

# START

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1 of 2

Mr. John Grantham  
State of Washington  
Department of Ecology  
Nuclear & Mixed Waste Program  
P. O. Box 47600  
Olympia, WA 98504-7600

FLUOR DANIEL, INC.

Date: February 26, 1993

Reference: Hanford Waste Vitrification Plant  
DOE Contract DE-AC06-86RL10838  
Fluor Contract 8457

Transmittal No.: WDOE-341

Dear Mr. Grantham:

TRANSMITTAL

We enclose \*  copy of the items listed below. These are issued per US-DOE request.  
\*2 FULLSIZE BLUELINES ROLLED & 2 SPECIFICATIONS, & 1 REDUCED

Response due to Fluor: N/A  
Responds to: B210A PACKAGE

NUMBER	REV	DATE	TITLE
SEE TRANSMITTAL ATTACHMENT	-----	-----	B210A VIT BUILDING FOUNDATION PACKAGE

Distribution:

Reference: FRP-805, FUP-376  
R. L. Long: DOE-RL w/0  
TWP/AME Corresp Cntrl Cntr, MSIN A5-10  
(B210A PACKAGE), w/0  
P. Felise, WHC-RL (MSIN G6-16), w/1F, 1 SPEC  
Environmental Data Management Center  
(MSIN H6-08), w/1F, 1 SPEC  
D. Duncan, US EPA, Region X w/0

Very truly yours,

*R. S. Poulter*  
R. S. Poulter  
Project Director

RSP:PP:lt

PP



TRANSMITTAL ATTACHMENT FOR PACKAGE DRAWINGS

PACKAGE NUMBER: B210A

<u>DRAWING NUMBER</u>	<u>SHT NO.</u>	<u>REV</u>	<u>DATE</u>	<u>DRAWING TITLE</u>
H-2-117431	1	1	02/25/93	STRUCT VIT BLDG TUNNEL FORMING PLAN SOUTH END
H-2-117432	1	1	02/25/93	STRUCT VIT BLDG TUNNEL FORMING PLAN NORTH END
H-2-117438	1	1	02/25/93	STRUCT VIT BLDG TUNNEL MAT REINF PLAN NORTH END TOP REINF
H-2-117442	1	1	02/25/93	STRUCTURAL VIT BLDG TUNNEL FLOOR PLAN
H-2-117452	1	1	02/25/93	STRUCTURAL VIT BLDG TUNNEL FLOOR PLAN
H-2-117454	1	1	02/25/93	STRUCTURAL VIT BLDG TUNNEL FLOOR PLAN
H-2-117953	2	0	02/25/93	STRUCTURAL VIT BLDG WALL ELEVATIONS
H-2-117966	1	1	02/25/93	STRUCTURAL VIT BLDG WALL ELEVATIONS
H-2-118226	1	1	02/25/93	STRUCT VIT BLDG REINF SECTS CA, CB, CC, CD, CE, & CF
H-2-118231	1	1	02/25/93	STRUCTURAL VIT BLDG SECTIONS & DETAILS
H-2-118235	1	1	02/25/93	STRUCTURAL VIT BLDG SS SUMPS
H-2-118235	2	1	02/25/93	STRUCTURAL VIT BLDG SS SUMPS
H-2-118235	3	1	02/25/93	STRUCTURAL VIT BLDG SS SUMPS
H-2-118235	4	1	02/25/93	STRUCTURAL VIT BLDG SS SUMPS
H-2-118240	1	1	02/25/93	STRUCTURAL VIT BLDG INSERT PL SCHED & DETS
H-2-118249	1	1	02/25/93	STRUCTURAL VIT BLDG SECTIONS & DETAILS
H-2-118250	1	1	02/25/93	STRUCT VIT BLDG RAILROAD DOOR EMBEDS SECTIONS & DETAILS
H-2-116005	1	1	02/25/93	VIT BUILDING FOUNDATION TITLE SHEET
H-2-116006	1	1	02/25/93	VIT BUILDING FOUNDATION DRAWING INDEX
H-2-116006	2	1	02/25/93	VIT BUILDING FOUNDATION DRAWING INDEX
H-2-124092	1	1	02/25/93	PIPING VIT BUILDING TUNNEL SLAB LEVEL DRAWING INDEX
H-2-124094	1	1	02/25/93	PIPING PLAN VIT BUILDING AREA S-A-1 AND S-A-2
H-2-124095	1	1	02/25/93	PIPING PLAN VIT BUILDING AREA S-B-1 THRU S-B-3
H-2-126175	8	0	02/25/93	PE-3"-110-017-DD-Ih SHEET 01 PIPING ISOMETRIC
H-2-126175	16	0	02/25/93	PE-2"-20C-203-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126176	5	0	02/25/93	PE-2"-20B-065-DE-NONE SHEET 01 PIPING ISOMETRIC
H-2-126176	21	0	02/25/93	PE-2"-20C-204-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126177	22	0	02/25/93	PE-2"-20C-195-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126178	14	0	02/25/93	PE-2"-20C-197-A-NONE SHEET 01 PIPING ISOMETRIC

TRANSMITTAL ATTACHMENT FOR PACKAGE DRAWINGS

PACKAGE NUMBER: B210A

<u>DRAWING NUMBER</u>	<u>SHT NO.</u>	<u>REV</u>	<u>DATE</u>	<u>DRAWING TITLE</u>
H-2-126178	17	0	02/25/93	PE-2"-20C-193-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126179	15	0	02/25/93	PE-2"-20C-196-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126179	16	0	02/25/93	PE-2"-20C-194-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126180	16	0	02/25/93	PE-2"-20C-199-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126185	3	0	02/25/93	PE-3" 110-002-DD-NONE SHEET 01 PIPING ISOMETRIC
H-2-126185	22	0	02/25/93	PE-2"-20C-202-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126185	23	0	02/25/93	PE-2"-20C-200-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126186	3	0	02/25/93	PE-3"-110-014-DD-Ih SHEET 01 PIPING ISOMETRIC
H-2-126186	20	0	02/25/93	PE-2"-20C-201-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-126187	9	0	02/25/93	PE-3"-110-038-DD-Ih SHEET 01 PIPING ISOMETRIC
H-2-126188	6	0	02/25/93	PE-2"-20B-064-DE-NONE SHEET 01 PIPING ISOMETRIC
H-2-126188	18	0	02/25/93	PE-2"-20C-198-A-NONE SHEET 01 PIPING ISOMETRIC
H-2-122381	1	1	02/25/93	ELECTRICAL VIT BLDG STANDARD DRAFTING SYMBOLS
H-2-122381	2	1	02/25/93	ELECTRICAL VIT BLDG STANDARD ABBREVIATIONS AND GENERAL NOTES
H-2-122382	1	1	02/25/93	ELECTRICAL VIT BLDG STANDARD ASSEMBLIES
H-2-122382	2	1	02/25/93	ELECTRICAL VIT BLDG STANDARD DETAILS
H-2-122383	1	1	02/25/93	ELECTRICAL VIT BLDG UNDERGROUND CONDUIT & GROUNDING PLAN
H-2-122383	2	1	02/25/93	ELECTRICAL VIT BLDG UNDERGROUND CONDUIT & GROUNDING PLAN
H-2-122383	3	1	02/25/93	ELECTRICAL VIT BLDG UNDERGROUND CONDUIT & GROUNDING PLAN
H-2-122383	4	1	02/25/93	ELECTRICAL VIT BLDG UNDERGROUND CONDUIT & GROUNDING PLAN
H-2-122384	1	1	02/25/93	ELECTRICAL VIT BLDG UNDERGROUND & GROUNDING SECTIONS
H-2-122384	2	1	02/25/93	ELECTRICAL VIT BLDG UNDERGROUND & GROUNDING SECTIONS
H-2-122384	3	1	02/25/93	ELECTRICAL VIT BLDG UNDERGROUND & GROUNDING SECTIONS

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02/26/93

TRANSMITTAL ATTACHMENT FOR PACKAGE SPECIFICATIONS

<u>SPEC NUMBER</u>	<u>PKG SIGN DATE</u>	<u>PKG REV</u>	<u>SECT REV</u>	<u>SECTION DATE</u>	<u>SECTION</u>	<u>SECTION TITLE</u>
B-595-C-B210A	B210A	1			VITRIFICATION BUILDING FOUNDATION	
	02/25/93		1		15062	PIPING MATERIAL, FABRICATION, ERECTION & PRESS TESTING SPEC (DOUBLE CONTAINED PIPING)
	02/25/93		1		16100	ELECTRICAL INSTALLATION
	02/25/93		1		16110	ELECTRICAL MATERIAL AND DEVICES
	02/25/93		0		RD-1	RELATED DOCUMENT NO. 1 PIPING ISOMETRICS RD-1

VITRIFICATION BUILDING FOUNDATION  
SPECIFICATION B-595-C-B210A

APPROVED FOR CONSTRUCTION

Revision 1 PER CR-0929

Issue Date 2/25/93

APPROVED BY:

<u>D. M. Garrett</u>	Project Package Engineer	<u>2/25/93</u>
Date		
<u>J. J. Salchak</u>	Area Project Manager	<u>2/25/93</u>
Date		
<u>P. J. Spirdel</u>	Engineering Project Manager	<u>2/25/93</u>
Date		
<u>J. V. Smets</u>	Systems Manager	<u>2/25/93</u>
Date		
<u>A. K. Yee</u>	Independent Safety Manager	<u>2/25/93</u>
Date		
<u>Fall Parizer for J.G. Kelly</u>	Quality Assurance Manager	<u>2/25/93</u>
Date		
<u>R. S. Poulter</u>	Project Director	<u>2/25/93</u>
Date		

FEB 26 1993

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VITRIFICATION BUILDING FOUNDATION  
B-595-C-B210A

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TECHNICAL SPECIFICATIONS

DIVISION 2 - SITE WORK

Section	Title	
02220	Excavation and Backfill	0

DIVISION 3 - CONCRETE

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03200	Concrete Reinforcement	0
03252	Concrete Anchors	0
03300	Cast-in-Place Concrete	0
03010	Metallic Topping	0

DIVISION 5 - METALS

Section	Title	
05059	Welding Stainless Steel Liners	0
05062	Welding Piping	0
05123	Miscellaneous Metals	0
05560	Embedded Wall Penetrations	0

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

Section	Title	
07160	Bituminous Dampproofing	0

DIVISION 9 - FINISHES

Section	Title	
09875	Priming of Steel	0

DIVISION 13 - SPECIAL CONSTRUCTION

Section	Title	
13252	Precautions for Fabrication, Handling and Storage of Stainless Steel and Nickel Alloys	0

943201.0174

**DIVISION 15 - MECHANICAL**

Section	Title	
RD-1	Piping Isometrics	1
15196	Identification and Tagging Methods for Mechanical Equipment	0
15060	Piping Material, Fabrication, Erection and Pressure Testing (Alloy Piping)	0
15062	Piping Material, Fabrication, Erection and Pressure Testing (Double Contained Piping)	1
*15250	Mechanical Insulation	C

**DIVISION 16 - ELECTRICAL**

Section	Title	
16100	Electrical Installation	1
16110	Electrical Material and Devices	1
16111	Conduit Schedule	D
16905	Electrical Testing	D

\* Submitted as Reference Document

9413201.0175

U.S. DEPARTMENT OF ENERGY  
Hanford Waste Vitrification Plant  
Richland, Washington  
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.  
Advanced Technology Division  
Fluor Contract 8457

SECTION 16100  
ELECTRICAL INSTALLATION  
B-595-C-B210A-16100

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0690 & CR-0929  
ISSUE DATE 2/25/83

WAPA YES  NO   
QUALITY LEVEL I  II   
SAFETY CLASS 1  2  3  4

ORIGINATOR:

CHECKER:

Charles C Simpson 2-25-93  
C. C. Simpson, Electrical Engineer Date

A. Larsen 2-25-93  
A. Larsen, Electrical Engineer Date

APPROVED BY:

K. A. Owrey  
K. A. Owrey Lead Discipline Engineer

2-25-93  
Date

9413201.0176

SECTION 16100  
ELECTRICAL INSTALLATION  
B-595-C-B210A-16100

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**SECTION 16100  
ELECTRICAL INSTALLATION**

**PART 1 GENERAL**

**1.1 SUMMARY**

- 1.1.1 This specification defines the technical requirements for installation of electrical materials and devices in the Vitrification Building foundation.
- 1.1.2 Seller shall furnish all labor, material, tools, and equipment necessary to perform installation of wall embedments, underground duct banks and grounding system for the Vitrification Building foundation package as shown on the Contract Drawings and in accordance with the requirements of this section.
- 1.1.3 Seller shall be responsible for electrical installation and field routing of conduit and grounding system where not specifically defined on the Contract Drawings.
- 1.1.4 Seller shall provide and install locknuts, union fittings, caps, plugs, and hardware, etc., as required to complete the installation per the Contract Drawings.
- 1.1.5 Dimensional tolerance shall be  $\pm 1$  inch unless otherwise specified on the Contract Drawings.

**1.2 REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

**NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)**

NFPA 70                      1990 National Electrical Code (NEC)

**1.3 RELATED REQUIREMENTS**

Specification Section 16110    Electrical Materials and Devices  
Specification Section 16111    Conduit Schedule  
Specification Section 16905    Electrical Testing

9413201.0178

1.4 **DEFINITIONS**

(Not Used)

1.5 **SYSTEM DESCRIPTION**

(Not Used)

1.6 **SUBMITTALS**

1.6.1 Submit the following in accordance with the Vendor Drawing and Data Requirements section of the subcontract.

A. As-Built Drawings

1.7 **CLASSIFICATION OF SYSTEM AND COMPONENTS**

(Not Used)

1.8 **PROJECT OR SITE ENVIRONMENTAL CONDITIONS**

1.8.1 Climatic and Geographic Site Conditions

A. Site Elevation 714 feet above sea level

B. Barometric Pressure 14.3 psia

C. Outside Design Temperature

1) Maximum Design Temperature 110°F

2) Minimum Design Temperature -20°F

**PART 2 PRODUCTS**

2.1 **MATERIALS AND EQUIPMENT**

2.1.1 Seller shall install all materials including grounding system, underground duct banks, wall embeds and conduit stub-ups required to complete electrical installation in accordance with the Contract Drawings and specification sections.

2.1.2 Electrical material and devices shall be in accordance with Specification Section 16110, Electrical Materials and Devices.

2.2 **FABRICATION AND MANUFACTURE**

(Not Used)

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### PART 3 EXECUTION

#### 3.1 INSTALLATION, APPLICATION AND ERECTION

- 3.1.1 Materials and devices shall be installed in accordance with NFPA 70, the Contract Drawings and manufacturer's instructions.
- 3.1.2 Conduit
- 3.1.2.1 Conduits installed below grade shall be polyvinyl chloride (PVC) Schedule 80 or rigid steel galvanized conduit as noted on the Contract Drawings.
- 3.1.2.2 Rigid steel galvanized conduit shall be cut square with a conduit cutter and threaded with a conduit threader. The ends shall be reamed of burrs and all metal shavings and cutting lubricants shall be removed before the conduit is connected to the conduit system.
- 3.1.2.3 Stainless steel conduits shall be cut square with a conduit cutter.
- 3.1.2.4 Electrical embeds shall be stainless steel conduit.
- 3.1.2.5 Conduit crushed or deformed in bending will be rejected. Concentric bends are not required; however, the Seller shall maintain identical spacing between adjacent conduit runs both at the beginning and after the bend.
- 3.1.2.6 Supports shall be erected square, and true to line and grade, with a minimum spacing of one support for every 10 feet of conduit length.
- 3.1.2.7 Conduit openings into which dirt, mortar mix or debris may fall shall be closed with caps or plugs during the construction period. Conduits in which such material has accumulated shall be thoroughly cleaned. Where such accumulations cannot be readily removed, the conduit shall be replaced.
- 3.1.2.8 When not shown in detail on the Contract Drawings or when an installation interference exists, the exact locations and routing of conduit shall be determined by the Seller and approved by the Buyer.
- 3.1.2.9 Fittings on conduit systems having threaded connections shall be made up tight, with full thread engagement, and with a minimum of wrench work in order to avoid wrench cuts. Running threads and slip joints are not permitted. Joints shall provide structural rigidity and low electrical resistance.

- 3.1.2.10 Before making up conduit runs, the interiors of all conduit, conduit bends and fittings shall be inspected and cleaned of all dirt, cuttings and other foreign material.
- 3.1.2.11 Conduit threads shall be continuous and shall be made with appropriate tooling.
- 3.1.2.12 Rigid steel field cut threads shall have anti-siege compound. The application of the coating shall overlap the unthreaded conduit by one inch all around.
- 3.1.2.13 Wall embeded conduits shall be installed with the largest symmetrical bending radius permitted as noted on the Contract Drawings. The entry and exit conduit penetrations shall be 90°/perpendicular to the wall.
- 3.1.3 Conduit and Hardware Supports
- 3.1.3.1 Conduit supports shall be furnished and installed by the Seller as required by National Electrical Code and as shown on the Contract Drawings.
- 3.1.4 Identification
- 3.1.4.1 Conduits
- 3.1.4.1.1 Embeds and conduits listed on Specification Section 16111, Conduit Schedule, shall be identified in accordance with Specification Section 16110.
- 3.1.4.1.2 Embeds shall be identified at both sides of any walls. Conduit stub-ups/stub-outs shall be identified as shown on the Contract Drawings.
- 3.1.5 Grounding
- 3.1.5.1 The grounding system including underground duct banks, ground rods, embedded ground plates, single point instrument ground, etc., shall be in accordance with the Contract Drawings. In addition to the grounding specified herein or on the Contract Drawings, all ground connections required by the National Electrical Code shall be furnished and installed.
- 3.1.5.2 Grounding conductors shall be copper. Routing shall be as shown on the Contract Drawings.
- 3.1.5.3 Before connections are made, all contact surfaces shall be clean of grease, dirt and debris. Apply approved anti-oxidizing compound as specified in Section 16110 to clean contact surfaces connections.

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3.1.5.4 Exothermic weld connections shall be made by the Cadweld process or equal. Grounding connections shall include but not be limited to, all cable to cable splices, tees, X's, cable to ground rods, copper to steel or cast iron and cable lug terminations as shown on the Contract Drawings.

3.1.5.5 Building rebar shall be grounded as shown on the Contract Drawings.

3.1.6 Single Point Instrument Grounding

3.1.6.1 Single point instrument grounding shall be a separate and isolated grounding system. The insulated copper conductor shall be run in PVC conduit and stubup shall be in rigid steel conduit. Routing shall be as shown on the Contract Drawings.

3.1.7 Underground Duct Banks

3.1.7.1 Underground duct banks shall consist of rigid steel galvanized conduit, PVC conduit and ground wire encased in concrete as shown on the Contract Drawings. Joints in conduit shall be water-tight.

3.1.7.2 Minimum depth to top of duct banks shall be 2'-6" except as noted on the Contract Drawings.

3.1.7.3 After underground conduit runs have been completed, pull a test mandrel and wire brush through each conduit to check alignment and remove foreign matter.

3.2 **FIELD QUALITY CONTROL**

Electrical materials and devices shall be inspected and tested in accordance with Specification Section 16905, Electrical Testing.

3.3 **ADJUSTMENTS**

(Not Used)

3.4 **CLEANING**

3.4.1 Clean and remove all debris, excess material and equipment from the job site after completion of installation.

3.4.2 Clean electrical parts with approved cleaner to remove conductive and deleterious materials.

3.4.3 Clean and repair all steel surfaces damaged during preparation, welding or installation with an approved galvanizing compound in accordance with manufacturer's recommendations and instructions.

3.5           **PROTECTION**

3.5.1        Seller shall be responsible for receiving, storing and site handling of all Seller furnished equipment and materials.

3.5.2        During installation Seller shall protect from damage all existing facilities, equipment and materials. Existing facilities, equipment or materials which are damaged during the installation shall be repaired at Seller's expense in accordance with contract terms and conditions.

3.6           **DEMONSTRATION**

(Not Used)

3.7           **SCHEDULES**

(Not Used)

**END OF SECTION**

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U.S. DEPARTMENT OF ENERGY  
Hanford Waste Vitrification Plant  
Richland, Washington  
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.  
Advanced Technology Division  
Fluor Contract 8457

SECTION 16110  
ELECTRICAL MATERIALS AND DEVICES  
B-595-C-B210A-16110

APPROVED FOR CONSTRUCTION

REVISION 1 PER CR-0690 & CR-0929  
ISSUE DATE 2/25/93

WAPA YES  NO   
QUALITY LEVEL I  II   
SAFETY CLASS 1  2  3  4

ORIGINATOR:

CHECKER:

Charles C Simpson 2-25-93  
C. C. Simpson, Electrical Engineer Date

A Larsen 2-25-93  
A. Larsen, Electrical Engineer Date

APPROVED BY:

K. A. Owrey 2-25-93  
K. A. Owrey Lead Discipline Engineer Date

9413201.0184

SECTION 16110  
ELECTRICAL MATERIALS AND DEVICES  
B-595-C-B210A-16110

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9413201.0185

SECTION 16110  
ELECTRICAL MATERIALS AND DEVICES

PART 1 GENERAL

1.1 SUMMARY

This specification section defines the technical requirements for furnishing and delivery of electrical materials and devices for the Vitrification Building foundation.

1.2 REFERENCES

The publications listed below form a part of this specification section to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.1 1990 Rigid Steel Conduit

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A312/A312M 1991 Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes

ASTM A403/A403M 1991 Standard Specification for Wrought Austenitic Stainless Steel Pipe Fittings

ASTM B3 1990 Standard Specification for Soft or Annealed Copper Wire

ASTM B8 1990 Standard Specification for Concentric-Lay-Standard Copper Conductors, Hard, Medium-Hard or Soft

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 1990 National Electrical Code (NEC)

UNDERWRITERS LABORATORIES, INC. (UL)

UL 467 1984 Grounding and Bonding Equipment

UL 514B 1989 Fittings for Conduit and Outlet Boxes

UL 651 1989 Schedule 40 and 80 Rigid PVC Conduit

9413201.0186

1.3 RELATED REQUIREMENTS

- Specification Section 16100 Electrical Installation
- Specification Section 16111 Conduit Schedule
- Specification Section 16905 Electrical Testing

1.4 DEFINITIONS

(Not Used)

1.5 SYSTEM DESCRIPTION

(Not Used)

1.6 SUBMITTALS

Submit the following in accordance with the Vendor Drawing and Data Requirements section of the Order/Subcontract.

1.6.1 Catalog and Manufacturer's Data

Catalog and manufacturer's data shall be submitted for the following:

- A. Conduit
- B. Conduit fittings
- C. Conduit support devices and hardware
- D. Identification
- E. Grounding materials
- F. Conduit anti-seize compounds
- G. Anti-oxidizing compound
- H. Galvanizing touch-up material

1.7 CLASSIFICATION OF SYSTEM AND COMPONENTS

(Not Used)

9413201.0187

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

1.8.1 Climatic and Geographic Site Conditions

- A. Site Elevation 714 feet above sea level
- B. Barometric Pressure 14.3 psia
- C. Outside Design Temperature
  - 1) Maximum Design Temperature 110°F
  - 2) Minimum Design Temperature -20°F

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

2.1.1 General

2.1.1.1 When applicable, all electrical materials and components shall be listed by Underwriter's Laboratories and shall bear the UL label.

2.1.1.2 When two or more components of the same specifications are required, the components shall be identical, that is same manufacturer and catalog number.

2.1.2 Conduit

2.1.2.1 Rigid Steel Conduit

Rigid steel conduit shall be in accordance with ANSI C80.1.

2.1.2.2 PVC Conduit

PVC conduit shall be Schedule 80 in accordance with UL 651.

2.1.2.3 Stainless Steel Conduit

2.1.2.3.1 Austenitic seamless stainless steel conduit shall be Type 304L Schedule 40 in accordance with ASTM A312/A312M.

2.1.3 Conduit Fittings

2.1.3.1 Stainless steel conduit ends shall be protected by means of a plastic or 300 series stainless plug or cap.

2.1.3.2 Rigid steel conduit caps and recessed plugs shall be galvanized steel.

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2.1.3.3 Conduit union fittings shall be steel, 1/2 inch - 1 inch or steel alloy 1-1/4 inch - 6 inch, with zinc-electroplated finish and in accordance with UL 514B. Appleton UNY and UNF or equal.

2.1.3.4 Weld fittings for stainless steel conduit shall be in accordance with ASTM A403/A403M.

2.1.4 Conduit Support Devices and Hardware

2.1.4.1 Conduit supports unless otherwise noted on the Contract Drawings shall be fabricated of 12 gauge, 1-5/8 inch by 1-5/8 inch, metal framing channels: Unistrut P-1000, pre-dipped galvanized, with Unistrut P-1000 series, electrogalvanized, pipe clamps or equal.

2.1.4.2 Conduit clamps shall be malleable iron type with hot-dipped galvanized finish. Appleton Series PC or equal.

2.1.5 Identification

2.1.5.1 Identification of wall embeds shall be by means of a nameplate. Nameplates shall be 3" x 1" machine-engraved, phenolic with 1/2 inch high black figures on white background. The nameplates shall read in accordance with Specification Section 16111, Conduit Schedule, Attachment B, Embed Number.

2.1.5.2 Identification of conduits shall be by means of self-sticking vinyl cloth, black identification on an orange background, as manufactured by Brady Catalog #B-502 or equal. Label shall read in accordance with Specification Section 16111, Conduit Schedule, Attachment A, Raceway. No. Label length shall be as indicated below:

CONDUIT TRADE SIZE	BAND LENGTH	CHARACTER SIZE
3/4" and 1"	8"	1/2"
1-1/2" to 6"	8"	3/4"

2.1.6 Grounding Materials

2.1.6.1 Grounding Conductors

2.1.6.1.1 External building ground loop and bonded connections shall be #500 kcmil bare copper wire in accordance with ASTM B3. Wire shall be Class B concentric stranded in accordance with ASTM B8.

2.1.6.1.2 Internal building ground and bonded connections shall be bare copper wire in accordance with ASTM B3 and sized as indicated on the Contract Drawings. Wire shall be Class B concentric stranded in accordance with ASTM B8.

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2.1.6.1.3 Single point instrument ground conductor shall be single conductor, stranded copper wire with green Type TW 600 volt insulation. Conductor shall be UL listed, in accordance with the National Electrical Code, NFPA 70 and sized as indicated on the Contract Drawings.

2.1.6.2 Ground Rods

Ground rods shall be copper clad steel, 5/8 inch diameter by 10 feet: Joslyn Number J8340 or equal.

2.1.6.3 Embedded Ground Plates

2.1.6.3.1 Embedded ground plates shall be cast copper alloy body, four holes type and in accordance with UL 467. Cadweld Catalog Number B161-2Q or equal.

2.1.6.4 Ground Connections

2.1.6.4.1 Weld connections between ground conductors or between ground conductors to steel surfaces shall be by the exothermic process type. Cadweld or equal.

2.1.6.4.2 Ground connections to embedded ground plates shall be made with exothermic connection, Cadweld Type TA or equal as shown on the Contract Drawings.

2.1.6.4.3 Ground wells shall be in accordance with the Contract Drawings.

2.1.7 Conduit Anti-Seize Compounds

Anti-seize compounds for threads of rigid steel conduit shall be electrically conductive: Thomas and Betts Co. "Kopr-Shield" or equal.

2.1.8 Anti-Oxidizing Compound

Anti-oxidizing compound for connections of grounding connectors shall be electrically conductive, rust and corrosion inhibitive, Thomas and Betts "Kopr-Shield" or equal.

2.2 FABRICATION AND MANUFACTURE

(Not Used)

PART 3 EXECUTION

3.1 PREPARATION

(Not Used)

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3.2 **INSTALLATION, APPLICATION AND ERECTION**

Materials and devices specified herein shall be installed in accordance with Specification Section 16100, Electrical Installation.

3.3 **FIELD QUALITY CONTROL**

Materials and devices specified herein shall be inspected and tested in accordance with Specification Section 16905, Electrical Testing.

3.4 **ADJUSTMENTS**

(Not Used)

3.5 **CLEANING**

(Not Used)

3.6 **PROTECTION**

(Not Used)

3.7 **DEMONSTRATION**

(Not Used)

3.8 **SCHEDULES**

(Not Used)

**END OF SECTION**

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SECTION 15062  
PIPING MATERIAL, FABRICATION, ERECTION  
& PRESSURE TESTING (DOUBLE CONTAINED PIPING)  
B-595-C-B210A-15062

APPROVED FOR CONSTRUCTION

REVISION 1 per CR-0929  
ISSUE DATE 25 FEBRUARY 1993

WAPA YES  NO   
QUALITY LEVEL I  II   
SAFETY CLASS 1  2  3  4

ORIGINATOR:

CHECKER:

Rod Wright 2/24/93  
Rod Wright, Piping Engineer Date

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Chris Inano, Piping Engineer Date

APPROVED BY:

Ken Baughman  
Ken Baughman Lead Discipline Engineer

2/24/93  
Date

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SECTION 15062  
PIPING MATERIAL, FABRICATION, ERECTION  
& PRESSURE TESTING (DOUBLE CONTAINED PIPING)  
B-595-C-B210A-15062

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**ATTACHMENTS**

<u>ATTACHMENT</u>	<u>TITLE</u>
A	UNDERGROUND PIPE DETAILS

**SECTION 15062  
PIPING MATERIAL, FABRICATION, ERECTION  
& PRESSURE TESTING (DOUBLE CONTAINED PIPING)**

**PART 1 GENERAL**

**1.1 SUMMARY**

This Section defines the technical requirements for the furnishing, fabrication, erection and testing of Double Contained Piping. Revision 1 of this Specification Section has been checked for completeness in regard to the Foundation Slab only.

**1.2 REFERENCES**

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

**AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)  
AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)**

- |                 |   |
|-----------------|---|
| ASME/ANSI B16.9 | 1986 Factory-Made Wrought Steel<br>Buttwelding Fittings                         |
| ASME B31.3      | 1990 Chemical Plant and Petroleum Refinery<br>Piping, Including Addenda a and b |

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

- |                   |  |
|-------------------|--|
| ASTM A 182/A 182M | 1990 Forged or Rolled Alloy-Steel Pipe<br>Flanges, Forged Fittings, and Valves and<br>Parts for High-Temperature Service |
| ASTM A 234/A 234M | 1990 Piping Fittings of Wrought Carbon<br>Steel and Alloy Steel for Moderate and<br>Elevated Temperatures                |
| ASTM A 240        | 1991 Heat-Resisting Chromium and Chromium-<br>Nickel Stainless Steel Plate, Sheet, and<br>Strip for Pressure Vessels     |
| ASTM A 262        | 1986 Detecting Susceptibility to<br>Intergranular Attack in Austenitic<br>Stainless Steels                               |
| ASTM A 312/A 312M | 1991 Seamless and Welded Austenitic<br>Stainless Steel Pipes   |

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ASTM A 403/A 403M      1991 Wrought Austenitic Stainless Steel  
Piping Fittings

NATIONAL ASSOCIATION OF CORROSION ENGINEERS (NACE)

NACE RP02-74      1974 High Voltage Electrical Inspection of  
Pipeline Coatings Prior to Installation

PIPE FABRICATION INSTITUTE (PFI)

PFI Standard ES-3      1990 Fabricating Tolerances

PFI Standard ES-24      1990 Pipe Bending Methods, Tolerances,  
Process and Material Requirements

PFI Standard ES-32      1985 Tool Calibration

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1.3      **RELATED REQUIREMENTS**

This specification is to be used in conjunction with the following specifications:

Specification Section 05062      Welding Piping

Specification Section 13252      Precautions for Fabrication,  
Handling and Storage of Stainless  
Steel and Nickel Alloys

1.4      **DEFINITIONS**

The term "erection," where used in this specification, shall be defined as follows: Shop or field fabricated erection - the placing of any pipe or component of a piping or instrument system in its final position specified in the drawings and/or specifications.

1.5      **SYSTEM DESCRIPTION**

All components, fabrication, erection, and testing, except as otherwise qualified herein, shall be in accordance with the requirements of ASME B31.3.

1.6      **SUBMITTALS**

Submit the following in accordance with Part III, Section I, Exhibit 5 of the Request for Proposal (RFP), Vendor Drawing and Data Requirements (VDDR).

1.6.1 Shop Drawings

Submit shop drawings of nonstandard components per Paragraph 2.1.3A.

1.6.2 Quality Control Submittals

A. Factory Acceptance Tests (FATS)

The following test reports shall include itemized test activities, inspection requirements and functional performance requirements, together with the corresponding acceptance criteria for the tests.

- 1) Submit corrosion test reports for each heat per Note 2 of Piping Material Classes DD and DE.

B. Construction Acceptance Tests (CATS)

The following test reports shall include itemized test activities, inspection requirements and functional performance requirements, together with the corresponding acceptance criteria for the tests.

- 1) Submit Pressure Test Reports per Paragraph 3.3.4.
- 2) Submit cleaning reports per Paragraph 3.5.3.

1.6.3 Certificates

Certified Material Test Reports (CMTRs) for all pressure containing and/or wetted parts.

1.7 CLASSIFICATION OF SYSTEMS AND COMPONENTS

(Not Used)

1.8 PROJECT OR SITE ENVIRONMENTAL CONDITIONS

(Not Used)

**PART 2 PRODUCTS**

**2.1 MATERIALS/EQUIPMENT**

**2.1.1 Piping Material Classes**

- A. Piping Material Classes are listed herein conform to designations as shown on the drawings.

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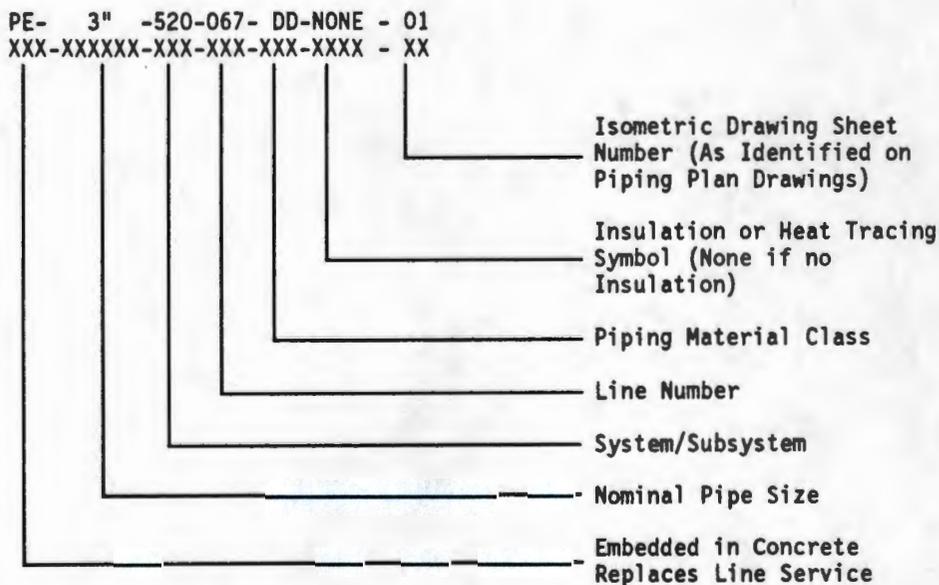
B. Unless otherwise specified, all pressures and temperatures listed are design conditions.

C. Piping Material Classes/Services Index

CLASS	MATERIAL	RATING CLASS	SERVICE
DD	Carrier - 304L SS Containment - 304L SS	300 300	Regulated Drains
DE	Carrier - 316L SS Containment - 316L SS	300 300	Process Regulated Drains (Formic Acid Drains)

D. Identification of Piping

Example:



### Piping Material Class DD

General Material: Carrier and Containment - 304L Stainless Steel  
Rating: Carrier - Class 300  
Containment - Class 300  
Temperature Limit: -20°F thru 450°F  
Maximum Pressure: 260 PSIG  
Corrosion Allowance: Carrier - .065" (See Note 3)  
Containment - None  
Construction: Carrier and Containment - Buttweld (except socketweld connections to containment drains)

### ITEM DESCRIPTION

#### Carrier and Containment Pipe (See Note 2)

2" - 8" Seamless stainless steel, schedule 40S, ASTM A 312/A 312M, Grade TP304L, beveled ends.

#### Carrier and Containment Fittings (ells, tees, laterals, caps, and reducers, See Notes 1 and 2)

2" - 8" Stainless steel, ASTM A 403/A 403M, Grade WP304L-S, buttweld type, schedule 40S.

#### Containment Self Reinforced Branch Connections

1/2" - 2" Class 3000 stainless steel, ASTM A 182/A 182M, Grade F304L, socketweld. Bonney Forge Sockolet or equal.

#### Carrier Branch Construction

Use reducing tees or reducing laterals within the size range of reducing tees per ASME/ANSI B16.9. Use reducing tees/laterals and reducers (or swage nipples) where not within the size range of ASME/ANSI B16.9.

#### Containment Branch Construction

Use reducing tees or reducing laterals (split and reweld to suit) within the size range of reducing tees per ASME/ANSI B16.9. Use reducing tees/laterals (split and reweld to suit) and reducers (or swage nipples) where not within the size range of ASME/ANSI B16.9.

#### Carrier Swages

2" - 2" Concentric swage, stainless steel ASTM A 403/A 403M, Grade WP304L-S, schedule 40S, beveled both ends.

Piping Material Class DD (continued)

Flanges (See Note 4)

2" - 8" Plate flange, 304L stainless steel flat face slip-on type, 1/4" thick. Flange drilling to match that of ASME/ANSI B16.5 Class 150 flange.

2" - 8" Plate blind flange, 304L stainless steel flat face slip-on type, 1/4" thick. Flange drilling to match that of ASME/ANSI B16.5 Class 150 blind flange.

Gaskets (See Note 4)

2" - 8" Class 125 full face red rubber gasket, 1/8" thick. Sepco 20 or equal.

Bolts (See Note 4)

Stud bolts, 304 stainless steel, ASTM A 193, Grade B8 with ASTM A 194 Grade 8S nuts.

Centering Guides

Centering guides shall be made from 1/4" thick ASTM A 240, Grade 304L stainless steel plate.

Notes:

1. Use bends with a radius of 3 nominal pipe diameters (3D) on carrier piping for sizes 2", and fittings on containment piping except where indicated otherwise on the drawings.
2. All carrier piping material shall be corrosion tested per ASTM A 262, Practice A. One test shall be conducted per heat of material. The acceptance criteria shall be passing of Practice A of ASTM A 262, or a measured corrosion rate of less than 2 mils per month per ASTM A 262, Practice C. A test report shall be submitted for each heat.
3. All embedded lines have been checked to ensure an available corrosion allowance of .120 inch minimum on the carrier pipe. New "field addition" embedded lines shall be checked to ensure that available corrosion allowance is a minimum of .120 inch on the carrier pipe.
4. Use these items only at cleanouts for drain lines.

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### Piping Material Class DE

General Material: Carrier and Containment - 316L Stainless Steel  
Rating: Carrier - Class 300  
Containment - Class 300  
Temperature Limit: -20°F thru 450°F  
Maximum Pressure: 260 PSIG  
Corrosion Allowance: Carrier - .065" (See Note 3)  
Containment - None  
Construction: Carrier and Containment - Buttweld (except socketweld connections to containment drains)

#### ITEM

#### DESCRIPTION

Carrier and Containment Pipe (See Note 2)

2" - 8" Seamless stainless steel, schedule 40S, ASTM A 312/A 312M, Grade TP316L, beveled ends.

Carrier and Containment Fittings (ells, tees, caps, and reducers, See Notes 1 and 2)

2" - 8" Stainless steel, ASTM A 403/A 403M, Grade WP316L-S, buttweld type, schedule 40S.

Containment Self Reinforced  
Branch Connections

1/2" - 2" Class 3000 stainless steel, ASTM A 182/A 182M, Grade F316L, socketweld. Bonney Forge Socket or equal.

Carrier Branch Construction

Use reducing tees or reducing laterals within the size range of reducing tees per ASME/ANSI B16.9. Use reducing tees/laterals and reducers (or swage nipples) where not within the size range of ASME/ANSI B16.9.

Containment Branch Construction

Use reducing tees or reducing laterals (split and reweld to suit) within the size range of reducing tees per ASME/ANSI B16.9. Use reducing tees/laterals (split and reweld to suit) and reducers (or swage nipples) where not within the size range of ASME/ANSI B16.9.

Carrier Swages

2" - 2" Concentric swage, stainless steel ASTM A 403/A 403M, Grade WP316L-S, schedule 40S, beveled both ends.

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Piping Material Class DE (continued)

Centering Guides

Centering guides shall be made from 1/4" thick ASTM A 240, Grade 316L stainless steel plate.

Flanges (See Note 4)

2" - 8" Plate flange, 316L stainless steel flat face slip-on type, 1/4" thick. Flange drilling to match that of ASME/ANSI B16.5 Class 150 flange.

2" - 8" Plate blind flange, 316L stainless steel flat face slip-on type, 1/4" thick. Flange drilling to match that of ASME/ANSI B16.5 Class 150 blind flange.

Gaskets (See Note 4)

2" - 8" Class 125 full face red rubber gasket, 1/8" thick. Sepco 20 or equal.

Bolts (See Note 4)

Stud bolts, 304 stainless steel, ASTM A 193, Grade B8 with ASTM A 194 Grade 8S nuts.

Notes:

1. Use bends with a radius of 3 nominal pipe diameters (3D) on carrier piping for size 2", and fittings on containment piping except where indicated otherwise on the drawings.
2. All carrier piping material shall be corrosion tested per ASTM A 262, Practice A. One test shall be conducted per heat of material. The acceptance criteria shall be passing of Practice A of ASTM A 262, Practice A, or a measured corrosion rate of less than 4 mils per month per ASTM A 262, Practice B. A test report shall be submitted for each heat.
3. All embedded lines have been checked to ensure an available corrosion allowance of .120 inch minimum on carrier piping. New "field addition" embedded lines shall be checked to ensure that available corrosion allowance is a minimum of .120 inch on carrier piping.
4. Use these items only at cleanouts for drain lines.

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2.1.2 Pressure Testing Materials

A. Test Water Requirements

Water used for cleaning and/or hydrotest shall conform to Specification Section 13252.

B. Pneumatic Air Requirements

The air for pneumatic testing shall have a dew point of  $-20^{\circ}\text{F}$  or less at atmospheric pressure and shall contain less than 10 parts per million oil.

C. Leak Detector Solution

Leak detector solution for pneumatic testing shall be Nupro "Snoop" or equal.

D. Pressure Test Blinds

Plain 1/4" thick stainless steel test blanks made from ASTM A 240, Grade TP304 plate with 1/16 inch thick non-asbestos gaskets shall be used for blanking raised face flanges for sizes up to 6 inches.

E. Pressure Test Plugs

Open ends of piping systems (i.e., plain end or beveled end) that cannot otherwise be blanked off for pressure testing shall be closed off with commercial pressure test plugs suitable for the pipe size and test pressure.

2.1.3 Components

General

The requirements contained in this Section shall apply to all Material Classes included in this specification.

- A. Pipe, fittings, and all other piping components (i.e., valves, strainers, gaskets, bolting, etc.) shall be standard components conforming to the standards listed in ASME B31.3, Appendix E within the size ranges of those standards. Where such conformance is not possible (i.e., fittings smaller than 1/2" NPS, manufacturer's proprietary design, etc.), the Seller shall submit a dimensional drawing of the component, and the component shall be certified by the manufacturer as being suitable for the design conditions of the applicable material class. The Seller shall adjust field dimensions if the materials procured do not correspond to the dimensions depicted on the drawings.

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2.1.4 Buried Warning and Identification Tape

Tape shall be an alkali-resistant polyethylene plastic tape manufactured specifically for warning and identification of buried utility lines, and shall be provided in rolls, 6 inches wide with minimum thickness of 0.004 inch and shall have a minimum strength of 1750 pounds per square inch lengthwise and 150 pounds per square inch crosswise. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion. The tape shall be as specified in Table 1 and shall be imprinted in bold black letters continuously and repeatedly over entire tape length.

TABLE 1

TAPE COLOR

Red: Gas, Oil, Dangerous Materials

Warning and identification shall be "CAUTION BURIED (Intended Service) LINE BELOW" or similar wording. Code and letter coloring shall be permanent, unaffected by moisture and other substances contained in the trench backfill.

2.1.5 Corrosion Control Materials for Underground Pipe

- A. Cold Applied Tape Wrap system shall consist of a tape manufacturer recommended primer and a Nomex or equal base cloth and phenolic base resin, and shall be suitable for operation at 340°F. Knight-Laggi 200 System or equal.
- B. High Temperature Cement for packing of voids and repair of coating at exothermic welds shall be a matrix composed primer and chopped fibers of the tape base cloth.
- C. Magnesium ribbon anode shall consist of .135" diameter core wire coated with magnesium in a 3/8" x 3/4" rectangular shape, with a nominal weight of 0.243 pounds per foot. Dow DC-1016 Galvoline or approved equal.
- D. 12 gauge wire for test leads and jumper wire shall be suitable for direct burial, with Type RHW insulation.

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2.2 FABRICATION AND MANUFACTURE

2.2.1 Shop Assembly

A. Welding

Welding, weld examination and postweld heat treatment shall be in accordance with Specification Section 05062.

B. Internal Misalignment

Where the ends of piping components are to be joined by welding and the internal surface misalignment exceeds the dimensional limits of the qualified welding procedure, one of the following procedures shall be used to correct this condition.

- 1) Taper bore or grind the wall of the component extending internally using a 4 to 1 maximum taper. Such tapering shall not result in a finished wall thickness, before welding, that is less than the nominal pipe wall thickness minus the manufacturer's mill tolerance. Further reduction of the wall thickness requires Buyer's authorization.
- 2) Use spreaders or internal and/or external lineup clamps to correct moderate out-of-round condition.

C. Cleanliness

Cleanliness requirements for fabrication, handling and storage of 300 series stainless steel piping shall be per Specification Section 13252.

D. Any deviations in dimensions from the drawings shall be submitted to the Buyer in writing, for approval, prior to fabrication of the affected piping.

E. Dimensions on the Piping Plan drawings are in inches when dimensions are less than 1'-0". Feet and inches are shown when dimensions are 1'-0" and more. Dimensions on the Piping Isometric drawings are in inches when less than 2 feet. Feet and inches are shown when dimensions are 2 feet or greater.

F. Dimensions are to the centerline of pipe.

G. Where cold spring (CS) or prespring (PS) is required, the Piping drawings have been adjusted to accommodate this. The piping shall be fabricated to the dimensions shown.

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- H. Reducers are concentric (except for slurry services) unless otherwise noted on the drawings.

2.2.2 Fabrication - Dimensional Tolerances

Pipe fabrication tolerances shall be in accordance with Pipe Fabrication Institute ES-3.

2.2.3 Fabrication - Pipe Bending

- A. Pipe bending shall be in accordance with Pipe Fabrication Institute ES-24. Except, pipe bend post wall thickness shall be no less than 78.1 percent of the pre-bend thickness.
- B. When three diameter bends "3D" are referenced, they are to be fabricated in accordance with the 3D requirements. (The requirements for 3Dn are not to be applied under any circumstance.)

2.2.4 Packaging and Shipping

- A. Preparation for shipment shall conform to the manufacturer's standard, and as a minimum shall provide protection against corrosion and damage from normal handling and storage.
- B. Minimum preparation shall include the following:

All pipe ends shall be protected by means of a plastic (non-PVC) or 300 series stainless steel plug or cap.

**PART 3 EXECUTION**

3.1 PREPARATION

(Not Used)

3.2 INSTALLATION APPLICATION AND ERECTION

3.2.1 Field Fabrication and Erection

- A. All field fabrication shall conform to the paragraph titled "Fabrication", except that field installation tolerances shall be plus or minus 1/2".
- B. All piping and tubing shall be fabricated and installed in accordance with the Piping drawings.
- C. Coordinates and elevations are used extensively on the Piping drawings. The Seller shall establish the required fabrication dimensions.

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D. Elevations are designated as follows:

Nonsloped lines - "Bottom of Pipe" (BOP EL \_\_\_\_\_)  
"Centerline Elevation" (CL EL \_\_\_\_\_)  
"Beveled End Elevation" (BE EL \_\_\_\_\_)  
"Plain End Elevation" (PE EL \_\_\_\_\_)

Sloped lines - "Centerline Work Point Elevation"  
(CL W.P. EL \_\_\_\_\_)

- E. Piping shall be examined before erection to ensure that all foreign matter has been removed.
- F. The Seller shall be responsible for the proper horizontal and vertical alignment of the piping as shown on the drawings.
- G. The Seller may elect, at his option, to split and reweld secondary containment piping, fittings, anchors, etc.
- H. The Seller shall place buried warning and identification tape conforming to Paragraph 2.1.4 to identify the presence of underground piping at a depth of 12 inches below finished grade or as shown on the Contract Drawings.
- I. Fitting make-up is not dimensioned on the drawings.

3.2.2 Corrosion Protection for Underground Piping

- A. All exposed piping (including stainless steel containment pipe) in underground service shall be protected from exterior corrosion by use of a cold applied tape wrap. Materials, surface preparation, application and inspection requirements shall be in accordance with manufacturer's recommendations.
- B. All buried piping shall be holiday tested, for coating discontinuities, per NACE RP02-74.
- C. Refer to Attachment A for temporary cathodic protection requirements.

3.3 FIELD QUALITY CONTROL

3.3.1 Pressure Tests

- A. The minimum test pressure is the lowest allowable test pressure gauge reading (the calculated test pressure plus the additional pressure resulting from the static head of the test fluid above the test gauge).

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- B. The maximum test pressure shall be the greater of:
    - 1) 1.1 times (1.1x) the minimum test pressure
    - 2) 60 psi greater than the minimum test pressure
  - C. Prior to initial operation, all installed piping shall be tested except where otherwise qualified by this specification.
  - D. Piping that is to be purged after installation shall be tested and all repairs made prior to purging.
  - E. The Buyer's Representative shall be given two working days prior notification of the time and date of any testing to be performed.
  - F. The Seller shall prepare and submit a hydrostatic and pneumatic test procedure, including test diagrams, and test report format.

### 3.3.2 Pressure Testing of Piping

- A. All pressure testing shall be per ASME B31.3.
- B. All piping systems shall be hydrostatically tested (carrier piping).
- C. The annular space of double contained pipe shall be pneumatically tested with air at 10 psig, meeting the requirements of paragraph 2.1.2.B of this specification.

### 3.3.3 Pressure Test Preparation

- A. All joints, including welds, are to be left uninsulated and exposed for examination during the test. Joints may be insulated or coated once they have been previously tested in accordance with this specification.
- B. Pressure test gauges shall be calibrated per PFI ES-32. The calibration shall be made using a dead weight tester with calibration records traceable to the National Institute of Standards and Technology. Gauge shall be tagged with the dates of the last and next calibrations. The date of the gauge calibration shall be recorded by the Seller.
- C. The Seller shall furnish the pumps, gauges, measuring devices, temporary plug valves, and other miscellaneous equipment necessary for testing.

- D. The test pressure, minimum duration, and acceptance criteria shall be in accordance ASME B31.3. The following additional requirements shall be included:
- 1) The test pressure shall be applied and maintained for at least five minutes prior to start of minimum test duration to assure that the pressure has equalized.
  - 2) The test pressure shall be maintained for a time sufficient to examine all joints and connections for leakage, but in any case not less than ten minutes. The acceptance criteria is zero leakage.
  - 3) If leaks are found, then  
their locations shall be marked;  
the test pressure shall be gradually released;  
the piping shall be drained;  
appropriate repairs or replacement shall be made;  
and the pressure testing shall be repeated until acceptable results have been achieved.

#### 3.3.4 Test Records

- A. The Seller shall prepare and submit to the Buyer test reports for all piping systems requiring tests. The test reports shall contain, as a minimum, the following data:
- 1) Job title and Contract Number
  - 2) Date of test
  - 3) Contract drawing and line numbers identification of piping systems
  - 4) Type of test, i.e., Hydrostatic, Pneumatic,
  - 5) Pressure applied and length of time at Test pressure
  - 6) Test results
  - 7) Test by
  - 8) Signature of Seller Test Supervisor
  - 9) Comments, if any

943201.008  
8020.102146

- 10) Gauge identification and dates of last and next calibration
- 11) Signature or stamp of the Buyer's Representative

3.4 **ADJUSTMENT**

(Not Used)

3.5 **CLEANING**

3.5.1 **Cleaning After Hydrotesting**

A. After hydrotesting, the following procedure shall be followed:

- 1) Water used in cleaning austenitic stainless steel and other alloy piping shall conform to Specification Section 13252.
- 2) Flushing velocity shall not exceed 10 feet per second but shall be a minimum of 4 feet per second.
- 3) Piping systems shall be flushed for a minimum of 10 minutes (continuous).
- 4) Visual examination of cleanliness shall be by visual examination of a clean white cloth used to filter the system discharge. Additional 10 minute flushes shall be performed until the visual examination reveals no visible debris collection on the cloth.
- 5) To ensure the absence of moisture after cleaning, lines shall be drained and blown dry. The drying procedure shall be per Specification 13252.
- 6) Immediately after cleaning, drying, and inspection, all non-flanged openings shall be tightly sealed with polyethylene caps to protect the bevel and pipe ends and to prevent the entry of moisture and foreign matter.

3.5.2 **Cleaning After Pneumatic Testing**

After pneumatic testing, piping shall be purged at a minimum velocity of ten feet per second until no foreign matter is seen exiting the pipe. Air quality shall be that specified per paragraph 2.1.2.B of this specification.

6020102116

3.5.3 Cleaning Reports

All visual examinations, flushes, and purges shall be documented in a test report to be submitted to the Buyer.

3.6 PROTECTION

(Not Used)

3.7 DEMONSTRATION

(Not Used)

3.8 SCHEDULE

(Not Used)

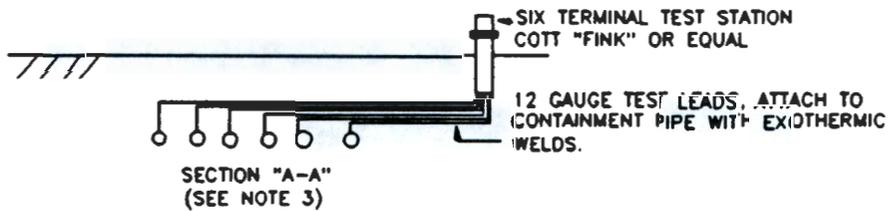
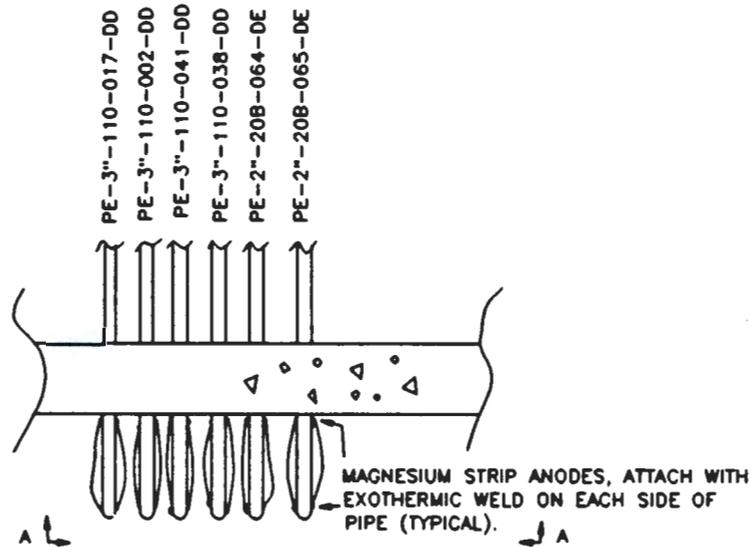
END OF SECTION

01201020146

ATTACHMENT A  
 UNDERGROUND PIPE DETAILS

DETAIL "B"  
 TEMPORARY CATHODIC PROTECTION DETAIL  
 FOR LINES LEAVING VITRIFICATION BUILDING SLAB  
 (SEE NOTES 1 AND 2)

PLAN VIEW



NOTES:

1. COVER EXOTHERMIC WELDS WITH HIGH TEMPERATURE CEMENT PRIOR TO WRAPPING AREA WITH HIGH TEMPERATURE TAPE.
2. REFER TO DETAIL "B" FOR ADDITIONAL REQUIREMENTS APPLICABLE TO INSULATED LINES.
3. LABEL EACH TEST LEAD WITH LINE NUMBER USING COMPUTER PRINTED CHARACTERS ON WHITE HEAT SHRINK SLEEVE, BRADY CATALOG NUMBER B321 OR EQUAL.

9413201.021

U.S. DEPARTMENT OF ENERGY  
Hanford Waste Vitrification Plant  
Richland, Washington  
DOE Contract DE-AC06-86RL10838

FLUOR DANIEL, INC.  
Advanced Technology Division  
Fluor Contract 8457

SECTION B210A  
RELATED DOCUMENT NO. 1  
PIPING ISOMETRICS  
B-595-C-B210A-RD-1

APPROVED FOR CONSTRUCTION

REVISION 1  
ISSUE DATE 2-24-93

WAPA	YES	<u>    </u>	NO	<u>X</u>
QUALITY LEVEL	I	<u>*</u>	II	<u>*</u>
SAFETY CLASS	1*	<u>2*</u>	3*	<u>4*</u>

\*See Individual Isometrics

ORIGINATOR:

CHECKER:

G. Van Viegen 2-24-93  
G. Van Viegen, Piping Date

G. Barauskas 2-25-93  
G. Barauskas, Piping Supervisor Date

APPROVED BY:

K. C. Baughman  
K. C. Baughman Lead Discipline Engineer

2/25/93  
Date

9413201.0212

## CWBS B210A PIPING ISOMETRIC INDEX VITRIFICATION BUILDING

DRAWING NUMBER	SHEET NUMBER	DWG REV	REV DATE	LINE NUMBER, CLASS, AND SHEET NUMBER	REMARKS	RD REV
H-2-126175	1	0	11/17/92	PE-2"-20C-159-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126175	2	0	11/17/92	PE-2"-20C-159-A-NONE SHEET 02 PIPING ISOMETRIC		
H-2-126175	8	0	02/10/93	PE-3"-110-017-DD-1h SHEET 01 PIPING ISOMETRIC	HOLD NO. HWVP-FD-240 & 241	1
H-2-126175	16	0	02/10/93	PE-2"-20C-203-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126176	1	0	11/17/92	PE-1"-20C-147-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126176	5	0	02/10/93	PE-2"-20B-065-DE-NONE SHEET 01 PIPING ISOMETRIC	HOLD NO. HWVP-FD-240 & 241	1
H-2-126176	21	0	02/10/93	PE-2"-20C-204-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126177	1	0	11/17/92	PE-1"-20C-148-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126177	22	0	02/10/93	PE-2"-20C-195-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126178	1	0	11/17/92	PE-1"-20C-152-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126178	14	0	02/10/93	PE-2"-20C-197-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126178	17	0	02/10/93	PE-2"-20C-193-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126179	1	0	11/17/92	PE-1"-20C-153-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126179	15	0	02/10/93	PE-2"-20C-196-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126179	16	0	02/10/93	PE-2"-20C-194-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126180	1	0	11/17/92	PE-1"-20C-151-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126180	16	0	02/10/93	PE-2"-20C-199-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126181	1	0	11/17/92	PE-1"-20C-141-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126182	1	0	11/17/92	PE-1"-20C-142-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126183	1	0	11/17/92	PE-1"-20C-143-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126184	1	0	11/17/92	PE-1"-20C-144-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126185	1	0	11/17/92	PE-1"-20C-149-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126185	3	0	02/10/93	PE-3"-110-002-DD-NONE SHEET 01 PIPING ISOMETRIC	HOLD NO. HWVP-FD-240 & 241	1
H-2-126185	22	0	02/10/93	PE-2"-20C-202-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126185	23	0	02/10/93	PE-2"-20C-200-A-1h SHEET 01 PIPING ISOMETRIC		1
H-2-126186	1	0	11/17/92	PE-1"-20C-146-A-NONE SHEET 01 PIPING ISOMETRIC		
H-2-126186	3	0	02/10/93	PE-3"-110-041-DD-1h SHEET 01 PIPING ISOMETRIC	HOLD NO. HWVP-FD-240 & 241	1
H-2-126186	20	0	02/10/93	PE-2"20C-201-A-NONE SHEET 01 PIPING ISOMETRIC		1
H-2-126187	2	0	11/17/92	PE-6"-520-067-DD-NONE SHEET 02 PIPING ISOMETRIC		
H-2-126187	3	0	11/17/92	PE-6"-520-067-DD-NONE SHEET 03 PIPING ISOMETRIC		
H-2-126187	9	0	02/10/93	PE-3"-110-038-DD-1h SHEET 01 PIPING ISOMETRIC	HOLD NO. HWVP-FD-240 & 241	1
H-2-126188	6	0	02/10/93	PE-2"-20B-064-DE-NONE SHEET 01 PIPING ISOMETRIC	HOLD NO. HWVP-FD-240 & 241	1
H-2-126188	18	0	02/18/93	PE-2"-20C-198-A-NONE SHEET 01 PIPING ISOMETRIC		1

Feb 09 10:17:36 1993 CALMA VELLUM E:ZRB3SW04.SPL

-----  
FABRICATION MATERIALS

PT NO	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
<u>CARRIER PIPE</u>				
1	PIPBAR PIPE SCH 40S SMLS 304L SS A312	3	5364086	82.9'
<u>CARRIER FITTINGS</u>				
2	CAPBW CAP SCH 40S 304L SS A403 WP304L	3	5438932	1
3	ELLBW ELL 90 DEG LR SCH40S 304L SS A403 WP304L	3	5438922	2
4	PIPE ANCHOR 5EA1 PER DWG H-2-124091 SH 1	3-6	5EA1	2
5	PIPE GUIDE 5EG1 PER DWG H-2-124091	3-6	5EG1	2
<u>CONTAINMENT PIPE</u>				
6	PIPE BAR PIPE SCH 40S SMLS 304L SS A312	6	5364086	82.9'
<u>CONTAINMENT FITTINGS</u>				
7	ELLBW ELL 90 DEG SR SCH40S 304L SS A403 WP304L	6	5438923	2
8	CAPBW CAP SCH 40S 304L SS A403 WP304L	6	5438932	1

QUALITY LEVEL 1  
 SAFETY CLASS 2

U.S. DEPARTMENT OF ENERGY			
Richland Field Office			
DE-AC05-86OR21400			
PROJECT TITLE			
HANFORD WASTE VITRIFICATION PLANT			
PROJECT NO.	PROJECT CONTRACT NO.	DRAWING NO.	
1452	8457	8210A	
SCALE	REVISED TO	DATE	
NONE		1993 02	

**BILL OF MATERIAL FOR REFERENCE ONLY**



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-----  
FABRICATION MATERIALS

PT NO	PIPE	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
1	PIPBAR PIPE	SCH 40S SMLS 304L SS A312	2	5364086	13.3'



FEB 24 1993

QUALITY LEVEL I  
SAFETY CLASS 3

DIVISION	U.S. DEPARTMENT OF ENERGY Richmond Field Office RF-AC06-05R-0029		
PROJECT TITLE	HAMPDEN WASTE VITRIFICATION PLANT		
PROJECT NO.	RF-AC06-05R-0029	PLANT CONTRACT NO.	CASE NO.
	B-396	B457	B2108
SCALE	NONE	DRAWING NO.	REVISION NO.
		1	

BILL OF MATERIAL FOR REFERENCE ONLY



ue Feb 09 10:24:01 1993 CALMA YELLUM E:ZZB3SW06.SPL

-----  
FABRICATION MATERIALS

PT NO	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
<u>CARRIER PIPE</u>				
1	PIPBAR PIPE SCH 40S SMLS 316L SS A312	2	5365120	116.0'
<u>CARRIER FITTINGS</u>				
2	CAPBW CAP SCH 40S 316L SS A403 WP316L	2	5449148	1
3	PIPE ANCHOR 5EA1 PER DWG H-2-124091 SH 1	2-4	5EA1	2
4	PIPE GUIDE 5EG1 PER DWG H-2-124091 SH 1	2-4	5EG1	6
<u>CONTAINMENT PIPE</u>				
5	PIPBAR PIPE SCH 40S SMLS 316L SS A312	4	5365120	116.2'
<u>CONTAINMENT FITTINGS</u>				
6	ELLBW ELL 90 DEG LR SCH 40S 316L SS A403 WP316L	4	5449138	2
7	CAPBW CAP SCH 40S 316L SS A403 WP316L	4	5449148	1
8	45LBW ELL 45 DEG SCH 40S 316L SS A403 WP316L	4	5449144	1

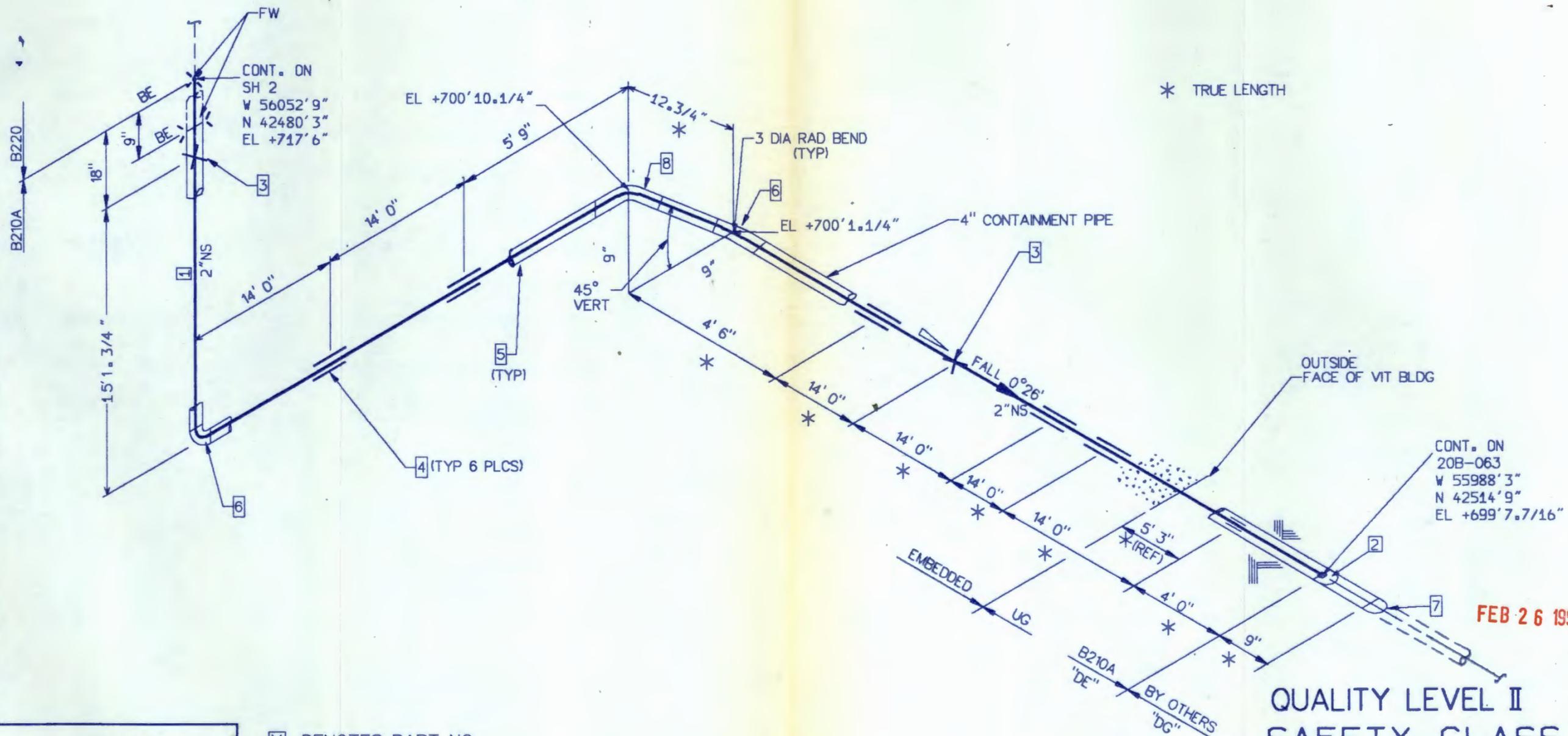
QUALITY LEVEL 1  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY  
 Richland Field Office  
 TE-4006-BUILDING

WYOMING  
 WYOMING NUCLEAR WASTE VITRIFICATION PLANT

PROJECT: 2-585 8-97 02:00  
 DATE: 12/24/92  
 BY: [Signature]

BILL OF MATERIAL FOR REFERENCE ONLY



\* TRUE LENGTH

FEB 26 1993

QUALITY LEVEL II  
SAFETY CLASS 3

MODEL: PIPE/PAES3T

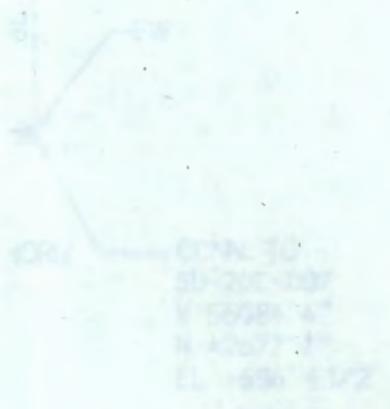
DENOTES PART NO.,  
SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APPV'D	MAT'L	STRESS	INSULATION	IH	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-86RL10838		
								TOTAL ISO					X	B-595-C-B210A SECTION 15060	CADFILE B126176E		PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT		
								PARTIAL ISO							CADCODE 2B: APL: DDM3: 7.0.78: SS		DRAWN BY: P. ABRAHAM		
								HEAT TRACING REQUIREMENTS	YES	NO	CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE	DATE 01/06/93		FLUOR CONTRACT NO. B-595		
								TRACING MEDIUM		X	DESIGN	150	150	PRO	BY NOT REQUIRED		CWBS NO. B210A		
								TRACER: QTY		X	OPERATING	39	125	VAPOR	CLASSIFICATION		BUILDING NO. 1		
								SIZE		X	REFERENCE PLAN DWG	H-2-124094-1		H-2-123060-32		INDEX NO.			
								ELECTRIC TRACE		X	SECTION	C7		LINE NUMBER AND CLASS		DRAWING NUMBER			
0	AFC	PA	2-10-93	sw	sw			HEAT TRANSFER CEMENT REQUIRED		X	H-2-124109-1		PE-2"-20B-065-DE-NONE		SHEET OF		H-2-126176		

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-----  
FABRICATION MATERIALS

PT NO --	PIPE -----	COMPONENT DESCRIPTION -----	N.S. (INS) ---	ITEM CODE -----	QTY ---
1	PIPBAR PIPE	SCH 40S SMLS 304L SS A312	2	5364086	35.0'

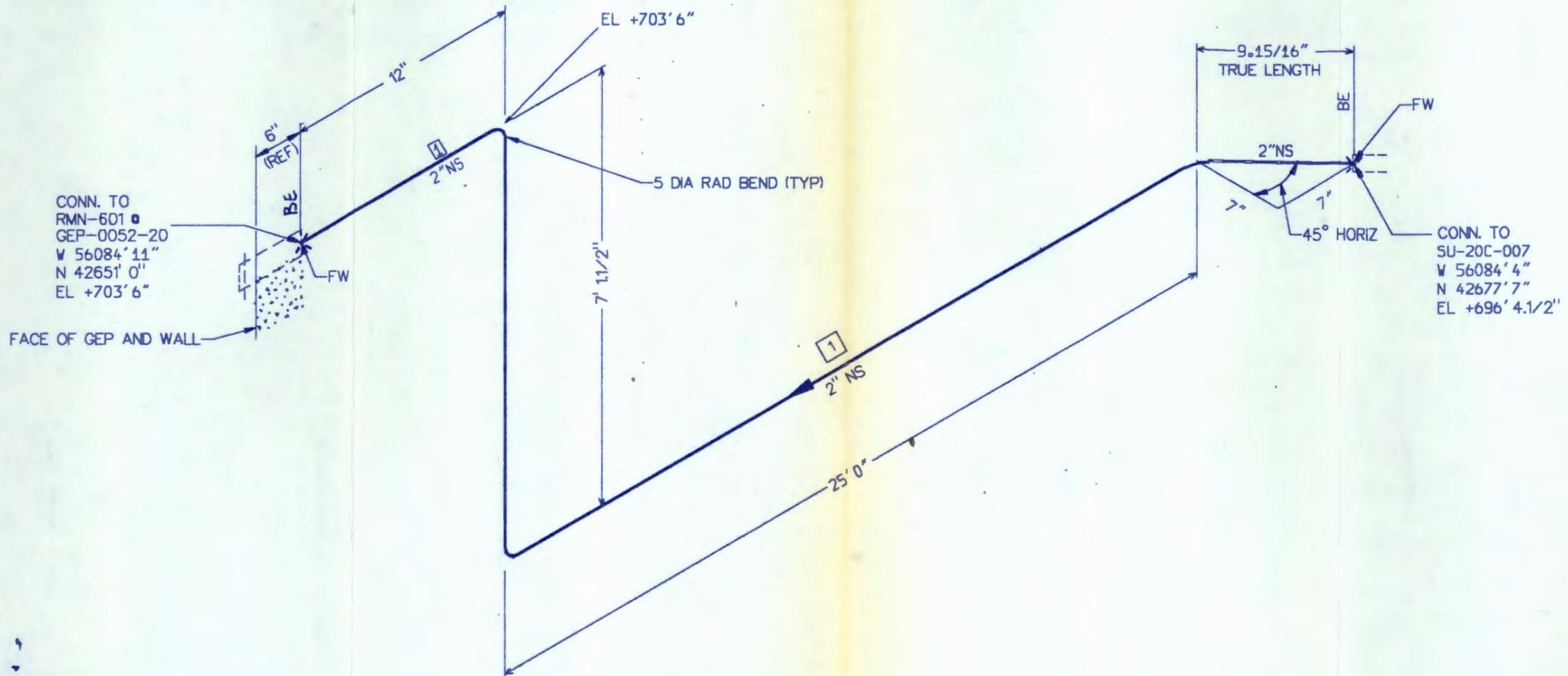


FEB 23 1993

QUALITY LEVEL I  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
Regional Field Office			
66-AC06-4571-0036			
PROJECT TITLE			
HANFORD WASTE VITRIFICATION PLANT			
DATE	PROJECT NO.	PLANT CONTRACT NO.	TYPE NO.
7/93	6-585	0437	SP10A
ISSUES		ISSUE NO.	ISSUE NO.
NONE		1	
DATE	ISSUE NO.	ISSUE NO.	ISSUE NO.
01/01	1-126176	1	1

**BILL OF MATERIAL FOR REFERENCE ONLY**



FEB 26 1993

QUALITY LEVEL II  
SAFETY CLASS 3

MODEL: PIPE/PAES4T

DENOTES PART NO.,  
SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APPV'D	MAT'L	STRESS	INSULATION	IH	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-B6RLI083B									
								TOTAL ISO					X	B-595-C-B210A SECTION 15060	B126176X	CADCODE 2B: APL:DDM3:7.0.78:SS	PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT									
								PARTIAL ISO						HEAT TRACING REQUIREMENTS			YES	NO	CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE				
														DESIGN	150	150	PRO	DRAWN BY: M. SCHJOLBERG								
														OPERATING	0	AMBIENT	VAPOR	LIQUID	X	DATE 01/09/93	PROJECT B-595	FLUOR CONTRACT NO. B457	CWBS NO. B210A			
														REFERENCE PLAN DWG H-2-124095-1	REFERENCE P&ID H-2-123060-14/15		CLASSIFICATION NONE BY NOT REQUIRED									
														TRACER: QTY	SIZE					SCALE NONE	BUILDING NO. 1	INDEX NO.				
														ELECTRIC TRACE						LINE NUMBER AND CLASS PE-2"-20C-204-A-NONE	SHEET 01	OF 01	DRAWING NUMBER H-2-126176	SHEET 21	OF 01	REV. 0
0	AFC	MS	2-10-93											HEAT TRANSFER CEMENT REQUIRED												

-----  
FABRICATION MATERIALS

PT NO --	PIPE -----	COMPONENT DESCRIPTION -----	N.S. (INS) ---	ITEM CODE -----	QTY ---
1	PIPBAR PIPE	SCH 40S SMLS 304L SS A312	2	5364086	12.5'



FEB 26 1993

QUALITY LEVEL I  
 SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
Reactor Plant Office			
Division of Operations			
PROJECT			
Savannah Nuclear Waste Reprocessing Plant			
793	8-895	8-897	8219A
REMARKS	NONE		
DATE OF	ISSUED	BY	REV.
01/10/93	02-12-93	JS	1

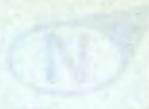
**BILL OF MATERIAL FOR REFERENCE ONLY**



FORM NO. 20-10-58 1993 CATMA VP111M F.XXR11007 SPI

FABRICATION MATERIALS I

PT NO	PIPE	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
1	PIPBAR	PIPE SCH 40S SMLS 304L SS A312	2	5364086	13.5'



FEB 24 1993

QUALITY LEVEL 1  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
NICKERSON FUEL OXIDE			
DE-ACCS BERLIORE			
HARFORD WASTE VITRIFICATION PLANT			
PROJECT	8-895	PLANT NO.	8487
UNIT	NONE	WELD NO.	1
DATE	2-12-93	REV	1

BILL OF MATERIAL FOR REFERENCE ONLY



Feb 02 16:31:09 1993 CALMA VELLUM E:XXB3MF8T.SPL

-----  
FABRICATION MATERIALS

PT NO --	PIPE -----	COMPONENT DESCRIPTION -----	N.S. (INS) ---	ITEM CODE -----	QTY ---
1	PIPBAR PIPE	SCH 40S SMLS 304L SS A312	2	5364086	27.2'

FEB 26 1993

QUALITY LEVEL 1  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY	Richard Fleck, Chief
Division	DE-AC06-88PL0001
PROJECT NO.	
CONTRACT NO.	
DATE	
BY	
REVISION	

BILL OF MATERIAL FOR REFERENCE ONLY



Feb 02 18-58:18 1993 CALIMA VILLUM F:XXR31D06.SPL

-----  
FABRICATION MATERIALS

PT NO --	PIPE -----	COMPONENT DESCRIPTION -----	N.S. (INS) ---	ITEM CODE -----	QTY ---
1	PIPBAR	PIPE SCH 40S SMLS 304L SS A312	2	5364086	15.0'

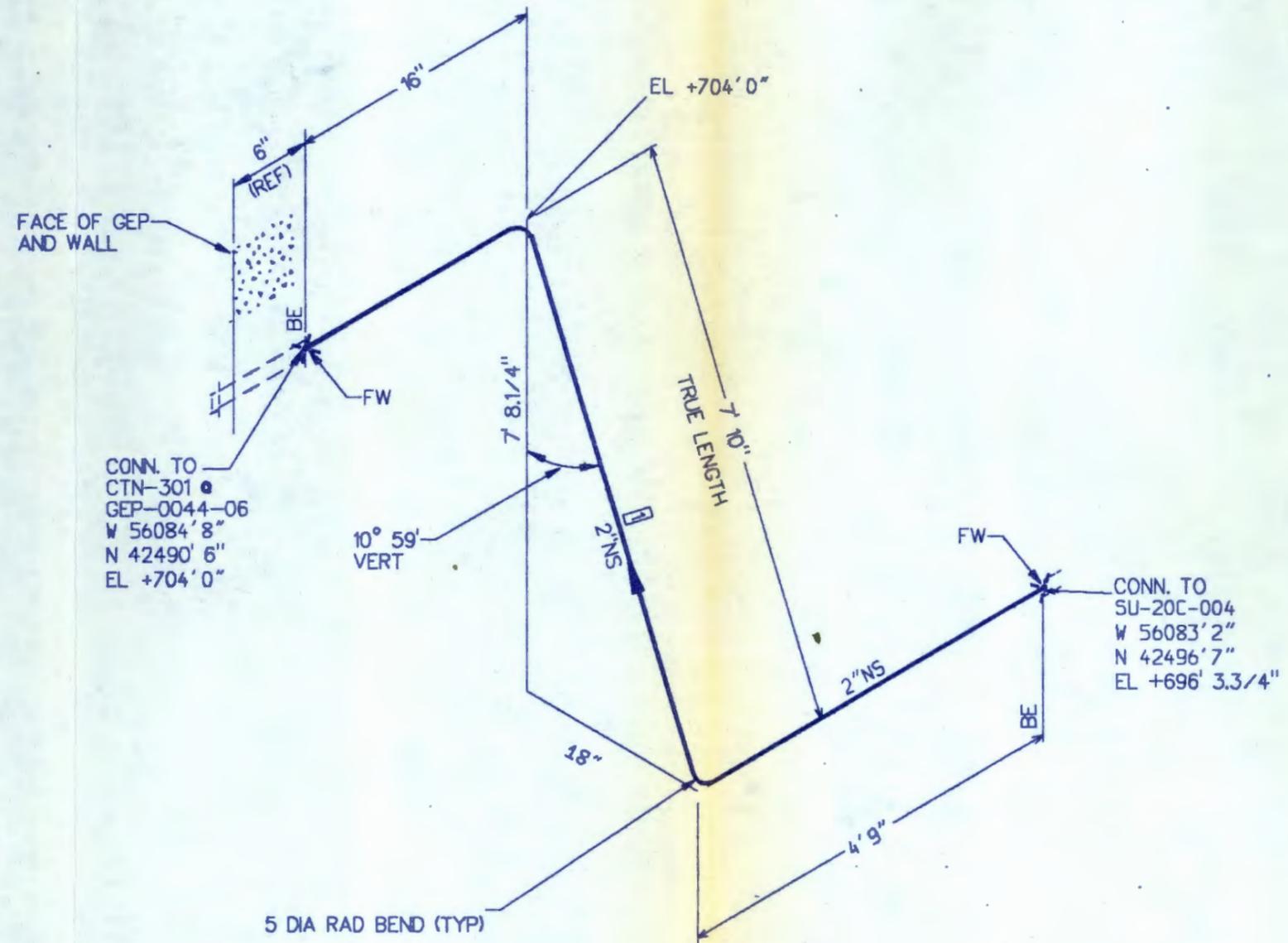


APR 16 1993

QUALITY LEVEL 1  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
Richard Field Office			
DE-ACCS-ENR/10930			
PROJECT: HANFORD WASTE FABRICATION PLANT			
OFFICE:	PROJECT:	LINE NUMBER:	LINE NO.
10930	W-365	5457	0310A
ISSUE:	DATE:	ISSUE:	ISSUE:
02/02	NONE	02/02	02/02
ISSUE:	DATE:	ISSUE:	ISSUE:
01/02	01/02	01/02	01/02

**BILL OF MATERIAL FOR REFERENCE ONLY**



FEB 26 1993

QUALITY LEVEL II  
SAFETY CLASS 3

MODEL: PIPE/PAES3T

DENOTES PART NO.,  
SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APPVD	MATL	STRESS	INSULATION	IH	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-86RL10838							
								TOTAL ISO					X	B-595-C-B210A SECTION 15060			PROJECT TITLE <b>HANFORD WASTE VITRIFICATION PLANT</b>							
								PARTIAL ISO																
								HEAT TRACING REQUIREMENTS				YES	NO	CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE	CADFILE	CADCODE	PROJECT TITLE				
								TRACING MEDIUM						DESIGN	150	150	PRO	B126179R	2B: APL: DDM3: 7.0. 78: SS	PROJECT TITLE				
								TRACER: QTY						OPERATING	0	AMBIENT	VAPOR	LIQUID	X	DRAWN BY:	DATE	PROJECT	FLUOR CONTRACT NO.	CWBS NO.
								ELECTRIC TRACE						REFERENCE PLAN DWG	REFERENCE P&ID		CLASSIFICATION		BY		NOT REQUIRED	SCALE	BUILDING NO.	INDEX NO.
								HEAT TRANSFER CEMENT REQUIRED						H-2-124094-1	H-2-123060-15/B		NONE		NOT REQUIRED		NONE	1		
0	AFC	PA	2-10-93	500	JW									H-2-124098-1	E3/A6		LINE NUMBER AND CLASS		SHEET	OF	DRAWING NUMBER	SHEET	OF	REV.
																			01	01	H-2-126179	15		0

-----  
FABRICATION MATERIALS

PT NO --	PIPE -----	COMPONENT DESCRIPTION -----	N.S. (INS) ---	ITEM CODE -----	QTY ---
1	PIPBAR	PIPE SCH 40S SMLS 304L SS A312	2	5364086	32.0'

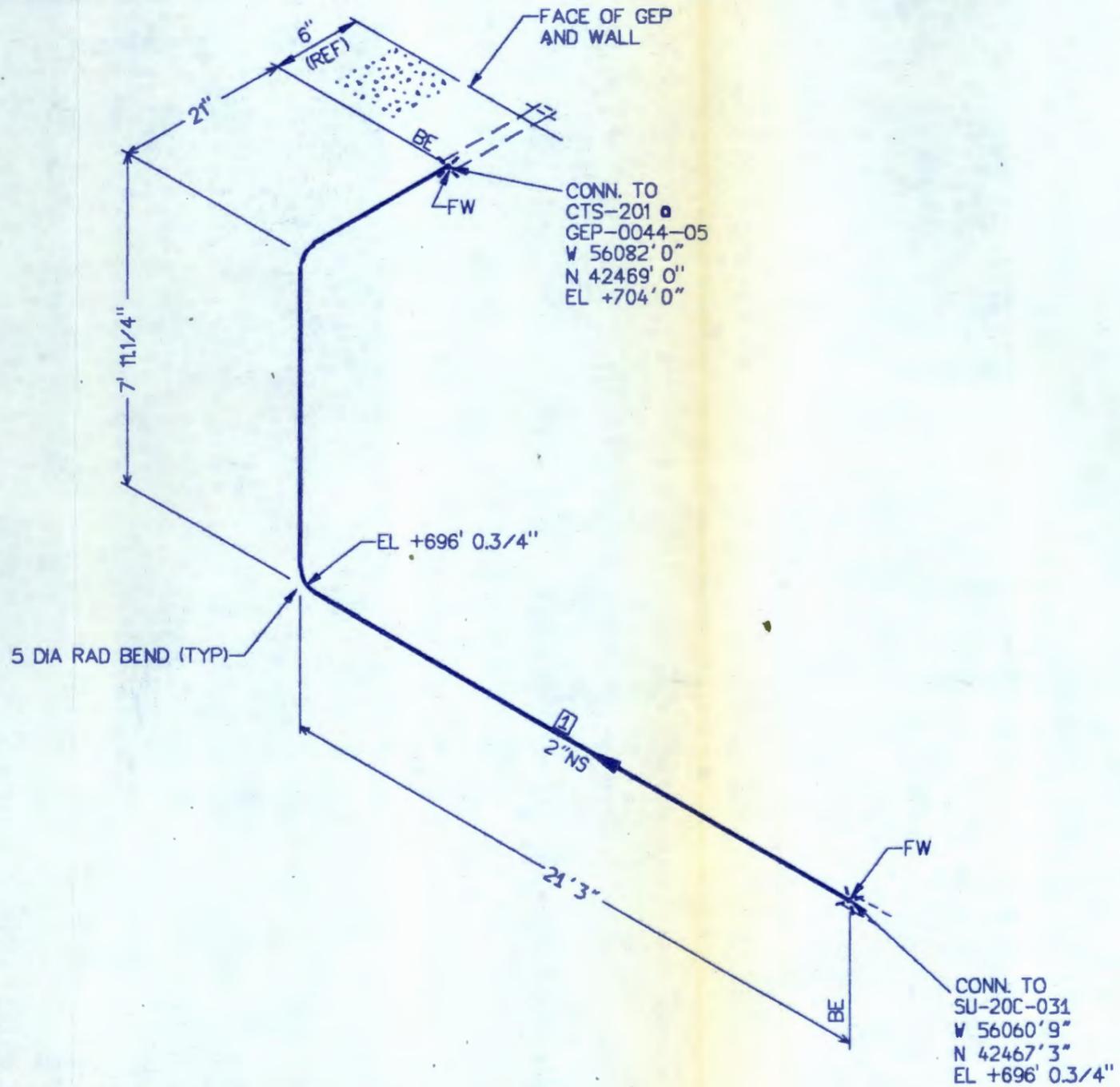


Feb 02 21:19:31 1993 CALIMA VELLUM E:XXB3JD08.SPL

QUALITY LEVEL I  
 SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
Nuclear Energy Research and Development Administration			
SANDIA NATIONAL LABORATORIES			
SANDIA NATIONAL LABORATORY WASTE MINIFICATION PLANT			
PROJECT	8-895	W-2-185179	8210A
DESCRIPTION	NONE		

**BILL OF MATERIAL FOR REFERENCE ONLY**



FEB 26 1993

QUALITY LEVEL II  
SAFETY CLASS 3

MODEL: PIPE/PAES3T

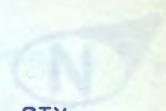
DENOTES PART NO.,  
SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APP'VD	MAT'L	STRESS	INSULATION	IH	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-B6RL10838			
								TOTAL ISO					X	B-595-C-B210A SECTION 15060	PROJECT TITLE		HANFORD WASTE VITRIFICATION PLANT			
								PARTIAL ISO							CADFILE	CADCODE	PROJECT			
								HEAT TRACING REQUIREMENTS	YES	NO	CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE	B126179S	2B: APL:DDM3:7.0.78:SS	FLUOR CONTRACT NO.			
								TRACING MEDIUM			DESIGN	150	150	PRO	DRAWN BY:		DATE			
								TRACER: QTY	SIZE		OPERATING	0	AMBIENT	VAPOR	LIVID	M. SCHJOLBERG	01/11/93			
								ELECTRIC TRACE			REFERENCE PLAN DWG	REFERENCE P&ID		CLASSIFICATION		BY NOT REQUIRED		SCALE		
								HEAT TRANSFER CEMENT REQUIRED			H-2-124098-1	H-2-123060-15/8		NONE		NOT REQUIRED		NONE		
0	AFC	MS	2-10-93	SAW	YUV						H-2-124094-1	SECTION		LINE NUMBER AND CLASS		SHEET	OF	DRAWING NUMBER		
											B3/A6	PE-2"-20C-194-A-NONE		01	01	H-2-126179		16	OF	
																				REV.
																				0

Feb 02 11:16:53 1993 CALMA VELLUM E:XXB3MF0S.SPL

FABRICATION MATERIALS I

PT NO	PIPE	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
1	PIPBAR PIPE	SCH 40S SMLS 304L SS A312	2	5364086	17.0'



FEB 25 1993

QUALITY LEVEL II  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
REGIONAL FIELD OFFICE			
DE WASH DC			
PROJECT NAME			
WASTE VERIFICATION PLANT			
PROJECT NO	8-583	DATE	0457
LIBRARY	NONE	DATE	

BILL OF MATERIAL FOR REFERENCE ONLY



Je Feb 09 10:49:04 1993 CALMA VEDDUM E:ZZB35W07.SPL

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FABRICATION MATERIALS



PT NO	COMPONENT DESCRIPTION	NaS. (INS)	ITEM CODE	QTY
<u>CARRIER PIPE</u>				
1	PIPBAR PIPE SCH 40S SMLS 304L SS A312	3	5364086	82.9'
<u>CARRIER FITTINGS</u>				
2	CAPBW CAP SCH 40S 304L SS A403 WP304L	3	5438932	1
3	ELLBW ELL 90 DEG LR SCH40S 304L SS A403 WP304L	3	5438922	2
4	45LBW ELL 45 DEG SCH 40S 304L SS A403 WP304L	3	5438928	1
5	PIPE GUIDE 5EG1 PER DWG H-2-124091 SH 1	3-6	5EG1	4
6	PIPE ANCHOR 5EA1 PER DWG H-2-124091 SH 1	3-6	5EA1	2
<u>CONTAINMENT PIPE</u>				
7	PIPBAR PIPE SCH 40S SMLS 304L SS A312	6	5364086	82.9'
<u>CONTAINMENT FITTINGS</u>				
8	CAPBW CAP SCH 40S 304L SS A403 WP304L	6	5438932	1
9	ELLBW ELL 90 DEG SR SCH40S 304L SS A403 WP304L	6	5439823	2
10	45LBW ELL 45 DEG SCH 40S 304L SS A403 WP304L	6	5438928	1

QUALITY LEVEL 1  
 SAFETY CLASS 2

U.S. DEPARTMENT OF ENERGY  
 Richard King Coffey  
 DE-ACCB-66PLU000

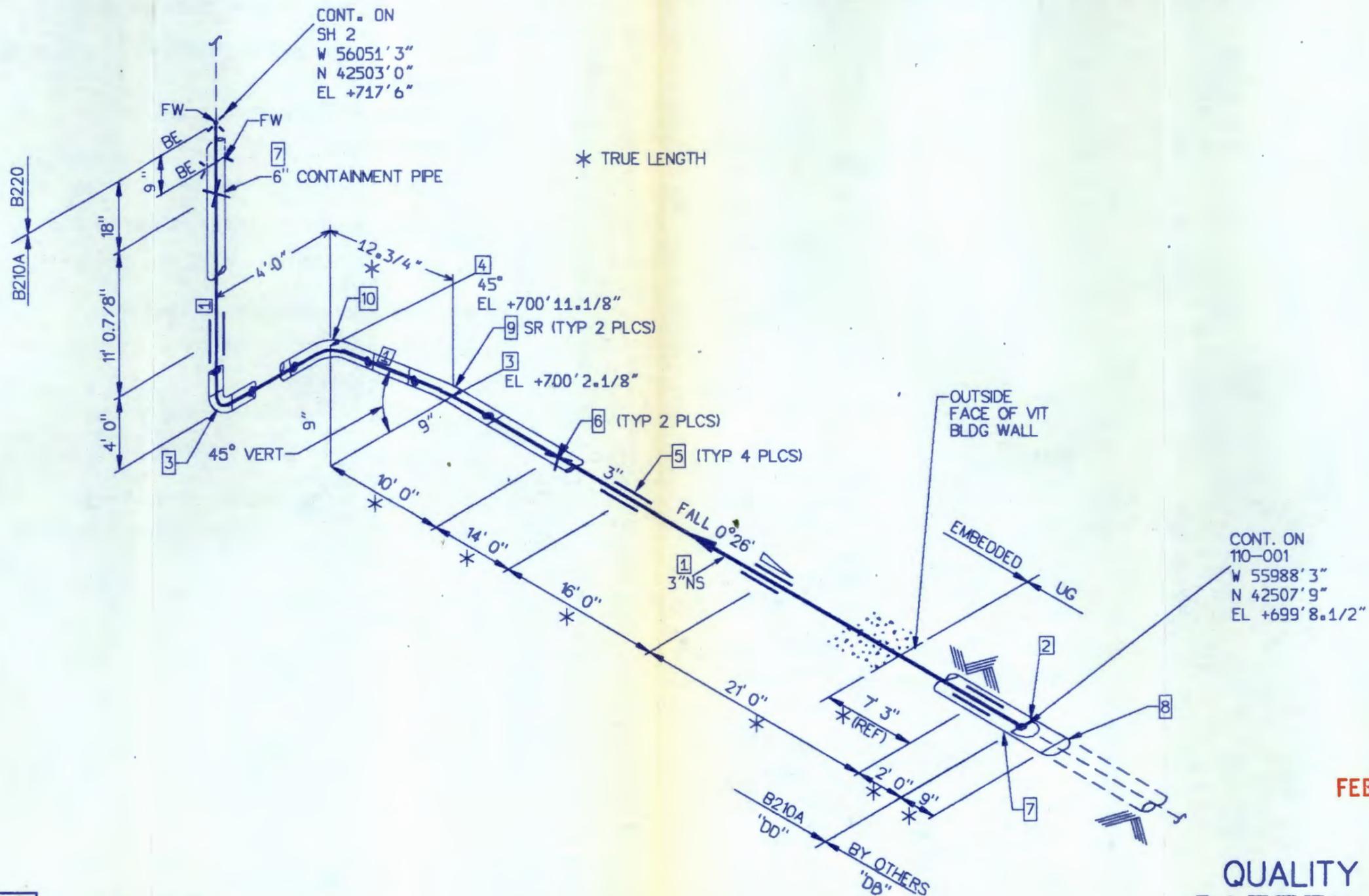
PROJECT NO. HANFORD WASTE VITRIFICATION PLANT

DATE: 8-889 6457 8218A

REVISION: NONE

DATE: 8-889 H-2-125136

**BILL OF MATERIAL FOR REFERENCE ONLY**



FEB 26 1993

QUALITY LEVEL I  
SAFETY CLASS 2

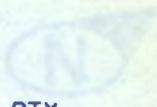
MODEL: PIPE/PAES3T  
 DENOTES PART NO.,  
 SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APP'VD	MAT'L	STRESS	INSULATION	H	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-B6RLI083B													
								TOTAL ISO	X					B-595-C-B210A SECTION 15060	CADFILE B126185C		PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT													
								PARTIAL ISO						HEAT TRACING REQUIREMENTS	YES	NO	CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE	CADCODE 2B:APL:DDM3:7.0.76:SS	DATE 11/24/92	PROJECT B-595	FLUOR CONTRACT NO. 8457	CWBS NO. B210A					
								TRACING MEDIUM						OPERATING			DESIGN	275	340	PRO	DRAWN BY: P. ABRAHAM	CLASSIFICATION NONE	BY NOT REQUIRED	SCALE NONE	BUILDING NO. 1	INDEX NO.				
								TRACER: QTY						REFERENCE PLAN DWG H-2-124094-1			OPERATING	175	190	VAPOR	LIQUID	X	SECTION H-2-126185	SHEET 01	OF	DRAWING NUMBER H-2-126185	SHEET 3	OF	REV. 0	
								ELECTRIC TRACE						REFERENCE P&ID H-2-123040-3			OPERATING						LINE NUMBER AND CLASS PE-3"-110-002-DD-IH			DISTRIBUTION CODE: 504				
								AT TRANSFER CEMENT REQUIRED						H-2-124101-1			OPERATING													

Feb 09 10:52:02 1993 CALMA VELDOR E:ZZB35W08.SPL

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FABRICATION MATERIALS

PT NO	PIPE	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
1	PIPBAR	PIPE SCH 40S SMLS 304L SS A312	2	5364086	26.2'



26.2' 105

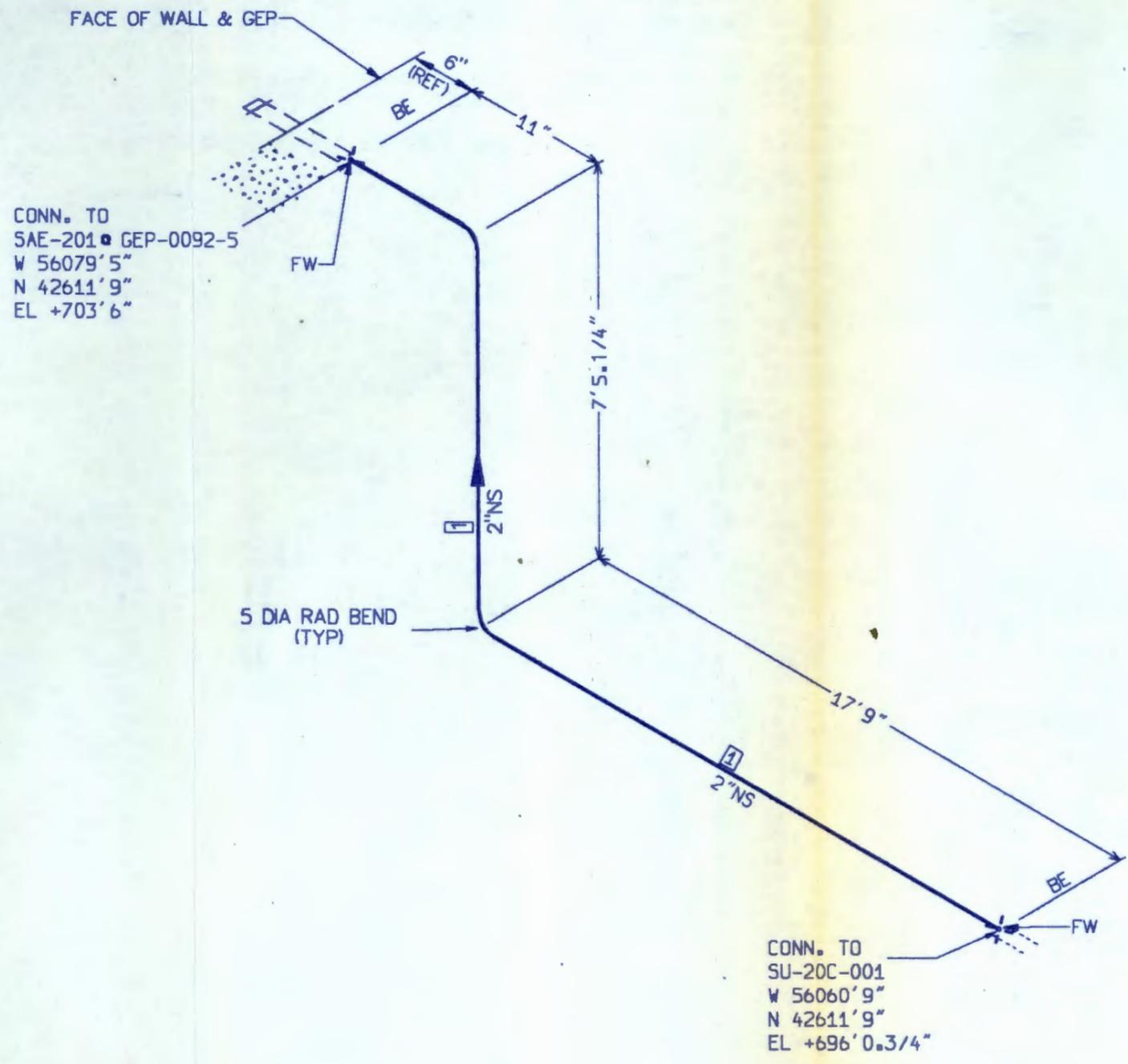
QUALITY LEVEL II  
SAFETY CLASS 3

STATE DEPARTMENT OF ENGINEERING  
Regional Field Office  
OS-AD06 - APR 1988 JF

REGIONAL OFFICE BASE FABRICATION PLANT

PROJECT NO.	16487	ISSUE NO.	02100
DATE		ISSUE DATE	

**BILL OF MATERIAL FOR REFERENCE ONLY**



FEB 26 1993

QUALITY LEVEL II  
SAFETY CLASS 3

MODEL: PIPE/PAES4T  DENOTES PART NO., SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APPVD	MAT'L	STRESS	INSULATION	H	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-B6RLIOB3B						
								TOTAL ISO					X	B-595-C-B210A SECTION 15060	CADFILE B126185Y		PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT						
								PARTIAL ISO						CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE	CADCODE	28: APL: DDM3:7.0.78: SS				
								HEAT TRACING REQUIREMENTS	YES	NO				DESIGN	150	150	PRO	DRAWN BY:	DATE				
								TRACING MEDIUM			X			OPERATING	0	AMBIENT	VAPOR	LIQUID	X	M. FUJIWARA	01/22/93		
								TRACER: QTY	SIZE		X			REFERENCE PLAN DWG	REFERENCE P&ID		CLASSIFICATION		BY NOT REQUIRED				
								ELECTRIC TRACE			X			H-2-124094-1	H-2-123360-15/8		NONE		NOT REQUIRED				
0	AFC	MKF	2-10-93	STW	JW			HEAT TRANSFER CEMENT REQUIRED			X			H-2-124097-1	SECTION F3/A0		LINE NUMBER AND CLASS PE-2"-20C-202-A-NONE		SHEET	OF	REV.		
																				01	01	22	0

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FABRICATION MATERIALS

PT NO ---	PIPE -----	COMPONENT DESCRIPTION -----	N.S. (INS) ---	ITEM CODE -----	QTY ---
1	PIPBAR PIPE	SCH 40S SMLS 304L SS A312	2	5364086	32.2'



11/18/82

QUALITY LEVEL 1  
 SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
Planning Field Office OE-7006-BW/10833			
DIVISION	PROJECT		
W-375-02	MANFORD WASTE VITRIFICATION PLANT		
P-125	PROJECT B-585	U.S. CONTRACT NO. 8407	THIS IS 3210A
ISSUED	SCALE NONE	REVISION NO. 1	WORK NO.
DATE	DESIGNER	CHECKED	BY

**BILL OF MATERIAL FOR REFERENCE ONLY**



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FABRICATION MATERIALS



PT NO	COMPONENT DESCRIPTION	No. S. (INS)	ITEM CODE	QTY
<u>CARRIER PIPE</u>				
1	PIPBAR PIPE SCH 40S SMLS 304L SS A312	3	5364086	84.7'
<u>CARRIER FITTINGS</u>				
2	CAPBW CAP SCH 40S 304L SS A403 WP304L	3	5438932	1
3	ELLBW ELL 90 DEG LR SCH40S 304L SS A403 WP304L	3	5438922	2
4	45LBW ELL 45 DEG SCH 40S 304L SS A403 WP304L	3	5438928	1
5	PIPE ANCHOR 5EA1 PER DWG H-2-124091 SH 1	3-6	5EA1	2
6	PIPE GUIDE 5EG1 PER DWG H-2-124091 SH 1	3-6	5EG1	4
<u>CONTAINMENT PIPE</u>				
7	PIPBAR PIPE SCH 40S SMLS 304L SS A312	6	5364086	84.7'
<u>CONTAINMENT FITTINGS</u>				
8	CAPBW CAP SCH 40S 304L SS A403 WP304L	6	5438932	1
9	ELLBW ELL 90 DEG SR SCH 40S 304L SS A403 WP304L	6	5438923	2
10	ELL 45 DEG SCH 40S 304L SS A403 WP304L	6	5438928	1

FEB 73 ON

QUALITY LEVEL I  
 SAFETY CLASS 2

U.S. DEPARTMENT OF ENERGY			
Nuclear Plant Division			
OF ALIEN SOURCES			
PROJECT NO.	WINDYBROOK WASTE VERIFICATION PLANT		
DATE	8-298	8437	02704
REGISTERED	NONE		
DATE OF	11-2-126106		

**BILL OF MATERIAL FOR REFERENCE ONLY**

Feb 09 11:34:34 1993 CALMA VELDUM E:ZZB35W09.SPL



10 Feb 09 12:31:31 1993 CALIMA VELLUM E:Z7B3SW10.SPL

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FABRICATION MATERIALS

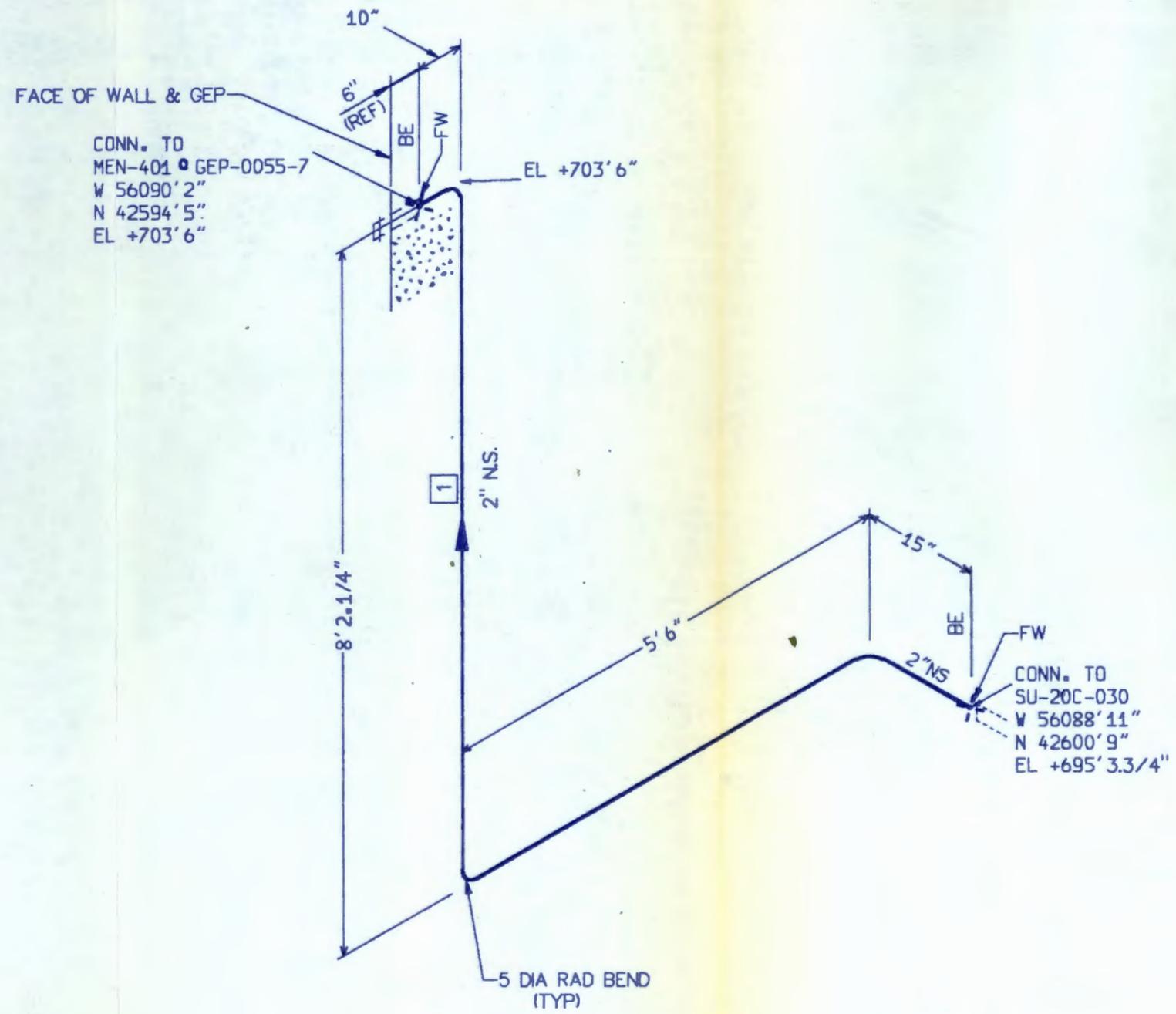
PT NO	PIPE	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
1		PIPBAR PIPE SCH 40S SMLS 304L SS A312	2	5364086	16.0'



QUALITY LEVEL 1  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
Richland Field Office			
US-ACC-86PL10235			
PROJECT TITLE	WASTED WASTE VITRIFICATION PLANT		
PROJECT NO.	8-895	8457	82185
ESTIMATE NO.	NONE	1	

**BILL OF MATERIAL FOR REFERENCE ONLY**



FEB 26 1993

QUALITY LEVEL II  
SAFETY CLASS 3

MODEL: PIPE/PAES4T  DENOTES PART NO., SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APP'VD	MAT'L	STRESS	INSULATION	H	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-B6RLIOB3B						
								TOTAL ISO					X	B-595-C-B210A SECTION 15060	CADFILE B126186W		CADCODE 2B: APL:DDM3:7.0.78:SS		PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT				
								PARTIAL ISO							CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE	PROJECT B-595	FLUOR CONTRACT NO. 8457	CWBS NO. B210A		
								HEAT TRACING REQUIREMENTS					YES	NO	DESIGN	150	150	PRO	SCALE NONE	BUILDING NO. 1	INDEX NO.		
								TRACING MEDIUM					X	OPERATING	0	AMBIENT	VAPOR	LIQUID	CLASSIFICATION NONE	BY NOT REQUIRED	DRAWING NUMBER H-2-126186	SHEET OF 20 OF 01	REV. 0
								TRACER: QTY					X	REFERENCE PLAN DWG H-2-124094-1	REFERENCE P&ID H-2-123060-15/8	DRAWN BY: M. FUJIWARA		DATE 01/22/93					
								SIZE					X	SECTION C3/A6	LINE NUMBER AND CLASS PE-2"-20C-201-A-NONE		SHEET OF 01 OF 01						
								ELECTRIC TRACE					X										
								HEAT TRANSFER CEMENT REQUIRED					X										
0	AFC	MKF	2-10-93	smw	smw																		

Job No. 13-51-46-1001 2002 CIVIL VEITIM E-77R23W13 GDI

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 I FABRICATION MATERIALS I  
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PT NO	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
<u>CARRIER PIPE</u>				
1	PIPBAR PIPE SCH 40S SMLS 304L SS A312	3	5364086	84.6'
<u>CARRIER FITTINGS</u>				
2	CAPBW CAP SCH 40S 304L SS A403 WP304L	3	5438932	1
3	ELLBW ELL 90 DEG LR SCH40S 304L SS A403 WP304L	3	5438922	2
4	45LBW ELL 45 DEG SCH 40S 304L SS A403 WP304L	3	5438928	1
5	PIPE ANCHOR 5EA1 PER DWG H-2-124091 SH 1	3-6	5EA1	2
6	PIPE GUIDE 5EG1 PER DWG H-2-124091 SH 1	3-6	5EG1	4
<u>CONTAINMENT PIPE</u>				
7	PIPEBAR PIPE SCH 40S SMLS 304L SS A312	6	5364086	84.6'
<u>CONTAINMENT FITTINGS</u>				
8	ELLBW ELL 90 DEG SR SCH40S 304L SS A403 WP304L	6	5438923	2
9	45LBW ELL 45 DEG SCH 40S 304L SS A403 WP304L	6	5438928	1
10	CAPBW CAP SCH 40S 304L SS A403 WP304L	6	5438932	1

FEB 26 1986

QUALITY LEVEL I  
 SAFETY CLASS 2

U.S. DEPARTMENT OF ENERGY			
Nuclear Fuel Cycle			
SPECIAL PURPOSE			
PROJECT			
HANFORD WASTE VENTILATION PLANT			
PROJECT	PROJECT NO.	DATE	REV.
W-200	0457	02/18	001
CLASS	SCALE		
NONE			
DRAWN BY			
RCS-126187			

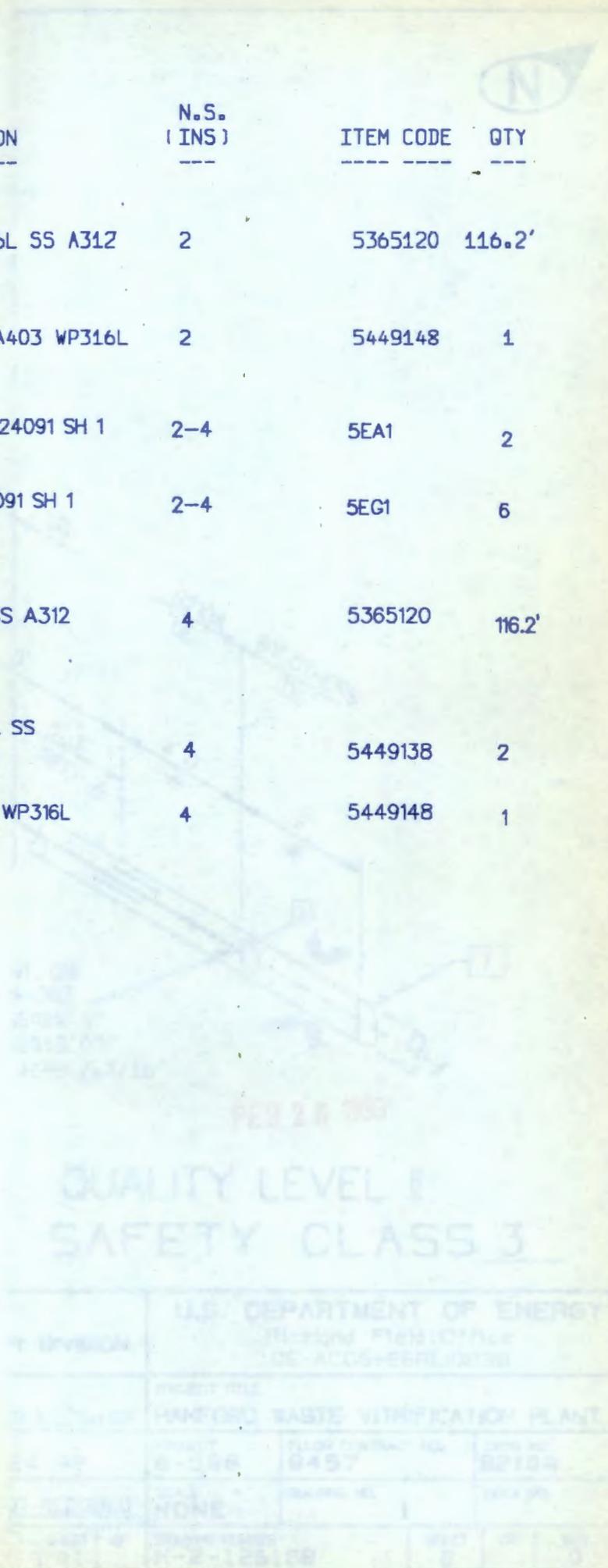
BILL OF MATERIAL FOR REFERENCE ONLY



ne Feb 09 16:22:31 1993 CALIMA VELLUM E:ZZB3SW14.SPL

I FABRICATION MATERIALS I

PT NO	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
<u>CARRIER PIPE</u>				
1	PIPBAR PIPE SCH 40S SMLS 316L SS A312	2	5365120	116.2'
<u>CARRIER FITTINGS</u>				
2	CAPBW CAP SCH 40S 316L SS A403 WP316L	2	5449148	1
3	PIPE ANCHOR 5EA1 PER DWG H-2-124091 SH 1	2-4	5EA1	2
4	PIPE GUIDE 5EG1 PER DWG H-2-124091 SH 1	2-4	5EG1	6
<u>CONTAINMENT PIPE</u>				
5	PIPBAR PIPE SCH 40S SMLS 316L SS A312	4	5365120	116.2'
<u>CONTAINMENT FITTINGS</u>				
6	ELLBW ELL 90 DEG LR SCH 40S 316L SS A403 WP316L	4	5449138	2
7	CAPBW CAP SCH 40S 316L SS A403 WP316L	4	5449148	1



QUALITY LEVEL 1  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
Hanford Field Office			
DE-ACCS-EEPL/XT38			
PROJECT TITLE			
HANFORD WASTE VITRIFICATION PLANT			
PROJECT NO.	FLOW CONTRACT NO.	JOB NO.	
6-388	8457	82184	
DESIGN NO.	DRAWING NO.	DATE	
NONE	1	1983-08	

BILL OF MATERIAL FOR REFERENCE ONLY



Feb 02 13:04:51 1993 CAIMA VEILUM E:XXB3MF8U.SPL

FABRICATION MATERIALS I

PT NO	PIPE	COMPONENT DESCRIPTION	N.S. (INS)	ITEM CODE	QTY
1		PIPBAR PIPE SCH 40S 5MLS 304L SS A312	2	5364086	27.5'

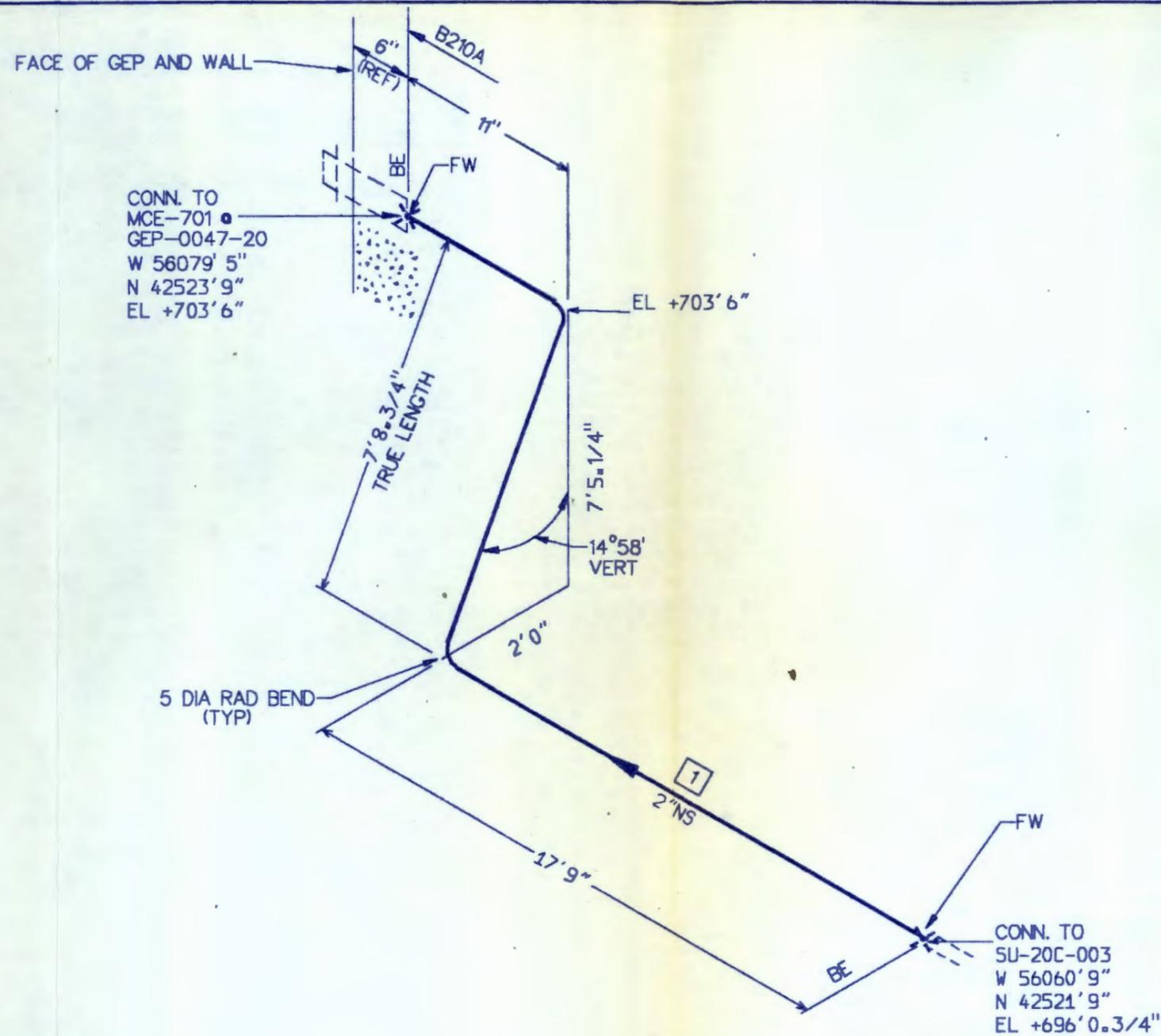


SEP 23 1993

QUALITY LEVEL 1  
SAFETY CLASS 3

U.S. DEPARTMENT OF ENERGY			
PROJECTS TEST OFFICE			
DE-ACOE-26RL-0000			
PROJECT TITLE			
SANDFORD WASTE VITRIFICATION PLANT			
PROJECT	PLANT CONTRACT NO.	WORKING	
12-78	B-595	8437	8210A
ORDERED	NONE	ISSUED NO.	ISSUE NO.
DATE ORDERED		DATE OF	DATE OF
11-2-1993			

BILL OF MATERIAL FOR REFERENCE ONLY



FEB 26 1993

QUALITY LEVEL II  
SAFETY CLASS 3

MODEL: PIPE/PAES3T

DENOTES PART NO.,  
SEE BILL OF MATERIAL

REV.	TYPE	BY	DATE	CHK'D	APP'VD	MAT'L	STRESS	INSULATION	IH	IS	IC	IA	NONE	FABRICATION SPECIFICATION	FLUOR DANIEL, INC. ADVANCED TECHNOLOGY DIVISION		U.S. DEPARTMENT OF ENERGY Richland Field Office DE-AC06-86RL1083B									
								TOTAL ISO					X	B-595-C-B210A SECTION 15060	CADFILE B126188U		PROJECT TITLE HANFORD WASTE VITRIFICATION PLANT									
								PARTIAL ISO						HEAT TRACING REQUIREMENTS	YES	NO	CONDITION	PRESS (PSIG)	TEMP (°F)	SERVICE	CADCODE 2B:APL:DDM3:7.0.78:SS	PROJECT B-595	FLOOR CONTRACT NO. B457	CWBS NO. B210A		
														DESIGN			150	150	PRO	OPERATING	0	AMBIENT	VAPOR	LIQUID	X	
														TRACER: QTY	SIZE						DRAWN BY: M. SCHJOLBERG	DATE 01/12/93	SCALE NONE	BUILDING NO. 1	INDEX NO.	
														REFERENCE PLAN DWG H-2-124094-1	REFERENCE P&ID H-2-123060-15/8	CLASSIFICATION NONE		BY NOT REQUIRED		LINE NUMBER AND CLASS PE-2"-20C-198-A-NONE	SHEET 01	OF 01	DRAWING NUMBER H-2-126188	SHEET 18	OF 01	REV. 0
0	AFC	MS	2-10-93	mm	JW			ELECTRIC TRACE					X	HEAT TRANSFER CEMENT REQUIRED			X	H-2-124097-1	SECTION F3/AG							

210A H-2-126188 0118  
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52

AFC  
77 78 79 80

DISTRIBUTION CODE: 504

PDS MKF  
02-02-93