft/1.58 ft	2-in. hose.
Tanker fill pipe	30 ft	13 ft	2-in. Schedule 40 seamless pipe, one each 2-way ball valve (FP), two each 90 degree 5D bends,

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table D-1: Secondary Waste Pump Skid Hydraulic Model Data

Location (From/To)	Reference Lengths	Reference Elevation @ CPs	Piping Segment Description
Pump to Tank 4 Inlet			
Pump skid piping, pump discharge to connection point	Determined by the Seller	Determined by the Seller	2-in. Schedule 40 seamless pipe, four each 2-way ball valve (FP), three each 3-way ball valve (FP), five each Tee, seven each 90 degree 5D bends, one each Yokagawa flow element, and one each HIHTL penetration. The Seller to determine number of 90 degree pipe bend.
HIHTL, pump skid to Receipt Tank 6	20 ft	≥3.2 ft/11 ft	2-in. hose.
Tank 6, recirculation piping	2 ft	11 ft/11 ft	2-in. Schedule 40 seamless pipe, with one each 3-way ball valve (FP) in "through" position and two each HIHTL penetration.
HIHTL, Tank 6 to Tank 5	16 ft	11 ft/11 ft	2-in. hose.
Tank 5, recirculation piping	2 ft	11 ft/11 ft	2-in. Schedule 40 seamless pipe, with one each 3-way ball valve (FP) in "through" position and two each HIHTL penetration.
HIHTL, Tank 5 to Tank 4	16 ft	11 ft/11 ft	2-in. hose.
Tank 4, recirculation piping	2 ft	11 ft/11 ft	2-in. Schedule 40 seamless pipe, with one each 2-way ball valve (FP) in "through" position and one each HIHTL penetration.
HIHTL, Tank 4 to Tank 3	16 ft	11 ft/11 ft	2-in. hose.

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Table D-1: Secondary Waste Pump Skid Hydraulic Model Data

Location (From/To)	Reference Lengths	Reference Elevation @ CPs	Piping Segment Description
Tank 3, recirculation piping	2 ft	11 ft/11 ft	2 in. Schedule 40 seamless pipe, with one each 2-way ball valve (FP) in "through" position and one each HIHTL penetration.
HIHTL, Tank 3 to Tank 2	16 ft	11 ft/11 ft	2-in. hose.
Tank 2, recirculation piping	2 ft	11 ft/11 ft	2-in. Schedule 40 seamless pipe, with one each 2-way ball valve (FP) in "through" position and one each HIHTL penetration.
HIHTL, Tank 2 to Tank 1	16 ft	11 ft/11 ft	2-in. hose.
Tank 1, recirculation piping	1 ft	11 ft/11 ft	2-in. Schedule 40 seamless pipe, with one each 2-way ball valve (FP) in "bypass" position and one each HIHTL penetration.
Tank 1, recirculation inlet piping	2.5 ft	11 ft/8.5 ft	2-in. Schedule 40 seamless pipe.

FP = full port.

HIHTL = hose-in-hose transfer line.

N/A = Not applicable.

SWS = Secondary Waste System.

Notes:

[a]2-in. HIHTL is 2.0 in. ID, fabricated from ethylene propylene diene monomer (EPDM) with Hazen-Williams coefficient of 140 for the specified hose material.

[b]The HIHTL to container penetration can be simulated as a 22-in.-long, 2-in.-diameter Schedule 40 seamless pipe as shown on Sketch DBVS-SK-M003 (Appendix B).

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Appendix E

TFC-ESHQ-Q_C-C-03, Revision B, *Control of Suspect/Counterfeit Items*

(53 pages including cover)

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USQ #03-1456-S

CH2M HILL Hanford Group, Inc.	Manual	ESHQ
	Document	TFC-ESHQ-Q_C-C-03, REV B
CONTROL OF SUSPECT/ COUNTERFEIT ITEMS	Page	1 of 52
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1.0 PURPOSE AND SCOPE
(7.1.1, 7.1.2, 7.1.3, 7.1.4)

This procedure describes the process for the identification, prevention, evaluation, notification, and disposition of suspect/counterfeit items (S/CIs) at CH2M HILL. This procedure applies to items that are:

- In the procurement cycle
- In source or receiving inspection
- In inventory at warehouses and staging areas
- Installed
- In operation.

This procedure applies to:

- Company ordered material
- Material supplied by subcontractors
- Material and test equipment supplied by test sponsors
- Construction
- Fabrication shops
- Laboratory work and experiments
- Surplus/excess property
- Government property
- Material obtained from U.S. Department of Energy (DOE) sources.

2.0 IMPLEMENTATION

This procedure is effective on the date shown in the header.

3.0 RESPONSIBILITES

3.1 Procurement Personnel

Maintain awareness of S/CI and support S/CI program implementation.

3.2 Inspection Personnel

Perform inspections for conformance or acceptance of material including verifications that the item(s) being inspected do not exhibit indications attributed to potential suspect/counterfeit items.

3.3 Quality Assurance Engineer

1. Ensures appropriate procurement controls are implemented to preclude entry of S/CI to the site through review of procurement documents.

2. Notifies the S/CI coordinator of nonconformance reports (NCRs) associated with S/CI.

3.4 S/CI Coordinator

Apprises company, DOE, and DOE local Office of the Inspector General personnel of S/CI status and final disposition.

3.5 Assigned Engineering Personnel

1. Evaluate S/CI information for applicability to design and procurement specifications, system configuration, and operating conditions.

2. Provide technical specifications, critical characteristics, and acceptance methods in support of procurement and inspection activities to prevent introduction of S/CI.

3.6 Responsible Managers and Supervisors

1. Maintain awareness of S/CI.

2. Control potential S/CI.

3. Evaluate training needs based on job classification and ensure individuals receive training in S/CI awareness, prevention, detection, and reporting, as appropriate, to respective assignments.

4.0 PROCEDURE

4.1 Introduction

The two most common S/CIs found at DOE facilities have been threaded fasteners fraudulently marked as high-strength bolts, and refurbished electrical circuit breakers sold and distributed under false certifications. Purchasers have also been misled into accepting S/CIs that do not conform to specified requirements by falsified documentation.

NOTE: Questions about a specific item should be referred to the S/CI coordinator. Attachment A provides a historical listing of suspect components. Equipment/material types or classes have been established to identify those specific items which are classified as potentially misrepresented or S/CI. Attachment B provides a listing of those classifications and items subject to S/CI control at tank farm facilities.

4.2 Procurement

CH2M HILL Personnel

1. Ensure material requirements are specified in subcontracts to preclude the purchase or introduction of S/CI. Use the information in Attachments A, B, C, D, E, F, G, H, and I to identify specific components, characteristics, precautions, and other considerations that are to be addressed during the procurement process to prevent introduction of S/CI.

2. Ensure material requests for quality level 1, 2, and 3 items and services include appropriate technical specifications, procurement quality clauses, documentation, and inspection requirements to prevent introduction of S/CI.

3. In maintenance and construction/fabrication subcontracts, specify appropriate requirements to preclude the purchase or introduction of S/CI.

Quality Assurance Engineer	4.	Review procurement documents to ensure they contain the appropriate procurement controls to preclude entry of S/CI to the site.
Procurement Personnel	5.	Ensure vendor selection complies with qualification requirements for the quality level of the items and services and is based on the vendor's ability to demonstrate the capability of delivering acceptable items.

4.3 Inspection for Potential S/CI

Bill of Material Preparers	1.	For quality level 0 and P-Card items listed in Attachment B, designate an S/CI inspection in the special instruction of the Bill of Material (BOM) in accordance with the requirements of TFC-BSM-FPM_MC-C-01.
	2.	Ensure quality level 0 and P-Card items are inspected prior to material issuance.
First Line Manager	3.	Obtain on-site S/CI inspection for quality level 0 and P-Card items prior to material issue and use.
Engineering Personnel	4.	Provide technical specifications, critical characteristics, and acceptance methods to facilitate inspection planning for S/CI prevention and detection.
Quality Assurance Engineer	5.	Ensure S/CI detection criteria is incorporated into QA inspection planning activities.
Assigned Inspection Personnel	6.	Use Attachments G, H, and I as resources for detecting S/CIs during walkdowns and inspections. Specific items are subject to inspection.
	7.	Verify and document that the items being inspected do not exhibit indications attributed to potential S/CIs as described in Attachments G through J.
	8.	If an S/CI is detected during inspection activities, document and control the S/CI in accordance with TFC-ESHQ-Q_ADM-C-02.

4.4 Control of Material Identified as S/CI

Responsible Manager or Delegate	1.	Ensure items identified as potential S/CI are documented as nonconforming and controlled in accordance with TFC-ESHQ-Q_ADM-C-02. Non conformances identified as S/CI shall be reviewed and processed within four working days to determine whether or not the items are S/CI.
	2.	Transfer tagged S/CIs to 2101-HV for storage.
Cognizant Quality Engineer	3.	Notify the S/CI coordinator of all NCRs associated with the S/CI.

4.5 Reporting of S/CI

Assigned Company Personnel

1. Report all items identified as potential S/CI in accordance with TFC-OPS-OPER-C-24. (7.1.1)

   NOTE: Reporting of S/CIs is required regardless of safety class, where the S/CIs are located (receiving inspection, inventory/storage areas, fabrication and maintenance areas, installed, etc.), or their operating status.

S/CI Coordinator

2. Notify the DOE S/CI coordinator of all occurrence reports associated with S/CIs. As appropriate, transmit copies of NCRs and applicable documentation.

3. Notify the DOE local Office of Inspector General of all S/CIs. Notification should be e-mailed to the DOE local Office of Inspector General points of contact providing information in the following format:

   - NCR number
   - Date NCR was written
   - Purchase order/job control number (if known)
   - End use of product
   - Name of manufacturer, distributor, supplier
   - Safety class (if known)
   - Occurrence report number
   - Value of item(s)
   - Point(s) of contact
   - Description of item(s)
   - Quantity
   - Description of nonconformance
   - Any other pertinent information that would help the DOE local Office of Inspector General.

4.6 Acceptance, Removal, and Disposition of S/CI

S/CI Coordinator

1. Notify responsible company personnel that S/CI may not be destroyed or disposed of without written release from the DOE local Office of Inspector General.

2. Prior to destroying or disposing of S/CIs, consult the Inspector General to determine if there is a need to retain the items as evidence for potential litigation. Based on the Office of Inspector General's decision, either:

   a. Retain S/CI material as evidence for potential litigation, or

   b. Release S/CI material for final disposition and/or disposal as directed by the S/CI coordinator.

Engineering Personnel

3. Evaluate S/CI to determine if its use could create a safety hazard in its current/proposed application.

Assigned Company Personnel

4. If the engineering evaluation of the S/CI has determined that its use could not create a safety hazard in its current/proposed application:

   a. Disposition the S/CI to remain in place.

      NOTE: Criteria for dispositioning S/CI is by acceptance, removal, or replacement after an engineering evaluation. This should be based on the deficient characteristic of the particular item.

   b. Identify the accepted S/CI by marking with orange paint or other appropriate methods and note its location.

   c. In areas where operating temperatures are 500°F and above or are subject to cyclic loading where fatigue failure is likely to occur, replace all grades 8 and 8.2 S/CI fasteners prior to further use of the equipment.

   d. Engineering must also identify a way to prevent its reuse in an application it may not be suitable for.

   e. If removed, prepare the S/CI for disposal.

5. If the engineering evaluation of the S/CI has determined that its use could create a safety hazard in its current/ proposed application:

   a. Contact Waste Feed Operations (WFO) Shift Operations to secure the equipment.

   b. Remove the S/CI as soon as practical.

   c. Tag, segregate, or otherwise control the S/CI to prevent inadvertent use.

   d. Prepare the S/CI for disposal.

S/CI Coordinator

6. Ensure that all S/CI material dispositioned for disposal is properly controlled and arranged for the material to be permanently and irrevocably altered so that it cannot be used. Examples of alterations include:

   - Melting
   - Shredding
   - Destroying the threads on fasteners.

7. If the DOE/Office of Inspector General has approved disposal, arrange for pick-up and disposal of the altered S/CI material on a yearly basis. Burying S/CIs may be acceptable if they do not contain hazardous material or material prohibited by federal, state, or local regulations.

4.7 Surplus/Excess Material

Responsible Personnel

1. Remove S/CI from surplus/excess material before they are released for sale or transfer of accountability.

2. Ensure surplus items received from DOE or other facilities are inspected for S/CI prior to installation.

4.8 Assessments

Quality Assurance

1. Conduct assessments of the effectiveness of the S/CI program.

   NOTE: The assessment should be performance based and designed to determine if company activities are conducted in accordance with this procedure, DOE 414.1A, DOE O 440.1A, DOE G 440.1-6, and 10 CFR 830, Subpart A.

2. Lines of inquiry will be used as appropriate during assessments in areas that interface with the S/CI process. See Attachment J.

4.9 Training

Managers and Supervisors

1. Evaluate individual training needs of assigned personnel to ensure they are proficient in S/CI identification and control procedures within their areas of responsibility.

2. All personnel involved in the following specific areas will receive S/CI process and hands-on training, whether it be formal, continuing training, or required reading. The formal training course that is available is Module #1, Course 170720, "Suspect/Counterfeit Items."

   - Quality Assurance/technicians
   - Engineers (design, systems, etc.) who procure materials/equipment
   - Maintenance personnel (electricians, pipefitters, millwrights, instrument technicians)
   - Warehouse personnel who handle and process materials/equipment
   - Tool Crib attendants.

5.0 DEFINITIONS

Counterfeit part. A part made or altered so as to imitate or resemble an "approved part" without authority or right, and with the intent to mislead or defraud by passing the imitation as original or genuine. (Source: U. S. Department of Transportation Federal Aviation Administration Advisory Circular 21-29B, Detecting and Reporting Suspected Unapproved Parts).

Fastener (regardless of the safety classification). (Source: Fastener Quality Act, Public Law 101-592 as amended by Public Law 104-113).

- A screw, nut, bolt, or stud with internal or external threads or a load-indicating washer with a nominal diameter of 5 millimeters or greater in the case of such items described in metric terms; or 1/4 inch or greater in the case of such items in terms of the English system of measurement which contains any quantity of metal and held out as meeting a standard or specification which requires through-hardening; or

- A screw, nut, bolt, or stud having internal or external threads which bears a grade identification marking required by a standard or specification; or

- A washer to the extent that it is subject to a standard or specification applicable to a screw, nut, bolt, or studs described above, except that such term does not include any screw, nut, bolt, or stud that is produced and marked as American Society for Testing and Materials (ASTM) A 307 Grade A or produced in accordance with ASTM F432.

Grade identification. Any symbol appearing on a fastener purporting to indicate that the fastener's base material, strength properties, or performance capabilities conform to a specific standard of a consensus standards organization or government agency.

Graded classifications. System used to determine minimum requirements for structures, systems and components (e.g., design, operation, procurement, and maintenance requirements). The graded classifications in order of precedence are safety class, safety significant, and enhanced quality general services.

High strength graded fastener. Fasteners having a minimum tensile strength of 75 ksi, including those produced and procured in accordance with the Society of Automotive Engineers Standard J429, Grades 5, 5.2, 8, and 8.2; ASTM Standard A325, Types 1, 2, and 3; ASTM A490, ASTM A354, ASTM A449 (I&II), and some ASTM F468.

Item. An all-inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, system, or unit. (Source: ASME-NQA-1-1989, Quality Assurance Requirements for Nuclear Facilities).

An all-inclusive term used in place of any of the following: appurtenance, facility, sample, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, system, unit, documented concept, or data. (Source: DOE G 440.1-6, Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1, Worker Protection Management; 10 CFR 830.120; and DOE 5700.6C, Quality Assurance).

Substantial safety hazard. A loss of safety function to the extent that there is a major reduction in the degree of protection to the public or employee health and safety. (Source: U.S. Department of Energy (DOE) M 232.1-1A, "Occurrence Reporting and Processing of Operations Information").

Suspect/counterfeit items. A suspect item is one in which there is an indication by visual inspection, testing, or other information that it may not conform to established Government or industry-accepted specifications or national consensus standards. A counterfeit item is a suspect item that is a copy or substitute without legal right or authority to do so or one whose material, performance, or characteristics are knowingly misrepresented by the vendor, supplier, distributor, or manufacturer. An item that does not conform to established requirements is not normally considered S/CI if the nonconformity results from one or more of the following conditions, which should be controlled by site procedures as nonconforming items:

- Defects resulting from inadequate design or production quality control
- Damage during shipping, handling, or storage
- Improper installation
- Deterioration during service
- Degradation during removal
- Failure resulting from aging or misapplication, or
- Other controllable causes.

(Source: DOE G 440.1-6, Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1, "Worker Protection Management;" 10 CFR 830.120; and DOE 700.6C, "Quality Assurance").

6.0 RECORDS

No records are generated during the performance of this procedure.

7.0 SOURCES

7.1 Requirements

1. DOE-O-232.1A Part 4.f. (1), "Occurrence Reporting and Processing of Operations Information." (S/RID)

2. DOE O 414.1A, "Quality Assurance."

3. 10 CFR 830, Subpart A, "Quality Assurance Requirements."

4. DOE O 440.1A, "Worker Protection Management for DOE Federal and Contractor Employees."

7.2 References

1. HNF-SD-MP-SRID-001, "Standards/Requirements Identification Document for the Tank Farm Contractor."

2. DOE G 440.1-6, "Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1, Worker Protection Management; 10CFR830.120; and DOE5700.6C, Quality Assurance."

3. NRC Information Notice 89-70: "Possible Indications of Misrepresented Vendor Products."

4. NRC Information Notice 89-70, Supplement 1: "Possible Indications of Misrepresented Vendor Products."

5. TFC-BSM-CP_CPR-C-01, "Purchasing Card (P-Card)."

6. TFC-BSM-CP_CPR-C-03, "Buyer's Technical Representative Process."

7. TFC-BSM-CP_CPR-C-06, "Procurement of Items (Materials)."

8. TFC-BSM-CP_CPR-C-09, "Supply Chain Process."

9. TFC-BSM-CP_CPR-C-11, "Acquisition Planning."

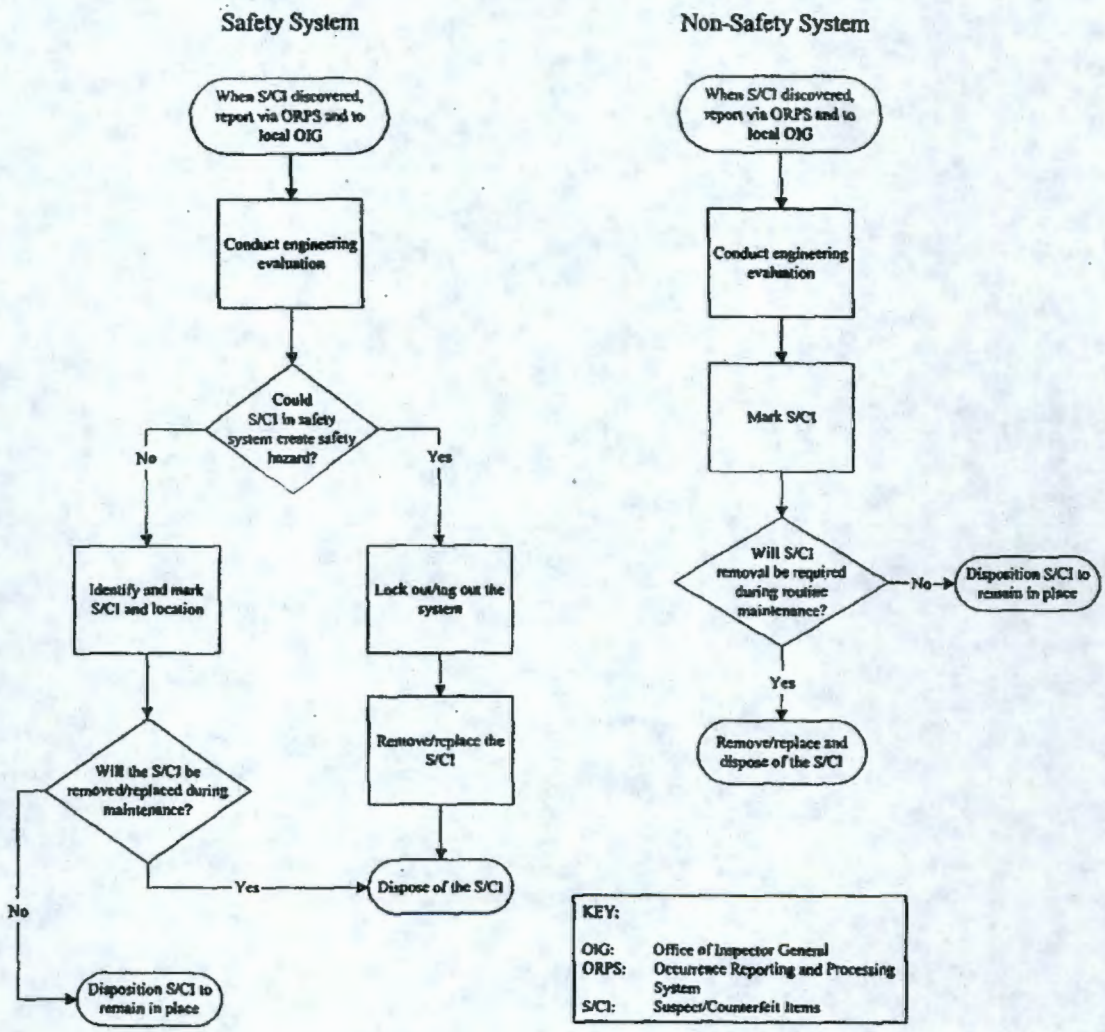
10. TFC-BSM-FPM_MC-C-01, "Material Receipt, Storage, Issuance, Return, and Excess Control."

11. TFC-ESHQ-Q_ADM-C-02, "Nonconforming Item Reporting and Control."

12. TFC-OPS-OPER-C-24, "Occurrence Reporting and Processing of Operations Information."

13. TFC-PLN-03, "Engineering Program Management Plan."

Figure 1. Management of Suspect/Counterfeit Items.



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ATTACHMENT A - SUSPECT COMPONENTS LIST

This list was extracted from the U.S. Department of Energy Quarterly Reports on the "Analysis and Trending of Suspect/Counterfeit Items at Department of Energy Facilities," July 1997.

NOTE: It is not necessarily a negative reflection on a supplier or manufacturer if S/CIs are reported regarding its particular product. Reputable manufacturers and suppliers have a vital interest in preventing the manufacture or distribution of S/CI associated with themselves. It may be that the supplier or manufacturer was victimized and is pursuing S/CI associated with its products in an aggressive, prudent, and professional manner in order to get such items off the market. Therefore, each particular case regarding the manufacture or supply of S/CI must be examined on its own merit without making premature conclusions regarding fault or culpability of the manufacturer or supplier whose name is associated with the S/CI. In short, what follows is a "suspect components list" and not a "suspect manufacturer or supplier list." The manufacturer or supplier identified in the following table should not be considered to have engaged in any wrongdoing without additional information.

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	General Electric (Component Examples) • AKF-2-25 • EC Trip Types, E-C-1, E-C-2A • AK All Types	Metal clad, low voltage, DC	Satin America & Circuit Breaker Systems Inc.	NRC I.N. 89-45, Supplements and Attachments SENS Report ID #6 5/23/89
Circuit Breakers	General Electric (Component Examples) • AK-3A-25 • KHL-36 125 • THEF 136050 • AK-2-75-3 • AK-2 • AK-1-50 • AK-1-75 • B • TDQ • TCVVFS • TFJ • TEB122015-WL • TEB132090-WL • TE111015 • TED134060-WL • TEB124050-WL • THED136100 WL • TED126050 • THED136060 WL • THGB2120 • TEF134015 • THEF136M1100 • TED 134030-WL • AK2A25 • THED-136100-WL • THED-136050-WL • THED-136045-WL • THFK-236070-WL • TE-122070 • THED-136150-WL • THED-13600-WL • TED-113020 • TEC-360S0 • THED-124015-WL	1, 2, & 3 pole, various amperages	Bud Ferguson's Industrial Control & Supply, Inc., General Circuit Breaker & Electrical Supply HLC Electric Supply NSSS, Inc. California Breakers, Inc. Rosen Electric Equipment PENCON International (DBA) General Magnetics/ Electric Wholesale Lakeland Engineering Equipment Co. ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker Electrical Supply California Breakers Voyter Electric Co.	NRC I.N. 88-46 Supplements and Attachments NRC I.N. 90-46 Office of Nuclear Safety 93-5 (#11)

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Westinghouse (Component Examples) • TF136090 • TF361050WL • TED1130020			
	• Not Provided	Commercial Grade	Westinghouse Electric Supply Co. (WESCO)	NRC I.N. 91-48
	• DB-25 & DS-416	Low Voltage	Satin America & Circuit Breaker Systems, Inc.	NRC I.N. 89-45 & Supplement #2
	• FSN-5925-628-0641 • DB-25 • DB-50 • HKB3150T • FB3020 • FB3070 • FB3050 • EHB3025 • LBB3125 • HKA31250 • JA3200 • EHB2100 • 225N	Trip units; Navy Trip units; 1, 2, & 3 pole various amp. ratings	General Circuit Breaker & Electrical Supply HLC Electrical Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale	NRC I.N. 88-46, Supplements and Attachments Office Of Nuclear Safety 93-9
	• EB 1020 • HDEA 2030 • MCP331100R • MCP431550CR • BAB3060H • 656D14 8G03		ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
	• FA-2100 • EH-2050 • HFB-3050		Molded Case Circuit Breakers	
	• HFD(B)-3020 • MA3600		NSSS, Inc.	
	• F2020 • EH2100 • EB3050 • HMC3800F		Spectrum, Tech.	
	• EA2090 • FA3125		Rosen Electric	
	• HMCP 150		Luckow Circuit Breaker	

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Westinghouse (cont.) (Component Examples) • HFD • EH2070 • FA2050 • JA2225 • JL3B125 • JL3B070 • JL3B150 • JL3B200 • JL3B090 • JL3B100 • HLM3800T • F3100N • MA3500 • EH2015 • FA3035 • FA2100 • HLA2125OTM • EH2070 • JB3100 • EB2030 • 8MC800 • CAH3200 • EHB3040 • JL3-B150 • JL3-B200 • JL3-B090 • JL3-B1000 • HFA, HFB, FA • JL3-(B)8070 • JL3-B125 • EH-2020 • FA-3035 • EH-2050 • FA-2100 • FA-2050 • HFB-3050 • JA-2225 • HLM3800T • F3100N • MA3500 • EH2015 • LA3200WL • HLA3200T • 2602D58U9	Shunt Trips Aux. Contacts 2 & 3 pole circuit breakers of various amperages	General Circuit Breaker & Electrical Supply HLC Electrical Supply PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply Molded Case Circuit Breakers Co. (MCCB)	NRC I.N. 88-46 Supplements and Attachments

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Westinghouse (cont.) (Component Examples)			
	• HLB3200T • 262156G19 • 1A & 1B • HL300T			NRC I.N. 88-46 Supp. & Attach.
	• HLA2400TM • HMA3600T • HMA3700T • HKA3225T • HNB2700T	225 amp, 3 pole 3 pole, 20 amp 3 pole, 30 amp 1 pole, 20 & 30 amp 2 pole, 20 & 30 amp 3 pole, 60 amp	Not Provided	
	• MDL#KAF • QNB3020 • QNB3030			SENS ID #10 3-17-89 SENS ID #11 3-3-89
	• BA	3 pole, 20 amp	Not Provided	
	• BA			
	• BA			
	• E3060			
	• F3020			SENS Report ID #12 10-19-88 NRC I.N. 88-46
Circuit Breakers	ITE (Component Examples)			
	• Model - E43B015	3-phase 480 volt	Cal. Breakers/Elect. Wholesale Supply Co.	SENS Report ID #8, 5-5-89
	• EQ-B	1 pole, 20 amp 3 pole, 30 amp	Not Provided	SENS ID #10 3-17-89
	• EE-3B030			SENS ID #11 3-3-89
	• EF3B070 • EF3H050 • EF3B125 • EF3B040 • E42B020 • QJ2B200 • JL3B400	2 & 3 pole various amperages	General Circuit Breaker & Electrical Supply HLC Electrical Supply	NRC I.N. 88-46, Supplements and Attachments

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	ITE (cont.) (Component Examples) • HE9B040 • EE3B050 • BQ2B030 • EE3B070 • EE2B100 • EE2B050 • EE2B030 • FJ3B225 • ET • KA • EH-313015 • JL-3B070 • JL-3B150 • E43B015 • EF2-B030 • EH3B100 • QP1B020 • QJ3B200 • EF3B100 • 1193		California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ATS Circuit Breakers, Inc. Panel Board Specialties Rosen Electric Equipment	
Circuit Breakers	ITE, Gould & ITE Imperial Brown Boveri Elect. (BBE) ASEA Brown Boveri (Component Examples) • Type HK • 5 HK • 7.5 HK • 15 HK • 38 HK • ITE 62-6	Not Provided ID-4KV Not Provided Not Provided Not Provided	Brown Boveri ASEA Brown Boveri	NRC I.N. 89-86 NRC I.N. 87-41 Office of Nuclear Safety, 92-25
Circuit Breakers	Square "D" Co. Component Examples • KHL 36125 (Any Type)	Molded Case	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale	NRC I.N. 88-46 Supp. & Attach. NRCB 88-10 NRC I.N. 90-46

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Square "D" Co. Component Examples (cont.)		ANTI THEFT Systems Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
	• QOB220	1 pole, 15 amp	Not Provided	SENS ID #10 3-17-89
	• QO220 • LO-3	2 & 3 pole 20 & 50 amp breakers	General Circuit Breaker & Electrical Supply	NRC I.N. 89-45 & Supplement #2
	• SBW-12 • 989316 • FAL3650-16M or • FAL36050-16M • KA36200	3 pole - 200 amp breaker 30A/600V	HLC Electric Supply California Breakers, Inc.	
	• 999330	Not Provided	PENCON International (DBA) General Magnetics/Electric Wholesale	
	Manufacturer not Provided • EHB3025	Not Provided	Stokely Enterprises Molded Case Circuit Breakers	DOE Letter 8-26-91 Reprinted NuVEP: Bulletin 7-26-91
Circuit Breakers	Fed. Pacific (Component Examples)		General Circuit Breaker & Electrical Supply	
	• NEF431020R • NE111020 • NE	3 pole, 20 amp 1 pole, 20 amp 1 pole, 15 amp	HLC Electric Supply California Breakers, Inc.	
			PENCON International (DBA) General Magnetics/Electric Wholesale	SENS ID. #10 3-17-89

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Fed. Pacific (Component Examples) (cont.) • NF63-1100 • NE22-4060 • NE22-4100 • NEF-433030 • 2P125	1, & 3 pole - 30, 60 & 100 amp breakers	ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc.	SENS ID. #11 3-3-89 NRC I.N. 88-46, Supp. & Attach.
	Jefferson (Component Examples)	Not Provided	PENCON International (DBA) General Magnetics/electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply Mid West Co.	NRC I.N. 88-46, Supp. & Attach.
Circuit Breakers	Superior (Component Examples) • 246U-3	Not Provided	General Circuit Breaker & Electrical Supply Rosen Electric HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46 Supp.& Attach.

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Manufacturer Not Provided (Component Examples) 50DHP250	 2 pole - 50 amp	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
Circuit Breakers Heaters	Cutler Hammer (Component Examples) • 10177H13 • 10177H21 • 10177H32 • 10177H036 • 10177H1049	 Not Provided	AAKER General Circuit Breaker & Electrical Supply HLC Electrical Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Switches	(Component Examples) Crouse Hinds #EDSC2129 Sq. D Type G. Class 9012, 9025, 9016	 Tumbler, ft. op	 Platt Electric Supply Co. Gen. Motors, Electro-Motive Design	 SENS ID #16 1-27-92 Office of Nuclear Safety 93-24 & 93-27
Transmitters	Rosemount	(Component Examples) • Model 1151 GP • Model 1151 DP	Venetech	E.L. Wilmot letter dated 8-1-91 H. Richardson letter HR-81-91 dated 8-15-91
Motors	Siemen & Allis (Component Examples) INP 143 T 215 T	 10 H.P.	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply Rosen Electric Equipment	NRC I.N. 88-46, Supplements and Attachments

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Relays	Potter & Brumfield (Component Examples) MDR-138, 173-1 134-1, 142-1	Not-latching rotary	Stokely Enterprises Spectronics, Inc. Nutherm International The Martin Co.	NRC I.N. 90-57 & Attach.
	Teledyne	All qualified to MIL-R-28776 and MIL-R-39016	Not Provided	DOE-ID Wilmot letter, 7-16-91
	G.E. & Exide (Component Examples) • 12HGA-11S52 • NX 400	Overload & Aux.	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
	Manufacturer not provided • FSC-5945	Not Provided	Stokely Enterprises	DOE Letter 8-26-91 Reprinted NuVEP: Bulletin 7-26-91
	Amerace (or Agastat) (Component Examples) Models: E7024 E7022	Electro Pneumatic Timing Relays	Amerace Control Components Supply	SENS ID #1 11-1-91 NRC I.N. 92-24
	A through L Series Model 7032	PRB		

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Fuses	Bussman Co. (Component Examples) REN 15 & NOS-30	15A-250V & 30A-600V	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
	Class 1E	All Supplied by PMS	Preventive Maintenance Systems (PMS)	NRC I.N. 88-19
Controllers	Manufacturer Not Listed (Component Examples)	Motor Controllers	Stokely Distributors & Stokely Enterprises, Inc.	DOE letter 8-26-91 & NUVEP Bulletin 7-26-91
Starters	Westinghouse (Component Examples) 626B187G17 626B187G13	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-45 Supp. & Attach.
Resistors	Unknown	All	Impala Electronics	NRC I.N. 91-01

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Semiconductors	Solid State Devices Inc. (SSDI) SFF 9140	P-Channel MOSFET	SSDI	DOE Albuquerque Letter, 06-25-96 to DOD Inspector General
	SPD 1511-1-11	Pin Diode (SA3059)		
	2A14/18 or 2A14/52	Ion Implanted Diode		
	SSR4045CTTXV	SCHOTTKY Diodes		
	SFF9140TWX	Power Transistors		
	SPMF106ANH	Special Pack MOSFET Switch		
	SPD 5818 or IN5858JTXV	Axial Leaded SCHOTTKY Diode		
	2N797	Transistor		
	Unknown	Diode (SA 3436)		
Starter Controls	Westinghouse (Component Examples)	Not Provided	General Circuit Breaker & Electrical Supply	NRC I.N. 88-48
	• A200MICAC		HLC Electric Supply	
	• A201KICA		California Breakers, Inc.	
	• A201L2CA			
	• AN13A		PENCON International (DBA) General Magnetics/Electric Wholesale	
			ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	

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ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Gauge Glasses	Siemen & Allis (Component Examples) #00-737-637-118 215 T	Not Provided	Rosen Electric Co.	NRC I.N. 88-46 Supp. & Attach.
Mercury Lamps	Spectro Inc. (Component Examples) V00014	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46
Electrical Frames	Westinghouse (Component Examples) LA2600F LA3600F MA2800F	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46
Push button station	Crouse Hinds (Component Examples) #00-737-637-118	Single gang, pushbutton	Platt Electric Supply Co.	SENS Report ID #16 1-27-92

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Overload Relay Thermal Unit	Square D (Component Examples) B19.5, B22	Not Provided	Not Provided	NRC I.N. 88-46
Piping, Fittings Flanges, and Components	Tube-line Corp. Ray Miller, Inc.	Subassemblies, fittings, flanges, & other components (Carbon and Stainless Steel components)	Tube-line Ray Miller, Inc.	NRC IEB 83-06 NRC I.N. 89-18 NRC IEB 83-07 NRC I.N. 83-01
Piping, Fittings, Flanges, and Components	Piping Supplies, Inc. & West Jersey Mfg. & Chews Landing Metal Mfg.	Carbon and Stainless Steel Fittings and Flanges	Piping Supplies, Inc. & West Jersey Mfg. & Chews Landing Metal Mfg.	NRC Bulletin 88-05 & Supplements
Valves	VOGT	Full port design 2-inch Model SW-13111 & 1023	CMA International IMA Valve Refurbisher	NRC I.N. 88-48 & Supplements
	Crane	4"-1500psi, pressure sealed	Southern Cal. Valve Maintenance co., Amesse Welding Service & CMA Int.	NRC I.N. 91-09
	ITT Grinnell Valve Co., Inc	Diaphragm valves	ITT Grinnell Valve Co. Inc, Div. of Diaflo & ITT Engineered Valves	NRC Comp. Bulletin 87-02
	Crane, Pacific, Powell, Walworth & Lunkenheimer	Gate Valves	Coffeyville Valve Inc.	NRC I.N. 92-56
	Pacific	8" & 3" Globe Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48, Supp. & Attach.
	Crane Chapman	24" Check Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48, Supp. & Attach.
	Pacific	Check Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48, Supp. & Attach.

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ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Valves	Kerotest	8" Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Pacific	4" Gate Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Lukenheimer	6" Model 1542 20" Model 3013	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Crane	All	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
Flanges	China Ding Zinang Nan Xi Li Flange Co. Shou Gang Mach. Eng. Co.	Flanges, ASTM A105, ASME SA105	Billiongold Co. LTD. Tain Gong Co. Sanxi Province Overseas Trading Corp	NRC I.N. 92-68 and Attachments Office of Nuclear Safety 92-25, 93-23, and 92-35 National Board of Boiler and Pressure Vessel Inspectors (NBBI) Bulletin: Special Report, 1992, Volume 48, Number 2, The Chinese Flange Investigation
Valve Replacement Parts	Masoncilian-Dresser Industries	Plug stem, stem to plug anti-rotation pin, seat ring, valve plugs, bushings, cages & packing box components	Cor-Val, Control Valve Specialists, H.H. Barnum & M.D. Norwood, Sample Webtrol Controls, Inc.	NRC I.N. 88-97 Supp. & Attach.
Pumps & Replacement Parts	Hayward Tyler Pump Co.	HTPC ASME Nuclear Code	Hayward Tyler Pump Co.	IEB 83-05 & Attachments
Channel Members	Unistrut Corporation	Continuously slotted channels, structural framing members, fasteners, nuts, fittings, pipe clamps	Unistrut Corporation	NRC I.N. 91-25
Fire Barriers	Thermal Science Inc.	Thermo-Log 330	None Listed	ES&Q Update #8 NRC I.N. 92-55
Valve Actuator	Limitorque	Eyebolts on housing cover	None Listed	Office of Nuclear Safety 93-25 NRC I.N. 93-37

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Steel	Alloy & Carbon Steel Co. Inc., Atlantic Steel Co., Levingston Steel Co., & Copperweld Steel co.	Plate Angle Flat Bar Bar	Meredith Corporation Pressure Vessel Nuclear Alloy & Carbon Steel Co., Inc.	NRC I.N. 89-56, Attachments and Supplements
Fasteners (Bolts, Screws, Nuts, and Washers)	(parentheses designated headmark) Asahi (A) Daiichi (D) Daiei (E) Fastener Co. of Japan (FM) Hinomoto Metal (H) Jin Her (J) Kyowa (K) Kosaka Kogyo (KS) Kyoei Minamida Seiybo (M) Mnato Kogyo (MS) Nippon (NF) Takai (RT) Tsukimori (S) Unytte (UNY) Yamadai (Y) Ivaco, Infasco (hollow triangled)	• Those with suppliers or manufacturers • Those that are improperly marked • Those of foreign manufacture that do not meet Public Law 101-592. Fastener Quality Act	Note: Listed suppliers may also be manufacturers Lawrence Engineering & Supply Co. Metal Building Bolts Nichimin Corporation UNICO Ace Corporation E. K. Fasteners, Inc. H. Y. Port Fasteners Co. Kobayashi Metals, LTD. Takai Screw Mfg. Co. LTD. Yamaguchi Sesakusho Co. LTD. Highland Bolt & Nut Porteous Fastener Co. Northwest Fasteners Ziegler Bolts & Parts Co. Edgewater Fasteners, Inc. Reynolds Fasteners A & G Engineering	Commercial Carrier Journal Articles for: 6/88, 1/90, 2/90, 3/90, 4/90, 6/90, 7/90, 12/90 INEL Suspect Headmark List SENS Report #5 2/6/91 SENS Report #13 2/6/91 HR 3000, U.S. House of Representatives, July 1988 J. A. Jones, Ltr, 9/23/92 Memo from L. Kubicek, 3/28/91 Memo from D. Sanow, 3/8/91 "Fastener Technology International," Feb., April, and June 1993 Rep. J. Dingell Ltr to Comm. Dept. & NRC June 18, 1993 Office of Nuclear Safety 93-26, 93-22, 93-11 DOE Quality Alert, Bulletin, Issue No. 92-4, August 1992 FDH Hanford Suspect Headmark List

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Fasteners (Bolts, Screws, Nuts, and Washers)	NUCOR	1-1/4" x 2" Zinc Chromate plated surface Hexhead cap screws	Cordova Bolt, Inc.	SENS ID #13 11-6/91
	Any	Any	Aircom Barnett Bolt Works Bolts & Nuts, Inc. Glasser & Assoc. Knoxville Bolt & Screw Metal Fastener Supply Phoell Mfg. Co. Service Supply Co. Southeastern Bolt & Screw Sure Loc Victory Bolt	NRC Compliance Bulletin 87-02 NRC I.N. 89-59

ATTACHMENT B - CLASSIFICATION OF POTENTIALLY SUSPECT/COUNTERFEIT ITEMS

A. ELECTRICAL ITEMS

- Molded Case Circuit Breakers
- Motor Control Centers
  - Complete Units
  - Components
  - Starters
  - Starting coils
  - Contactors
  - Overload relays
  - Starter control relays
  - Overload heaters
- Protective/control relays
- DC power supplies/chargers
- AC inverters
- Current/potential transformers
- Exciters/regulators
- Bus transfers/auto bus transfers
- Motor generator sets
- Generators
- Rewindable motors
- Printed circuit boards
- Bulk commodity items
  - Fuses
  - Splices
  - Electrical connectors
- Indicators/controllers
- Panel lights/switches
- Transmitters/instrument switches
- Isolation devices.

The following items are excluded unless required by the applicable program/project: 600V or less: motors; outlets, switches, and plugs; boxes, conduit (i.e., bodies and covers, nipples, fittings, EMT, flex, liquid tight, rigid); wire; miscellaneous wire connections #10 and below; fixtures; lights.

B. MECHANICAL ITEMS

- Welding materials
  - Rod
  - Wire
  - Flux
- Structural members (pipe supports)
- Channel members

ATTACHMENT B - CLASSIFICATION OF POTENTIALLY SUSPECT/COUNTERFEIT ITEMS (cont.)

- Sheet
- Plate
- Bars
- Round stock
- Other raw material which requires an ASTM or national standard
- All lifting/rigging gear (wire rope shall be made in the United States by a member of the Wire Rope Technical Board (WRTB) or the Associated Wire Rope Fabricators (AWRF) (except stainless steel, and unless recommended otherwise by a crane or hoist manufacturer); stainless steel wire rope shall be made in the United States and shall be 302 or 304 grade stainless steel unless otherwise recommended by a crane or hoist manufacturer)
- Ratchet tie-downs/strapping devices and come-a-longs, with fasteners.

The following materials are excluded unless required by the applicable program/project: ASTM-A36, brass, copper, sheet metal 7 GA or less, and aluminum.

C. PIPING - which requires an ASTM or ASME standard
- Fittings
- Flanges
- Valves
- Pipe
- Components.

The following materials are excluded unless required by the applicable program/project: ASTM-A-53, Swagelock; cast iron, galvanized, copper, bronze, and brass; PVC; and gaskets.

D. FASTENERS - All fasteners 1/4" and above in diameter
- Bolts
- Studs
- Cap screws
- High-strength washers
- Nuts
- Anchors.

NOTE: Attachment I identifies headmarkings for stainless steel and carbon steel high strength fasteners that are considered counterfeit. Fasteners exhibiting these headmarks are counterfeit and no further testing is required.

The following items are excluded, unless required by the applicable program/project: sheetmetal screws, wood screws, stove bolts, pan heads, machine screws, lag bolts, threaded rod, rivets, and carriage bolts.

ATTACHMENT C - SUSPECT/COUNTERFEIT ITEMS INFORMATION SOURCE LIST

A wide variety of industry and Government sources publish information relative to suspect/counterfeit products. The following sources provide information which is available on a continuing basis:

Industrial Fasteners Institute (IFI)

The following information is available from IFI via subscription:

- "Fastener Application Advisory" (Published Monthly)
- "North American Manufacturers Identification Markings for Fasteners"
- Fastener-related video cassettes.

The National Board of Pressure Vessel Inspectors (NBBI)

The NBBI publishes "National Board Bulletins" to alert manufacturers and users of misrepresented products as they are discovered.

National Highway Traffic Safety Administration (NHTSA)

The NHTSA's Office of Defects Investigation issued a "Suspect Bolt List" in late 1990 identifying numerous fasteners, which they determined to be misrepresented.

Trade Journals and Magazines

There are numerous trade-oriented magazines which have carried articles identifying incidents of failure of substandard parts in industry applications which have caused personal injury and death, as well as serious property damage.

Newspaper and Television Reports

Another good source of information are news reports, which provide current accounts of problems encountered as a result of misrepresented products.

U.S. Nuclear Regulatory Commission (NRC)

The NRC issues bulletins, notices, and regulatory guidance on a continuing basis to alert nuclear power utilities of potential intrusion of misrepresented products into the operations environment of operating nuclear power plants.

U.S. Department of Defense (DOD) and U.S. Department of Commerce publications are also monitored by the DOE to assure that the deficiencies identified do not contaminate DOE facilities.

ATTACHMENT C - SUSPECT/COUNTERFEIT ITEMS INFORMATION SOURCE LIST (cont.)

Government Industry Data Exchange Program (GIDEP)

The mission of this program, established by the Office of Management and Budget, is to support government systems readiness, logistics effectiveness, productivity, and cost reduction through timely retrieval, storage, and distribution of data among government and industry organizations.

U.S. Department of Energy

The following documents are issued by the DOE to provide information and guidance relative to the suspect/counterfeit parts issue:

- DOE Orders
- Letters of Direction
- Bulletins and Quality Alerts

(In addition, the DOE periodically sponsors seminars/workshops relative to the detection and control of suspect/counterfeit parts).

U.S. Customs Service

The U.S. Customs Service has published the Suspect Headmark List (Figure 1) identifying graded fasteners determined to be of indeterminate quality, which has been adopted by DOE and, ultimately, Project Hanford, as a formal guide for use when evaluating currently installed and newly procured graded fasteners to assure their fitness for use on the Hanford Site.

ATTACHMENT D - CHARACTERISTICS THAT MAY MAKE PRODUCTS VULNERABLE TO MISREPRESENTATION, FRAUDULENT PRACTICES, AND COUNTERFEITING

The following information has been extracted from the NRC Information Notice 89-70, Supplement 1, Attachment 3:

- High-turnover usage rate.
- No easy or practical way to uniquely mark the component itself.
- Critical characteristics, including environmental qualification not easily discernable in external visual inspection, or characteristics that are difficult to verify through receipt testing.
- May be widely used in non-critical and critical applications.
- Use may not result in used appearance.
- Often marketed through a supplier and dropped shipped from locations other than that of the original supplier.
- Special processes for ASME materials may be subcontracted (heat treating, testing, and inspections).
- Easily copied by secondary market suppliers.
- Viable salvage market.
- Reduced number of original equipment manufacturers.
- Obsolete or hard-to-get components.
- Components manufactured by a company that is no longer in business.
- Items with documentation from a plant where construction has been suspended, canceled, or deferred.
- Moderate or low cost.
- High potential for profit (rejected heats of material are purchased and decertified).

ATTACHMENT E - WHERE TO LOOK FOR SUSPECT/COUNTERFEIT ITEMS

The following areas should receive increased scrutiny to assure that suspect/counterfeit items are not evident:

Items in Supply

- Company supply stock
- Wagon stock
- Other sources of supply contamination.

Items in Use

- Plant facilities, components, and systems
- Equipment
- Operations and maintenance.

Items Being Procured

- "Known" critical items
- Critical equipment and assemblies
- Non-critical "known" purchases.

Operations Decisions

- Major disaster risks
- Personnel safety risks
- Program/mission risks (cost and schedule).

Cost of Implementation

- Potential consequential costs
- Management risk assessment
- Cost of focusing established controls
- Impact on schedule and program mission.

Cost of Focus on Known Suspect/Counterfeit Parts

- Uses existing procurement program
- Focuses on "known parts first"
- Reduction in major disaster potential
- Program costs low/benefits high.

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION

It is very important to remember that just because an item is identified as being "suspect/counterfeit" it may not be appropriate to simply reject it. A review should be performed prior to formal disposition of the item to assure that it is indeed unfit for the intended application.

DETECTION METHODS

Visual Inspection

Items may be substandard or fraudulent when:

- Nameplates, labels, or tags have been altered, photocopied, painted over, are not secured well, show incomplete data, or are missing (e.g., preprinted labels normally show typed entries).
- Obvious attempts at beautification have been made, e.g., excess painting or wire brushing, evidence of hand painting (touch-up), or stainless steel is painted.
- Handmade parts are evident, gaskets are rough cut, shims and thin metal part edges show evidence of cutting or dressing by hand tools (filing, hacksaw marking, use of tin snips or nippers).
- Hand tool marks on fasteners or other assembly parts (upset metal exists on screw or bolt heads) or dissimilar parts are evident (e.g., seven or eight bolts are of the same material and one is a different material).
- Poor fit between assembled items.
- Configuration is not consistent with other items from the same supplier or varies from that indicated in supplier literature or drawings.
- Unusual box or packing of component or item.
- The supplier is not a factory-authorized distributor.
- Dimensions of the item are inconsistent with the specifications requested on the purchase order and/or those provided by the supplier at the time of shipment.
- The item or component matches the description of one that is on a suspect items list (e.g., U.S. Customs Service "Suspect Headmark List," National Board of Boiler and Pressure Vessel Inspectors (NBBI) "Special Bulletin," etc.).

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

Documentation

Documents may be suspect/counterfeit when:

- The use of correction fluid or correction tape is evident. Type or pitch change is evident.
- The document is not signed or initialed when required, is excessively faded or unclear (indicating multiple, sequential copying), or data are missing.
- The name or title of the document approved cannot be determined.
- Technical data is inconsistent (e.g., chemical analysis indicates one material and physical tests indicate another).
- Certification or test results are identical between items when normal variations should be expected.
- Document traceability is not clear. The document should be traceable to the item(s).
- Technical data are not consistent with code or standard requirements (e.g., no impact test results provided when impact testing is required or CMTRS physical test data indicate no heat treatment and heat treatment is required).
- Documentation is not delivered as required on the purchase order or is in an unusual format.
- Lines on forms are bent, broken, or interrupted indicating data has been deleted or exchanged (cut and paste).
- Handwritten entries of data are on the same document where typed or preprinted data exists.
- Data on a single line located at different heights indicate the possibility of retyping.

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

Fasteners

- Headmarkings are marred, missing, or appear to have been altered.
- Threads show evidence of dressing or wear (threads should be of uniform color and finish).
- Headmarkings are inconsistent with a heat lot.
- Headmarkings matching one of those identified on the U.S. Customs Service, "Suspect Headmark List" (Figure QP 3.2-1).
  - Headmarkings which depict both raised and hand-stamped markings, such as those described in WHC Quality Assurance Bulletin # 94-01, "Discrepant Dual Head Stamped Stainless Steel Bolts." This bulletin documents the results of internal inspections and independent testing of stainless steel bolts purchased to ASTM A193, Grade B8, which were found to be substandard.
  - Only manufacturers listed on the "Suspect Fastener Headmark List" (Figure QP 3.2-1) are known to produce substandard graded fasteners. If graded fasteners are discovered which exhibit headmarks matching those on the Suspect/Fastener Headmark List, they shall be considered to be defective without further testing, unless traceable manufacturer's certifications are received which provide documented evidence that the fasteners were not produced by the manufacturer listed on the Suspect Fastener Headmark List.
  - Interpretation of headmark/manufacturers listed on the "Suspect Fastener Headmark List," including newly discovered variations thereto, shall only be provided by the designated S/CI coordinator based on guidance received from the DOE.

Electrical Devices

- Connections show evidence of previous attachment (metal upset or marring).
- Connections show arcing or discoloration.
- Fasteners are loose, missing, or show metal upset.
- Molded case circuit breakers are not consistent with manufacturer-provided checklists for detecting substandard/fraudulent breakers.
- Missing or photocopied Underwriters Laboratories (UL) labels on products requiring such

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

Rotating Machinery and Valve Internal Parts

- Shows marring, tool impressions, wear marks, traces of Prussian blue or lapping compound, or other evidence of previous attempts at fit up or assembly.
- Heat discoloration is evident.
- Evidence of erosion, corrosion, wire-drawing or "dimples" (inverted cone-shaped impressions) on valve discs, seats, or pump impellers.

Valves

- Paint
  - Valve appears to be freshly painted and valve stem has paint on it
  - Wear marks on any painted surface
  - Valve stem is protected, but protection has paint on it
  - Paint does not match standard Original Equipment Manufacturer (OEM) color.
- Valve Tags
  - Tags attached with screws instead of rivets
  - Tags attached in a different location than normal
  - Tags appear to be worn or old
  - Tags with paint on them
  - Tags that look newer than the valve
  - Tags with no part numbers
  - Tags with irregular stamping.
- Hand Wheels
  - Old looking hand wheels on new looking valves
  - Hand wheels that look sand blasted or newer than the valve
  - Different types of hand wheels on valves of the same manufacturer.
- Bolts and Nuts
  - Bolts and nuts have a used appearance (excessive wrench marks on flats)
  - Improper bolt/nut material (e.g., a bronze nut on a stainless stem).

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

- Valve Body
  - Ground off casting marks with other markings stamped in the area (OEM markings are nearly always raised, not stamped)
  - Signs of weld repairs
  - Incorrect dimensions
  - Freshly sand-blasted appearance, including eye bolts, grease fittings, stem, etc.
  - Evidence of previous bolt head scoring on backsides of flanges, or evidence that this area has been ground to remove such marks
  - On a stainless valve, a finish that is unusually shiny indicates bead-blasting. A finish that is unusually dull indicates sand-blasting. The finish on a new valve is in-between.

Manufacturer's Logo

- Missing.
- Logo plate looks newer than the valve.
- Logo plate shows signs of discoloration from previous use.

Other

- Foreign material inside the valve (e.g., metal shavings).
- Valve stem packing that shows all the adjustments have been run out.
- In gate valves, a gate that is off-center when checked through the open end of the valve.
- Obvious differences between valves in the same shipment.

Price

- Price is significantly less than that of the competition.

ATTACHMENT G - FASTENERS

1.0 Counterfeit/Substandard High-Strength Bolts

1.1 General Background

Counterfeit bolts have been found in military and commercial aircraft, surface ships, submarines, nuclear weapon production facilities, bridges, buildings, and the space shuttle. These bolts often do not possess the capabilities of the genuine bolts they counterfeit and can threaten the reliability of industrial and consumer products, National Security, or lives. At Congressional hearings in 1987, the Army testified that they had purchased bolts that bore the headmarks of Grade 8 high-strength bolts, but that were actually inferior Grade 8.2 bolts.

The International Fasteners Institute (IFI) reported finding substandard, mis-marked, and/or counterfeit high-strength Grade 8 bolts in the United States commercial marketplace. In 1988, IFI reported that counterfeit medium- strength Grade 5 bolts had also been found.

Foreign bolts dominate the American marketplace due to their price advantage, and the majority of suspect/counterfeit bolts are imported. Identifying, testing, and replacing these bolts has proven expensive and difficult, both mechanically and technically. Not finding and replacing these bolts, however, has proven fatal in some instances.

1.2 Headmarks

Attachment I may be removed and photocopied, as needed, for use as a poster and reference to known suspect fastener headmarks. Bolts with the headmarkings shown have a significant likelihood of being found to be inferior to standards. Generally, the cost of replacement of these bolts is less than the cost of chemical, hardness, and tensile strength testing. Note also that counterfeit bolts can be delivered with counterfeit certificates. Documentation alone is insufficient to demonstrate compliance with standards.

1.3 Consensus Standards

There are several consensus organizations that have published standards for the properties of fasteners. One of these is the Society of Automotive Engineers (SAE). The SAE grade (or alleged grade on a suspect item) of a bolt is indicated by raised or indented radial lines on the bolt's head, as shown in Attachment L These markings are called headmarks. DOE is currently concerned with two different grades of fasteners: one has three equally spaced radial lines on the head of a bolt which indicate that it should meet the specifications for a Grade 5 bolt; the other has six equally spaced radial lines which indicate a Grade 8 bolt. Letters or symbols on the head of a bolt indicate the manufacturer.

ATTACHMENT G - FASTENERS (cont.)

Attachment I is a Suspect/Counterfeit Headmark List that was prepared by the United States Customs Service after extensive testing of many samples of bolts from around the nation. Any bolts anywhere in the DOE community that are currently in stock, in bins, or installed that are on the Customs Headmark List should be considered suspect/ counterfeit. The headmarks on this list are those of manufacturers that have often been found to have sold bolts that did not meet the indicated consensus standards. Sufficient testing has been done on the bolts on this list to presume them defective without further testing.

1.4 Precautions: Selective Testing

Some facilities (manufacturers, distributors, etc.) perform selective testing of sample bolts rather than have an independent testing laboratory run all the tests required by consensus standards. In many cases, a new counterfeit bolt has roughly the same physical strength as the graded bolt it mimics, but does not have either the chemical composition or the heat treatment specified by the consensus standards. As a result, it will stretch, exhibit metal fatigue, or corrode under less harsh service than the genuine bolt. Simple tensile strength tests cannot be used to identify substandard high-strength fasteners and should not be solely relied upon in performing acceptance test.

1.5 Using Suspect/Counterfeit Grade 5 Bolts in Grade 2 Applications

Some sites use suspect/counterfeit Grade 5 bolts in applications that only call for Grade 2 bolts. Eventually, the suspect/counterfeit Grade 5 bolts may find its way into an application that requires a genuine Grade 5 bolt and that application may fail. In some cases, cheap imported graded bolts have been purchased in place of upgraded bolts because the small price differential made the extra quality seem to be a bargain. Given the expense of removing suspect bolts from DOE facilities, the practice of using suspect bolts for any application should be discontinued.

1.6 Keep Bolts in Original Packages

All bolts purchased should be kept in the original packages, not emptied into bins. The packages should have labels or other markings that would permit them to be associated with a particular procurement action and a specific vendor. Approved supplier lists should be checked to assure that fastener suppliers on that list have been recently qualified/audited for adequacy of their quality programs.

ATTACHMENT G - FASTENERS (cont.)

2.0 Stainless Steel fasteners

2.1 Purpose

To provide follow-up information to the previous notification sent to the DOE field and contractor organizations in late 1996.

2.2 Background

In November 1993, the Industrial Fastener Institute (IFI) issued a Fastener Advisory regarding 18-8 stainless steel bolts. The advisory warned about a "bait and switch" tactic in which a distributor takes an 18-8 bolt (indicated by two radial lines 90 degrees apart), but no manufacturer's marking, and sells them as ASTM A320 Grade B8 bolts after hand-stamping B8 on to the heads.

As a result of this IFI Advisory, DOE sites conducted a search of facility stores for stainless steel fasteners with hand-stamped B8 grade marks. Hundreds of stainless steel bolts with hand-stamped B8 grade markings, along with a variety of other raised and depressed head and manufacturer's markings were identified in facility stores throughout the DOE complex.

For example, an inspection of shop stock at a Hanford Site facility revealed bolts with three different raised grade markings, 18-8, 304, and F593C, along with raised manufacturer's identifications of CK, H, HP, C, SO, CS, PMC, TH, THE, and a STAR. The majority of the remaining samples found at Hanford exhibited raised grade markings of 18-8 and 304, with a B8 grade marking and manufacturer's identification hand-stamped into the head of the bolt.

Finally, a few samples did not display any manufacturer's markings. Most of the bolts discovered were purchased with the specification to meet a national consensus standard, American Society for Testing and Materials (ASTM) A193, B8 Class 1 rather than the ASTM A320 standard discussed in the IFI warning.

The Savannah River Site also conducted a site-wide search of facility stores with similar results. A total of 159 stainless steel fasteners with hand-stamped B8 grade marks and raised or hand-stamped manufacturer's symbols were found. Fifteen stainless steel fasteners that had no manufacturer's symbol were also found.

ATTACHMENT G - FASTENERS (cont.)

2.3 Issue

The requirements of the ASTM A193 standard regarding fastener marking and certification are very similar those required by the ASTM A320 standard discussed in the IFI advisory. The ASTM A193 standard requires that grade and manufacturer's identification symbols be applied to the heads of bolts that are larger than 1/4" in diameter. The standard, however, does not specifically differentiate between raised and depressed headmarkings, but states only that "for the purposes of identification marking, the manufacturer is considered the organization that certifies the fastener was manufactured, sampled, tested, inspected in accordance with this specification." In other words, the standard allows for some of the required markings to be formed into the head of the bolt (either raised or lowered) during manufacturing, and the rest to be applied later on via hand-stamping.

Since ASTM A193 does not differentiate between raised and depressed markings, these fasteners can be counterfeited in the same way as the ASTM A320 fasteners discussed in the November 1993 IFI warning. For example, distributors can procure 18-8 stainless steel bolts that were manufactured by an anonymous party, and without conducting the necessary upgrading process or certification testing, a second party could hand-stamp B8 and a manufacturer's marking into the heads to indicate that the fasteners exhibit the mechanical and chemical properties required of ASTM A193Grade B8 Class 1.

Unless the certification documentation is specifically requested, and in most cases it is not, there is no way to determine by visual inspection whether these fasteners were properly certified and tested to meet the requirements of the ASTM standard.

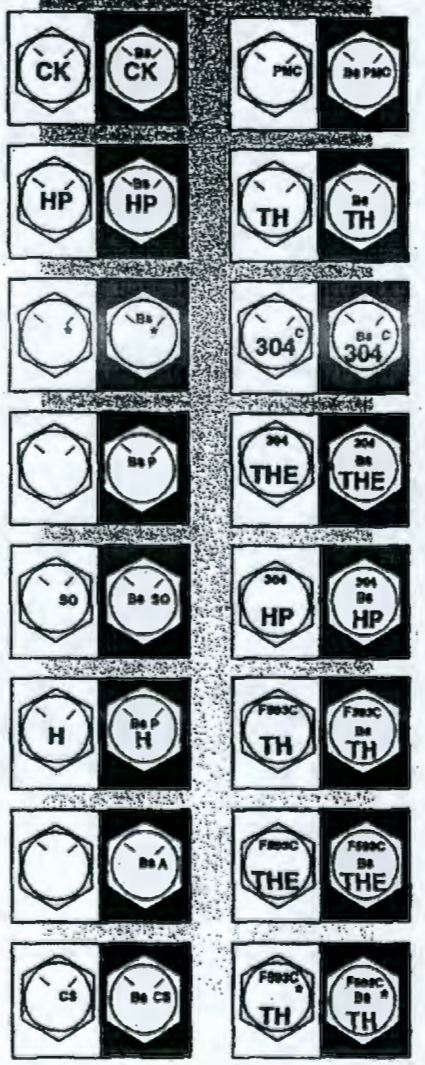
ATTACHMENT H - DOE HEADMARK LIST

Help Stamp Out Suspects/Counterfeits

Examples of stainless steel fasteners that have been upgraded from 18-8 to ASTM A320 or ASTM A193 Grade B8 after hand stamping. The last three examples show samples of fasteners to indicate conformance to two non-compatible standards, ASTM A193 and ASTM F593C.

Any bolt on this list should be treated as defective without further testing and process in accordance with HNF-PRO-301. Note: This list was originally Published by DOE /EH-0196, Issue No. 97-6

If any of these fasteners are located, contact your facility S/CI Point of Contact (POC) for instructions. The POC list is on the Hanford Intranet at: http://docs.rl.gov/hsn.info/hlansci/hlansci.doc. Scroll to the end of the document for the list.



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ATTACHMENT H - DOE HEADMARK LIST (cont.)

Help Stamp Out Suspects/Counterfeits

Suspect Fastener Headmark List

All Grade 5 and Grade 8 fasteners of foreign origin which do not bear any manufacturers' headmarks:

Grade 5 Grade 8

Grade 5 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
J	Jinn Her (TW)	KS	Kosaka Kogyo (JP)

Grade 8 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
A	Asahi Mgf (JP)	KS	Kosaka Kogyo (JP)
NF	Nippon Fasteners (JP)	RT	Takai Ltd (JP)
H	Hinomoto Metal (JP)	FM	Fastener Co. of Japan (JP)
M	Minamida Steybo (JP)	KY	Kyoei Mfg (JP)
MS	Minato Kogyo (JP)	J	Jinn Her (TW)
Hollow Triangle	Infasco (CA, TW, JP, YU) (Greater than 1/2-inch diameter Grade 8 Hollow Triangle only)		
E	Daisi (JP)	UNY	Unytite (JP)

Grade 8.2 fasteners with the following headmarks:

Mark	Manufacturer
KS	Kosaka Kogyo (JP)

Grade A325 fasteners (Bennett Denver target only) with the following headmarks:

	Mark	Manufacturer
Type 1	A325 KS	Kosaka Kogyo (JP)
Type 2		
Type 3		

Key: CA-Canada, JP-Japan, TW-Taiwan, YU-Yugoslavia

Any bolt on this list should be treated as defective without further testing.

ATTACHMENT I - REFURBISHED MOLDED CASE CIRCUIT BREAKERS

Investigations thus far of electrical components at DOE facilities uncovered over 700 suspect/ counterfeit molded-case circuit breakers that were previously used, refurbished and sold to DOE contractors.

1. Recognition Factors

The following factors should be recognized regarding suspect or refurbished circuit breakers:

A. The quality and safety of refurbished molded-case circuit breakers is questionable since they are not designed to be taken apart and serviced or refurbished. There are no electrical standards established by Underwriters Laboratory (UL) for the refurbishing of molded-case electrical circuit breakers, nor are there any "authorized" refurbishes of molded case circuit breakers. Therefore, "refurbished" molded-case circuit breakers should not be accepted for use in any DOE facility.

B. One source of refurbished molded-case circuit breakers is from the demolition of old buildings. Some refurbishes are junk dealers who may change the amperage labels on the circuit breakers to conform to the amperage ordered and then merely clean and shine the breakers.

This situation was brought to DOE's attention by the Nuclear Regulatory Commission (NRC), which, in turn, had been informed of the practice by the company that manufactures circuit breakers. In early 1988, a sales representative identified "refurbished" circuit breakers at Diablo Canyon Nuclear Power Plant. A subsequent investigation confirmed that circuit breakers sold to the power plant as new equipment were actually refurbished. The managers of the two firms that refurbished and sold these breakers have been convicted of fraud and have paid a substantial fine.

C. NRC published information Notice No. 88-46 dated July 8, 1988, on the investigation findings and circulated it to all applicable government agencies, including DOE. On July 20, 1988, DOE notified all field offices that refurbished circuit breakers may have been installed in critical systems. Shortly thereafter, DOE established the Suspect Equipment Notification System (SENS), a sub-module of ES&H Events and News on the Safety Performance Measurement System (SPMS). SENS has since been replaced by the Supplier Evaluation and Suspect Equipment (SESE) sub-module which includes Suspect Equipment Reports.

D. Some of DOE's older sites have circuit breakers in use that are no longer manufactured. According to the Nuclear Management and Resources Council (NUMARC), examples of such breakers are Westinghouse breakers with frames E, EA, F, and FA. If a DOE contractor has an electrical box that requires a breaker with one of these frame sizes, that contractor would not have been able to purchase it from Westinghouse for several years. If the contractor were to order a replacement breaker from an authorized Westinghouse dealer, the dealer could not get a new replacement breaker from the manufacturer. To fill the order, the dealer had to turn to the secondary or refurbished market.

ATTACHMENT I - REFURBISHED MOLDED CASE CIRCUIT BREAKERS (cont.)

Dealing with an authorized distributor does not preclude ending up with refurbished circuit breakers. Westinghouse has announced that it is considering satisfying this market by manufacturing circuit breakers that will fit in these applications.

The solution, as recommended by NUMARC, is not to focus on the credentials of the distributor but on the traceability of the circuit breaker itself. A purchaser can be assured of having a new circuit breaker only if the breaker can be traced back to the original manufacturer.

2. Indicators of Refurbished Breakers

Typically, refurbished circuit breakers sold as new equipment have one or more of the following characteristics:

- The style of breaker is no longer manufactured.
- The breakers may have come in cheap, generic-type packaging instead of in the manufacturer's original boxes.
- Refurbished circuit breakers are often bulk-packaged in plastic bags, brown paper bags, or cardboard boxes with handwritten labels. New circuit breakers are packed individually in boxes that are labeled with the manufacturer's name, which is usually in two or more colors, and are often date stamped.
- The original manufacturer's labels and/or the Underwriter's Laboratory (UL) or Factory Mutual (FM) labels may have been counterfeited or removed from the breaker. Refurbishing operations have been known to use copying machines to produce poor quality copies of the original manufacturer's and the certifying body's labels.
- Breakers may be labeled with the refurbisher's name rather than the label of a known manufacturer.
- The manufacturer's seal (often multicolored) across the two halves of the case of the breaker is broken or missing.
- Wire lugs (connectors) show evidence of tampering.
- The surface of the circuit breaker may be nicked or scratched yet have a high gloss. Refurbishers often coat breakers with clear plastic to produce a high gloss that gives the casual observer the impression that the breaker is new. The plastic case of new circuit breakers often have a dull appearance.
- Some rivets may have been removed and the case may be held together by wood screws, metal screws, or nuts and bolts.

ATTACHMENT I - REFURBISHED MOLDED CASE CIRCUIT BREAKERS (cont.)

- Contradictory amperage ratings may appear on different parts of the same refurbished breaker. On a new breaker, the amperage rating is stamped into, raised from, or machine-painted on the handle of the circuit breaker. In order to supply a breaker with a hard-to-find rating, refurbishers have been known to file down the surface of the handle to remove the original rating and hand-paint the desired amperage rating.

3. Testing

In a news release dated February 6, 1989, the National Electrical Manufacturers Association (NEMA) announced the cancellation of its Publication AB-2-1984 entitled, "Procedures for Field Inspection and Performance Verification of Molded-Case Circuit Breakers used in Commercial and Industrial Applications," and stated the following:

"These procedures were intended for use with breakers that had been originally tested and calibrated in accordance with NEMA Standards Publication AB 1 or Underwriters Laboratories Standard UL 489, and not subsequently opened, cleaned or modified...Therefore, the Standards Publication contained none of the destructive test procedures...necessary to verify the product's ability to withstand such conditions as full voltage overload or short circuit. Without such tests, even if a rebuilt breaker had passed the tests specified in AB-2, there would be no assurance that it would not fail under overload or short circuit conditions. It is NEMA's position that regardless of the results of electrical testing, refurbished electrical circuit breakers are not reliable and should not be used."

4. Precautions

Follow these precautions regarding suspect or refurbished circuit breakers.

A. Require that molded-case breakers be new and unaltered. Proof that they are new and unaltered requires the vendor to show traceability back to the original manufacturer.

B. Do not rely completely on dealing with authorized dealers for protection from purchasing refurbished molded-case circuit breakers.

C. Approve formal procedures for inspecting circuit breakers that are received and installed according to the indicators of refurbished breakers listed above.

D. Contact the original manufacturer if any indication of misrepresentation is encountered. There are many original manufacturers of molded-case circuit breakers whose products are being refurbished and sold as new. These manufacturers have the most specific information about how to ensure that their products have not been refurbished.

ATTACHMENT I - REFURBISHED MOLDED CASE CIRCUIT BREAKERS (cont.)

5. Disposition

A. Segregate and retain all circuit breakers found with indications that they may be refurbished. These will be retained as potential evidence until specifically released by the Office of Inspector General and the Office of Nuclear Safety for Price Anderson Enforcement. Circuit breakers that may be refurbished may only be disposed of when the above organizations no longer need them as evidence.

B. Report suspect electrical components to Occurrence Reporting and Processing System (ORPS). The ORPS categorization group should be identified as "Cross-Category items, Potential Concerns or issues." The description of cause section in the ORPS report should included the text "suspect counterfeit parts."

C. Witness and document the destruction of all suspect/counterfeit circuit breakers when approval is given for disposal.

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ATTACHMENT J - ASSESSMENT/SURVEILLANCE LINES OF INQUIRY

1. S/CI processes and other S/CI related processes are effective in addressing the safety-related aspects of S/CI.

2. Formal supplier qualification and re-qualification processes are established and implemented, including routine collection of evaluations of feedback on vendor performance.

3. Controls are established on a graded basis that considers the risks involved and historical experience with S/CIs.

4. Controls are implemented for segregation and separate storage of material identified as suspect/counterfeit

5. Subcontractors have established and implemented sufficient controls to preclude an introduction or use of S/CIs. These controls address construction materials, maintenance or modification equipment and components, and the use subcontractor owned or rented equipment (cranes, hoists, etc.) on site.

6. S/CI processes, requirements, and controls are fully integrated into Integrated Safety Management (ISM) and quality assurance programs and procedures, e.g, training, procurement, maintenance, and assessment) to ensure adequate linkage to S/CI elements.

7. Expectations are established for timeliness in determining whether nonconforming items are S/CI.

8. Protocols are established for clearly identifying S/CIs that are determined to be acceptable for use

9. Inspections for S/CI materials are incorporated into routine maintenance activities, and clear guidance is provided for the disposition of installed S/CI materials identified during routine inspections and maintenance activities.

10. Expectations for S/CI controls are integrated within existing processes, such as routine and special inspections for S/CIs in site procedures, and guidance is provided for performing such inspections.

11. Roles and responsibilities and interfaces for management of S/CIs are clearly assigned, including provisions for the handling of sensitive information and interfacing with the local Office of the Inspector General (IG), to ensure effective, consistent, and timely communication of S/CI information.

12. S/CI reporting requirements are effectively integrated into the site contractors' processes for disposition of non-conforming items, such as NCR processes, as required by appropriate DOE directives.

13. Lessons learned processes are evaluated to determine whether all available and relevant information resources, such as the Government Industry Data Exchange Program (GIDEP), are being utilized for screening S/CI and other relevant information for potential applicability to site activities.

ATTACHMENT J – ASSESSMENT/SURVEILLENCE LINES OF INQUIRY (cont.)

14. Lessons learned processes are evaluated to ensure that significant requirements and performance expectations have been established for the documentation of applicability reviews, needed actions, and actions taken for lessons learned that require line management attention and action.

15. Lessons learned requiring line management actions are integrated with the site's corrective action management processes to ensure formal tracking, feedback, and closure of actions taken.

16. Corrective actions and management procedures include formal linkage to S/CI reporting requirements for the site office, Occurrence Reporting System (ORPS), contractor General Counsel, and the IG.

17. Site mechanisms, such as a controlled product list, are established and used to maintain current and accurate information on S/CIs. Provisions are available for making this list readily available to site personnel who have S/CI responsibilities for procurement, inspection, and other areas associated with the implementation of S/CI controls.

18. S/CI training programs-include the identification of positions and associated personnel required to receive training, the processes for designating those personnel who must receive initial and refresher training, and the required frequencies for refresher training.

19. All personnel involved in design, system engineering, procurement, inspection, maintenance, and other functions involving potential S/CI materials receive S/CI process and hands-on training.

20. Training programs place special emphasis on ensuring that system engineers involved in the design, procurement, and inspection of materials and components with the potential for S/CI receive such training.

21. Subcontractors involved in the procurement or handling of potential S/CI materials and components receive initial and refresher training and are knowledgeable of site S/CI processes, procedures, requirements, and controls.

22. S/CI training addresses site-specific processes and procedures for identifying, dispositioning, and reporting S/CIs, including reporting to the IG.

23. S/CI processes are subject to regular self-assessment, consistent with site self-assessment protocol.

24. Assessments are performed for S/CI processes to evaluate significant changes to the S/CI processes and to establish a baseline for implementation where appropriate. Based on that baseline review, further assessments are tailored to the maturity of the S/CI processes.

25. S/CI lines of inquiry are considered and evaluated, as appropriate, during assessments of areas that interface with S/CI processes (procurement process, NCR process, etc.).

DMJM technology

amec

TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Appendix F

Request for Information

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

REQUEST FOR INFORMATION

Project # RFI.XXX
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Contract/Project No.

TO BE COMPLETED BY SUBCONTRACTOR

Insert Title of RFI Here

Originator (Name) & Company:

Problem/Deficiency: ☐ Clarification ☐ Change

Proposed Solution:

Basis of Change:

Note: Subcontractor to provide cost and schedule impacts associated with each discrete change line item.
Response: ☐ Clarification ☐ Change COST ☐ Yes ☐ No SCHEDULE ☐ Yes ☐ No
Required Response Date:

Cost Impact	Schedule Impact

Subcontractor (sign/date)

TO BE COMPLETED BY THE BUYER

RFI Approved ☐ Yes ☐ No CN Required: ☐ - CN # ____ CN Not Required: ☐ As-Built documentation Required: ☐ As-Built documentation Not Required: ☐ Submittal Data Required: ☐ Yes ☐ No	COMMENTS Design Lead / Proj Mgr / Date

RFI.Feb 2004

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TECHNICAL SPECIFICATION

PROJECT:	Final DBVS Design	145579-D-SP-011	REV. 1
PROJECT NO.:	145579	SECONDARY WASTE PUMP SKID	
CLIENT:	AMEC E&E - Richland, Washington		

Appendix G

Instrumentation Naming and Tagging Convention

(3 pages including cover)

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G1 EQUIPMENT IDENTIFICATION NUMBER

The equipment identification number (EIN) is comprised of three fields, SYSTEM-COMPONENT-SEQUENCE. Where SYSTEM is the plant Area 00,31-37, COMPONENT is the ISA-loop function code, and SEQUENCE is the device number within the Area.

Example: Waste dryer Area 33 Instrument Junction Box 33-IJB-001.

Note: The Hanford FARM and LOCATION fields do not apply to the Demonstration Bulk Vitrification System and have been dropped from this convention.

G2 CABLE TAGGING

Cables shall be tagged using From Source & To Destination information. The format will be "FROM-TO" or "FROM-TO-##" if more than one cable run.

Example:

Two Cables:	From	36-CAB-123 to 36-IJB-123
Cable Tag:		"36CAB123-36IJB123-C1"
Cable Tag:		"36CAB123-36IJB123-C2"

G3 WIRE TAGGING

Wires will be tagged using the equipment tag and polarity.

Example 1: Wires connected from instrument 36-FIT-123 (24V dc)

Positive Tag "36FIT123(+)"
Negative Tag "36FIT123(-)"

Example 2: Wires connected from instrument 36-LSH-123 (110V ac)

Positive Tag "36LSH123(H)"
Negative Tag "36LSH123(N)"

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G4 NOTES

1. Cables shall be identified with cable tag number "source-destination-type." Types will be as follows:

   M = Motor Feeder Cable; L = Local Control Station Cable; MH = Motor Stator Heater; RTD = Motor Winding Temperature Detector; MA = Motor Armature Cable; MF = Motor Field Cable; C = Control Cable; F = General Feeder Cable; A = Ammeter Cable; T = Tachometer Cable; COM = Communications Cable; RS484, Ethernet, Fibre.

   Analog cables from junction box to field instrument will only be tagged with the instrument tag number.

2. Cables will be tagged on both ends with the same cable tag number.

3. Equipment, motor, and instrument tag numbers shown are for illustration purposes only. Use project specific equipment, motor, and instrument tags.

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CHANGE NOTICE

Page 1 of 1

CN No. 145579-011-CN-002

Change Notice (CN) Category (Check One) Supplemental ☒ Direct Revision ☐ Cancel ☐ Quality Program Procedure Change ☐	Originator's Name and Signature: Charles Grenard		Date 4/19/05
Affects Cost? Yes ☐ No ☒	Project Title/ Project No. Demonstration Bulk Vitrification System	Design Verification Required (Independent Review) Yes ☐ No ☒	Safety Class (If Rq'd) N/A
Affects Schedule? Yes ☐ No ☒	Primary Document Changed by this CN (include sheet no. and rev) 145579-D-SP-011, Revision 1	Affected Documents Superseded Yes ☐ No ☒	Contract No. 145579
Other Documents Affected by this CN: None			

Reason for Change:
1. To correct an inconsistency between the specification 145579-D-SP-010, 011 and 031 noted by the Department of Ecology, comment #12. CH2M Hill has requested that the waste property inconsistencies be rectified. No inconsistencies were identified with regard to viscosities when comparing the most recent specification changes. An inconsistency with the pH was identified and is being corrected with this ECN.
2. Correction of typo noted by the Department of Ecology, comment #13.
3. Correction of typo noted by the Department of Ecology, comment #14.

Detailed Description of Change (Use Continuation Sheet as Applicable):
1. In Table 3-4, change the pH from ">13" to "10+"
2. Section 3.2.4(7), line 5: Change "log and tag" to "lock and tag."
3. Section 3.2.6(5), line 1: Change "outside of an extended period of time" to "outside for an extended period of time."

Review/Approval Authorities: A = Approval, R = Review, I = Information (Check where applicable for change notice)

Printed Name/Signature	Date	R	A	I	Printed Name/Signature	Date	R	A	I
Originator Charles Grenard	4/19/05	☐	☒	☐	Process Technology Manager		☐	☐	☐
DMJM Project Manager Jim Frederickson	4/20/05	☐	☒	☐	Independent Reviewer* Kurt McCracken		☐	☒	☒
Program Director Michael Wiemers		☐	☐	☐	Bill Bp 4-21-05		☐	☐	☐
Engineering Manager Ja-Kael Luey	4/20/05	☐	☒	☐	AMEC Design Engineering Lead Mark Lucas	4/20/05	☐	☒	☐
DMJM Quality Assurance Ross Truitt	4/20/05	☐	☒	☐	AMEC Quality Assurance or Designee	4/20/05	☐	☒	☐
Manager of Projects Dave Bennett		☐	☐	☐	CH2M HILL Project Manager or Designee 4/21/05	4/21/05	☐	☒	☐

* Design Verification per EP 3.9 required? Yes ☐ No ☒ Assign Independent Reviewer

CN Incorporated? PM or designee sign and date: _____

EP 3.8.1F October 2003

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TECHNICAL SPECIFICATION
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The document revision number is indicated below. Please replace all revised pages of this document and destroy the superseded copies.

PROJECT:	**Final DBVS Design**	**145579-D-SP-031**	**REV. 1**
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REV. NO.	ISSUED FOR	ORIGIN	DATE	INITIAL
A	For Internal Review	MEP	28-Sep-04	MEP
B	For Internal Approval	MEP	12-Oct-04	MEP
C	For CH2M Hill Review	MEP	22-Oct-04	MEP
0	Construction	MEP	02-Dec-04	MEP
1	Construction	MEP	18-Mar-05	MEP

DOCUMENT APPROVAL

CLIENT APPROVAL (AMEC RICHLAND)

Original Approvals on File

Project Manager: AR Carlson (for Bill Bishop)

Date: 3/21/05

Q.A. Rep.:

Date: 3/21/05

CLIENT APPROVAL (CH2M HILL) with comment*

Project Manager: SSC 3/29/05

Date: 3/29/05

AMEC AMERICAS LIMITED (TRAIL)

Original Approvals on File

Project Manager: J. Heim

Date: Mar 18, 2005

Discipline Lead:

Date: Mar 18, 2005

Originator:

Date: March 18, 2005

* Revise 3.3.2.7 to delete plant air system reference and change to secondary waste tanks.

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145579-D-DS-031.1 Secondary Waste Storage Tanks Data Sheet
F-145579-37-D-0003 Secondary Waste Tank Assembly

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Acronym List

°F	Degrees Fahrenheit
AISC	American Institute for Steel Construction
AMEC	AMEC Americas Limited
ANSI	American National Standards Institute
API	American Petroleum Institute
aq	Aqueous Solution
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	American Society of Testing and Materials
AWS	American Welding Society
CFR	Code of Federal Regulations
CH2M HILL	CH2M HILL Hanford Group, Inc
CMTR	Certified Material Test Reports
CoC	Certificate of Conformance
CP	CentiPoise
DBVS	Demonstration Bulk Vitrification System
DOE	Department of Energy
EDPM	Ethylene Propylene Diene Monomer
ETF	Effluent Treatment Facility
FAT	Factory Acceptance Test
ft^3/ft^2	Feet Cubed/ Feet Squared
gal	Gallon
Hp	Horsepower
ℓ	Liquid
lb	Pound
NCR	Nonconformance Report
NDE	Non Destructive Examination
OGTS	Off Gas Treatment System
OSHA	Occupational Safety and Health Association
psi	Pounds per Square Inch
QA	Quality Assurance

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RF	Raised Face
SAE	Society of Automotive Engineers
SCR	Selective Catalytic Reduction
usgpm	United States Gallons Per Minute
UL	Underwriters Laboratories
US	United States

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1.0 SCOPE

1.1 PURPOSE

AMEC is part of a team that has been selected by the CH2M HILL Hanford Group, Inc. (CH2M HILL) to design, fabricate, test, and deploy a Demonstration Bulk Vitrification System (DBVS) to receive, dry, and immobilize waste from an underground storage tank located in the 200 West Area of the Hanford Nuclear reservation. A component of the DBVS is the Secondary Waste Storage Tanks.

Any discrepancies noted in this specification or between this specification and other documentation shall be noted and referred to the Buyer for resolution before proceeding with design or fabrication of the item in question.

Throughout this specification;

1. The secondary waste storage tanks will be referred to as storage tanks;
2. The dryer condensate, OGTS scrubber effluent and the Tri-Mer®[1] scrubber bleed shall be referred to as secondary waste;
3. Throughout this specification, Contract Responder shall act as the Seller and AMEC shall act as the Buyer.

1.2 SCOPE OF SUPPLY

The Seller's Scope of Supply shall include, but not be limited to, the design, analysis, fabrication, inspection, testing, documentation, packaging, and shipping of double walled tanks for storage of three liquid waste streams; the dryer secondary waste; scrubber secondary waste (from the Off Gas Treatment System (OGTS)); and the Tri-Mer® scrubber secondary waste in the event that the Selective Catalytic Reduction Unit (SCR) is not operational. The secondary waste will be distributed as follows; the dryer secondary waste will be fed into tanks 37-D74-009 and 37-D74-010, the OGTS scrubber secondary waste will be fed into tanks 37-D74-011 and 37-D74-012 and the Tri-Mer® scrubber secondary waste will be fed into tanks 37-D74-013 and 37-D74-014. The material to be stored in these tanks is considered hazardous and radioactive waste that is regulated

[1] Tri-Mer® is a registered trademark of Tri-Mer Corporation

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under the requirements of WAC 173-303-640 *Washington Administrative Code, Tank Systems*, and 10 CFR 830 *Nuclear Safety Management*.

The Seller shall provide storage tanks including the vacuum/pressure relief devices, work platforms, and stairways as necessary to access tank nozzles located on top of the tanks. The Seller shall provide all submittals and perform all inspections and tests including the structural and natural phenomena hazard analysis required by this specification. From the results of the tests, Seller shall provide anchoring hardware and tie-down parts for the tanks.

Work not included in the Seller Scope of Supply is as follows:

1. Provide the valve secondary containment housings and the associated valving for the top and front of the tanks;
2. Provide the instrumentation and controls;
3. Provide the piping jumpers and/or hose-in-hose transfer lines connecting the tanks;
4. Procure the tank heaters, and flushing hardware;
5. Install at the Buyer's Site; and
6. Breather Filters.

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2.0 APPLICABLE DOCUMENTS

The following documents, of the exact issue shown, form a part of the basis of design to the extent specified in the application sections of this document. In the event of a conflict between documents referenced herein and the requirements of this specification, the requirements of this specification shall take precedence.

Documents applicable to the work scope are shown in Table 2-1 and Table 2-2. The latest issue and addenda to the documents in effect at the time of procurement (unless otherwise specified) shall apply and form a part of the basis of design for this specification to the extent specified in the applicable sections of this document. In the event of a conflict between documents referenced herein and the requirements of this specification, the requirements of this specification shall take precedence. All conflicts shall be brought to the attention of the Buyer for resolution.

2.1 GOVERNMENT DOCUMENTS

Table 2-1: Government Documents

Document Number	Title
10 CFR 830	Nuclear Safety Management
29 CFR 1910 (2003)	Occupational Safety and Health Standards
DOE/RL-92-36	Hanford Site Hoisting and Rigging Manual
WAC 173-303-640	Washington Administrative Code, Tank Systems

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2.2 NON-GOVERNMENT DOCUMENTS

Table 2-2: Non-Government Documents

Document Number	Title
AISC ASD	American Institute of Steel Construction – Allowable Stress Design
ANSI/AWWA D100	Welded Steel Tanks for Water Storage
API 620	Design and Construction of Large, Welded, Low-Pressure Storage Tanks
ASCE 7-98	Minimum Design Loads for Building and Other Structures
ASME B16.5	Pipe Flanges and Flanged Fittings
ASME B30.20	Standard Below-the-Hook lifting Devices
ASME NQA-1 (1994) *(See note at end of table)	Quality Assurance Requirements for Nuclear Facility Applications
ASME PCC-1	Guidelines for Pressure Boundary Bolted Flange Joint Assembly
ASME Section VIII, Div 1 or Div 2	Boiler and Pressure Vessel Code – Rules and/or Alternative Rules for Construction of Pressure Vessels
ASNT-SNT-TC-1A	Recommended Practice – Non-Destructive Testing
ASTM A36	Standard Specification for Carbon Structural Steel
ASTM A53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A105	Standard Specification for Carbon Steel Forgings for Piping Applications
ASTM A106	Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A108	Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
ASTM A193	Standard specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
ASTM A307	Standard specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A325	Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A354	Standard specification for Quenched and Tempered Alloy Steel Bolts, Studs and other Externally Threaded Fasteners
ASTM A500	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

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Table 2-2: Non-Government Documents

Document Number	Title
ASTM A563	Standard specification for Carbon and Alloy Steel Nuts
ASTM A569	Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial
ASTM B18.2.1	Square and Hex Bolts and Screws - Inch Series
ASTM D5162	Standard Practice for Discountability (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
AWS D1.1	Structural Welding Code – Steel
AWS QC-1	Standard for AWS Certification of Welding Inspectors
SAE J429	Mechanical And Material Requirements for Externally Threaded Fasteners, Standard
TFC-ESHQ-QC-C-03, Rev. B	Control of Suspect/Counterfeit Items
TFC-PLN-09, Rev A-1	Human Factors Program
UL 142	Steel Above Ground Tanks for Flammable and Combustible Liquids

* The relevant requirements of NQA-1 are included in Section 4.0.

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3.0 TECHNICAL REQUIREMENTS

The following is a description of the characteristics of the storage tanks. The Seller shall provide a similar documentation stating the ability of their equipment to comply with the necessary procedures.

3.1 ITEM DEFINITION

The storage tanks are designed to double-contain secondary wastes.

3.1.1 Item Diagram

The secondary waste storage tank interfaces are shown in Figure 3-1.

3.1.2 Interface Definition

The minimum set of nozzles and fittings, and the associated physical requirements are identified in the attached drawing F-145579-37-D-0003. The secondary containment housings for the inlet and outlet valves are not within the Seller's scope of work; however, the flanged connections for the Buyer-installed secondary containment housings on the top and front of the tank are included in the Seller's work scope. A conceptual nozzle layout is shown in the attached drawing F-145579-37-D-0003 for a rectangular tank. The nozzle layout for a horizontal, cylindrical tank would be similar. The actual nozzle layout shall be recommended by the Seller and shall be approved by the Buyer. The storage tanks will be installed and anchored on a compacted gravel surface.

1. The secondary waste and the vacuum/pressure protection nozzle shall be located inside the valve secondary containment riser on top of the tank. See Section 3.2.2 for details.

   (a) If the valve secondary containment covers the top of the tank, the riser shall provide unrestricted drainage to the secondary containment tank.

   (b) If the valve secondary containment does not cover the top of the tank, a 2-inch drain pipe shall be provided inside the tank from the top secondary containment housing to the tank secondary containment.

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2. The secondary waste outlet nozzle shall be located inside a valve secondary containment riser on the front of the tank. The riser shall provide unrestricted drainage from the secondary containment tank into the housing flange. See Section 3.2.2 for details.

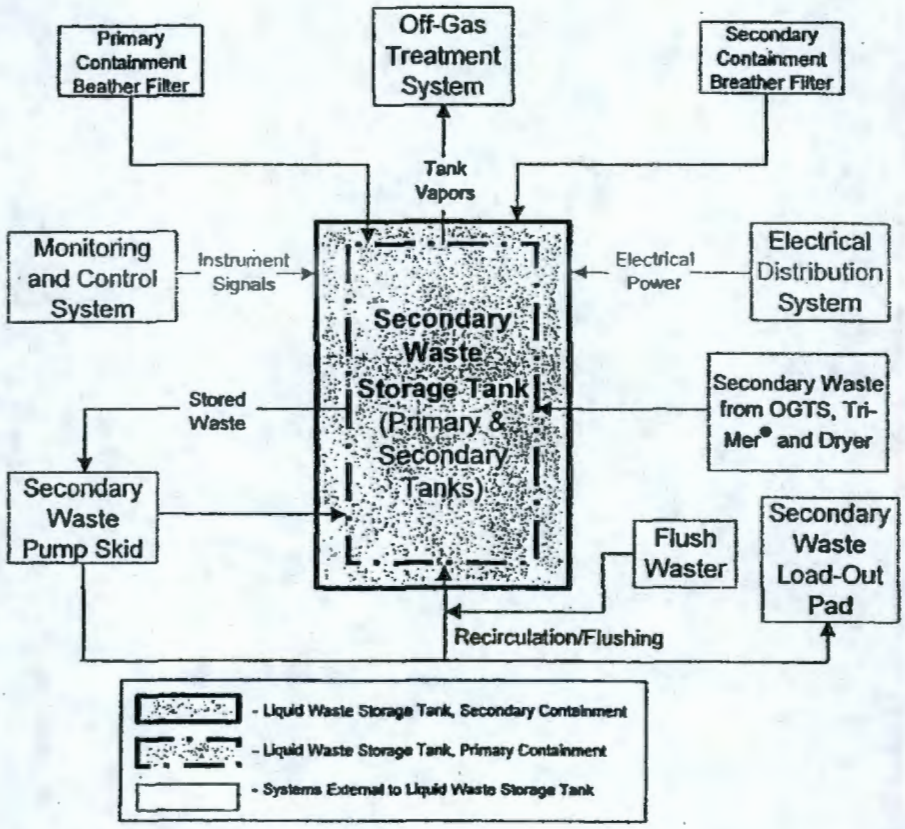

Figure 3-1: Secondary Waste Storage Tank Interfaces

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3.2 CHARACTERISTICS

The characteristics (e.g., functional, physical, performance, and environmental requirements) that the storage tanks must satisfy are described below.

3.2.1 Functional Characteristics

The functional characteristics of the storage tanks are identified below.

3.2.1.1 Receive Secondary Waste

The secondary waste storage tank receives all secondary waste generated by the DBVS process prior to removal to the effluent treatment facility (ETF). Each storage tank shall be capable of receiving up to 15,000 gal of secondary waste. The secondary waste storage tank flows are as shown in Table 3-1. The waste shall be discharged above the maximum liquid level (see Section 6.0). The three streams are distributed separately to two tanks per stream for a total of six tanks. The OGTS scrubber and Tri-Mer® scrubber streams will be caustic and the dryer steam will be neutral, as seen in Table 3-1. The characteristics of the secondary waste streams are listed in Table 3-1. The weight compositions of the secondary waste streams are listed in Table 3-2.

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Table 3-1: Secondary Waste Physical Properties

Properties	Data
DRYER SECONDARY WASTE:	
Temperature:	50 - 150°F
Supernatant Liquid Density:	0.98 g/mL
Fluid pH:	7
Viscosity:	1.00 CP (max.)
Pump Flow Rate:	25 USGPM
Ave. Continuous Rate:	0.98 USGPM
Total Flow per one Dryer Batch	1483 USG
Ave. Design Rate during 8 hr Dryer Batch:	3.1 USGPM
Total Capacity for one ICV™ Box:	~12,000 USG
OGTS SCRUBBER SECONDARY WASTE:	
Temperature:	~77°F
Supernatant Liquid Density:	1.07 g/mL
Fluid pH:	10+
Viscosity:	1.5 CP (max.)
Ave, Continuous Rate:	0.56 USGPM
Design Rate during 139 hr Melt Batch:	0.80 USGPM
Total Capacity for one ICV™ Box:	~7,000 USG
TRI-MER® SCRUBBER SECONDARY WASTE:	
Temperature:	~77°F
Supernatant Liquid Density:	1.02 g/mL
Fluid pH:	9+
Viscosity:	1.2 CP (max.)
Ave. Continuous Rate:	4.3 USGPM
Design Rate during Melt Operation:	6.2 USGPM
Total Capacity for one ICV™ Box (based on 70 hrs of operation):	~26,000 USG

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Table 3-2: Secondary Waste Composition

Analyte	Analyte Weight %
DRYER SECONDARY WASTE:	
Water:	100.00
I-29 Average Continuous Activity Rate:	2.5E-05 Ci/hr
OGTS SCRUBBER SECONDARY WASTE:	
Composition	**Mass %**
Water:	89.41
NaOH (aq):	0.47
Na_2SO_3 (aq):	0.87
NaCl (aq):	0.04
$NaNO_3$ (aq):	1.60
Na_2CO_3 (aq):	7.61
Average Continuous Activity Rate Ci/Hr	
Cs-137:	6.5E-06
Tc-199:	2.6E-07
TRU:	3.8E-11
I-129:	6.8E-09
Co-70:	5.78E-11
Eu-154:	2.65E-10
TRI-MER® SCRUBBER SECONDARY WASTE	
Composition	**Mass %**
Water:	84.3
NaCl:	2.6
NO_3 (aq)	2.8
Na+ (aq)	1.02
Na_2SO_3 (aq)	3.0
$NaNO_3$ (aq)	0.3
NaOH (aq)	0.1
$NaNO_2$ (aq)	0.22
Na_2SO_4 (aq)	3.1

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Table 3-2: Secondary Waste Composition

Analyte	Analyte Weight %
Average Continuous Activity Rate CI/HR	
Cs-137	4.6E-11
Tc-199	1.8E-11
TRU	2.7E-15
I-129	5.5E-13
Co-70	4.13E-15
Eu-154	1.9E-14

3.2.1.2 Store Secondary Waste

Each storage tank shall have a usable capacity of at least 15,000 gal. The maximum capacity of each tank shall not exceed 18,000 gal. The usable capacity is the total tank volume minus the minimum heel minus the minimum gas space (see Section 6.0 for definitions). The characteristics of the secondary waste stream are listed in Table 3-1.

1. The storage tanks shall be designed for four (4) psig over fully loaded condition or standard design pressure, whichever is greater at 150°F.

2. Each storage tank shall have vacuum/pressure relief devices capable of limiting the tank gas pressure/vacuum. The relief setpoints shall be as specified by the design code, however, the relief pressure shall not be greater than 2 psig and the vacuum relief pressure shall not be less than –0.4 psig.

3.2.1.3 Supply Secondary Waste

The tank shall be designed to provide an outlet flow rate of 70 gal/min without drawing air into the piping with no more than 1,000 gal of waste in the tank. The design shall include vortex breakers or other devices as necessary to limit vortexing near the outlet nozzle.

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3.2.1.4 Receive Re-circulated Secondary Waste

The storage tanks shall be capable of receiving secondary waste re-circulated from an interfacing system through the secondary waste receipt nozzle by virtue of a three-way valve, at a flow rate of 50-70 gal/min. The secondary waste shall be discharged approximately one (1) foot below the maximum liquid level. The secondary waste characteristics are listed in Table 3-1.

3.2.1.5 Contain Waste Leakage

The storage tanks shall include a secondary containment capable of containing leaks from the primary containment and the associated hoses at or below the maximum expected liquid level of the tank. The secondary containment shall be capable of holding the maximum contents of the tank (assuming the primary tank liquid level will equalize with the liquid in the secondary confinement enclosure).

1. Secondary containment is not required more than 6 inch above the maximum liquid level.

2. The gap between the primary and secondary containments shall not impede the flow of leaked waste to the low point of the annulus.

3. The primary and secondary containment shall be sloped to a minimum of 1/8 in. per foot toward the front, so that leaked waste will flow to the low point of the annulus.

3.2.2 Physical Characteristics

1. The storage tank dimensions, including the support structure, shall not exceed 9 feet wide by 16 feet high when sitting on the ground (not including easily removed hardware) by 50 feet long.

2. The size and nozzle spacing requirements for both valve secondary containment risers are shown in the secondary waste tank assembly drawing F-145579-37-D-0003. The secondary containment riser flanges shall be at least three (3) inches beyond the surrounding surfaces.

3. The storage tank soil/floor loading limit shall be less than or equal to 3,000lb/ft^2.

3.2.3 Reliability

The Bulk Vitrification plant is expected to operate 24 hours per day, 7 days per week. Service work will be done during scheduled downtimes. The service life is 2 years and the design life is five years.

The failure of any DBVS component shall not compromise safe maintenance or post corrective action operations of the DBVS.

3.2.4 Maintainability

Maintainability for the secondary waste storage tanks is defined as accessibility to the nozzles, tank interior, and supply of any special tools necessary for maintenance.

3.2.4.1 Accessibility

3.2.4.1.1 Access to Top of Tank

Personnel access to the top of the storage tanks shall be provided by a stairway. The stairway may be shipped separate from the tanks.

3.2.4.1.2 Access to Tank Nozzles

The storage tanks shall have a work platform with handrail, kickplate, and access gate that provides safe access and travel to nozzles and manways on top of the tank. The work platforms shall consist of one or more layers of carbon-steel plate with a total thickness of not less than ¼ inch.

1. For a tank with a flat top, the platform shall be at least as wide as the secondary containment tank and may be integral with the primary or secondary containment.

2. For a horizontal, cylindrical tank, the width of the work platform shall be at least two-thirds the diameter of the secondary containment tank and may be integral with the secondary containment.

The access platform need not be integral with the tank, but can be supported by a structure provided by the Seller in accordance with ASCE 7–98, *Minimum Design Loads for Building and Other Structures.*

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3.2.4.1.3 Access to Tank Interior

The storage tanks shall have at least two, 30-inch manways to provide access for inspection, maintenance, and decontamination. The centerline spacing between the two manways must be greater than 50 percent of the tank length.

3.2.4.2 Special Tools

The storage tanks should be designed for relocation and/or maintenance using commercially available tools and equipment. If required, the Seller shall submit a list identifying recommended special tools and equipment (including a justification of why and when the tool is required), shall be provided to the Buyer for approved special tools and lifting devices, and shall provide all the information needed to replace the tools (e.g., detailed drawings or procurement information). The tanks will be empty when lifted. Special tools and lifting devices provided by the Seller shall become the property of the Buyer.

3.2.5 Environment

This equipment will be operated outdoors. Any equipment and related enclosures installed outside shall be designed to operate and be stored in the climatic and environmental conditions listed below.

(i) Ambient air temperature range is -25°F to 115°F with a maximum 24-hour differential of 50°F;

(ii) Relative humidity ranges from near 0 to 100%;

(iii) Maximum precipitation is 1.6 inches in a 24-hour period;

(iv) Sand and dust concentrations are 1.10×10^{-5} lbm/ft^3 with a typical size of less than 150 μm;

(v) Solar radiation is expected to be a maximum 900 Langleys distributed over a 24 hour period.

Tanks shall be designed to minimize the potential for standing water on the outside of the tank.

3.2.6 Transportability and Storage

The storage tank shall be designed to be transported to the site by truck; onsite transportation shall be by permanently attached or detachable wheels.

The empty tanks shall be designed to withstand a 0.75 gravity (forward), hard braking stop and a rearward acceleration of 0.25 gravity, as well as shock and vibration loads associated with transportation.

The ladder shall be removed for transportation of the tanks.

Parts removed for transport shall be match marked for assembly upon delivery.

3.2.7 Safety

The storage tanks shall be designed to maintain the safety of operators, general public, and equipment. The equipment supplied by the Seller shall incorporate any design features to comply with the applicable subparts of 29 CFR 1910, *Occupational Safety and Health Standards.*

The secondary waste storage tanks shall be designed to be compliant with WAC 173-303-640.

3.3 DESIGN AND CONSTRUCTION

3.3.1 Parts/Materials/Processes

The minimum requirements for material and fabrication processes for the storage tanks are specified below.

3.3.1.1 Parts

The vacuum/pressure relief valve design will be determined by the Seller and shall be submitted to the Buyer for review and approval.

3.3.1.2 Materials

The Seller shall select materials based on the design life specified in the Section 3.2.3 of materials subjected to the secondary waste stream characteristics described in Section 3.2 with the radiation exposure described in Section 3.3.3 of this specification.

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3.3.1.2.1 General

1. All parts and materials shall be new.
2. Material selection shall be identified in the Seller documents to the Buyer. Material type and grade shall be clearly identified on the Bill of Materials.
3. Certified Material Test Reports (CMTR) are required for all materials which will be or may come in contact with the secondary waste or secondary waste vapors (*e.g., the secondary containment) and all material provided for* structural support. The Seller shall identify any materials for which CMTRs do not exist and shall submit a request for approval to the Buyer before use.

3.3.1.2.2 Material Exclusions

1. No aluminum or "yellow" metals are to be used.
2. No beryllium shall be present.
3. No lead shall be used in the design unless it is fully encapsulated and identified with a permanent tag.
4. *No equipment shall use or require the use of polychlorinated biphenyls.*
5. Exposed polymer materials shall be constructed of anti-static materials.
6. No asbestos shall be used.

3.3.1.2.3 Carbon Steel

Carbon-steel products shall comply with the material specifications identified in Table 3-3. The Seller shall identify and submit the appropriate standards for any material not identified in the table.

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Table 3-3: Storage Tank Material Requirements

	Standard	Other
Plate	ASTM A 36/A 36M[a]	General purpose, hot-rolled, low-carbon steel
Sheet	ASTM A 569[b]	–
Structural Shapes	ASTM A 36/A 36M[a]	–
Bars and Rods	ASTM A 108[c]	• Minimum yield of 36,000 lb/in^2 • Maximum carbon content 0.35%.
Rectangular Tubing	ASTM A 500[d], Grade B	–
Pipe	ASTM A 53/A 53M[e] Type S, Grade B	Seamless
Pipe Flange Fittings	ASTM A 105/A 105M[f]	Flanges for pipe greater than 1/2 in. shall be standard 150-lb raised-face flanges in accordance with ASME B16.5[h] and shall be made from the same type of steel as the pipe in which it will be welded. Flange assembly and bolting shall be performed in accordance with ASME PCC-1[i].

[a]ASTM A 36/A 36M, *Standard Specification for Carbon Structural Steel*, American Society of Testing and Materials, New York, New York.

[b]ASTM A 569, *Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[c]ASTM A 108, *Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[d]ASTM A 500, *Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[e]ASTM A 53/A 53M, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*, American Society of Testing and Materials, New York, New York.

[f]ASTM A 105/A 105M, *Standard Specification for Carbon Steel Forgings for Piping Applications*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

[g]ASME B16.5, *Pipe Flanges and Flanged Fittings*, American Society of Mechanical Engineers, New York, New York.

[h]ASME PCC-1, *Guidelines for Pressure Boundary Bolted Flange Joint Assembly*, American Society of Mechanical Engineers, New York, New York.

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3.3.1.2.4 Fasteners

The Seller shall ensure that fasteners used are not suspect in accordance with the U.S. Department of Energy Suspect/Counterfeit Parts List provided in Appendix A - TFC-ESHQ-QC-C-03 *Control of Suspect/Counterfeit Items*. Suspect fasteners can be identified by the following inspection methods:

1. Head markings are marred, missing, or appear to have been altered;
2. Threads show evidence of dressing or wear (threads should be of uniform color and finish);
3. Head markings are inconsistent with a heat lot; and
4. Head markings matching one of those identified on the U.S. Customs Service, Appendix A Suspect Fastener Headmark List

The Seller shall select fasteners using the following guidelines:

1. Carbon-steel bolts shall be ASTM A 307 *Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength*, or better, depending on strength and torque requirements. Carbon-steel nuts shall be ASTM A 563A *Standard Specification for Carbon and Alloy Steel Nuts*. Bolts and cap screws shall be grade marked.

   (a) All graded fasteners shall conform to ASME B18.2.1 Square and Hex Bolts and Screws - Inch Series, SAE J429 Mechanical and Material Requirements for Externally Threaded Fasteners, Standard, and ASTM A 354 Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs and other Externally Threaded Fasteners.

2. No fasteners shall be capable of vibrating loose under transporting or operating conditions. All such joints should be tack welded or have some equivalent means of ensuring they remain intact. Joints using ASTM A 325 *Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength* or ASTM A 193/A 193M *Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service* bolts shall not be tack welded. Double-nutting is not an acceptable

method of securing fasteners. Loctite®[2] threadlock may be used where applicable.

3.3.1.2.5 Gaskets

Pipe flange connections shall use PSI Inc., LineBacker®[3] sealing gaskets with stainless steel as the retainer material and Viton®[4] as the sealing element. LineBacker® Type F sealing gaskets shall be used for raised face flanges and LineBacker® Type E sealing gaskets shall be used for flat face flanges. CMTRs are not required for gaskets or seals, copies of Certificates of Conformance (CoC) shall be provided.

Valve, secondary containment housing flange connections shall use ethylene propylene diene monomer (EDPM) gaskets (minimum of 1/8 in. thick) and shall be water tight. Water tightness shall be verified during Factory Acceptance Testing (FAT). The Seller shall provide a spare set of gaskets for all secondary containment housing flange connections for each tank.

3.3.1.3 Welding

3.3.1.3.1 Welding Standard

Structural welding shall be performed in accordance with AWS D1.1/D1.1M *Structural Welding Code - Steel.*

3.3.1.3.2 Welding Inspection

Fabrication/erection welding shall be performed by the Seller. At a minimum, all welds shall be visually inspected. Welds that form part of the primary containment boundary must receive a 100 percent magnetic particle examination. Additional inspection requirements shall be as specified on the Seller's drawings in accordance with AWS D1.1/D1.1M (Annex C) guidelines based on the stress analysis results.

The Buyer retains the right to perform weld verification inspections or have a qualified testing agency perform weld verification inspections.

[2] Loctite is a registered trademark of Henkel Corporation
[3] LineBacker® is a registered trademark of Pipeline Seal and Insulator, Inc.
[4] Viton® is a registered trademark of DuPont Dow Elastomers

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3.3.2 Industry and Government Standards

The storage tanks shall be either commercial grade tanks inspected to API 620 *Design and Construction of Large, Welded, Low-Pressure Storage Tanks* or designed, fabricated, and tested in accordance with any of the following codes and standards as applicable (or another code or standard approved by the Buyer):

1. ANSI/AWWA D100 *Welded Steel Tanks for Water Storage*
2. API 620 *Design and Construction of Large, Welded, Low-Pressure Storage Tanks*
3. ASME Section VIII *Boiler and Pressure Vessel Code*, Division 1 *Rules for Construction of Pressure Vessels* or Division 2 *Alternative Rules for Construction of Pressure Vessels*,
4. UL 142 *Steel Above Ground Tanks for Flammable and Combustible Liquids*

The designs shall be modified as required to satisfy the requirements of this specification.

3.3.2.1 Design Loads

The storage tanks equipment shall conform to allowable loading factors as defined by the American Institute for Steel Construction (AISC) for the loads identified below. The Seller shall submit details of structural mounting brackets and attachments to the equipment for loading analysis by the Buyer.

3.3.2.2 Dead Loads

Dead loads include the weight of all permanent materials and equipment, including the storage tanks equipment weight and the weights of fluids and materials being handled.

3.3.2.3 Live Loads

Live loads are those loads produced by the use of the storage tanks and do not include construction and environmental loads such as wind load, snow load, rain

load, earthquake load, flood load, or dead load. Live loads are produced by operations and maintenance workers and equipment.

- Live loads shall be not less than the minimum uniform load or concentrated load stipulated in ASCE 7 – 98 *Minimum Design Loads for Building and Other Structures.*
- The minimum roof design live load shall be 20 lb/ft^2 (includes ashfall).
- The weight of service equipment that may be removed with change of occupancy of a given area shall be considered as live load.

3.3.2.4 Snow Loads

Snow loads for the storage tanks shall be in conformance with ASCE 7 - 98. A ground snow load, Pg of 15 lb/ft^2 shall be used for calculating roof snow load. Unbalanced snow loads resulting from drifting or sliding shall be considered. Snow loads, full or unbalanced, shall be substituted for roof live loads where such loading results in larger members or connections.

3.3.2.5 Wind Loads

The storage tanks shall be designed to resist pressures from wind from any direction. Partial wind loading shall be considered if it produces a more severe effect. Wind load design shall comply with ASCE 7 - 98, using the 85 mph "three-second gust wind velocity" with an importance factor of 1.15 exposure category C.

3.3.2.6 Hoisting and Rigging Loads

Hoisting and Rigging shall be in accordance with DOE/RL-92-36 *Hanford Site Hoisting and Rigging Manual.* The lifting apparatus (eyebolts, hoist rings, and lifting bails) shall be designed in accordance with the ASME B30.20 *Standard Below-the-Hook Lifting Devices.* Equipment designed and fabricated by Seller shall have a factor of safety of 3 based on yield strength. Equipment purchased by Seller shall have a factor of safety of 3 based on yield strength. Documents shall be provided to the Buyer demonstrating incorporation of these safety factors. The Seller shall identify the total weight, the center of gravity, and the lift points and rigging methods necessary for lifting each storage tank component. Lift

points shall be identified with yellow paint. Any special tooling, spreader bars or other recommended fabricated devices for lifting shall be provided by the Seller

3.3.2.7 Seismic Loads

The plant air system shall be designed for earthquake induced horizontal forces. The method shall be as in the Uniform Building Code (UBC). However, earthquakes need not be considered as acting concurrently with wind. The site seismic zone is 2B and the soil type is SC.

3.3.3 Radiation

(a) Electromagnetic. Does not apply.

(b) Nuclear. The storage tank materials shall operate in a 0.00233 mR/h radiation field with a cumulative radiation dose of less than or equal to 60.55 R without failure.

3.3.4 Cleanliness

Before assembly, and before preparing for shipment, all components shall be cleaned by flushing clean water and/or blown clean and dry with compressed air to the extent that any extraneous materials, such as those listed below, are not present:

(a) Metallic or other dusts (shop dust), chips, turnings, and weld splatter;
(b) Abrasive particles;
(c) Rust and other loose corrosion particles;
(d) Magnetic/liquid penetrate residues, dye check, etc.;
(e) Foreign material, such as paper, tape, plastic, sand, and wood;
(f) Cutting oils;
(g) Excess lubrication, grease, and oil; and
(h) Marking dyes.

The fabrication procedure shall describe the cleaning and packaging steps taken.

The storage tank equipment ports and pipe openings shall be temporarily capped following cleaning and drying for shipment. Packaging requirements following cleaning are documented in Section 5.3 of this document.

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3.3.5 Corrosion of Parts

Carbon-steel surfaces shall be protected from corrosion by coating or painting the surfaces (see Section 3.3.6).

3.3.6 Protective Coatings

1. Surfaces that are normally in contact with secondary waste and/or secondary waste vapors shall be protected with a coating material that is compatible with the secondary waste and the radiation levels specified elsewhere in this specification.

   (a) The surfaces shall be prepared and the coating installed in accordance with the manufacturer's instructions. The procedure for preparing and coating the surfaces shall be submitted to the Buyer for review and approval.

2. Exterior surfaces shall be protected from corrosion with paint that is compatible with the secondary waste and the radiation levels specified elsewhere in this specification.

   (a) The surfaces shall be prepared and the coating installed in accordance with the manufacturer's instructions.

3.3.7 Interchangeability

The storage tanks shall have an identical and interchangeable design. It is the Buyer's preference that the coating material be compatible with each of the specified materials to maximize interchangeability of the tanks.

3.3.8 Identification and Marking

All equipment that is designed to be mechanically lifted shall have marked lifting points and be marked with the lifting weight and the center of gravity. Lift points shall be identified with yellow paint.

All specialized lifting devices shall be marked in accordance with DOE/RL-92-36 *Hanford Site Hoisting and Rigging Manual*, as follows.

(a) Structural and mechanical below-the-hook devices shall be provided with identification displaying the following data, as a minimum:
- Rated load,
- Manufacturer's name,
- Lifting device weight (if over 100 lb),
- Drawing number (if applicable), and
- Serial number (if applicable).

The identification data may be displayed on a nametag, nameplate, metal stamp, or other permanent marker. If the lifting device comprises several lifting devices that can be detached from the assembly, these individual lifting devices shall be marked with their individual load rating also.

Nozzle numbers shall be labeled with paint in accordance with the attached drawing F-145579-37-D-0003.

3.3.9 Nameplates

The assembled system shall have a Seller provided nameplate with the following minimum information: project number, purchase order number, assembly name and number (provided by the Buyer), assembly weight, and this specification number (including revision).

3.3.10 Human Engineering

Human factors engineering principles and criteria shall be integrated into the design of systems and the facilities that house and support these systems in accordance with TFC-PLN-09, Rev A-1 *Human Factors Program*. Operator movements and accessibility of equipment and controls in the work area shall be considered, and practical access to each system component for operation and maintenance shall be provided. Components shall be designed to allow handling and maintenance by personnel outfitted in protective clothing and gloves, as required.

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3.3.11 Qualification

3.3.11.1 Structural Analyses

1. The storage tanks shall be capable of being moved by crane.

   (a) The storage tanks shall be designed to be lifted in accordance with AISC *Manual of Steel Construction—Allowable Stress Design* using a safety factor of 3 based on yield strength and a safety factor of 5 based on ultimate strength.

2. The Seller shall submit the design drawings, and the structural and seismic analyses for the storage tanks to the Buyer for review. The Seller will perform the storage tank structural and seismic analyses. The Seller shall allow two weeks for this review. The Seller shall then incorporate the Buyer's comments and submit the final design drawings to the Buyer for approval. The Seller should allow one week for the approval process.

3.3.12 Document Submittal

Each document submittal shall be identified with this specification number, item number, purchase order number, and Seller's identification number. Submittals shall be transmitted to the Buyer in accordance with the directions found in the Drawing and Data Commitment sheet in attached data sheets, 145579-D-DS-031.1.

Data shall be sufficiently clear to allow legible copies to be made on standard reproduction equipment after microfilming.

Along with the bid submittal, the items shown in the Drawing and Data Commitment sheets shall be included. The schedule shall show equipment fabrication, testing, and delivery as noted on the inquiry. The drawings shall show full compliance with this specification (and the associated drawings/documents) or note any exceptions. The Seller shall allow 10 working days for the Buyer to review and state the disposition of each submittal.

Approval by the Buyer does not relieve the Seller from the responsibility for accuracy or adequacy of design under this specification.

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Submittals are divided into two types: (1) Those requiring "approval before proceeding" (i.e., weld procedures or pre-purchase evaluation data); and (2) Those requiring "approval before shipment" (i.e., vendor information data).

Submittals requiring approval before shipment will be reviewed to verify completeness and adequacy for their intended purposes.

Unacceptable items that require approval before proceeding will be handled as specified below.

A submittal requiring approval that is not approved by the Buyer, will be dispositional as:

1. "Not Approved, Revise and Resubmit." The submittal is considered technically deficient, or incomplete, and is therefore unacceptable. Re-submittal is required; hence fabrication, procurement, or performance of procedures shall not proceed.

2. "Approved with Exception." Fabrication, procurement, and performance of procedures may proceed, and re-submittal is required to verify incorporation of the exception. Final acceptance of the item is contingent upon the Buyer's receipt and approval of the corrected submittal.

Submittals requiring approval before shipment that are determined to be incomplete or inadequate will be marked "Resubmit" and will be returned. An explanation of the deficiencies will be included for corrective action by the Seller.

The Seller shall provide fabrication traveler(s) for the fabrication and testing of the above-described storage tank equipment. The fabrication traveler(s) shall include detailed procurement, fabrication, assembly, testing, shipping, and handling steps required to properly fabricate, assemble, and test the equipment in accordance with the drawings and specifications.

A proposed schedule of fabrication, inspection, and testing of all storage tank equipment shall be submitted for review with the bid and approval with the submittal of the fabrication traveler(s).

The Buyer will insert witness/hold points in the fabrication traveler during their review and approval of the fabrication traveler. Witness points can be waived by the Buyer but must be document in writing. Hold points require the Buyer personnel to be present during the fabrication, inspection, or test step.

3.3.13 Personnel and Training

Records for the following areas shall be prepared and made available for the Buyer. Review of the qualifications may be subject to a surveillance or source inspection by the Buyer.

3.3.13.1 Welding Procedure Qualifications

Welding procedures qualifications shall be submitted and approved by the Buyer before welding is performed.

3.3.13.2 Coatings Application Qualification

If required, appropriate training will be provided to personnel applying and performing testing of coatings.

3.3.13.3 Workmanship

1. General: Remove all burrs and break all sharp edges
2. Drawings
   (a) Dimensioning and tolerancing shall be interpreted per ANSI Y14.5M and.
   (b) Tolerances not specified on drawings shall be as shown in Table 3-4.

Table 3-4: Standard Drawing Dimension Tolerances

Dimension	Tolerance
One Decimal Place	± 0.1
Two Decimal Places	± 0.06
Three Decimal Places	± 0.030
Angular	± 2°

3. Welding to Ball Valves

   (a) *Ball valves shall be disassembled before welding to the valve body.*

4. Piping and components

   (a) Pipe flange, man-way, and flange faces shall be within plus or minus ±2° degrees of vertical or horizontal, whichever is appropriate;

   (b) Pipe flange bolt holes shall straddle centerlines;

   (c) Material and debris shall be removed from piping and components before welding/assembly; and

   (d) Secondary containment housing flanges shall be flat.

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4.0 QUALITY ASSURANCE REQUIREMENTS

4.1 GENERAL

4.1.1 Quality Assurance Program

The Subcontractor/Supplier shall have a documented, implemented and maintained Quality Assurance Program that is based on a national standard and identifies the activities and items to which it applies. Instructions and procedures must include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished. The Quality Assurance Program must address each of the areas discussed within this QA Requirements Flow-down. The Subcontractor/Supplier must submit the Quality Assurance Program to the Buyer for review prior to award of contract.

The Subcontractor/Supplier shall assess its Quality Assurance Program regularly to assure its effective implementation.

The Quality Assurance Program shall provide for indoctrination and training, as necessary, of personnel performing activities affecting quality to assure that suitable proficiency is achieved and maintained. Personnel who conduct inspection and test activities shall be qualified to conduct those activities and certification of the qualification must be submitted to the Buyer upon request.

4.1.2 Design

The Subcontractor/Supplier must define, control, and verify designs developed for this contract. Design inputs must be specified on a timely basis and correctly translated into design documents. Design interfaces must be identified and controlled. Persons who did not design the item must be used to verify design adequacy. Design changes, including field changes, must be reviewed and approved by the same personnel who reviewed and approved the initial designs.

4.1.3 Procurement Document Control

Procurement documents must include or reference sufficient quality and technical requirements in order to describe the items and services requested. Procurement documents must be reviewed and approved by the authorized personnel within

the Subcontractor's/Supplier's organization, and changes must be reviewed and approved by the same individuals who reviewed and approved the original procurement documents.

The Subcontractor/Supplier must have a process for accepting procured items. This process must include one or a combination of the following: Certificate of Conformance, source verification, receiving inspection, and post-installation testing.

The Subcontractor/Supplier shall provide a legible and reproducible Certificate of Conformance. The Certificate of Conformance shall be signed by the Subcontractor's/Supplier's authorized representative responsible for quality assurance.

The Certificate of Conformance shall contain, as a minimum, the following information:

- Identification of the Buyer's contract or purchase order number under which the materials, equipment, component, or service is being purchased;
- Provide traceability by means of positive identification from the material, equipment, component, or service to the Certificate of Conformance;
- Identify the specific procurement requirements met by the material, equipment, component, or service supplied (i.e., codes, standards, or other applicable specification). The procurement requirements shall include any approved changes, waivers, or deviations applicable to the subject materials, equipment, component, or service;
- Identify any procurement requirements that have not been met, together with an explanation and the means for resolving the nonconformance.

The Subcontractor's/Supplier's certification system, including the procedures to be followed in filling out a certificate and the administrative procedures for review and approval of the certificates, shall be described in the Subcontractor's/Supplier's QA Program.

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The certification system shall provide a means to verify the validity of Subcontractor/Supplier certificates and the effectiveness of the certification system, such as during the performance of audits of the Subcontractor/Supplier or independent inspection or test of the items. The Buyer shall conduct this verification at intervals commensurate with the Subcontractor's/Supplier's past quality performance.

The Subcontractor/Supplier is required to flow-down all quality assurance requirements from this contract to any sub-tier suppliers/Subcontractor/Suppliers. Any access to the sub-tier suppliers'/Subcontractor/Suppliers' facilities for verification activities will be requested through the Subcontractor/Supplier prior to access, and verification activities may be performed jointly.

The Subcontractor/Supplier shall warrant that all items furnished under the contract are genuine (i.e., new, not refurbished, not counterfeit) and match the quality, test reports, markings, and/or fitness for intended use as required by the contract. Any materials furnished as part of the contract that the government or other duly recognized agency had been previously found to be suspect/counterfeit shall not be used.

All items are subject to inspection at the Subcontractor's/Supplier's facility or lower-tier subcontractor's facility. The Subcontractor/Supplier shall notify the Buyer at least 7 working days in advance of the time when such items or activities will reach the Buyer's identified inspection hold points. As a minimum, final inspection prior to packaging for shipment shall be considered such a hold point, unless specifically waived by the Buyer.

The Subcontractor/Supplier shall obtain all materials to be delivered under the contract directly from the original manufacturer or an authorized manufacturer's representative. The Subcontractor/Supplier shall provide legible and reproducible documentation, with the materials, that provides objective evidence that the items were provided by the original manufacturer. Such documentation may include a copy of the purchase order to the manufacturer, shipping documentation or manufacturer invoice; each of which would identify that the materials were obtained from the original manufacturer.

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The Subcontractor/Supplier shall submit, with or prior to item shipment, a recommended spare parts list. The list shall provide the name and address of the original supplier of the replacement part, and the part's drawings, specification, or catalog identity including applicable change or revision information.

All items and/or services procured under this specification shall be subject to inspection by the Buyer or Buyer's representative throughout the contract. Additionally, procured items and/or services shall be subject to inspection for acceptance.

The Subcontractor/Supplier shall grant access to the Subcontractor's/Supplier's plant facilities and records for inspection or audit by the Buyer, his designated representative, and/or other parties authorized by the Buyer.

4.1.4 Identification and Control of Items

The Subcontractor/Supplier shall establish controls to assure that only correct and accepted items are used or installed.

All items shall be identified with the applicable part number, model number, or other identifier prescribed in the specification. Identification shall be on the item or the package containing the item. When the identification is on the item, such marking shall not impair the service of the item or violate dimensional, chemical, or physical requirements.

The Subcontractor/Supplier shall submit a legible and reproducible copy of the product data sheet (e.g., drawing, catalog cut sheet, brochure, etc.) that provides adequate information to enable the Buyer to verify the form and function of the articles procured. One copy of such documentation, unless otherwise specified, shall accompany the item.

The Subcontractor/Supplier shall identify each item, assembly, package, container, or material, having limited shelf life, with the cure date or date of manufacture and the expiration date. The Subcontractor/Supplier shall specify any storage temperatures, humidity and environmental conditions that should be maintained. Material shall not be furnished having less than 75 percent of total shelf life available at time of shipment.

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Certified Material Test Reports (CMTRs) containing actual chemical analysis and mechanical properties of the material being supplied shall be submitted prior to or with each shipment of material. Each CMTR shall contain the following information as a minimum:

- Product Description – specification(s), codes, type of material, etc.;
- Actual results of chemical analysis/mechanical testing in accordance with the provisions of the code, standard, and/or specification;
- The specification and material grade;
- Traceability to the item tested (e.g., heat number, lot number, etc.);
- Name and address of manufacturer (may be identified by letterhead, logo, etc.);
- Manufacturer's ASME certificate number and expiration date;
- Buyer's contract number and item number to which the report applies;
- The report shall be signed by an authorized representative of the manufacturer.

4.1.5 Control of Processes

The Subcontractor/Supplier shall have processes to control processes, including special processes that control or verify quality (e.g., welding, heat treating, and nondestructive examination). Special processes must be performed by qualified personnel using qualified procedures in accordance with specified requirements.

Subcontractor/Supplier personnel performing weld inspections shall be certified as a CWI in accordance with the requirements of the American Welding Society (AWS), QC-1. The following documentation shall be submitted for Buyer approval prior to the start of fabrication:

- Current AWS CWI certification;
- Current/valid visual acuity examination (must be given every 3 years); and
- Visual weld inspection procedure(s).

Welding procedures and personnel shall be qualified in accordance with applicable AWS or ASME requirements specified in the contract. The

Subcontractor/Supplier shall submit copies of all welding procedures, procedure qualification records, and welder qualification records to be employed. Buyer review and approval of these documents is required prior to start of fabrication.

Nondestructive Examination (NDE) personnel shall be qualified and certified in accordance with the recommended guidelines of the American Society of Nondestructive Testing (ASNT) SNT-TC-1A. The Supplier is not authorized to begin fabrication until the following documentation has been approved by the Buyer:

- NDE personnel qualification and certification procedure;
- Level I, II, and/or III personnel qualification and certification records, including objective evidence of NDE training, formal education, examination, experience, date of hire and current visual acuity exam;
- NDE method procedure(s) compliant with the applicable requirements of the Buyer's contract.

NDE reports and radiographs shall be traceable to the item examined, shall include all essential examination parameters, and shall be signed and dated by a qualified/certified NDE examiner. All NDE reports and radiographs shall accompany or preceded shipment of the item or component. Radiographs and radiographic technique and examination reports shall be subject to approval by the Buyer prior to shipment.

These requirements shall be passed to lower-tier subcontractors.

4.1.6 Inspection

The Subcontractor/Supplier shall have a process to plan and execute inspections to verify conformance of an item or activity to specified requirements. The process shall document the characteristics to be inspected and inspection methods to be employed. The Subcontractor/Supplier shall document the results of inspections. Inspections for acceptance shall be performed by persons other than those who performed or directly supervised the work being inspected.

The Subcontractor/Supplier shall submit, as required by the contract, legible, reproducible copies of inspection and/or test reports. The reports shall include, as a minimum, the following information:

- Identification of applicable inspection and/or test procedure;
- Resulting data for all characteristics evaluated, as required by inspection or test procedures, including reference to information on action taken in connection with nonconformances;
- Traceability to the item inspected/tested (e.g., serial number, part number, lot number, etc.), date of inspection, name of inspector, type of observation; and
- Signature of the Subcontractor/Supplier's authorized representative or agency performing the inspection or test.

4.1.7 Test Control

The Subcontractor/Supplier shall have a process to plan and execute tests to verify conformance of an item or activity to specified requirements. The process shall document the characteristics to be tested and test methods to be employed.

The Subcontractor/Supplier shall prepare a detailed test plan. Prior to starting work, the plan shall be submitted to the Buyer for approval and insertion of Buyer's designated source inspection/witness notification points. The test plan shall provide the following at a minimum:

- Traceability to Buyer's purchase/contract order document number;
- Name or description of the item to be tested (e.g., components, assemblies, subassemblies); and
- Method/procedure to be used during test.

Subsequent revisions/modifications to the test plan require review and approval by the Buyer prior to implementation of the changes.

The Subcontractor/Supplier shall provide test reports that include, as a minimum:

- Item tested,
- Date of test,
- Tester or data recorder,
- Type of observation,
- Results and acceptability,
- Action taken in connection with any deviations noted, and
- Person evaluating test results.

Test plans and test reports must be submitted to the Buyer for the project records.

4.1.8 Handling, Storage, and Shipping

The Subcontractor/Supplier shall prepare and submit for Buyer review and approval, prior to use, procedure(s) or plan(s) for the packaging and shipping of materials, equipment, or components to be furnished under the contract. The procedure(s) or plan(s) shall include, as appropriate, cleanliness inspection prior to packaging, use of preservatives and coatings, descriptions of specially designed shipping containers, handling and rigging data, final inspections and the type of transfer and shipping vehicles.

4.1.9 Control of Nonconforming Items

The Subcontractor/Supplier must have a process to control items that do not conform to specified requirements to prevent inadvertent installation or use. These controls must provide for identification, documentation, evaluation, segregation (when practical), and disposition of nonconforming items, and for notification to affected organizations.

All nonconforming conditions identified at the Subcontractor/Supplier's facility, with a proposed disposition of "Accept-as-Is" or "Repair," as defined below, shall be approved by the Buyer before Supplier implementation of the Nonconformance Report (NCR) disposition:

- **Accept-as-Is:** Nonconforming materials will perform its intended function.
- **Repair:** Nonconforming item can be corrected so that its characteristics meet requirements of the contract.

Nonconforming items identified as "Repair" or "Rework" shall be re-examined in accordance with applicable procedures and with the original acceptance criteria, unless the nonconforming item disposition has established alternate acceptance criteria.

Nonconformances shall be documented by the Subcontractor/Supplier on their own nonconformance form or one provided by the Buyer. After documenting the nonconformance and providing a proposed disposition and technical justification, the report shall be submitted to the Buyer.

After the proposed disposition has been evaluated, and approved or rejected by the Buyer, the form shall be returned to the Subcontractor/Supplier. Corrective action may only take place after Buyer approval. Copies of completed, Buyer approved, NCRs shall be shipped to the Buyer with the affected item.

4.1.10 Quality System for Material Specifying Additional Testing – ASME III/VIII

Materials shall be manufactured and controlled under a quality program in accordance with the appropriate issue of ASME Section III or VIII. The manufacturer shall have an appropriate Quality System Certificate (e.g., Material Manufacturer, Material Supplier) and utilize it to control their activities associated with execution of the Buyer's contract.

The Supplier's ASME-approved QA Program shall be used during the performance of the contract and shall be subject to audit and approval by the Buyer or its representatives as warranted. The Subcontractor's/Supplier's QA Program and manufacturer's ASME certificate shall be submitted to the Buyer with the proposal.

Where such documentation has been submitted to the Buyer within the previous 12 months and such documentation has not been revised, re-submittals are not necessary. In this instance, the Subcontractor/Supplier shall reference the QA Program title and expiration date.

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4.2 RESPONSIBILITY FOR VERIFICATION

The Seller is responsible for verifying that the storage tanks satisfy all the requirements of this specification. All test procedures and test data sheets prepared for the verification will be submitted to the Buyer for approval.

4.2.1 Verification Methods

The Seller shall perform verification tests appropriate for the qualifications listed in Section 4.3.

4.3 QUALIFICATION VERIFICATION

Qualification verification will be performed through review of the record submittals.

Both inspection and test plans shall be submitted to the Buyer for review and approval a minimum of ten working days before performing the associated inspection or test. The Buyer reserves the right to witness all tests and shall be given a minimum of ten working days written notice before each test date.

4.4 INSPECTIONS AND TESTS

4.4.1 General

The Seller shall qualify Inspection and Test Personnel performing acceptance inspections and testing. In addition, the Seller shall document all qualifications. Review of personnel qualifications may be subjected to surveillance or source inspection by the Buyer.

The results of these inspections and tests shall be documented and submitted to the Buyer for review and approval before storage tank acceptance. Buyer approval of the inspection and test results indicates concurrence that the inspection and test results verify compliance with the associated design requirements.

4.4.2 In-Process Inspections

Procedures shall be submitted by the Seller to the Buyer for all in-process testing and inspections required by the codes and this specification. The procedures submitted shall address the flushing and drying of residual water from hydrostatic testing, if used. All test procedures and results shall be submitted to the Buyer for review and approval according to the document submittal schedule listed in the Attached data sheets, 145579-D-DS-031.1.

4.4.3 Final Inspection

A final inspection shall be performed in accordance with the Seller's standard practices. At a minimum the Seller shall verify that the tank skid assembly's critical dimensions, as identified in the attached drawing F-145579-37-D-0003, are within the specified tolerances. Storage tank as-built drawings shall be produced from this inspection.

4.4.4 Factory Acceptance Testing

The secondary waste tanks shall be hydrostatically tested in accordance with the following subsections. The results shall be recorded and a video record of the hydrostatic tests shall be submitted to the Buyer with test records/documents.

The vacuum/pressure relief shall be tested with results submitted to the Buyer for review and approval before final acceptance.

Before performing the FAT, an FAT procedure shall be submitted to the Buyer for review and approval according to the document submittal schedule listed in Attached data sheets, 145579-D-DS-031.1. The results of the FAT shall be documented and submitted to the Buyer for review and approval before final acceptance of each storage tank.

The FAT performed by the Seller shall include as a minimum, and not limited to, the tests described in the following sections.

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4.4.4.1 Primary Containment

The primary containment for each storage tank shall be hydro-tested by filling the tank with water and then pressurizing the tank. The pressure at the bottom of the tank shall be 130 percent of the pressure that will be experienced when filled with secondary waste at the maximum density identified in Table 3-1. The test pressure shall be held for a minimum of four (4) hours with no visible/detectable leakage. Components that could prevent performance of this test or that could be damaged during the test shall be isolated or removed and the associated fitting shall be flanged, capped, or plugged. The test results shall be recorded and included in the final data package.

4.4.4.2 Secondary Containment

The secondary containment for each storage tank shall be hydro-tested by first filling the primary containment with water and then filling the secondary containment with water. Pressure at the bottom of the tank shall be 130 percent of the pressure that will be experienced when filled with waste at the maximum density identified in Table 3-1. The test pressure shall be held for a minimum of 4 h with no visible/detectable leakage and the tank side wall deflection compared to the corner structure shall not be greater than 1/4 in. The secondary containment shall be dried for 24 hours by forced airflow to remove any remaining moisture from the pressure test. Components that could prevent performance of this test or that could be damaged during the test shall be isolated or removed and the associated fitting shall be flanged, capped, or plugged. The test results shall be recorded and included in the final data package.

4.4.4.3 Secondary Containment Drain Test

The unobstructed flow of liquid from the top, secondary containment housing flange to the front, secondary containment housing flange shall be verified by test. The test shall consist of slowly pouring 2.4 gallons of water at approximately 0.25 gal/min into the top, secondary containment housing as far away from the drain pipe as possible and collecting water draining from the front, secondary containment housing. At least 2.0 gallons of water shall be collected within 1 hour after start of the test. The test results shall be recorded and included in the final package. A calculation will be performed during detailed design if the Seller determines it is necessary. The Seller will need to meet this requirement or

provide a basis for changing it. The sump will be designed to provide a 1-inch liquid depth with only 1.5 gallons. Only ½" is necessary for detection with a mini-probe.

4.4.4.4 Lift Tests

1. Each storage tank shall be lifted to determine the actual tank weight, the actual load at each lift point, and to verify the tank center of gravity.

2. The lift points for each storage tank shall be load tested to verify adequacy of the lifting components and accessories. Weight shall be added as required such that each lift point is supporting at least 125 percent of the actual load measured above. The lifting components and accessories shall not incur any damage because of this test. A 100 percent visual and magnetic particle inspection shall be performed for all welds at the lift points or within the load path to the lift points shall be performed following the lift test. The test results shall be recorded and included in the final data package.

3. The Seller will determine the number of load cells required. The test will verify the load at each lift point is within the design load and that the lift fixture, if one is needed, is properly designed.

4.4.4.5 Protective Coatings

Interior protective coatings shall be tested for holidays in accordance with ASTM D5162 *Standard Practice for Discountability (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates* or an equivalent national standard.

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5.0 PREPARATION FOR DELIVERY

5.1 GENERAL

Each storage tank shall arrive at the Buyer's specified site fully assembled and in the same condition it was in when it passed the FAT.

5.2 PRESERVATION AND PACKAGING

Before packaging, the Seller shall remove all residual water using oil-free, dry air. All open pipe ends shall be sealed to prevent ingress of debris and vermin. The tanks shall be cleaned to remove any dirt or dust that may have accumulated during testing. Defects in the paint (including the primary containment coating) shall be touched up or repaired.

5.3 PACKING

1. The tanks shall be inspected for cleanliness before packaging. Dirt, oil, residue, metal chips, or other forms of contamination shall be removed in accordance with Section 3.3.4. Any entrapped water shall be removed.

2. All openings into items shall be capped, plugged, and sealed with materials, which perform their intended function without causing deleterious effects on the equipment or its operation. Nozzles within the secondary containment housing flanges shall be plugged before placing a cap or seal on the housing flange.

   (a) Nonmetallic plugs and caps shall be brightly colored. Clear plastic caps or plugs are not to be used except when specified.

   (b) Plugs or caps shall be prevented from falling into or being pushed into openings after packaging, preservative coatings shall be visually inspected after loading. Damaged areas shall be repaired. If shipped with desiccants, the desiccant shall be inspected after loading to verify that seals are intact.

3. Precautions shall be taken to minimize marring of the finish of painted surfaces during handling and shipping, as practicable.

4. Cables, slings, chain falls, etc., shall not be placed where they can cause damage to any component part.

5. Items not specifically covered by these requirements shall be handled in accordance with sound material handling practices.

5.4 MARKING

The storage tanks shall be properly and clearly marked in accordance with Section 3.3.8.

5.5 HANDLING

If required, the Seller shall lift tanks using the lifting points designed for that purpose. The Seller shall provide rigging sketches and a handling procedure with the first tank. The sketches shall identify the tank weight, sling locations, balance points, methods of attachment, and other information necessary for safe handling. Special rigging required to lift the tanks shall be shipped to the Buyer at the same time the first tank is delivered.

The Seller shall provide any requirements for offloading and installation of the storage tanks.

5.6 SHIPPING

The Seller shall prepare the storage tanks for delivery to the Buyer's specified site located near the U.S. Department of Energy's Hanford Site in Richland, Washington in a manner that permits ease of inspection by the Buyer's personnel. The equipment will remain the property of the Seller until the Buyer has completed a receipt inspection at the Buyer's facility. The Seller shall be responsible for the tanks through shipping and site receipt inspection and shall be responsible for any damage that may occur during shipping.

The equipment will remain the property of the Seller until the Buyer has completed a receipt inspection at the Buyer's facility.

The Seller shall obtain approval to ship from the Buyer before the equipment is prepared for shipment.

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5.7 RECEIVING

The Buyer's agent will perform a receipt inspection of the tanks at the Buyer's specified site. This receipt inspection shall ensure the tank caps and seals are all in place the interior coating was not damaged during shipping, and there is no physical damage to the tanks.

1. If caps and/or seals are missing, the Seller shall clean the tanks, as required, to achieve the same level of cleanness as provided following the FAT.

2. If the interior coating was damaged during shipment, the Seller shall repair the damage and test the coating to verify the absence of holidays.

6.0 NOTES

1. The minimum heel is defined as the volume left in the tank at the point that air will be sucked into the piping with the outlet flow rate specified for Note 3 below.

2. The minimum gas space is defined as the space required to ensure the tank pressure protection devices will not be activated by temperature fluctuations if the tank is isolated (i.e., not vented) for 24 hours.

3. The maximum liquid level is the liquid level at which the minimum gas space is reached.

7.0 APPENDICES

Appendix	Description
A	TFC-ESHQ-Q_C-C-03 – Control of Suspect/Counterfeit Items

8.0 ATTACHMENTS

Document No.	Description	Revision No.
145579-D-DS-031.1	Secondary Waste Storage Tanks Data Sheet	0
F-145579-37-D-0003	Secondary Waste Tank Assembly	1

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TECHNICAL SPECIFICATION

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APPENDIX A

TFC-ESHQ-Q_C-C-03, REV. B
CONTROL OF SUSPECT COUNTERFEIT ITEMS

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USQ #03-1456-S

CH2M HILL Hanford Group, Inc.	Manual	ESHQ
	Document	TFC-ESHQ-Q_C-C-03, REV B
CONTROL OF SUSPECT/ COUNTERFEIT ITEMS	Page	1 of 52
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1.0 PURPOSE AND SCOPE
(7.1.1, 7.1.2, 7.1.3, 7.1.4)

This procedure describes the process for the identification, prevention, evaluation, notification, and disposition of suspect/counterfeit items (S/CIs) at CH2M HILL. This procedure applies to items that are:

- In the procurement cycle
- In source or receiving inspection
- In inventory at warehouses and staging areas
- Installed
- In operation.

This procedure applies to:

- Company ordered material
- Material supplied by subcontractors
- Material and test equipment supplied by test sponsors
- Construction
- Fabrication shops
- Laboratory work and experiments
- Surplus/excess property
- Government property
- Material obtained from U.S. Department of Energy (DOE) sources.

2.0 IMPLEMENTATION

This procedure is effective on the date shown in the header.

3.0 RESPONSIBILITES

3.1 Procurement Personnel

Maintain awareness of S/CI and support S/CI program implementation.

3.2 Inspection Personnel

Perform inspections for conformance or acceptance of material including verifications that the item(s) being inspected do not exhibit indications attributed to potential suspect/counterfeit items.

3.3 Quality Assurance Engineer

1. Ensures appropriate procurement controls are implemented to preclude entry of S/CI to the site through review of procurement documents.

2. Notifies the S/CI coordinator of nonconformance reports (NCRs) associated with S/CI.

3.4 S/CI Coordinator

Apprises company, DOE, and DOE local Office of the Inspector General personnel of S/CI status and final disposition.

3.5 Assigned Engineering Personnel

1. Evaluate S/CI information for applicability to design and procurement specifications, system configuration, and operating conditions.

2. Provide technical specifications, critical characteristics, and acceptance methods in support of procurement and inspection activities to prevent introduction of S/CI.

3.6 Responsible Managers and Supervisors

1. Maintain awareness of S/CI.

2. Control potential S/CI.

3. Evaluate training needs based on job classification and ensure individuals receive training in S/CI awareness, prevention, detection, and reporting, as appropriate, to respective assignments.

4.0 PROCEDURE

4.1 Introduction

The two most common S/CIs found at DOE facilities have been threaded fasteners fraudulently marked as high-strength bolts, and refurbished electrical circuit breakers sold and distributed under false certifications. Purchasers have also been misled into accepting S/CIs that do not conform to specified requirements by falsified documentation.

NOTE: Questions about a specific item should be referred to the S/CI coordinator. Attachment A provides a historical listing of suspect components. Equipment/material types or classes have been established to identify those specific items which are classified as potentially misrepresented or S/CI. Attachment B provides a listing of those classifications and items subject to S/CI control at tank farm facilities.

4.2 Procurement

CH2M HILL Personnel

1. Ensure material requirements are specified in subcontracts to preclude the purchase or introduction of S/CI. Use the information in Attachments A, B, C, D, E, F, G, H, and I to identify specific components, characteristics, precautions, and other considerations that are to be addressed during the procurement process to prevent introduction of S/CI.

2. Ensure material requests for quality level 1, 2, and 3 items and services include appropriate technical specifications, procurement quality clauses, documentation, and inspection requirements to prevent introduction of S/CI.

3. In maintenance and construction/fabrication subcontracts, specify appropriate requirements to preclude the purchase or introduction of S/CI.

Quality Assurance Engineer	4. Review procurement documents to ensure they contain the appropriate procurement controls to preclude entry of S/CI to the site.
Procurement Personnel	5. Ensure vendor selection complies with qualification requirements for the quality level of the items and services and is based on the vendor's ability to demonstrate the capability of delivering acceptable items.

4.3 Inspection for Potential S/CI

Bill of Material Preparers	1. For quality level 0 and P-Card items listed in Attachment B, designate an S/CI inspection in the special instruction of the Bill of Material (BOM) in accordance with the requirements of TFC-BSM-FPM_MC-C-01.
	2. Ensure quality level 0 and P-Card items are inspected prior to material issuance.
First Line Manager	3. Obtain on-site S/CI inspection for quality level 0 and P-Card items prior to material issue and use.
Engineering Personnel	4. Provide technical specifications, critical characteristics, and acceptance methods to facilitate inspection planning for S/CI prevention and detection.
Quality Assurance Engineer	5. Ensure S/CI detection criteria is incorporated into QA inspection planning activities.
Assigned Inspection Personnel	6. Use Attachments G, H, and I as resources for detecting S/CIs during walkdowns and inspections. Specific items are subject to inspection.
	7. Verify and document that the items being inspected do not exhibit indications attributed to potential S/CIs as described in Attachments G through J.
	8. If an S/CI is detected during inspection activities, document and control the S/CI in accordance with TFC-ESHQ-Q_ADM-C-02.

4.4 Control of Material Identified as S/CI

Responsible Manager or Delegate	1. Ensure items identified as potential S/CI are documented as nonconforming and controlled in accordance with TFC-ESHQ-Q_ADM-C-02. Non conformances identified as S/CI shall be reviewed and processed within four working days to determine whether or not the items are S/CI.
	2. Transfer tagged S/CIs to 2101-HV for storage.
Cognizant Quality Engineer	3. Notify the S/CI coordinator of all NCRs associated with the S/CI.

4.5 Reporting of S/CI

Assigned Company Personnel

1. Report all items identified as potential S/CI in accordance with TFC-OPS-OPER-C-24. (7.1.1)

   NOTE: Reporting of S/CIs is required regardless of safety class, where the S/CIs are located (receiving inspection, inventory/storage areas, fabrication and maintenance areas, installed, etc.), or their operating status.

S/CI Coordinator

2. Notify the DOE S/CI coordinator of all occurrence reports associated with S/CIs. As appropriate, transmit copies of NCRs and applicable documentation.

3. Notify the DOE local Office of Inspector General of all S/CIs. Notification should be e-mailed to the DOE local Office of Inspector General points of contact providing information in the following format:

   - NCR number
   - Date NCR was written
   - Purchase order/job control number (if known)
   - End use of product
   - Name of manufacturer, distributor, supplier
   - Safety class (if known)
   - Occurrence report number
   - Value of item(s)
   - Point(s) of contact
   - Description of item(s)
   - Quantity
   - Description of nonconformance
   - Any other pertinent information that would help the DOE local Office of Inspector General.

4.6 Acceptance, Removal, and Disposition of S/CI

S/CI Coordinator

1. Notify responsible company personnel that S/CI may not be destroyed or disposed of without written release from the DOE local Office of Inspector General.

2 Prior to destroying or disposing of S/CIs, consult the Inspector General to determine if there is a need to retain the items as evidence for potential litigation. Based on the Office of Inspector General's decision, either:

   a. Retain S/CI material as evidence for potential litigation, or

   b. Release S/CI material for final disposition and/or disposal as directed by the S/CI coordinator.

Engineering Personnel	3. Evaluate S/CI to determine if its use could create a safety hazard in its current/proposed application.
Assigned Company Personnel	4. If the engineering evaluation of the S/CI has determined that its use could not create a safety hazard in its current/proposed application: a. Disposition the S/CI to remain in place. NOTE: Criteria for dispositioning S/CI is by acceptance, removal, or replacement after an engineering evaluation. This should be based on the deficient characteristic of the particular item. b. Identify the accepted S/CI by marking with orange paint or other appropriate methods and note its location. c. In areas where operating temperatures are 500°F and above or are subject to cyclic loading where fatigue failure is likely to occur, replace all grades 8 and 8.2 S/CI fasteners prior to further use of the equipment. d. Engineering must also identify a way to prevent its reuse in an application it may not be suitable for. e. If removed, prepare the S/CI for disposal. 5. If the engineering evaluation of the S/CI has determined that its use could create a safety hazard in its current/ proposed application: a. Contact Waste Feed Operations (WFO) Shift Operations to secure the equipment. b. Remove the S/CI as soon as practical. c. Tag, segregate, or otherwise control the S/CI to prevent inadvertent use. d. Prepare the S/CI for disposal.
S/CI Coordinator	6. Ensure that all S/CI material dispositioned for disposal is properly controlled and arranged for the material to be permanently and irrevocably altered so that it cannot be used. Examples of alterations include: • Melting • Shredding • Destroying the threads on fasteners.

7. If the DOE/Office of Inspector General has approved disposal, arrange for pick-up and disposal of the altered S/CI material on a yearly basis. Burying S/CIs may be acceptable if they do not contain hazardous material or material prohibited by federal, state, or local regulations.

4.7 Surplus/Excess Material

Responsible Personnel

1. Remove S/CI from surplus/excess material before they are released for sale or transfer of accountability.

2. Ensure surplus items received from DOE or other facilities are inspected for S/CI prior to installation.

4.8 Assessments

Quality Assurance

1. Conduct assessments of the effectiveness of the S/CI program.

   NOTE: The assessment should be performance based and designed to determine if company activities are conducted in accordance with this procedure, DOE 414.1A, DOE O 440.1A, DOE G 440.1-6, and 10 CFR 830, Subpart A.

2. Lines of inquiry will be used as appropriate during assessments in areas that interface with the S/CI process. See Attachment J.

4.9 Training

Managers and Supervisors

1. Evaluate individual training needs of assigned personnel to ensure they are proficient in S/CI identification and control procedures within their areas of responsibility.

2. All personnel involved in the following specific areas will receive S/CI process and hands-on training, whether it be formal, continuing training, or required reading. The formal training course that is available is Module #1, Course 170720, "Suspect/Counterfeit Items."

   - Quality Assurance/technicians
   - Engineers (design, systems, etc.) who procure materials/equipment
   - Maintenance personnel (electricians, pipefitters, millwrights, instrument technicians)
   - Warehouse personnel who handle and process materials/equipment
   - Tool Crib attendants.

5.0 DEFINITIONS

Counterfeit part. A part made or altered so as to imitate or resemble an "approved part" without authority or right, and with the intent to mislead or defraud by passing the imitation as original or genuine. (Source: U. S. Department of Transportation Federal Aviation Administration Advisory Circular 21-29B, Detecting and Reporting Suspected Unapproved Parts).

Fastener (regardless of the safety classification). (Source: Fastener Quality Act, Public Law 101-592 as amended by Public Law 104-113).

- A screw, nut, bolt, or stud with internal or external threads or a load-indicating washer with a nominal diameter of 5 millimeters or greater in the case of such items described in metric terms; or 1/4 inch or greater in the case of such items in terms of the English system of measurement which contains any quantity of metal and held out as meeting a standard or specification which requires through-hardening; or

- A screw, nut, bolt, or stud having internal or external threads which bears a grade identification marking required by a standard or specification; or

- A washer to the extent that it is subject to a standard or specification applicable to a screw, nut, bolt, or studs described above, except that such term does not include any screw, nut, bolt, or stud that is produced and marked as American Society for Testing and Materials (ASTM) A 307 Grade A or produced in accordance with ASTM F432.

Grade identification. Any symbol appearing on a fastener purporting to indicate that the fastener's base material, strength properties, or performance capabilities conform to a specific standard of a consensus standards organization or government agency.

Graded classifications. System used to determine minimum requirements for structures, systems and components (e.g., design, operation, procurement, and maintenance requirements). The graded classifications in order of precedence are safety class, safety significant, and enhanced quality general services.

High strength graded fastener. Fasteners having a minimum tensile strength of 75 ksi, including those produced and procured in accordance with the Society of Automotive Engineers Standard J429, Grades 5, 5.2, 8, and 8.2; ASTM Standard A325, Types 1, 2, and 3; ASTM A490, ASTM A354, ASTM A449 (I&II), and some ASTM F468.

Item. An all-inclusive term used in place of any of the following: appurtenance, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, system, or unit. (Source: ASME-NQA-1-1989, Quality Assurance Requirements for Nuclear Facilities).

An all-inclusive term used in place of any of the following: appurtenance, facility, sample, assembly, component, equipment, material, module, part, structure, subassembly, subsystem, system, unit, documented concept, or data. (Source: DOE G 440.1-6, Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1, Worker Protection Management; 10 CFR 830.120; and DOE 5700.6C, Quality Assurance).

Substantial safety hazard. A loss of safety function to the extent that there is a major reduction in the degree of protection to the public or employee health and safety. (Source: U.S. Department of Energy (DOE) M 232.1-1A, "Occurrence Reporting and Processing of Operations Information").

Suspect/counterfeit items. A suspect item is one in which there is an indication by visual inspection, testing, or other information that it may not conform to established Government or industry-accepted specifications or national consensus standards. A counterfeit item is a suspect item that is a copy or substitute without legal right or authority to do so or one whose material, performance, or characteristics are knowingly misrepresented by the vendor, supplier, distributor, or manufacturer. An item that does not conform to established requirements is not normally considered S/CI if the nonconformity results from one or more of the following conditions, which should be controlled by site procedures as nonconforming items:

- Defects resulting from inadequate design or production quality control
- Damage during shipping, handling, or storage
- Improper installation
- Deterioration during service
- Degradation during removal
- Failure resulting from aging or misapplication, or
- Other controllable causes.

(Source: DOE G 440.1-6, Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1, "Worker Protection Management;" 10 CFR 830.120; and DOE 700.6C, "Quality Assurance").

6.0 RECORDS

No records are generated during the performance of this procedure.

7.0 SOURCES

7.1 Requirements

1. DOE-O-232.1A Part 4.f. (1), "Occurrence Reporting and Processing of Operations Information." (S/RID)

2. DOE O 414.1A, "Quality Assurance."

3. 10 CFR 830, Subpart A, "Quality Assurance Requirements."

4. DOE O 440.1A, "Worker Protection Management for DOE Federal and Contractor Employees."

7.2 References

1. HNF-SD-MP-SRID-001, "Standards/Requirements Identification Document for the Tank Farm Contractor."

2. DOE G 440.1-6, "Implementation Guide for use with Suspect/Counterfeit Items Requirements of DOE O 440.1, Worker Protection Management; 10CFR830.120; and DOE5700.6C, Quality Assurance."

3. NRC Information Notice 89-70: "Possible Indications of Misrepresented Vendor Products."

4. NRC Information Notice 89-70, Supplement 1: "Possible Indications of Misrepresented Vendor Products."

5. TFC-BSM-CP_CPR-C-01, "Purchasing Card (P-Card)."

6. TFC-BSM-CP_CPR-C-03, "Buyer's Technical Representative Process."

7. TFC-BSM-CP_CPR-C-06, "Procurement of Items (Materials)."

8. TFC-BSM-CP_CPR-C-09, "Supply Chain Process."

9. TFC-BSM-CP_CPR-C-11, "Acquisition Planning."

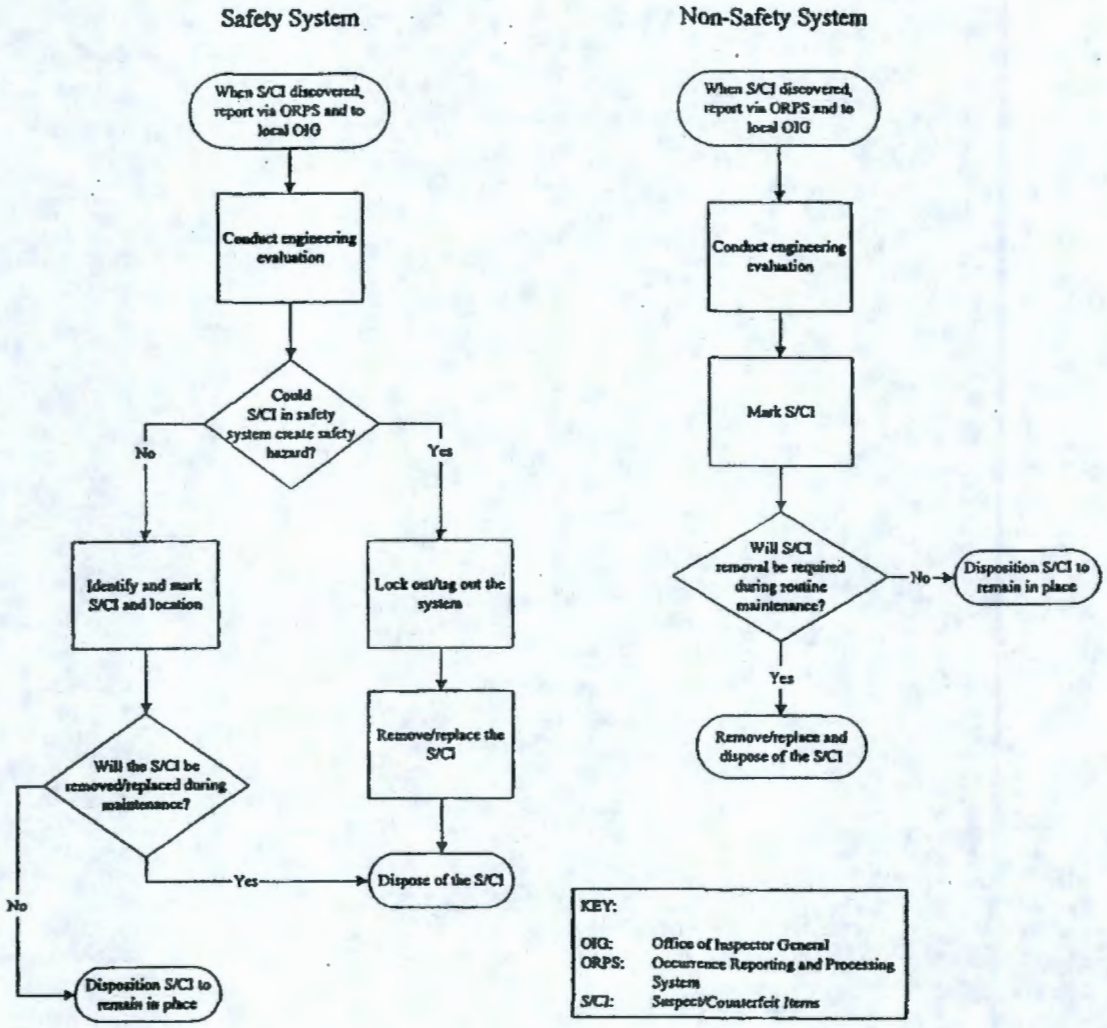
10. TFC-BSM-FPM_MC-C-01, "Material Receipt, Storage, Issuance, Return, and Excess Control."

11. TFC-ESHQ-Q_ADM-C-02, "Nonconforming Item Reporting and Control."

12. TFC-OPS-OPER-C-24, "Occurrence Reporting and Processing of Operations Information."

13. TFC-PLN-03, "Engineering Program Management Plan."

Figure 1. Management of Suspect/Counterfeit Items.



ATTACHMENT A - SUSPECT COMPONENTS LIST

This list was extracted from the U.S. Department of Energy Quarterly Reports on the "Analysis and Trending of Suspect/Counterfeit Items at Department of Energy Facilities," July 1997.

NOTE: It is not necessarily a negative reflection on a supplier or manufacturer if S/CIs are reported regarding its particular product. Reputable manufacturers and suppliers have a vital interest in preventing the manufacture or distribution of S/CI associated with themselves. It may be that the supplier or manufacturer was victimized and is pursuing S/CI associated with its products in an aggressive, prudent, and professional manner in order to get such items off the market. Therefore, each particular case regarding the manufacture or supply of S/CI must be examined on its own merit without making premature conclusions regarding fault or culpability of the manufacturer or supplier whose name is associated with the S/CI. In short, what follows is a "suspect components list" and not a "suspect manufacturer or supplier list." The manufacturer or supplier identified in the following table should not be considered to have engaged in any wrongdoing without additional information.

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	General Electric (Component Examples) • AKF-2-25 • EC Trip Types, E-C-1, E-C-2A • AK All Types	Metal clad, low voltage, DC	Satin America & Circuit Breaker Systems Inc.	NRC I.N. 89-45, Supplements and Attachments SENS Report ID #6 5/23/89
Circuit Breakers	General Electric (Component Examples) • AK-3A-25 • KHL-36 125 • THEF 136050 • AK-2-75-3 • AK-2 • AK-1-50 • AK-1-75 • B • TDQ • TCVVFS • TFJ • TEB122015-WL • TEB132090-WL • TE111015 • TED134060-WL • TEB124050-WL • THED136100 WL • TED126050 • THED136060 WL • THGB2120 • TEF134015 • THEF136M1100 • TED 134030-WL • AK2A25 • THED-136100-WL • THED-136050-WL • THED-136045-WL • THFK-236070-WL • TE-122070 • THED-136150-WL • THED-13600-WL • TED-113020 • TEC-360S0 • THED-124015-WL	1, 2, & 3 pole, various amperages	Bud Ferguson's Industrial Control & Supply, Inc., General Circuit Breaker & Electrical Supply HLC Electric Supply NSSS, Inc. California Breakers, Inc. Rosen Electric Equipment PENCON International (DBA) General Magnetics/ Electric Wholesale Lakeland Engineering Equipment Co. ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker Electrical Supply California Breakers Voyter Electric Co.	NRC I.N. 88-46 Supplements and Attachments NRC I.N. 90-46 Office of Nuclear Safety 93-5 (#11)

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Westinghouse (Component Examples) • TF136090 • TF361050WL • TED1130020			
	• Not Provided	Commercial Grade	Westinghouse Electric Supply Co. (WESCO)	NRC I.N. 91-48
	• DB-25 & DS-416	Low Voltage	Satin America & Circuit Breaker Systems, Inc.	NRC I.N. 89-45 & Supplement #2
	• FSN-5925-628-0641 • DB-25 • DB-50 • HKB3150T • FB3020 • FB3070 • FB3050 • EHB3025 • LBB3125 • HKA31250 • JA3200 • EHB2100 • 225N	Trip units; Navy Trip units; 1, 2, & 3 pole various amp. ratings	General Circuit Breaker & Electrical Supply HLC Electrical Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale	NRC I.N. 88-46, Supplements and Attachments Office Of Nuclear Safety 93-9
	• EB 1020 • HDEA 2030 • MCP331100R • MCP431550CR • BAB3060H • 656D14 8G03 • FA-2100 • EH-2050 • HFB-3050 • HFD(B)-3020 • MA3600 • F2020 • EH2100 • EB3050 • HMC3800F • EA2090 • FA3125 • HMCP 150		ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply Molded Case Circuit Breakers NSSS, Inc. Spectrum, Tech. Rosen Electric Luckow Circuit Breaker	

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Westinghouse (cont.) (Component Examples) • HFD • EH2070 • FA2050 • JA2225 • JL3B125 • JL3B070 • JL3B150 • JL3B200 • JL3B090 • JL3B100 • HLM3800T • F3100N • MA3500 • EH2015 • FA3035 • FA2100 • HLA2125OTM • EH2070 • JB3100 • EB2030 • 8MC800 • CAH3200 • EHB3040 • JL3-B150 • JL3-B200 • JL3-B090 • JL3-B1000 • HFA, HFB, FA • JL3-(B)8070 • JL3-B125 • EH-2020 • FA-3035 • EH-2050 • FA-2100 • FA-2050 • HFB-3050 • JA-2225 • HLM3800T • F3100N • MA3500 • EH2015 • LA3200WL • HLA3200T • 2602D58U9	Shunt Trips Aux. Contacts 2 & 3 pole circuit breakers of various amperages	General Circuit Breaker & Electrical Supply HLC Electrical Supply PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply Molded Case Circuit Breakers Co. (MCCB)	NRC LN. 88-46 Supplements and Attachments

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Westinghouse (cont.) (Component Examples)			
	• HLB3200T • 262156G19 • 1A & 1B			NRC I.N. 88-46 Supp. & Attach.
	• HL300T • HLA2400TM • HMA3600T • HMA3700T • HKA3225T • HNB2700T	225 amp, 3 pole 3 pole, 20 amp 3 pole, 30 amp 1 pole, 20 & 30 amp 2 pole, 20 & 30 amp 3 pole, 60 amp	Not Provided	
	• MDL#KAF • QNB3020 • QNB3030			SENS ID #10 3-17-89 SENS ID #11 3-3-89
	• BA	3 pole, 20 amp	Not Provided	
	• BA			
	• BA			
	• E3060 • F3020			SENS Report ID #12 10-19-88 NRC I.N. 88-46
Circuit Breakers	ITE (Component Examples)			
	• Model - E43B015	3-phase 480 volt	Cal. Breakers/Elect. Wholesale Supply Co.	SENS Report ID #8, 5-5-89
	• EQ-B	1 pole, 20 amp 3 pole, 30 amp	Not Provided	SENS ID #10 3-17-89
	• EE-3B030			SENS ID #11 3-3-89
	• EF3B070 • EF3H050 • EF3B125 • EF3B040 • E42B020 • QJ2B200 • JL3B400	2 & 3 pole various amperages	General Circuit Breaker & Electrical Supply HLC Electrical Supply	NRC I.N. 88-46, Supplements and Attachments

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	ITE (cont.) (Component Examples) • HE9B040 • EE3B050 • BQ2B030 • EE3B070 • EE2B100 • EE2B050 • EE2B030 • FJ3B225 • ET • KA • EH-313015 • JL-3B070 • JL-3B150 • E43B015 • EF2-B030 • EH3B100 • QP1B020 • QJ3B200 • EF3B100 • 1193		California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ATS Circuit Breakers, Inc. Panel Board Specialties Rosen Electric Equipment	
Circuit Breakers	ITE, Gould & ITE Imperial Brown Boveri Elect. (BBE) ASEA Brown Boveri (Component Examples) • Type HK • 5 HK • 7.5 HK • 15 HK • 38 HK • ITE 62-6	Not Provided ID-4KV Not Provided Not Provided Not Provided	Brown Boveri ASEA Brown Boveri	NRC I.N. 89-86 NRC I.N. 87-41 Office of Nuclear Safety, 92-25
Circuit Breakers	Square "D" Co. Component Examples • KHL 36125 (Any Type)	Molded Case	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale	NRC I.N. 88-46 Supp. & Attach. NRCB 88-10 NRC I.N. 90-46

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Square "D" Co. Component Examples (cont.)		ANTI THEFT Systems Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
	• QOB220	1 pole, 15 amp	Not Provided	SENS ID #10 3-17-89
	• QO220 • LO-3	2 & 3 pole 20 & 50 amp breakers	General Circuit Breaker & Electrical Supply	NRC LN. 89-45 & Supplement #2
	• SBW-12 • 989316 • FAL3650-16M or • FAL36050-16M • KA36200	3 pole - 200 amp breaker 30A/600V	HLC Electric Supply California Breakers, Inc.	
	• 999330	Not Provided	PENCON International (DBA) General Magnetics/Electric Wholesale	
	Manufacturer not Provided • EHB3025	Not Provided	Stokely Enterprises Molded Case Circuit Breakers	DOE Letter 8-26-91 Reprinted NuVEP: Bulletin 7-26-91
Circuit Breakers	Fed. Pacific (Component Examples)		General Circuit Breaker & Electrical Supply	
	• NEF431020R • NE111020 • NE	3 pole, 20 amp 1 pole, 20 amp 1 pole, 15 amp	HLC Electric Supply California Breakers, Inc.	
			PENCON International (DBA) General Magnetics/Electric Wholesale	SENS ID. #10 3-17-89

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Fed. Pacific (Component Examples) (cont.) • NF63-1100 • NE22-4060 • NE22-4100 • NEF-433030 • 2P125	1, & 3 pole - 30, 60 & 100 amp breakers	ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc.	SENS ID. #11 3-3-89 NRC I.N. 88-46, Supp. & Attach.
	Jefferson (Component Examples)	Not Provided	PENCON International (DBA) General Magnetics/electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply Mid West Co.	NRC I.N. 88-46, Supp. & Attach.
Circuit Breakers	Superior (Component Examples) • 246U-3	Not Provided	General Circuit Breaker & Electrical Supply Rosen Electric HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46 Supp.& Attach.

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Circuit Breakers	Manufacturer Not Provided (Component Examples) 50DHP250	 2 pole - 50 amp	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
Circuit Breakers Heaters	Cutler Hammer (Component Examples) • 10177H13 • 10177H21 • 10177H32 • 10177H036 • 10177H1049	 Not Provided	AAKER General Circuit Breaker & Electrical Supply HLC Electrical Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Switches	(Component Examples) Crouse Hinds #EDSC2129 Sq. D Type G. Class 9012, 9025, 9016	Tumbler, ft. op	Platt Electric Supply Co. Gen. Motors, Electro-Motive Design	SENS ID #16 1-27-92 Office of Nuclear Safety 93-24 & 93-27
Transmitters	Rosemount	(Component Examples) • Model 1151 GP • Model 1151 DP	Venetech	E.L. Wilmot letter dated 8-1-91 H. Richardson letter HR-81-91 dated 8-15-91
Motors	Siemen & Allis (Component Examples) INP 143 T 215 T	10 H.P.	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply Rosen Electric Equipment	NRC I.N. 88-46, Supplements and Attachments

ESHQ	Document	TFC-ESHQ-Q_C-C-03, REV B
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CONTROL OF SUSPECT/ COUNTERFEIT ITEMS	Effective Date	December 31, 2003

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Relays	Potter & Brumfield (Component Examples) MDR-138, 173-1 134-1, 142-1	Not-latching rotary	Stokely Enterprises Spectronics, Inc. Nutherm International The Martin Co.	NRC I.N. 90-57 & Attach.
	Teledyne	All qualified to MIL-R-28776 and MIL-R-39016	Not Provided	DOE-ID Wilmot letter, 7-16-91
	G.E. & Exide (Component Examples) • 12HGA-11S52 • NX 400	Overload & Aux.	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
	Manufacturer not provided • FSC-5945	Not Provided	Stokely Enterprises	DOE Letter 8-26-91 Reprinted NuVEP: Bulletin 7-26-91
	Amerace (or Agastat) (Component Examples) Models: E7024 E7022	Electro Pneumatic Timing Relays	Amerace Control Components Supply	SENS ID #1 11-1-91 NRC I.N. 92-24
	A through L Series Model 7032	PRB		

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Fuses	Bussman Co. (Component Examples) REN 15 & NOS-30	15A-250V & 30A-600V	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
	Class 1E	All Supplied by PMS	Preventive Maintenance Systems (PMS)	NRC I.N. 88-19
Controllers	Manufacturer Not Listed (Component Examples)	Motor Controllers	Stokely Distributors & Stokely Enterprises, Inc.	DOE letter 8-26-91 & NUVEP Bulletin 7-26-91
Starters	Westinghouse (Component Examples) 626B187G17 626B187G13	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-45 Supp. & Attach.
Resistors	Unknown	All	Impala Electronics	NRC I.N. 91-01

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Semiconductors	Solid State Devices Inc. (SSDI) SFF 9140	P-Channel MOSFET	SSDI	DOE Albuquerque Letter, 06-25-96 to DOD Inspector General
	SPD 1511-1-11	Pin Diode (SA3059)		
	2A14/18 or 2A14/52	Ion Implanted Diode		
	SSR4045CTTXV	SCHOTTKY Diodes		
	SFF9140TWX	Power Transistors		
	SPMF106ANH	Special Pack MOSFET Switch		
	SPD 5818 or IN5858JTXV	Axial Leaded SCHOTTKY Diode		
	2N797	Transistor		
	Unknown	Diode (SA 3436)		
Starter Controls	Westinghouse (Component Examples)	Not Provided	General Circuit Breaker & Electrical Supply	NRC I.N. 88-48
	• A200MICAC		HLC Electric Supply	
	• A201KICA		California Breakers, Inc.	
	• A201L2CA			
	• AN13A		PENCON International (DBA) General Magnetics/Electric Wholesale	
			ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	

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ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Gauge Glasses	Siemen & Allis (Component Examples) #00-737-637-118 215 T	Not Provided	Rosen Electric Co.	NRC I.N. 88-46 Supp. & Attach.
Mercury Lamps	Spectro Inc. (Component Examples) V00014	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46
Electrical Frames	Westinghouse (Component Examples) LA2600F LA3600F MA2800F	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46
Push button station	Crouse Hinds (Component Examples) #00-737-637-118	Single gang, pushbutton	Platt Electric Supply Co.	SENS Report ID #16 1-27-92

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ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Overload Relay Thermal Unit	*Square D (Component Examples)* B19.5, B22	*Not Provided*	*Not Provided*	*NRC I.N. 88-46*
Piping, Fittings Flanges, and Components	Tube-line Corp. Ray Miller, Inc.	Subassemblies, fittings, flanges, & other components (Carbon and Stainless Steel components)	Tube-line Ray Miller, Inc.	NRC IEB 83-06 NRC I.N. 89-18 NRC IEB 83-07 NRC I.N. 83-01
Piping, Fittings, Flanges, and Components	Piping Supplies, Inc. & West Jersey Mfg. & Chews Landing Metal Mfg.	Carbon and Stainless Steel Fittings and Flanges	Piping Supplies, Inc. & West Jersey Mfg. & Chews Landing Metal Mfg.	NRC Bulletin 88-05 & Supplements
Valves	VOGT	Full port design 2-inch Model SW-13111 & 1023	CMA International IMA Valve Refurbisher	NRC I.N. 88-48 & Supplements
	Crane	4"-1500psi, pressure sealed	Southern Cal. Valve Maintenance co., Amesse Welding Service & CMA Int.	NRC I.N. 91-09
	ITT Grinnell Valve Co., Inc	Diaphragm valves	ITT Grinnell Valve Co. Inc. Div. of *Diaflo & ITT* Engineered Valves	NRC Comp. Bulletin 87-02
	Crane, Pacific, Powell, Walworth & Lunkenheimer	Gate Valves	Coffeyville Valve Inc.	NRC I.N. 92-56
	Pacific	8" & 3" Globe Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48, Supp. & Attach.
	Crane Chapman	24" Check Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48, Supp. & Attach.
	Pacific	Check Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48, Supp. & Attach.

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ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Valves	Kerotest	8" Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Pacific	4" Gate Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Lukenheimer	6" Model 1542 20" Model 3013	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Crane	All	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
Flanges	China Ding Zinang Nan XI Li Flange Co. Shou Gang Mach. Eng. Co.	Flanges, ASTM A105, ASME SA105	Billiongold Co. LTD. Tain Gong Co. Sanxi Province Overseas Trading Corp	NRC I.N. 92-68 and Attachments Office of Nuclear Safety 92-25, 93-23, and 92-35 National Board of Boiler and Pressure Vessel Inspectors (NBBI) Bulletin: Special Report, 1992, Volume 48, Number 2, The Chinese Flange Investigation
Valve Replacement Parts	Masoneilian-Dresser Industries	Plug stem, stem to plug anti-rotation pin, seat ring, valve plugs, bushings, cages & packing box components	Cor-Val, Control Valve Specialists, H.H. Barnum & M.D. Norwood, Sample Webtrol Controls, Inc.	NRC I.N. 88-97 Supp. & Attach.
Pumps & Replacement Parts	Hayward Tyler Pump Co.	HTPC ASME Nuclear Code	Hayward Tyler Pump Co.	IEB 83-05 & Attachments
Channel Members	Unistrut Corporation	Continuously slotted channels, structural framing members, fasteners, nuts, fittings, pipe clamps	Unistrut Corporation	NRC I.N. 91-25
Fire Barriers	Thermal Science Inc.	Thermo-Log 330	None Listed	ES&Q Update #8 NRC I.N. 92-55
Valve Actuator	Limitorque	Eyebolts on housing cover	None Listed	Office of Nuclear Safety 93-25 NRC I.N. 93-37

ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Steel	Alloy & Carbon Steel Co. Inc., Atlantic Steel Co., Levingston Steel Co., & Copperweld Steel co.	Plate Angle Flat Bar Bar	Meredith Corporation Pressure Vessel Nuclear Alloy & Carbon Steel Co., Inc.	NRC I.N. 89-56, Attachments and Supplements
Fasteners (Bolts, Screws, Nuts, and Washers)	(parentheses designated headmark) Asahi (A) Daiichi (D) Daiei (E) Fastener Co. of Japan (FM) Hinomoto Metal (H) Jin Her (J) Kyowa (K) Kosaka Kogyo (KS) Kyoci Minamida Seiybo (M) Mnato Kogyo (MS) Nippon (NF) Takai (RT) Tsukimori (S) Unytte (UNY) Yamadai (Y) Ivaco, Infasco (hollow triangled).	• Those with suppliers or manufacturers • Those that are improperly marked • Those of foreign manufacture that do not meet Public Law 101-592. Fastener Quality Act	Note: Listed suppliers may also be manufacturers Lawrence Engineering & Supply Co. Metal Building Bolts Nichimin Corporation UNICO Ace Corporation E. K. Fasteners, Inc. H. Y. Port Fasteners Co. Kobayashi Metals, LTD. Takai Screw Mfg. Co. LTD. Yamaguchi Sesakusho Co. LTD. Highland Bolt & Nut Porteous Fastener Co. Northwest Fasteners Ziegler Bolts & Parts Co. Edgewater Fasteners, Inc. Reynolds Fasteners A & G Engineering	Commercial Carrier Journal Articles for: 6/88, 1/90, 2/90, 3/90, 4/90, 6/90, 7/90, 12/90 INEL Suspect Headmark List SENS Report #5 2/6/91 SENS Report #13 2/6/91 HR 3000, U.S. House of Representatives, July 1988 J. A. Jones, Ltr, 9/23/92 Memo from L. Kubicek, 3/28/91 Memo from D. Sanow, 3/8/91 "Fastener Technology International," Feb., April, and June 1993 Rep. J. Dingell Ltr to Comm. Dept. & NRC June 18, 1993 Office of Nuclear Safety 93-26, 93-22, 93-11 DOE Quality Alert, Bulletin, Issue No. 92-4, August 1992 FDH Hanford Suspect Headmark List

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ATTACHMENT A - SUSPECT COMPONENTS LIST (cont.)

Component	Manufacturer/Type	Description	Supplier	References
Fasteners (Bolts, Screws, Nuts, and Washers)	NUCOR	1-1/4" x 2" Zinc Chromate plated surface Hexhead cap screws	Cordova Bolt, Inc.	SENS ID #13 11-6/91
	Any	Any	Aircom Barnett Bolt Works Bolts & Nuts, Inc. Glasser & Assoc. Knoxville Bolt & Screw Metal Fastener Supply Phoell Mfg. Co. Service Supply Co. Southeastern Bolt & Screw Sure Loc Victory Bolt	NRC Compliance Bulletin 87-02 NRC I.N. 89-59

ATTACHMENT B - CLASSIFICATION OF POTENTIALLY SUSPECT/COUNTERFEIT ITEMS

A. ELECTRICAL ITEMS

- Molded Case Circuit Breakers
- Motor Control Centers
  - Complete Units
  - Components
  - Starters
  - Starting coils
  - Contactors
  - Overload relays
  - Starter control relays
  - Overload heaters
- Protective/control relays
- DC power supplies/chargers
- AC inverters
- Current/potential transformers
- Exciters/regulators
- Bus transfers/auto bus transfers
- Motor generator sets
- Generators
- Rewindable motors
- Printed circuit boards
- Bulk commodity items
  - Fuses
  - Splices
  - Electrical connectors
- Indicators/controllers
- Panel lights/switches
- Transmitters/instrument switches
- Isolation devices.

The following items are excluded unless required by the applicable program/project: 600V or less: motors; outlets, switches, and plugs; boxes, conduit (i.e., bodies and covers, nipples, fittings, EMT, flex, liquid tight, rigid); wire; miscellaneous wire connections #10 and below; fixtures; lights.

B. MECHANICAL ITEMS

- Welding materials
  - Rod
  - Wire
  - Flux
- Structural members (pipe supports)
- Channel members

ATTACHMENT B - CLASSIFICATION OF POTENTIALLY SUSPECT/COUNTERFEIT ITEMS (cont.)

- Sheet
- Plate
- Bars
- Round stock
- Other raw material which requires an ASTM or national standard
- All lifting/rigging gear (wire rope shall be made in the United States by a member of the Wire Rope Technical Board (WRTB) or the Associated Wire Rope Fabricators (AWRF) (except stainless steel, and unless recommended otherwise by a crane or hoist manufacturer); stainless steel wire rope shall be made in the United States and shall be 302 or 304 grade stainless steel unless otherwise recommended by a crane or hoist manufacturer)
- Ratchet tie-downs/strapping devices and come-a-longs, with fasteners.

The following materials are excluded unless required by the applicable program/project: ASTM-A36, brass, copper, sheet metal 7 GA or less, and aluminum.

C. PIPING - which requires an ASTM or ASME standard
- Fittings
- Flanges
- Valves
- Pipe
- Components.

The following materials are excluded unless required by the applicable program/project: ASTM-A-53, Swagelock; cast iron, galvanized, copper, bronze, and brass; PVC; and gaskets.

D. FASTENERS - All fasteners 1/4" and above in diameter
- Bolts
- Studs
- Cap screws
- High-strength washers
- Nuts
- Anchors.

NOTE: Attachment I identifies headmarkings for stainless steel and carbon steel high strength fasteners that are considered counterfeit. Fasteners exhibiting these headmarks are counterfeit and no further testing is required.

The following items are excluded, unless required by the applicable program/project: sheetmetal screws, wood screws, stove bolts, pan heads, machine screws, lag bolts, threaded rod, rivets, and carriage bolts.

ATTACHMENT C - SUSPECT/COUNTERFEIT ITEMS INFORMATION SOURCE LIST

A wide variety of industry and Government sources publish information relative to suspect/counterfeit products. The following sources provide information which is available on a continuing basis:

Industrial Fasteners Institute (IFI)

The following information is available from IFI via subscription:

- "Fastener Application Advisory" (Published Monthly)
- "North American Manufacturers Identification Markings for Fasteners"
- Fastener-related video cassettes.

The National Board of Pressure Vessel Inspectors (NBBI)

The NBBI publishes "National Board Bulletins" to alert manufacturers and users of misrepresented products as they are discovered.

National Highway Traffic Safety Administration (NHTSA)

The NHTSA's Office of Defects Investigation issued a "Suspect Bolt List" in late 1990 identifying numerous fasteners, which they determined to be misrepresented.

Trade Journals and Magazines

There are numerous trade-oriented magazines which have carried articles identifying incidents of failure of substandard parts in industry applications which have caused personal injury and death, as well as serious property damage.

Newspaper and Television Reports

Another good source of information are news reports, which provide current accounts of problems encountered as a result of misrepresented products.

U.S. Nuclear Regulatory Commission (NRC)

The NRC issues bulletins, notices, and regulatory guidance on a continuing basis to alert nuclear power utilities of potential intrusion of misrepresented products into the operations environment of operating nuclear power plants.

U.S. Department of Defense (DOD) and U.S. Department of Commerce publications are also monitored by the DOE to assure that the deficiencies identified do not contaminate DOE facilities.

ATTACHMENT C - SUSPECT/COUNTERFEIT ITEMS INFORMATION SOURCE LIST (cont.)

Government Industry Data Exchange Program (GIDEP)

The mission of this program, established by the Office of Management and Budget, is to support government systems readiness, logistics effectiveness, productivity, and cost reduction through timely retrieval, storage, and distribution of data among government and industry organizations.

U.S. Department of Energy

The following documents are issued by the DOE to provide information and guidance relative to the suspect/counterfeit parts issue:

- DOE Orders
- Letters of Direction
- Bulletins and Quality Alerts

(In addition, the DOE periodically sponsors seminars/workshops relative to the detection and control of suspect/counterfeit parts).

U.S. Customs Service

The U.S. Customs Service has published the Suspect Headmark List (Figure 1) identifying graded fasteners determined to be of indeterminate quality, which has been adopted by DOE and, ultimately, Project Hanford, as a formal guide for use when evaluating currently installed and newly procured graded fasteners to assure their fitness for use on the Hanford Site.

ATTACHMENT D - CHARACTERISTICS THAT MAY MAKE PRODUCTS VULNERABLE TO MISREPRESENTATION, FRAUDULENT PRACTICES, AND COUNTERFEITING

The following information has been extracted from the NRC Information Notice 89-70, Supplement 1, Attachment 3:

- High-turnover usage rate.
- No easy or practical way to uniquely mark the component itself.
- Critical characteristics, including environmental qualification not easily discernable in external visual inspection, or characteristics that are difficult to verify through receipt testing.
- May be widely used in non-critical and critical applications.
- Use may not result in used appearance.
- Often marketed through a supplier and dropped shipped from locations other than that of the original supplier.
- Special processes for ASME materials may be subcontracted (heat treating, testing, and inspections).
- Easily copied by secondary market suppliers.
- Viable salvage market.
- Reduced number of original equipment manufacturers.
- Obsolete or hard-to-get components.
- Components manufactured by a company that is no longer in business.
- Items with documentation from a plant where construction has been suspended, canceled, or deferred.
- Moderate or low cost.
- High potential for profit (rejected heats of material are purchased and decertified).

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ATTACHMENT E - WHERE TO LOOK FOR SUSPECT/COUNTERFEIT ITEMS

The following areas should receive increased scrutiny to assure that suspect/counterfeit items are not evident:

Items in Supply

- Company supply stock
- Wagon stock
- Other sources of supply contamination.

Items in Use

- Plant facilities, components, and systems
- Equipment
- Operations and maintenance.

Items Being Procured

- "Known" critical items
- Critical equipment and assemblies
- Non-critical "known" purchases.

Operations Decisions

- Major disaster risks
- Personnel safety risks
- Program/mission risks (cost and schedule).

Cost of Implementation

- Potential consequential costs
- Management risk assessment
- Cost of focusing established controls
- Impact on schedule and program mission.

Cost of Focus on Known Suspect/Counterfeit Parts

- Uses existing procurement program
- Focuses on "known parts first"
- Reduction in major disaster potential
- Program costs low/benefits high.

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION

It is very important to remember that just because an item is identified as being "suspect/counterfeit" it may not be appropriate to simply reject it. A review should be performed prior to formal disposition of *the item to assure that it is indeed unfit for the intended application.*

DETECTION METHODS

Visual Inspection

Items may be substandard or fraudulent when:

- Nameplates, labels, or tags have been altered, photocopied, painted over, are not secured well, show incomplete data, or are missing (e.g., preprinted labels normally show typed entries).
- Obvious attempts at beautification have been made, e.g., excess painting or wire brushing, evidence of hand painting (touch-up), or stainless steel is painted.
- Handmade parts are evident, gaskets are rough cut, shims and thin metal part edges show evidence of cutting or dressing by hand tools (filing, hacksaw marking, use of tin snips or nippers).
- Hand tool marks on fasteners or other assembly parts (upset metal exists on screw or bolt heads) or dissimilar parts are evident (e.g., seven or eight bolts are of the same material and one is a different material).
- Poor fit between assembled items.
- Configuration is not consistent with other items from the same supplier or varies from that indicated in supplier literature or drawings.
- Unusual box or packing of component or item.
- The supplier is not a factory-authorized distributor.
- Dimensions of the item are inconsistent with the specifications requested on the purchase order and/or those provided by the supplier at the time of shipment.
- The item or component matches the description of one that is on a suspect items list (e.g., U.S. Customs Service "Suspect Headmark List," National Board of Boiler and Pressure Vessel Inspectors (NBBI) "Special Bulletin," etc.).

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

Documentation

Documents may be suspect/counterfeit when:

- The use of correction fluid or correction tape is evident. Type or pitch change is evident.
- The document is not signed or initialed when required, is excessively faded or unclear (indicating multiple, sequential copying), or data are missing.
- The name or title of the document approved cannot be determined.
- Technical data is inconsistent (e.g., chemical analysis indicates one material and physical tests indicate another).
- Certification or test results are identical between items when normal variations should be expected.
- Document traceability is not clear. The document should be traceable to the item(s).
- Technical data are not consistent with code or standard requirements (e.g., no impact test results provided when impact testing is required or CMTRS physical test data indicate no heat treatment and heat treatment is required).
- Documentation is not delivered as required on the purchase order or is in an unusual format.
- Lines on forms are bent, broken, or interrupted indicating data has been deleted or exchanged (cut and paste).
- Handwritten entries of data are on the same document where typed or preprinted data exists.
- Data on a single line located at different heights indicate the possibility of retyping.

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

Fasteners

- Headmarkings are marred, missing, or appear to have been altered.
- Threads show evidence of dressing or wear (threads should be of uniform color and finish).
- Headmarkings are inconsistent with a heat lot.
- Headmarkings matching one of those identified on the U.S. Customs Service, "Suspect Headmark List" (Figure QP 3.2-1).
  - Headmarkings which depict both raised and hand-stamped markings, such as those described in WHC Quality Assurance Bulletin # 94-01, "Discrepant Dual Head Stamped Stainless Steel Bolts." This bulletin documents the results of internal inspections and independent testing of stainless steel bolts purchased to ASTM A193, Grade B8, which were found to be substandard.
  - Only manufacturers listed on the "Suspect Fastener Headmark List" (Figure QP 3.2-1) are known to produce substandard graded fasteners. If graded fasteners are discovered which exhibit headmarks matching those on the Suspect/Fastener Headmark List, they shall be considered to be defective without further testing, unless traceable manufacturer's certifications are received which provide documented evidence that the fasteners were not produced by the manufacturer listed on the Suspect Fastener Headmark List.
  - Interpretation of headmark/manufacturers listed on the "Suspect Fastener Headmark List," including newly discovered variations thereto, shall only be provided by the designated S/CI coordinator based on guidance received from the DOE.

Electrical Devices

- Connections show evidence of previous attachment (metal upset or marring).
- *Connections show arcing or discoloration.*
- Fasteners are loose, missing, or show metal upset.
- Molded case circuit breakers are not consistent with manufacturer-provided checklists for detecting substandard/fraudulent breakers.
- Missing or photocopied Underwriters Laboratories (UL) labels on products requiring such.

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

Rotating Machinery and Valve Internal Parts

- Shows marring, tool impressions, wear marks, traces of Prussian blue or lapping compound, or other evidence of previous attempts at fit up or assembly.
- Heat discoloration is evident.
- Evidence of erosion, corrosion, wire-drawing or "dimples" (inverted cone-shaped impressions) on valve discs, seats, or pump impellers.

Valves

- Paint
  - Valve appears to be freshly painted and valve stem has paint on it
  - Wear marks on any painted surface
  - Valve stem is protected, but protection has paint on it
  - Paint does not match standard Original Equipment Manufacturer (OEM) color.
- Valve Tags
  - Tags attached with screws instead of rivets
  - Tags attached in a different location than normal
  - Tags appear to be worn or old
  - Tags with paint on them
  - Tags that look newer than the valve
  - Tags with no part numbers
  - Tags with irregular stamping.
- Hand Wheels
  - Old looking hand wheels on new looking valves
  - Hand wheels that look sand blasted or newer than the valve
  - Different types of hand wheels on valves of the same manufacturer.
- Bolts and Nuts
  - Bolts and nuts have a used appearance (excessive wrench marks on flats)
  - Improper bolt/nut material (e.g., a bronze nut on a stainless stem).

ATTACHMENT F - SUSPECT/COUNTERFEIT PARTS DETECTION (cont.)

- Valve Body
  - Ground off casting marks with other markings stamped in the area (OEM markings are nearly always raised, not stamped)
  - Signs of weld repairs
  - Incorrect dimensions
  - Freshly sand-blasted appearance, including eye bolts, grease fittings, stem, etc.
  - Evidence of previous bolt head scoring on backsides of flanges, or evidence that this area has been ground to remove such marks
  - On a stainless valve, a finish that is unusually shiny indicates bead-blasting. A finish that is unusually dull indicates sand-blasting. The finish on a new valve is in-between.

Manufacturer's Logo

- Missing.
- Logo plate looks newer than the valve.
- Logo plate shows signs of discoloration from previous use.

Other

- Foreign material inside the valve (e.g., metal shavings).
- Valve stem packing that shows all the adjustments have been run out.
- In gate valves, a gate that is off-center when checked through the open end of the valve.
- Obvious differences between valves in the same shipment.

Price

- Price is significantly less than that of the competition.

ATTACHMENT G - FASTENERS

1.0 Counterfeit/Substandard High-Strength Bolts

1.1 General Background

Counterfeit bolts have been found in military and commercial aircraft, surface ships, submarines, nuclear weapon production facilities, bridges, buildings, and the space shuttle. These bolts often do not possess the capabilities of the genuine bolts they counterfeit and can threaten the reliability of industrial and consumer products, National Security, or lives. At Congressional hearings in 1987, the Army testified that they had purchased bolts that bore the headmarks of Grade 8 high-strength bolts, but that were actually inferior Grade 8.2 bolts.

The International Fasteners Institute (IFI) reported finding substandard, mis-marked, and/or counterfeit high-strength Grade 8 bolts in the United States commercial marketplace. In 1988, IFI reported that counterfeit medium- strength Grade 5 bolts had also been found.

Foreign bolts dominate the American marketplace due to their price advantage, and the majority of suspect/counterfeit bolts are imported. Identifying, testing, and replacing these bolts has proven expensive and difficult, both mechanically and technically. Not finding and replacing these bolts, however, has proven fatal in some instances.

1.2 Headmarks

Attachment I may be removed and photocopied, as needed, for use as a poster and reference to known suspect fastener headmarks. Bolts with the headmarkings shown have a significant likelihood of being found to be inferior to standards. Generally, the cost of replacement of these bolts is less than the cost of chemical, hardness, and tensile strength testing. Note also that counterfeit bolts can be delivered with counterfeit certificates. Documentation alone is insufficient to demonstrate compliance with standards.

1.3 Consensus Standards

There are several consensus organizations that have published standards for the properties of fasteners. One of these is the Society of Automotive Engineers (SAE). The SAE grade (or alleged grade on a suspect item) of a bolt is indicated by raised or indented radial lines on the bolt's head, as shown in Attachment I. These markings are called headmarks. DOE is currently concerned with two different grades of fasteners: one has three equally spaced radial lines on the head of a bolt which indicate that it should meet the specifications for a Grade 5 bolt; the other has six equally spaced radial lines which indicate a Grade 8 bolt. Letters or symbols on the head of a bolt indicate the manufacturer.

ATTACHMENT G - FASTENERS (cont.)

Attachment I is a Suspect/Counterfeit Headmark List that was prepared by the United States Customs Service after extensive testing of many samples of bolts from around the nation. Any bolts anywhere in the DOE community that are currently in stock, in bins, or installed that are on the Customs Headmark List should be considered suspect/ counterfeit. The headmarks on this list are those of manufacturers that have often been found to have sold bolts that did not meet the indicated consensus standards. Sufficient testing has been done on the bolts on this list to presume them defective without further testing.

1.4 Precautions: Selective Testing

Some facilities (manufacturers, distributors, etc.) perform selective testing of sample bolts rather than have an independent testing laboratory run all the tests required by consensus standards. In many cases, a new counterfeit bolt has roughly the same physical strength as the graded bolt it mimics, but does not have either the chemical composition or the heat treatment specified by the consensus standards. As a result, it will stretch, exhibit metal fatigue, or corrode under less harsh service than the genuine bolt. Simple tensile strength tests cannot be used to identify substandard high-strength fasteners and should not be solely relied upon in performing acceptance test.

1.5 Using Suspect/Counterfeit Grade 5 Bolts in Grade 2 Applications

Some sites use suspect/counterfeit Grade 5 bolts in applications that only call for Grade 2 bolts. Eventually, the suspect/counterfeit Grade 5 bolts may find its way into an application that requires a genuine Grade 5 bolt and that application may fail. In some cases, cheap imported graded bolts have been purchased in place of upgraded bolts because the small price differential made the extra quality seem to be a bargain. Given the expense of removing suspect bolts from DOE facilities, the practice of using suspect bolts for any application should be discontinued.

1.6 Keep Bolts in Original Packages

All bolts purchased should be kept in the original packages, not emptied into bins. The packages should have labels or other markings that would permit them to be associated with a particular procurement action and a specific vendor. Approved supplier lists should be checked to assure that fastener suppliers on that list have been recently qualified/audited for adequacy of their quality programs.

ATTACHMENT G - FASTENERS (cont.)

2.0 Stainless Steel fasteners

2.1 Purpose

To provide follow-up information to the previous notification sent to the DOE field and contractor organizations in late 1996.

2.2 Background

In November 1993, the Industrial Fastener Institute (IFI) issued a Fastener Advisory regarding 18-8 stainless steel bolts. The advisory warned about a "bait and switch" tactic in which a distributor takes an 18-8 bolt (indicated by two radial lines 90 degrees apart), but no manufacturer's marking, and sells them as ASTM A320 Grade B8 bolts after hand-stamping B8 on to the heads.

As a result of this IFI Advisory, DOE sites conducted a search of facility stores for stainless steel fasteners with hand-stamped B8 grade marks. Hundreds of stainless steel bolts with hand-stamped B8 grade markings, along with a variety of other raised and depressed head and manufacturer's markings were identified in facility stores throughout the DOE complex.

For example, an inspection of shop stock at a Hanford Site facility revealed bolts with three different raised grade markings, 18-8, 304, and F593C, along with raised manufacturer's identifications of CK, H, HP, C, SO, CS, PMC, TH, THE, and a STAR. The majority of the remaining samples found at Hanford exhibited raised grade markings of 18-8 and 304, with a B8 grade marking and manufacturer's identification hand-stamped into the head of the bolt.

Finally, a few samples did not display any manufacturer's markings. Most of the bolts discovered were purchased with the specification to meet a national consensus standard, American Society for Testing and Materials (ASTM) A193, B8 Class 1 rather than the ASTM A320 standard discussed in the IFI warning.

The Savannah River Site also conducted a site-wide search of facility stores with similar results. A total of 159 stainless steel fasteners with hand-stamped B8 grade marks and raised or hand-stamped manufacturer's symbols were found. Fifteen stainless steel fasteners that had no manufacturer's symbol were also found.

ATTACHMENT G - FASTENERS (cont.)

2.3 Issue

The requirements of the ASTM A193 standard regarding fastener marking and certification are very similar those required by the ASTM A320 standard discussed in the IFI advisory. The ASTM A193 standard requires that grade and manufacturer's identification symbols be applied to the heads of bolts that are larger than 1/4" in diameter. The standard, however, does not specifically differentiate between raised and depressed headmarkings, but states only that "for the purposes of identification marking, the manufacturer is considered the organization that certifies the fastener was manufactured, sampled, tested, inspected in accordance with this specification." In other words, the standard allows for some of the required markings to be formed into the head of the bolt (either raised or lowered) during manufacturing, and the rest to be applied later on via hand-stamping.

Since ASTM A193 does not differentiate between raised and depressed markings, these fasteners can be counterfeited in the same way as the ASTM A320 fasteners discussed in the November 1993 IFI warning. For example, distributors can procure 18-8 stainless steel bolts that were manufactured by an anonymous party, and without conducting the necessary upgrading process or certification testing, a second party could hand-stamp B8 and a manufacturer's marking into the heads to indicate that the fasteners exhibit the mechanical and chemical properties required of ASTM A193Grade B8 Class 1.

Unless the certification documentation is specifically requested, and in most cases it is not, there is no way to determine by visual inspection whether these fasteners were properly certified and tested to meet the requirements of the ASTM standard.

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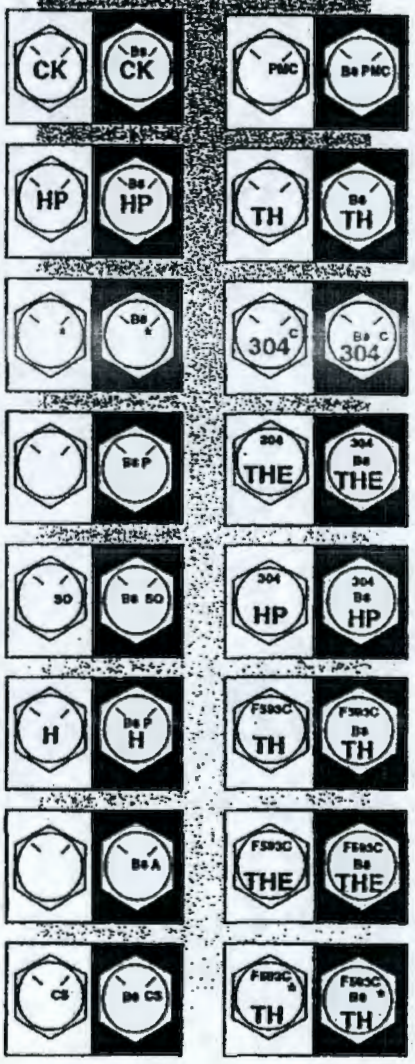
ATTACHMENT H - DOE HEADMARK LIST

Help Stamp Out Suspects/Counterfeits

Examples of stainless steel fasteners that have been upgraded from 18-8 to ASTM A320 or ASTM A193 Grade B8 after hand stamping. The last three examples show samples of fasteners to indicate conformance to two non-compatible standards, ASTM A193 and ASTM F 593C.

Any bolt on this list should be treated as defective without further testing and process in accordance with HNF-PRO-301. Note: This list was originally Published by DOE /EH-0196, Issue No. 97-6

If any of these fasteners are located, contact your facility S/CI Point of Contact (POC) for instructions. The POC list is on the Hanford Intranet at: http://docs.rl.gov/han.info/hianeci/hianeci.doc. Scroll to the end of the document for the list.



ATTACHMENT H - DOE HEADMARK LIST (cont.)

Help Stamp Out Suspects/Counterfeits

Suspect Fastener Headmark List

All Grade 5 and Grade 8 fasteners of foreign origin which do not bear any manufacturers' headmarks:

Grade 5 Grade 8

Grade 5 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
J	Jinn Her (TW)	XS	Kosaka Kogyo (JP)

Grade 8 fasteners with the following Manufacturers' headmarks:

Mark	Manufacturer	Mark	Manufacturer
A	Asahi Mgf (JP)	KS	Kosaka Kogyo (JP)
NF	Nippon Fasteners (JP)	HT	Takai Ltd (JP)
H	Hinomoto Metal (JP)	FM	Fastener Co. of Japan (JP)
M	Minamida Sieybo (JP)	KY	Kyoei Mfg (JP)
MS	Minato Kogyo (JP)	J	Jinn Her (TW)
Hollow Triangle	Infasco (CA, TW, JP, YU) (Greater than 1/2-inch diameter Grade 8 Hollow Triangle only)		
E	Daisi (JP)	UNY	Unytite (JP)

Grade 8.2 fasteners with the following headmarks:

Mark	Manufacturer
KS	Kosaka Kogyo (JP)

Grade A325 fasteners (Bennett Denver target only) with the following headmarks:

	Mark	Manufacturer
Type 1	A325 KS	Kosaka Kogyo (JP)
Type 2		
Type 3		

Key: CA-Canada, JP-Japan, TW-Taiwan, YU-Yugoslavia

Any bolt on this list should be treated as defective without further testing.

ATTACHMENT I - REFURBISHED MOLDED CASE CIRCUIT BREAKERS

Investigations thus far of electrical components at DOE facilities uncovered over 700 suspect/ counterfeit molded-case circuit breakers that were previously used, refurbished and sold to DOE contractors.

1. Recognition Factors

The following factors should be recognized regarding suspect or refurbished circuit breakers:

A. The quality and safety of refurbished molded-case circuit breakers is questionable since they are not designed to be taken apart and serviced or refurbished. There are no electrical standards established by Underwriters Laboratory (UL) for the refurbishing of molded-case electrical circuit breakers, nor are there any "authorized" refurbishes of molded case circuit breakers. Therefore, "refurbished" molded-case circuit breakers should not be accepted for use in any DOE facility.

B. One source of refurbished molded-case circuit breakers is from the demolition of old buildings. Some refurbishes are junk dealers who may change the amperage labels on the circuit breakers to conform to the amperage ordered and then merely clean and shine the breakers.

This situation was brought to DOE's attention by the Nuclear Regulatory Commission (NRC), which, in turn, had been informed of the practice by the company that manufactures circuit breakers. In early 1988, a sales representative identified "refurbished" circuit breakers at Diablo Canyon Nuclear Power Plant. A subsequent investigation confirmed that circuit breakers sold to the power plant as new equipment were actually refurbished. The managers of the two firms that refurbished and sold these breakers have been convicted of fraud and have paid a substantial fine.

C. NRC published information Notice No. 88-46 dated July 8, 1988, on the investigation findings and circulated it to all applicable government agencies, including DOE. On July 20, 1988, DOE notified all field offices that refurbished circuit breakers may have been installed in critical systems. Shortly thereafter, DOE established the Suspect Equipment Notification System (SENS), a sub-module of ES&H Events and News on the Safety Performance Measurement System (SPMS). SENS has since been replaced by the Supplier Evaluation and Suspect Equipment (SESE) sub-module which includes Suspect Equipment Reports.

D. Some of DOE's older sites have circuit breakers in use that are no longer manufactured. According to the Nuclear Management and Resources Council (NUMARC), examples of such breakers are Westinghouse breakers with frames E, EA, F, and FA. If a DOE contractor has an electrical box that requires a breaker with one of these frame sizes, that contractor would not have been able to purchase it from Westinghouse for several years. If the contractor were to order a replacement breaker from an authorized Westinghouse dealer, the dealer could not get a new replacement breaker from the manufacturer. To fill the order, the dealer had to turn to the secondary or refurbished market.

ATTACHMENT I - REFURBISHED MOLDED CASE CIRCUIT BREAKERS (cont.)

Dealing with an authorized distributor does not preclude ending up with refurbished circuit breakers. Westinghouse has announced that it is considering satisfying this market by manufacturing circuit breakers that will fit in these applications.

The solution, as recommended by NUMARC, is not to focus on the credentials of the distributor but on the traceability of the circuit breaker itself. A purchaser can be assured of having a new circuit breaker only if the breaker can be traced back to the original manufacturer.

2. Indicators of Refurbished Breakers

Typically, refurbished circuit breakers sold as new equipment have one or more of the following characteristics:

- The style of breaker is no longer manufactured.
- The breakers may have come in cheap, generic-type packaging instead of in the manufacturer's original boxes.
- Refurbished circuit breakers are often bulk-packaged in plastic bags, brown paper bags, or cardboard boxes with handwritten labels. New circuit breakers are packed individually in boxes that are labeled with the manufacturer's name, which is usually in two or more colors, and are often date stamped.
- The original manufacturer's labels and/or the Underwriter's Laboratory (UL) or Factory Mutual (FM) labels may have been counterfeited or removed from the breaker. Refurbishing operations have been known to use copying machines to produce poor quality copies of the original manufacturer's and the certifying body's labels.
- Breakers may be labeled with the refurbisher's name rather than the label of a known manufacturer.
- The manufacturer's seal (often multicolored) across the two halves of the case of the breaker is broken or missing.
- Wire lugs (connectors) show evidence of tampering.
- The surface of the circuit breaker may be nicked or scratched yet have a high gloss. Refurbishers often coat breakers with clear plastic to produce a high gloss that gives the casual observer the impression that the breaker is new. The plastic case of new circuit breakers often have a dull appearance.
- Some rivets may have been removed and the case may be held together by wood screws, metal screws, or nuts and bolts.

ATTACHMENT 1 - REFURBISHED MOLDED CASE CIRCUIT BREAKERS (cont.)

- Contradictory amperage ratings may appear on different parts of the same refurbished breaker. On a new breaker, the amperage rating is stamped into, raised from, or machine-painted on the handle of the circuit breaker. In order to supply a breaker with a hard-to-find rating, refurbishers have been known to file down the surface of the handle to remove the original rating and hand-paint the desired amperage rating.

3. Testing

In a news release dated February 6, 1989, the National Electrical Manufacturers Association (NEMA) announced the cancellation of its Publication AB-2-1984 entitled, "Procedures for Field Inspection and Performance Verification of Molded-Case Circuit Breakers used in Commercial and Industrial Applications," and stated the following:

"These procedures were intended for use with breakers that had been originally tested and calibrated in accordance with NEMA Standards Publication AB 1 or Underwriters Laboratories Standard UL 489, and not subsequently opened, cleaned or modified...Therefore, the Standards Publication contained none of the destructive test procedures...necessary to verify the product's ability to withstand such conditions as full voltage overload or short circuit. Without such tests, even if a rebuilt breaker had passed the tests specified in AB-2, there would be no assurance that it would not fail under overload or short circuit conditions. It is NEMA's position that regardless of the results of electrical testing, refurbished electrical circuit breakers are not reliable and should not be used."

4. Precautions

Follow these precautions regarding suspect or refurbished circuit breakers.

A. Require that molded-case breakers be new and unaltered. Proof that they are new and unaltered requires the vendor to show traceability back to the original manufacturer.

B. Do not rely completely on dealing with authorized dealers for protection from purchasing refurbished molded-case circuit breakers.

C. Approve formal procedures for inspecting circuit breakers that are received and installed according to the indicators of refurbished breakers listed above.

D. Contact the original manufacturer if any indication of misrepresentation is encountered. There are many original manufacturers of molded-case circuit breakers whose products are being refurbished and sold as new. These manufacturers have the most specific information about how to ensure that their products have not been refurbished.

ATTACHMENT I - REFURBISHED MOLDED CASE CIRCUIT BREAKERS (cont.)

5. Disposition

A. Segregate and retain all circuit breakers found with indications that they may be refurbished. These will be retained as potential evidence until specifically released by the Office of Inspector General and the Office of Nuclear Safety for Price Anderson Enforcement. Circuit breakers that may be refurbished may only be disposed of when the above organizations no longer need them as evidence.

B. Report suspect electrical components to Occurrence Reporting and Processing System (ORPS). The ORPS categorization group should be identified as "Cross-Category items, Potential Concerns or issues." The description of cause section in the ORPS report should included the text "suspect counterfeit parts."

C. Witness and document the destruction of all suspect/counterfeit circuit breakers when approval is given for disposal.

ATTACHMENT J - ASSESSMENT/SURVEILLANCE LINES OF INQUIRY

1. S/CI processes and other S/CI related processes are effective in addressing the safety-related aspects of S/CI.

2. Formal supplier qualification and re-qualification processes are established and implemented, including routine collection of evaluations of feedback on vendor performance.

3. Controls are established on a graded basis that considers the risks involved and historical experience with S/CIs.

4. Controls are implemented for segregation and separate storage of material identified as suspect/counterfeit

5. Subcontractors have established and implemented sufficient controls to preclude an introduction or use of S/CIs. These controls address construction materials, maintenance or modification equipment and components, and the use subcontractor owned or rented equipment (cranes, hoists, etc.) on site.

6. S/CI processes, requirements, and controls are fully integrated into Integrated Safety Management (ISM) and quality assurance programs and procedures, e.g, training, procurement, maintenance, and assessment) to ensure adequate linkage to S/CI elements.

7. Expectations are established for timeliness in determining whether nonconforming items are S/CI.

8. Protocols are established for clearly identifying S/CIs that are determined to be acceptable for use

9. Inspections for S/CI materials are incorporated into routine maintenance activities, and clear guidance is provided for the disposition of installed S/CI materials identified during routine inspections and maintenance activities.

10. Expectations for S/CI controls are integrated within existing processes, such as routine and special inspections for S/CIs in site procedures, and guidance is provided for performing such inspections.

11. Roles and responsibilities and interfaces for management of S/CIs are clearly assigned, including provisions for the handling of sensitive information and interfacing with the local Office of the Inspector General (IG), to ensure effective, consistent, and timely communication of S/CI information.

12. S/CI reporting requirements are effectively integrated into the site contractors' processes for disposition of non-conforming items, such as NCR processes, as required by appropriate DOE directives.

13. Lessons learned processes are evaluated to determine whether all available and relevant information resources, such as the Government Industry Data Exchange Program (GIDEP), are being utilized for screening S/CI and other relevant information for potential applicability to site activities.

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ATTACHMENT J – ASSESSMENT/SURVEILLENCE LINES OF INQUIRY (cont.)

14. Lessons learned processes are evaluated to ensure that significant requirements and performance expectations have been established for the documentation of applicability reviews, needed actions, and actions taken for lessons learned that require line management attention and action.

15. Lessons learned requiring line management actions are integrated with the site's corrective action management processes to ensure formal tracking, feedback, and closure of actions taken.

16. Corrective actions and management procedures include formal linkage to S/CI reporting requirements for the site office, Occurrence Reporting System (ORPS), contractor General Counsel, and the IG.

17. Site mechanisms, such as a controlled product list, are established and used to maintain current and accurate information on S/CIs. Provisions are available for making this list readily available to site personnel who have S/CI responsibilities for procurement, inspection, and other areas associated with the implementation of S/CI controls.

18. S/CI training programs include the identification of positions and associated personnel required to receive training, the processes for designating those personnel who must receive initial and refresher training, and the required frequencies for refresher training.

19. All personnel involved in design, system engineering, procurement, inspection, maintenance, and other functions involving potential S/CI materials receive S/CI process and hands-on training.

20. Training programs place special emphasis on ensuring that system engineers involved in the design, procurement, and inspection of materials and components with the potential for S/CI receive such training.

21. Subcontractors involved in the procurement or handling of potential S/CI materials and components receive initial and refresher training and are knowledgeable of site S/CI processes, procedures, requirements, and controls.

22. S/CI training addresses site-specific processes and procedures for identifying, dispositioning, and reporting S/CIs, including reporting to the IG.

23. S/CI processes are subject to regular self-assessment, consistent with site self-assessment protocol.

24. Assessments are performed for S/CI processes to evaluate significant changes to the S/CI processes and to establish a baseline for implementation where appropriate. Based on that baseline review, further assessments are tailored to the maturity of the S/CI processes.

25. S/CI lines of inquiry are considered and evaluated, as appropriate, during assessments of areas that interface with S/CI processes (procurement process, NCR process, etc.).

TECHNICAL DATA SHEET
AMEC Americas Limited

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The document revision number is indicated below. Please replace all revised pages of this document and destroy the superseded copies.

PROJECT:	**Final DBVS Design**	**145579-D-DS-031.1**	**REV. 1**
PROJECT NO.:	**145579**	**Secondary Waste Storage Tanks Data Sheet**	
CLIENT:	**AMEC E&E - Richland, Washington**		

REV. NO.	ISSUED FOR	ORIGIN	DATE	INITIAL
A	Internal Review	MEP	28-Sep-04	MEP
B	Internal Approval	MEP	13-Oct-04	MEP
C	CH2M Hill Review	MEP	22-Oct-04	MEP
0	Construction	MEP	02-Dec-04	MEP
1	Construction	VL	18-Mar-05	VL

DOCUMENT APPROVAL

CLIENT APPROVAL (AMEC RICHLAND)
Original Approvals on File

Project Manager: (for B. Bishop)
Date: 3/21/05
Q.A. Rep.:
Date: 3/21/05

CLIENT APPROVAL (CH2M HILL)

Project Manager:
Date: 3/29/05

AMEC AMERICAS LIMITED (TRAIL)
Original Approvals on File

Project Manager: J. Heim
Date: Mar 18/05
Discipline Lead:
Date: Mar 18/05
Originator: Victor Lawrence
Date: March 18, 2005

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TECHNICAL DATA SHEET

PROJECT:	Final DBVS Design	145579-D-DS-031.1	REV. 1
PROJECT NO.:	145579	Secondary Waste Storage Tanks Data Sheet	
CLIENT:	AMEC E&E - Richland, Washington		

REFERENCE SPECIFICATION

Document No.	Specification
145579-D-SP-031	Secondary Waste Storage Tanks Specification

CONTENTS

Data Sheet ..... See Drwg. F-145579-37-D-0003

Bidders Drawing & Data Commitments Sheet ..... 1 Page

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TECHNICAL DATA SHEETS

PROJECT:	Final DBVS Design	143643-D-DS-031.1	REV. 1
PROJECT NO.:	145579	Secondary Waste Storage Tanks	
CLIENT:	AMEC E&E - Richland, Washington		

BIDDERS DRAWING AND DATA COMMITMENTS

Vendor shall supply all drawings, manuals and documentation in the quantities indicated. Approval drawings are due within the listed number of calendar days after issue of the Purchase Order or Letter of Intent. The dates set out for drawing and data submissions are governed by the engineering design schedule of the project. The Vendor shall supply one AutoCAD disk file and requested number of copies within the listed number of calendar days. Final drawings must be certified as correct and bear the Vendors name, equipment number and Purchase Order Number. Drawing Transmittals listing the document numbers, revisions numbers, quantities, status and document types must be included with all submissions (including electronic submittals).

SEND ALL DOCUMENTS TO:	AMEC Americas Limited
	1385 Cedar Avenue
Submit all documents via courier service	Trail, BC, Canada
Faxed documents must be followed by the originals.	V1R 4C3
Electronic E-mail or FTP transmissions of drawings & data must be copied to	Attn: Document Control
Document Control	Phone: (250) 368-2400
Always include a transmittal	Fax: (250) 368-2401

BIDDERS MUST PROVIDE ESTIMATED LEAD TIMES FOR APPROVAL DRAWINGS

Proposal	Bidder shall include this data for each item			REVIEW ITEMS DUE WITHIN (DAYS)	VENDOR COMMITMENT (SEE NOTE 4) (DAYS)
	Review	Required before ordering or start of fabrication			
		Final	Required within 7 days prior to shipment and before final payment		
PROPOSAL	REVIEW	FINAL	DESCRIPTION		
E+3			QA program that addresses the requirements of NQA-1-1994	Bid	
E+3			Subcontractor list	Bid	
E+3			Preliminary design, fabrication & delivery schedule	Bid	
	E+3	E+3	Packing and shipping plan	PO+7	
	E+3		Final Design, fabrication & delivery schedule	PO+7	
	E+3		Preliminary design and fabrication package including: - Preliminary design drawings - Bill of Materials - Preliminary Calculations - Materials Standards	PO+7	
	E+3	E+1	Test plan/test procedure	PO+7	
	E+3	E+3	Protective coating test procedure	PO+7	
	E+1	E+1	NDE personnel certifications	PO+7	
	E+1	E+1	Visual weld/NDE procedures	PO+7	
	E+3	E+1	Welder procedures, procedure qualification records and welder qualification records	PO+7	
	E+3	E+1	AWS CWI certificate	PO+7	
	E+3	E+1	Material control procedures	PO+7	
	E+3	E+1	Materials without CMTRs for review and approval	PO+7	
	E+3		Recommended Vacuum/Pressure Relief Valve	PO+7	
	E+3		Factory Acceptance Test procedure	PO+7	
		E+6	Final Designing and fabrication package including: - Final design drawings - Bill of Materials - Final Mechanical and Structural Calculations (Including Natural Phenomena Hazard analysis) - Materials Standards	Fab-10	
	E+3	E+1	NCR's	When identified +3	
	E+3	E+3	Fabrication red-line changes	When identified	
	E+3	E+1	Final Data Package including - As-built drawings - Rigging sketches - Final Test results (document and video record) - Inspection results - CoC's/CMTR's	Del-10	

THE TIMELY RECEIPT OF THE VENDOR DOCUMENTS IS CRITICAL TO THIS PROJECT
BUYER COMMITS TO A 10 WORKING DAY TURNAROUND ON REVIEW ITEMS

I agree to provide the listed documentation and data and the dates shown above.

Vendor Signature _____ Date _____

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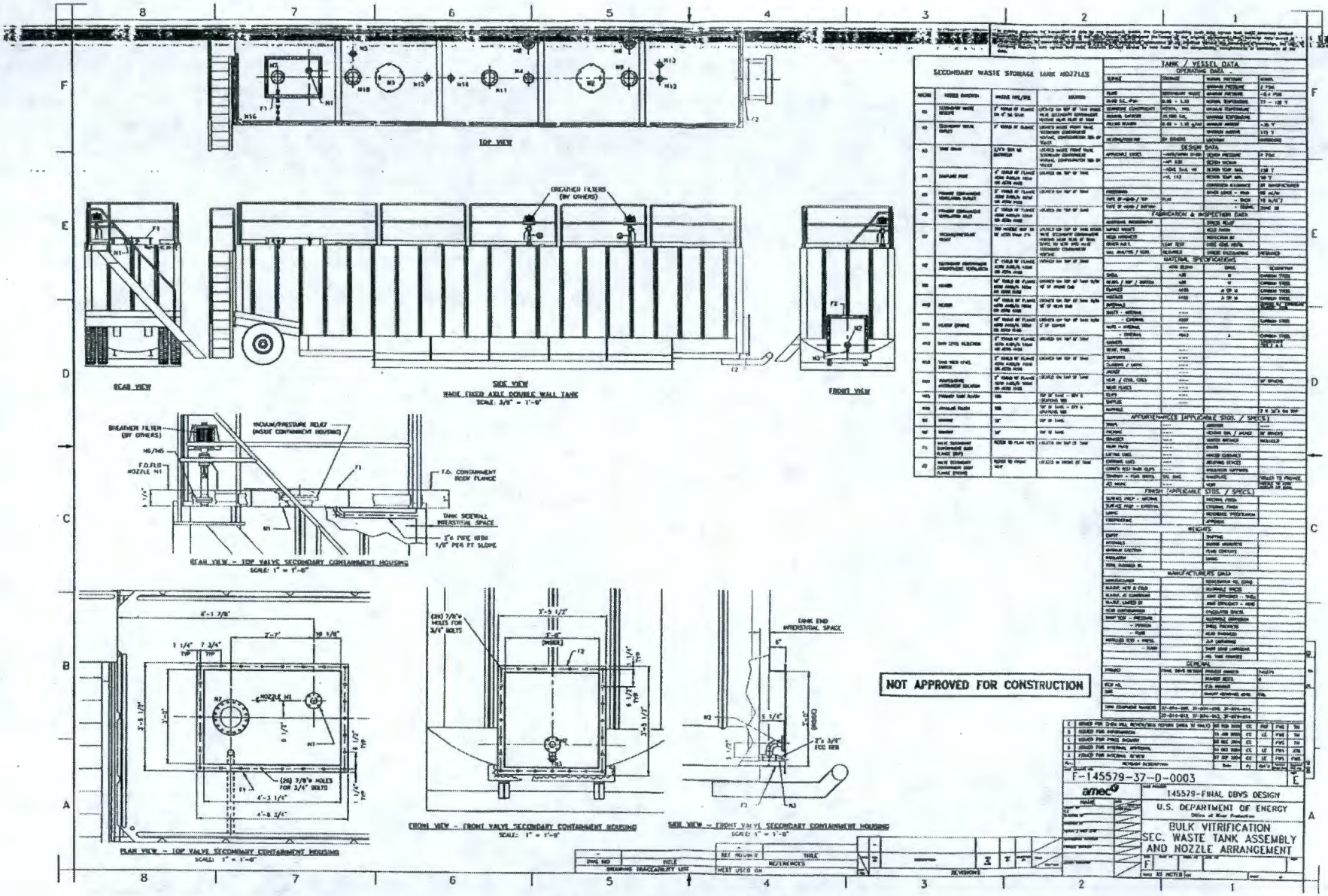
TOP VIEW
SIDE VIEW
WAGE FIXED AXLE DOUBLE WALL TANK
SCALE: 3/8" = 1'-0"
REAR VIEW
FRONT VIEW
BREATHER FILTERS (BY OTHERS)
REAR VIEW - TOP VALVE SECONDARY CONTAINMENT HOUSING
SCALE: 1" = 1'-0"
PLAN VIEW - TOP VALVE SECONDARY CONTAINMENT HOUSING
SCALE: 1" = 1'-0"
FRONT VIEW - FRONT VALVE SECONDARY CONTAINMENT HOUSING
SCALE: 1" = 1'-0"
SIDE VIEW - FRONT VALVE SECONDARY CONTAINMENT HOUSING
SCALE: 1" = 1'-0"
TANK END INTERSTITIAL SPACE
NOT APPROVED FOR CONSTRUCTION
F-145579-37-D-0003
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145579-FINAL DBVS DESIGN
U.S. DEPARTMENT OF ENERGY
BULK VITRIFICATION
SEC. WASTE TANK ASSEMBLY
AND NOZZLE ARRANGEMENT

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TECHNICAL ENGINEERING CHANGE NOTICE (TECN)

145579 FINAL DBVS DESIGN TECN No.: 018.001

DOCUMENT(S) AFFECTED BY CHANGE

Document No. of affected Docs.	Rev	Title:
145579-D-SP-031	1	Secondary Waste Storage Tanks Specification

Originator: Michael Paul Date: Mar 29, 2005

BASIS OF CHANGE:

Incorrect wording in Section 3.3.2.7 and 3.2.1.1 as indicated below.

DESCRIPTION OF CHANGE:

Section 3.3.2.7 replaced "plant air system" with "storage tanks".

Section 3.2.1.1 sentence #6 replaced "steam" with "stream".

Note: These changes are editorial in nature; therefore we do not believe CH2M Hill's approval is necessary.

AREA/DISC. LEAD:		DATE:	Mar 29, 2005
TRL ENG. MNGR. (JDS/TH):		DATE:	Mar 29, 2005
AMEC E&E (M. Lucas):		DATE:	4/8/05
CLIENT APPROVAL: DHS		DATE:	4/19/05

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TECHNICAL ENGINEERING CHANGE NOTICE (TECN)

145579 FINAL DBVS DESIGN **TECN No.: D-SP-031.R01.2**

DOCUMENT(S) AFFECTED BY CHANGE

Document No. of affected Docs.	Rev	Title:
145579-D-SP-031	1	Secondary Waste Storage Tanks Specification

Originator: Vicki Lawrence for Frank Sweet Date: April 19, 2005

BASIS OF CHANGE:

There is inconsistency between the specification 145579-D-SP-010, 011 and 031. The State has noted that there are inconsistencies. CH2M Hill has requested that these inconsistencies be rectified.

DESCRIPTION OF CHANGE:

On Table 3-1, all temperature ranges to read "50 - 150°F".

Notes in Section 6: delete notes 1 through 3 and replaced with "None".

Add Section *3.3.11.2 Design Calculations* to the Specification as stated below:

3.3.11.2 Design Calculations

"Vendor is to provide minimum heel volume design calculation to provide the minimum water level or tank volume to be left in the tank such that air will not be sucked into the piping with the outlet flow rate specified in section 3.2.1.3.

Vendor is to provide a design calculation to determine the minimum gas space required, defined in terms of maximum liquid level, such that the tank pressure protection devices will not activate from temperature fluctuations if the tank is isolated (i.e., not vented) for 24 hours."

In Section 8.0 Attachments change the revision for 145579-37-D-0003 to "F" (attached). (Note: The operating temperature range on Rev. F has also been changed to "50 - 150°F".)

Total Pages Attached: 5

AREA/DISC. LEAD:	(for F. Sweet)	DATE:	20 APR 2005
TRL ENG. MNGR. (JDS/TH):		DATE:	20 APR 2005
AMEC E&E (M. Lucas):		DATE:	4/21/05
CLIENT APPROVAL:		DATE:	4/21/05

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Permit Attachment KK Tank Management

Appendix 4 Secondary Waste System

Section 6 Corrosion Review

Technical Specifications: Secondary Waste Storage tanks Specification (145579-D-SP-031, Rev. 0) and Secondary Waste Pump Skid (145579-D-SP-001, Rev. 0) – A Corrosion Review

CHEMMET, LTD, PC
POB 4068
West Richland, WA 99353
509-967-2309 fax 967-2459

Your single source for Chemical, Materials, and Environmental Technology

February 2, 2005

Charles E. Grenard
DMJM Technologies
3250 Port of Benton Blvd
Richland, WA 99354-1670

Dear Mr Grenard

Technical Specifications: *Secondary Waste Storage Tanks Specification* (145579-D-SP-031, Rev 0) and *Secondary Waste Pump Skid* (145579-D-SP-001, Rev 0) – A Corrosion Review

This document presents some comments on specific details in the specifications

***Secondary Waste Storage Tanks Specification* (145579-D-SP-031, Rev 0)**

1. Acronym List - Include Mo – molybdenum. [Note also cP is centipoise, not CP. Also be consistent throughout the document whether you will use usgpm, USgpm, or Usgpm.]
2. Section 2.2, Table 2-2 – Consider adding references to ASTM documents on 6% Mo alloys and polymer tanks.
3. Section 3.2.1.1 – The OGTS scrubber Secondary Waste is compatible with the 300 series stainless steels. However the Tri-mer® Scrubber Secondary Waste has restrictions: it should not be allowed to contact bare carbon steel because of high corrosion rates in the <pH 1 solution; coated carbon steel is not recommended because of the likelihood of holidays and coating damage; the use of the 300 series stainless steel is not permitted due to the potential for pitting or cracking – a 6% Mo alloy such as AL-6XN may suffice for short periods but a higher alloy such a C-22 is recommended; polymer tanks are acceptable if resistant to dilute nitric acid. This also pertains to the proposed stainless steel tanker.
4. Section 3.2.4.1.2 – The noted regions shall be protected from Tri-mer® solution vapors.
5. Section 3.2.5 – Carbon steel components shall be protected from mechanical damage if the temperature is below their nil-ductility transition temperature.

***Secondary Waste Pump Skid* (145579-D-SP-001, Rev 0)**

1. Pertinent items in Specification 031 also apply to Specification 001.

Sincerely,

James R. Divine, PhD, PE
NACE Corrosion Specialist, #867
Chief Engineer

JAMES R. DIVINE
STATE OF WASHINGTON
12231
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES: 3-11-06

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March 10, 2005

DBVS-LDS-005

Mr. James R. Divine
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P.O. Box 4068
West Richland, Washington 99353

Reference: *Secondary Waste Transfer Pump Skid* (145579-D-SP-031) and *Secondary Waste Staging Tanks* (145579-D-SP-010)—A Corrosion Review, dated February 2, 2005.

SUBJECT: RESPONSE TO CORROSION REVIEW FOR THE SECONDARY WASTE SYSTEM

Dear Mr. Divine,

DMJMH+N, Inc. (dba DMJM Technology) recently contracted with ChemMet, Ltd. to conduct a corrosion review on various systems and components for the Demonstration Bulk Vitrification System (DBVS) Project.

Table 1 denotes our planned actions to address your comments, issues, and concerns stated in your review of the above-referenced DBVS equipment specifications.

Thank you for your corrosion review on the DBVS Secondary Waste System.

Respectfully,

Kurt J. McCracken
Chief Engineer

James R. Fredrickson
DBVS Project Manager

rlk

Attachments: As stated

cc: DMJM Technology

James Frederickson
Kurt McCracken
Ja-Kael Luey
DMJM File/LB

CH2M HILL Hanford Group, Inc.

Mike Leonard
Dave Shuford

AMEC Earth and Environmental

Leo Thompson
Mark Lucas

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Table 1. Secondary Waste System. (2 sheets)

Item	Section	Comment or Recommendation	Disposition or Planned Action
Secondary Waste Storage Tanks Specification (145579-D-SP-031)—A Corrosion Review, dated February 2, 2005			
1.	Acronym List	Include Mo – molybdenum. [Note also cP is centipoise, not CP. Also be consistent throughout the document whether you will use usgpm, USgpm, or Usgpm.]	cP will be changed in the following revision to this specification along with the USgpm and the document will be checked for consistency.
2.	Section 2.2, Table 2-2	Consider adding references to ASTM documents on 6% Mo alloys and polymer tanks.	See Item #3. The Mo alloy and polymer tanks are not needed due to a change in the operating conditions of the DBVS Project, which will maintain solutions neutral to caustic.
3.	Section 3.2.1.1	The OGTS scrubber Secondary Waste is compatible with the 300 series stainless steels. However the Tri-mer® Scrubber Secondary Waste has restrictions: it should not be allowed to contact bare carbon steel because of high corrosion rates in the <pH 1 solution; coated carbon steel is not recommended because of the likelihood of holidays and coating damage; the use of the 300 series stainless steel is not permitted due to the potential for pitting or cracking – a 6% Mo alloy such as AL-6XN may suffice for short periods but a higher alloy such a C-22 is recommended; polymer tanks are acceptable if resistant to dilute nitric acid. This also pertains to the proposed stainless steel tanker.	Recently, the Tri-Mer scrubber has been evaluated for operating the unit to keep the discharges from being "acidic" in normal and upset conditions. The attached letter from AMEC DBVS process engineering (Attachment 1) states that the Tri-Mer effluent will now be operated such that the pH will range from 7-8 in both normal and upset conditions; therefore, the need for changing the pump system and tank design is no longer necessary.
4.	Section 3.2.4.1.2	The noted regions shall be protected from Tri-mer® solution vapors.	The tank nozzles will also be protected from the tank vapors and will be evaluated in the final design package from the vendor.

Table 1. Secondary Waste System. (2 sheets)

Item	Section	Comment or Recommendation	Disposition or Planned Action
5.	Section 3.2.5	Carbon steel components shall be protected from mechanical damage if the temperature is below their nil-ductility transition temperature.	The secondary waste tanks have heaters to keep the liquids above freezing near 40 to 50 °F. The heat transfer is expected to keep the wall in contact with the waste above 0 °F. HIHTL connections are also heat traced. Transportation and installation plans will be reviewed to ensure that these activities are not performed during temperatures of concern.
Secondary Waste Pump Skid Specification (145579-D-SP-001)—A Corrosion Review, dated February 2, 2005			
1.	N/A	Pertinent items in Specification 031 also apply to Specification 001.	The pump skid specification number is 011 rather than 001. Please see Items #3 and #4 for 145579-D-SP-031 (above) for pertinent items associated with the Secondary Waste Pump Skid.

Mr. James R. Divine
DBVS-LDS-005
Attachment 1
March 10, 2005
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Memo

To	Tony Heim	File No.	145579
From	Khosrow Nikkhah	cc	John Stephens, Luis Eugenio, Charles Grenard (DMJM)
Date	February 03, 2004		

Subject Background for Changes in the Tri-Mer Effluent pH

Introduction

When used for the DBVS off-gas treatment, the Tri-Mer scrubber effluent is comprised of spent solution flows from 6 Tri-Mer towers.

In previous process documents, the Tri-Mer effluent was characterized as potentially "acidic" under both normal and upset operating conditions due to assumption of low efficiency in chemical consumption of sulphuric acid in the two towers to which it is added as reagent.

The operation of the Tri-Mer has been reviewed and it has been determined that under normal operation the Tri-Mer effluent stream will be alkali. The Tri-Mer scrubber can and will be operated such that the efficiency of acid use is much higher and excess acid from towers #2 and #4 is much reduced. Effluent from these towers is combined with alkali effluent from the other towers and mass balance calculations indicate that the combined effluent will normally be alkaline.

The Tri-Mer scrubber P & IDs were reviewed and it was found that no instrumentation or controls were in place to ensure that Tri-Mer effluent pH would remain alkali under upset conditions. The background to this problem and the changes required for ensuring an alkali Tri-Mer effluent stream under all conditions is presented in this memorandum.

Recommendations for additional instrumentation and control interlocks are made to ensure the Tri-Mer effluent is not less than 7 when transferred to the secondary waste storage tanks.

Control of Tri-Mer Effluent Characteristics

The reagents addition system for the Tri-Mer scrubber is shown in P&ID F-145579-36-A-0104. Below are the concerns regarding the operation of the Tri-Mer scrubber and the changes recommended to ensure that the Tri-Mer scrubber effluent pH is always in the desired alkali range.

1. Solution pH is controlled in the 3rd (36-D77-070), 5th (36-D77-072) and the 6th (36-D77-073) columns and it is ensured that these columns are operating under alkali conditions. pH meters AE 611, AE 622 and AE 630 at these columns are used for tying the caustic solution flow rate to measured pH set-points. No additional pH control is shown anywhere else in the Tri-Mer scrubber system.

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2. Previously, because there was no documented means of controlling the pH at the Tri-Mer sump and the fact that in the columns 36-D77-069 and 071 (#2 & #4) we had assumed that excessive quantities of acid are being used in the chlorine dioxide production reaction with sodium chlorite, no additional caustic solution was taken into account to neutralize it. Currently, it is suggested that the small excess acid flows from columns 069 and 070 can be limited to less than 0.5 wt% sulfuric acid and then combined in the sump with excess caustic from the other towers resulting in an alkali pH.

3. Under normal operating conditions, addition of sulfuric acid and sodium chlorite in the 2nd and 4th towers should be interlocked so that there would be little or no excess sulphuric acid overflow from columns 069 and 071 to the common discharge line and then to the Tri-Mer bleed pump. It is not clear if the Tri-Mer PLC ensures this by shutting down the acid flow, when sodium chlorite pump has failed, but such an interlock can be implemented if required.

4. Under normal operating conditions any small amounts of excess acid would be neutralized with excess caustic backflow from the other columns (tanks 070, 072 and 073) to ensure an effluent solution pH in the 9-10 range. However, lack of pH meter in the effluent sump suggests that currently there is no positive control on the effluent pH in the sump and under upset conditions (eg failure of the sodium chlorite pump) the Tri-Mer effluent discharged to the storage tanks could be acidic.

5. P&IDs have been revised to include installation of a pH meter at the Tri-Mer sump so that if (under an off-normal condition) - despite addition of normal quantities of caustic -, the effluent pH continues to drop sharply, then acid flow can be adjusted immediately (by means of a control inter-lock) to limit acid concentrations in streams overflowing to the sump from columns 069 and 071 and ensure a minimum effluent pH of 7.

6. Tables below show the Tri-Mer scrubber effluent characteristics and composition based on the aforementioned changes.

Tri-Mer® Scrubber Secondary Waste:	
Temperature:	50 – 150 °F
Supernatant Liquid Density:	1.1g/mL
Operating Fluid pH:	9-10
Upset Condition Fluid pH:	7-8
Viscosity:	1.5 CP (max.)
Design Volume Flow:	Normally No Flow (Stream flow rate at 7.0 USgpm for a period of 70 hrs when operating)

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Tri-Mer® Scrubber Secondary Waste:	
Water	85.6
NaCl	2.5
NO_3^- (aq)	2.65
Na^+ (aq)	0.98
Na_2SO_3 (aq)	4.95
$NaNO_3$ (aq)	0.23
NaOH (aq)	0.1
$NaNO_2$ (aq)	0.19
Na_2SO_4 (aq)	2.48
Total	100.00

Please let me know if you need additional information and or comments.

K. Nikkhah

Khosrow Nikkhah, Ph.D., P.Eng.

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Facility Description - Section 2 of the Permit Application

Current Version is in Permit Attachment KK

Section 4.0 – Bulk Vitrification Test And Demonstration Facility

Current version is located in Appendix KK